

1982 DATSUN PICK-UP

**SERVICE
MANUAL**



**1982
DATSUN
PICK-UP**

SERVICE MANUAL



DATSUN PICK-UP

Model 720 Series

FOREWORD

This service manual has been prepared primarily for the purpose of assisting service personnel in providing effective service and maintenance of the 1982 DATSUN PICK-UP.

This manual includes procedures for maintenance, adjustments, removal and installation, disassembly and assembly of components, and trouble-shooting.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication. If your DATSUN model differs from the specifications contained in this manual, consult your NISSAN/DATSUN dealer for information.

The right is reserved to make changes in specifications and methods at any time without notice.

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HOW TO USE THIS MANUAL

- ▶ This Service Manual is designed as a guide for servicing vehicles.
- ▶ This manual deals with the engine, chassis, body and electrical system.
- ▶ A **QUICK REFERENCE INDEX** is provided on the first page. Refer to this index along with the index of the particular section you wish to consult.
- ▶ The first page of each section lists the contents and gives the page numbers for the respective topics.
- ▶ **SERVICE DATA AND SPECIFICATIONS** are contained in each section.
- ▶ **TROUBLE DIAGNOSES AND CORRECTIONS** are also included in each section. This feature of the manual lists the likely causes of trouble and recommends the appropriate corrective actions to be taken.
- ▶ A list of **SPECIAL SERVICE TOOLS** is included in each section. The special service tools are designed to assist you in performing repair safely, accurately and quickly. For information concerning how to obtain special service tools, write to the following address:

Kent-Moore Corporation
29784 Little Mack
Roseville, Michigan 48066

Kent-Moore of Canada, Ltd.
5466 Timberlea Blvd.,
Unit 2
Mississauga, Ontario
Canada L4W2T7

- ▶ The measurements given in this manual are primarily expressed with the SI unit (International System of Unit), and alternately expressed in the metric system and in the yard/pound system.
- ▶ The back cover of the manual provides maintenance data for quick reference.
- ▶ In the text, the following abbreviations are used:

S.D.S.: Service Data and Specifications
Ⓣ: Tightening Torque
L.H., R.H.: Left Hand, Right Hand

M/T, A/T: Manual Transmission, Automatic Transmission
2WD, 4WD: 2-wheel drive vehicle, 4-wheel drive vehicle
SST: Special Service Tools

- ▶ The captions **CAUTION** and **WARNING** warn you of steps that must be followed to prevent personal injury and/or damage to some part of the vehicle.



IMPORTANT SAFETY NOTICE

The proper performance of service is essential for both the safety of the mechanic and the efficient functioning of the vehicle.

The service methods in this Service Manual are described in such a manner that the service may be performed safely and accurately.

Special service tools have been designed to permit safe and proper performance of service. Be sure to use them.

Service varies with the procedures used, the skills of the mechanic and the tools and parts available. Accordingly, anyone using service procedures, tools or parts which are not specifically recommended by NISSAN must first completely satisfy himself that neither his safety nor the vehicle's safety will be jeopardized by the service method selected.

GENERAL INFORMATION

GI

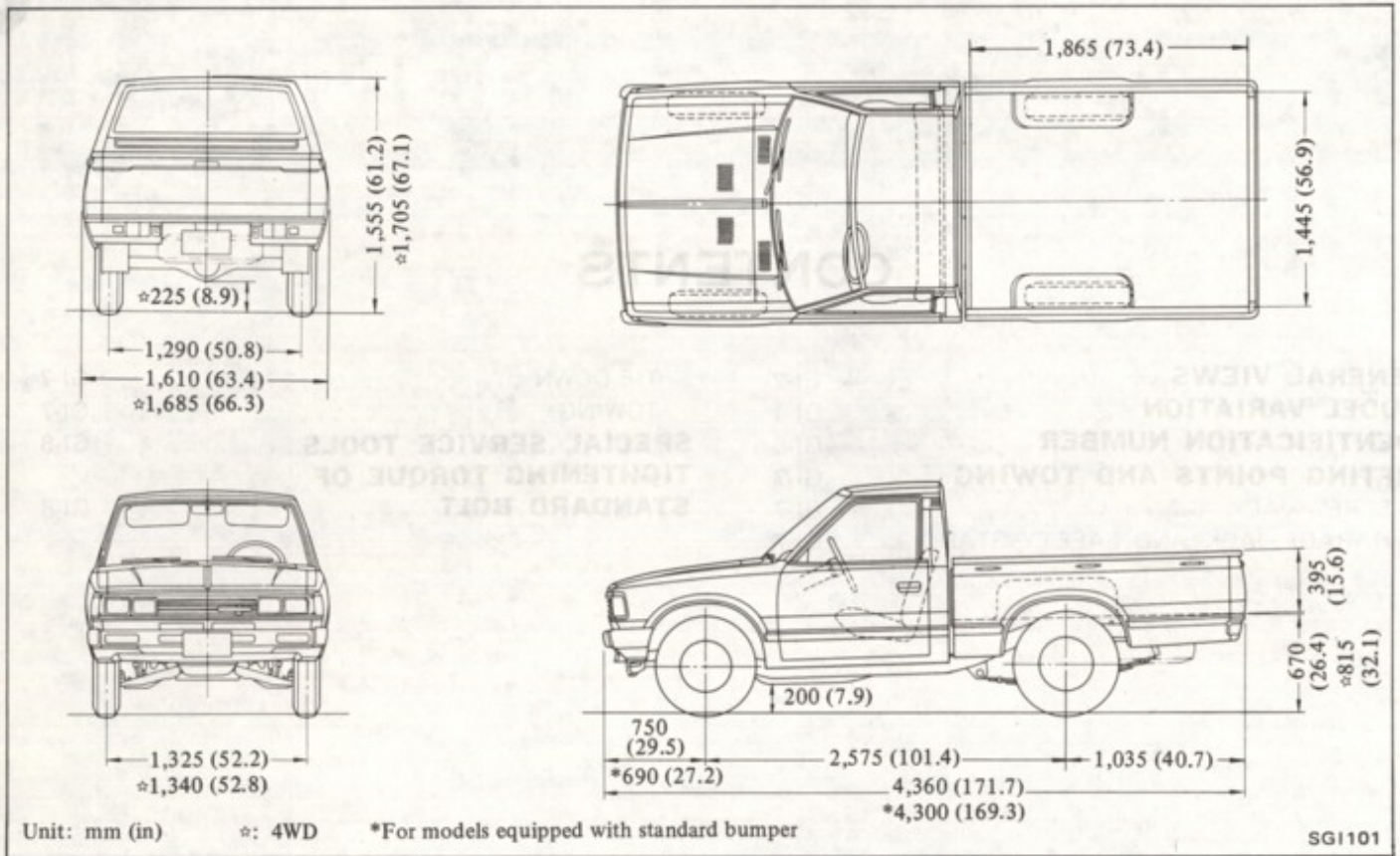
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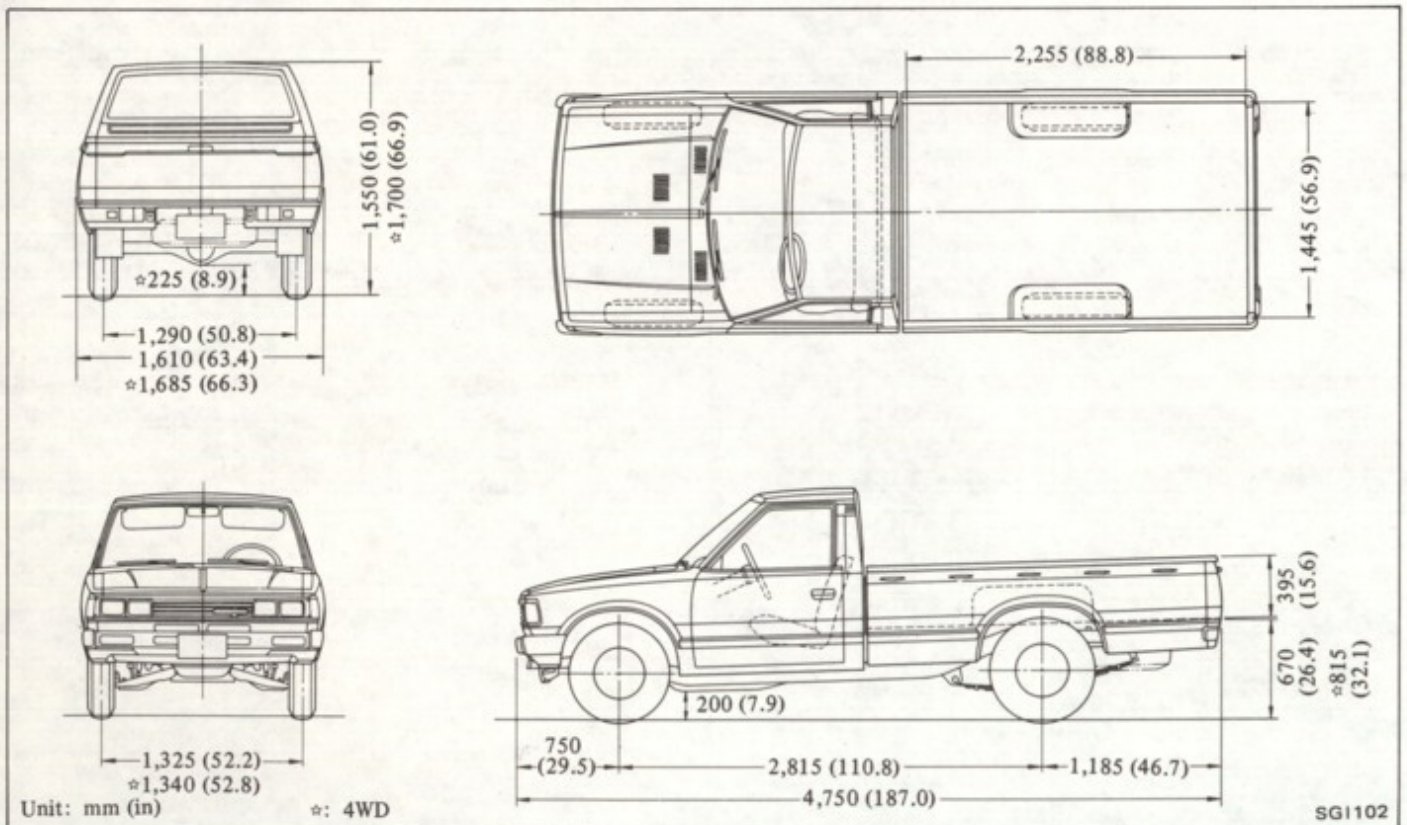
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GENERAL VIEWS

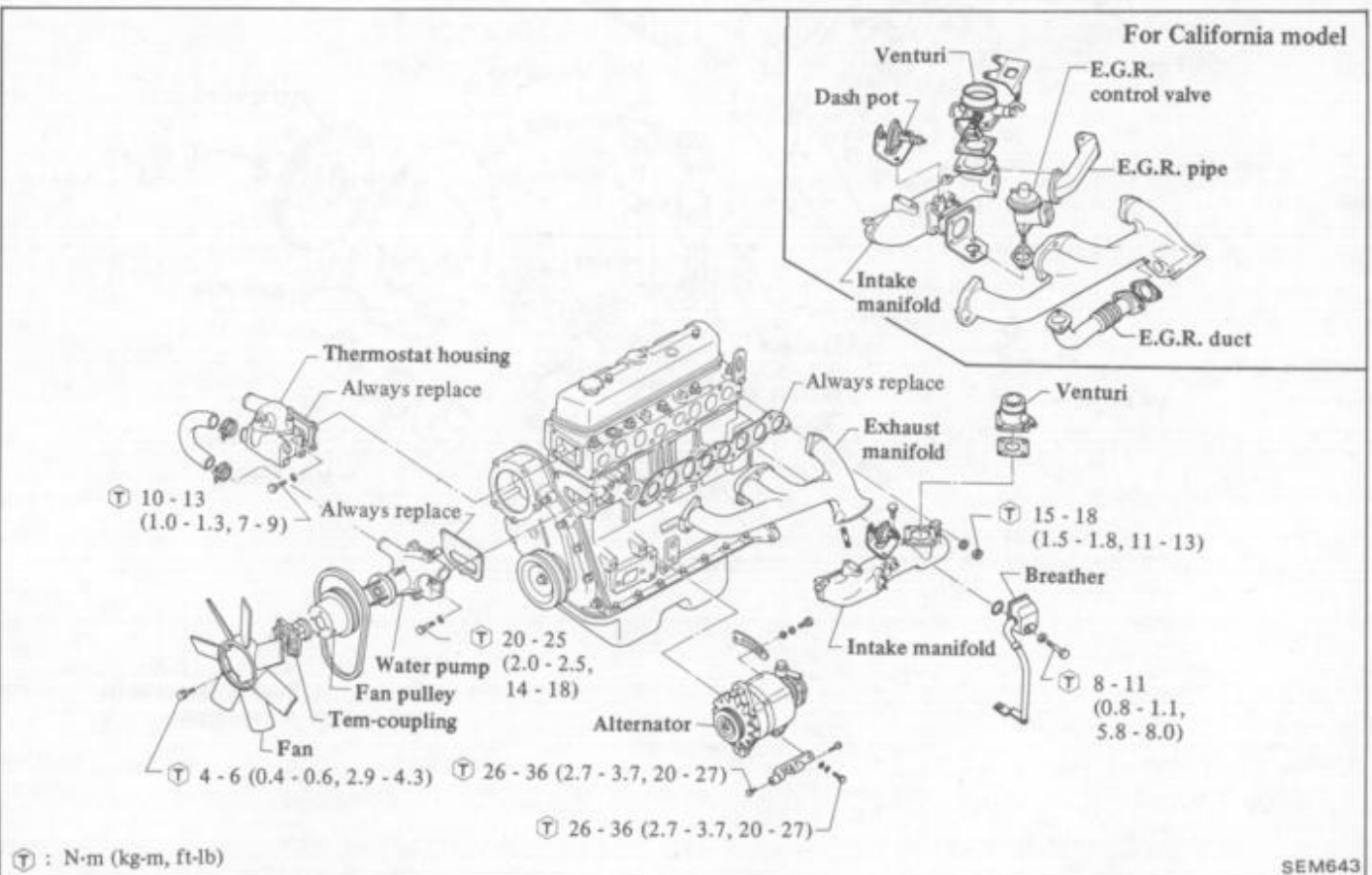
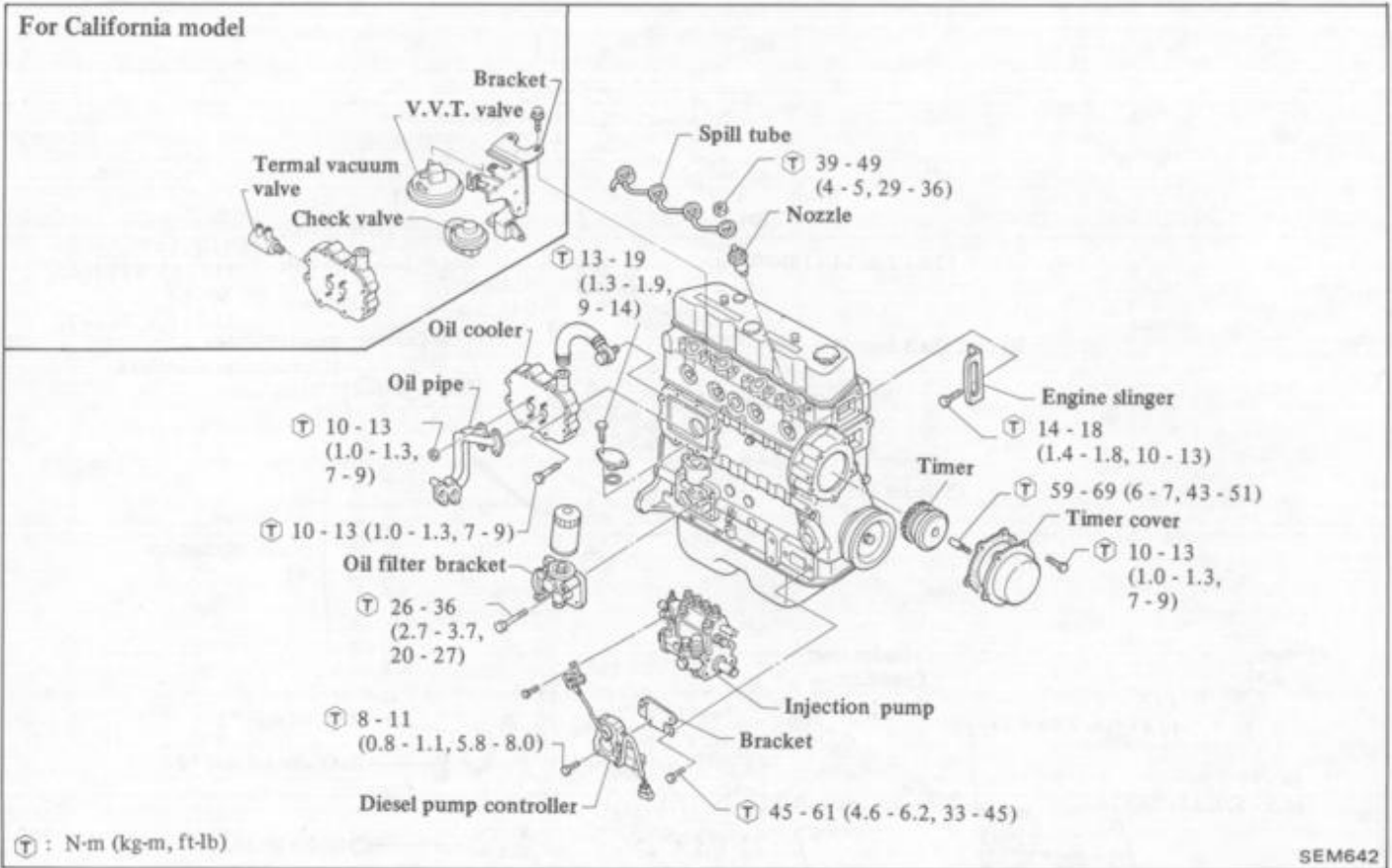
Regular Bed



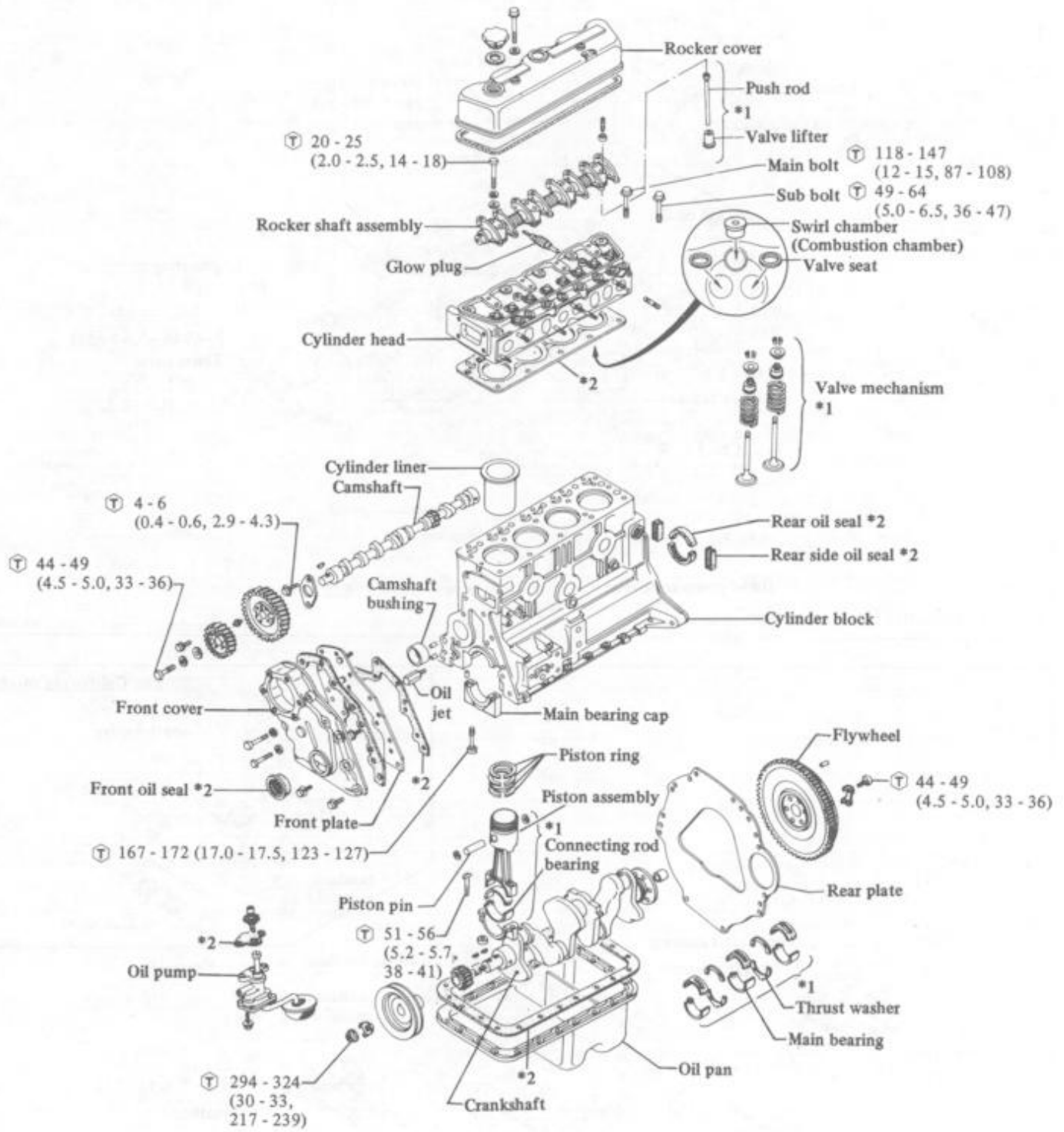
Long Bed and Heavy Duty



ENGINE COMPONENTS (Outer parts)

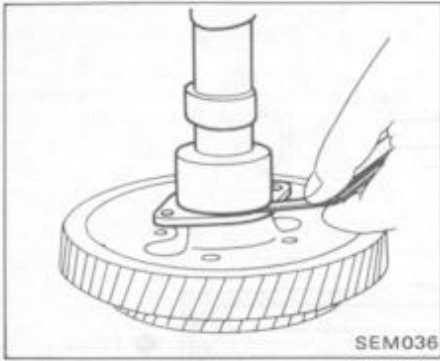


ENGINE COMPONENTS (Internal parts)



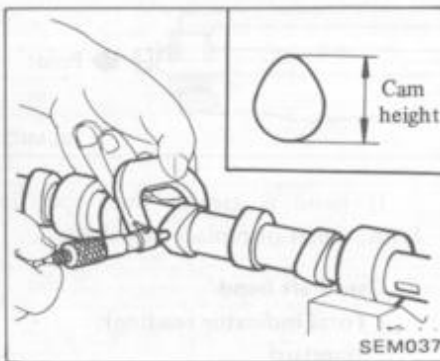
Ⓣ : N·m (kg·m, ft·lb)
 *1 Keep in correct order.
 *2 Always replace.

SEM396



4. Measure camshaft cam height. If beyond the specified limit, replace camshaft.

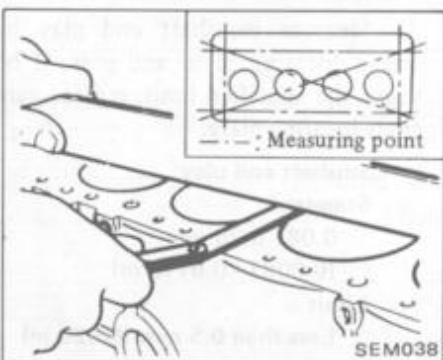
Cam height limit:
Less than 36.8 mm (1.449 in)



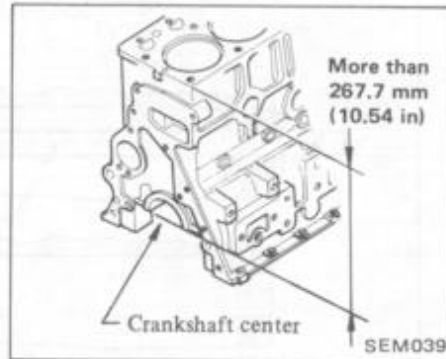
CYLINDER BLOCK

1. Check cylinder block for cracks or flaws.
2. Check cylinder block warpage with cylinder liner removed. If beyond the limit, correct with a surface grinder.

Warpage of cylinder block surface (Without cylinder liner):
Shaft direction
 Less than 0.10 mm (0.0039 in)
Right angle direction
 Less than 0.02 mm (0.0008 in)



Surface grinding limit:
 Height from upper face of cylinder block to crankshaft centerline should be greater than specified limit.



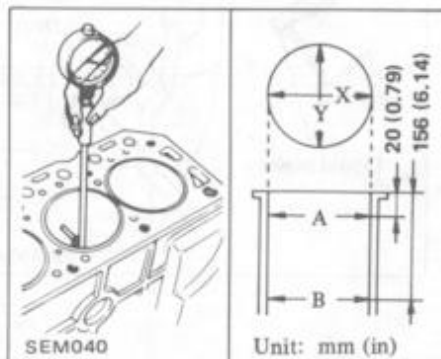
CYLINDER LINER

1. Check cylinder liner wear by means of bore diameter.

Cylinder liner bore wear limit:
 Less than 0.3 mm (0.012 in)
Bore standard:
 82.990 - 83.030 mm
 (3.2673 - 3.2689 in)

2. Measure cylinder liner bore for out-of-round and taper with a bore gauge. If beyond the limit, replace cylinder liner.

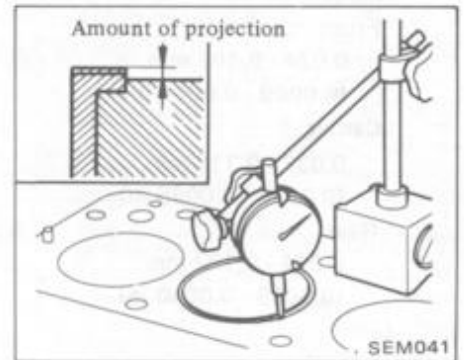
Out-of-round (X-Y):
Standard
 0.02 mm (0.0008 in)
Taper (A-B):
Standard
 0.03 mm (0.0012 in)



3. Check amount of projection of cylinder liner.

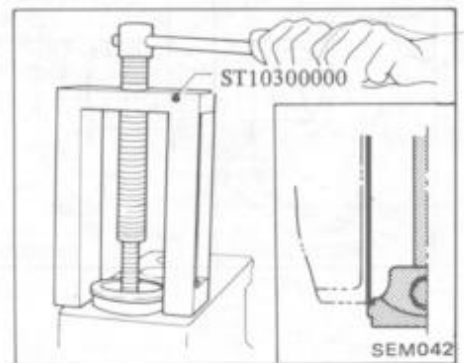
Cylinder liner projection:
Standard
 0.02 - 0.09 mm
 (0.0008 - 0.0035 in)

Deviation of each cylinder
 Less than 0.05 mm (0.0020 in)

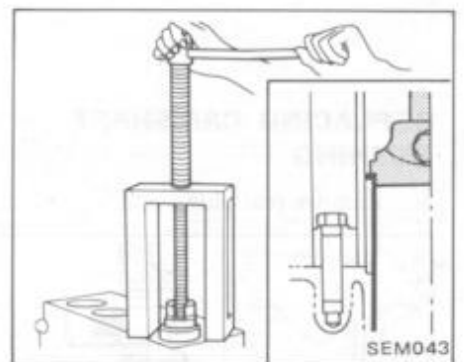


CYLINDER LINER REPLACEMENT

1. Remove cylinder liner with Tool.



2. Install cylinder liner with Tool or press stand.



3. Check amount of projection of cylinder liner.

PISTON, PISTON PIN AND PISTON RINGS

1. Check for damage, scratches and wear. Replace if such a fault is detected.

EXHAUST EMISSION CONTROL SYSTEM

DESCRIPTION

The exhaust emission control system is made up of the following.

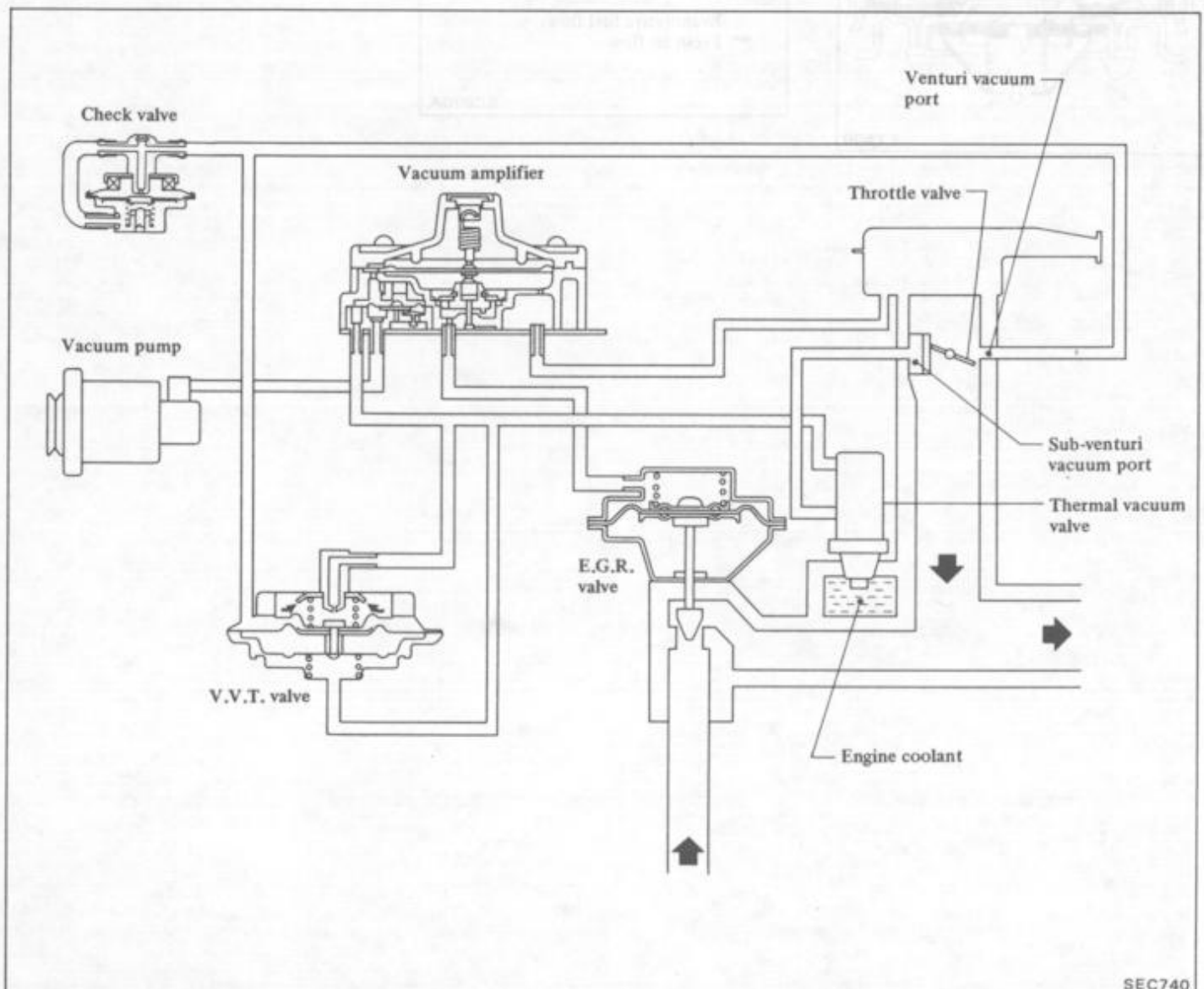
Item		Destination	Transmission	SD22
E.G.R. System	• E.G.R. control valve			X
	• Thermal vacuum valve			X
	• Venturi Vacuum Transducer (V.V.T.) valve			X
	• Vacuum amplifier			X
	• Check valve			X

EXHAUST GAS RECIRCULATION (E.G.R.) CONTROL SYSTEM

DESCRIPTION

The E.G.R. system is designed to control the formation of NO_x emission by recirculating the exhaust gas into the intake manifold passage through the control valve.

The E.G.R. system is composed of the E.G.R. control valve, thermal vacuum valve, V.V.T. valve, check valve and vacuum amplifier.



SEC740

OPERATION

The flow-rate of the recirculating exhaust gas is controlled continuously by means of a vacuum amplifier,

which functions in response to the engine load and engine speed. When the engine is under light load, the flow-rate increases; when it is under heavy load, the flow-rate decreases.

VENTURI VACUUM TRANSDUCER (V.V.T.) VALVE

The V.V.T. valve monitors the pressure of the sub-venturi vacuum which actuates the diaphragm ①, ③, and the venturi-ported vacuum which in turn activate the diaphragm ①, ②. This valve is actuated when the sub-venturi vacuum and venturi-ported vacuum are in equilibrium. It controls the vacuum signal that operates E.G.R. control valve.

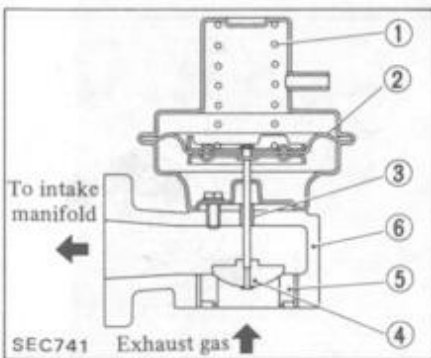
In other words, the amount of recirculated exhaust gas varies with the position of the E.G.R. valve regulated by the operating condition of the engine.

Water temperature °C (°F)	Thermal vacuum valve	V.V.T. Valve			E.G.R. Control System
		Venturi Ported vacuum	Sub-venturi vacuum	Operation	
Below 25 - 30 (77 - 86)	Closed	High	Low	Closed	Not actuated
		↑	High		
		Low	↑		
		↑	Low		
Above 25 - 30 (77 - 86)	Open	High	Low	Closed	Actuated
		↑	High		
		Low	↑	Open	
		Low	Low		

E.G.R. CONTROL VALVE

The E.G.R. control valve, which is connected to diaphragm, is designed to move vertically in order to control the amount of exhaust gas admitted to intake manifold.

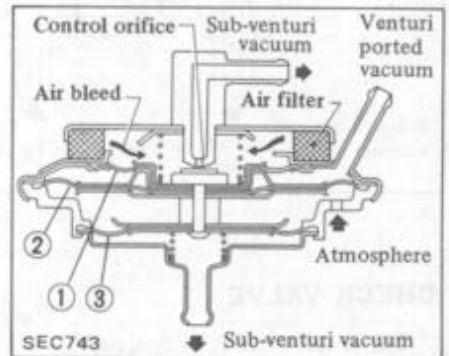
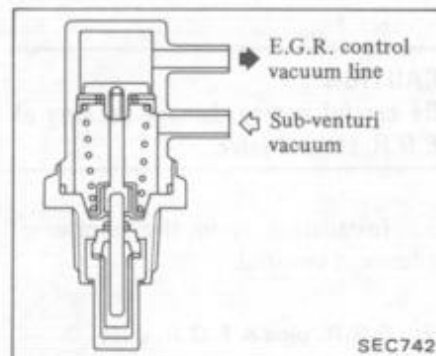
The vacuum that activates diaphragm is created in response to a sub-venturi vacuum signal that is amplified by vacuum amplifier.



- 1 Diaphragm spring
- 2 Diaphragm
- 3 Valve shaft
- 4 Valve
- 5 Valve seat
- 6 Valve chamber

THERMAL VACUUM VALVE

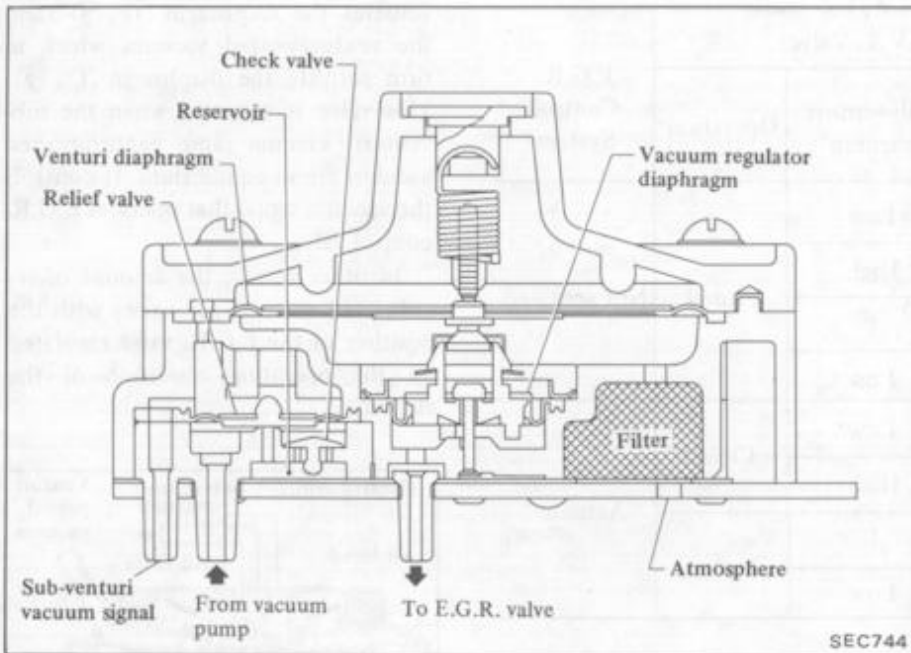
The thermal vacuum valve, which is attached to the oil cooler housing, monitors the temperature of the engine cooling water. The valve shaft is propelled by the thermal expansion force of wax which depends on the temperature. This action opens and closes the valve, which causes the E.G.R. control vacuum line to be exposed or closed. When the valve opens, sub-venturi vacuum activates the vacuum amplifier and V.V.T. valve, which in turn causes the E.G.R. system to operate.



VACUUM AMPLIFIER

The vacuum amplifier, which receives a weak vacuum signal produced in sub-venturi, activates venturi dia-

phragm and vacuum regulator diaphragm. This in turn controls the output vacuum admitted to E.G.R. control valve.

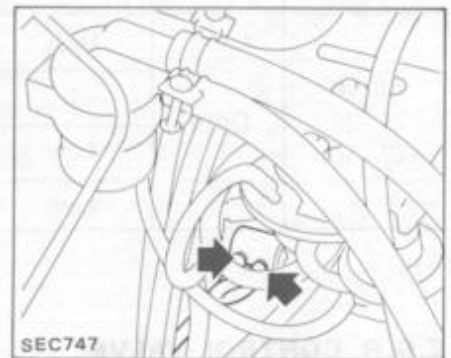


Thermal vacuum valve

The thermal vacuum valve is made of plastic. Consequently care should be taken to avoid damaging it. This valve is located on the oil cooler housing.

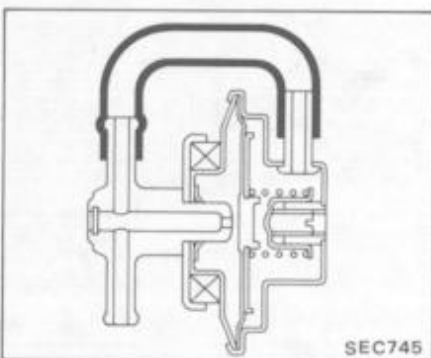
1. Drain engine coolant until its level is lower than the cooler.
2. Disconnect vacuum hoses and unscrew the thermal vacuum valve. Then, the valve can be removed.
3. Installation is in the reverse sequence of removal.

Be sure to apply sealer to threads of the valve prior to installing a new valve.

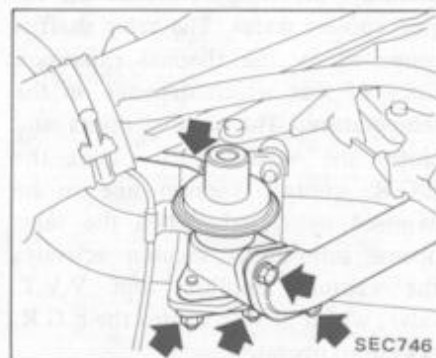


CHECK VALVE

The check valve is located on V.V.T. valve bracket in the venturi-ported vacuum line. This valve prevents the vacuum acting on V.V.T. valve from increasing excessively and activates E.G.R. system properly.



2. Disconnect vacuum hose. The E.G.R. control valve can then be taken out.



CAUTION:
Be careful not to damage packing of E.G.R. control valve.

3. Installation is in the reverse sequence of removal.

Ⓣ : E.G.R. pipe & E.G.R. duct to E.G.R. control valve bolt
25 - 35 N·m
(2.6 - 3.6 kg·m,
19 - 26 ft·lb)

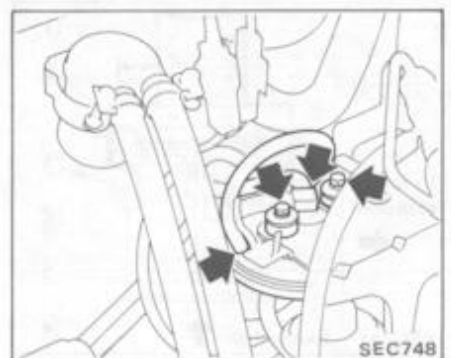
REMOVAL AND INSTALLATION

E.G.R. control valve and E.G.R. tube

1. Remove E.G.R. duct and E.G.R. pipe bolts at E.G.R. control valve side.

V.V.T. valve

1. Disconnect vacuum hoses on the V.V.T. valve.
2. Disconnect screws which secure V.V.T. valve to bracket.
3. The V.V.T. valve can then be removed.



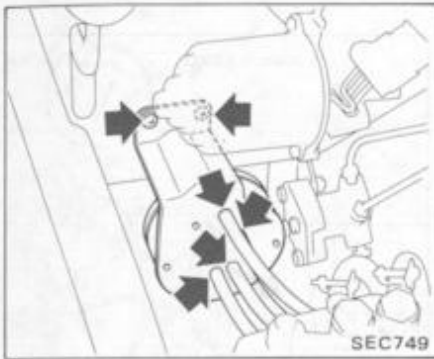
4. Installation is in the reverse sequence of removal.

When replacing the V.V.T. valve with a new one, verify that the type number on the new part is the same as that on the former one.

- Ⓣ : V.V.T. valve mounting screw
 3.4 - 5.4 N-m
 (0.35 - 0.55 kg-m,
 2.5 - 4.0 ft-lb)

Vacuum amplifier

1. Disconnect vacuum hoses on the amplifier.
2. Remove the amplifier assembly.



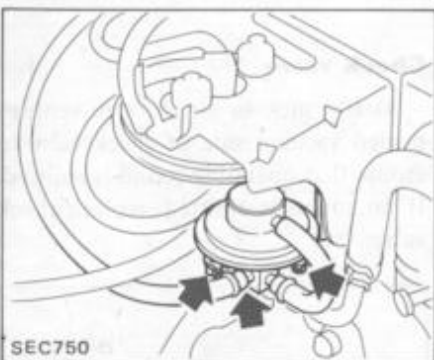
3. Installation is in the reverse sequence of removal.

CAUTION:

Ensure that vacuum hoses are connected to their proper positions on vacuum amplifier.

Check valve

1. Disconnect venturi-ported vacuum hose.
2. Remove check valve from V.V.T. valve bracket.



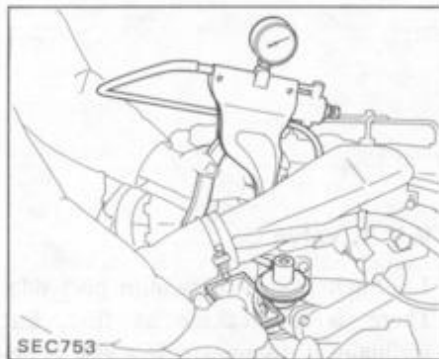
3. Installation is in the reverse sequence of removal.

- Ⓣ : Check valve mounting screw
 3.4 - 5.4 N-m
 (0.35 - 0.55 kg-m,
 2.5 - 4.0 ft-lb)

INSPECTION

Entire system

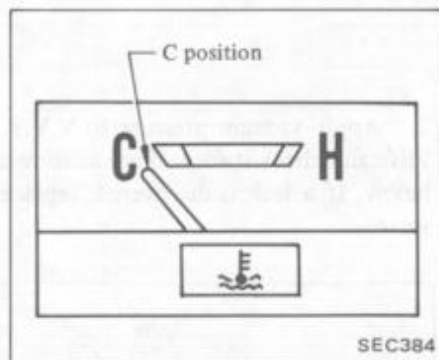
1. Make a thorough visual check of E.G.R. control system. If necessary, wipe away oil to facilitate inspection. If any hoses are cracked or broken, replace.
2. With engine stopped, inspect E.G.R. control valve for any indication of binding or sticking by using vacuum gauge, and check control valve upwards and downwards.



3. With engine running, inspect E.G.R. control valve and thermal vacuum valve for normal operation.

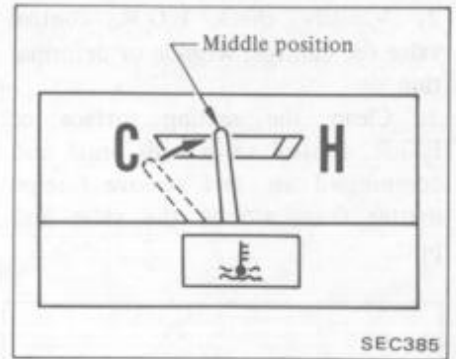
Place mirror under the diaphragm of E.G.R. control valve to ensure that the valve functions as described below.

- (1) When temperature of the engine coolant is low: [Below 25 to 30°C (77 to 86°F)]



Make sure that E.G.R. control valve does not operate when engine speed is increased.

- (2) When temperature of the engine coolant is high: [Above 25 to 30°C (77 to 86°F)]



- 1) Make sure that E.G.R. control valve operates when engine speed is increased.

- 2) If E.G.R. control valve does not operate properly, check it as follows:

- Disconnect one end (E.G.R. control valve side) of vacuum hose which connects to the vacuum amplifier.
- Make sure that thermal vacuum valve is open, and that sub-venturi vacuum is present at the end (vacuum amplifier side) of the vacuum hose by using vacuum gauge.

If vacuum pressure is nonexistent, replace thermal vacuum valve.

If vacuum pressure is existent, replace vacuum amplifier.

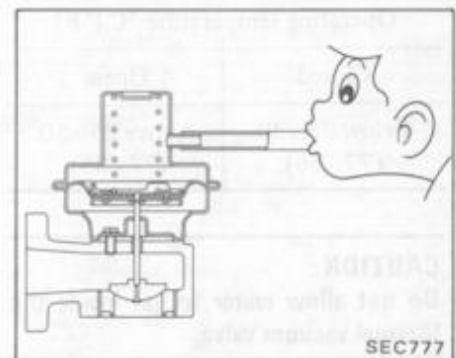
If any difficulty is encountered in judging the condition of any component during above inspection, check the questionable component independently as follows:

E.G.R. control valve

Dismount E.G.R. control valve from engine.

1. Apply vacuum to E.G.R. control valve, referring to the following figure. If the valve moves to full position, it is normal.

E.G.R. control valve will remain open for more than 30 seconds after vacuum has cut off.



ELECTRICAL SYSTEM

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- EMISSION CONTROL SYSTEM

Refer to Section HA (Heater & Air Conditioner) for:

- HEATER
- AIR CONDITIONER

ELECTRICAL DIAGNOSIS INTRODUCTION

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

The key to timely and accurate diagnosis of electrical problems is to:

1. Have a basic understanding of electrical principles and electrical component operation.
2. Be able to interpret wiring diagrams and schematics.
3. Know the various test methods and when to use each.
4. Have a systematic approach to identify the specific cause of an electrical problem.

BASIC RULE OF ELECTRICITY

A complete electrical circuit must have:

1. A Source (battery, alternator)
2. A Load (lights, coil, amplifiers, motor, etc.)
3. Electrical Pathway (connecting from the source to the load and back to the source); (wires, switches, body of vehicle (ground)).

Remembering this basic rule will make it a lot easier to troubleshoot

electrical problems.

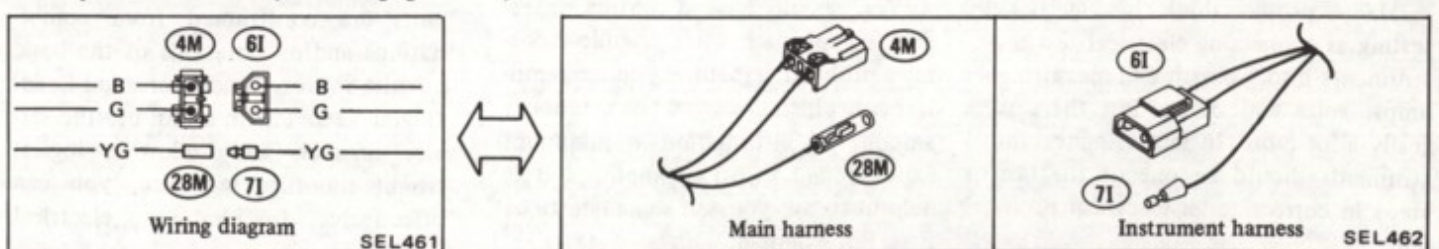
WIRING DIAGRAMS

There are several wiring diagrams and schematics illustrating each electrical circuit. Accurate diagnosis of electrical problems requires that you effectively use and interpret these diagrams. Since they have a special language, i.e., symbols, codes and abbreviations, let's review the following chart.

ELECTRICAL SYMBOLS AND ABBREVIATIONS											
<p>SYMBOLS</p>	<p>WIRE COLOR CODING</p> <table style="width: 100%;"> <tr> <td>B = Black</td> <td>Y = Yellow</td> </tr> <tr> <td>W = White</td> <td>Lg = Light Green</td> </tr> <tr> <td>R = Red</td> <td>Br = Brown</td> </tr> <tr> <td>G = Green</td> <td>Gr = Gray</td> </tr> <tr> <td>L = Blue</td> <td></td> </tr> </table> <p>In case of color coding with Tracers, Base Color is given first, followed by the Tracer Color:</p> <p>Example: LW = Blue w/White Tracers</p>	B = Black	Y = Yellow	W = White	Lg = Light Green	R = Red	Br = Brown	G = Green	Gr = Gray	L = Blue	
B = Black	Y = Yellow										
W = White	Lg = Light Green										
R = Red	Br = Brown										
G = Green	Gr = Gray										
L = Blue											
<p>CONNECTORS</p>	<p>ABBREVIATIONS</p> <ul style="list-style-type: none"> A Automatic transmission models M Manual transmission models 										

HARNESS LAYOUT

For easy identification, connectors indicated in the system wiring diagram have the same numbers as those used in the harness layout schematic. (Refer to page EL-90)



To trace a problem in any electrical circuit, several types of diagrams can be used.

1. **Power Supply Routing** (Refer to page EL-5). This diagram is helpful in identifying specific problems in the power supply portion of the electrical circuits. For example, let's say a vehicle has inoperative instrument meter lights. A quick check proves that all other lights in the vehicle are operative. The power supply diagram shows that there cannot be a problem between the battery, ignition relay, ignition switch or fuse since the power supply circuit for the instrument meter lights is common with the clearance, tail, side marker, and license plate lights. Therefore, the cause of this specific problem must lie past the fuse, such as in the wiring, meter lights, or ground.

2. **Schematic** (Refer to Headlamp Circuit page EL-55). A schematic is a very simplified wiring diagram useful for tracing electrical current flow and studying the operation of an electrical circuit.

3. **Circuit Wiring Diagram** (Refer to Headlamp Circuit page EL-55). This diagram is a more "true to life" layout of a complete circuit than the schematic. It identifies types and number of connectors, electrical terminal positions in the connector, color coding of wires, and connector codes. In order to quickly find the exact location of a connector, the connector codes can be cross-referenced to the harness layout illustrations in the back of this section.

4. **Complete Wiring Diagram** (Fold-out page). The complete wiring diagram will assist in locating interrelated circuits i.e., circuits which share common ground circuits, power circuits, etc.

TESTING

Many people think of electrical testing as connecting electrical test instruments into a circuit and measuring amps, volts and ohms. But there is really a lot more. In fact using test instruments should be one of the last steps in correcting an electrical problem.

SIGHT AND SOUND play an important role in electrical testing. Relays click, blowers spin, air condition clutches engage, lights illuminate, etc. Even though we cannot observe current flowing through a wire or a component, we can observe the effect it has on an electrical component. Sight and sound testing methods should be thoroughly exhausted before hooking-up any test instrument.

SUBSTITUTION is another test method. For example, you suspect a bad ground at the tail lamp. Try a jumper wire from ground to the lamp. What about a questionable fuse? Simply replace it with another. In several instances substitution may turn out to be the most effective method of correcting an electrical problem.

TEST INSTRUMENTS

Problems that cannot be solved through sight, sound, or substitution can be solved by using the appropriate test instrument. The charts on the back of the vehicle wiring diagram, illustrates how and when these instruments should be used.

A general rule to follow while trouble-shooting is to perform the easiest and least expensive checks first. This often means giving some careful thought to a trouble-shooting plan. Some of the most frustrating and confusing electrical problems begin with a haphazard and planless start. Make sure the checks you have selected are going to give the answers you need. If you test the wrong circuit, use the wrong meter, or forget to check the meter scale and calibration, you just can't diagnose the problem.

TROUBLE-SHOOTING APPROACH

You should have a routine procedure or approach when trouble-shooting a problem, a method you are familiar with which gives you the maximum amount of information at minimum expense and effort. Sometimes it is helpful to ask yourself some questions first. For example:

WHAT IS THE PROBLEM? While this may seem a foolish question at first glance, the problem involved may not be the same as stated on the repair order or even as observed by the customer. Sometimes, other problems or symptoms have been overlooked. Do not forget to identify the problem and controls involved. Check to see what electrical components work and what components do not work. This is an opportune time to use sight and sound testing methods.

HOW DOES THE CIRCUIT WORK? Once the electrical problem has been identified, consult the various wiring diagrams in the service manual.

Study the simplified schematic to develop an understanding of how the circuit is supposed to work. Then use the circuit wiring diagram, harness layout illustration, power supply routing diagram, and vehicle wiring diagram. Get an idea of how the circuit is laid out in the car and how it interrelates with other circuits.

WHICH TEST IS BEST? Stop and think of exactly what information you need to reach a proper solution. Decide which test will give you the most information. Do not forget to think of where you are going to make your test connections. Make sure you are performing your test at the most advantageous point. You do not want to dismantle a dash assembly to check a component which could be tested at a more accessible location. For instance, it is much easier to check terminal connectors and plugs than to break into a harness.

Once the tests have been performed, you should have the information you need to reach a logical conclusion and solve the problem but, if not, then review your testing procedure. Be certain that you are performing the test correctly and your procedure is valid.

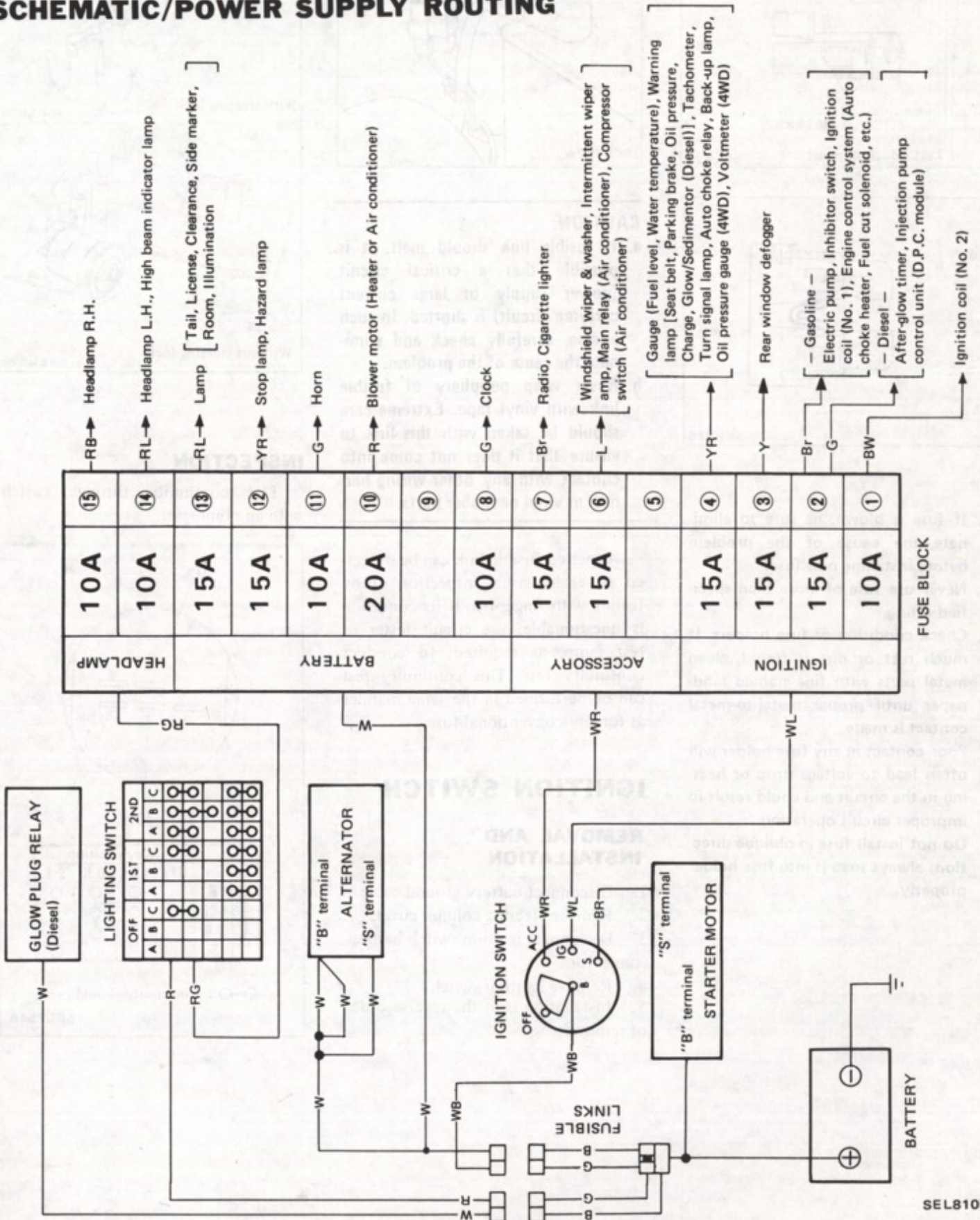
Remember the most complex circuits are constructed from combinations and/or variations of the basic circuit: Source, Conductors, and Load. If you keep this in mind, use the service manual, and follow a logical trouble-shooting sequence, you can effectively troubleshoot electrical problems.

POWER SUPPLY ROUTING

FUSE

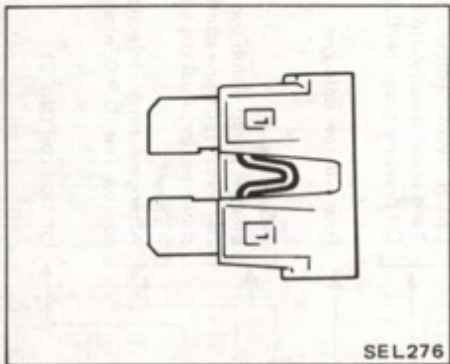
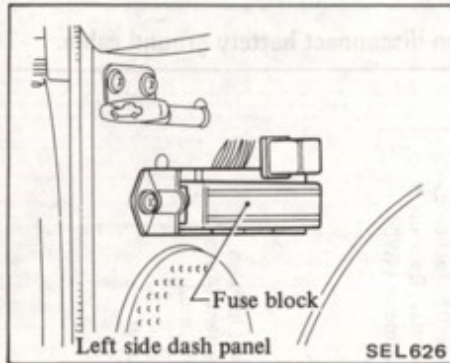
CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

SCHEMATIC/POWER SUPPLY ROUTING



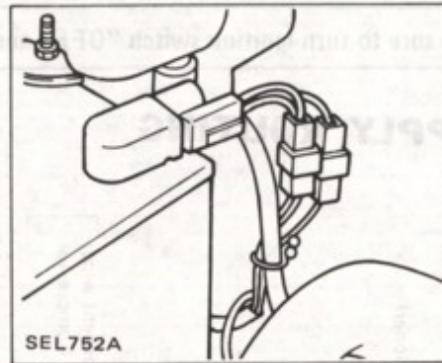
SEL8108

FUSE



- a. If fuse is blown, be sure to eliminate the cause of the problem before installing new fuse.
- b. Never use fuse of more than specified rating.
- c. Check condition of fuse holders. If much rust or dirt is found, clean metal parts with fine-grained sandpaper until proper metal-to-metal contact is made.
Poor contact in any fuse holder will often lead to voltage drop or heating in the circuit and could result in improper circuit operation.
- d. Do not install fuse in oblique direction, always snap it into fuse holder properly.

FUSIBLE LINK



CAUTION:

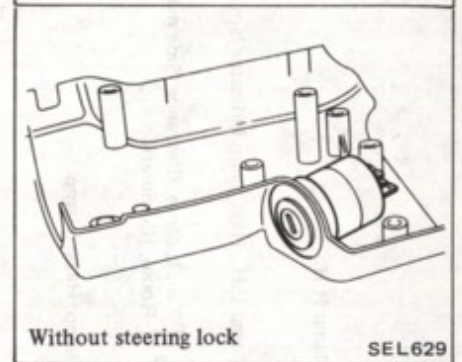
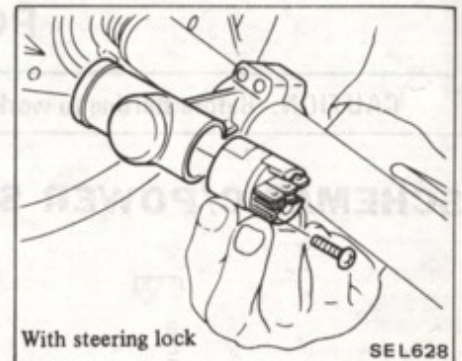
- a. If fusible link should melt, it is possible that a critical circuit (power supply or large current carrying circuit) is shorted. In such a case, carefully check and eliminate the cause of the problem.
- b. Never wrap periphery of fusible link with vinyl tape. Extreme care should be taken with this link to ensure that it does not come into contact with any other wiring harness or vinyl or rubber parts.

A melted fusible link can be detected either by visual inspection or by feeling with finger-tip. If its condition is questionable, use circuit tester or test lamp, as required, to conduct continuity test. This continuity test can be performed in the same manner as for any conventional fuse.

IGNITION SWITCH

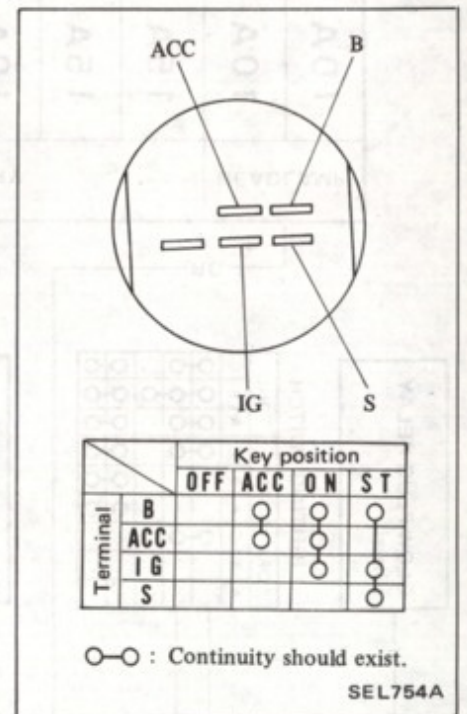
REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove steering column cover.
3. Disconnect ignition switch harness connector.
4. Remove ignition switch.
5. Installation is in the reverse order of removal.



INSPECTION

Test continuity through switch with an ohmmeter.



BATTERY

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

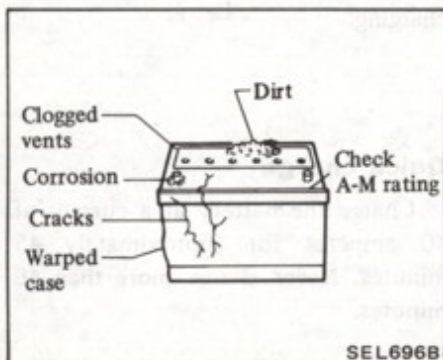
WARNING:

Never touch positive and negative terminals at the same time with bare hands. This could result in injury.

CAUTION:

- If it becomes necessary to start the engine with a booster battery and jumper cables, use a 12-volt booster battery.
- If the battery cables are disconnected, they should be tightly clamped to the battery terminals to secure a good contact.

VISUAL INSPECTION



SEL696B

- Check battery rating against that of original factory equipment.
- Check for cracks and warpage of the case.
- Make sure cables are clean and tight.
- Check acid level.
- Make sure vents are not clogged.
- Make sure top of battery is clean.

CLEANING

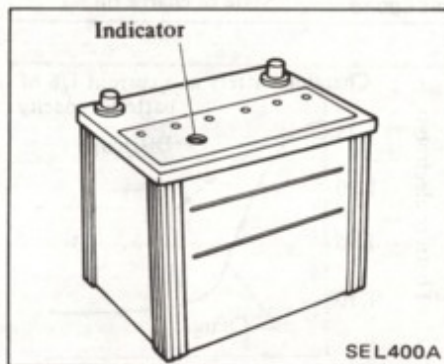
Use a stiff brush and a common baking soda and water solution to clean the battery surface, terminals and cable ends.

CAUTION:

Never allow the solution to enter individual cells. The baking soda will react with the battery acid. Also remember that battery acid is harmful to the eyes, skin and clothing.

CONDITION CHECK

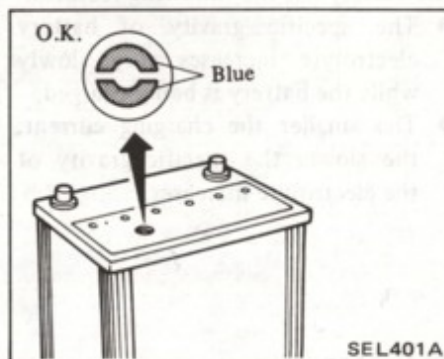
Battery condition can be checked using indicator on battery.



SEL400A

Good condition

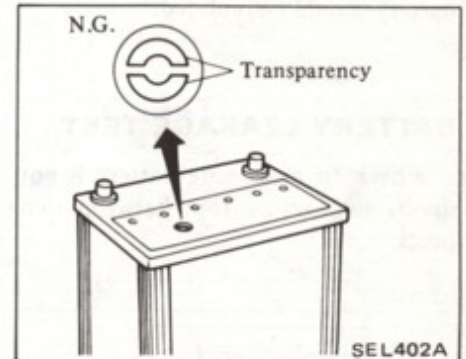
When blue indicator is shown, battery is properly charged.



SEL401A

Lack of charge condition

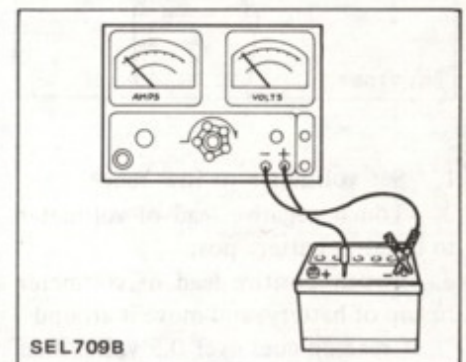
When transparent indicator is shown, battery is not charged and requires recharging.



SEL402A

TEST

BATTERY CAPACITY TEST



SEL709B

- Check battery rating against that of original factory equipment.
- With battery connected to tester as shown, turn load knob until a draw of 3 times the battery rating is shown. (Example: Battery rating 60AH Turn load to 180A draw.)
- Hold this draw for 15 seconds, then look at voltage. If voltage remains at 9.6 volts or above, THE BATTERY IS GOOD. You need not perform any further tests. If voltage drops below 9.6 volts, then proceed to next test.

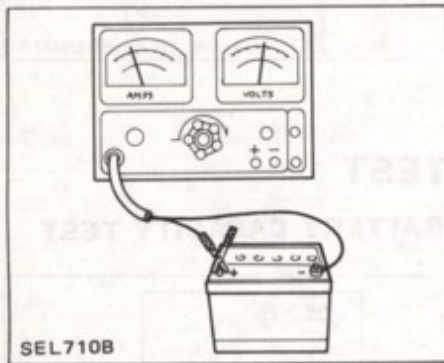
THREE-MINUTE CHARGE TEST

This test identifies a battery as being sulfated and should only be performed if the battery has failed the capacity test.

1. Connect a good quality battery charger.
2. Turn charger to a fast rate not over 40A.
3. After three minutes, check voltmeter reading. If it is over 16.5 volts, battery should be replaced.

BATTERY LEAKAGE TEST

Check to make sure battery is not discharging across top, between two posts.



1. Set voltmeter to low range.
 2. Touch negative lead of voltmeter to negative battery post.
 3. Touch positive lead of voltmeter to top of battery, and move it around.
- If reading goes over 0.5 volts, then clean off top of battery and retest.

BATTERY DRAW TEST

For discharging problems after other battery tests show that the battery is good and capable of holding a charge perform the battery draw test.

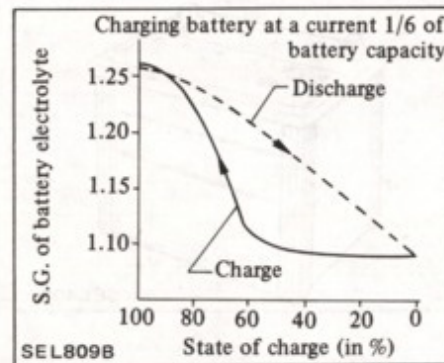
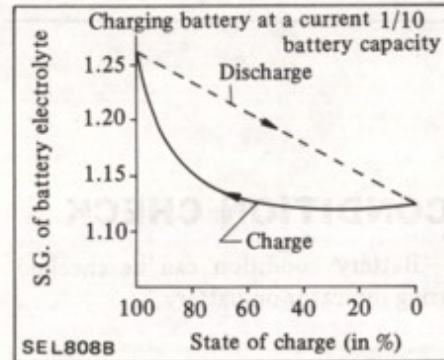
1. Disconnect battery ground cable.
2. Insert test light in series between cable end and the negative battery post.
3. With all switches and systems off the test light should not be lit.
4. If the light is lit begin disconnecting fuses and units until the light goes out. **The clock is designed to run at all times. Be sure it is not the cause of the light being on.**
5. Repair the circuit causing the draw.

CHARGING

DESCRIPTION

Charging rate and specific gravity of battery electrolyte

The relationship between the charged condition of the battery and the specific gravity of battery electrolyte differs, as shown in figures below, when the battery is discharging and when it is being charged.



As can be seen from these figures, the battery has the following features:

- The specific gravity of battery electrolyte increases very slowly while the battery is being charged.
- The smaller the charging current, the slower the specific gravity of the electrolyte increases.

Indicator

- The indicator will turn from blue to transparent when the battery charge drops to 20 to 30%.
- The indicator will turn blue when the battery charge is between 65 and 90% under charging.

CHARGING

If the indicator turns transparent (indicating that battery charge is required), charge the battery in the following manner:

WARNING:

- a. Keep battery away from open flame while it is being charged.
- b. When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.
- c. Do not allow electrolyte temperature to go over 45°C (113°F).

Standard method

Charge the battery at 1/10 the current of battery capacity. When the indicator turns from transparent to blue, continue to charge the battery for an additional two hours, then stop charging.

Quick charge

Charge the battery at a current of 40 amperes for approximately 45 minutes. **Never charge more than 45 minutes.**

CAUTION:

Charging the battery at a current of more than 10 amperes will shorten the service life of the battery. Use the standard method to charge the battery unless circumstances requires otherwise.

Charging current and time required for charging

Charging current	Time required
1/6 of battery capacity	Approx. 4 - 5 hours
1/10 of battery capacity	Approx. 8 - 10 hours

If the battery is run down and has not been used for a long period of time, it will be hard to charge and it will require a longer time to charge

than under normal circumstances. In such a case, extend the charging time as required while observing the indicator.

REPLACEMENT

If battery indicator shows lack of charge condition, and it is recharged and does not crank engine, replace battery.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

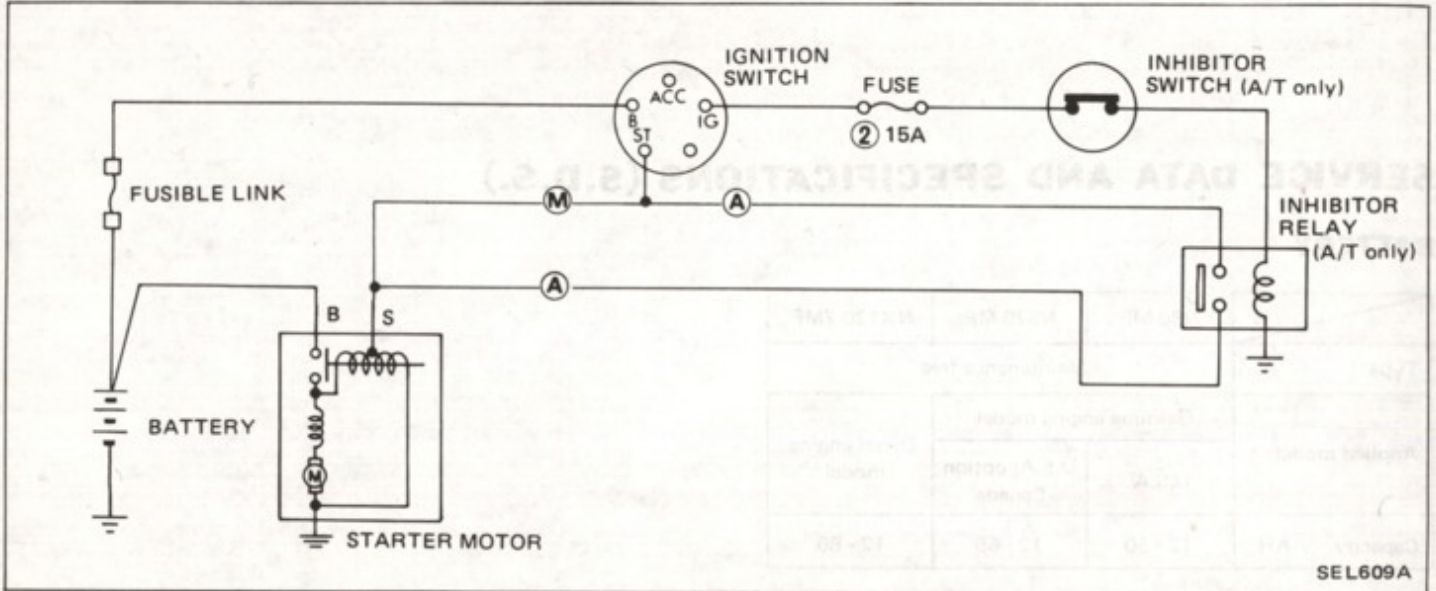
BATTERY

	N60 MF	NS70 MF	NX120-7MF
Type	Maintenance free		
Applied model	Gasoline engine model		Diesel engine model
	U.S.A.	U.S.A. option Canada	
Capacity V-AH	12 - 60	12 - 65	12 - 80

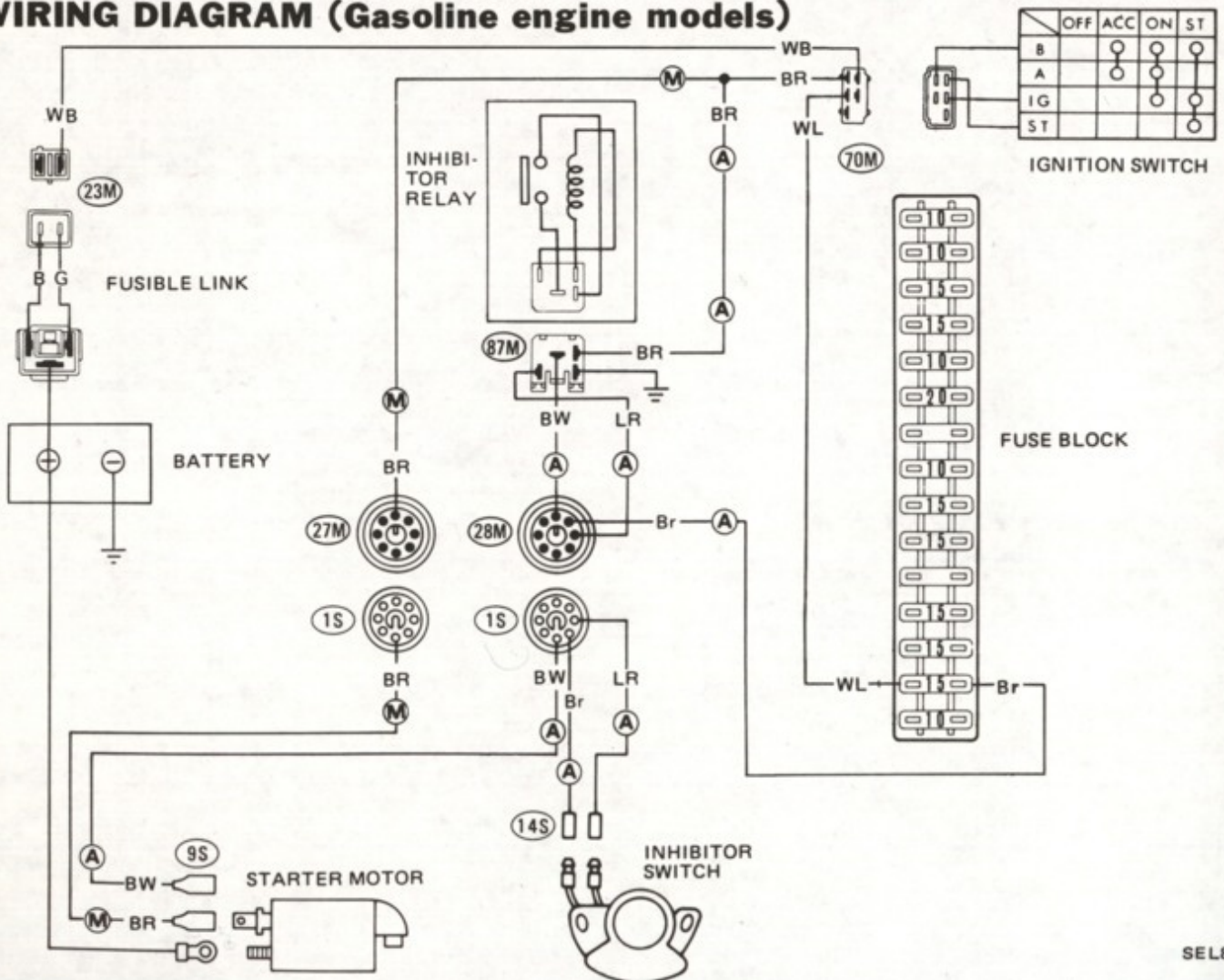
STARTING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

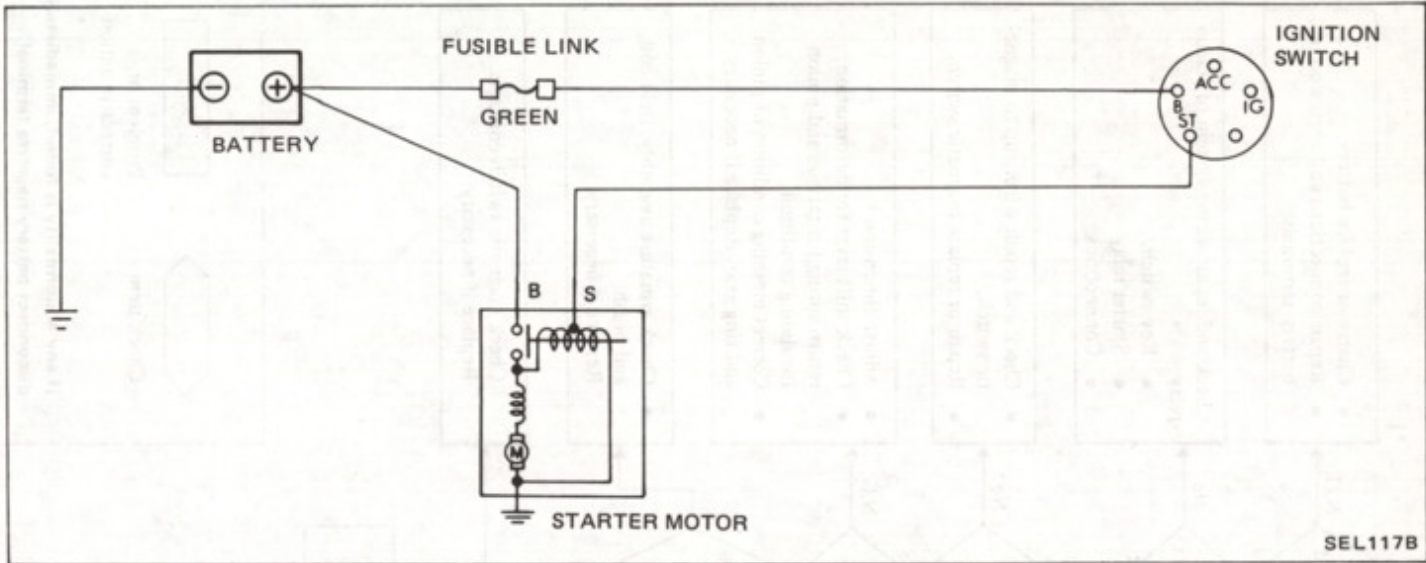
SCHEMATIC (Gasoline engine models)



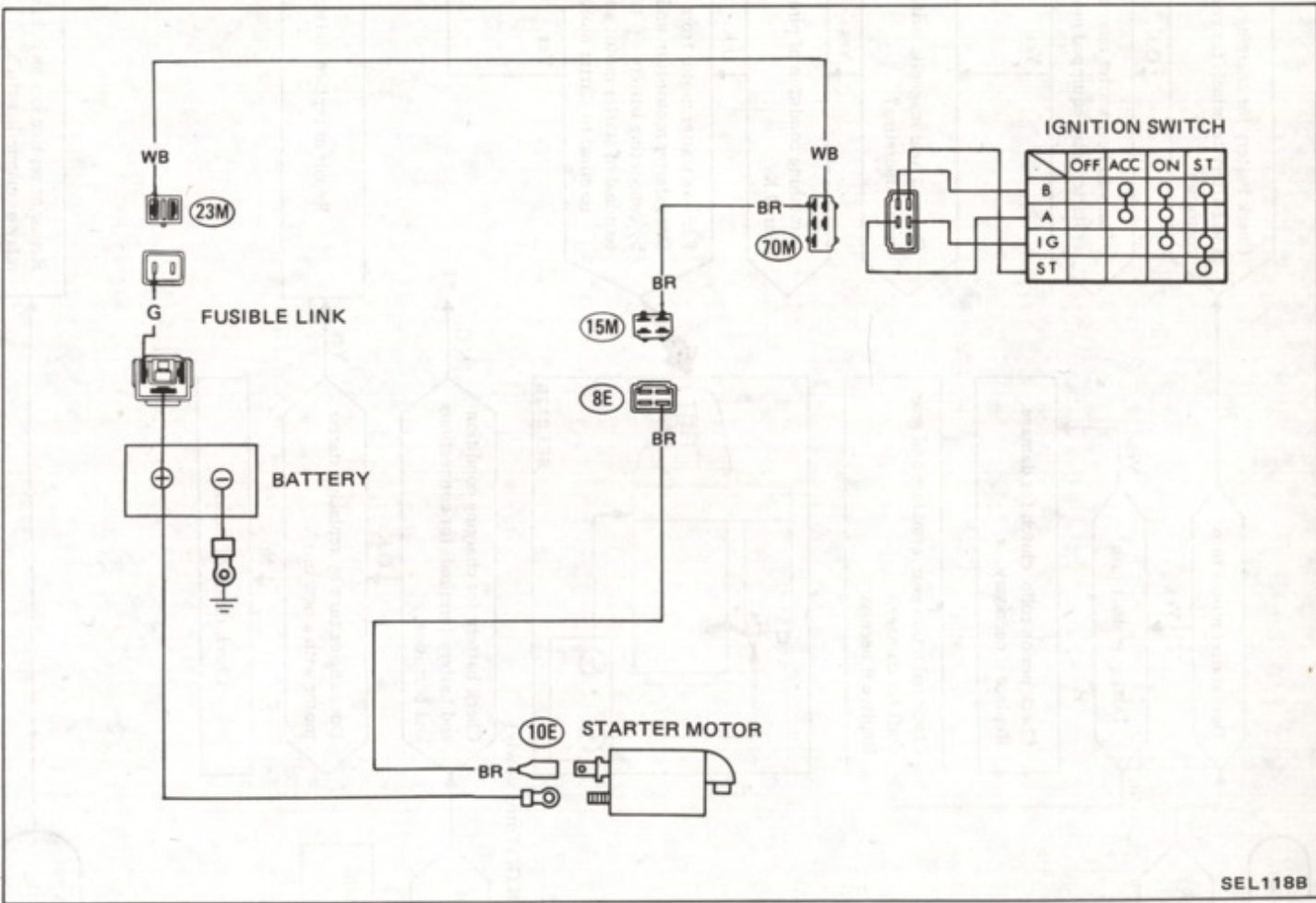
WIRING DIAGRAM (Gasoline engine models)



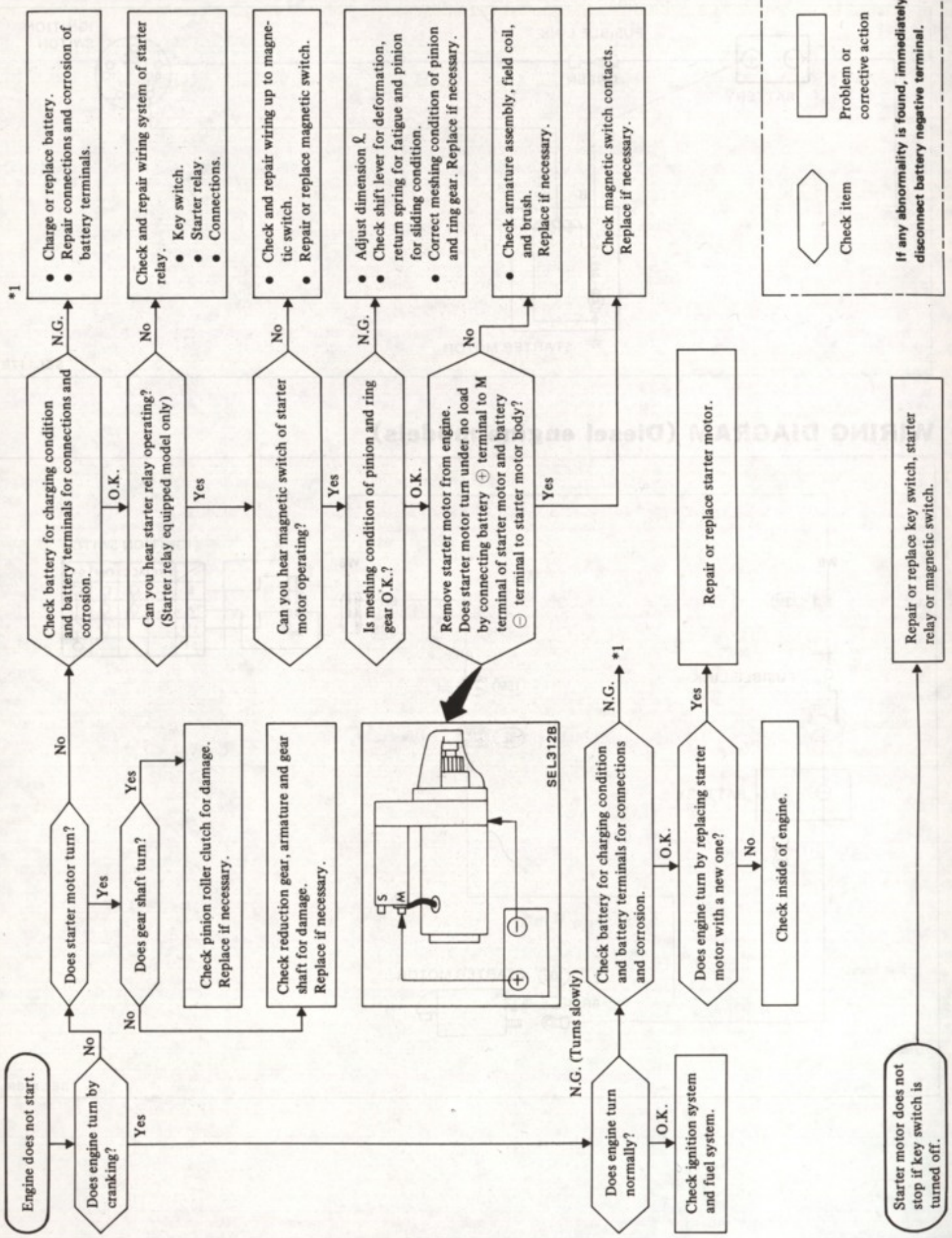
SCHEMATIC (Diesel engine models)





WIRING DIAGRAM (Diesel engine models)



STARTING SYSTEM TROUBLE-SHOOTING

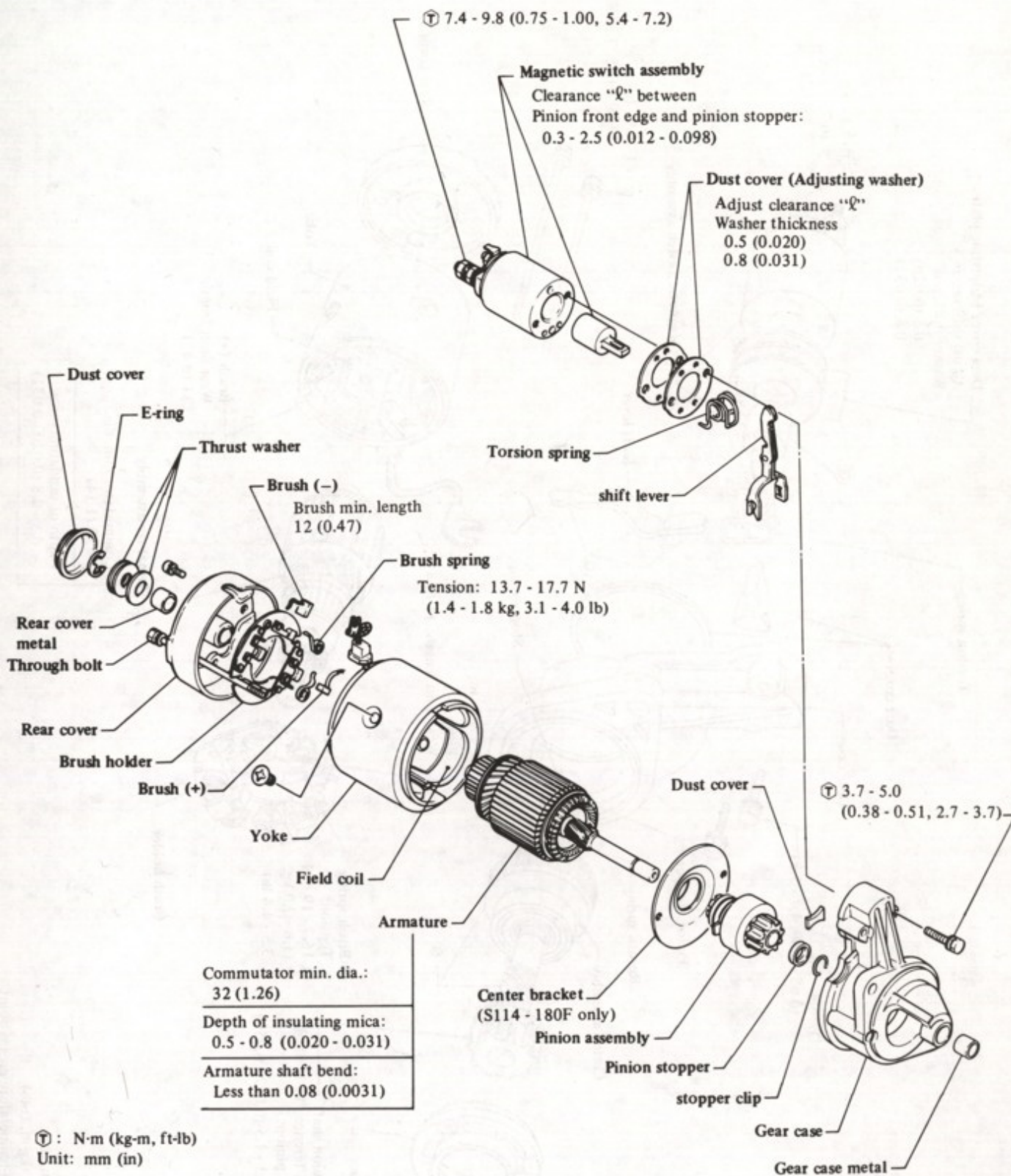


 Check item
 Problem or corrective action

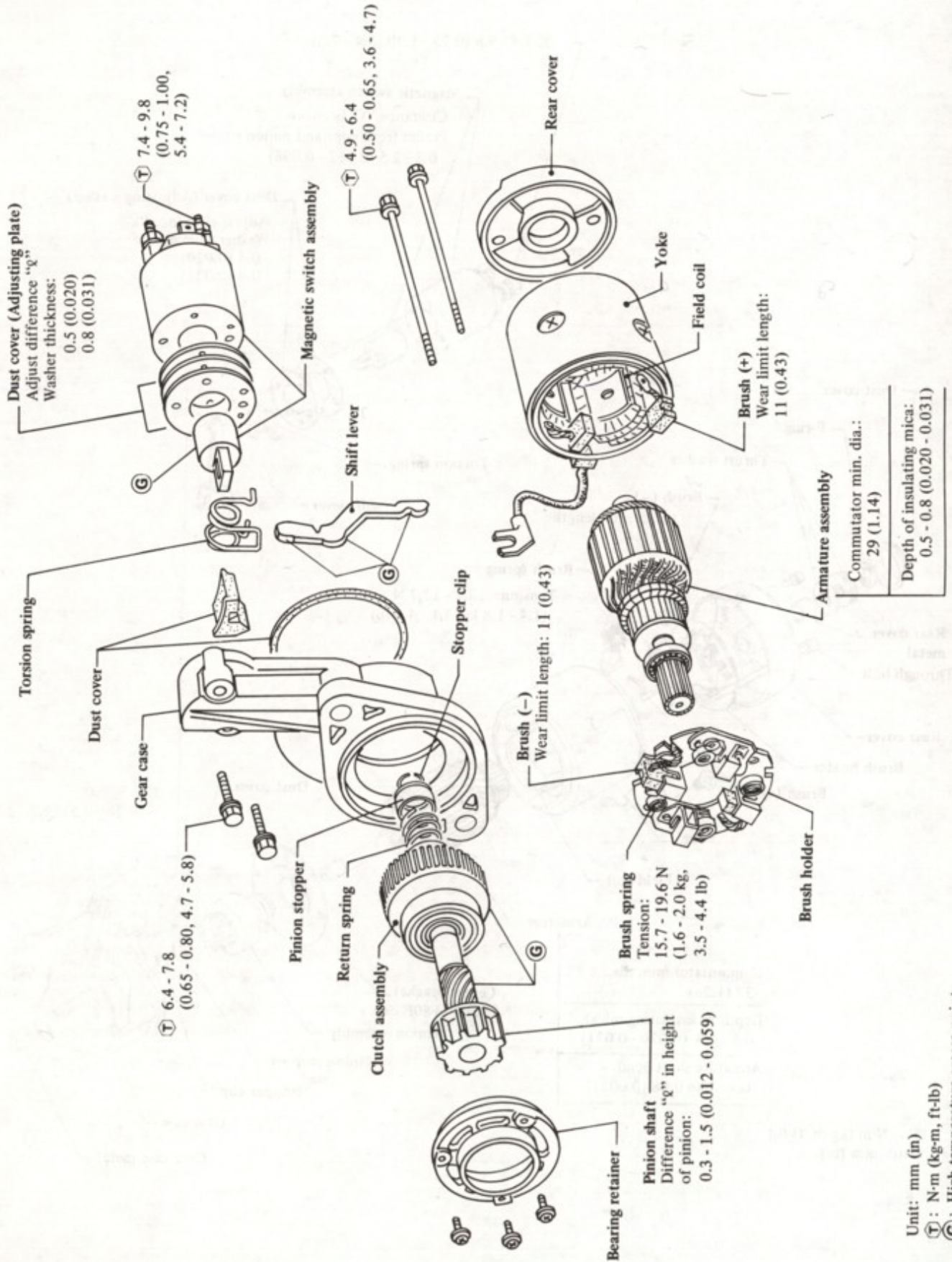
If any abnormality is found, immediately disconnect battery negative terminal.

STARTER MOTOR

S114-229F and -295 (Gasoline engine model for U.S.A.)

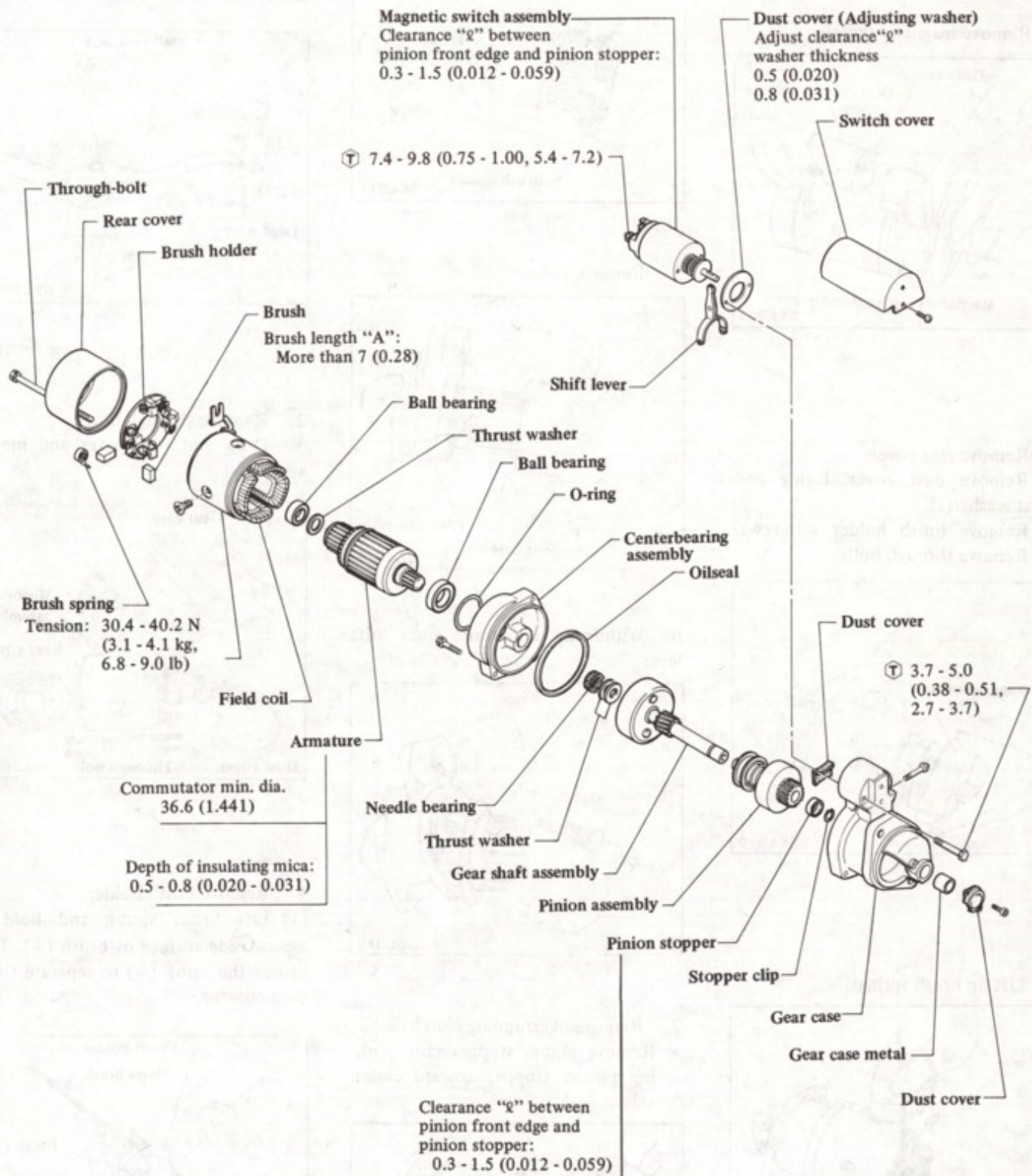


S114-304 (Gasoline engine model for Canada)



Unit: mm (in)
 T: N·m (kg·m, ft·lb)
 G: High-temperature grease point

S13-45B (Diesel engine model)

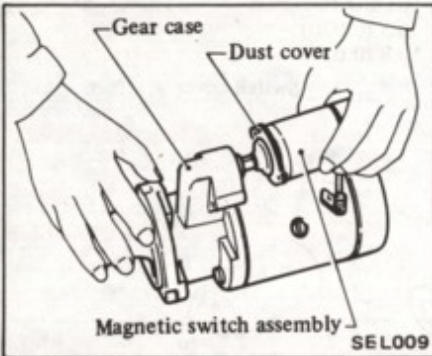


⊕ : N-m (kg-m, ft-lb)
Unit: mm (in)

DISASSEMBLY

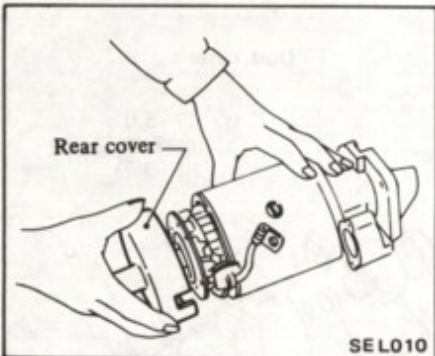
S114-229F and -295

1. Remove magnetic switch.

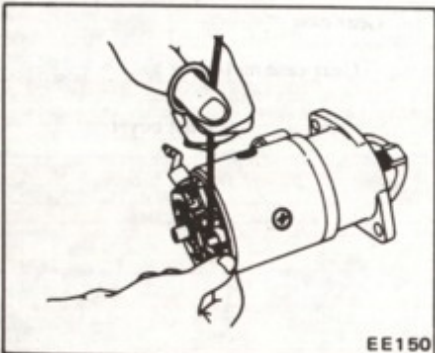


2. Remove rear cover.

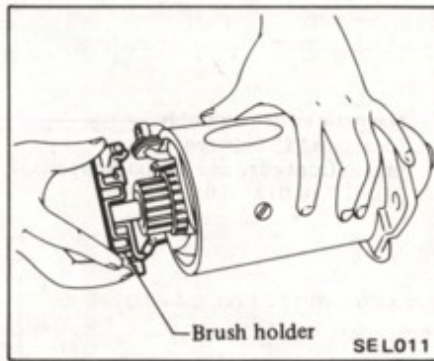
- (1) Remove dust cover, E-ring and thrust washer(s).
- (2) Remove brush holder setscrews.
- (3) Remove through bolts.



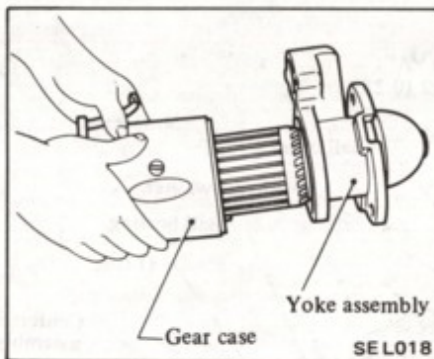
3. Lift up brush springs.



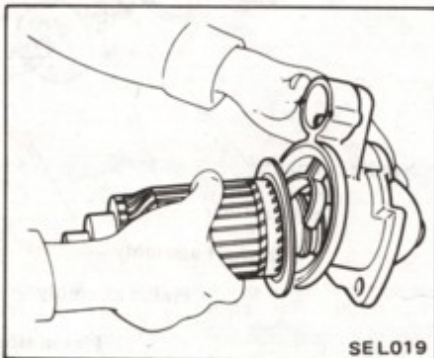
4. Remove brush holder



5. Remove yoke.

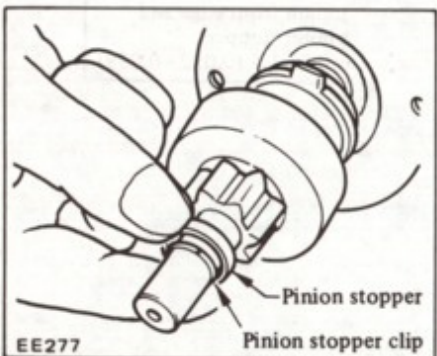


6. Withdraw armature and shift lever.



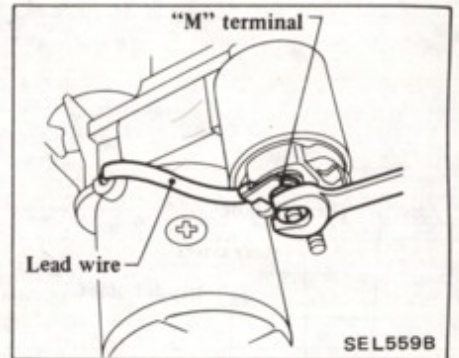
7. Remove overrunning clutch.

- Remove pinion stopper clip, pushing pinion stopper toward clutch side.



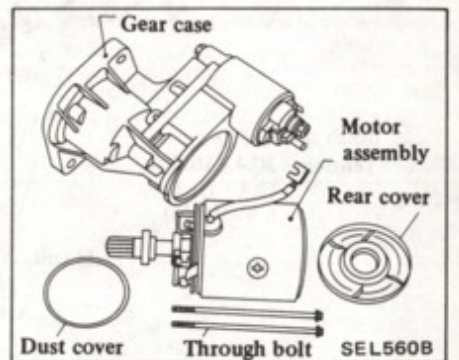
S114-304

1. Loosen nut from "M" terminal and remove lead wire.



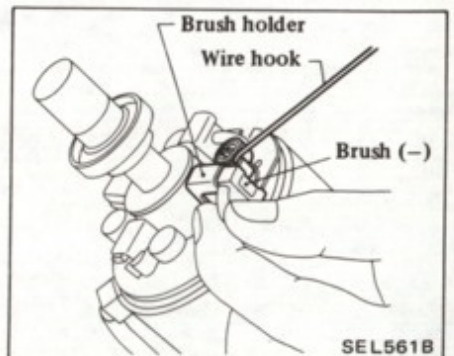
2. Remove through bolts.

3. Draw out rear cover and motor assembly.



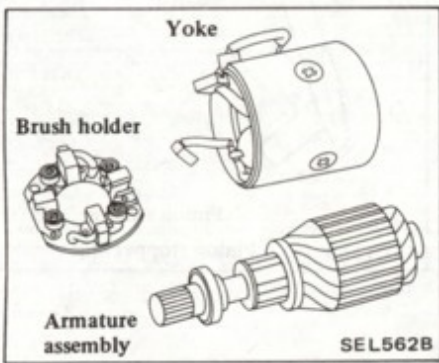
4. Remove brush holder.

(1) Lift brush spring and hold it against side surface of brush (-). This causes the brush (-) to separate from commutator.

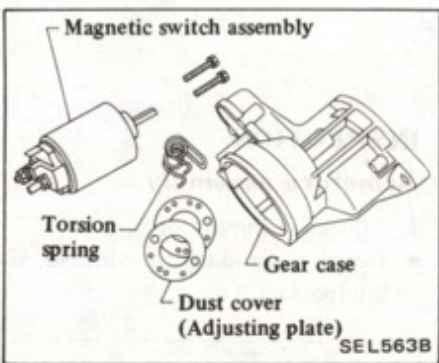


(2) Remove brush (+) from brush holder by lifting the brush spring.

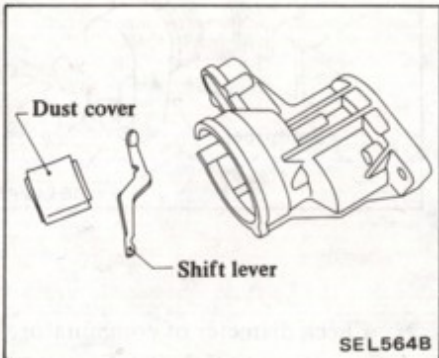
5. Draw out armature assembly from yoke.



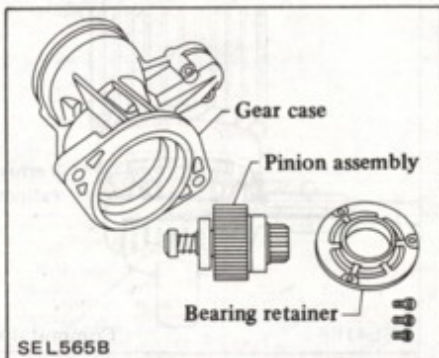
6. Remove magnetic switch assembly from gear case.



7. Remove dust cover and shift lever.

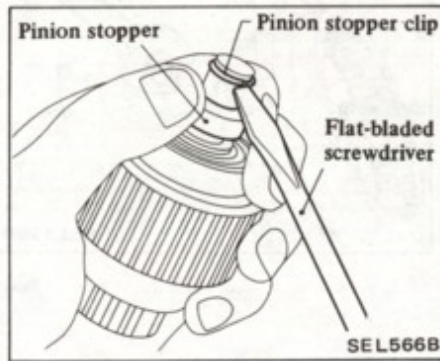


8. Remove bearing retainer and draw out pinion assembly.

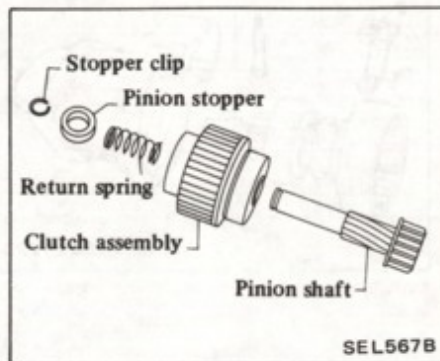


9. Remove pinion stopper clip.

Move pinion stopper toward pinion, and remove pinion stopper clip with a flat-bladed screwdriver.

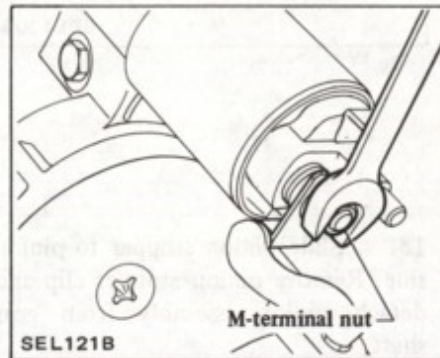


10. Remove pinion shaft from clutch assembly.

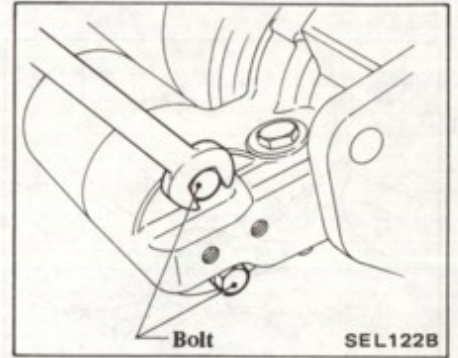


S13-45B

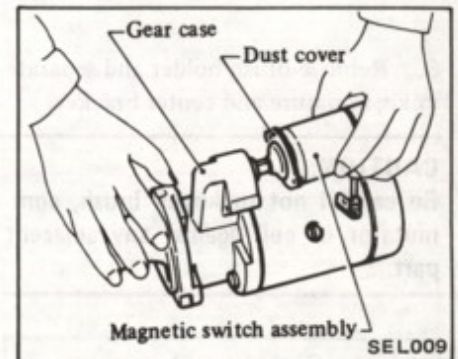
1. Remove switch cover.
2. Remove nut from terminal M and separate lead wire.



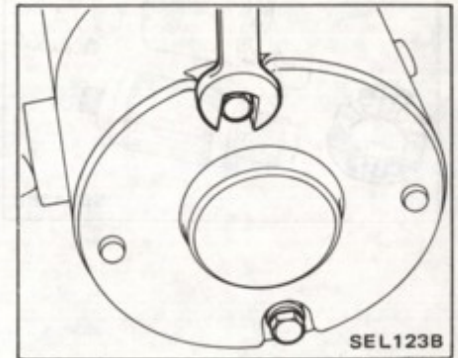
3. Remove bolts.



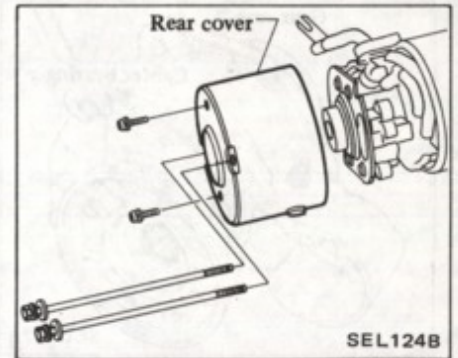
4. Remove magnetic switch assembly and dust cover.



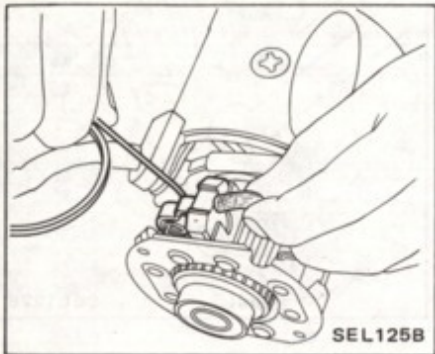
5. Remove screws and through-bolts.



6. Remove rear cover assembly by prying carefully with screwdriver.



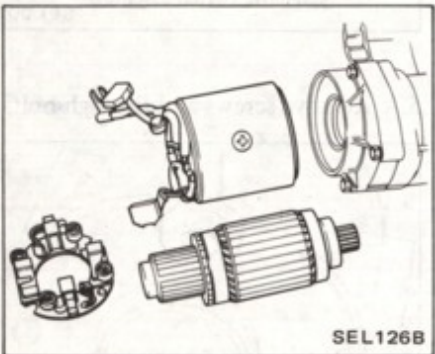
7. Lift up brush spring with wire and separate brush.



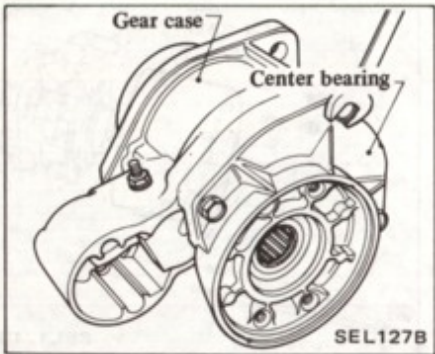
8. Remove brush holder and separate yoke, armature and center bracket.

CAUTION:

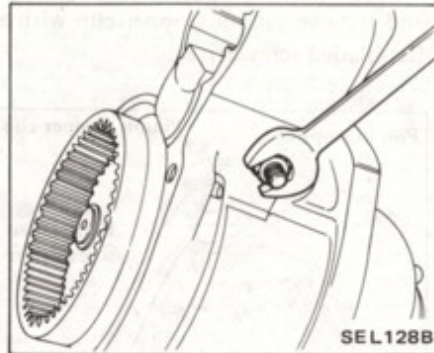
Be careful not to knock brush, commutator or coil against any adjacent part.



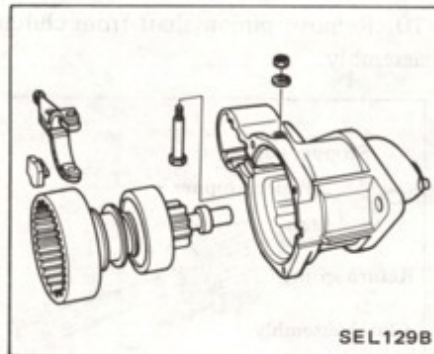
9. Separate gear case and center bearing.



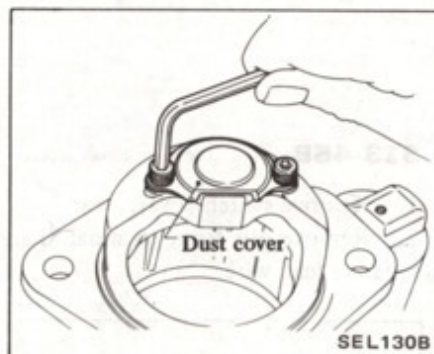
10. Remove shift lever pin.



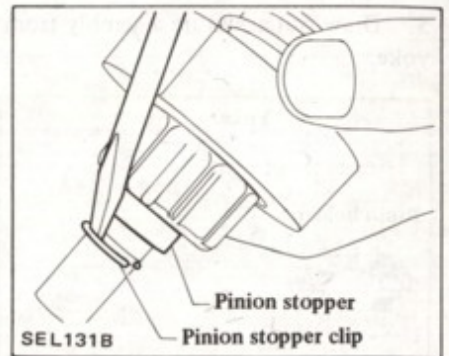
11. Remove dust cover, shift lever and gear shaft with pinion assembly.



12. Remove dust cover from tip of gear case.



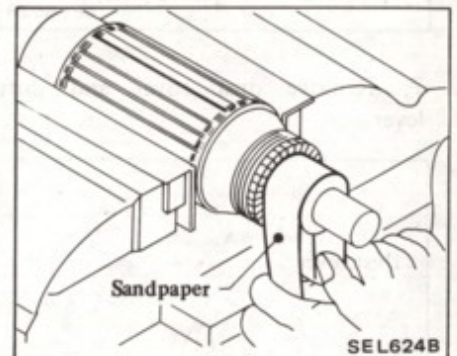
13. Slide pinion stopper to pinion side. Remove pinion stopper clip and detach pinion assembly from gear shaft.



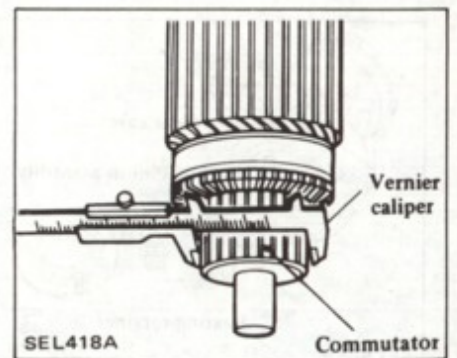
INSPECTION

Armature assembly

1. Check commutator surface.
 - Rough ... Sand lightly with No. 500 sandpaper.

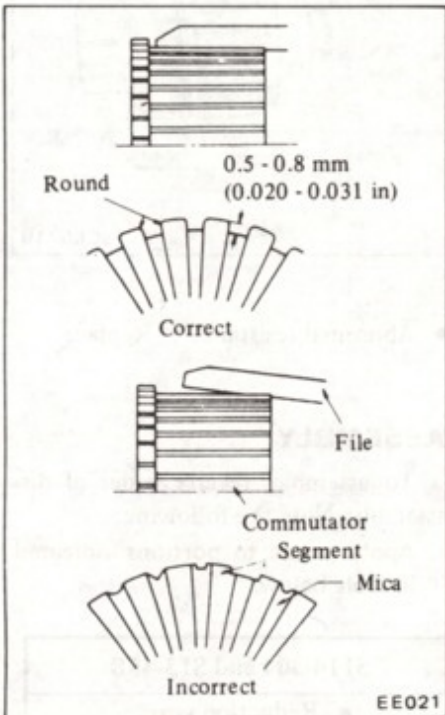


2. Check diameter of commutator. Commutator minimum diameter:
 - Less than specified value ... Replace.

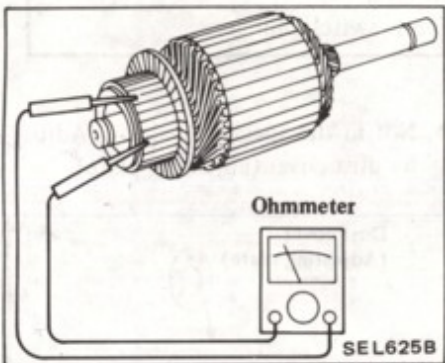


3. Check depth of insulating mica from commutator surface.

- Less than 0.2 mm (0.008 in) ... Undercut to 0.5 to 0.8 mm (0.020 to 0.031 in).

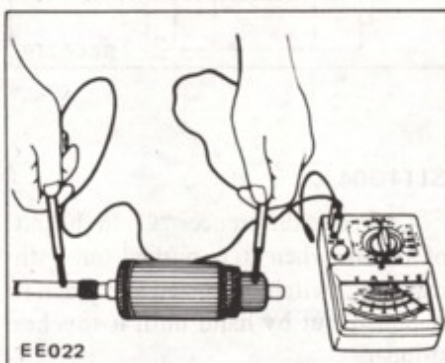


4. Continuity test (between two segments side by side).



- No continuity ... Replace.

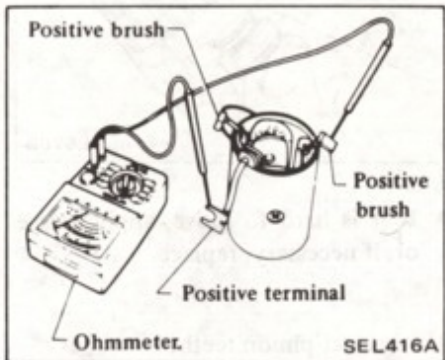
5. Insulation test (between each commutator bar and shaft).



- Continuity exists ... Replace.

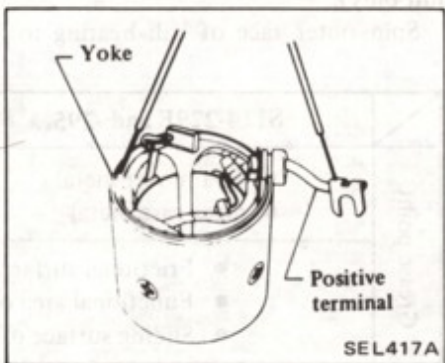
Field coil

1. Continuity test (between field coil positive terminal and positive brushes).



- No continuity ... Replace field coil.

2. Ground test (between field coil positive terminal and yoke).

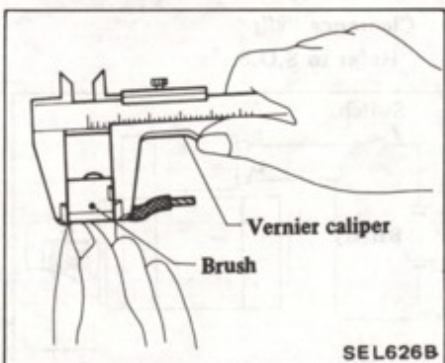


- Continuity exists ... Replace field coil.

Brush

Check wear of brush.

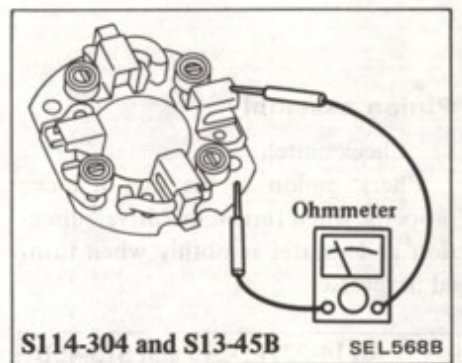
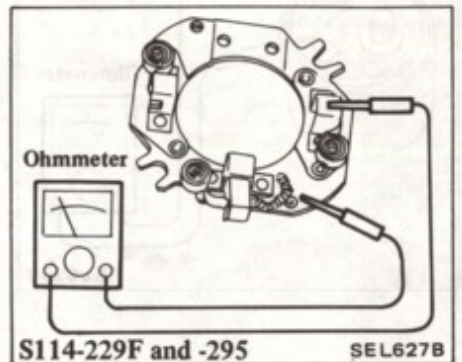
Wear limit length:
Refer to S.D.S.



- Excessive wear ... Replace.

Brush holder

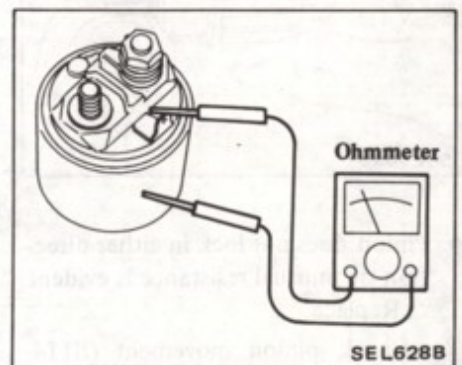
1. Perform insulation test between brush holder (positive side) and its base (negative side).



- Continuity exists ... Replace.
2. Check brush holder to see if it moves smoothly.
- If brush holder is bent, replace it; if sliding surface is dirty, clean.

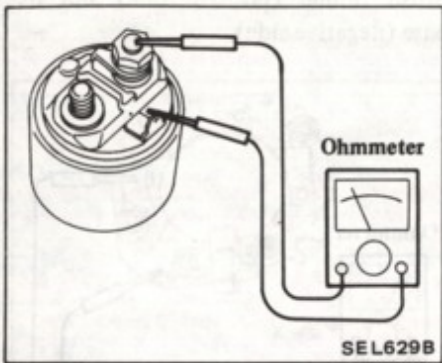
Magnetic switch

1. Continuity test (between "S" terminal and switch body).



- No continuity ... Replace.

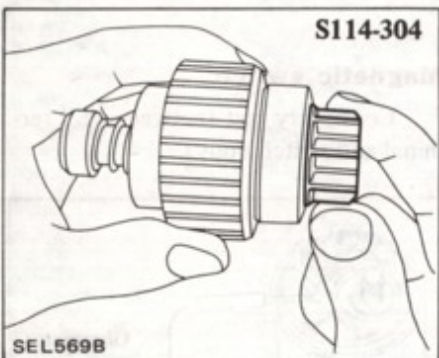
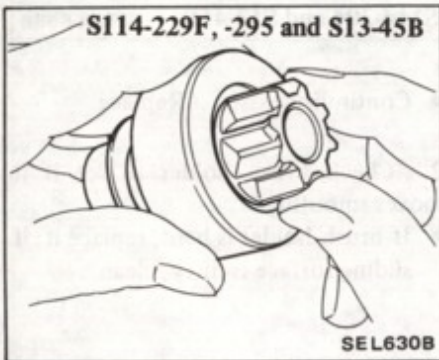
2. Continuity test (between “S” terminal and “M” terminal).



Pinion assembly

1. Check clutch.

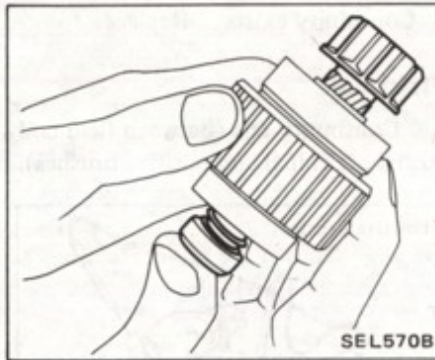
Check pinion to see that it locks properly when turned in “drive” direction and rotates smoothly when turned in reverse.



- Pinion does not lock in either direction or unusual resistance is evident ... Replace.

2. Check pinion movement (S114-304 unit only).

Check pinion to see if it moves smoothly.



- If it is hard to move, apply grease or, if necessary, replace.

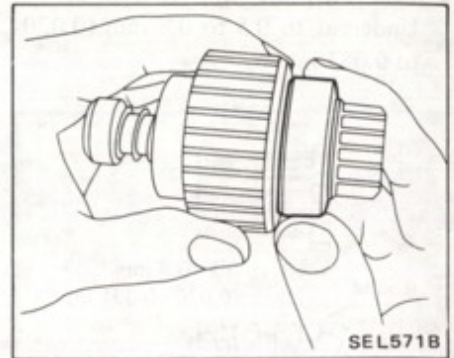
3. Inspect pinion teeth.

- If pinion teeth are worn or damaged, replace pinion. (Also check for condition of ring gear teeth.)

4. Inspect ball bearing (S114-304 unit only).

Spin outer race of ball bearing to

ensure that it turns smoothly without binding.



- Abnormal resistance ... Replace.

ASSEMBLY

To assemble, reverse order of disassembly. Note the following:

a. Apply grease to portions indicated in table below.

	S114-229F and -295	S114-304 and S13-45B
Grease point	<ul style="list-style-type: none"> • Rear cover metal • Gear case metal 	<ul style="list-style-type: none"> • Reduction gear • Rear cover metal • Gear case metal
	<ul style="list-style-type: none"> • Frictional surface of pinion • Functional area of shift lever • Sliding surface of magnetic switch plunger 	

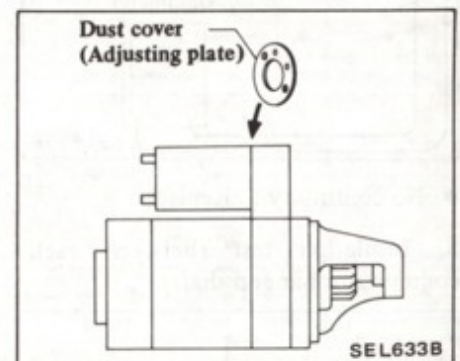
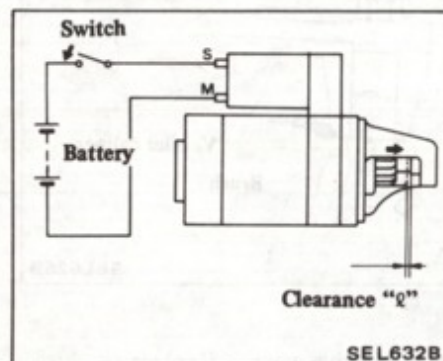
b. Check pinion to see if its protruded length is correct.

- Not in the specified value ... Adjust by dust cover (adjusting plate).

S114-229F, -295 and S13-45B

With pinion forced out by magnetic switch, push pinion back to remove slack and measure clearance “*q*” between the front edge of the pinion and the pinion stopper.

Clearance “*q*”:
Refer to S.D.S.

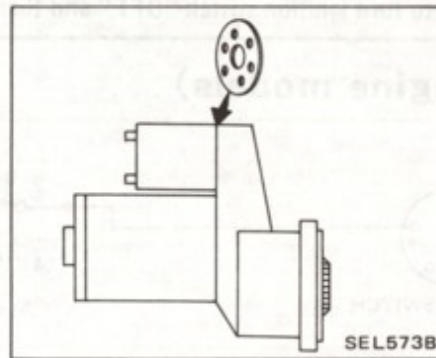
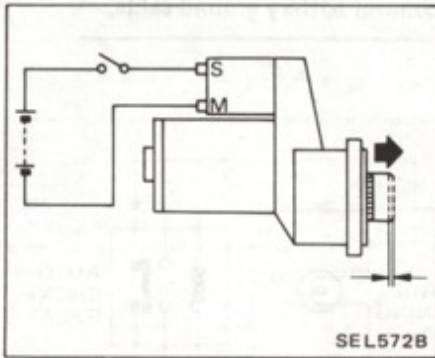


S114-304

Compare difference “*q*” in height of pinion when it is pushed out with magnetic switch energized and when it is pulled out by hand until it touches stopper.

Difference "ℓ":
Refer to S.D.S.

- Not in the specified value ... Adjust by dust cover (adjusting plate).



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

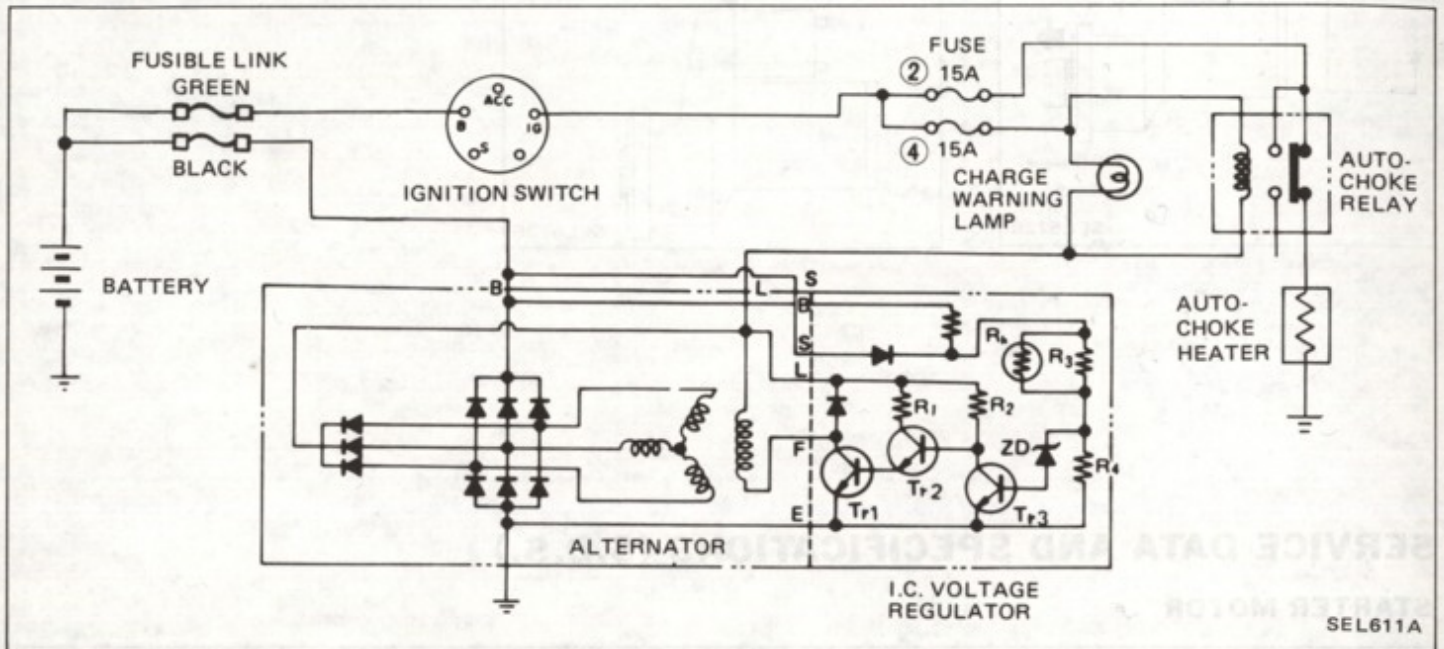
STARTER MOTOR

Type		S114-295	S114-229F	S114-304	S13-45B
		Non-reduction gear type		Reduction gear type	
Applied model		Gasoline engine models			Diesel engine model
		U.S.A. (A/T)	U.S.A. (M/T)	Canada (A/T, M/T)	
System voltage	V	12			
No load	Terminal voltage	11.5		11	12
	Current	Less than 60		Less than 100	Less than 150
	Revolution	rpm	More than 7,000	More than 6,000	More than 3,900
Outer diameter of commutator	mm (in)	More than 32 (1.26)		More than 29 (1.14)	More than 36.6 (1.441)
Minimum length of brush	mm (in)	12 (0.47)		11 (0.43)	7 (0.28)
Brush spring tension	N (kg, lb)	13.7 - 17.7 (1.4 - 1.8, 3.1 - 4.0)		15.7 - 19.6 (1.6 - 2.0, 3.5 - 4.4)	30.4 - 40.2 (3.1 - 4.1, 6.8 - 9.0)
Clearance between bearing metal and armature shaft	mm (in)	Less than 0.2 (0.008)		—	Less than 0.2 (0.008)
Clearance "ℓ" between pinion front edge and pinion stopper	mm (in)	0.3 - 2.5 (0.012 - 0.098)		—	0.3 - 1.5 (0.012 - 0.059)
Difference "ℓ" in height of pinion	mm (in)	—	—	0.3 - 1.5 (0.012 - 0.059)	—

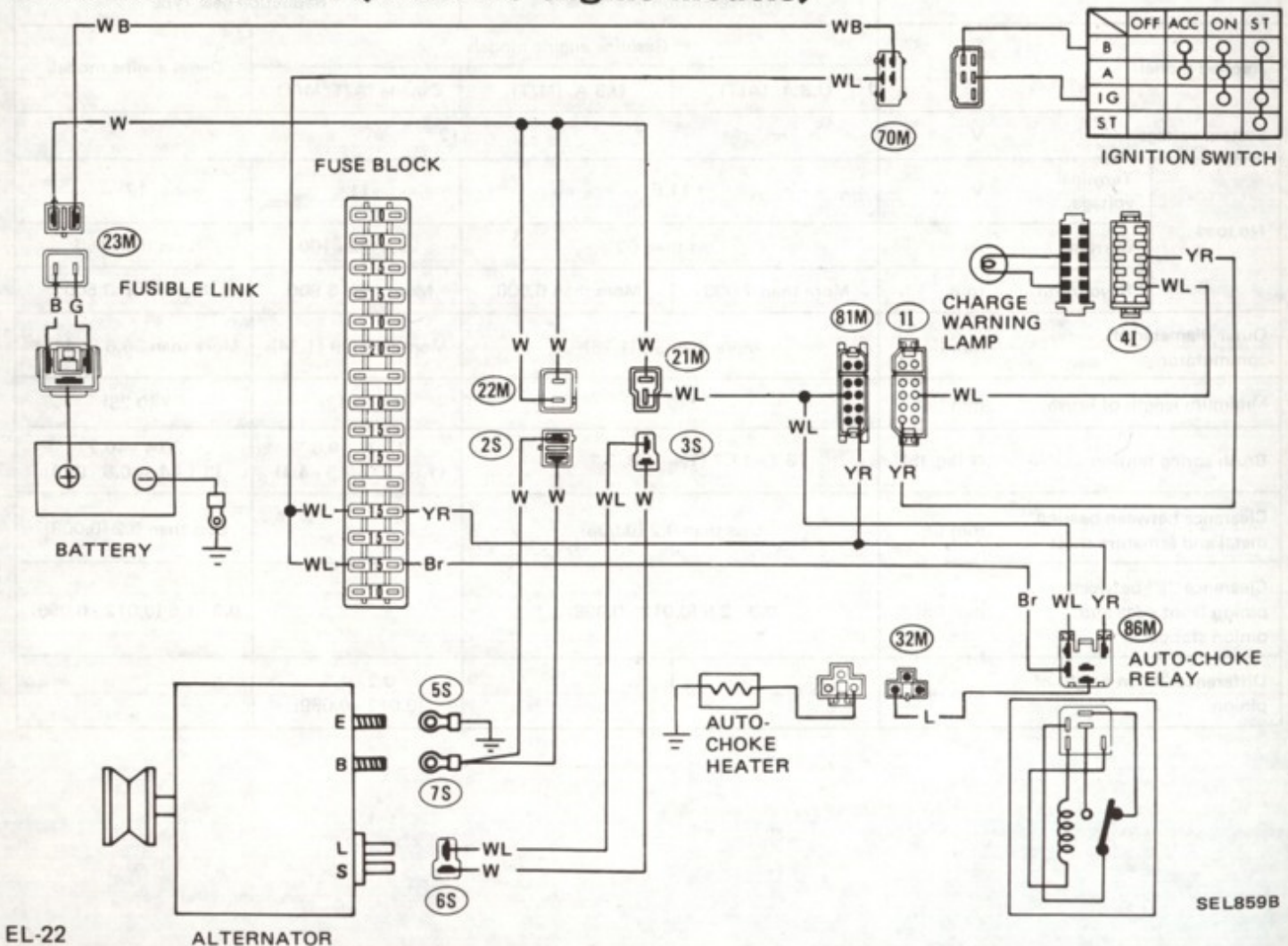
CHARGING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

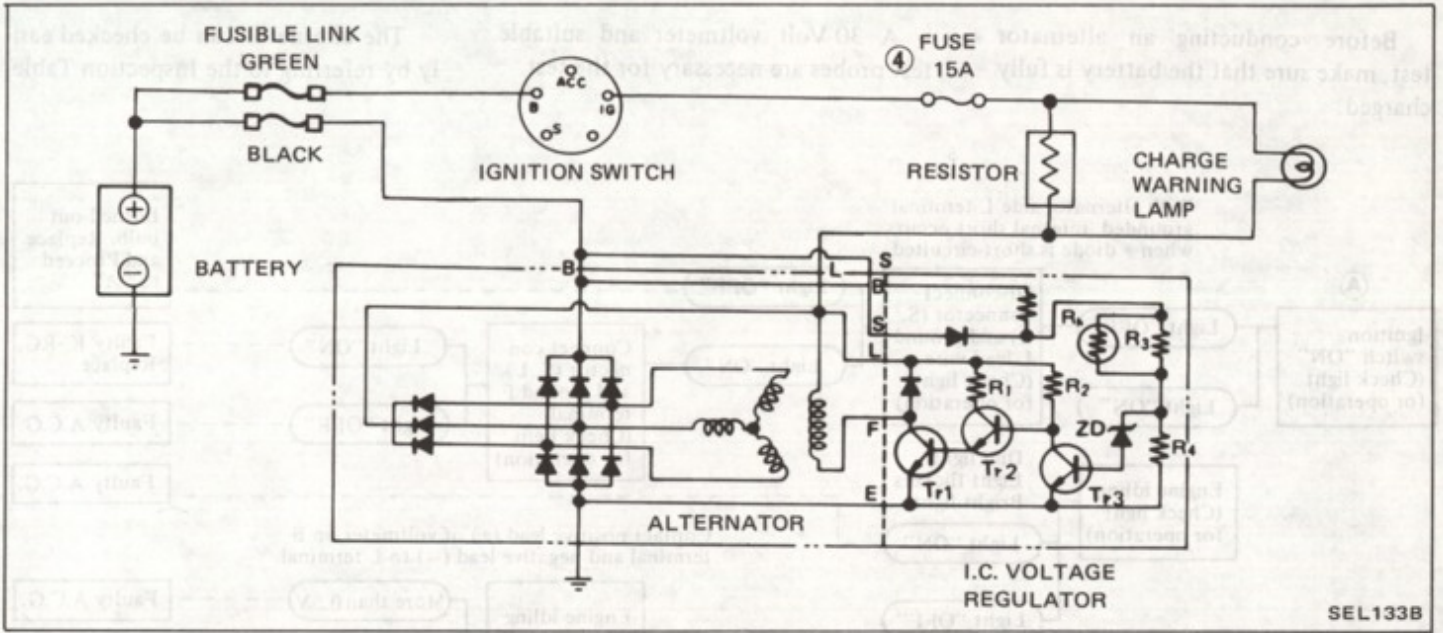
SCHEMATIC (Gasoline engine models)



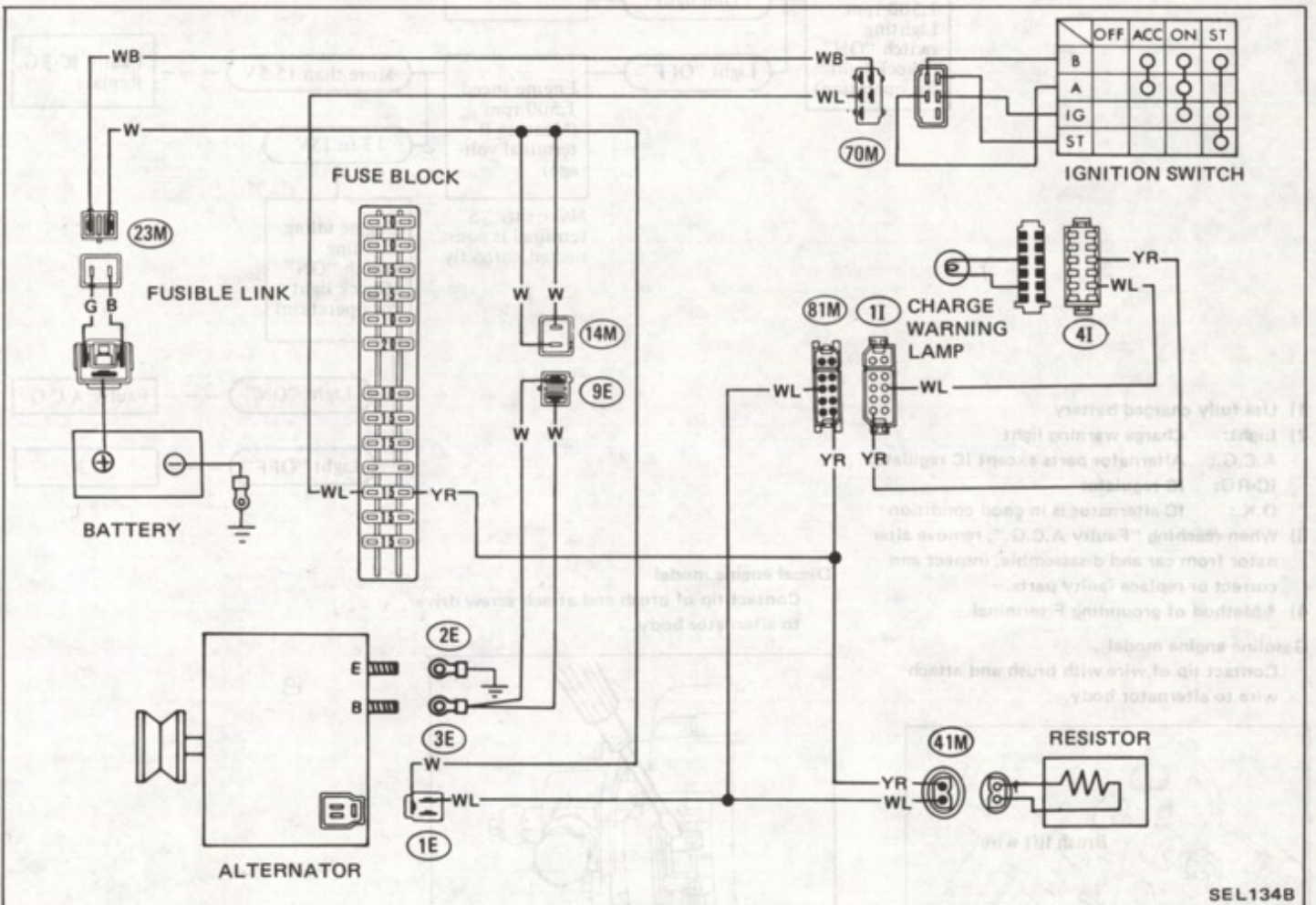
WIRING DIAGRAM (Gasoline engine models)



SCHEMATIC (Diesel engine models)



WIRING DIAGRAM (Diesel engine models)

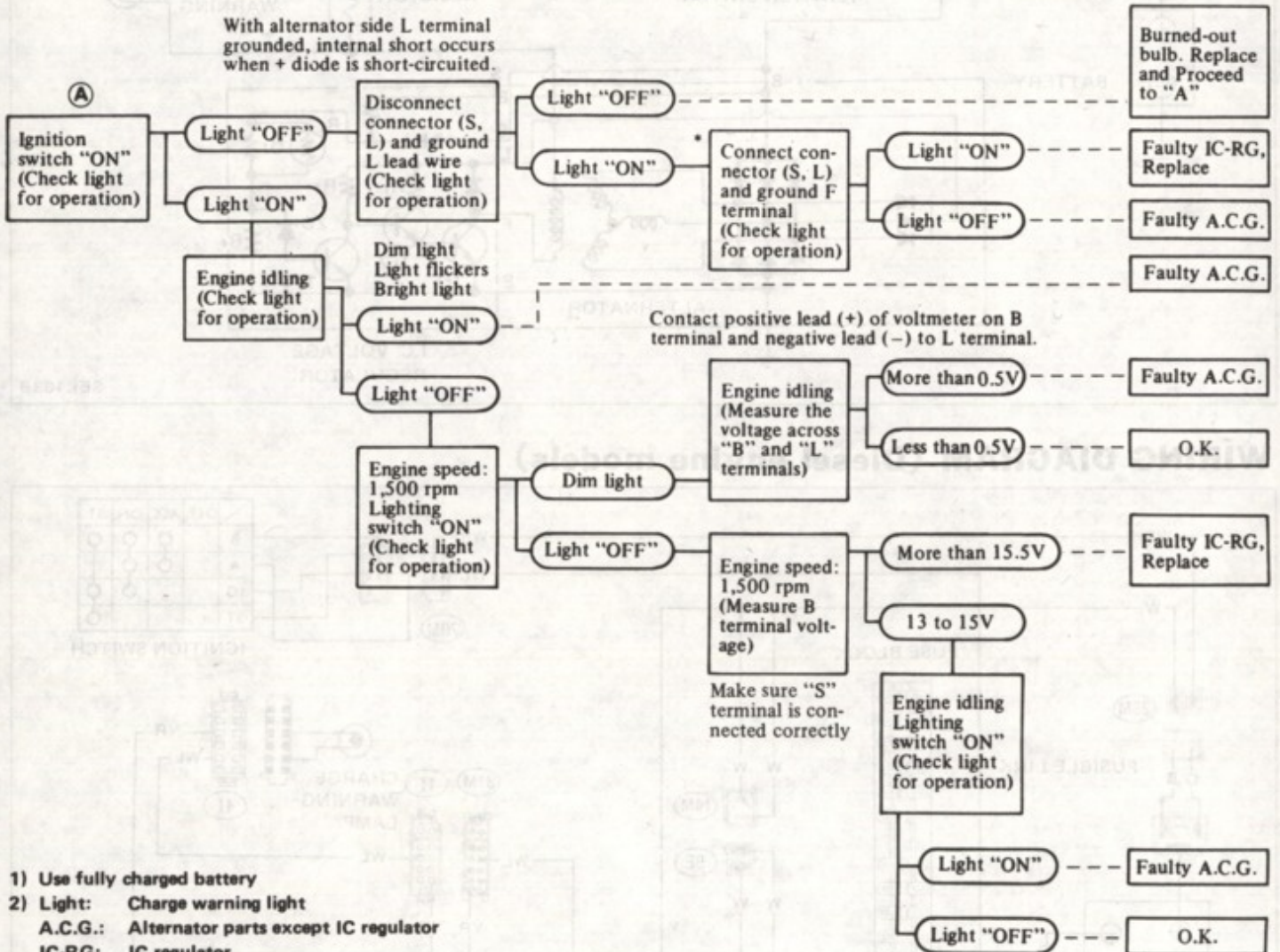


CHARGING SYSTEM TROUBLE-SHOOTING

Before conducting an alternator test, make sure that the battery is fully charged.

A 30-Volt voltmeter and suitable test probes are necessary for the test.

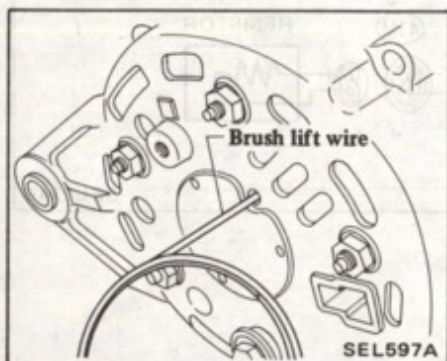
The alternator can be checked easily by referring to the Inspection Table.



- 1) Use fully charged battery
- 2) Light: Charge warning light
A.C.G.: Alternator parts except IC regulator
IC-RG: IC regulator
O.K.: IC-alternator is in good condition
- 3) When reaching "Faulty A.C.G.", remove alternator from car and disassemble, inspect and correct or replace faulty parts.
- 4) * Method of grounding F terminal

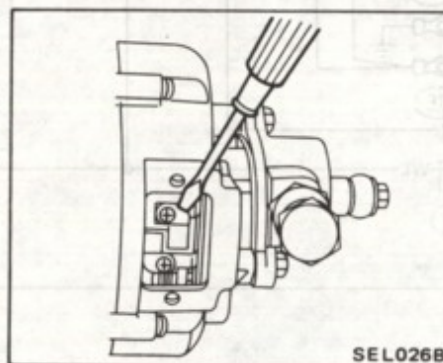
Gasoline engine model

Contact tip of wire with brush and attach wire to alternator body.



Diesel engine model

Contact tip of brush and attach screw driver to alternator body.



- 5) Terminals "S", "L", "BAT" and "E" are marked on rear cover of alternator.

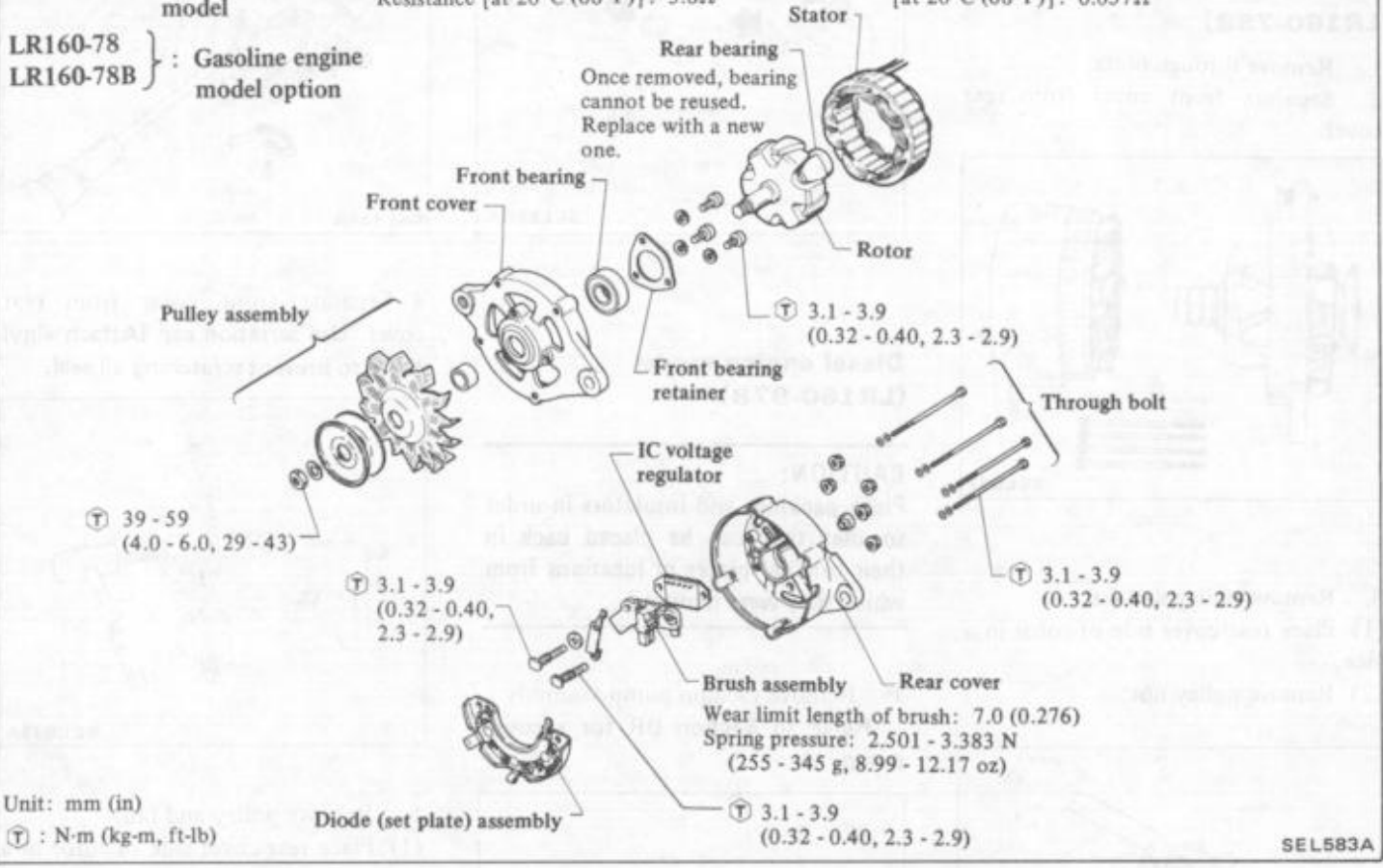
ALTERNATOR

LR150-98B: Gasoline engine model

Slip ring dia.: more than 30 (1.18)
Resistance [at 20°C (68°F)]: 3.8Ω

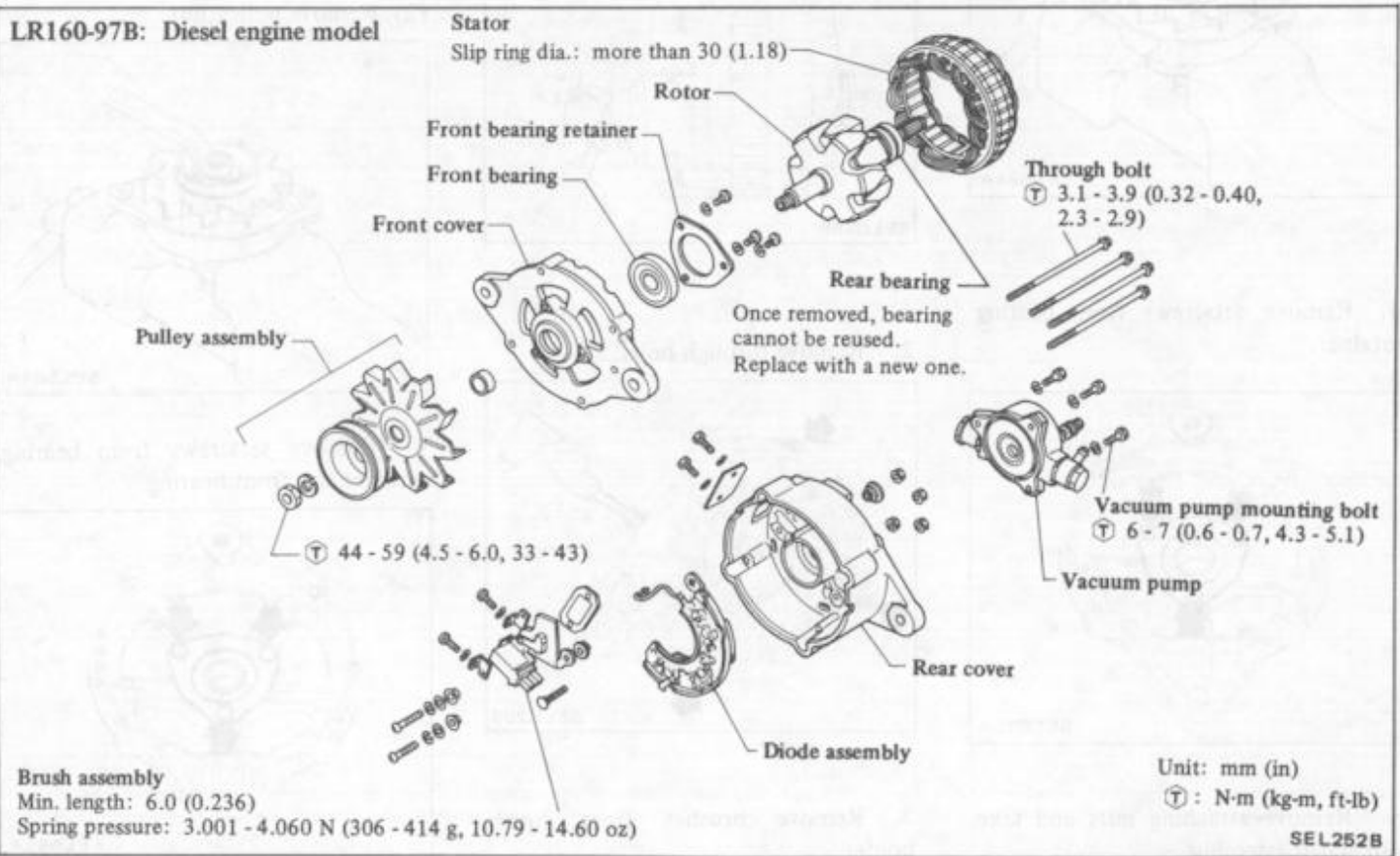
Resistance per phase [at 20°C (68°F)]: 0.057Ω

LR160-78 } : Gasoline engine model option
LR160-78B }



LR160-97B: Diesel engine model

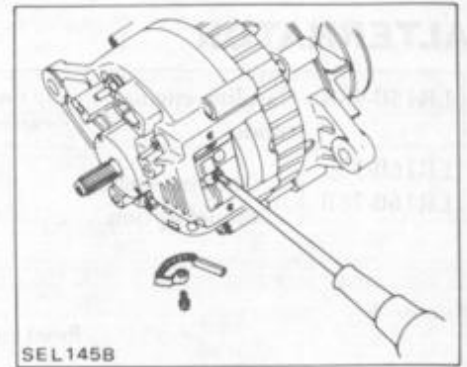
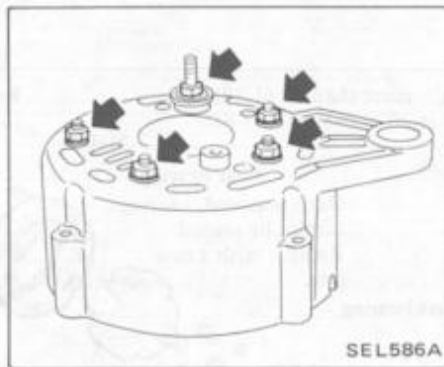
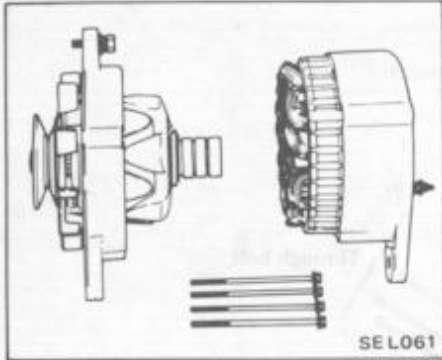
Stator
Slip ring dia.: more than 30 (1.18)



DISASSEMBLY

**Gasoline engine model
(LR150-98B, LR160-78,
LR160-78B)**

1. Remove through bolts.
2. Separate front cover from rear cover.

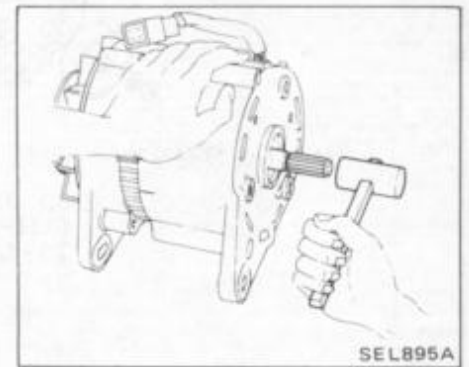


**Diesel engine model
(LR160-97B)**

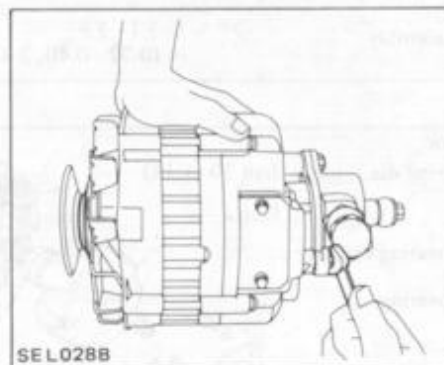
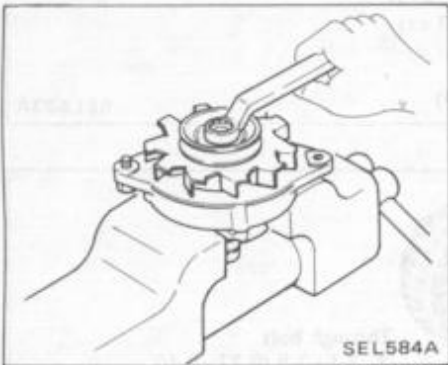
CAUTION:
Place packings and insulators in order so that they can be placed back in their original places or locations from which they were removed.

1. Remove vacuum pump assembly. Refer to Section BR for vacuum pump.

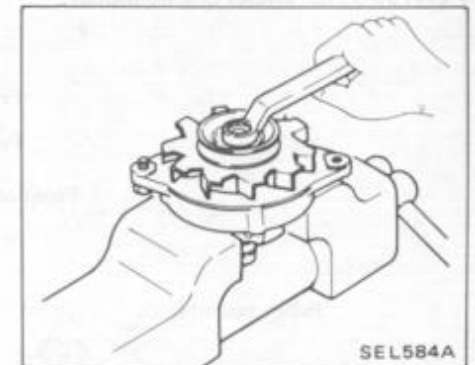
4. Separate front cover from rear cover. Use serration cap (Attach vinyl tape) to prevent scratching oil seal.



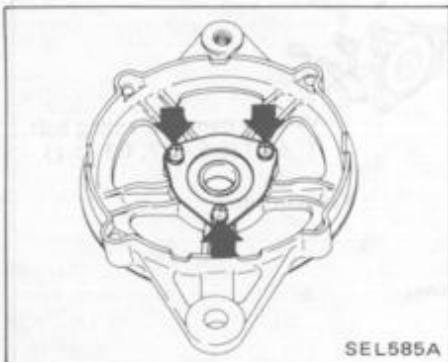
3. Remove pulley and fan.
 - (1) Place rear cover side of rotor in a vice.
 - (2) Remove pulley nut.



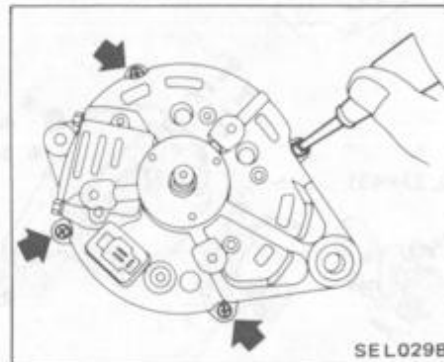
5. Remove pulley and fan.
 - (1) Place rear cover side of rotor in a vice.
 - (2) Remove pulley nut.



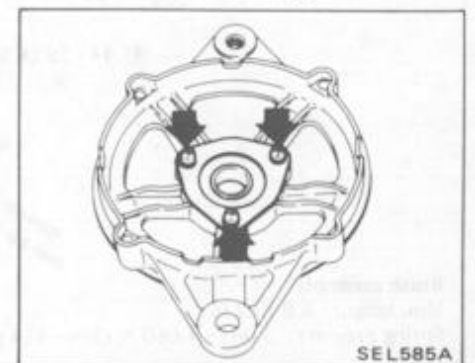
4. Remove setscrews from bearing retainer.



2. Remove through bolts.



6. Remove setscrews from bearing retainer and front bearing.

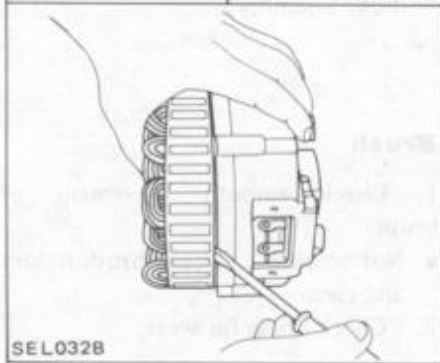
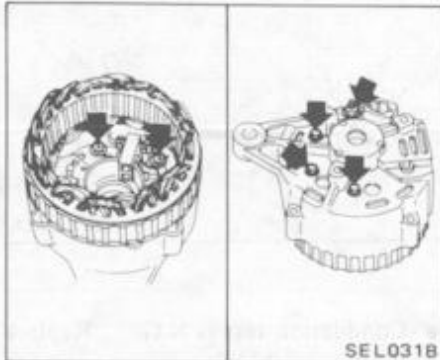


5. Remove attaching nuts and take out stator assembly.

3. Remove brushes from brush holder.

7. Remove brush holder fixing screws and diode assembly attaching nuts.

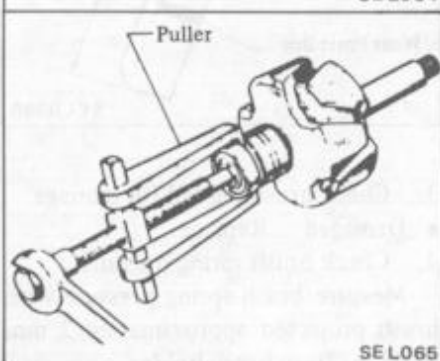
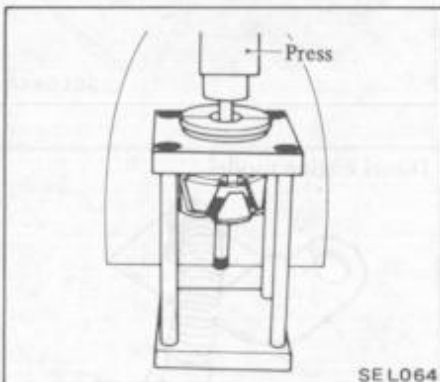
Take out stator assembly together with diode assembly.



Rotor

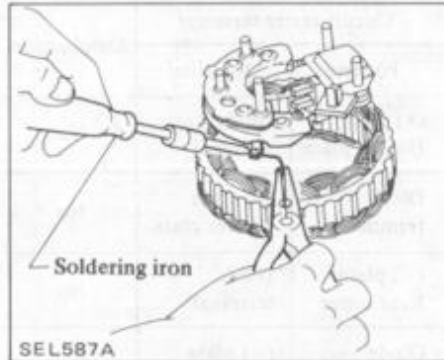
Pull rear bearing off from rotor assembly with a press or bearing puller.

Once removed, bearing cannot be reused. Replace with a new one.



Stator

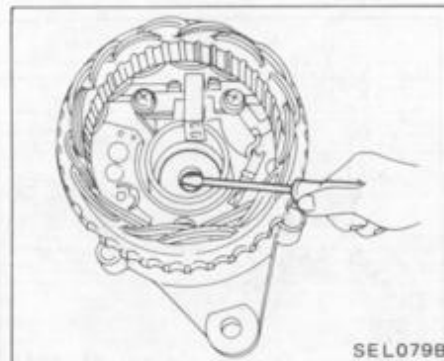
Disconnect stator coil lead wires from diode terminals.



**Replacement of oil seal:
Only diesel engine model**

If oil leaks from oil seal or any abnormalities are found after inspection, replace oil seal.

1. Pry off oil seal.

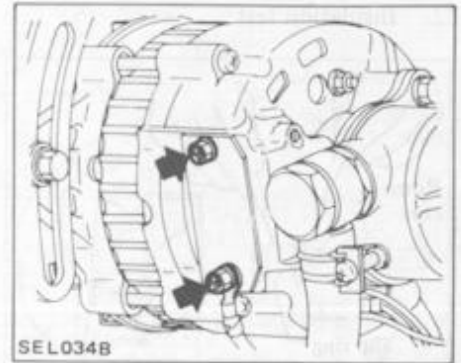


2. Apply engine oil to seal and install oil seal in position.

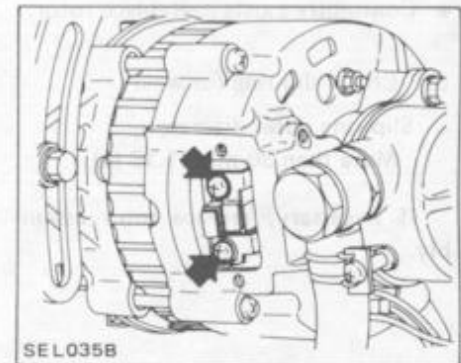


**Replacement of brush (On vehicle):
Only diesel engine model**

1. Disconnect battery ground cable.
2. Remove brush cover.



3. Remove brush from brush holder.



When replacing brush, both brushes should be replaced.

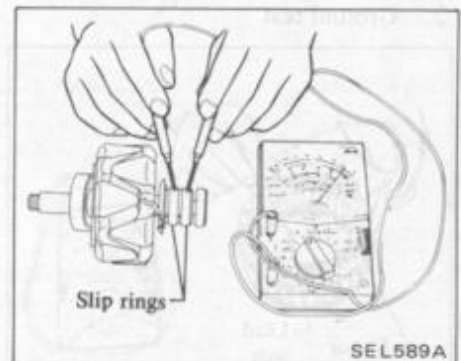
4. Install new brush and brush cover.



INSPECTION

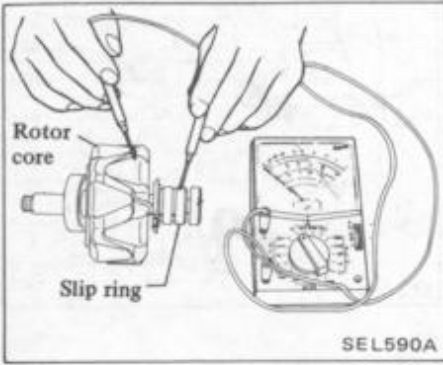
Rotor

1. Continuity test.



● No continuity ... Replace rotor.

2. Insulation test



- Continuity exists ... Replace rotor.

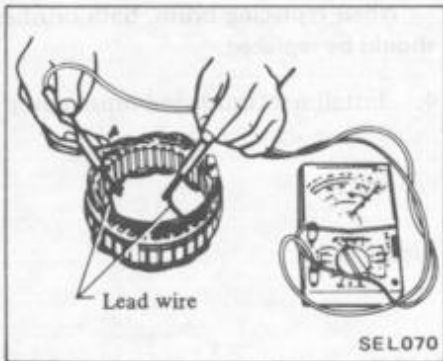
3. Check slip ring for wear.

Slip ring outer diameter:
More than 30 mm (1.18 in)

If necessary, replace rotor assembly.

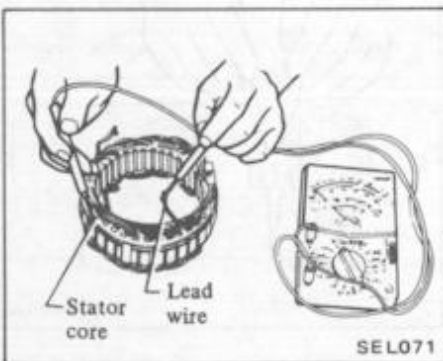
Stator

1. Continuity test



- No continuity ... Replace stator.

2. Ground test



- Continuity exists ... Replace stator.

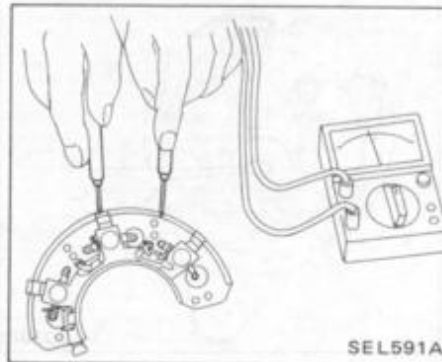
Diode

Perform a continuity test on diodes in both directions, using an ohmmeter.

Circuit tester terminal		Conduction
Positive	Negative	
(+) plate Holder plate	Diode terminal	Yes
Diode terminal	(+) plate Holder plate	No
(-) plate Rear cover	Diode terminal	No
Diode terminal	(-) plate Rear cover	Yes

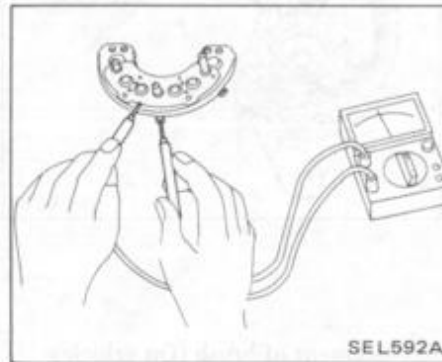
Some ohmmeters use a reverse polarity, in which case continuity will be observed exactly opposite from the chart above.

Positive diode



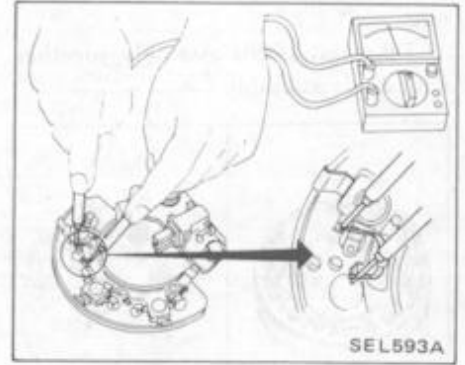
- Conduction test is N.G. ... Replace diode assembly.

Negative diode



- Conduction test is N.G. ... Replace diode assembly.

Sub-diode



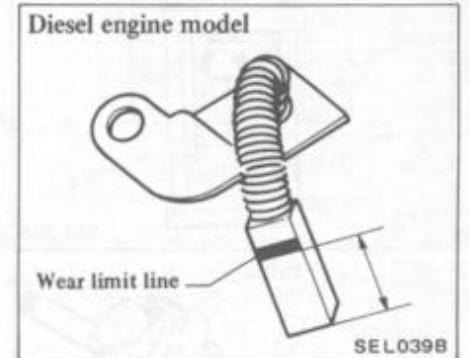
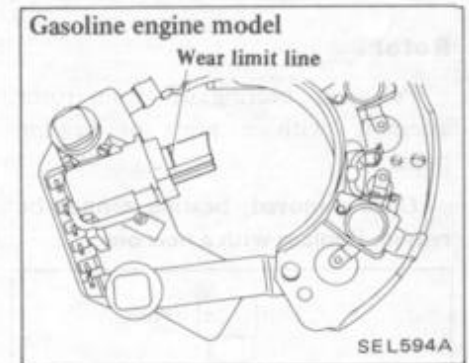
- Conduction test is N.G. ... Replace diode assembly.

Brush

1. Check smooth movement of brush.

- Not smooth ... Check brush holder and clean.

2. Check brush for wear.



3. Check brush pig tail for damage.

- Damaged ... Replace.

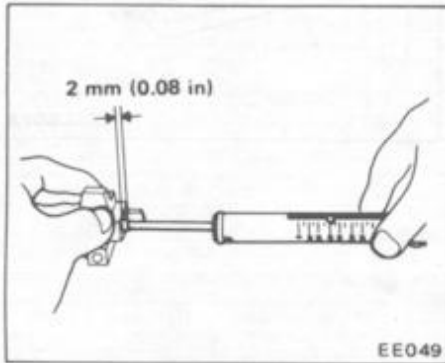
4. Check brush spring pressure.

Measure brush spring pressure with brush projected approximately 2 mm (0.08 in) from brush holder.

Spring pressure:

- Gasoline engine model
 - 2.501 - 3.383 N
 - (255 - 345 g,
 - 8.99 - 12.17 oz)
- Diesel engine model
 - 3.001 - 4.060 N
 - (306 - 414 g,
 - 10.79 - 14.60 oz)

When brush is worn, pressure decreases approximately 0.196 N (20 g, 0.71 oz) per 1 mm (0.04 in) wear.



- Not in the specified value ... Replace brush assembly.

Oil seals (Only diesel engine model)

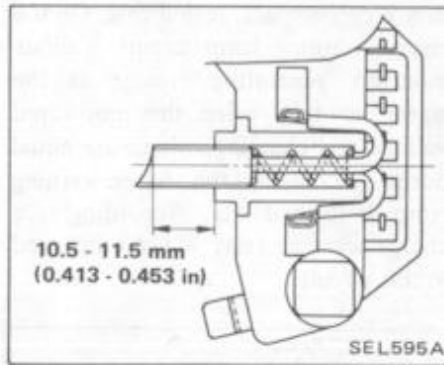
Check oil seal for wear, cracks or deformation. Replace if necessary.

ASSEMBLY

Gasoline engine model (LR150-98B, LR160-78, LR160-78B)

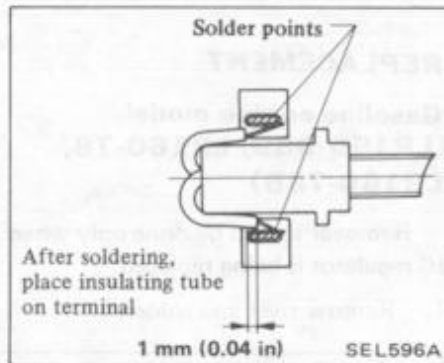
Assemble alternator in the reverse order of disassembly, noting the following:

1. When soldering each stator coil lead wire to diode assembly terminal, carry out the operation as fast as possible.
2. When soldering brush lead wire, observe the following.
 - (1) Position brush so that it extends 11 mm (0.43 in) from brush holder.



- (2) Coil lead wire 1.5 times around terminal groove. Solder outside of terminal.

When soldering, be careful not to let solder adhere to insulating tube as it will weaken the tube and cause it to break.

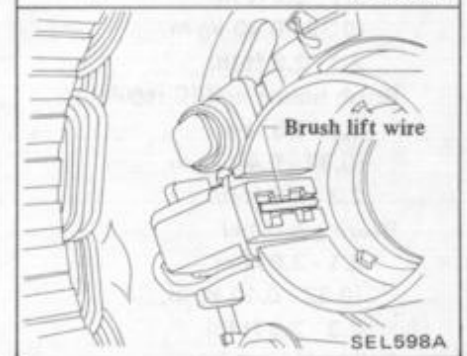
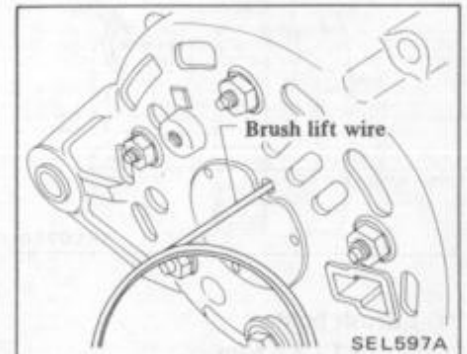


- Ⓣ : Brush holder
 - 3.1 - 3.9 N·m
 - (0.32 - 0.40 kg·m,
 - 2.3 - 2.9 ft·lb)
- Diode and IC regulator
 - 3.1 - 3.9 N·m
 - (0.32 - 0.40 kg·m,
 - 2.3 - 2.9 ft·lb)
- Bearing retainer
 - 3.1 - 3.9 N·m
 - (0.32 - 0.40 kg·m,
 - 2.3 - 2.9 ft·lb)

3. Tighten pulley nut and make sure that deflection of V-groove is proper.

- Ⓣ : Pulley nut
 - 39 - 59 N·m
 - (4.0 - 6.0 kg·m,
 - 29 - 43 ft·lb)
- V-groove deflection:
 - 0.3 mm (0.012 in)

4. Before installing front and rear sides of alternator, push brush up with fingers and retain brush, by inserting brush lift wire into brush lift hole from outside.



5. After installing front and rear sides of alternator, pull brush lift wire by pushing toward center.

Do not pull brush lift by pushing toward outside of cover as it will damage slip ring sliding surface.

6. Tighten through bolts.

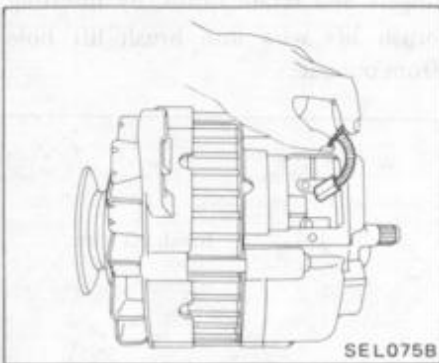
- Ⓣ : Through bolts
 - 3.1 - 3.9 N·m
 - (0.32 - 0.40 kg·m,
 - 2.3 - 2.9 ft·lb)

Diesel engine model (LR160-97B)

Assemble alternator in the reverse order of disassembly, noting the following:

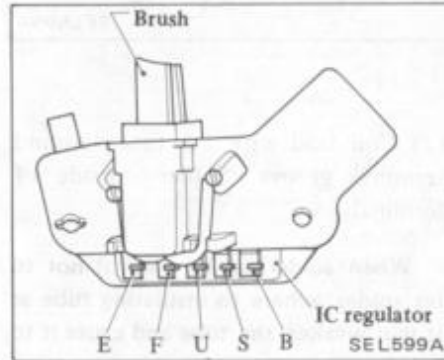
1. When soldering each stator coil lead wire to diode assembly terminal, carry out the operation as fast as possible.

2. After assembling front and rear sides of covers, install brushes.



- Ⓣ : Brush holder
 3.1 - 3.9 N·m
 (0.32 - 0.40 kg·m,
 2.3 - 2.9 ft·lb)
- Brush holder and IC regulator
 3.1 - 3.9 N·m
 (0.32 - 0.40 kg·m,
 2.3 - 2.9 ft·lb)
- Bearing retainer
 3.1 - 3.9 N·m
 (0.32 - 0.40 kg·m,
 2.3 - 2.9 ft·lb)
- Pulley nut
 44 - 59 N·m
 (4.5 - 6.0 kg·m,
 33 - 43 ft·lb)
- V-groove deflection:
 0.3 mm (0.012 in)
- Through bolts
 3.1 - 3.9 N·m
 (0.32 - 0.40 kg·m,
 2.3 - 2.9 ft·lb)
- Vacuum pump fixing bolt
 6 - 7 N·m
 (0.6 - 0.7 kg·m,
 4.3 - 5.1 ft·lb)

in a very compact, sealed case. On the charge warning lamp circuit, a diode monitors generating voltage at the stator so that when the monitored voltage and charging voltage are equal during re-charging, the charge warning lamp is turned off. Accordingly, a charge warning relay is not employed in this circuit.

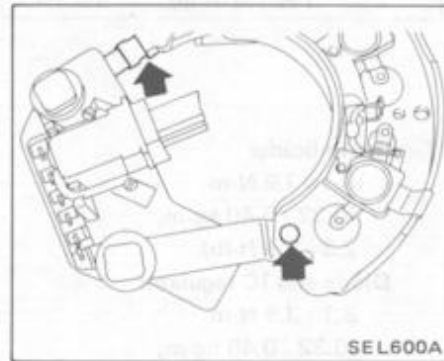


REPLACEMENT

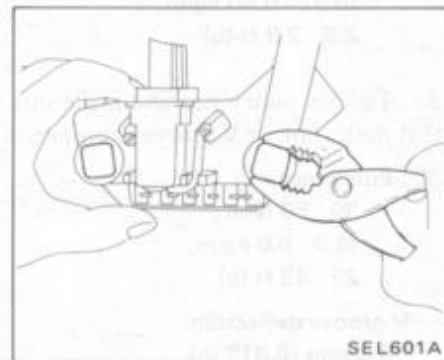
Gasoline engine model (LR150-98B, LR160-78, LR160-78B)

Removal should be done only when IC regulator is being replaced.

1. Remove rivet and solder.

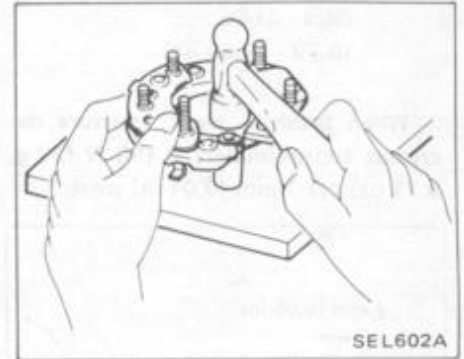


2. Remove the terminal's solder and take out bolts.



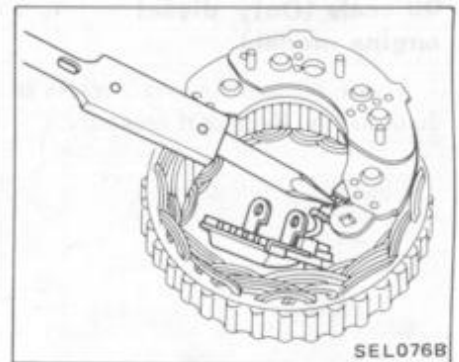
3. When installing the regulator, reverse order of removal, noting the following.

- (1) Put IC regulator on brush holder and press-fit bolts using hand press.
- (2) Stake rivets using Tool.

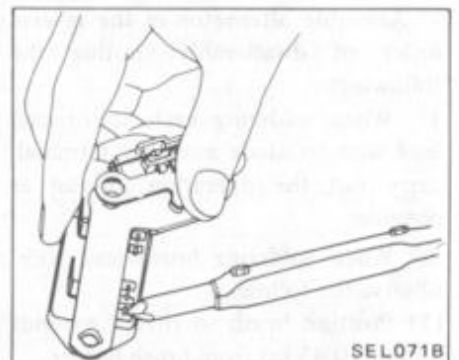


Diesel engine model (LR160-97B)

1. Disconnect terminal block from diode assembly.



2. Unsolder the terminal of regulator and terminal block connection.



IC VOLTAGE REGULATOR

DESCRIPTION

The regulator consists essentially of integrated circuits incorporating transistors. These transistors interrupt and admit current flow to the alternator rotor coil, thus maintaining its output voltage at a constant value. Unlike in a mechanical type regulator, an electronic relay employing transistors is utilized. These transistors are enclosed

3. Solder the terminal of regulator and terminal block connection.
4. Install terminal block (IC regulator).



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

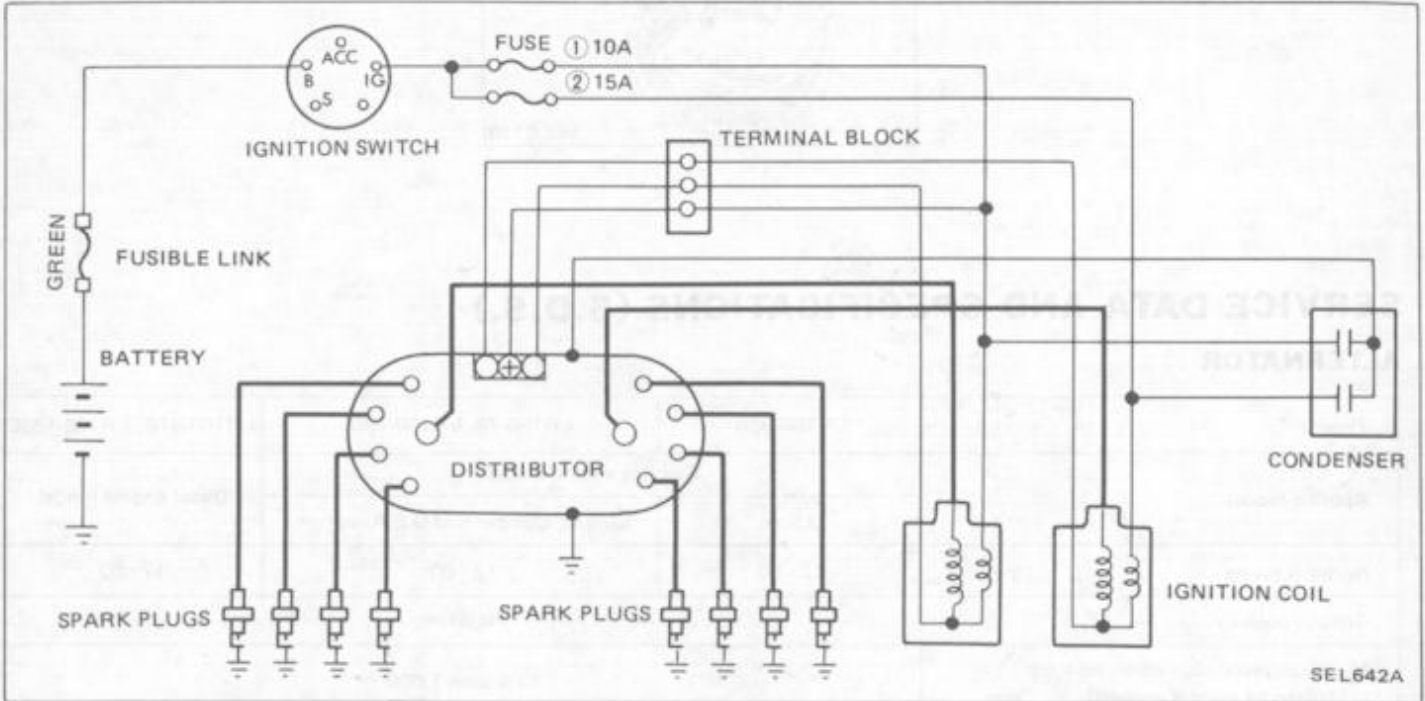
ALTERNATOR

Type		LR150-98B	LR160-78, LR160-78B	LR160-97B, LR150-133E
Applied model		Gasoline engine model		Diesel engine model
		U.S.A.	Canada, Camper and U.S.A. option	
Nominal rating	V-A	12 - 50	12 - 60	12 - 50
Ground polarity		Negative		
Minimum revolution under no-load (When 14 volts is applied)	rpm	Less than 1,000		
Hot output current	A/rpm	More than 40/2,500 More than 50/5,000	More than 50/2,500 More than 60/5,000	More than 16/1,300 More than 42/2,500 More than 50/5,000
Regulated output voltage	V	14.4 - 15.0		
Wear limit length of brush	mm (in)	More than 7 (0.28)		More than 6 (0.24)
Brush spring pressure	N (g, oz)	2.501 - 3.383 (255 - 345, 8.99 - 12.17)		3.001 - 4.060 (306 - 414, 10.79 - 14.60)
Slip ring outer diameter	mm (in)	More than 30 (1.18)		

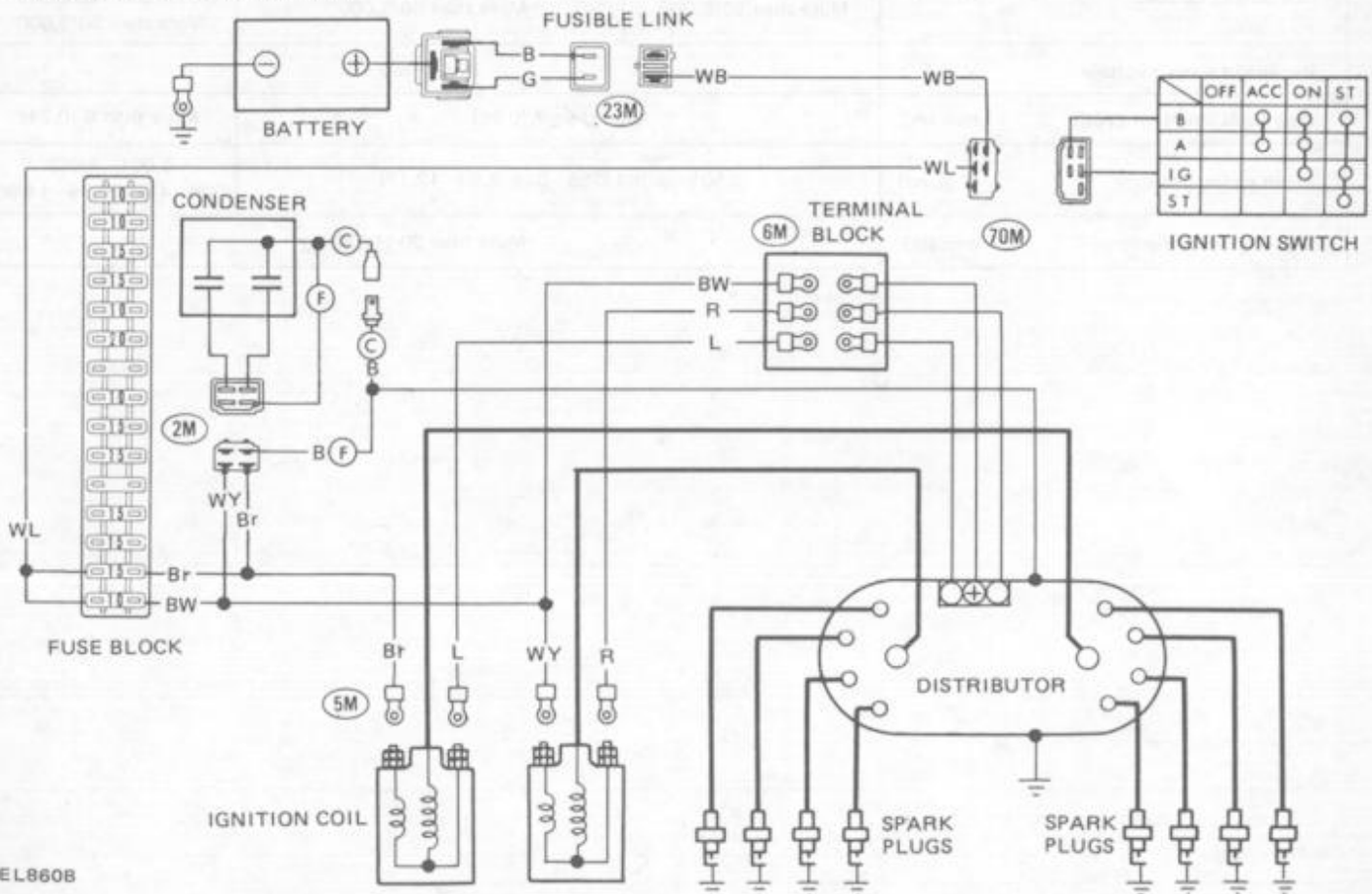
IGNITION SYSTEM (Gasoline engine model)

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

SCHEMATIC

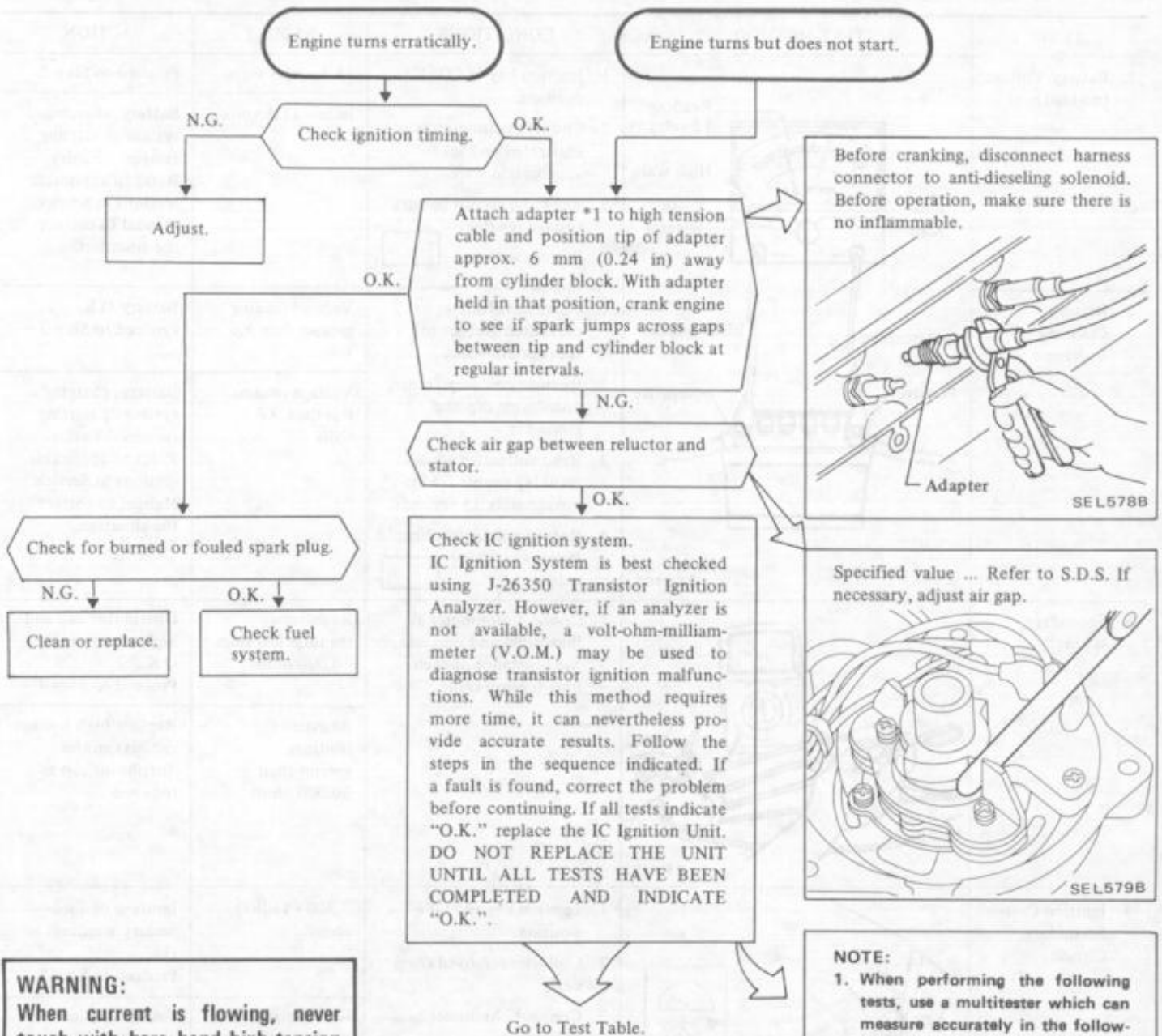


WIRING DIAGRAM

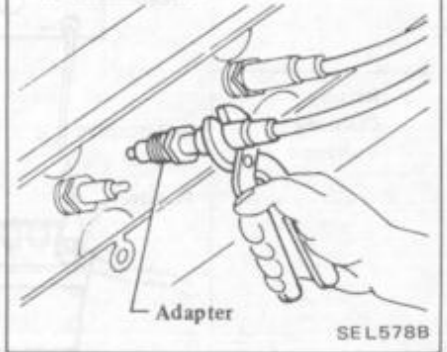


SEL860B

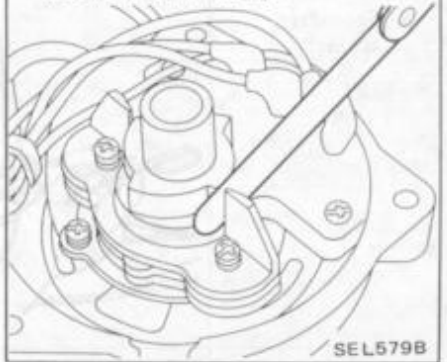
IC IGNITION SYSTEM TROUBLE-SHOOTING



Before cranking, disconnect harness connector to anti-dieseling solenoid. Before operation, make sure there is no inflammable.



Specified value ... Refer to S.D.S. If necessary, adjust air gap.

**WARNING:**

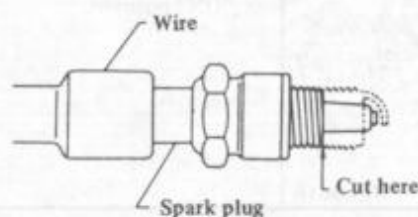
When current is flowing, never touch with bare hand high tension cables or any other parts with high voltage. If parts are moist, touching them could cause an electric shock, even if they are insulated. Always wear dry, well-insulated gloves or wrap affected parts with dry cloth before handling.

NOTE:

- When performing the following tests, use a multimeter which can measure accurately in the following ranges; 0 to 20V. D.C.; 0 to 1,000 Ω ; 0 to 10V A.C.; 0 to 50,000 Ω .
- If possible, start the vehicles and let it run for 5 to 15 minutes with the hood closed. This will bring all components to normal operating temperature, and will make it easier to diagnose intermittent problems.
- It is not necessary to disconnect the harness connectors when performing the tests which follow. Simply insert the meter probes into the back of appropriate connector cavity.

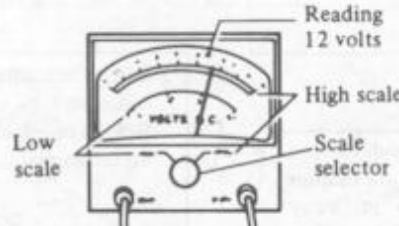
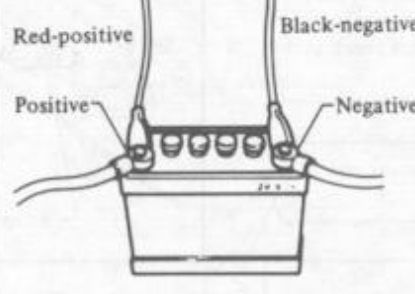
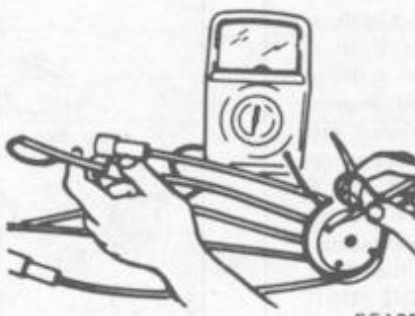
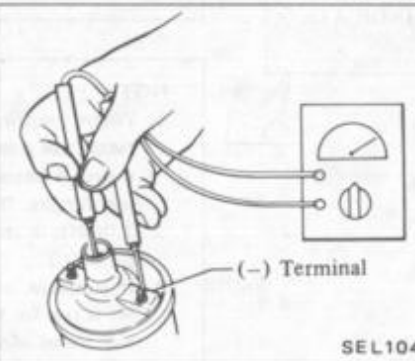
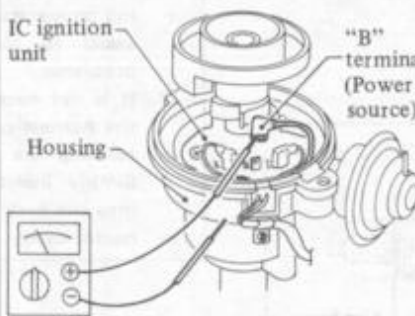
*1:

Preparation of spark plug for checking
Many things can be utilized as an adapter. However, it is recommended that a used spark plug whose threaded portion has been half cut off as shown in the figure be utilized.



SEL581B

TEST TABLE

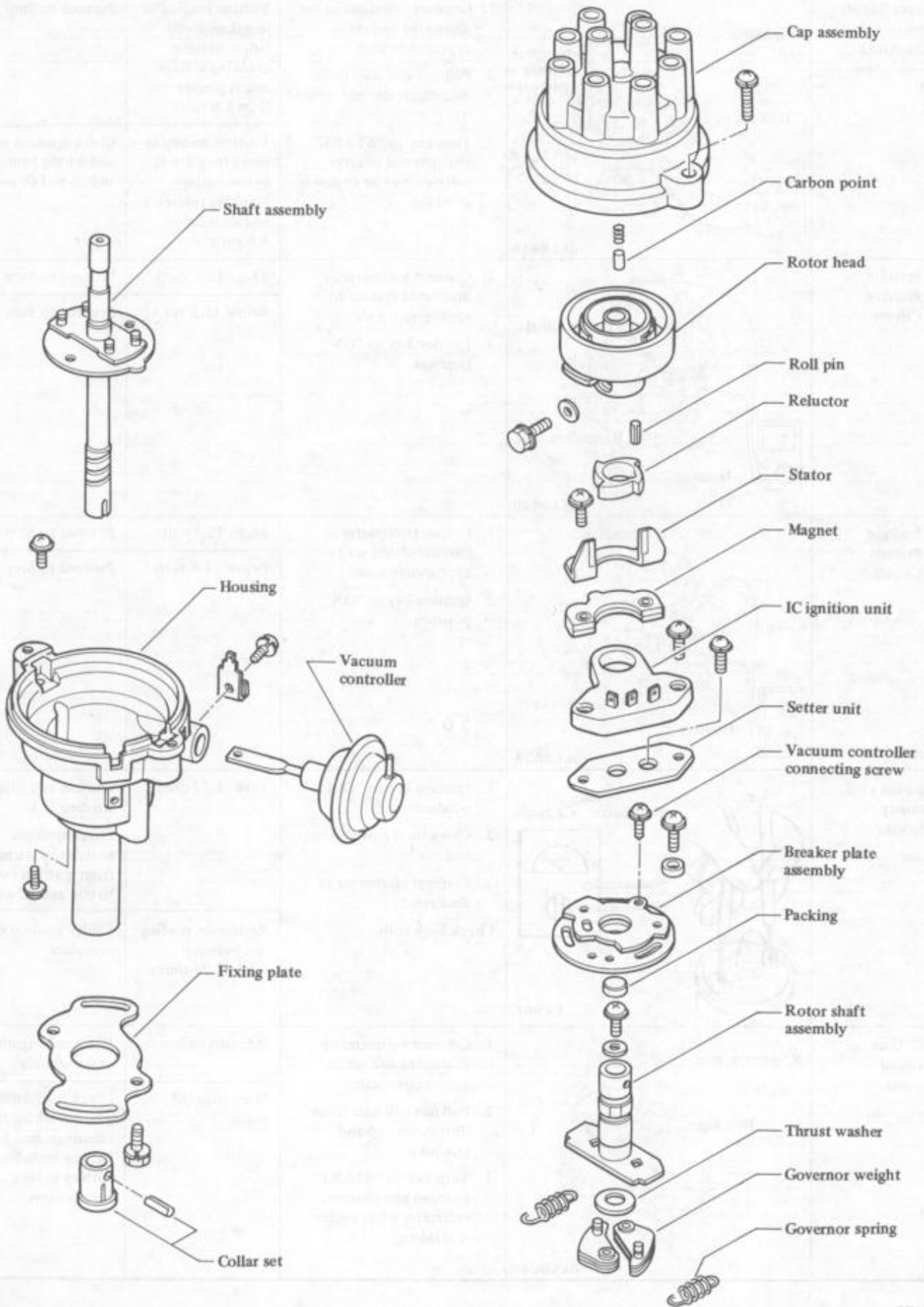
TEST	TEST METHOD	CONDITIONS	RESULT	ACTION
1. Battery Voltage (no load)		1. Ignition key in "OFF" position. 2. Connect voltmeter as illustrated and set to appropriate scale. 3. Read and record battery voltage reading. Battery voltage <input type="text"/>	11.5 - 12.5 volts	Proceed to Step 2.
			Below 11.5 volts	Battery, charging system or starting system – Faulty. Refer to applicable sections in Service Manual to correct the situation.
2. Battery Cranking Voltage	 <p style="text-align: right;">SEL103</p>	1. Connect voltmeter as illustrated and set to appropriate scale. 2. Remove coil wire from distributor cap and ground it. 3. Read voltmeter while cranking engine for approximately 15 seconds. 4. Record voltage reading. Battery cranking voltage <input type="text"/>	Voltage reading greater than 9.6 volts	Battery O.K. Proceed to Step 3.
			Voltage reading less than 9.6 volts	Battery, charging system or starting system – Faulty. Refer to applicable sections in Service Manual to correct the situation.
3. Secondary Wiring	 <p style="text-align: right;">EF125</p>	1. Connect ohmmeter as illustrated and measure the resistance of each high tension cable.	Resistance readings less than 30,000 ohms	Distributor cap and high tension cables – O.K. Proceed to Step 4.
			Resistance readings greater than 30,000 ohms	Replace high tension cable(s) and/or distributor cap as required.
4. Ignition Coil Secondary Circuit	 <p style="text-align: right;">SEL104</p>	1. Ignition key in "OFF" position. 2. Coil wire removed from coil. 3. Connect ohmmeter as illustrated Check both coils.	7,300 - 11,000 ohms	Ignition coil secondary windings – O.K. Proceed to Step 5.
			Resistance reading not between 7,300 - 11,000 ohms	Faulty ignition coil – replace
5. Power Supply Circuit	 <p style="text-align: right;">SEL861B</p>	1. Connect voltmeter as illustrated and set to appropriate scale. 2. Turn ignition key to "ON" position.	11.5 - 12.5 volts	Proceed to Step 6.
			Below 11.5 volts	Check wiring from ignition switch to I.C. unit.

(Continued next page)

ELECTRICAL SYSTEM – Ignition System (Gasoline engine model)

TEST	TEST METHOD	CONDITIONS	RESULT	ACTION
6. Power Supply Circuit (Cranking)	<p>IC ignition unit Housing "B" terminal (Power source)</p> <p>SEL861B</p>	<ol style="list-style-type: none"> 1. Connect voltmeter as illustrated and set to appropriate scale. 2. Pull out coil wire from distributor cap and ground it. 3. Turn key to "START" position and observe voltmeter while engine is cranking. 	<p>Voltage reading is less than 1 volt below battery cranking voltage and is greater than 8.6 volts.</p> <p>Voltage reading is more than 1 volt below battery cranking voltage and/or is below 8.6 volts.</p>	<p>Proceed to Step 7-A.</p> <p>Check ignition switch and wiring from switch to I.C. unit.</p>
7-A. Ignition Primary Circuit	<p>"I" terminal IC ignition unit Housing</p> <p>SEL862B</p>	<ol style="list-style-type: none"> 1. Connect voltmeter as illustrated and set to appropriate scale. 2. Ignition key in "ON" position. 	<p>11.5 - 12.5 volts</p> <p>Below 11.5 volts</p>	<p>Proceed to Step 7-B.</p> <p>Proceed to Step 8.</p>
7-B. Ignition Primary Circuit	<p>"E" terminal IC ignition unit Housing</p> <p>SEL863B</p>	<ol style="list-style-type: none"> 1. Connect voltmeter as illustrated and set to appropriate scale. 2. Ignition key in "ON" position. 	<p>11.5 - 12.5 volts</p> <p>Below 11.5 volts</p>	<p>Proceed to Step 9.</p> <p>Proceed to Step 8.</p>
8. Ignition Coil Primary Circuit	<p>Resistance: $\times 1$ range</p> <p>EE567</p>	<ol style="list-style-type: none"> 1. Ignition key in "OFF" position. 2. Coil wire removed from coil. 3. Connect ohmmeter as illustrated. <p>Check both coils.</p>	<p>1.04 - 1.27 ohms</p> <p>Resistance reading not between 1.04 - 1.27 ohms</p>	<p>Ignition coil primary winding O.K.</p> <p>Check ignition switch and wiring from ignition switch to coil and IC unit.</p> <p>Faulty ignition coil – replace.</p>
9. I.C. Unit Ground Circuit	<p>IC ignition unit Housing</p> <p>SEL864B</p>	<ol style="list-style-type: none"> 1. Connect voltmeter as illustrated and set to appropriate scale. 2. Pull out coil wire from distributor cap and ground it. 3. Turn key to "START" position and observe voltmeter while engine is cranking. 	<p>0.5 volts or less</p> <p>More than 0.5 volts</p>	<p>Replace IC ignition unit assembly.</p> <p>Check distributor ground, wiring from chassis ground to battery including battery cable connections.</p>

DISTRIBUTOR (IC type)



SEL865B

CHECKING AND ADJUSTMENT

Cap and rotor head

Check cap and rotor head for dust, carbon deposits and cracks.

Advance mechanisms

Specifications

Refer to S.D.S.

Vacuum advance mechanism mechanical parts

1. Check vacuum inlet for signs of leakages at its connection.
2. Check vacuum diaphragm for air leak.

If leak is found, replace vacuum controller assembly.

3. Inspect breaker plate for smooth moving.

If plate does not move smoothly, this condition could be due to sticky steel balls or pivot. Apply grease to steel balls or, if necessary, replace breaker plate as an assembly.

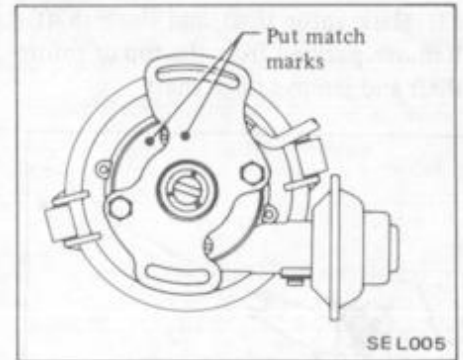
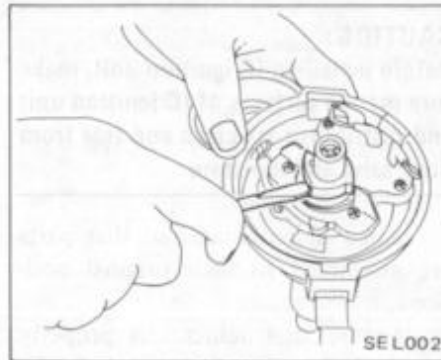
Centrifugal advance mechanical parts

When cause of engine malfunction is traced to centrifugal advance mechanical parts, use distributor tester to check its characteristics.

If nothing is wrong with its characteristics, conceivable causes are faulty or abnormal wear of driving part or others. So do not disassemble it.

In the event of improper characteristics, check closely rotor shaft assembly, governor weight and shaft.

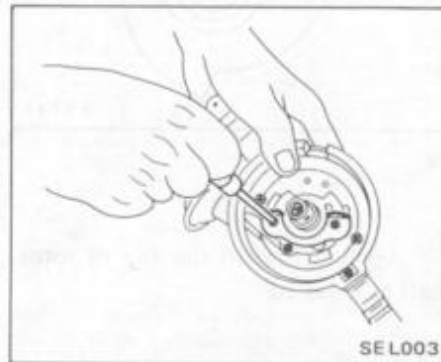
If any of the above parts are malfunctioning, replace the parts.



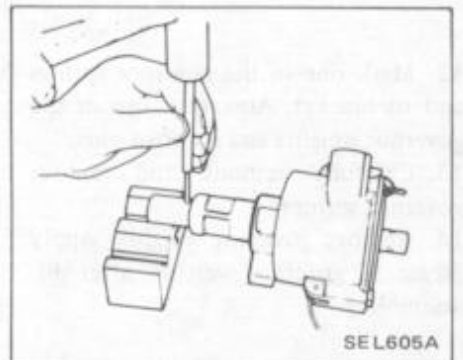
CAUTION:

When removing reluctor, be careful not to distort or damage the teeth.

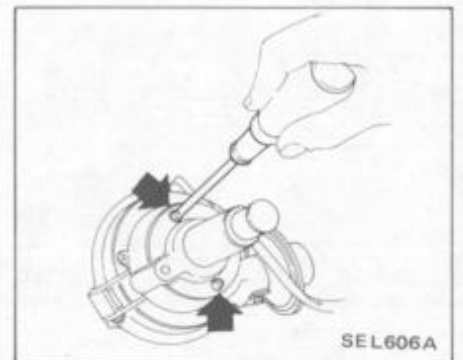
3. Remove IC ignition unit and unit setter.
4. Remove stator and magnet.



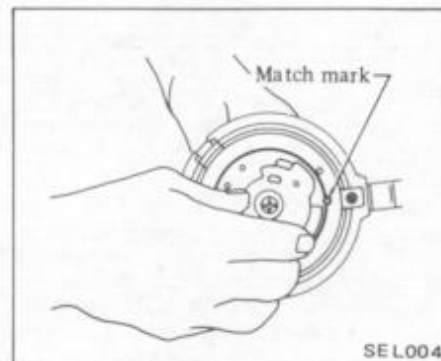
8. Remove collar.



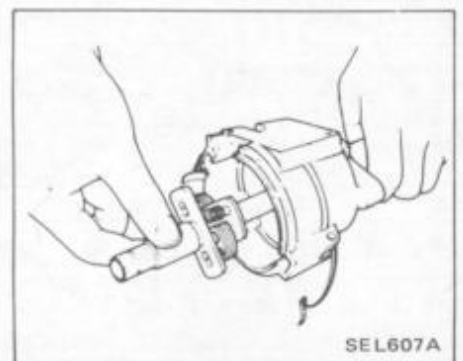
9. Remove bearing retainer attaching bolts.



5. Remove vacuum control assembly.
6. Remove breaker plate. Before disassembling, be sure to mark housing and fixing plate.



10. Remove rotor shaft and drive shaft.



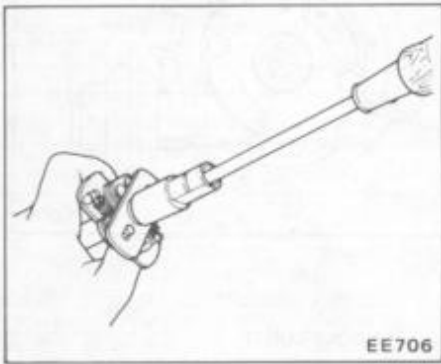
DISASSEMBLY

1. Take off cap and remove rotor head.
2. Pry reluctor from shaft.

7. Remove fixing plate. Mark housing and fixing plate.

Ignition System (Gasoline engine model) – ELECTRICAL SYSTEM

11. Mark rotor shaft and drive shaft. Remove packing from the top of rotor shaft and remove rotor shaft.



12. Mark one of the governor springs and its bracket. Also mark one of the governor weights and its pivot pins.

13. Carefully unhook and remove governor springs.

14. Remove governor weights. Apply grease to governor weights, after disassembling.

ASSEMBLY

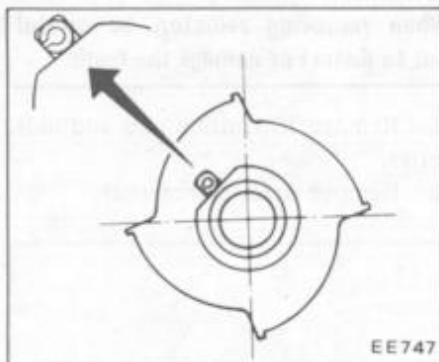
To assembly, reverse the order of disassembly. Carefully observe the following instruction.

CAUTION:

Before installing IC ignition unit, make sure mating surfaces of IC ignition unit and distributor are clean and free from dust, sand and moisture.

1. Align match marks so that parts are assembled to their original positions.

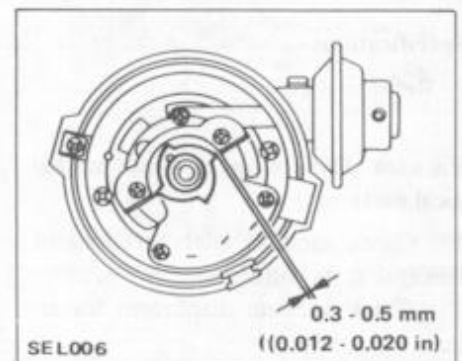
2. Ensure that reluctor is properly oriented when installing on shaft. Always drive in new roll pin as shown in Figure.



3. Apply grease to the top of rotor shaft as required.

4. Check the operation of governor before installing distributor on engine.
5. Properly center stator and reluctor before tightening.

Standard air gap:
0.3 - 0.5 mm
(0.012 - 0.020 in)



6. Adjust ignition timing after distributor is installed on engine.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)
DISTRIBUTOR

Type	D4N80-36	D4N80-37	D4N80-38	D4N80-39	D4N80-36	D4N80-38	D4N80-37	D4N80-36	D4N80-38	D4N80-37	D4N80-36	D4N80-38	D4N80-37	
Applied model	M/T except heavy duty and 4WD	A/T	Heavy duty	4WD	Except heavy duty and 4WD	Heavy duty	4WD	Except heavy duty and 4WD	Heavy duty	4WD	Except heavy duty and 4WD	Heavy duty	4WD	
Rotor head type	Without resistor													
Firing order	1-3-4-2													
Rotating direction	Counterclockwise													
Air gap mm (in)	0.3 - 0.5 (0.012 - 0.020)													
Cap insulation resistance M Ω	More than 50													
Rotor head insulation resistance M Ω	More than 50													
Cap carbon point length mm (in)	10 (0.39)													
Vacuum advance [Distributor degree/distributor kPa (mmHg, inHg)]	0°/10.7 (80, 3.15) 4°/15.66 - 20.00 (117.5 - 150, 4.626 - 5.906) 17.5°/53.3 (400, 15.75)	0°/10.7 (80, 3.15) 4°/15.66 - 19.33 (117.5 - 145, 4.626 - 5.709) 15°/46.7 (350, 13.78)	0°/12.7 (95, 3.74) 1.5°/16.0 - 20.0 (120 - 150, 4.72 - 5.91) 7.5°/33.3 (250, 9.84)	0°/10.7 (80, 3.15) 4°/15.66 - 20.00 (117.5 - 150, 4.626 - 5.906) 10°/34.7 (260, 10.24)	0°/10.7 (80, 3.15) 4°/15.66 - 22.00 (117.5 - 150, 4.626 - 5.906) 17.5°/53.3 (400, 15.75)	0°/12.7 (95, 3.74) 1.5°/16.0 - 20.0 (120 - 150, 4.72 - 5.91) 7.5°/33.3 (250, 9.84)	0°/10.7 (80, 3.15) 4°/15.66 - 19.33 (117.5 - 145, 4.626 - 5.709) 15°/46.7 (350, 13.78)	0°/10.7 (80, 3.15) 4°/15.66 - 22.00 (117.5 - 150, 4.626 - 5.906) 17.5°/53.3 (400, 15.75)	0°/12.7 (95, 3.74) 1.5°/16.0 - 20.0 (120 - 150, 4.72 - 5.91) 7.5°/33.3 (250, 9.84)	0°/10.7 (80, 3.15) 4°/15.66 - 19.33 (117.5 - 145, 4.626 - 5.709) 15°/46.7 (350, 13.78)	0°/10.7 (80, 3.15) 4°/15.66 - 22.00 (117.5 - 150, 4.626 - 5.906) 17.5°/53.3 (400, 15.75)	0°/12.7 (95, 3.74) 1.5°/16.0 - 20.0 (120 - 150, 4.72 - 5.91) 7.5°/33.3 (250, 9.84)	0°/10.7 (80, 3.15) 4°/15.66 - 19.33 (117.5 - 145, 4.626 - 5.709) 15°/46.7 (350, 13.78)	0°/10.7 (80, 3.15) 4°/15.66 - 22.00 (117.5 - 150, 4.626 - 5.906) 17.5°/53.3 (400, 15.75)
Centrifugal advance [Distributor degree/distributor rpm]	0°/750 7°/2,250													

Ignition System (Gasoline engine model) – ELECTRICAL SYSTEM

IGNITION COIL

Type		CIT-46
Applied model		All gasoline engine model
Primary voltage	V	12
Primary resistance [at 20°C (68°F)]	Ω	1.04 - 1.27
Secondary resistance [at 20°C (68°F)]	kΩ	7.3 - 11.0

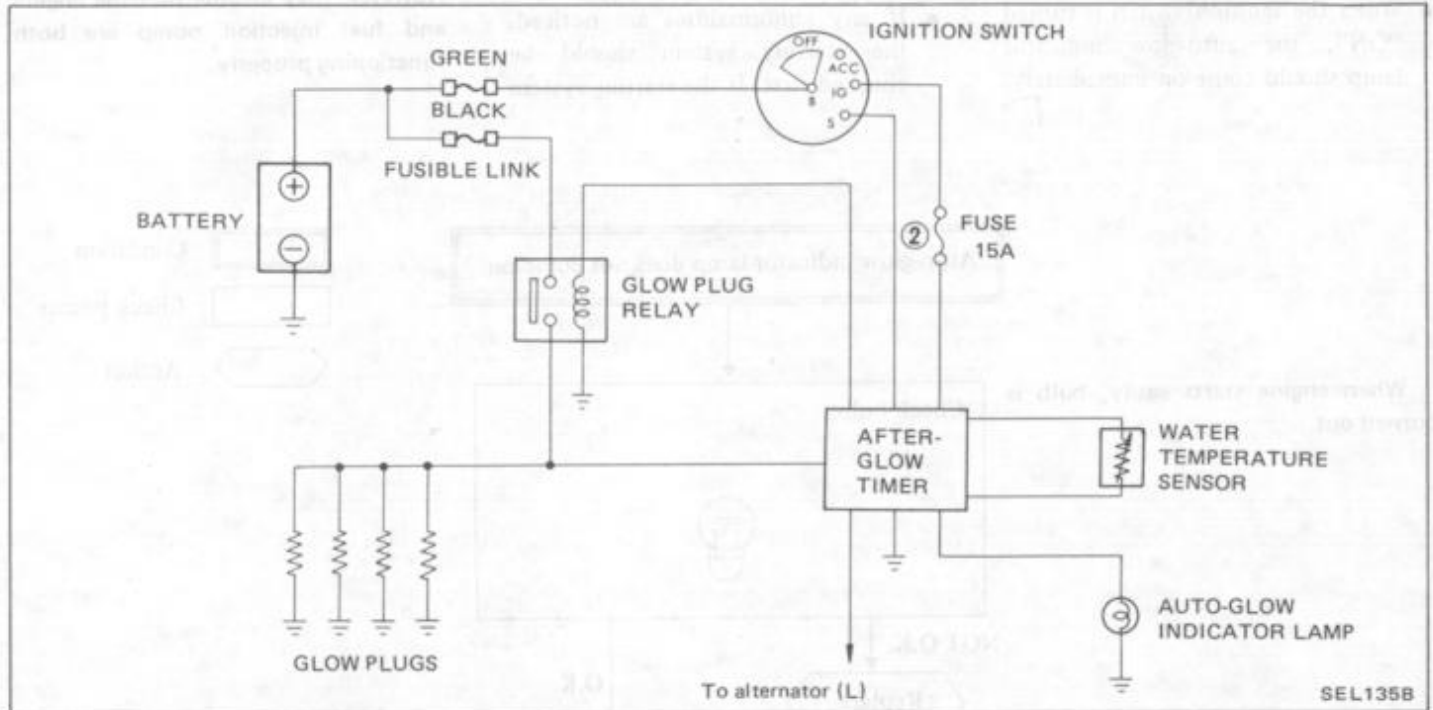
SPARK PLUG

Applied model		All gasoline engine models	
		Intake side	Exhaust side
Type	Standard	BPR6ES	BPR5ES
	Hot	BPR5ES	
	Cold	BPR7ES	BPR6ES BPR7ES
Size (Screw dia. x reach)		14 x 19 (0.55 x 0.75)	
		mm (in)	
Plug gap		0.8 - 0.9 (0.031 - 0.035)	
		mm (in)	

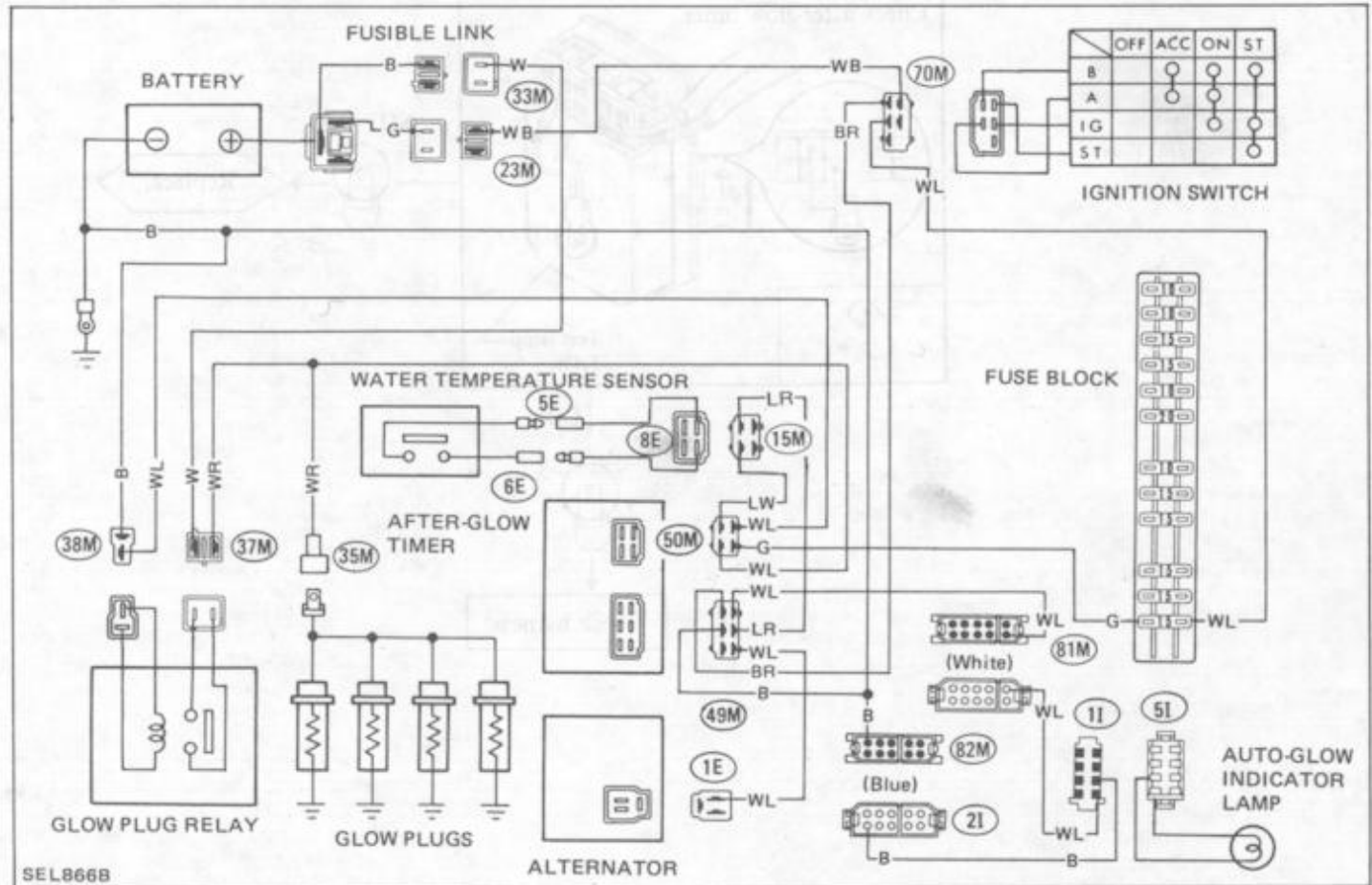
AUTO-GLOW SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

SCHEMATIC



WIRING DIAGRAM



SEL866B

TROUBLE DIAGNOSES AND CORRECTIONS

TROUBLE-SHOOTING CHART

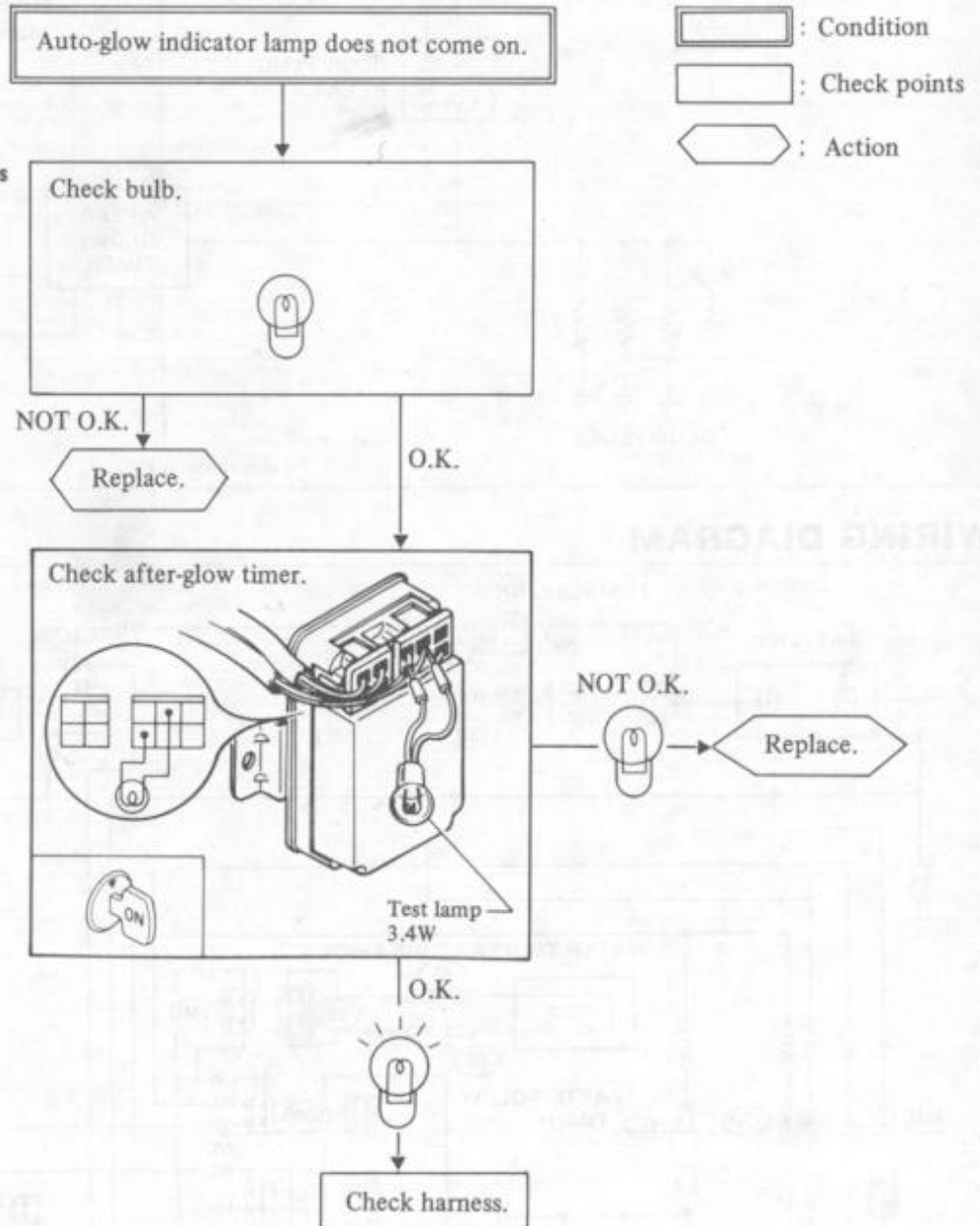
- When the ignition switch is turned "ON", the auto-glow indicator lamp should come on immediately.

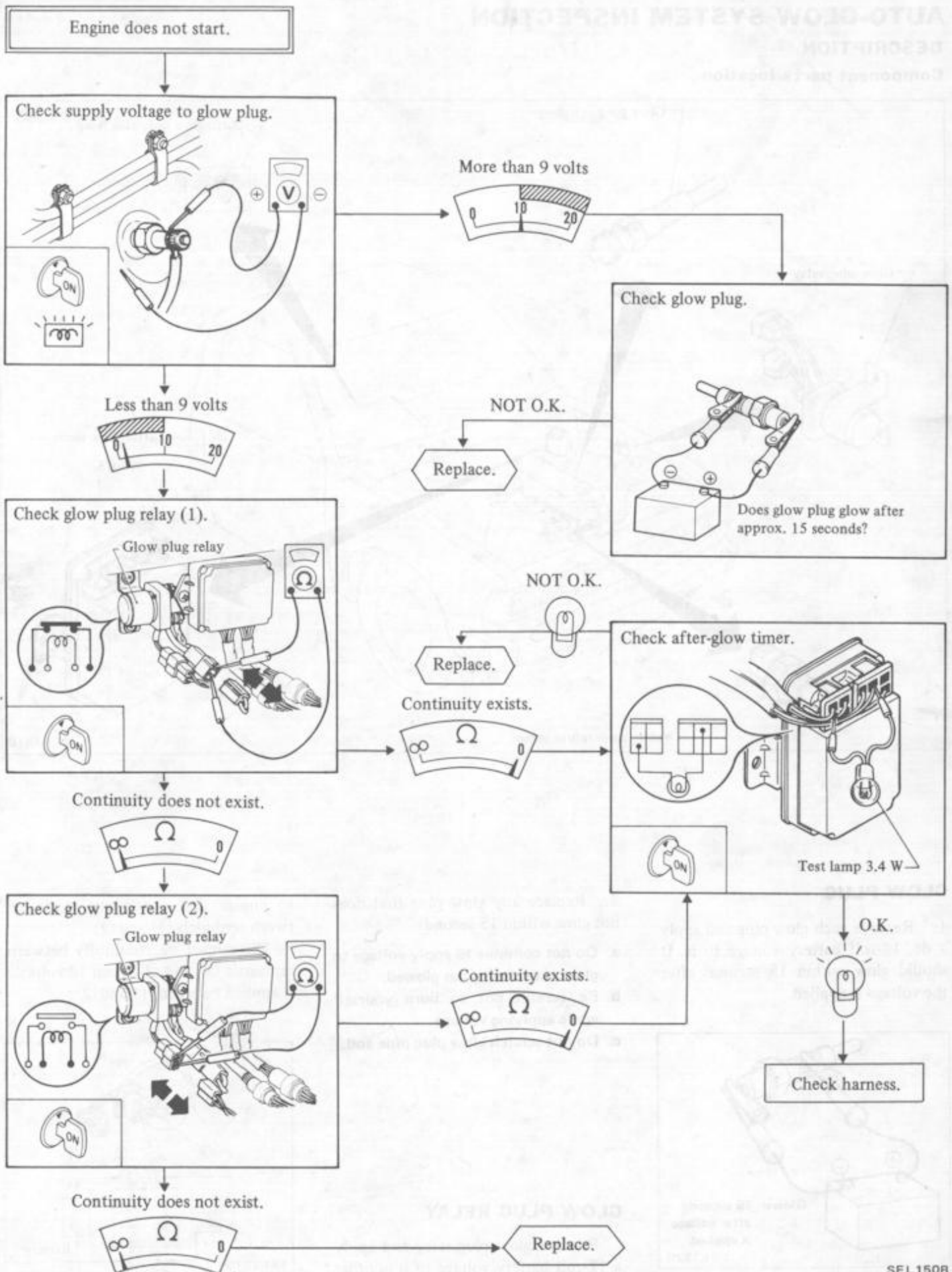
- From 1 to 48 seconds later (approx.), it should go out.
- The engine should start when the ignition switch is turned to "START" immediately after the indicator lamp has gone out.
- If any abnormalities are noticed, the starting system should be checked first. If the starting system

is functioning properly, other parts or units which may be faulty should be checked.

The following charts depict various symptoms of faulty parts or units. However, they assume that the engine and fuel injection pump are both functioning properly.

When engine starts easily, bulb is burned out.

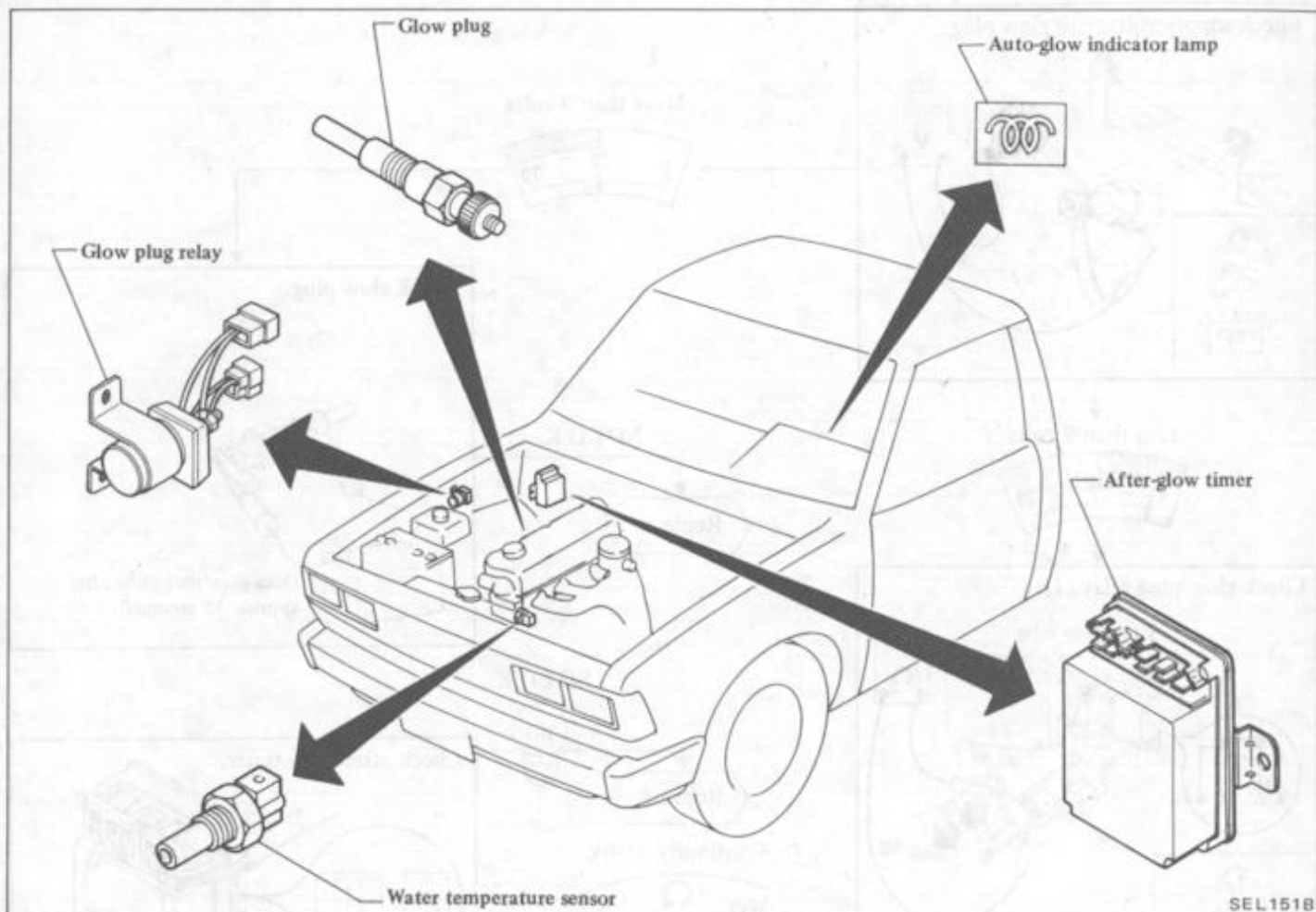




AUTO-GLOW SYSTEM INSPECTION

DESCRIPTION

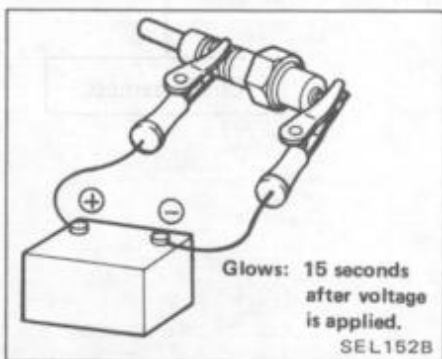
Component parts location



SEL151B

GLOW PLUG

1. Remove each glow plug and apply a dc, 12-volt battery voltage to it. It should glow within 15 seconds after the voltage is applied.



2. Replace any glow plug that does not glow within 15 seconds.

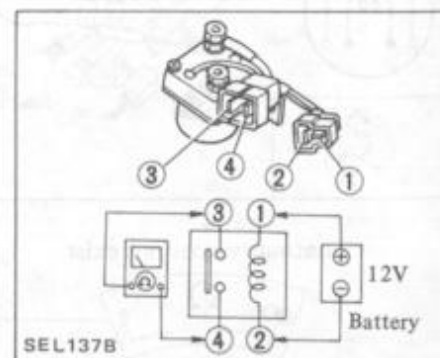
- Do not continue to apply voltage to glow plug after it has glowed.
- Be careful not to burn yourself while applying voltage.
- Do not scratch glow plug pipe end.

GLOW PLUG RELAY

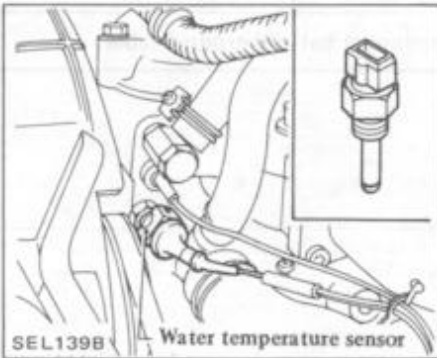
Remove glow plug relay and apply a 12-volt battery voltage to it in order

to ensure that continuity exists between terminals ① and ②.

There must be continuity between terminals ③ and ④ when 12 volts dc is applied between ① and ② :

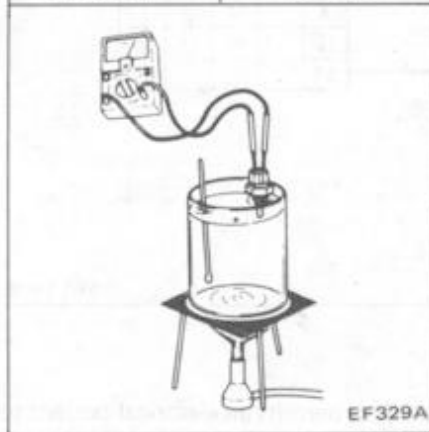


WATER TEMPERATURE SENSOR

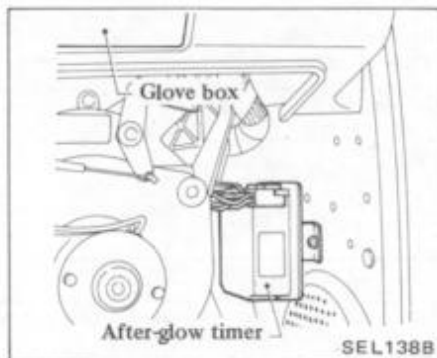


Measure resistance to temperature as shown.

Temperature °C (°F)	Resistance kΩ
-10 (14)	7.0 - 11.4
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00



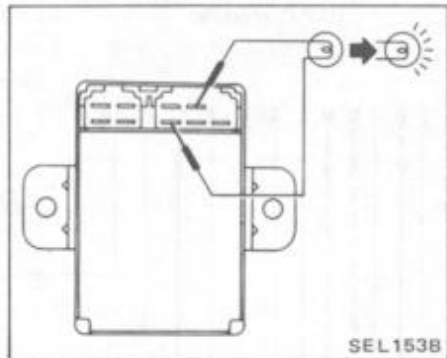
AFTER-GLOW TIMER



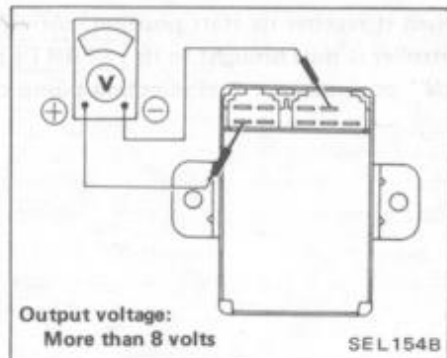
Before checking after-glow timer, make sure that all of the other circuits are in good working order.

1. With after-glow timer connector securely connected, turn ignition switch from "OFF" to "ON".

(1) Auto-glow indicator lamp should illuminate. If it doesn't, find out if voltage is being produced between terminals shown in Figure below.

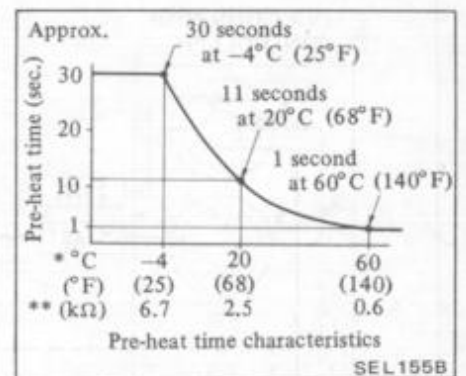


(2) Connect terminals (shown in Figure below) and measure the output voltage using a voltmeter.



2. Check length of time required to preheat glow plug. If the output voltage measured as described above corresponds approximately to "preheating time characteristics" indicated in Figure below, then system is normal.

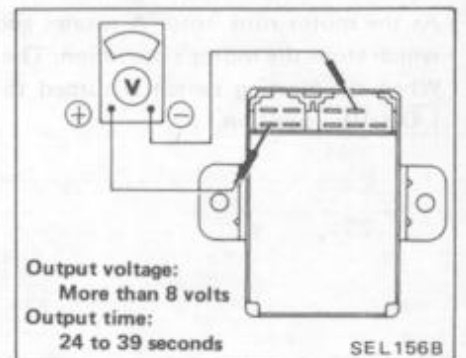
"Preheating time" refers to the minimum length of time required for glow plugs to preheat. Consequently, after-glow timer may be considered "in good order" if the output voltage measured as described above is produced within this minimum period of time.



* Water temperature
** Resistance (Approx.)

3. Check the after-glow function. To do this, measure both voltage produced between terminals (indicated in Figure below) and the length of time required to produce the output voltage, when key switch is returned to "ON" from "START".

Lead wire should be disconnected from "S" terminal of starter motor while measurements are being made.

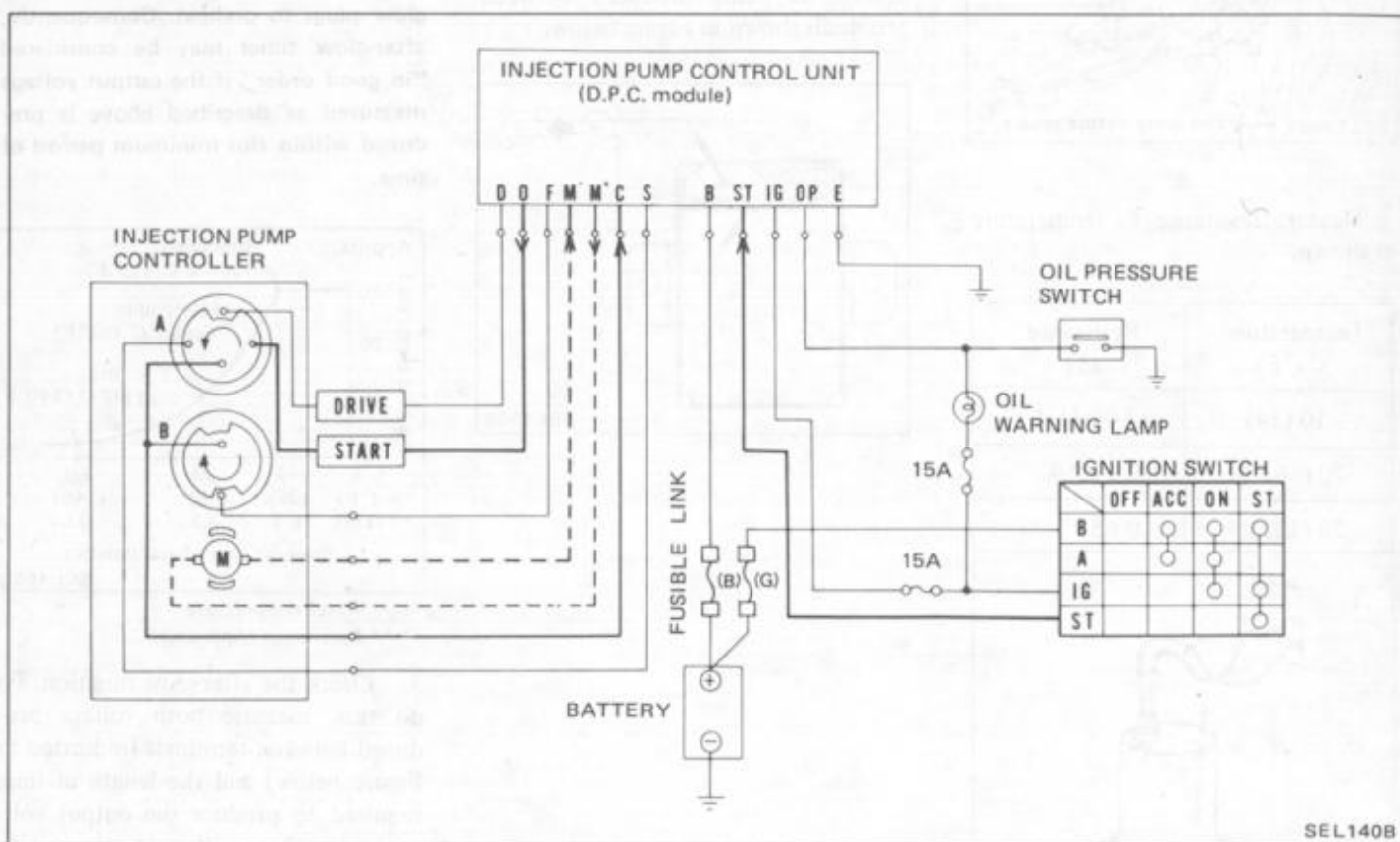


INJECTION PUMP CONTROL SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

DESCRIPTION

FUEL EXCESS OPERATION

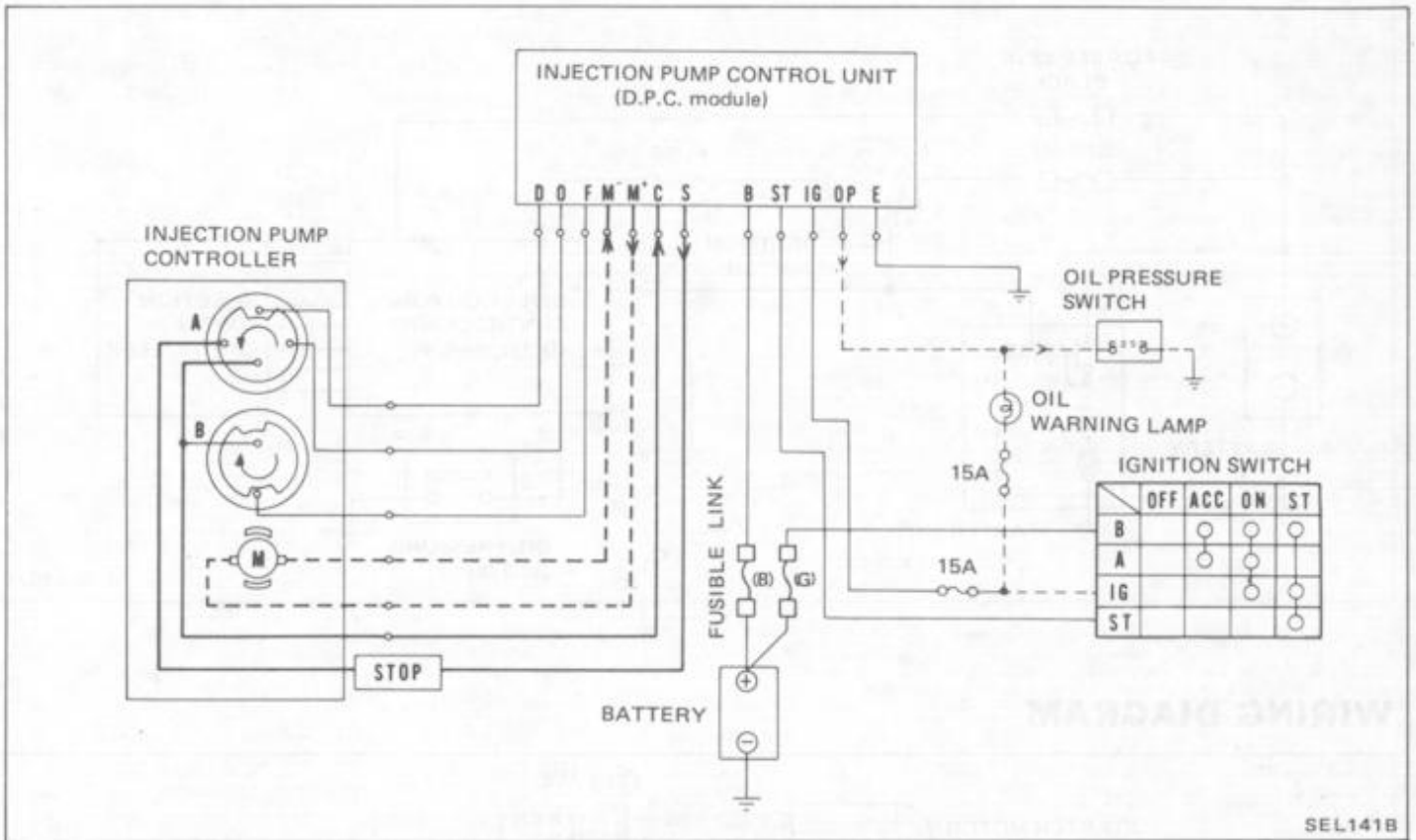


When the ignition switch is turned to "START", the fuel injection control unit activates. This permits an electrical current to flow in sequence via rotor A of the fuel injection pump controller, from terminal O to rotor A and terminal C, causing the fuel injection controller motor to run.

As the motor runs, rotor A rotates and, when it reaches its start position, current flow between terminal O and C is broken, which stops the motor's operation. The controller is thus brought to its **START** position.

When the starting switch is turned to "ON" position, the fuel injection pump controller will activate and is then set at its **DRIVE** position.

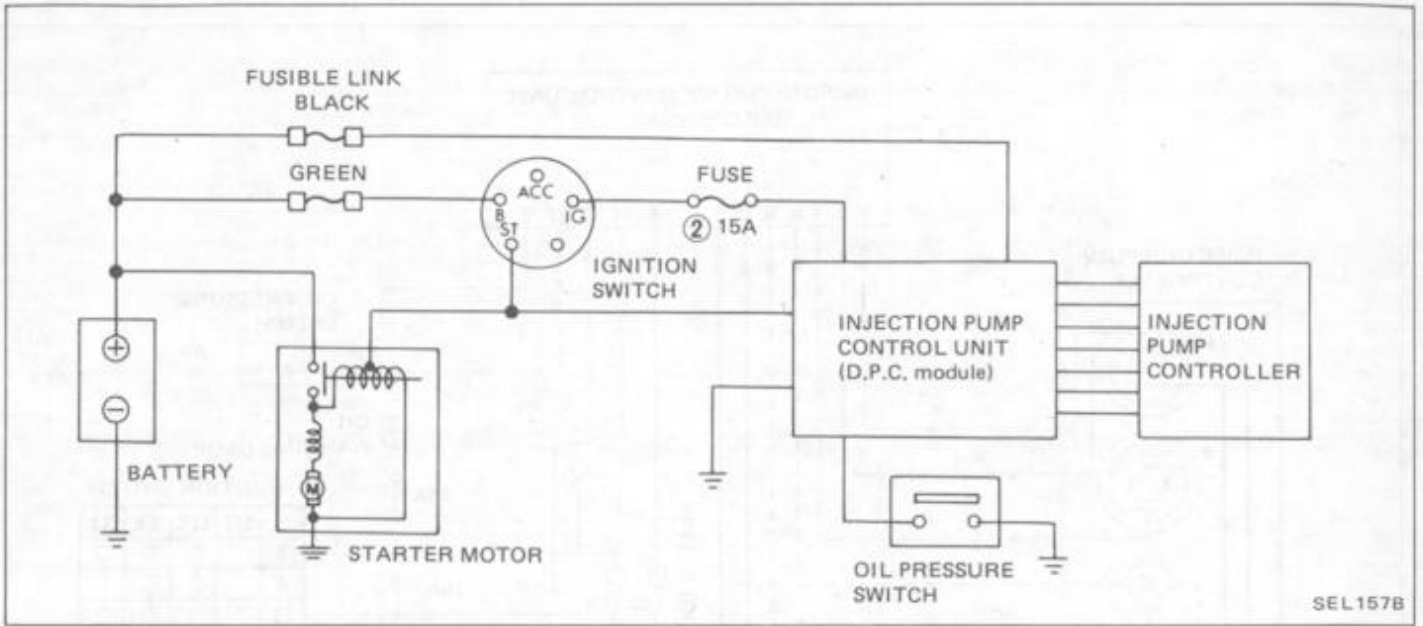
ENGINE STOP OPERATION



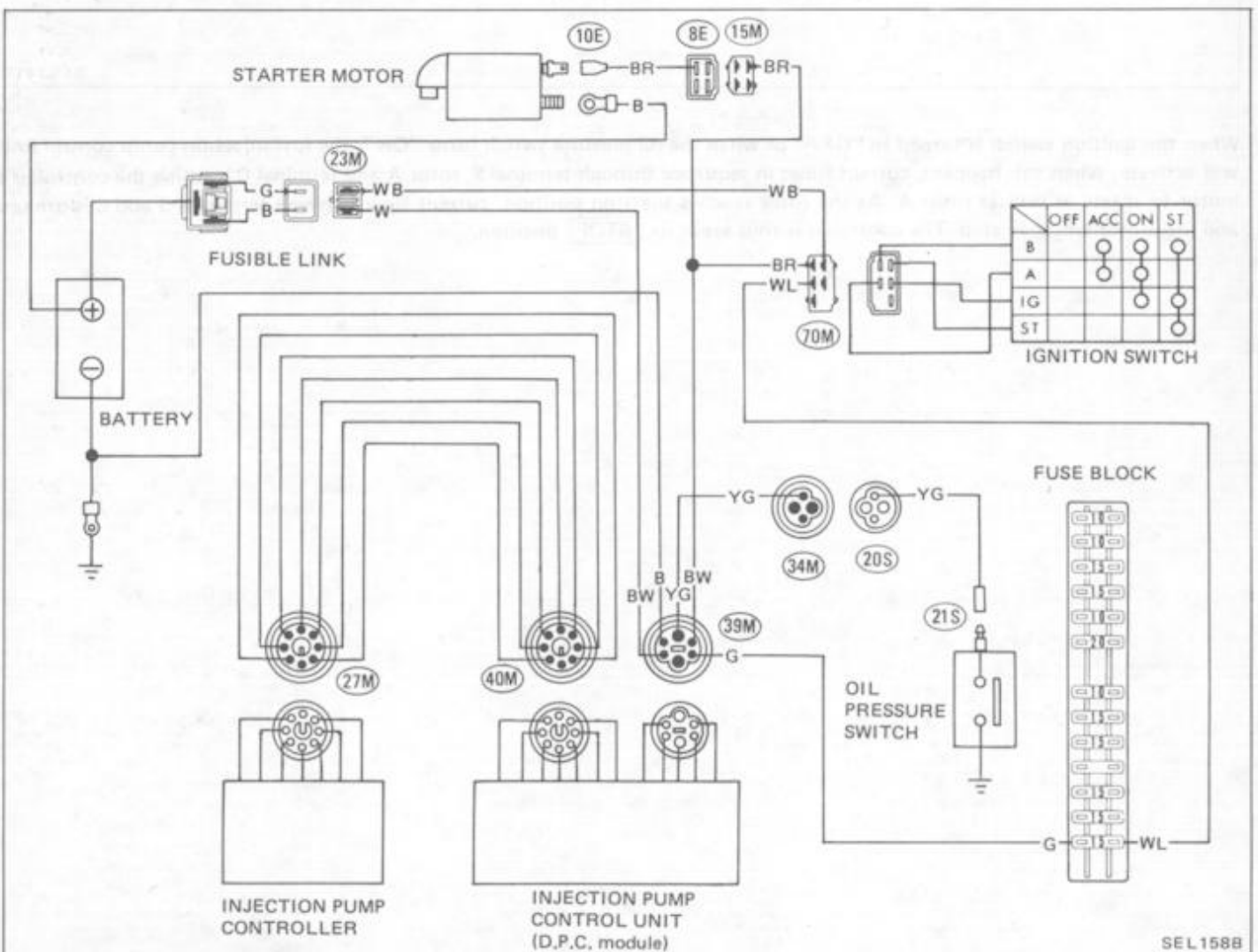
SEL141B

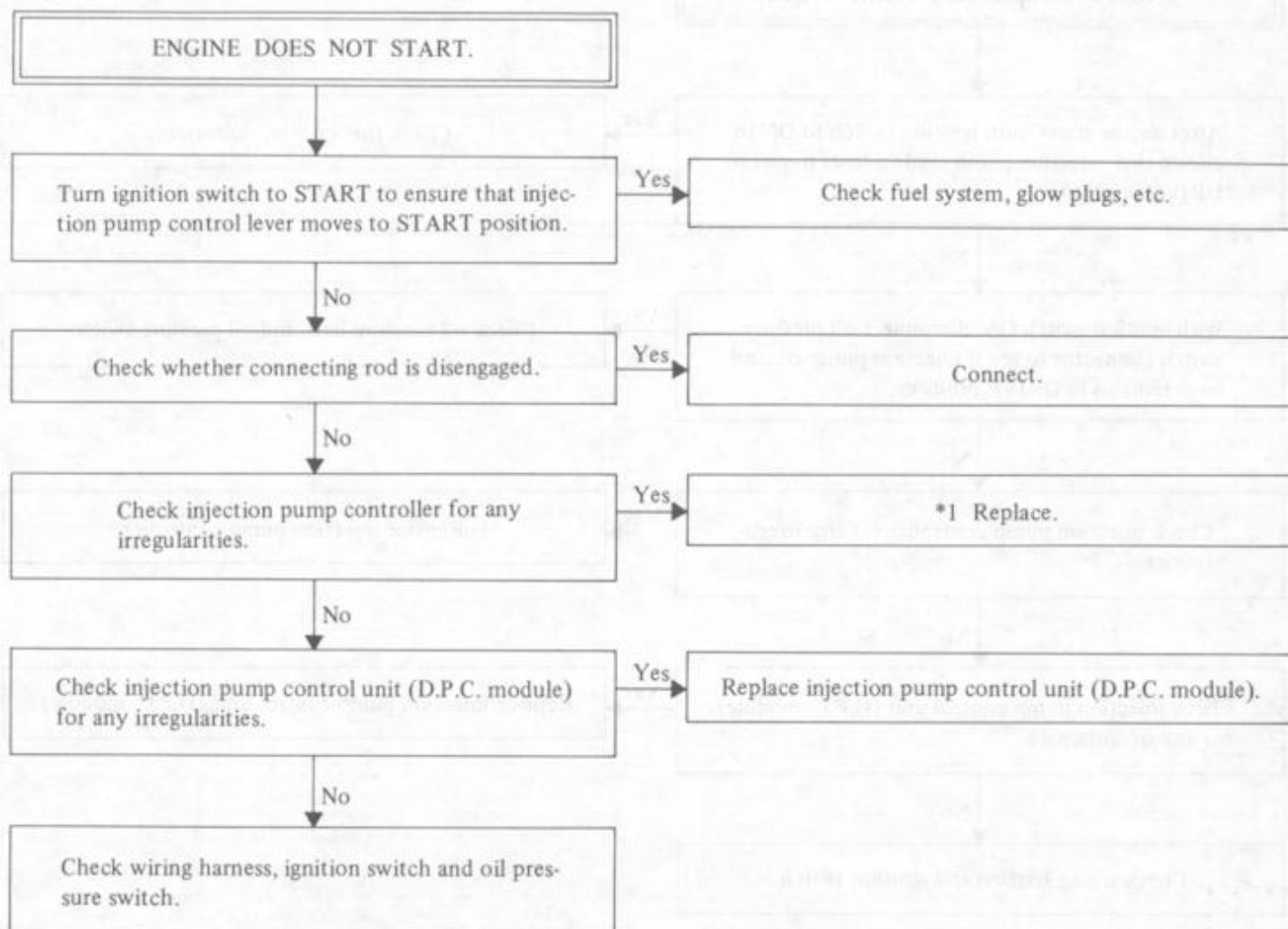
When the ignition switch is turned to "OFF" or when the oil pressure switch turns "ON", the fuel injection pump control unit will activate. When this happens, current flows in sequence through terminal S, rotor A and terminal C, causing the controller's motor to rotate as well as rotor A. As the rotor reaches the stop position, current flow between terminals S and C is broken and the motor will then stop. The controller is thus set at its **STOP** position.

SCHEMATIC



WIRING DIAGRAM

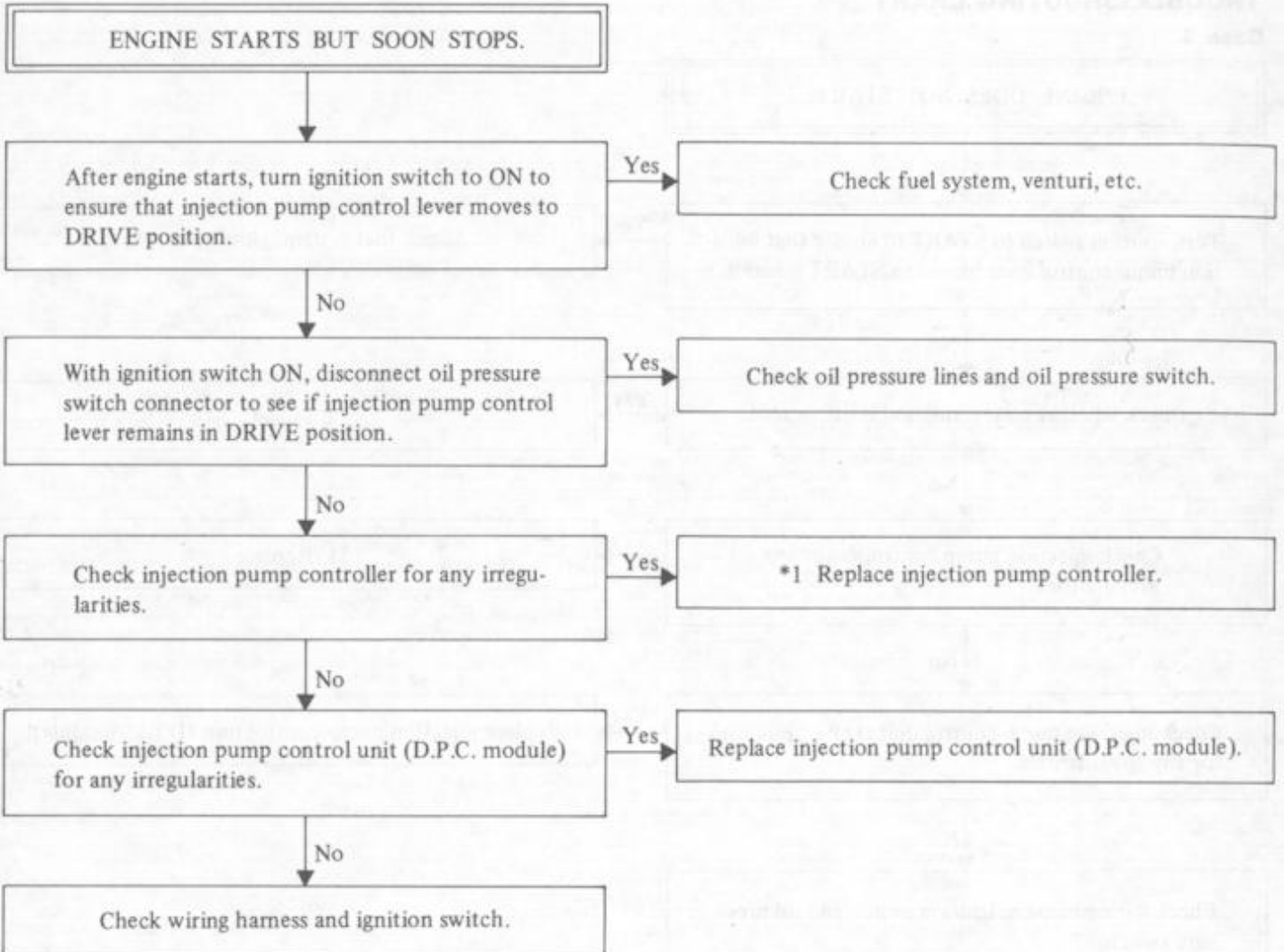


TROUBLE DIAGNOSES AND CORRECTIONS**TROUBLE-SHOOTING CHART****Case 1**

*1: Whenever injection pump controller is replaced, disconnect 6-pin connector from injection pump control unit (D.P.C. module) and connect again, then check operation of injection pump controller.

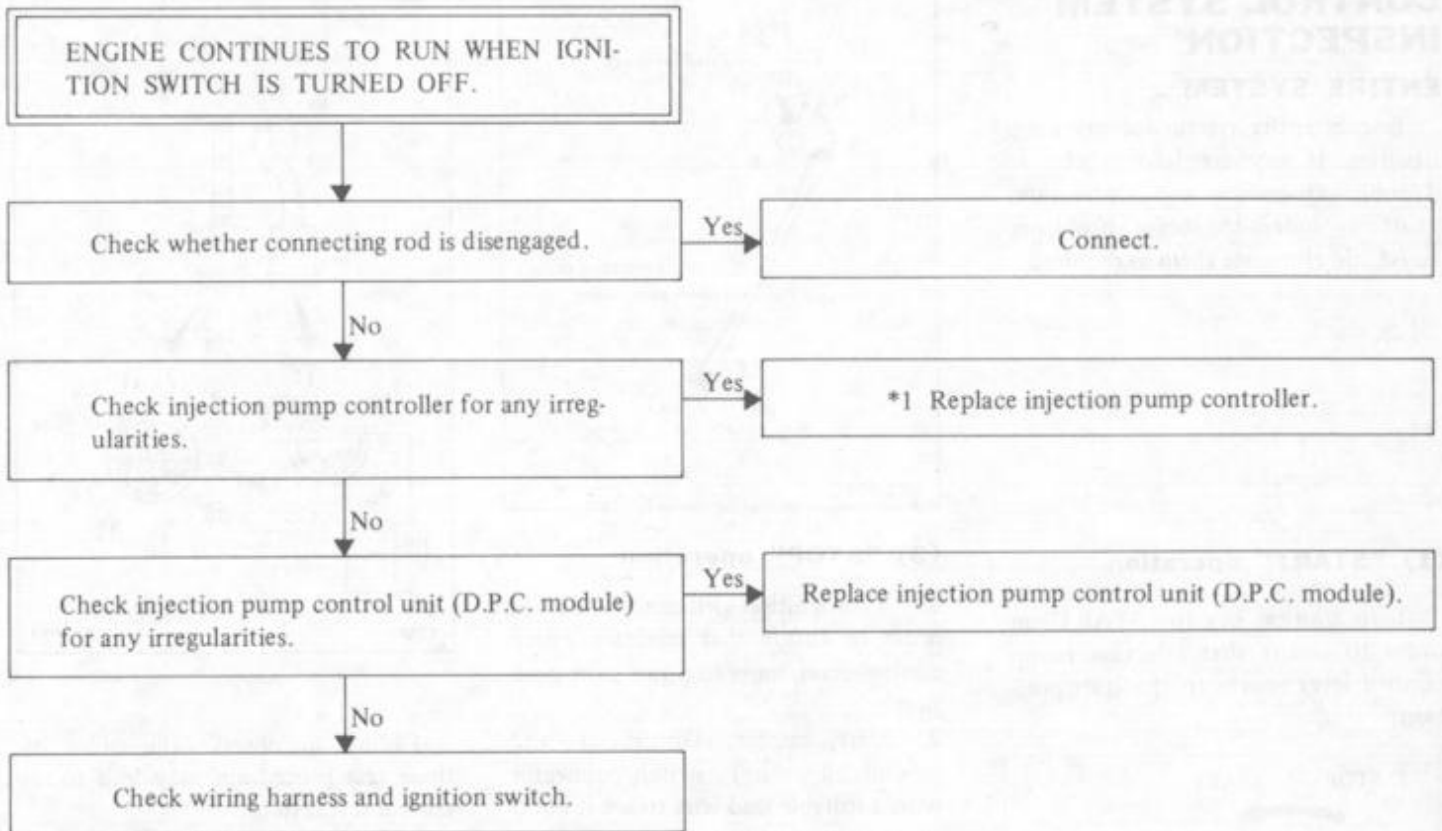
Injection Pump Control System – ELECTRICAL SYSTEM

Case 2



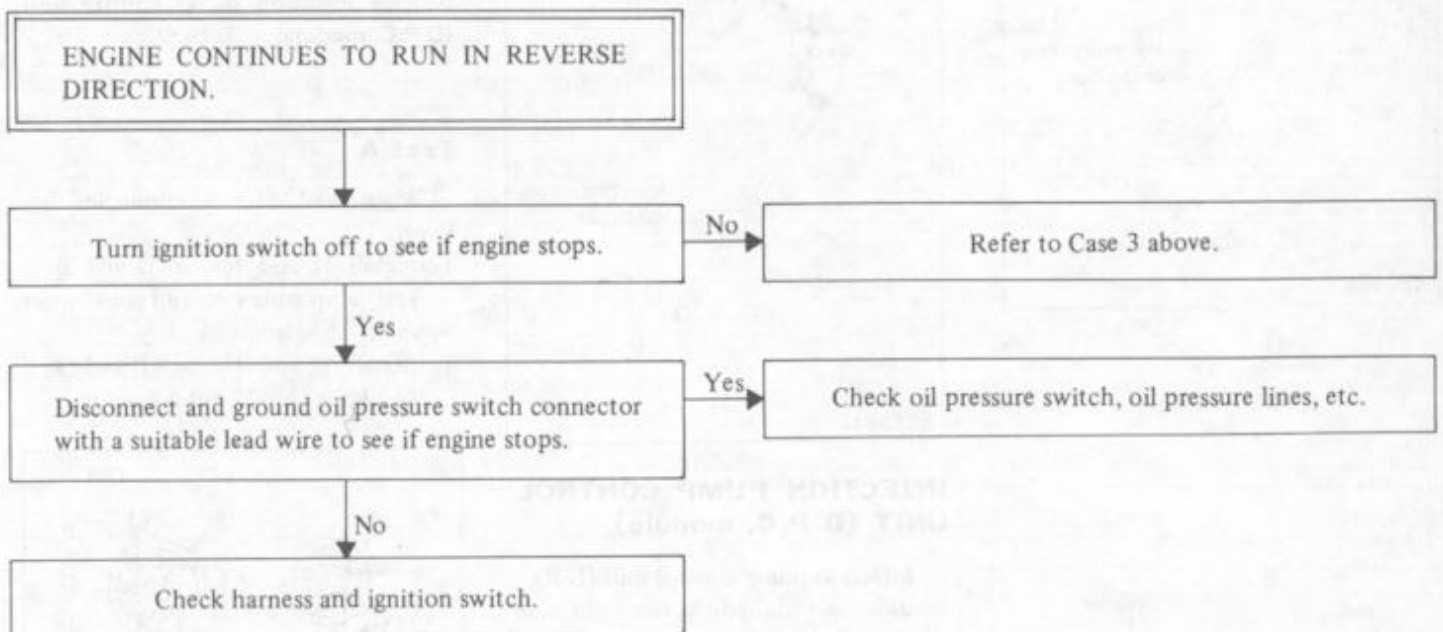
*1: Whenever injection pump controller is replaced, disconnect 6-pin connector from injection pump control unit (D.P.C. module) and connect again, then check operation of injection pump controller.

Case 3



*1: Whenever injection pump controller is replaced, disconnect 6-pin connector from injection pump control unit (D.P.C. module) and connect again, then check operation of injection pump controller.

Case 4



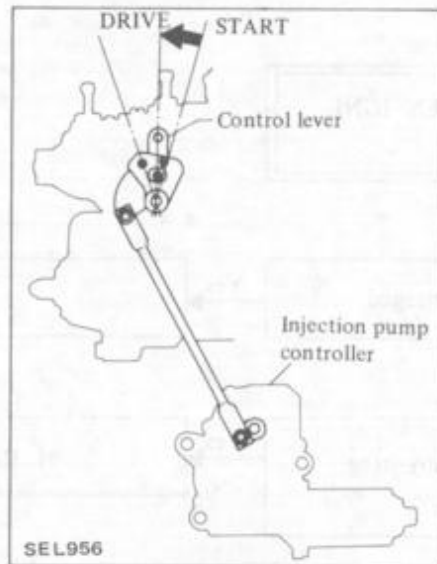
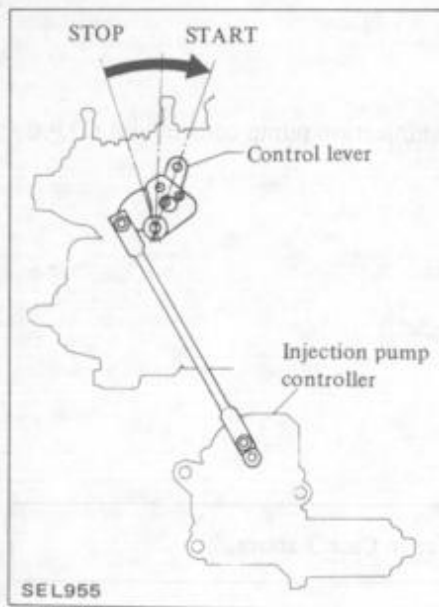
INJECTION PUMP CONTROL SYSTEM INSPECTION

ENTIRE SYSTEM

Inspect entire system for any irregularities. If any are found, refer to Trouble Diagnoses and Corrections chart in order to locate problems' cause and eliminate them as required.

(1) "START" operation

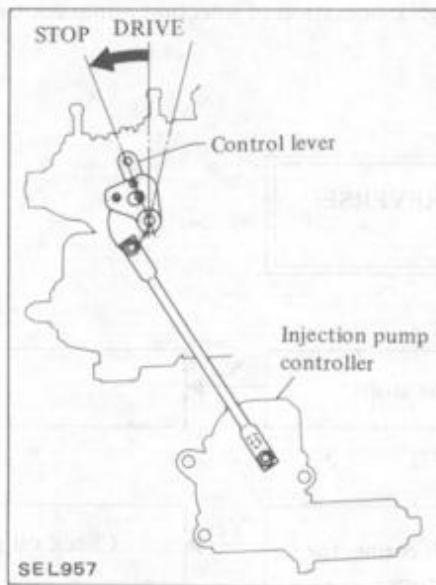
Turn ignition key to "START" in order to ensure that injection pump control lever moves to the start position.



(3) "STOP" operation

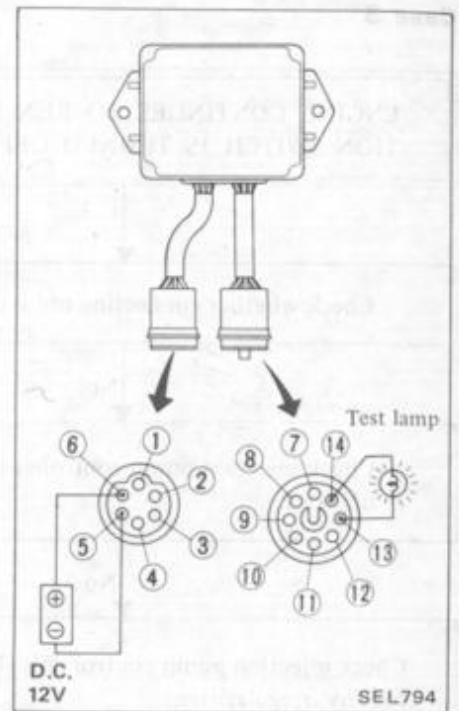
1. Turn ignition switch to "OFF" in order to ensure that injection pump control lever moves to the stop position.

2. Start engine. Disconnect and ground oil pressure switch connector with a suitable lead wire to see if injection pump control lever moves to the stop position.



INJECTION PUMP CONTROL UNIT (D.P.C. module)

Injection pump control unit (D.P.C. module) is installed on the right side of hoodledge. To check injection pump control unit (D.P.C. module), fabricate adapters as shown in the following illustration, and utilize the following procedures in the order listed.



Failure to observe the order of these test procedures may lead to incorrect test results.

If results of the following tests are satisfactory as indicated below, injection pump control unit (D.P.C. module) is functioning properly.

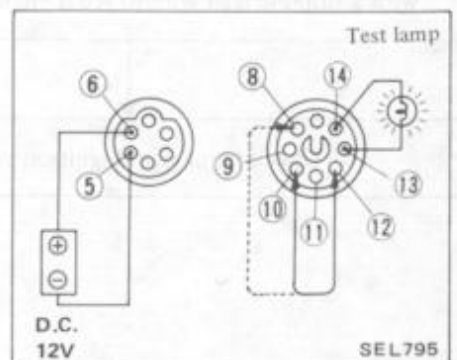
Be careful not to connect lead wires to the wrong terminals as this will damage injection pump control unit (D.P.C. module).

Test A

When lead wire is connected between;

Terminals 12 and 10, or 12 and 8 :
Test lamp comes on and goes out in about 15 seconds.

Terminals 12 and 11, or 12 and 9 :
Test lamp should not come on.

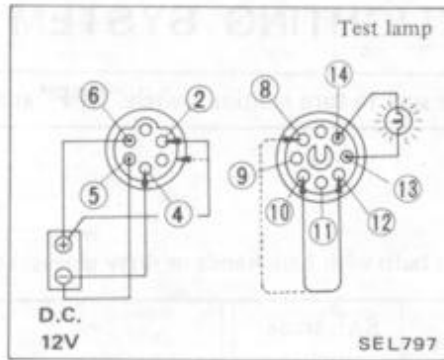
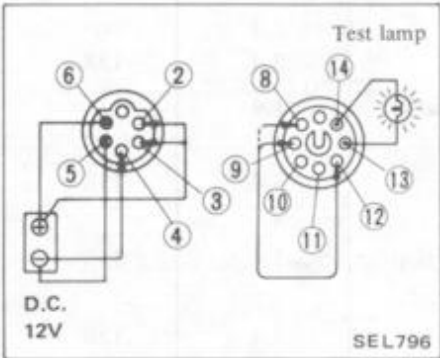


Test B

Connect positive lead wire to terminals ② and ③, and connect negative lead wire to terminal ④.

When lead wire is connected between;

- Terminals ⑫ and ⑨, or ⑫ and ⑧ :
Test lamp comes on and goes out in about 15 seconds.
- Terminals ⑫ and ⑪, or ⑫ and ⑩ :
Test lamp should not come on.

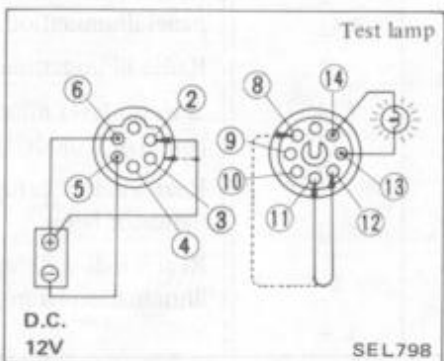


Test E

Disconnect lead wire from terminal ④.

When lead wire is connected between;

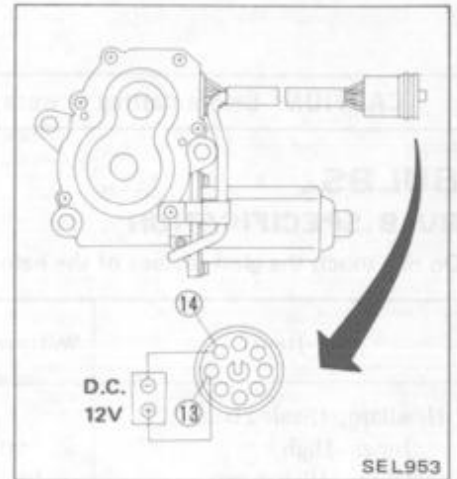
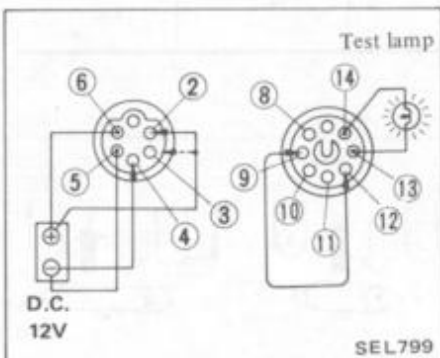
- Terminals ⑫ and ⑪, or ⑫ and ⑧ :
Test lamp comes on and goes out in about 15 seconds.
- Terminals ⑫ and ⑩, or ⑫ and ⑨ :
Test lamp should not come on.



Test C

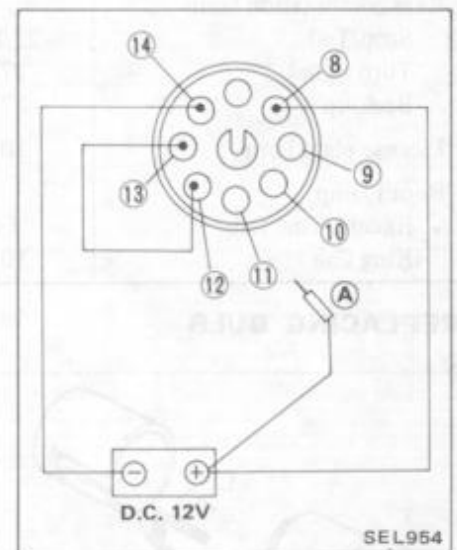
Connect lead wire between ⑫ and ⑨, and then disconnect lead wire from terminal ③.

Test lamp should go out in 10 seconds.



Test B

Fabricate adapters, as shown in the following illustration, and connect terminal A to each of terminals listed in the table below. Injection pump control lever should stop at corresponding position.



INJECTION PUMP CONTROLLER

Test A

Connect positive lead wire to terminal ⑬, and negative lead wire to terminal ⑭.

Injection pump controller motor should run.

Be careful not to connect lead wire to the wrong terminals as this will damage injection pump controller.

Test D

When lead wire is connected between;

- Terminals ⑫ and ⑩, or ⑫ and ⑧ :
Test lamp comes on and goes out in about 15 seconds.
- Terminals ⑫ and ⑪, or ⑫ and ⑨ :
Test lamp should not come on.

Connect terminal A to:	Corresponding position of injection pump control lever
Terminal ⑨	START
Terminal ⑩	STOP
Terminal ⑪	DRIVE

LIGHTING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

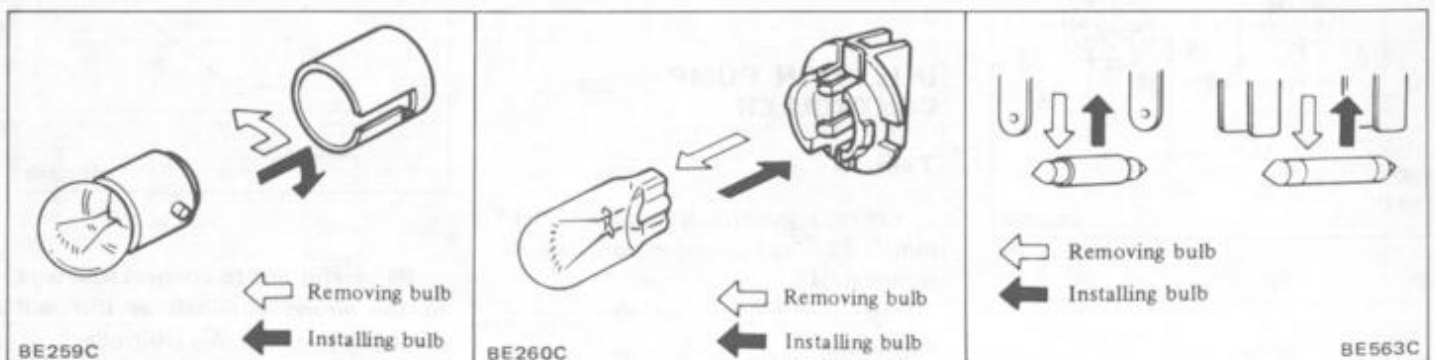
BULBS

BULB SPECIFICATION

Do not touch the glass surface of the halogen bulb with bare hands or dirty gloves, etc.

Item	Wattage (W)	SAE trade number	Item	Wattage (W)	SAE trade number
Headlamp (Sealed beam)			Combination meter		
Inner–High	50	4651	Illumination lamp	3.4	–
Outer–High/Low	40/60	4652	Warning lamp	3.4	158
Halogen headlamp (Sealed beam)			Cigarette lighter illumination lamp	1.4	–
Inner (Type 1)–High	50	H4651	4WD oil pressure gauge illumination lamp	3.4	158
Outer (Type 2)–High/Low	35/35	H4656	4WD voltmeter illumination lamp	3.4	158
Front combination lamp			4WD indicator lamp	3.4	158
Turn signal	27	1156	Heater (Air-con.) control panel illumination lamp	3.4	158
Clearance	8	–	Radio illumination lamp	3.4	158
Side marker lamp			Selector lever illumination lamp (A/T models)	3.4	158
Front	8	–	Rear window defogger switch indicator lamp	1.4	–
Rear	8	–	Rear window defogger switch illumination lamp	3.4	158
Rear combination lamp					
Stop/Tail	27/8	1157			
Turn signal	27	1156			
Back-up	27	1156			
License plate lamp	10	–			
Room lamp					
Except King Cab	5	–			
King Cab	10	–			

REPLACING BULB



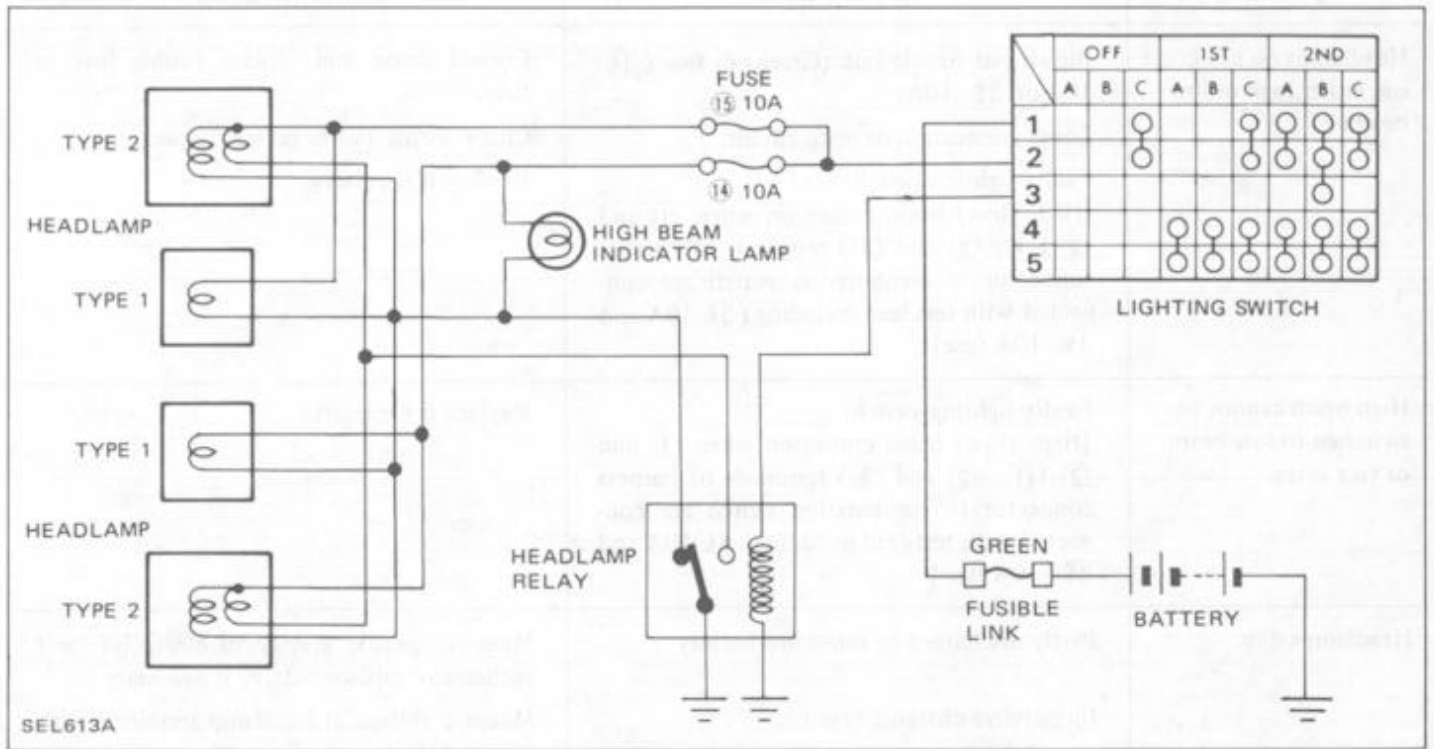
COMBINATION SWITCH

REMOVAL AND INSTALLATION

1. Disconnect battery ground cable.
2. Remove horn pad.
3. Remove steering wheel.
4. Remove steering column cover.
5. Disconnect combination switch wires at connector.
6. Loosen retaining screw and remove combination switch assembly.
7. Install combination switch in the reverse order of removal. ⚙️

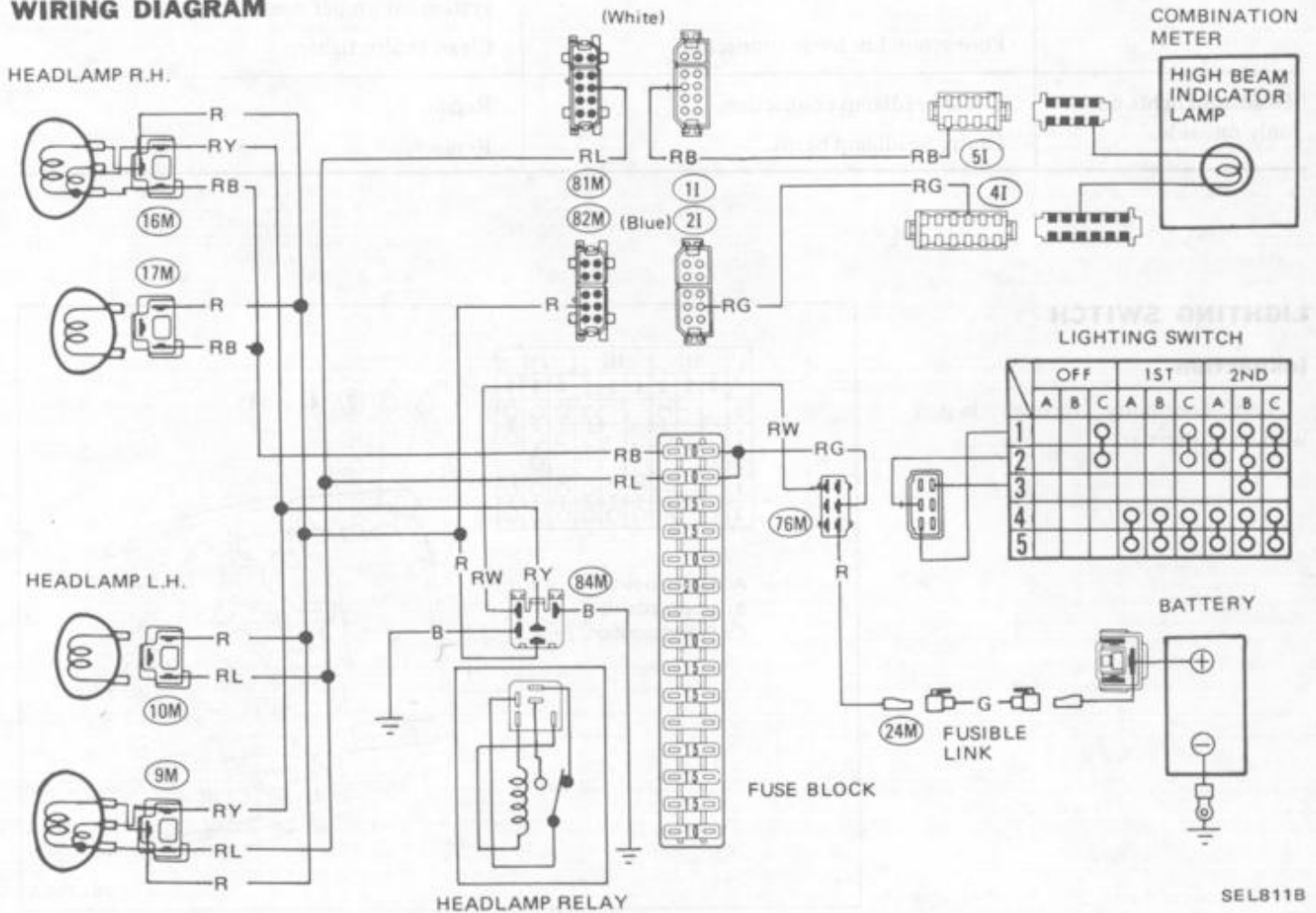
TROUBLE DIAGNOSES AND CORRECTIONS

HEADLAMP SCHEMATIC



SEL613A

WIRING DIAGRAM



SEL811B

TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Headlamps do not come on, either high or low beams.	Blown out fusible link (Green) or fuse (14 10A or 15 10A). Loose connection or open circuit. Faulty lighting switch. [High (low) beam comes on when ① and ② (①, ② and ③) terminals of harness connector to combination switch are connected with test lead including (14 10A and 15 10A fuse)].	Correct cause and replace fusible link or fuse. Check wiring and/or repair connection. Replace if necessary.
High beam cannot be switched to low beam or vice versa.	Faulty lighting switch. [High (low) beam comes on when ① and ② (①, ② and ③) terminals of harness connector to combination switch are connected with test lead including 14 10A and 15 10A fuse].	Replace if necessary.
Headlamps dim.	Partly discharged or run-down battery. Inoperative charging system. Poor ground or loose connection.	Measure specific gravity of electrolyte and recharge or replace battery if necessary. Measure voltage at headlamp terminals with engine running. If it is less than 12.8V, check charging system for proper operation. Clean and/or tighten.
Headlamp lights on only one side.	Loose headlamp connection. Faulty headlamp beam.	Repair. Replace.

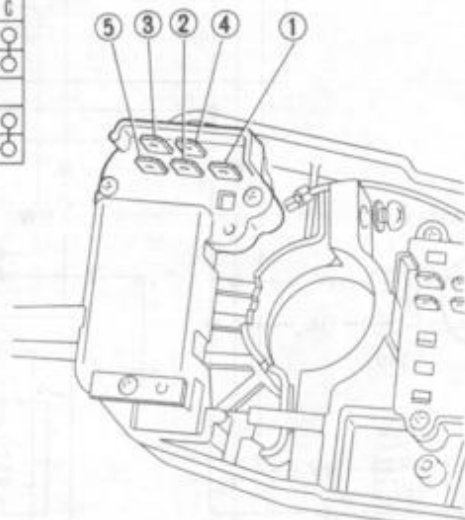
LIGHTING SWITCH

Inspection

Test continuity through switch with an ohmmeter.

	OFF			1ST			2ND		
	A	B	C	A	B	C	A	B	C
1									
2			○						
3									○
4				○	○	○	○	○	○
5				○	○	○	○	○	○

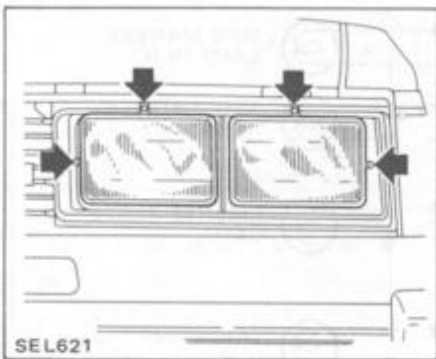
- A: Lower position
- B: Upper position
- C: Pulled position



SEL755A

AIMING ADJUSTMENT

To adjust vertical aim, use adjusting screw on upper side of headlamp; and to adjust horizontal aim, use adjusting screw on side of headlamp.



- c. See that there is no load in vehicle (coolant, engine oil filled up to correct level and full fuel tank) other than the driver (or equivalent weight placed in driver's position).

When performing headlamp aiming adjustment, use an aiming machine, aiming wall screen or headlamp tester. For operating instructions of any aimer, it should be in good repair, calibrated and used according to respective operation manuals supplied with the unit.

If any aimer is not available, aiming adjustment can be done as follows:

- a. Adjust headlamps so that upper edge of hot spot is equal in height to headlamp height.
 b. The illustration, below center, shows headlamp aiming pattern for driving on right side of road; for driving on left side of road, aiming pattern is reversed.
 c. Dotted lines in illustration show center of headlamp.

High beam

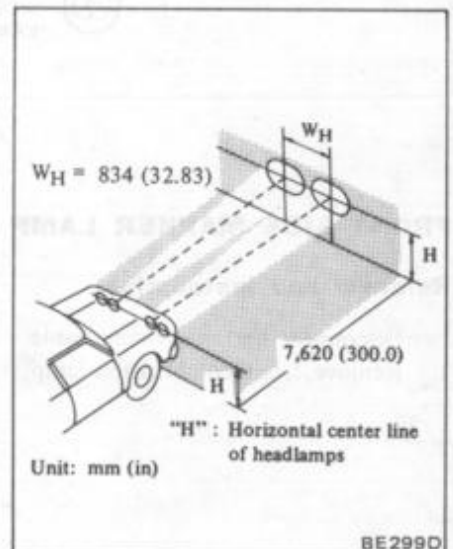
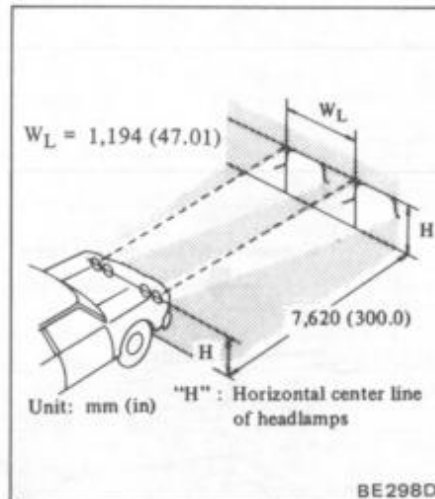
With type II unit lamps (outer lamps) covered, turn headlamps to high beam.

Before making headlamp aiming adjustment, observe the following instructions.

- a. Keep all tires inflated to correct pressures.
 b. Place vehicle and tester on one and same flat surface.

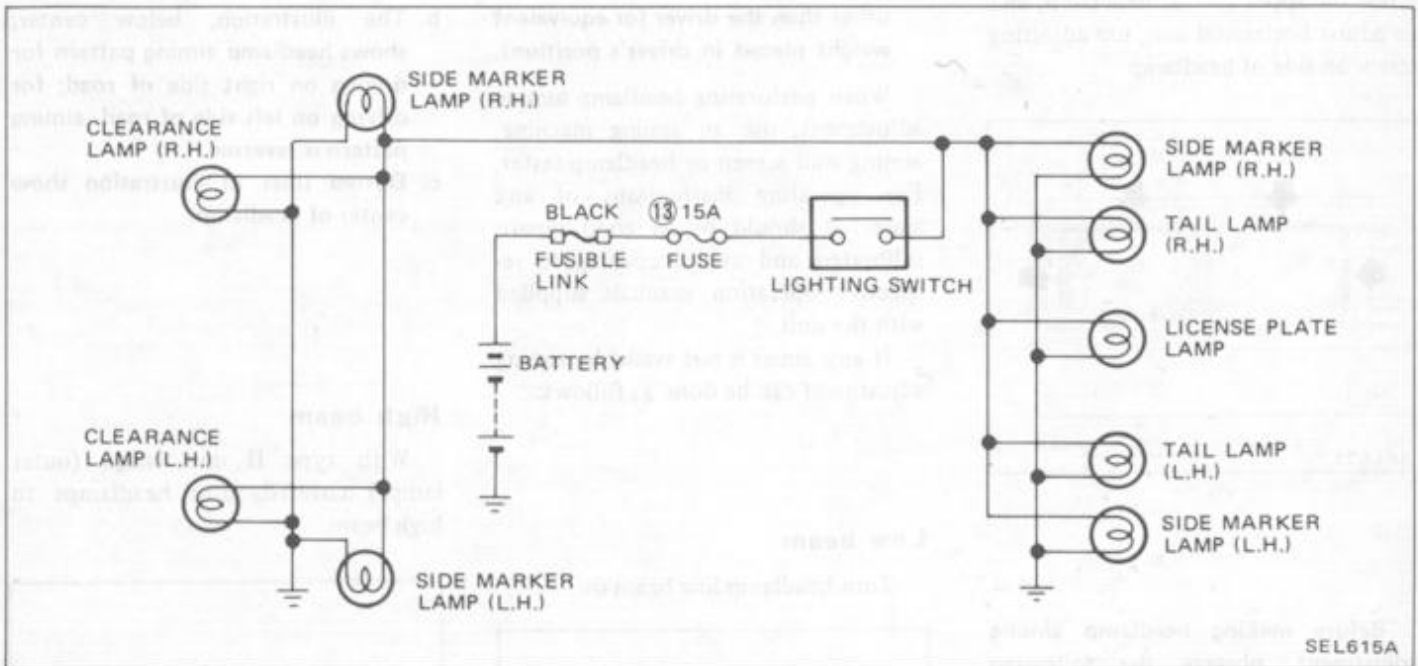
Low beam

Turn headlamp low beam on.



TAIL, CLEARANCE, SIDE MARKER AND LICENSE PLATE LAMPS

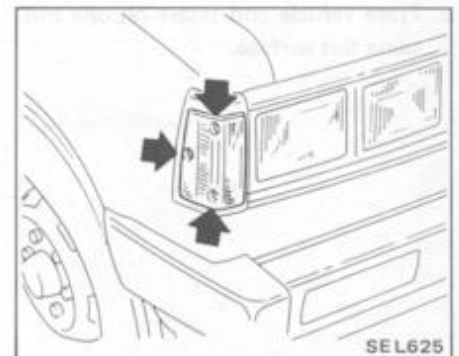
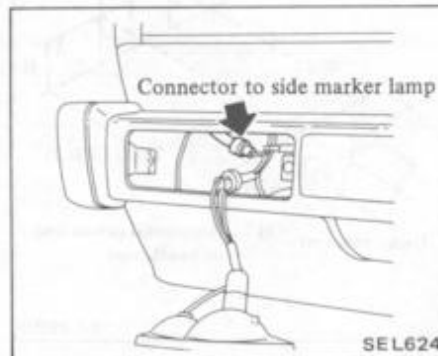
SCHEMATIC



FRONT SIDE MARKER LAMP

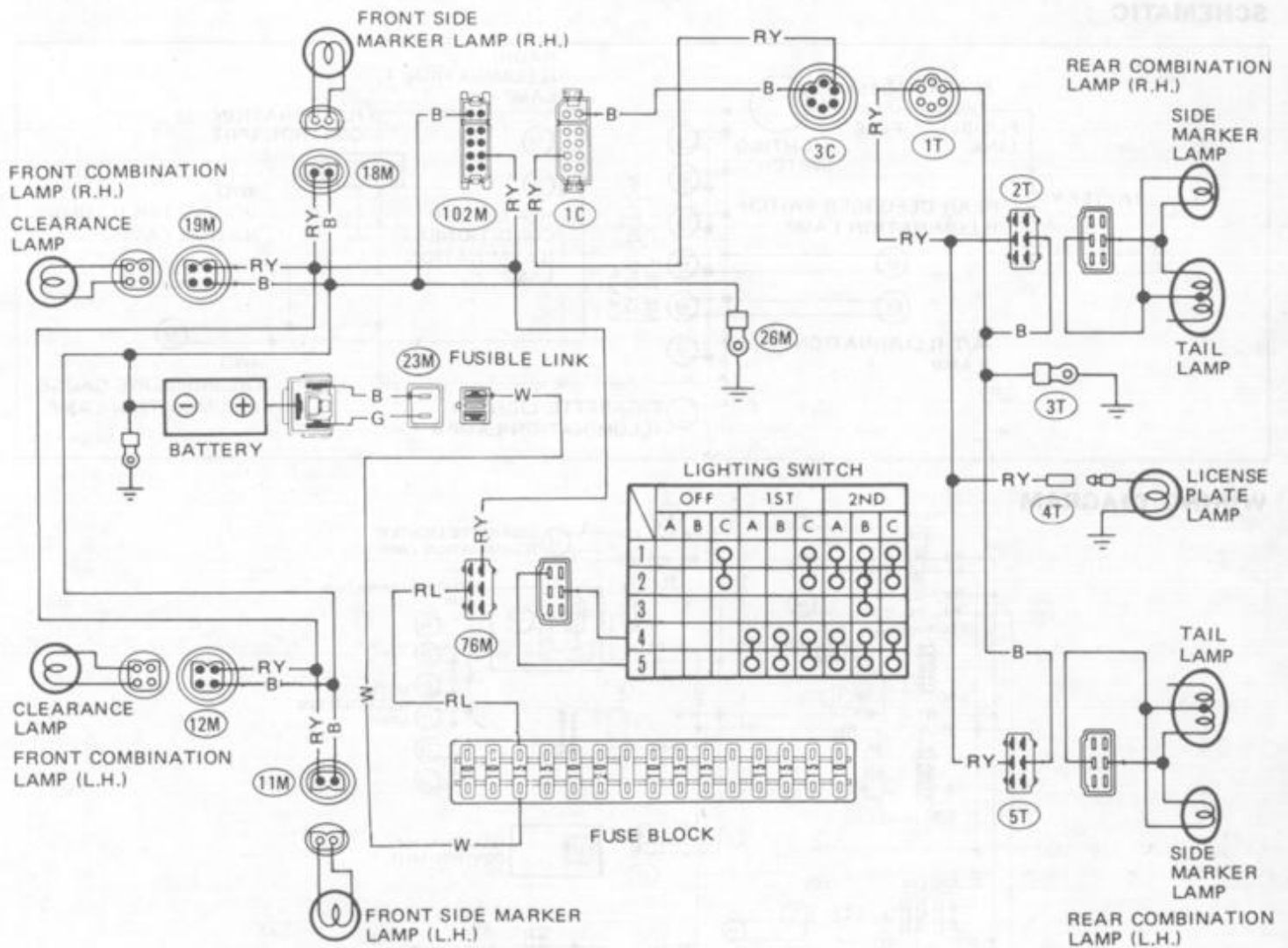
Removal and installation

1. Disconnect battery ground cable.
2. Remove front combination lamp.



3. Disconnect harness connector to side marker lamp.
4. Remove front side marker lamp.
5. Installation is in the reverse order of removal.

WIRING DIAGRAM



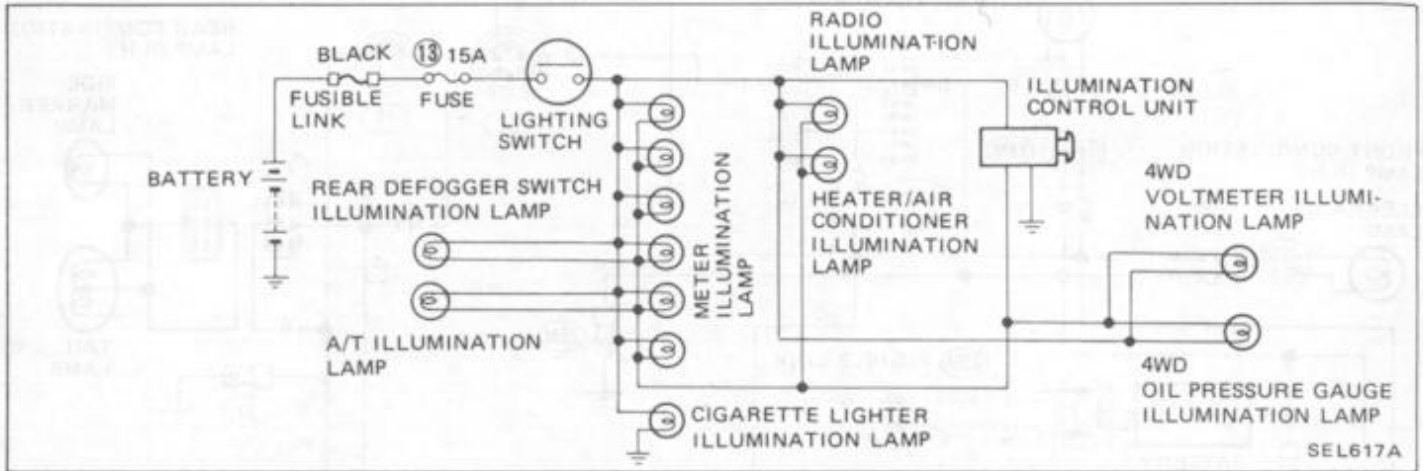
SEL616A

TRUBLE DIAGNOSES AND CORRECTIONS

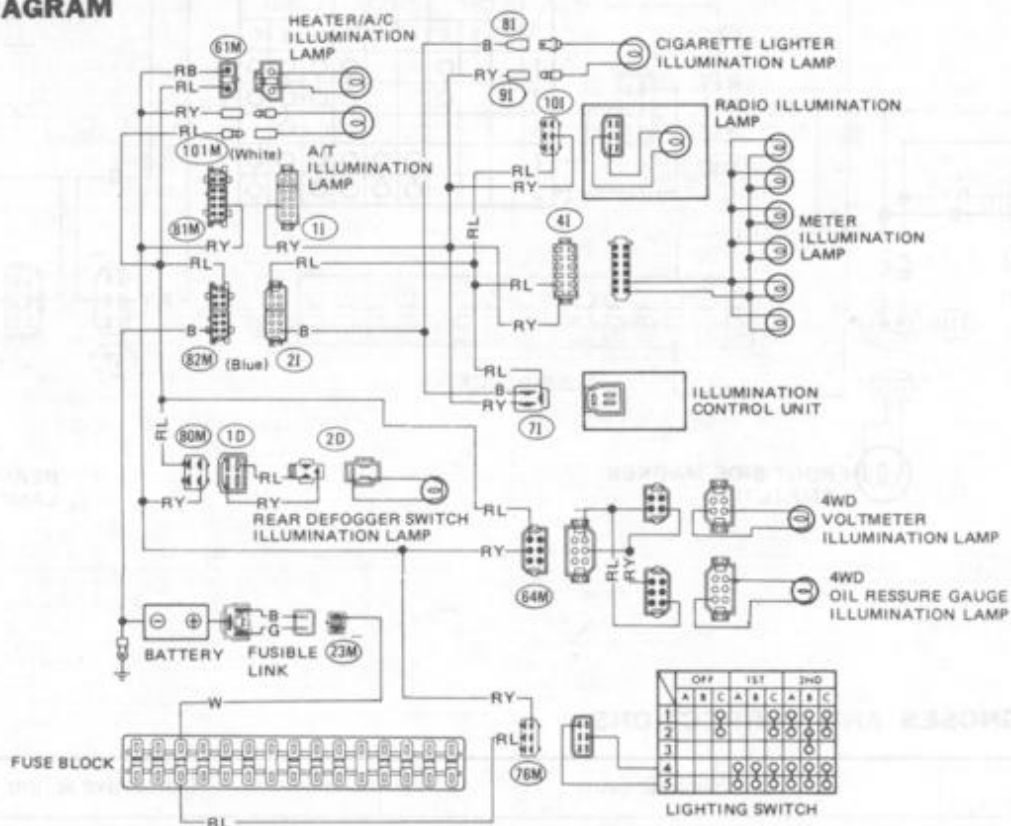
Condition	Probable cause	Corrective action
Neither left nor right lamp lights.	Blown out fusible link (Black) or fuse (13 15A). Loose connection or open circuit. Faulty lighting switch. [Lamps light when 4 and 5 terminals of harness connector to combination switch are connected with test lead including 13 15A fuse].	Correct cause and replace. Check wiring and/or repair connection. Replace if necessary.
Lamp on only one side lights.	Burned out bulb. Loose bulb. Loose connection to lamp.	Replace. Correct. Correct.

ILLUMINATION LAMPS

SCHEMATIC



WIRING DIAGRAM



ILLUMINATION CONTROL UNIT

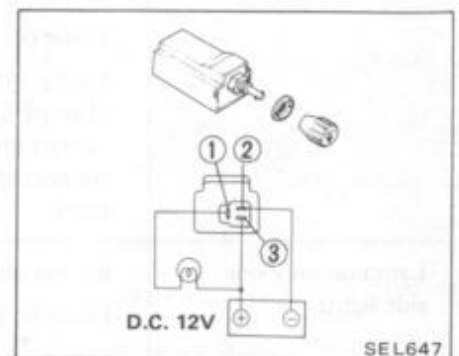
Removal and installation

1. Disconnect battery ground cable.
2. Pull out knob of switch.
3. Remove ring nut and disconnect harness connector.
4. Switch body can be taken out from behind instrument panel.
5. Installation is in the reverse order of removal.

Inspection

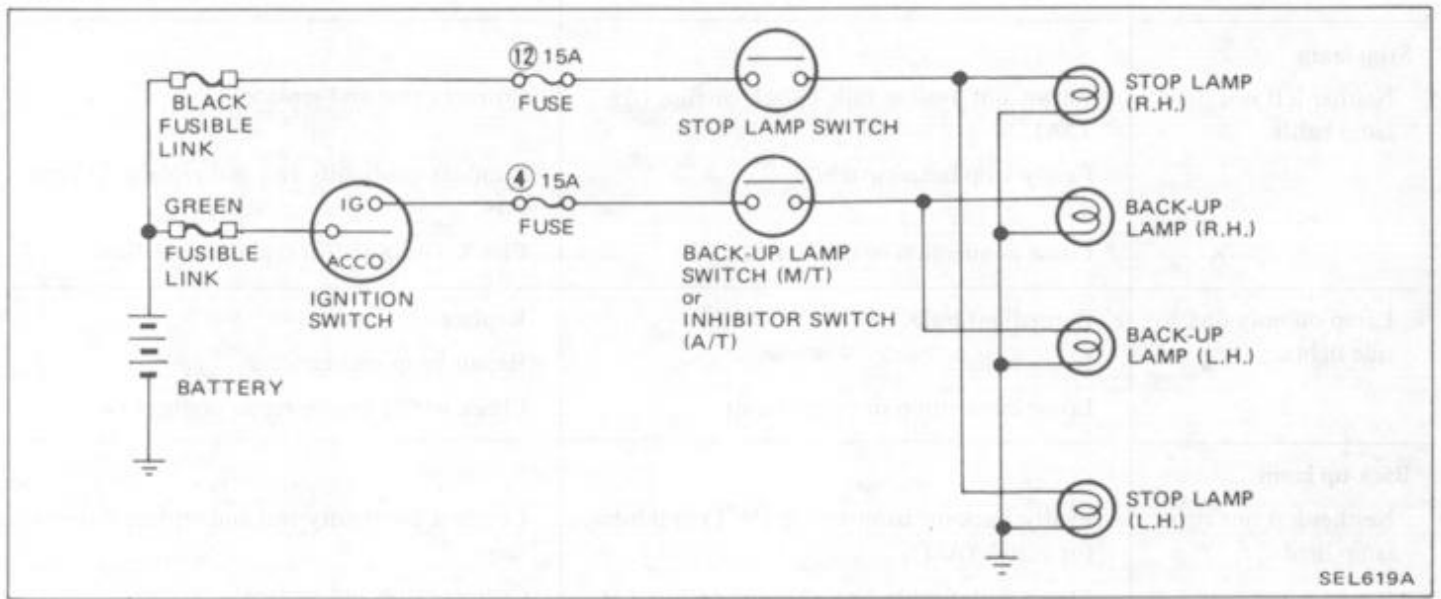
1. Connect test lamp between terminal ① and positive (+) terminal.
2. Connect terminal ③ to positive (+) terminal, and terminal ② to negative (-) terminal.
3. Turn control knob right or left, and brightness of test lamp will vary.

Be careful not to connect lead wires to incorrect terminals as this will damage the unit.

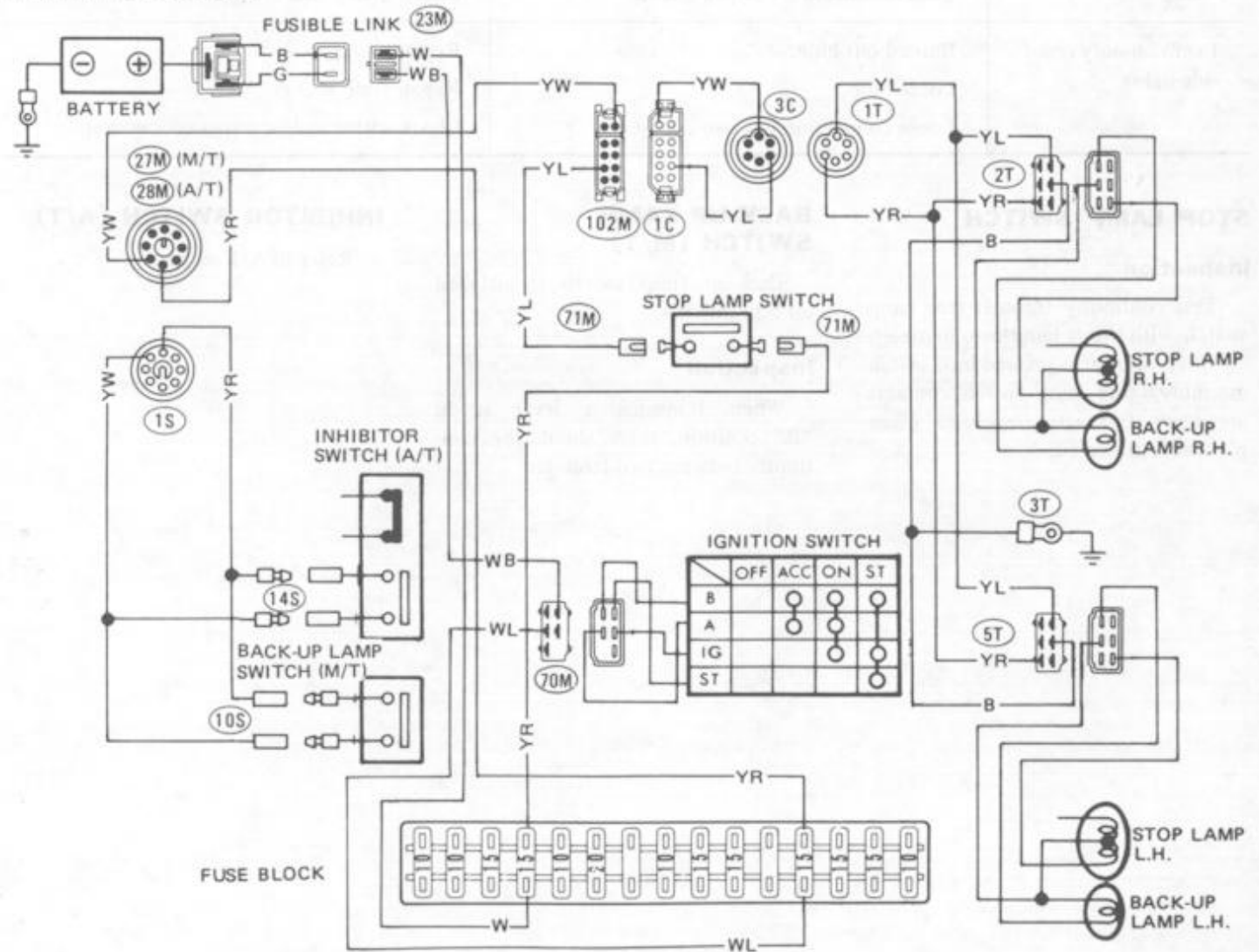


STOP AND BACK-UP LAMPS

SCHEMATIC



WIRING DIAGRAM



Lighting System – ELECTRICAL SYSTEM

TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Stop lamp Neither left nor right lamp lights.	Blown out fusible link (Black) or fuse (12) 15A). Faulty stop lamp switch. Loose connection or open circuit.	Correct cause and replace. Conduct continuity test and replace if necessary. Check wiring and/or repair connection.
Lamp on only one side lights.	Burned out bulb. Loose bulb. Loose connection or open circuit.	Replace. Repair lamp socket. Check wiring and/or repair connection.
Back-up lamp Neither left nor right lamp lights.	Faulty back-up lamp switch (M/T) or inhibitor switch (A/T). Blown out fusible link (Green) or fuse (4) 15A). Loose connection or open circuit.	Conduct continuity test and replace if necessary. Correct cause and replace. Check wiring and/or repair connection.
Lamp on only one side lights.	Burned out bulb. Loose bulb. Loose connection or open circuit.	Replace. Repair lamp socket. Check wiring and/or repair connection.

STOP LAMP SWITCH

Inspection

Test continuity through stop lamp switch with a test lamp or ohmmeter.

When plunger is pressed into switch assembly, stop lamp switch contacts are open. Contacts are closed when plunger is projected.

BACK-UP LAMP SWITCH (M/T)

Back-up lamp switch is installed on transmission.

Inspection

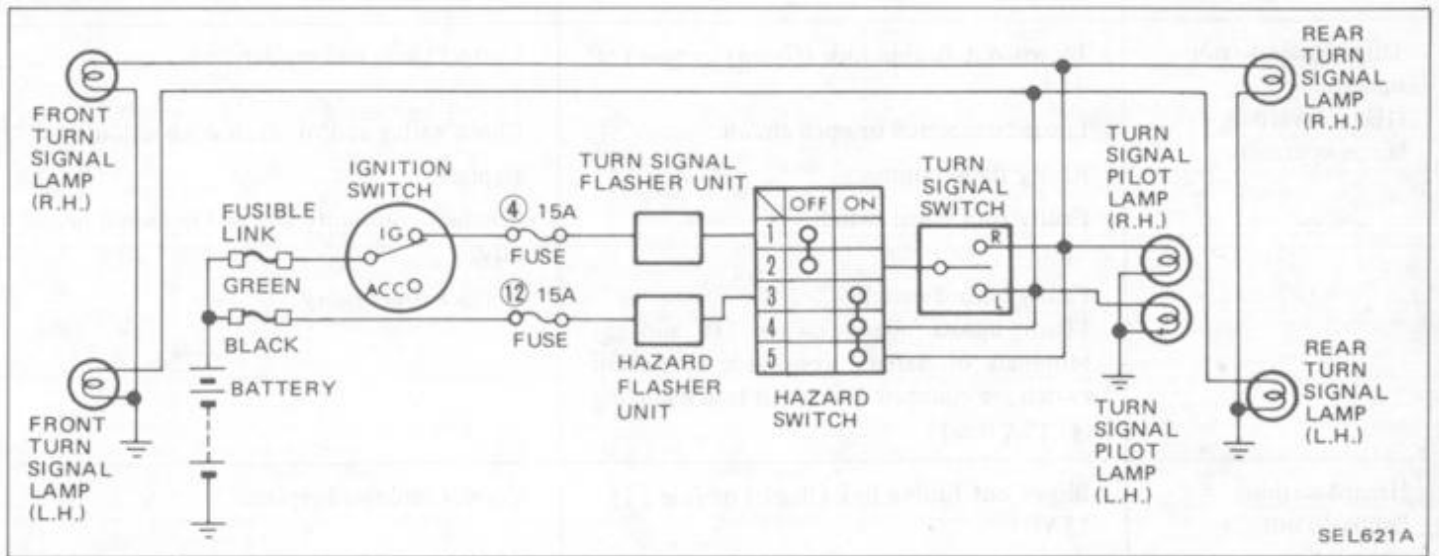
When transmission lever is in "R" position, there should be continuity between two terminals.

INHIBITOR SWITCH (A/T)

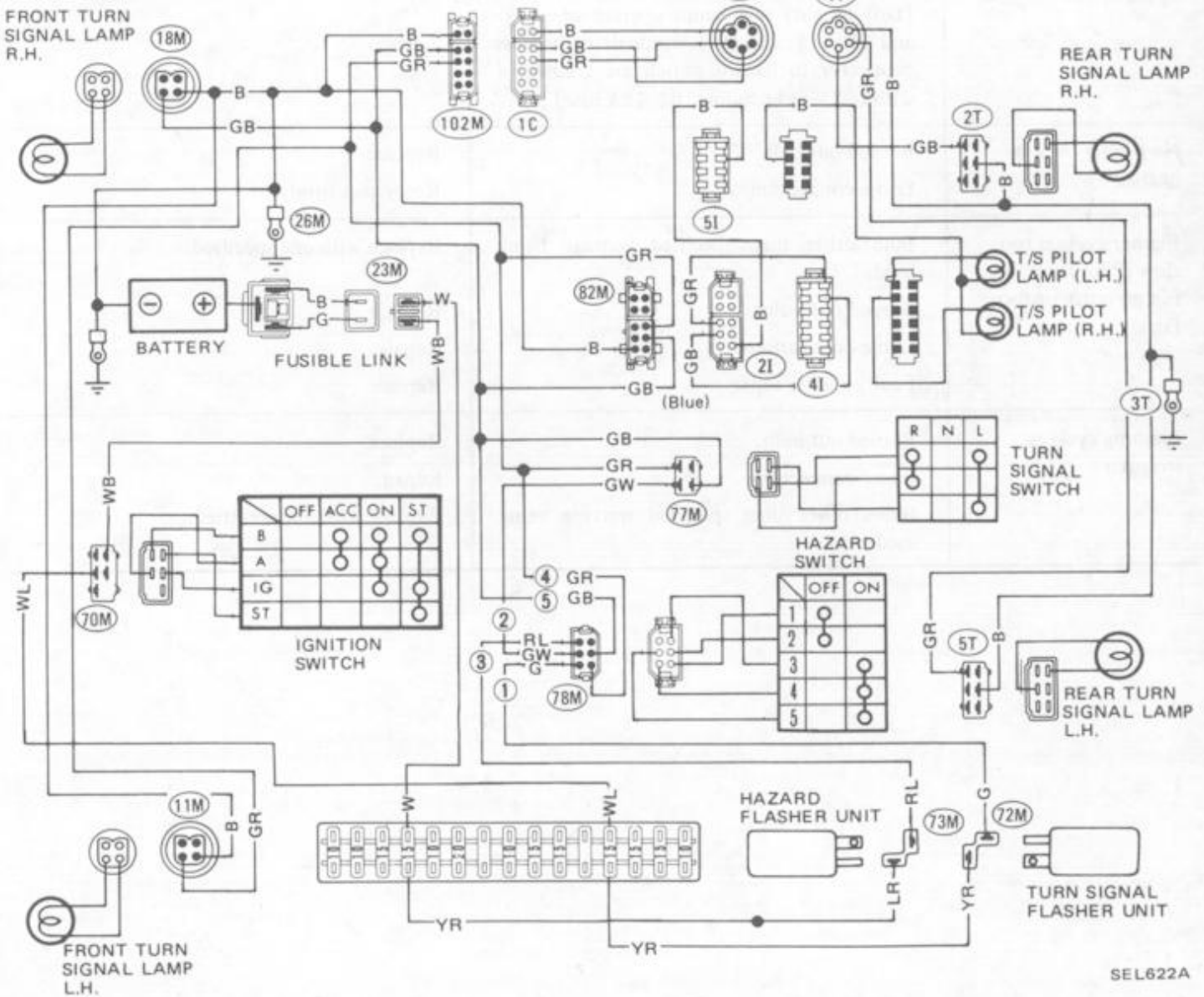
Refer to A/T section.

TURN SIGNAL AND HAZARD WARNING LAMPS

SCHEMATIC



WIRING DIAGRAM



TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Turn signals do not operate. (Hazard warning lamps operate).	Blown out fusible link (Green) or fuse (④ 15A). Loose connection or open circuit. Faulty flasher unit. Faulty turn signal switch. Faulty hazard switch. [Turn signals operate when ① and ② terminals of harness connector to hazard switch are connected with test lead including ④ 15A fuse].	Correct cause and replace. Check wiring and/or repair connection. Replace. Conduct continuity test and replace if necessary. Replace if necessary.
Hazard warning lamps do not operate. (Turn signals operate).	Blown out fusible link (Black) or fuse (⑫ 15A). Faulty hazard warning flasher unit. Faulty hazard switch. [Left (Right) side lamps operate when ③ and ④ (③ and ⑤) terminals of harness connector to hazard switch are connected with test lead including ⑫ 15A fuse].	Correct cause and replace. Replace. Replace if necessary.
No flasher click is heard.	Burned out bulb. Loose connection.	Replace. Reconnect firmly.
Flasher cycle is too slow (Pilot lamp does not go out.), or too fast.	Bulb other than specified wattage being used. Burned out bulbs. Loose connections. Faulty flasher unit.	Replace with one specified. Replace. Repair. Replace.
Flashing cycle is irregular.	Burned out bulb. Loose connection. Bulbs other than specified wattage being used.	Replace. Repair. Replace with one specified.

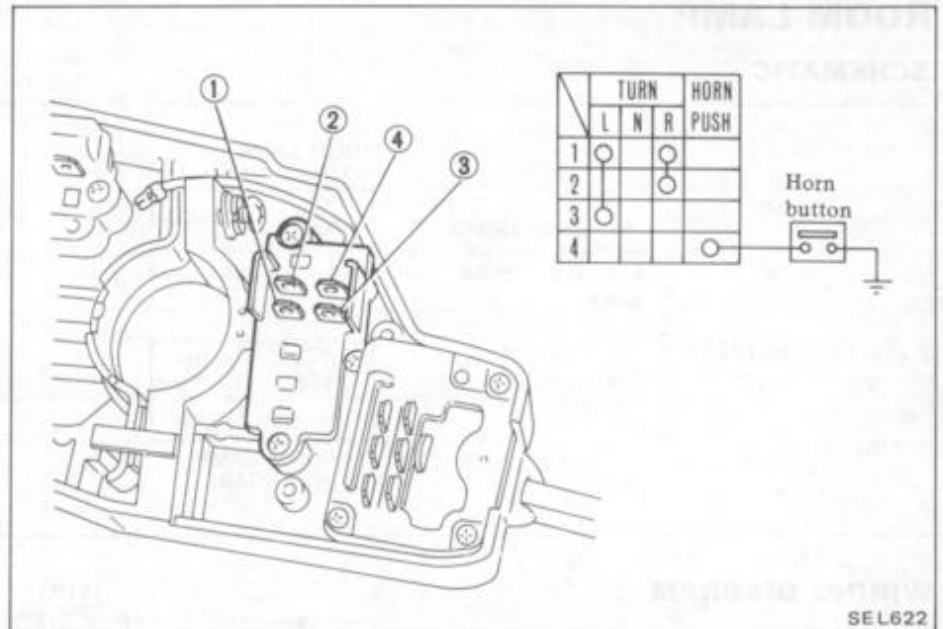
TURN SIGNAL SWITCH

Removal and installation

Refer to Combination Switch.

Inspection

Test continuity through switch with a test lamp or ohmmeter.



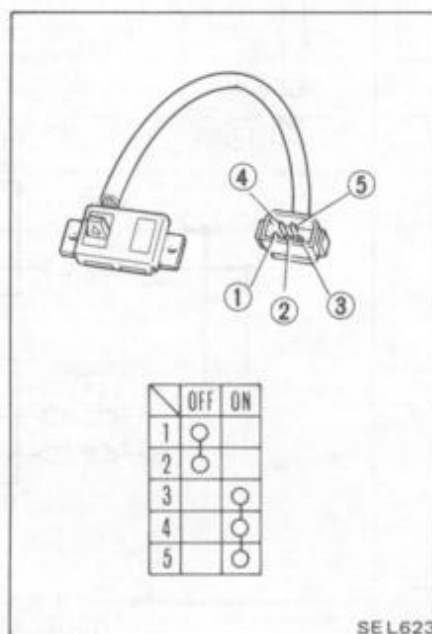
HAZARD WARNING SWITCH

Removal and installation

1. Disconnect battery ground cable.
2. Remove steering column cover.
3. Remove hazard warning switch.
4. Installation is in the reverse order of removal.

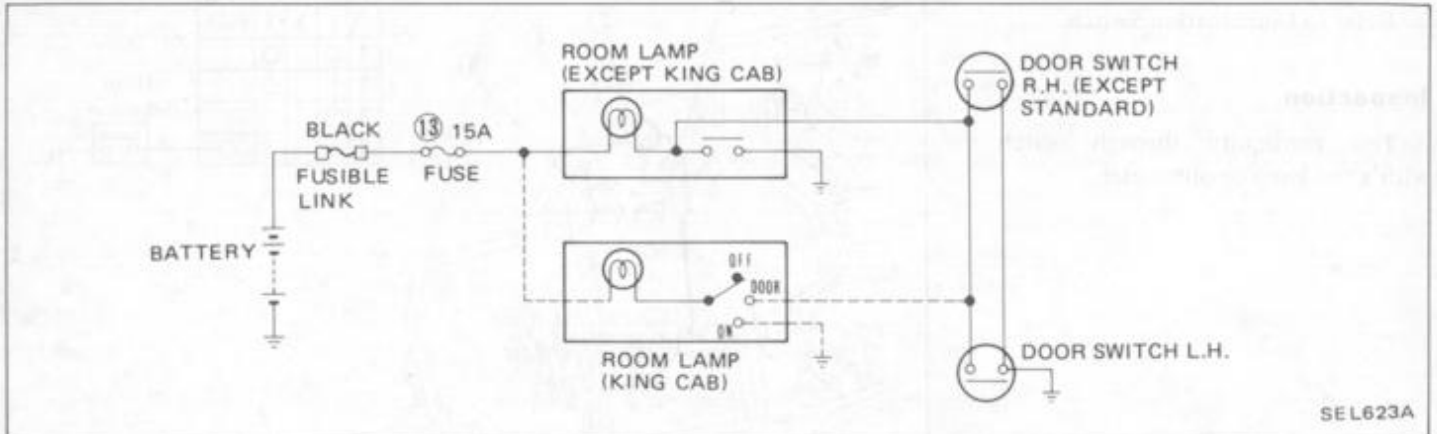
Inspection

Test continuity through switch with an ohmmeter.



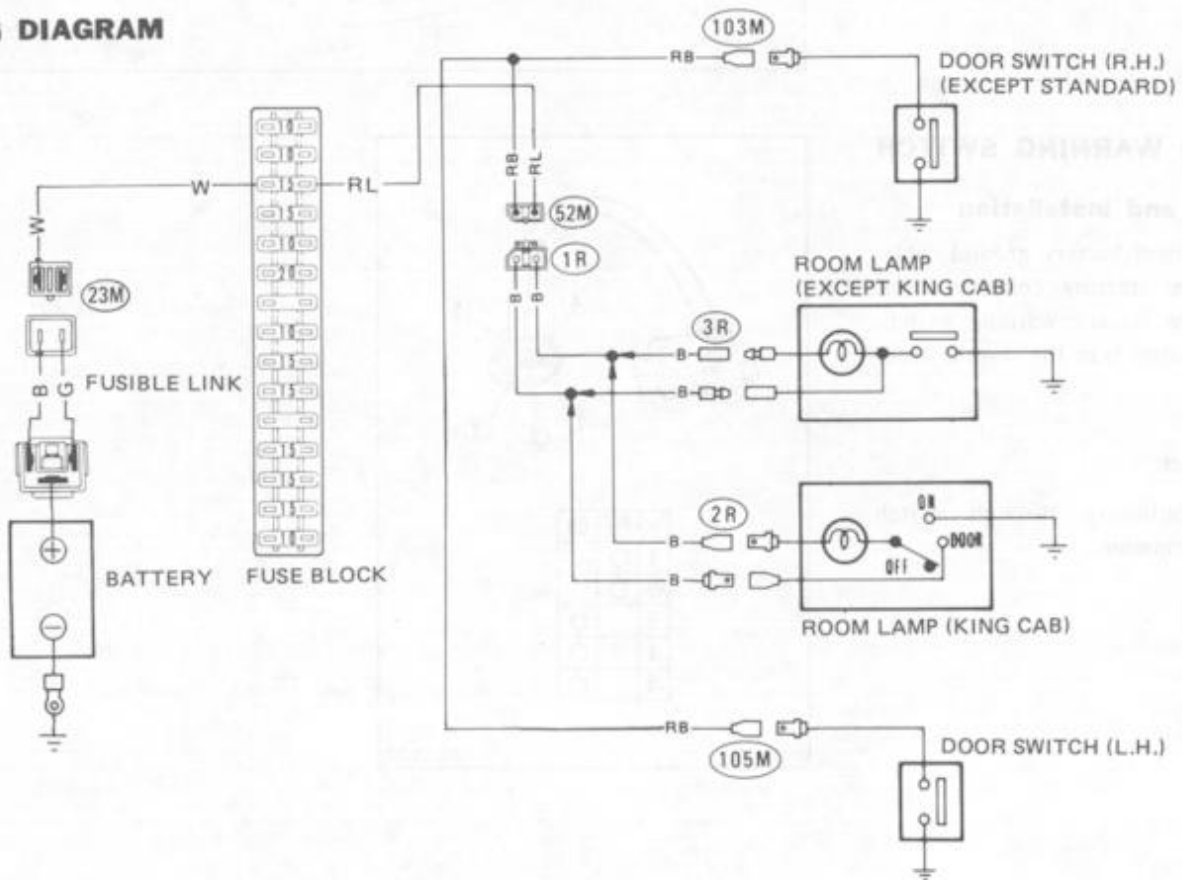
ROOM LAMP

SCHEMATIC



SEL623A

WIRING DIAGRAM



SEL624A

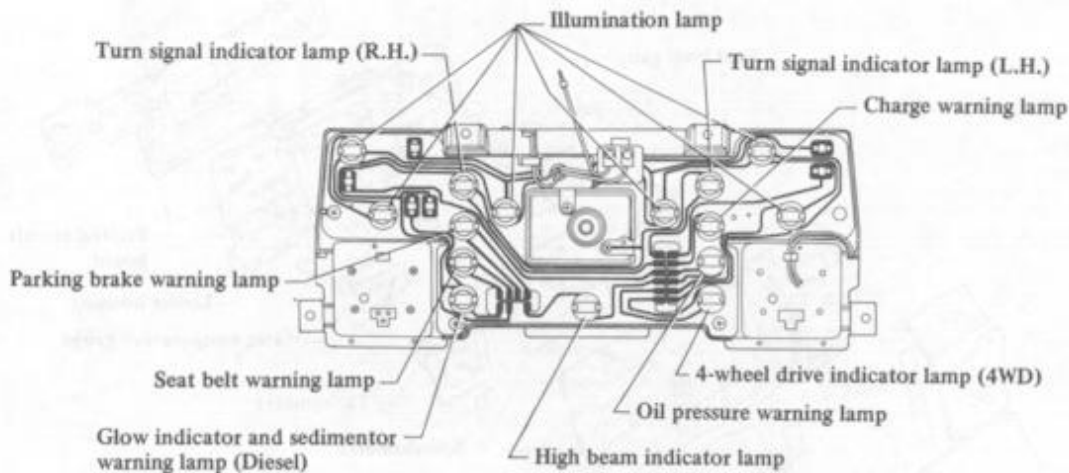
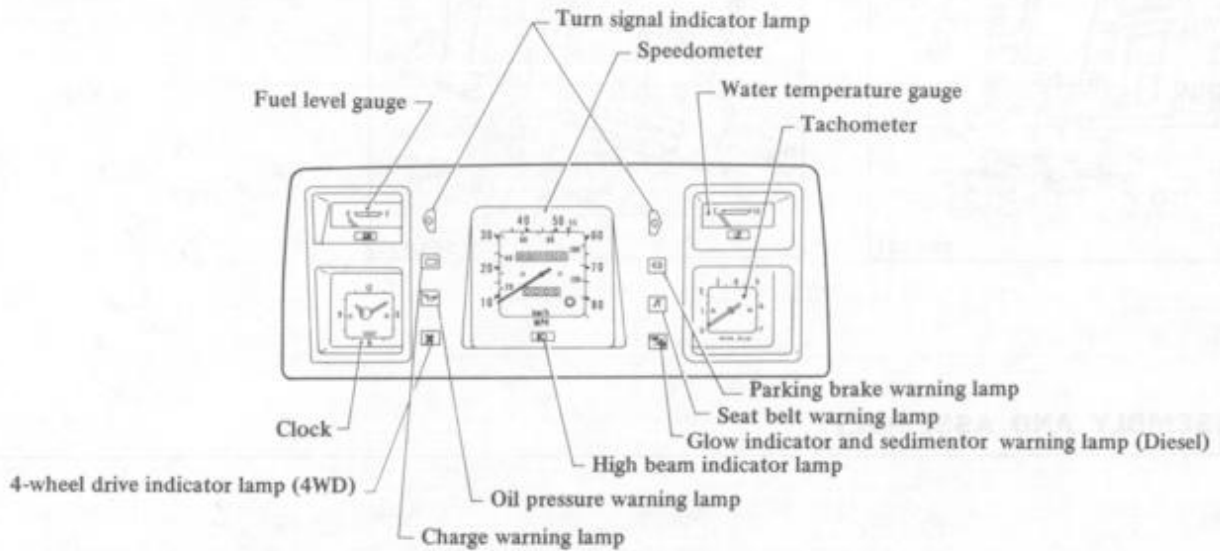
TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Correction action
Lamp does not light when door is opened.	Blown out fusible link (Black) or fuse (13 15A). Burned out bulb. Loose bulb. Loose connection to lamp. Faulty door switch. Faulty room lamp switch.	Correct cause and replace. Repalce. Correct. Correct. Replace if necessary. Replace if necessary.

METERS, GAUGES AND WARNING SYSTEM

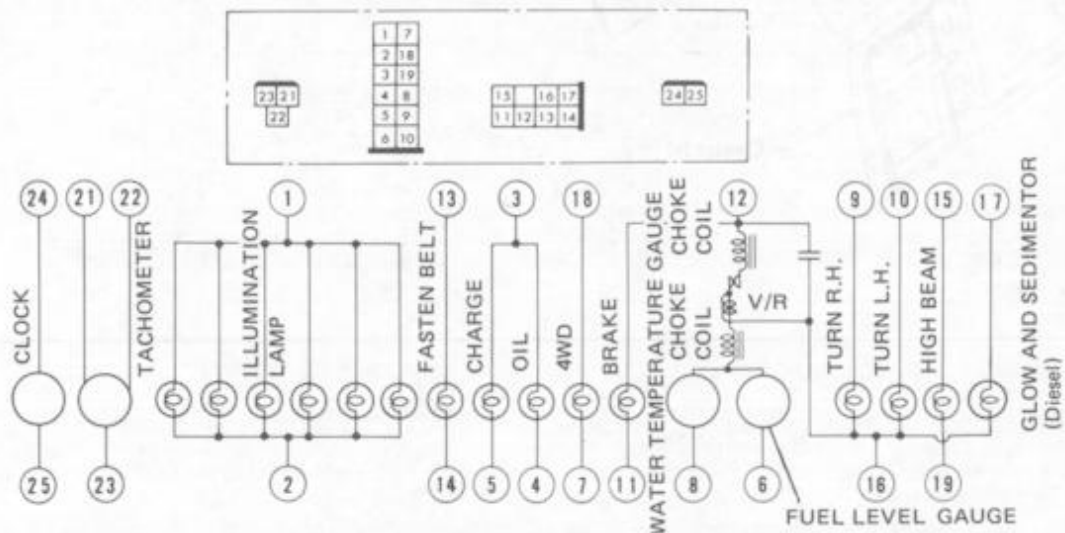
CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

COMBINATION METER



SEL813B

SCHEMATIC



SEL814B

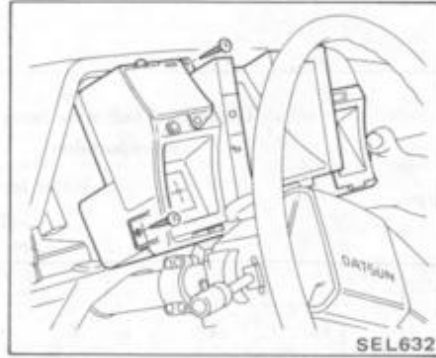
**REMOVAL
AND INSTALLATION**

1. Disconnect battery ground cable.
2. Remove cluster lid.

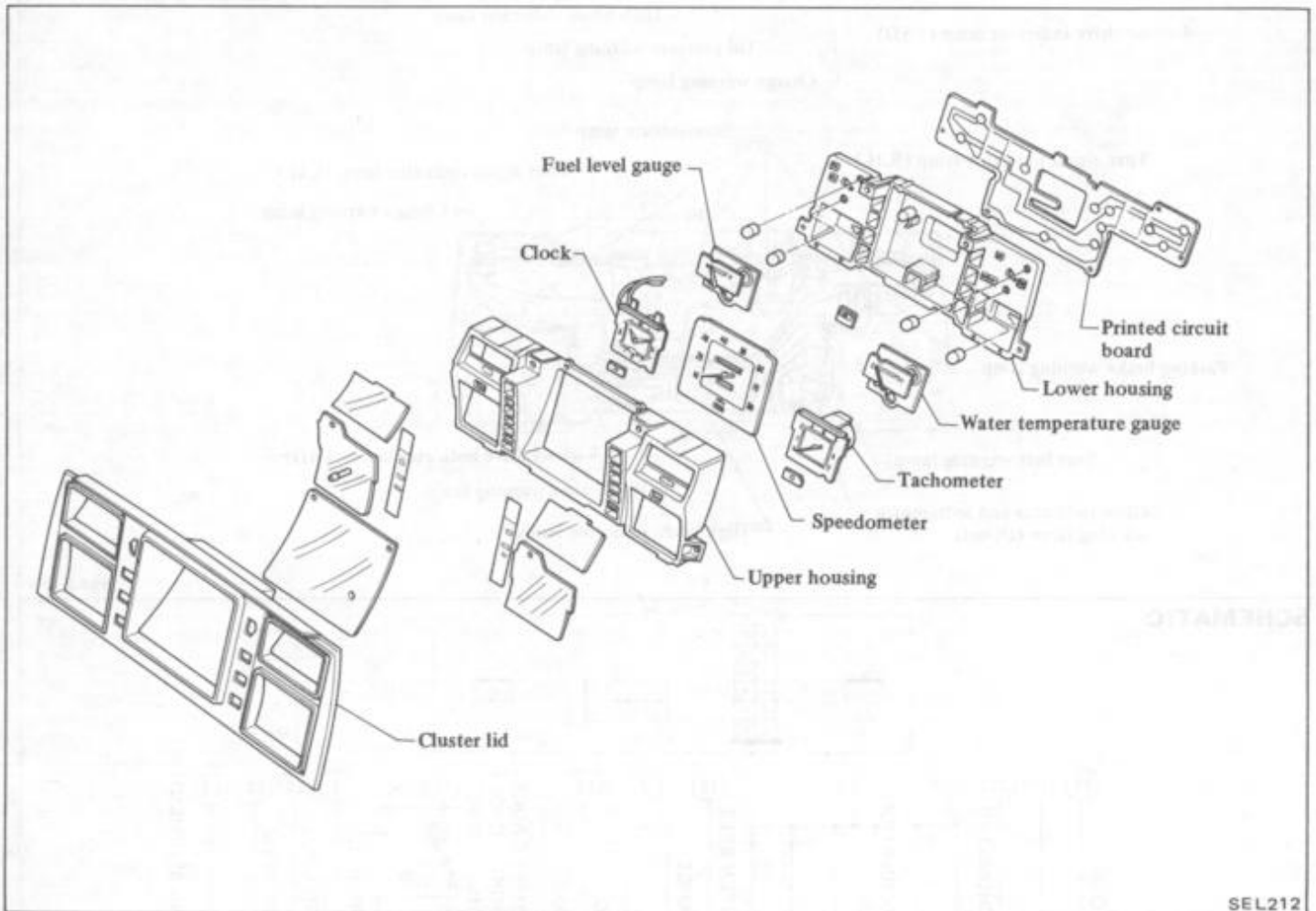
3. Remove combination meter assembly.

Carefully pull out combination meter and disconnect connectors.

4. Install combination meter in the reverse order of removal.

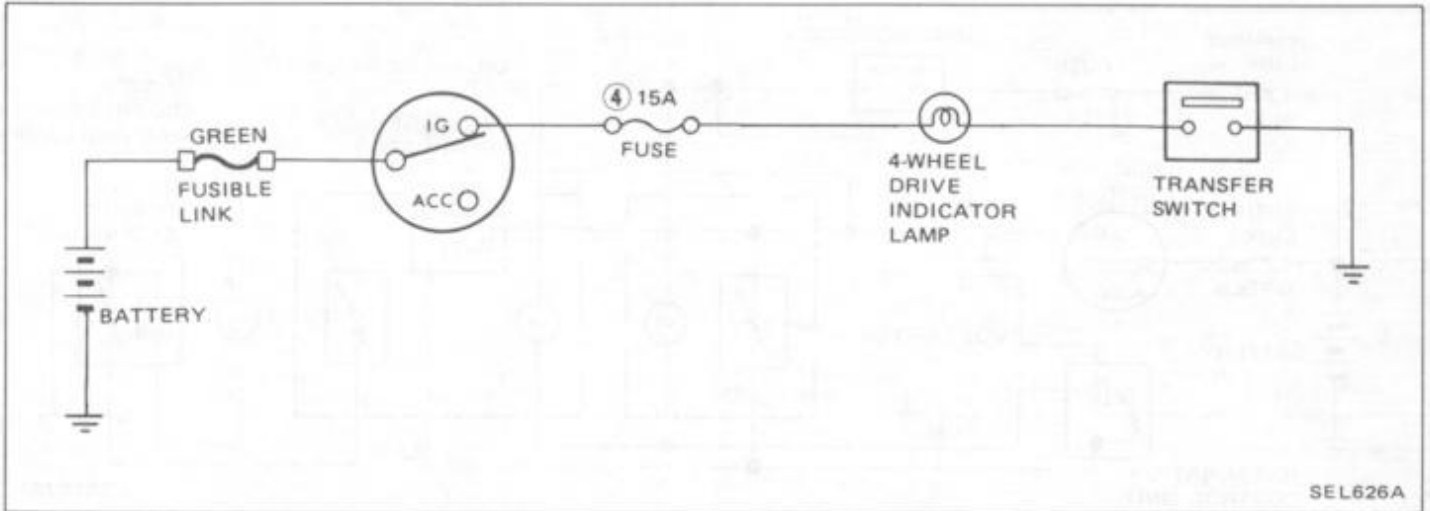


DISASSEMBLY AND ASSEMBLY



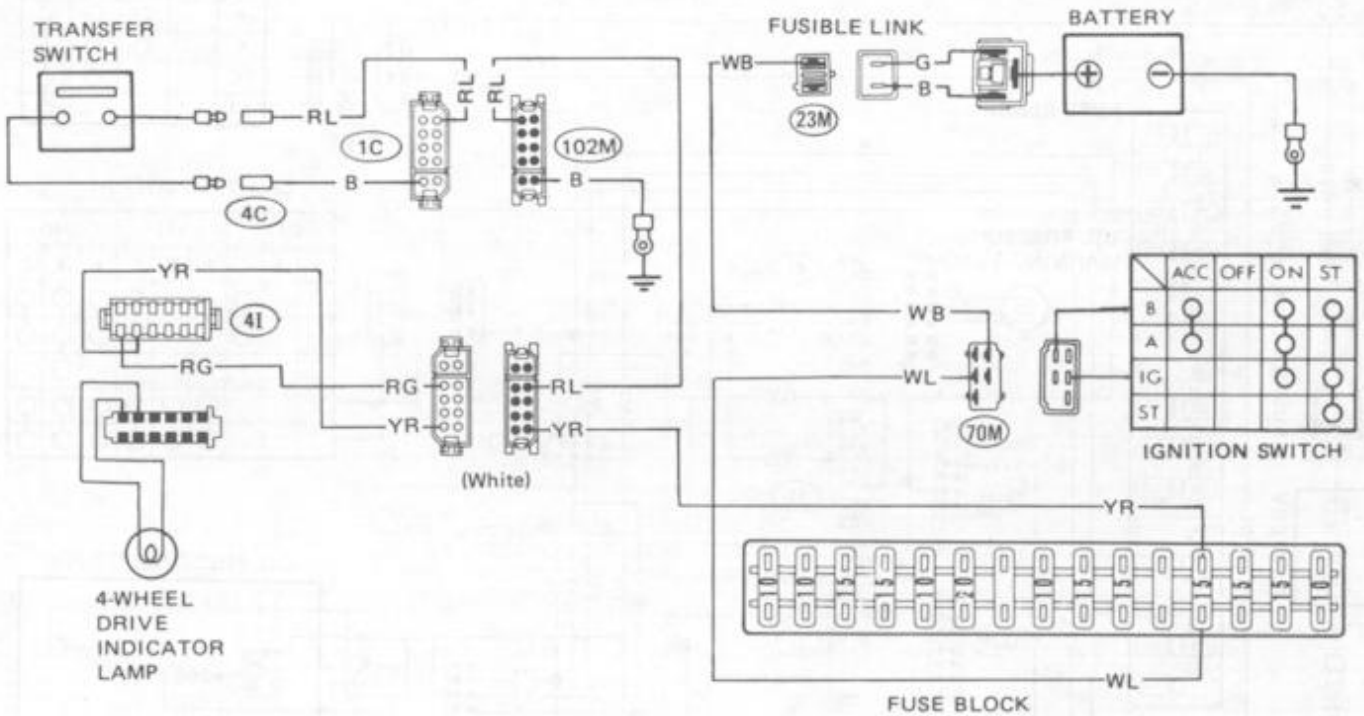
4-WHEEL DRIVE INDICATOR LAMP

SCHEMATIC



SEL626A

WIRING DIAGRAM

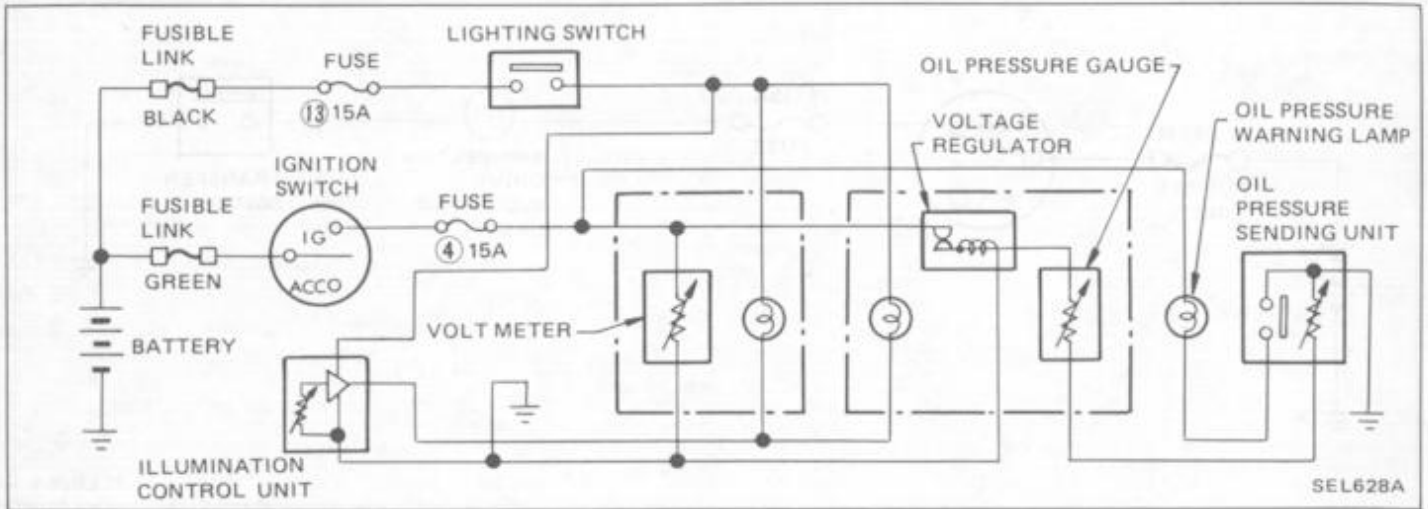


SEL815B

EL-69

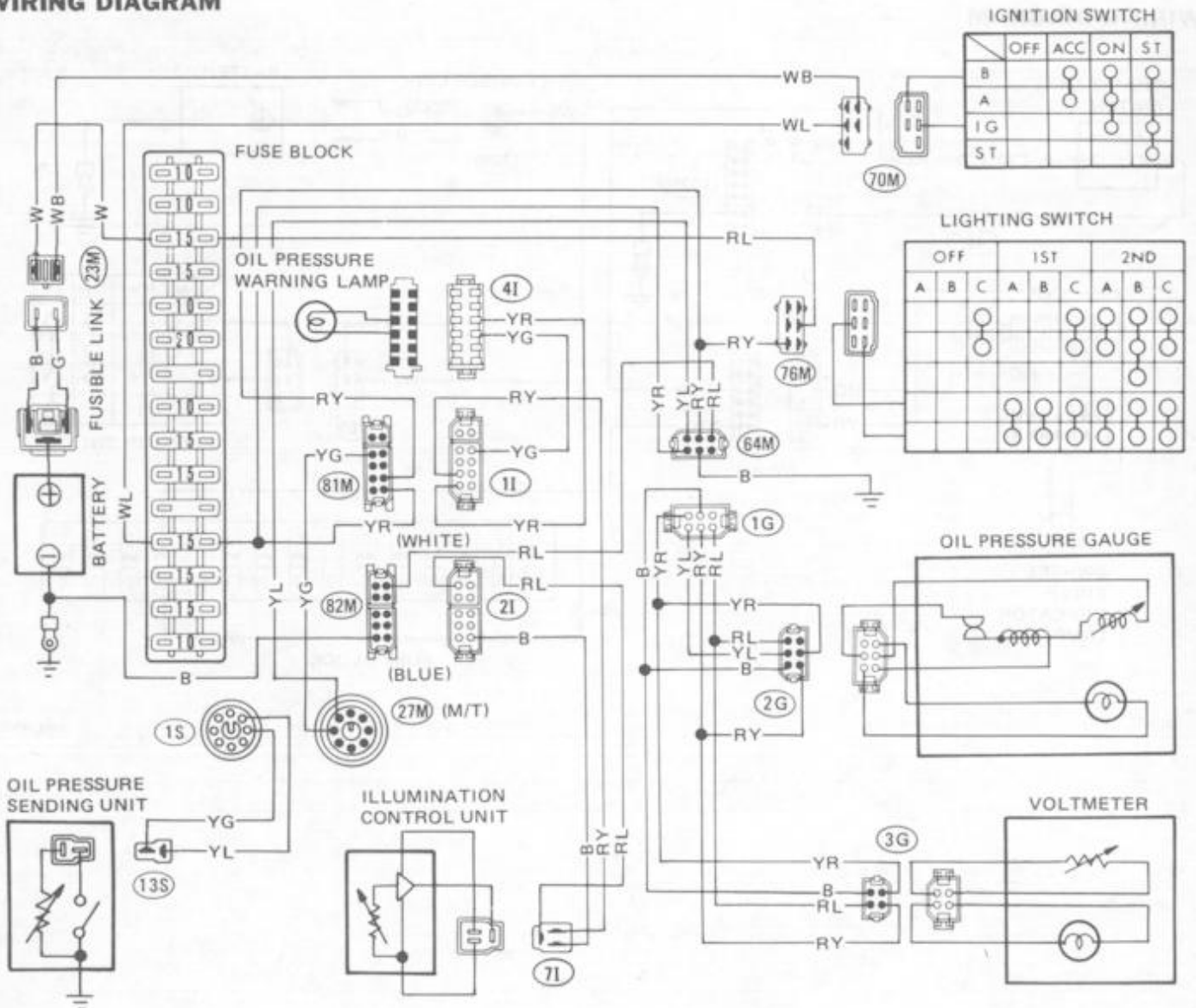
VOLTMETER AND OIL PRESSURE GAUGE

SCHEMATIC



SEL628A

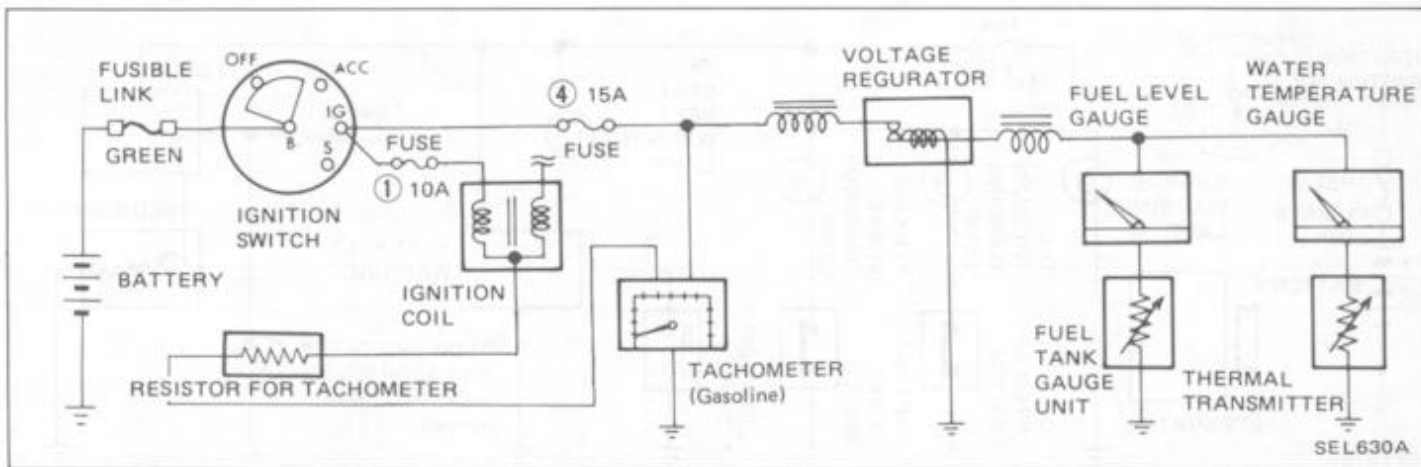
WIRING DIAGRAM



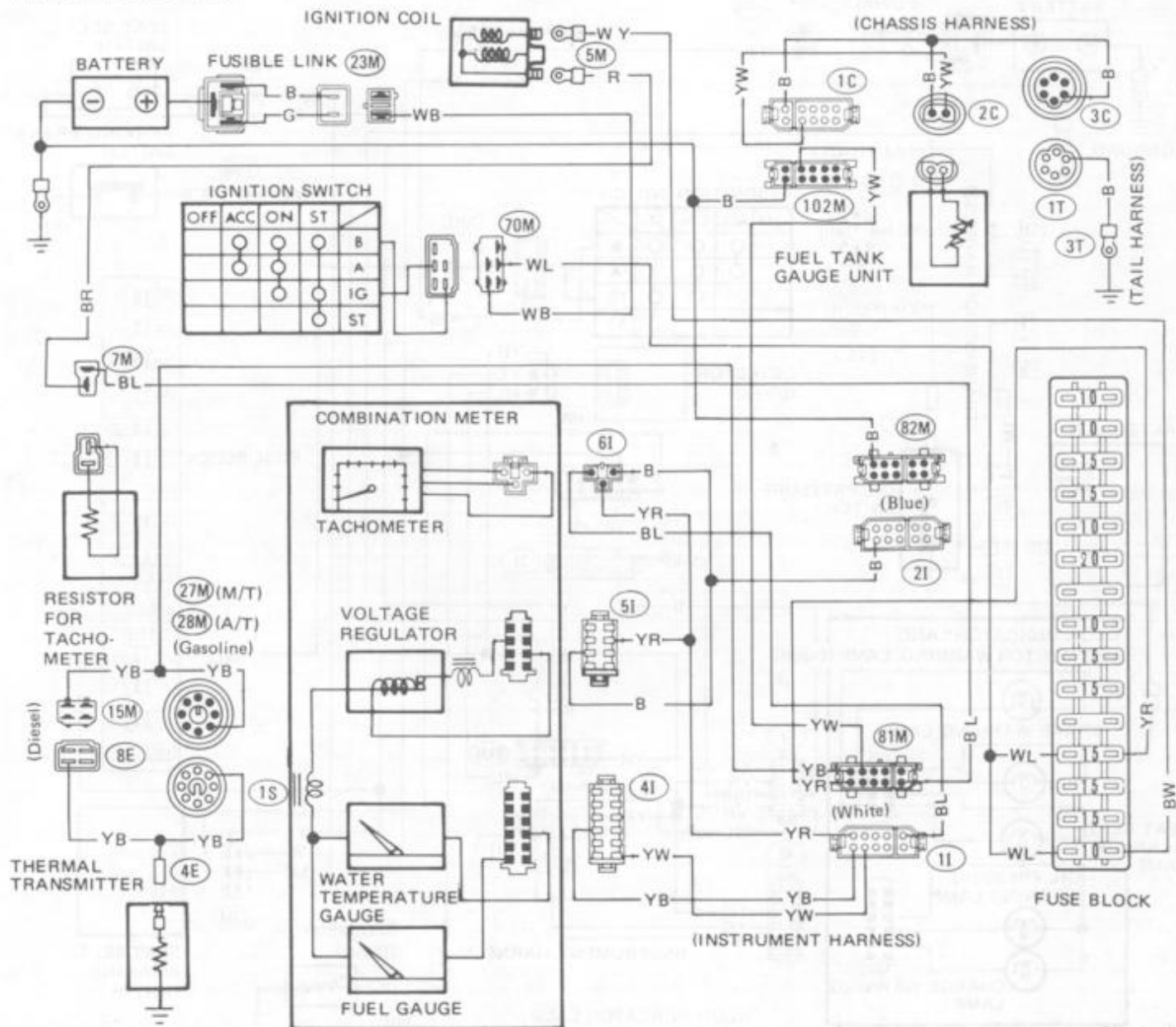
SEL816B

GAUGES AND METERS

SCHEMATIC

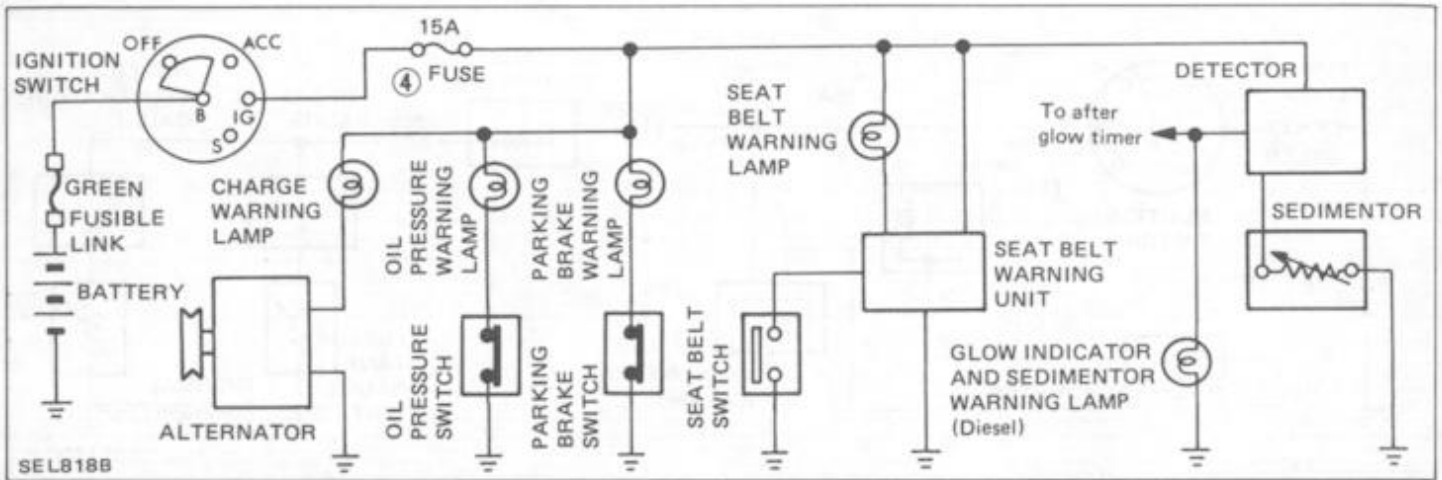


WIRING DIAGRAM

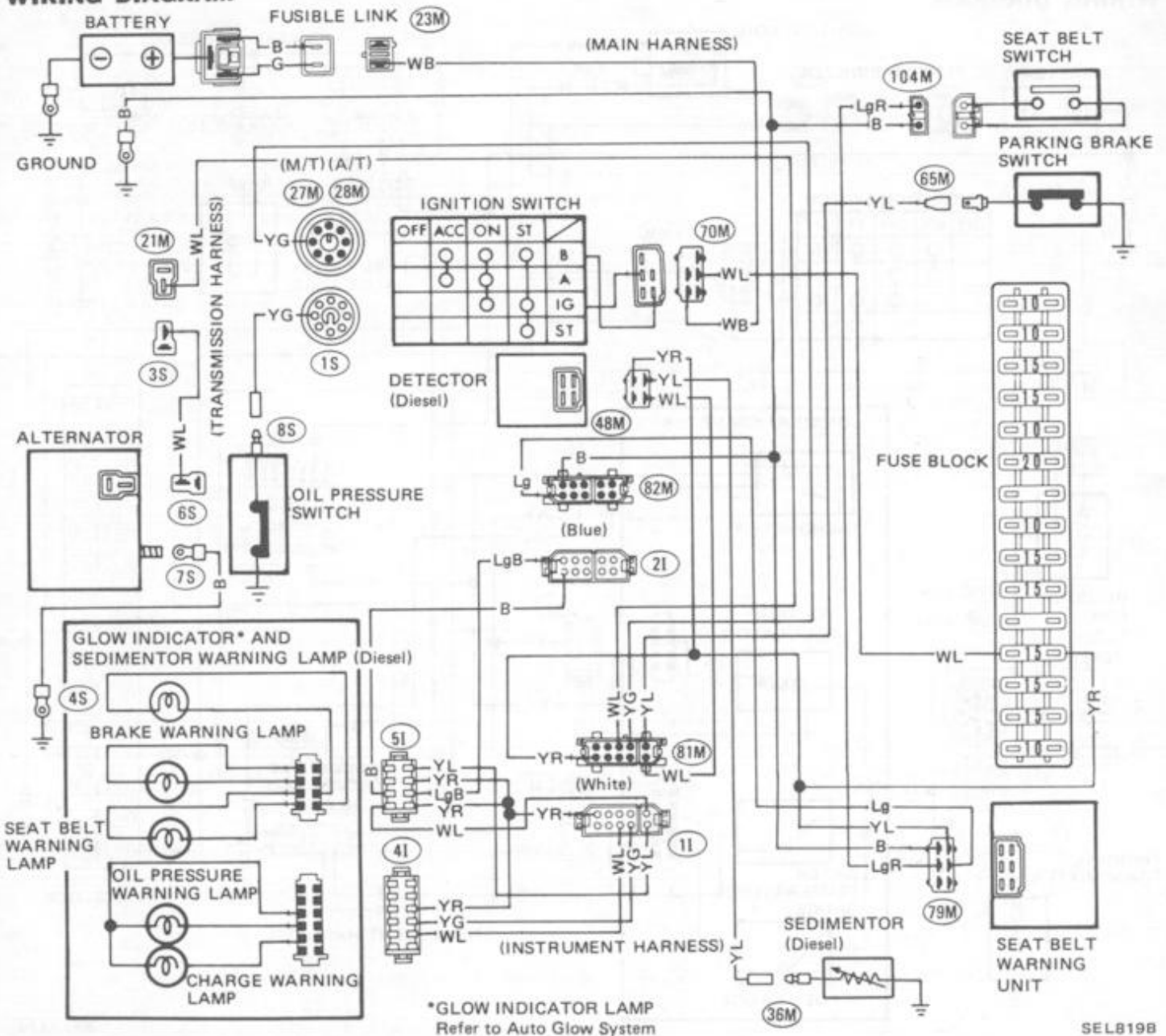


WARNING SYSTEM

SCHEMATIC



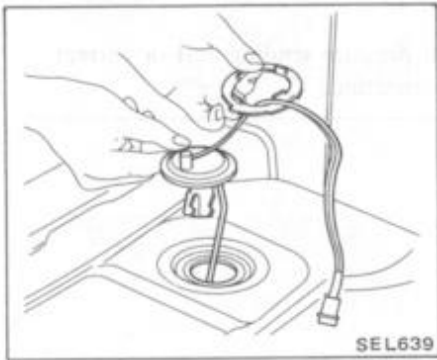
WIRING DIAGRAM



FUEL TANK GAUGE UNIT

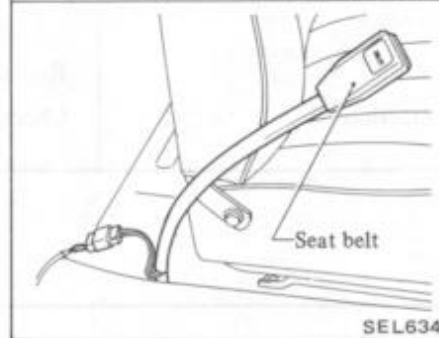
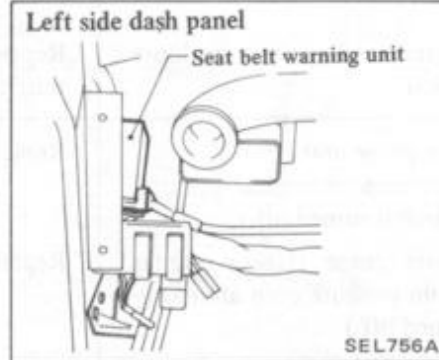
Removal and installation

Refer to FE section



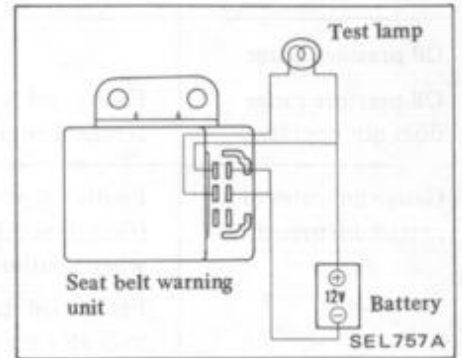
SEAT BELT WARNING SYSTEM

Location



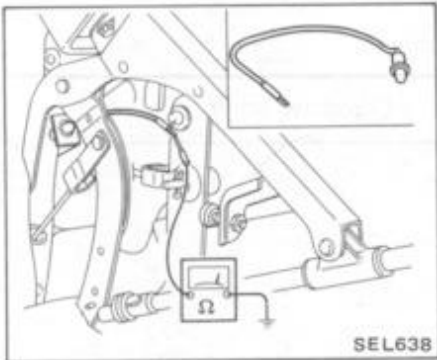
Inspection

Seat belt warning unit



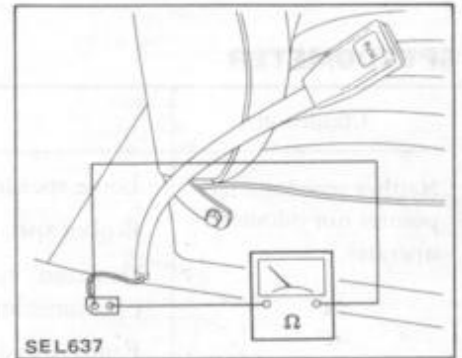
Buzzer sounds O.K.
 Test lamp should remain on for about 6 sec. and then go out

PARKING BRAKE SWITCH



Circuit tester indication:
 Parking brake pulled 0Ω
 Parking brake released ∞Ω

Seat belt switch



Circuit tester indication
 Seat belt is fastened ∞Ω
 Seat belt is not fastened 0Ω

TROUBLE DIAGNOSES AND CORRECTIONS

4-WHEEL DRIVE INDICATOR LAMP

Condition	Probable cause	Corrective action
Indicator lamp does not glow when transfer shift lever is set in 4-wheel drive position.	Burned out indicator lamp bulb. Faulty transfer switch. Blown out fuse (④ 15A).	Replace. Replace if necessary. Replace.

VOLTMETER AND OIL PRESSURE GAUGE

Condition	Probable cause	Corrective action
Oil pressure gauge Oil pressure gauge does not operate.	Faulty oil pressure sending unit or loose terminal connection.	Replace oil pressure sending unit or correct terminal connection.
Gauge indicates only maximum pressure.	Faulty oil pressure gauge unit. (Gauge pointer returns to original position when ignition switch is turned off.) Faulty oil pressure gauge. (Gauge pointer indicates maximum pressure even after ignition switch is turned off.)	Replace. Replace.
Voltmeter Voltmeter does not operate, or abnormally indicates.	Faulty voltmeter. Loose or poor connection.	Replace. Check wiring and/or repair connection.

SPEEDOMETER

Condition	Probable cause	Corrective action
Neither speedometer pointer nor odometer operates.	Loose speedometer cable connector. Broken speedometer cable. Damaged speedometer drive pinion gear (Transmission side). Faulty speedometer.	Retighten. Replace. Replace. Replace.
Unstable speedometer pointer.	Loose speedometer cable connector. Damaged speedometer cable. Faulty speedometer.	Retighten. Replace. Replace.
Unusual sound occurs in response to increase in driving speed.	Excessively bent or twisted speedometer cable inner wire or lack of lubrication. Faulty speedometer.	Replace or lubricate. Replace.
Inaccurate speedometer indication.	Faulty speedometer.	Replace.
Inaccurate odometer operation.	Improperly meshed second and third gear or worn gears. Faulty feeding due to deformed odometer and pinion carrier.	Replace speedometer. Replace speedometer.

ELECTRICAL SYSTEM – Meters, Gauges and Warning System

FUEL LEVEL GAUGE

Condition	Probable cause	Corrective action
Fuel level gauge does not operate.	Faulty fuel tank gauge unit. (Pointer deflects when fuel tank gauge unit YW wire is grounded.) Faulty fuel level gauge. Loose connection or open circuit. Faulty voltage regulator built into water temperature gauge.	Replace fuel tank gauge unit. Replace. Check wiring and/or repair connection. Replace water temperature gauge.
Pointer indicates only "F" position.	Faulty fuel tank gauge unit. (Gauge pointer returns to original position when ignition switch is turned off.) Faulty fuel level gauge. (Gauge pointer indicates "F" position even after ignition switch has been turned off.)	Replace. Replace.
Fuel level gauge does not operate accurately.	Faulty fuel tank gauge unit. Faulty fuel level gauge. Poor or loose connection.	Replace. Replace fuel level gauge. Correct connector terminal contact.

WATER TEMPERATURE GAUGE

Condition	Probable cause	Corrective action
Gauge does not operate.	Faulty thermal transmitter or loose terminal connection. (When wire to thermal transmitter is grounded, gauge pointer fluctuates.) Faulty water temperature gauge. Faulty voltage regulator built into water temperature gauge.	Replace thermal transmitter or correct terminal connection. Replace water temperature gauge. Replace water temperature gauge.
Gauge indicates only maximum temperature.	Faulty thermal transmitter. (Gauge pointer returns to original position when ignition switch is turned off.) Faulty water temperature gauge. (Gauge pointer indicates maximum temperature even after ignition switch is turned off.)	Replace thermal transmitter. Replace water temperature gauge.
Gauge does not operate accurately.	Faulty water temperature gauge. Loose or poor connection.	Replace water temperature gauge. Correct connector terminal contact.

WARNING LAMPS

Condition	Probable cause	Corrective action
Charge warning lamp Lamp does not go out when engine is started.	Faulty charging system.	Inspect charging system.
Oil pressure warning lamp Lamp does not light when ignition switch is set to "ON".	Faulty oil pressure switch or loose switch terminal connection. (When lead wire connected to switch is grounded, warning lamp lights.)	Replace or correct connection.
Lamp does not go out while engine is being operated.	Lack of engine oil. Oil pressure too low. Faulty oil pressure switch.	Check oil level and add oil as required. Inspect engine oil pressure system. Replace.
Parking brake warning lamp Lamp does not go out.	Faulty parking brake switch (When parking brake lever is released).	Replace.
Glow indicator and sedimentor warning lamp Glow indicator lamp Auto-glow indicator lamp does not come on.	Faulty auto-glow system.	Inspect auto-glow system.
Sedimentor warning lamp Lamp does not come on when water is mixed in fuel filter.	Burned out bulb. Faulty detector. Faulty sedimentor.	Replace. Replace. Replace.

TACHOMETER

Condition	Probable cause	Corrective action
Tachometer pointer deflects.	Loose or poor connection. Faulty resistor. Faulty tachometer.	Repair. Replace resistor. Repair or replace tachometer.
Tachometer pointer will not move.	Loose or poor connection. Faulty tachometer.	Repair. Repair or replace tachometer.

ELECTRICAL SYSTEM – Meters, Gauges and Warning System

SEAT BELT WARNING SYSTEM

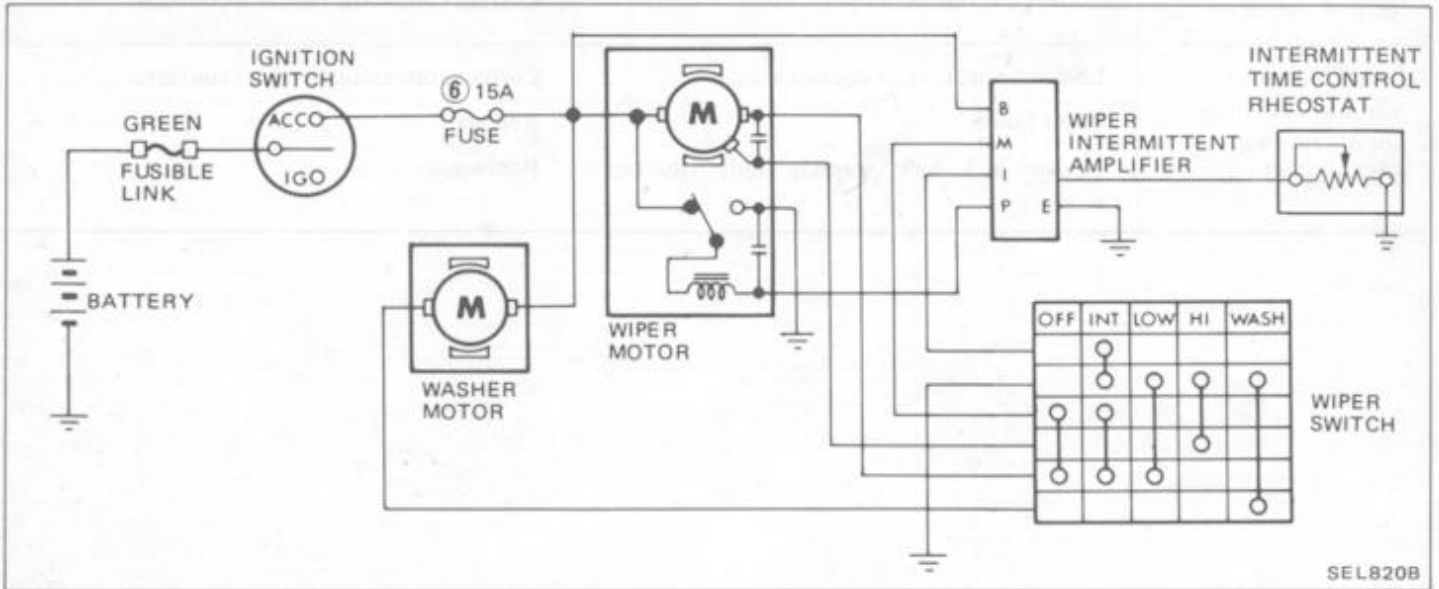
Condition	Probable cause	Corrective action
Buzzer does not sound and warning lamp does not glow with ignition switch on.	Faulty seat belt switch. Faulty seat belt warning unit. Loose connection or open circuit.	Repair or replace. Replace. Correct connector terminal contacts.
Either buzzer or warning lamp does not operate with proper condition.	Loose connection or open circuit. Burnt bulb. Faulty seat belt warning unit (Built-in buzzer).	Correct connector terminal contacts. Replace. Replace.

WIPER AND WASHER

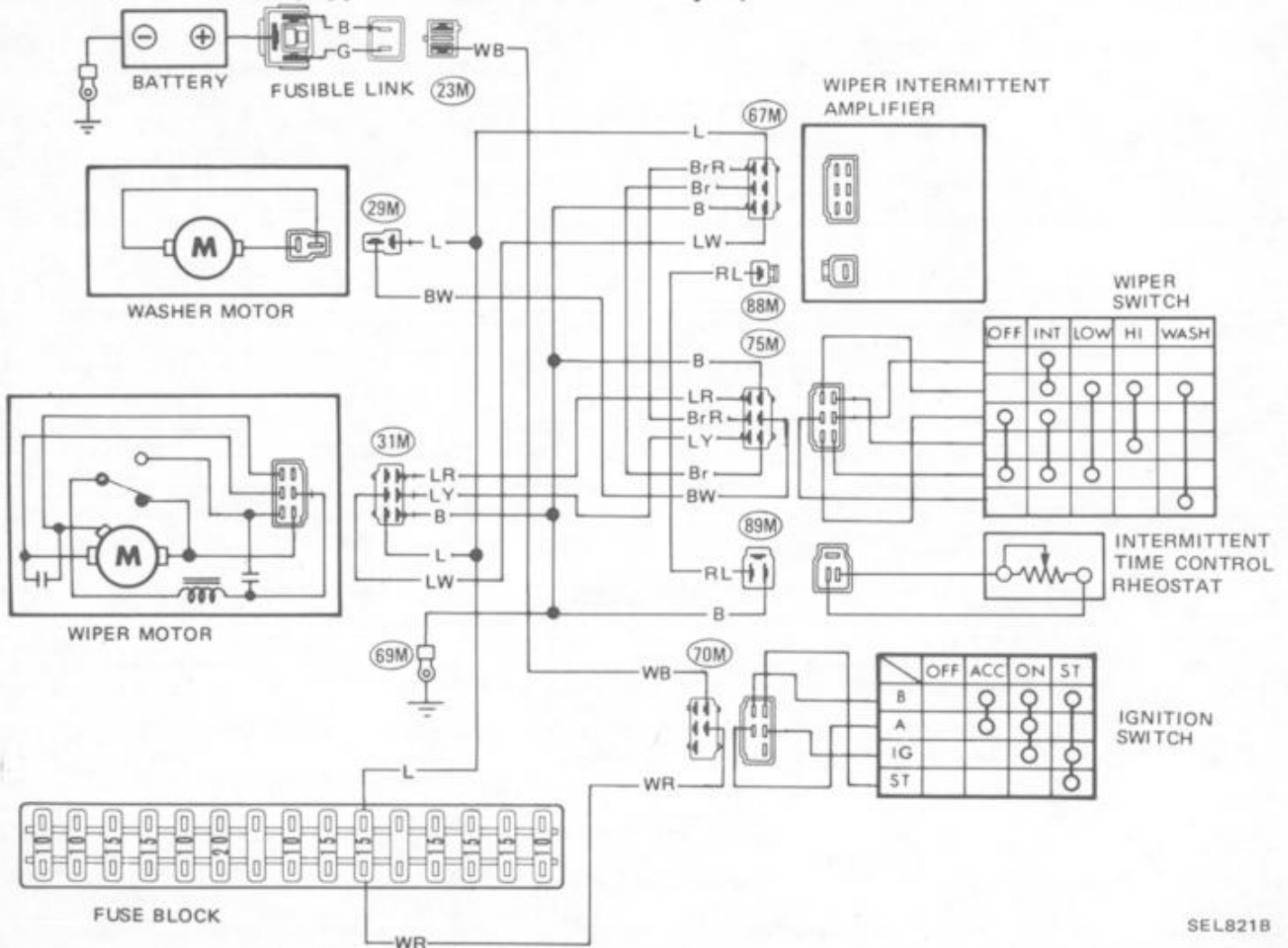
CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

WINDSHIELD WIPER AND WASHER

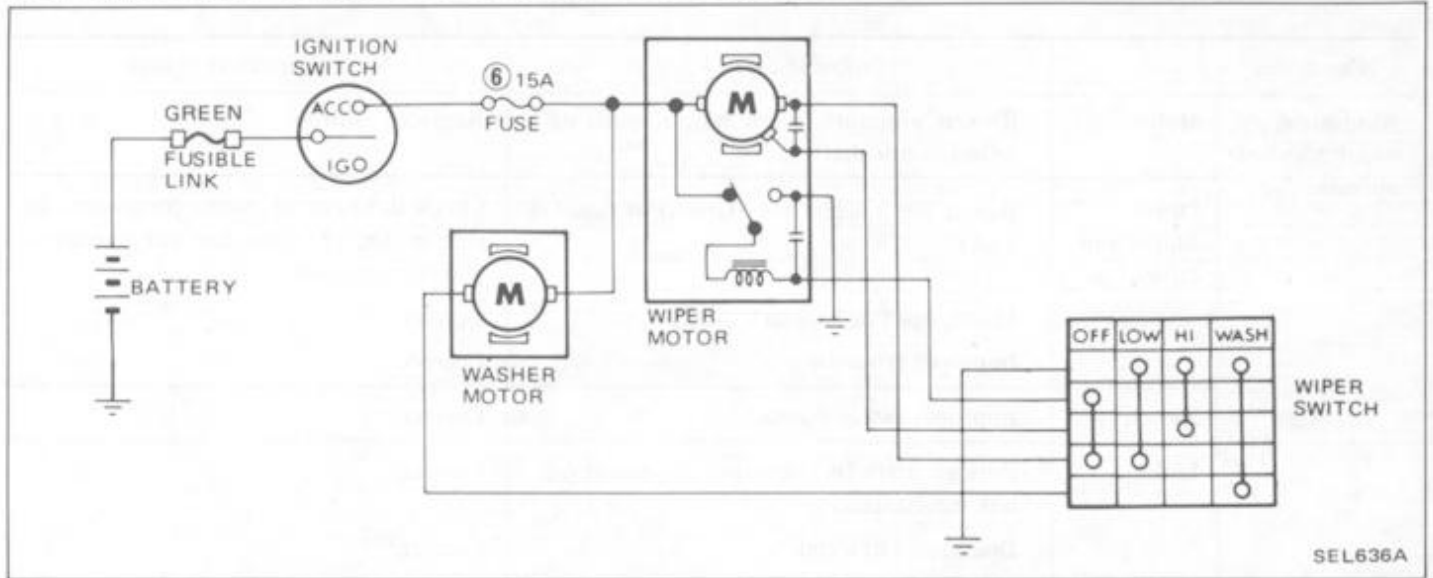
SCHEMATIC (Equipped with intermittent wiper)



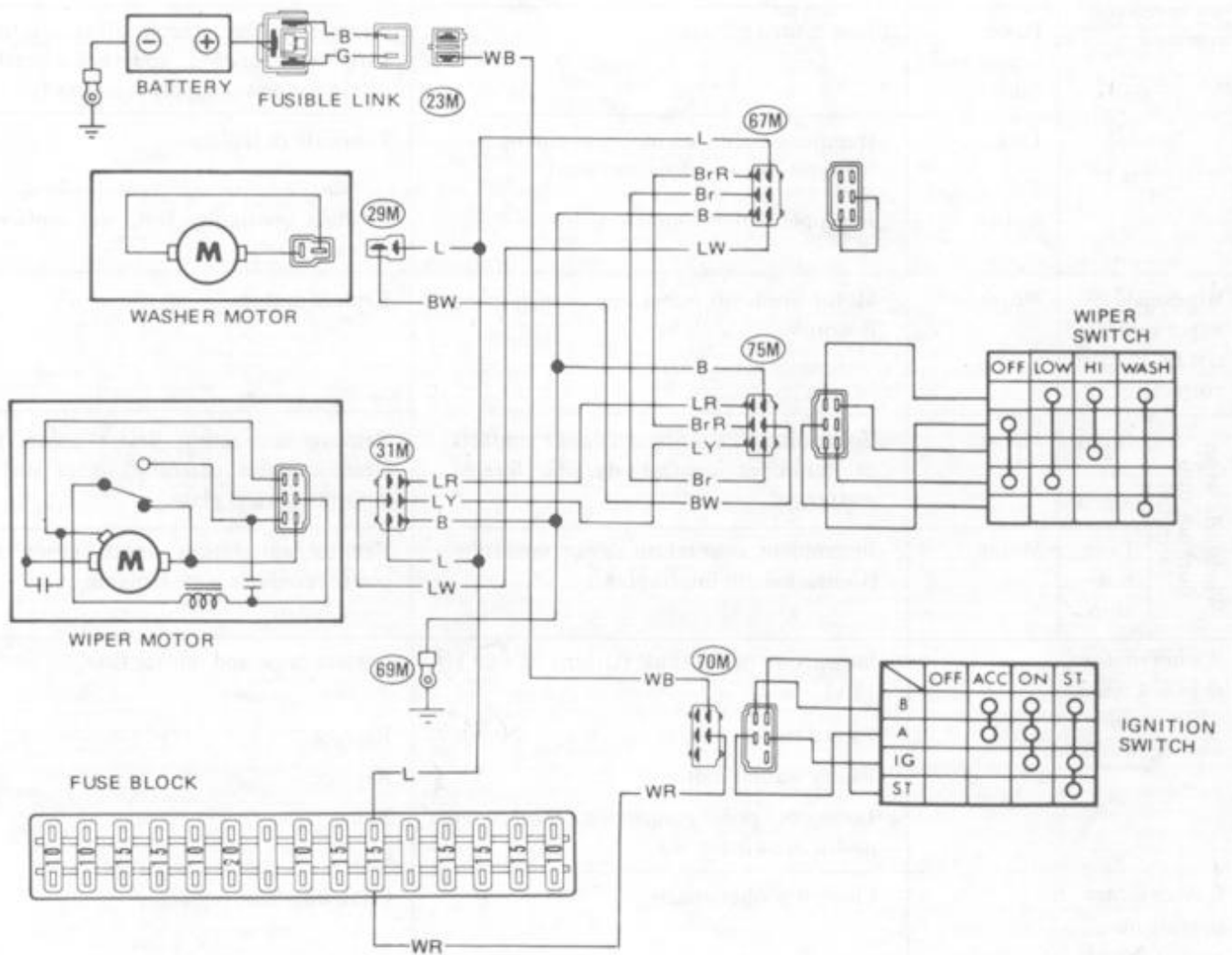
WIRING DIAGRAM (Equipped with intermittent wiper)



SCHEMATIC (Not equipped with intermittent wiper)



WIRING DIAGRAM (Not equipped with intermittent wiper)



TROUBLE DIAGNOSES AND CORRECTIONS

Condition		Probable cause	Corrective action	
Windshield wiper does not operate.	Motor	Broken armature, worn motor brush or seized motor shaft.	Replace motor.	
	Power supply and cable	Blown out fusible link (Green) or fuse (⑥ 15A).	Check short-circuit, burnt component inside motor or other part for operation, and correct problem.	
		Loose, open or broken wiring. Improper grounding.	Correct. Correct.	
	Switch	Improper switch contact.	Correct.	
Windshield wiper operating speed is too slow.	Motor	Short-circuit of motor armature, worn motor brush or seized motor shaft.	Replace motor or lubricate bearing with engine oil.	
	Power supply and cable	Low source voltage.	Measure voltage, check other electrical parts for operation, and take corrective action for power supply if necessary.	
	Link	Humming occurs on motor in arm operating cycle due to seized arm shaft.	Lubricate or replace.	
	Switch	Improper switch contact.	Conduct continuity test, and replace if necessary.	
Windshield wiper speed can not be adjusted correctly.	Motor	Motor brush for either low or high speed is worn.	Replace motor.	
Windshield wiper does not stop correctly.	Stops anywhere.	Motor	Contaminated auto-return device contacts or improper contact due to foreign matter.	Remove auto-return device cover, and clean contacts carefully so as not to deform contacts plate.
	Does not stop.	Motor	Incomplete auto-return device operation (Contact is not interrupted.)	Remove auto-return device cover, and correct contacts plate bending.
Washer motor does not operate when pushing washer switch on.		Blown out fusible link (Green) or fuse (⑥ 15A). Faulty switch. Faulty washer motor. Loose or poor connection contact at motor or switch.	Correct cause and replace fuse. Replace. Replace. Repair.	
Washer motor operate but washer fluid is not ejected.		Clogged washer nozzle.	Clean nozzle or replace.	

Intermittent windshield wiper**The sign for corrective action**

A. Measure voltage across positive (+) and negative (–) terminals of in-

termittent amplifier with a circuit tester.

B. Check continuity of all wiper switch positions.

C. Check continuity of terminals of

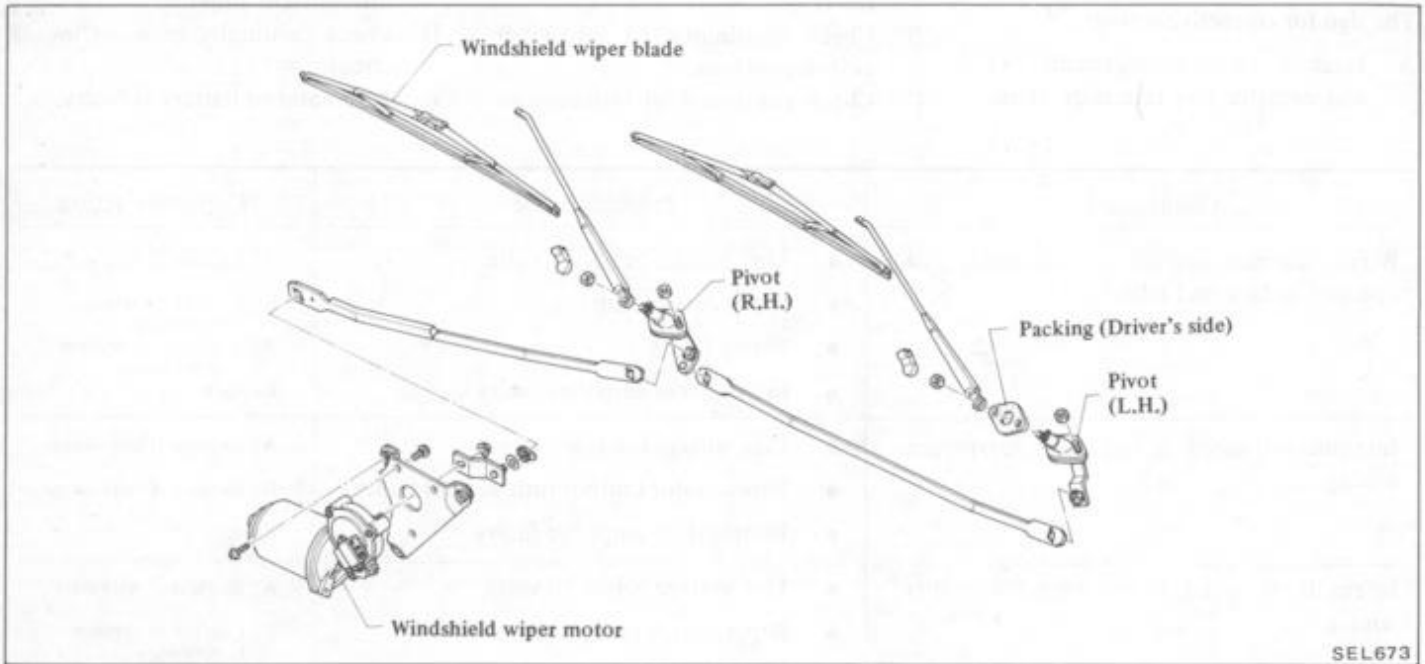
wiper motor, wiper switch and intermittent amplifier.

D. Check continuity in wiper motor circuit.

E. Alternator or battery is faulty.

Condition	Probable cause	Corrective action
Wipers do not operate intermittently but operates at Low and High speeds.	<ul style="list-style-type: none"> ● Line voltage below 10 volts ● Wiper switch faulty ● Wiring faulty ● Intermittent amplifier faulty 	<p>A: Replace if necessary.</p> <p>B: Correct or replace if necessary.</p> <p>A,C: Repair or replace if necessary.</p> <p>Replace.</p>
Intermittent speed is too short for proper wiping.	<ul style="list-style-type: none"> ● Line voltage too high ● Wiper motor (auto-return device) faulty ● Intermittent amplifier faulty 	<p>A: Replace if necessary.</p> <p>D: Replace if necessary.</p> <p>Replace.</p>
Intermittent speed is too long for proper wiping.	<ul style="list-style-type: none"> ● Line voltage below 10 volts ● Wiper switch faulty ● Wiring faulty ● Intermittent amplifier faulty 	<p>A: Replace if necessary.</p> <p>B: Correct or replace if necessary.</p> <p>A,C: Repair or replace if necessary.</p> <p>Replace.</p>
Wipers do not shut off.	<ul style="list-style-type: none"> ● Wiper motor faulty ● Intermittent amplifier faulty 	<p>D: Replace if necessary.</p> <p>Replace.</p>
Wipers operate intermittently with wiper switch OFF.	<ul style="list-style-type: none"> ● Wiper switch faulty ● Wiring faulty ● Intermittent amplifier faulty 	<p>B: Correct or replace if necessary.</p> <p>A,C: Repair or replace if necessary.</p> <p>Replace.</p>
Intermittent speed is erratic.	<ul style="list-style-type: none"> ● Line voltage fluctuation excessive ● Wiper switch faulty ● Wiring faulty ● Wiper motor faulty ● Intermittent amplifier faulty 	<p>E: Correct or replace if necessary.</p> <p>B: Correct or replace if necessary.</p> <p>A,C: Repair or replace if necessary.</p> <p>D: Replace if necessary.</p> <p>Replace.</p>
Wipers make a complete wiping stroke only one time with wiper switch ON but do not continue operation.	<ul style="list-style-type: none"> ● Line voltage below 10 volts ● Intermittent amplifier faulty 	<p>A: Replace if necessary.</p> <p>Replace.</p>
Wiper motor is not interconnected when washer switch is depressed, but intermittent operation is normal.	<ul style="list-style-type: none"> ● Connections poor ● Intermittent amplifier faulty 	<p>C: Repair or replace if necessary.</p> <p>Replace.</p>
Wiper motor simultaneously operates (or: does not delay) when washer switch is depressed.	<ul style="list-style-type: none"> ● Intermittent amplifier faulty 	<p>Replace.</p>
Wipers do not make a complete wiping stroke when washer switch is first turned on and is quickly turned off.	<ul style="list-style-type: none"> ● Intermittent amplifier faulty 	<p>Replace.</p>

WINDSHIELD WIPER



SEL673

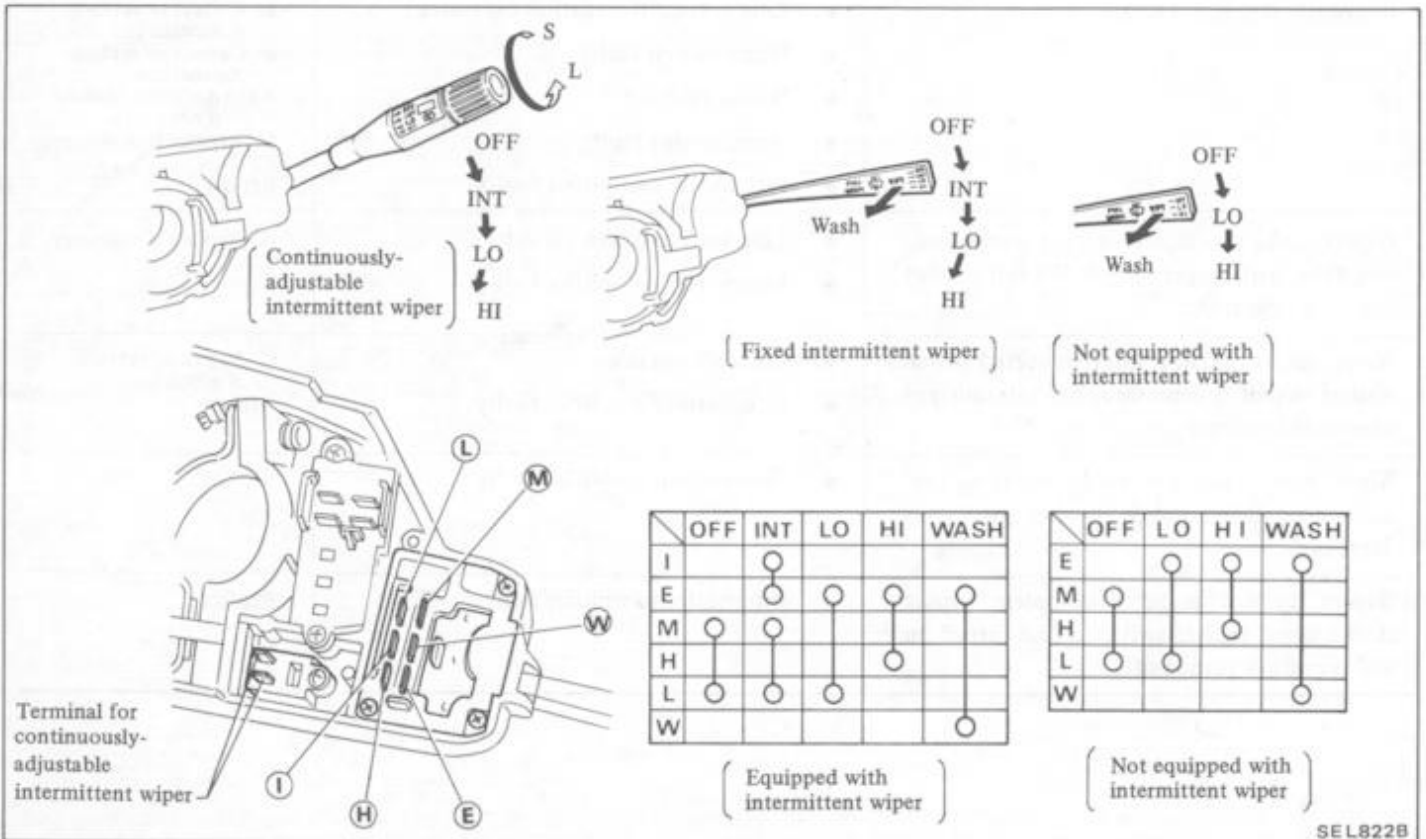
WIPER AND WASHER SWITCH

Removal and installation

Refer to Combination Switch.

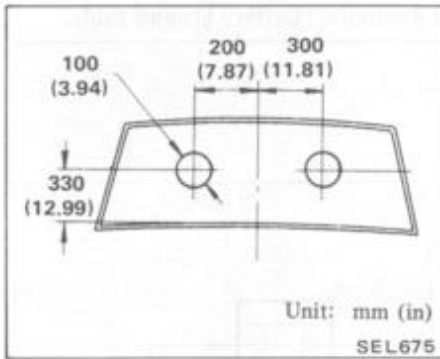
Inspection

Test continuity through switch with a test lamp or ohmmeter.

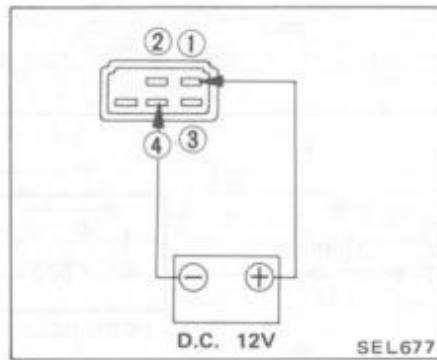


SEL822B

WASHER NOZZLE ADJUSTMENT



2. Connect positive lead wire to terminal ①, and ground lead wire to terminal ④. The motor should be run at low speed.

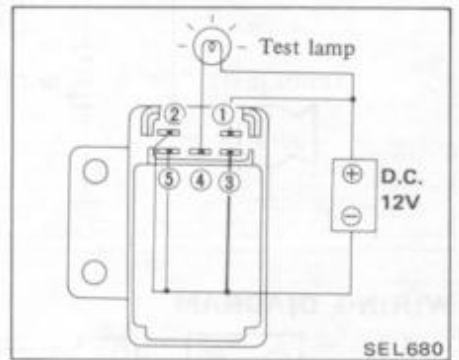


Failure to observe the order of these test procedures may lead to improper test results.

If results of following tests are satisfactory as indicated below, intermittent amplifier is functioning properly.

Be careful not to connect lead wires to incorrect terminals as this will damage intermittent amplifier.

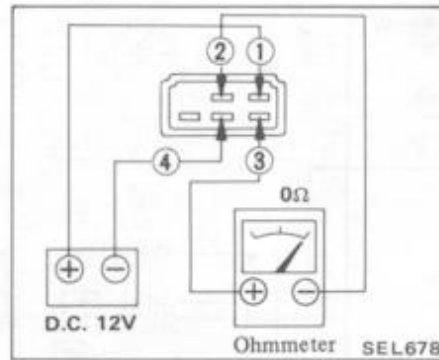
1. Make sure that test lamp comes on when negative lead wire is connected to terminal ③.



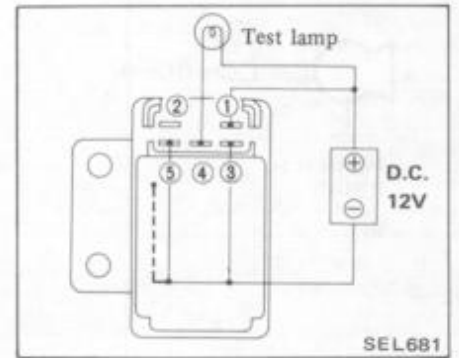
CAUTION:

- a. Be sure to use only windshield washing solution. Never mix soap powder or detergent with solution.
- b. To avoid improper windshield washer operation, do not operate windshield washer continuously for more than 30 seconds or without washer fluid. Normally, windshield washer should be operated for 10 seconds or less at one time.

3. Keep the motor running. Check continuity between terminals ② and ③. Continuity should repeat "ON" and "OFF" periodically.



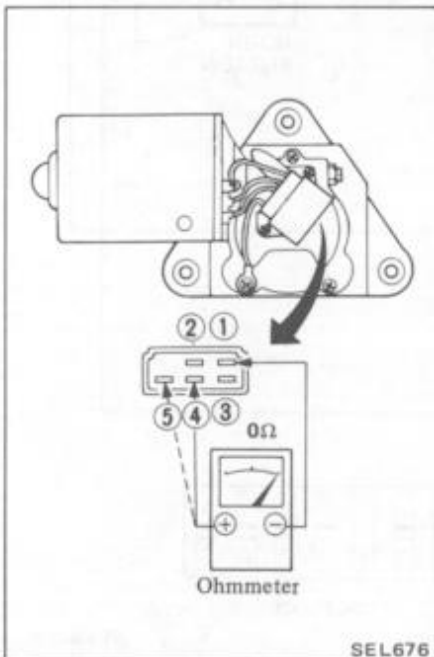
2. Disconnect lead wire from terminal ②. Test lamp should go out and comes on in about 6 seconds.



WINDSHIELD WIPER MOTOR

Inspection

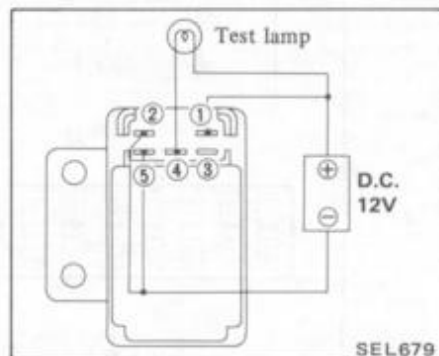
1. There should be continuity between terminals ① and ④, and ① and ⑤.



INTERMITTENT AMPLIFIER

Inspection

To check intermittent amplifier for proper operation, fabricate adapters shown in the following illustration, and utilize the following procedures in the order enumerated.

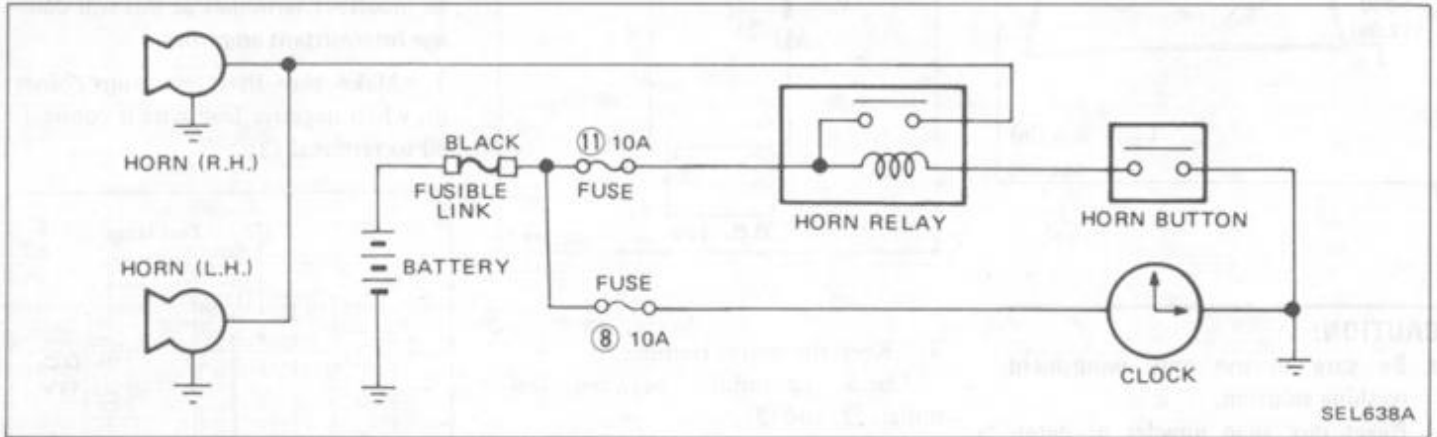


ELECTRICAL ACCESSORIES

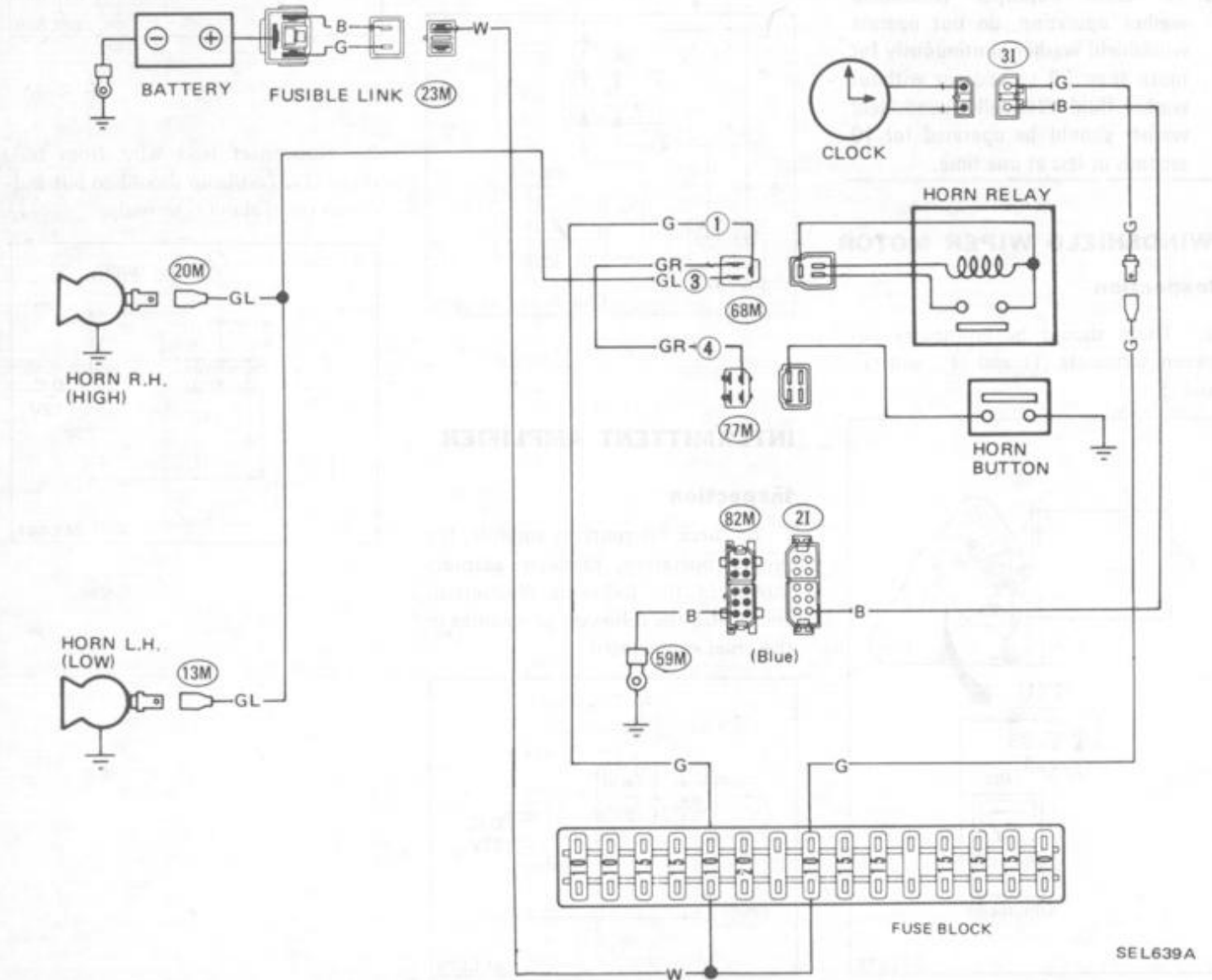
CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

HORN AND CLOCK

SCHEMATIC



WIRING DIAGRAM



TROUBLE DIAGNOSES AND CORRECTIONS

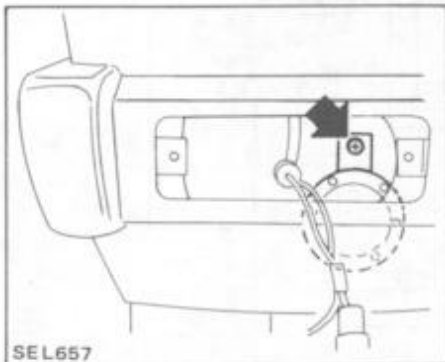
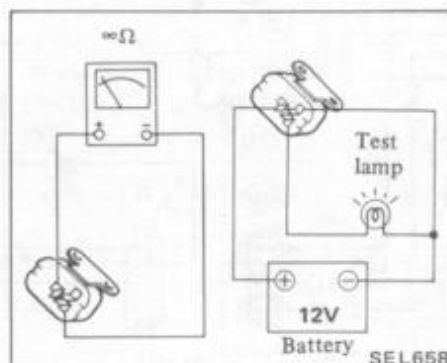
Horn

Condition	Probable cause	Corrective action
Neither high nor low horn operates.	Burnt fuse. (⑪ 10A) Faulty horn button contact. [Horn sounds when ④ terminal of harness connector to combination switch is grounded.] Faulty horn relay. [Horn sounds when ① and ③ terminals of main harness to horn relay are connected with a test lead including 10A fuse.] Loose connection or open circuit.	Correct cause and replace fuse. Repair horn button. Replace. Check wiring and/or repair connection.
High (Low) horn does not operate.	Faulty horn or loose horn terminal connection. Break in wire to horn.	Correct horn terminal connection or replace horn. Repair.
Horn does not stop to sound.	Short-circuited horn button and/or horn button lead wire. [When harness connector is disconnected from combination switch, horn stops sounding.] Faulty horn relay.	Repair horn button or its wiring. Replace.
Reduce volume and/or tone quality.	Loose or poor connector contact. (Fuse, relay, horn and/or horn button.) Faulty horn.	Repair. Replace.

HORN

Removal and installation

1. Disconnect battery ground cable.
2. Remove front combination light.
3. Remove horn.

HORN RELAY
Inspection

CLOCK

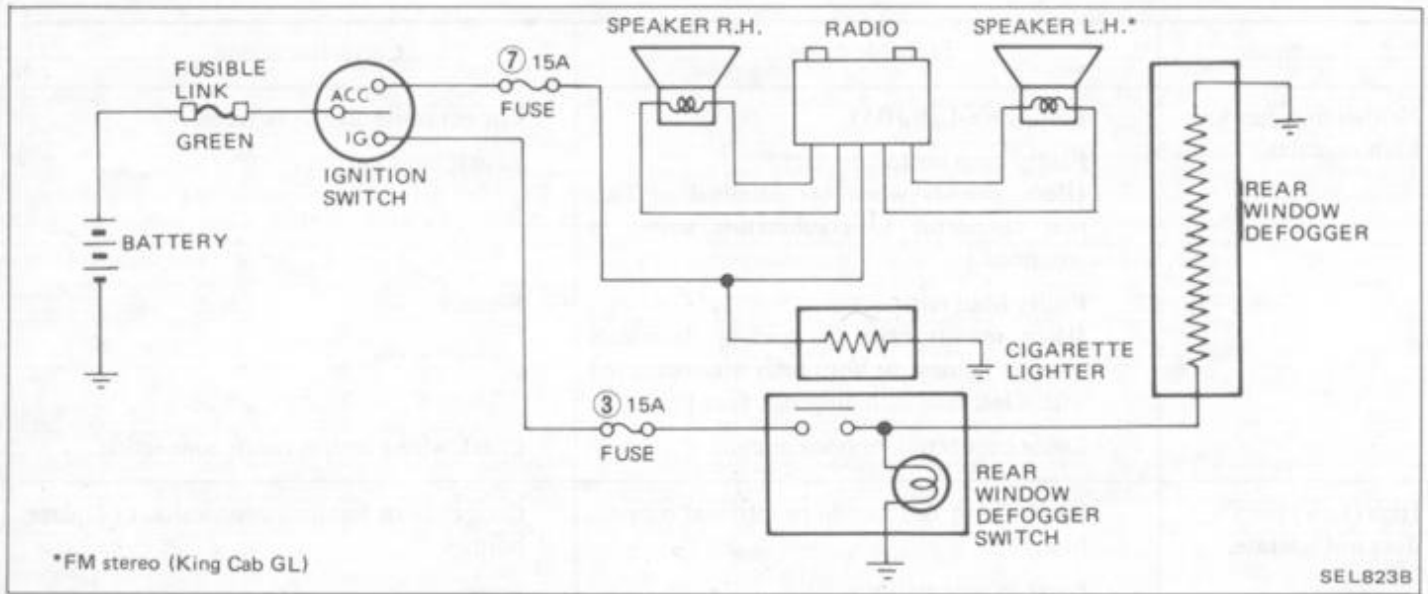
Removal and installation

1. Disconnect battery ground cable.
2. Remove cluster lid and combination meter. Refer to Combination Meter.
3. Disassemble combination meter and then remove clock. Refer to Combination meter.
4. Installation is in the reverse order of removal.

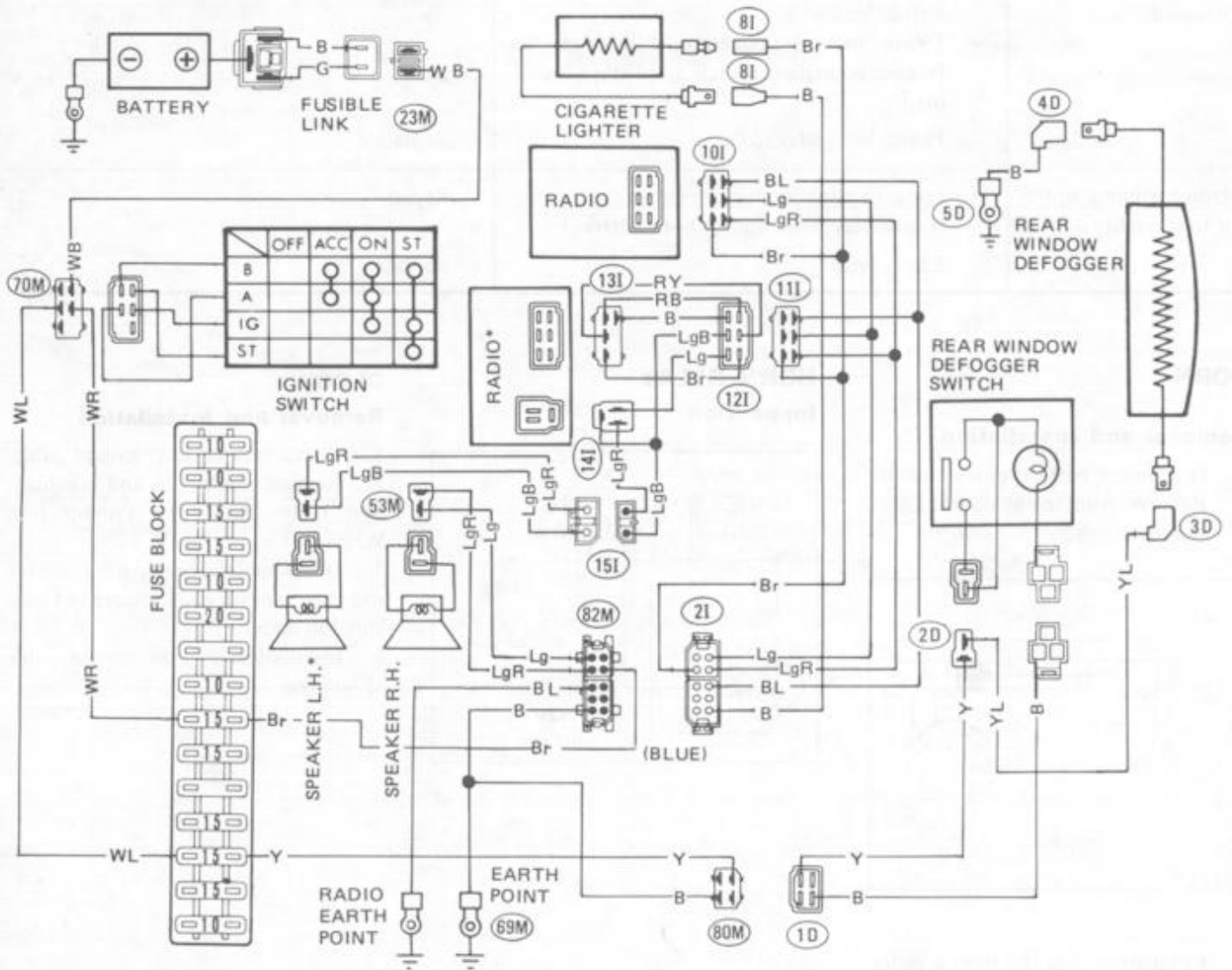
4. Installation is in the reverse order of removal.

REAR WINDOW DEFOGGER, CIGARETTE LIGHTER AND RADIO

SCHEMATIC



WIRING DIAGRAM



TROUBLE DIAGNOSES AND CORRECTIONS (Radio)

Noise prevention chart

Position vehicle in an open area away from steel buildings, run engine, extend antenna to its maximum length, set volume control to maximum and set dial at a median point where no broadcasting wave is received.

Condition	Probable cause	Corrective action
Ignition system Noise occurs when engine is operated.	High tension cable. Ignition coil.	Install new high tension cable. Replace 0.5 μ F capacitor installed to primary side \oplus terminal of ignition coil with new ones. Be careful not to install capacitor to secondary or primary \ominus terminal side. This will result in improper engine operation.
Charging system Sound of alternating current present.	Alternator.	Replace 0.5 μ F capacitor installed to charging terminal B. Do not use a larger capacitor.

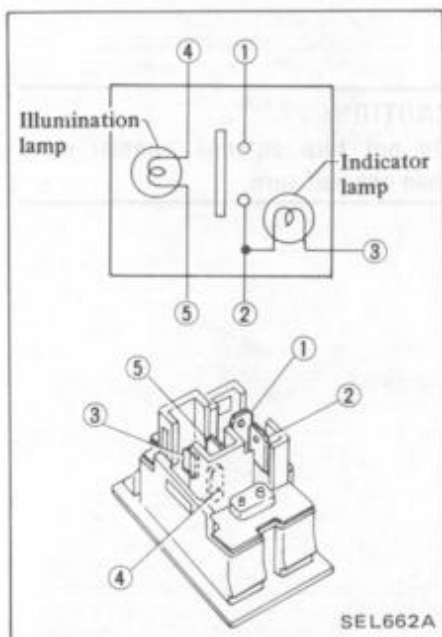
REAR WINDOW DEFOGGER SWITCH

Removal and installation

1. Disconnect battery ground cable.
2. Remove defogger switch by prying it off with a screwdriver and pull it out.
3. Disconnect harness connector.
4. Install defogger switch in the reverse order of removal.

Inspection

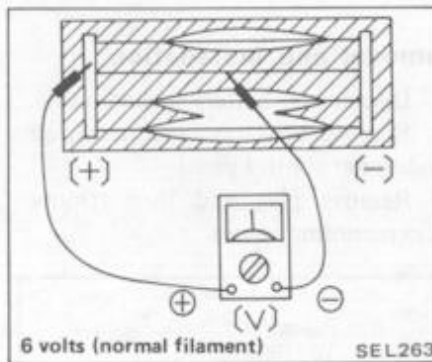
Test continuity through switch with ohmmeter or test lamp.



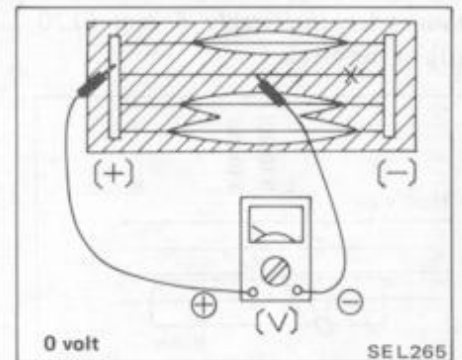
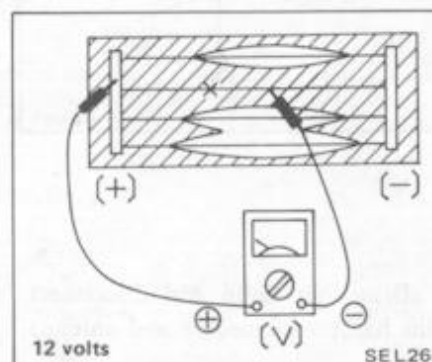
REAR WINDOW DEFOGGER FILAMENTS

Inspection

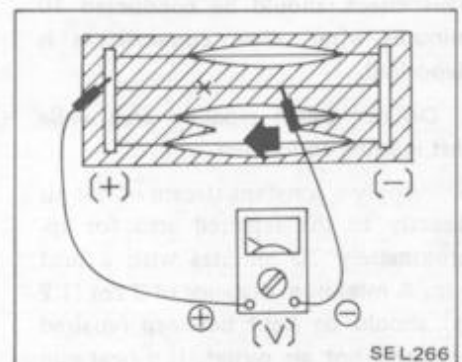
1. Connect probe of circuit tester (in Volt range) to middle portion of each filament. Engine should run.



2. Tester indicates 0 or 12 volts if a filament is burned out.



3. Burned out point can be detected by an abrupt deflection of tester pointer while moving probe to left and right along filament.



FILAMENT MAINTENANCE

Repair equipment

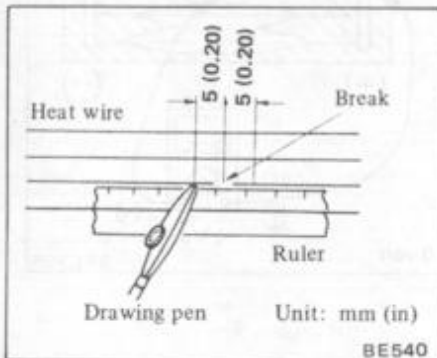
1. Conductive silver composition (Dupont No. 4817) or equivalent
2. Ruler, 30 cm (12 in) long
3. Drawing pen
4. Heat gun
5. Alcohol
6. Cloth

Repair procedure

1. Wipe broken heat wire and its surrounding area clean with a cloth dampened in alcohol.
2. Apply a small amount of conductive silver composition to tip of drawing pen.

Shake silver composition container before use.

3. Place ruler on glass along broken line. Deposit conductive silver composition on break with drawing pen. Slightly overlap existing heat wire on both sides [preferably 5 mm (0.20 in)] of the break.



4. Wipe clean silver composition from tip of drawing pen.
5. After repair has been completed, check repaired wire for continuity. This check should be conducted 10 minutes after silver composition is deposited.

Do not touch repaired area while test is being conducted.

6. Apply a constant stream of hot air directly to the repaired area for approximately 20 minutes with a heat gun. A minimum distance of 3 cm (1.2 in) should be kept between repaired area and hot air outlet. If a heat gun

is not available, let the repaired area dry for 24 hours.

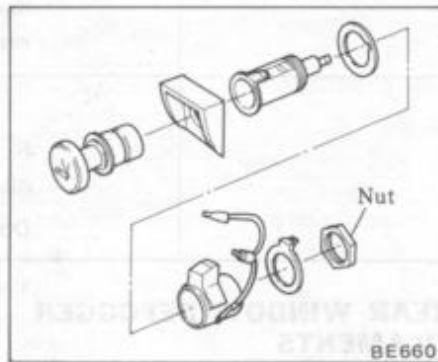
5. Installation is in the reverse order of removal.

Install plug securely.

CIGARETTE LIGHTER

Removal and installation

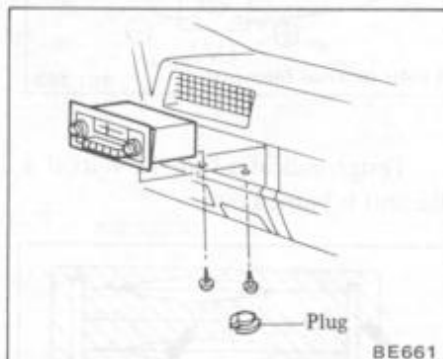
1. Disconnect battery ground cable.
2. Disconnect cigarette lighter connectors.
3. Remove lighter mounting nut and then remove cigarette lighter assembly.
4. Installation is in the reverse order of removal.



RADIO

Removal and installation

1. Disconnect battery ground cable.
2. Remove ash tray and heater/air conditioner control panel.
3. Remove plug and then remove radio mounting screws.



4. Draw out radio and disconnect radio harness connector and antenna cable.

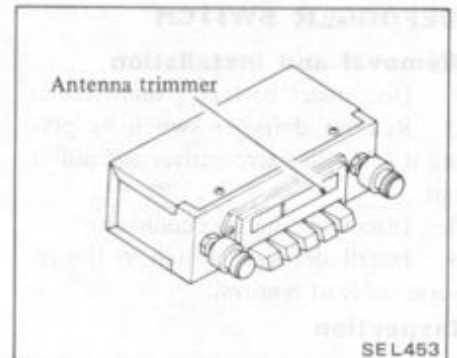
Antenna trimmer adjustment

The antenna trimmer should be adjusted in the following cases:

- Fading and weak AM reception.
- After installation of new antenna, feeder cable or radio receiver.

Before adjusting, be sure to check harness and antenna feeder cable connectors for proper connection.

1. Extend antenna completely.
2. Turn radio on, and turn volume control to increase speaker volume.
3. Push the AM selector button.
4. Tune in the weakest station (barely audible) on dial at the range around 14 (1,400 kHz).
5. Turn antenna trimmer to left or right slowly, and set it in the position where reception is strongest.



CAUTION:

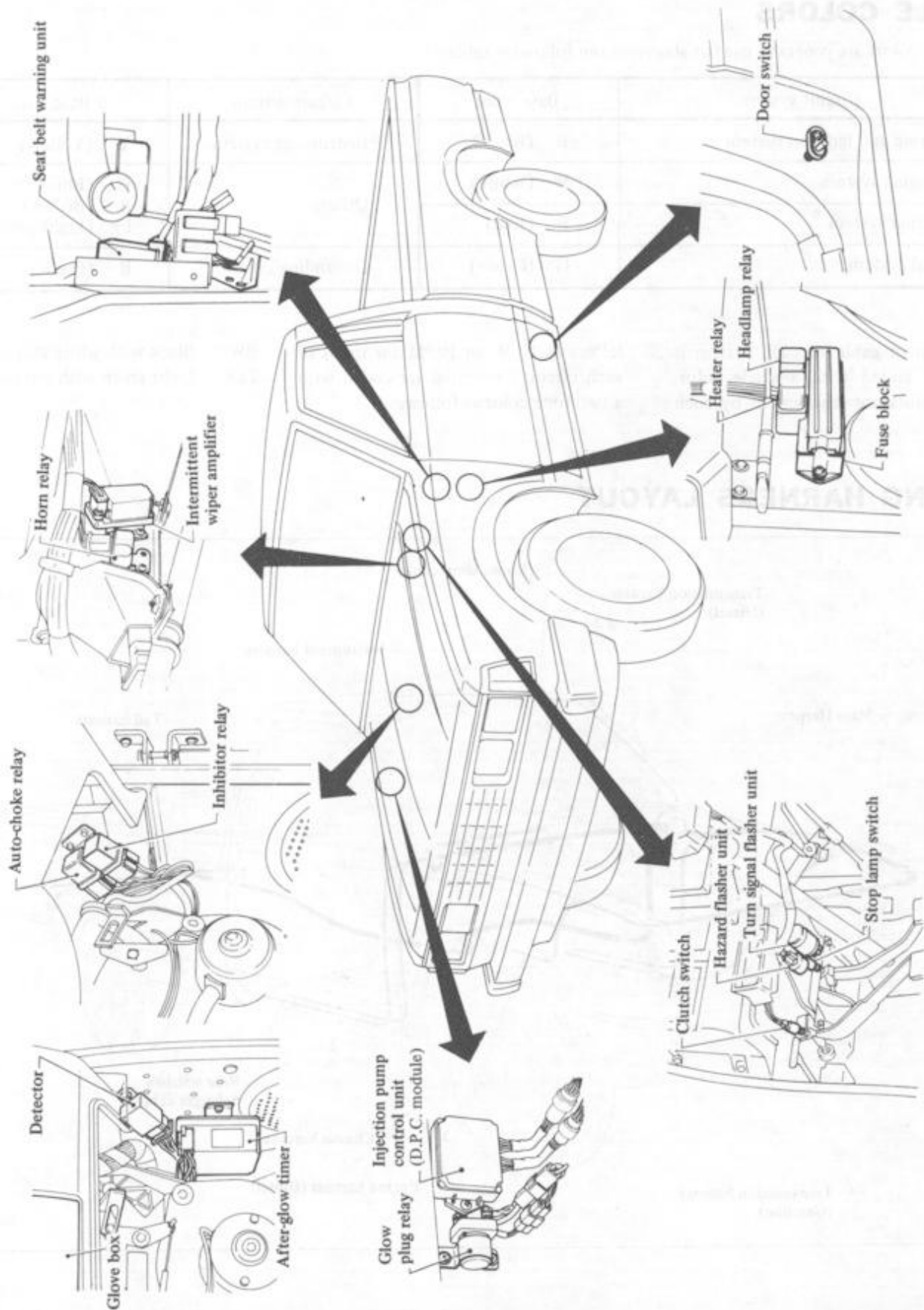
Do not turn antenna trimmer more than one-half turn.

LOCATION OF ELECTRICAL UNITS

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

Left side dash panel

Right side dash panel



WIRING HARNESS

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

CABLE COLORS

Cable colors are generally used as shown in the following table.

Circuit system	Base color	Circuit system	Base color
Starting and ignition system	B (Black)	Instrument system	Y (Yellow)
Changing system	W (White)	Others	L (Blue)
Lighting system	R (Red)		Br (Brown)
Signal system	G (Green)	Grounding circuit	B (Black)

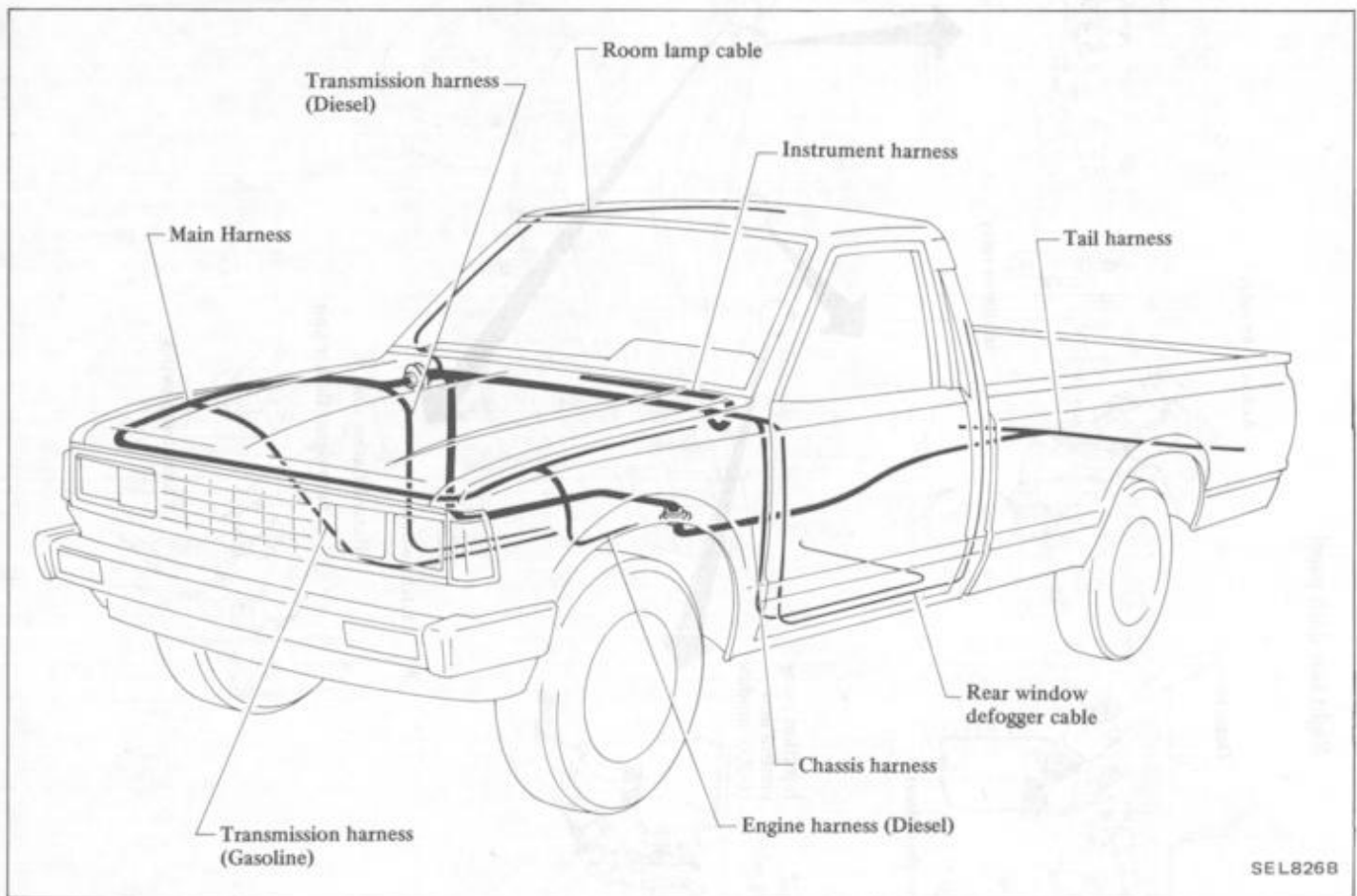
The main cable of each system is generally coded with a single color. These colors are represented by such

letters as G, W, or Br. Minor items of each circuit's terminal are coded with a two-tone color as follows:

BW : Black with white stripe

LgR : Light green with red stripe

WIRING HARNESS LAYOUT



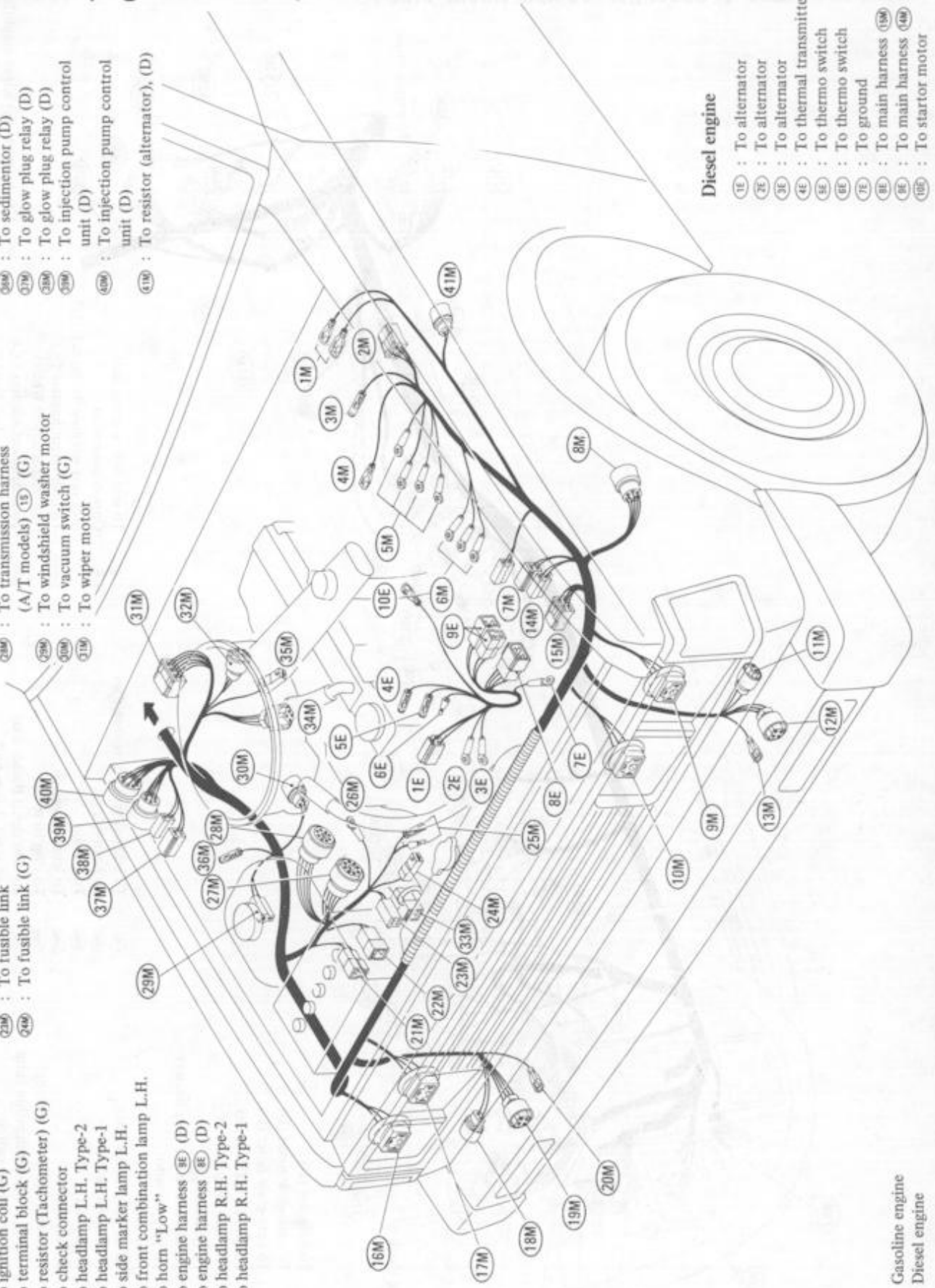
SEL8268

MAIN HARNESS (Engine room side)

- 16M : To F.I.C.D. solenoid
- 17M : To condenser (G)
- 18M : To air conditioner compressor
- 19M : To distributor earth point (California models) (G)
- 20M : To ignition coil (G)
- 21M : To terminal block (G)
- 22M : To resistor (Tachometer) (G)
- 23M : To check connector
- 24M : To headlamp L.H. Type-2
- 25M : To headlamp L.H. Type-1
- 26M : To side marker lamp L.H.
- 27M : To front combination lamp L.H.
- 28M : To horn "Low"
- 29M : To engine harness (E) (D)
- 30M : To engine harness (E) (D)
- 31M : To headlamp R.H. Type-2
- 32M : To headlamp R.H. Type-1
- 33M : To side marker lamp L.H.
- 34M : To front combination lamp L.H.
- 35M : To horn "Low"
- 36M : To engine harness (E) (D)
- 37M : To engine harness (E) (D)
- 38M : To headlamp R.H. Type-2
- 39M : To headlamp R.H. Type-1
- 40M : To side marker lamp R.H.
- 41M : To front combination lamp R.H.
- 42M : To horn "High"
- 43M : To transmission harness (M/T models) (G)
- 44M : To transmission harness (California models) (G)
- 45M : To fusible link (G)
- 46M : To fusible link (G)

- 25M : To low pressure switch
- 26M : To ground
- 27M : To transmission harness (M/T models) (G)
- 28M : To injection pump controller (D)
- 29M : To transmission harness (A/T models) (G)
- 30M : To windshield washer motor
- 31M : To vacuum switch (G)
- 32M : To wiper motor

- 32M : To fuel cut solenoid and auto-choke heater (G)
- 33M : To fusible link (D)
- 34M : To transmission harness (D)
- 35M : To glow plug (D)
- 36M : To sedimentor (D)
- 37M : To glow plug relay (D)
- 38M : To glow plug relay (D)
- 39M : To injection pump control unit (D)
- 40M : To injection pump control unit (D)
- 41M : To resistor (alternator), (D)



Diesel engine

- 1E : To alternator
- 2E : To alternator
- 3E : To alternator
- 4E : To thermal transmitter
- 5E : To thermo switch
- 6E : To thermo switch
- 7E : To ground
- 8E : To main harness (8M)
- 9E : To main harness (9M)
- 10E : To starter motor

(G): Gasoline engine
(D): Diesel engine

MAIN HARNESS (Passenger compartment side-A)



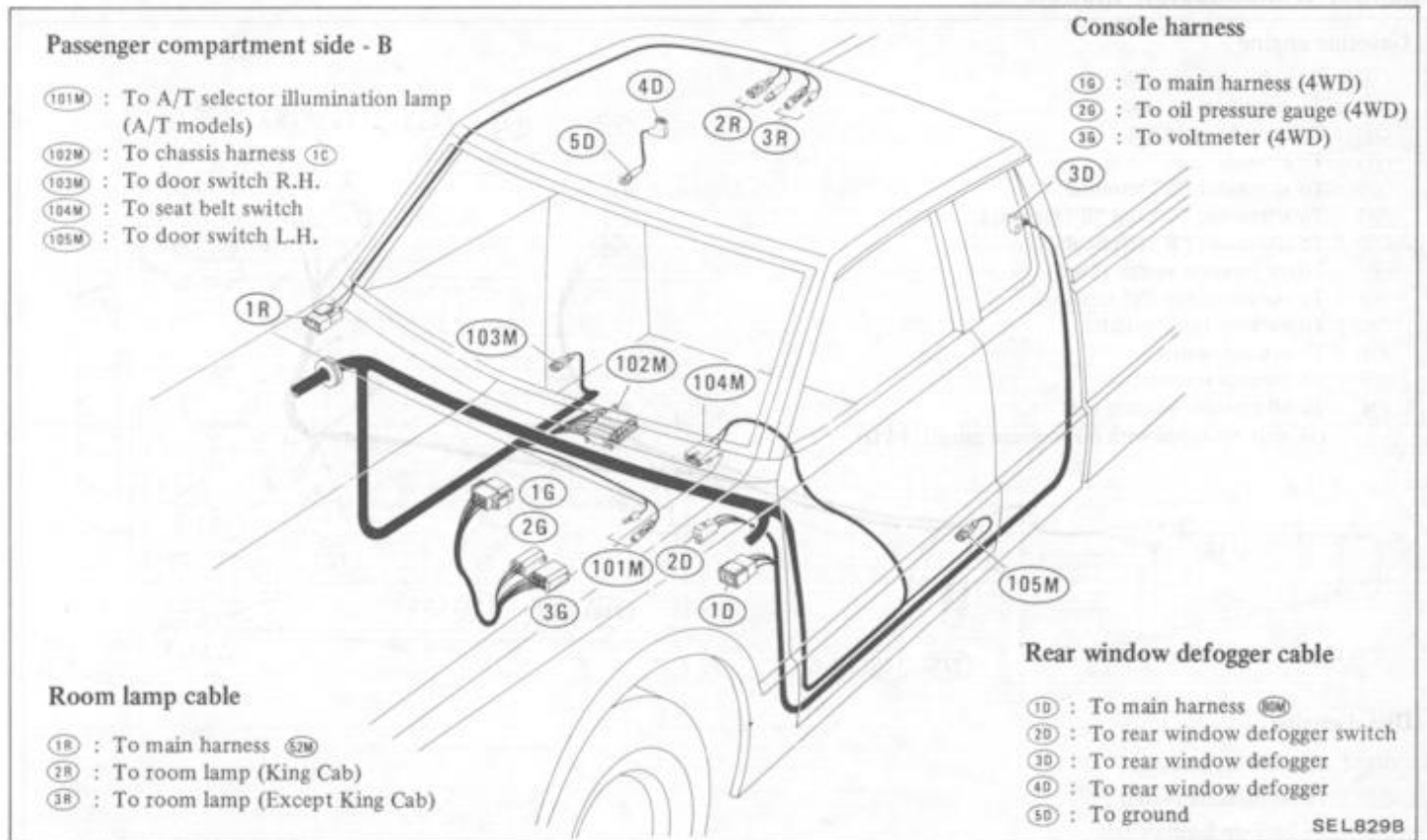
- 43M : To detector (D)
- 45M : To auto-glow timer (D)
- 46M : To auto-glow timer (D)
- 50M : To diode (A/T models)
- 51M : To room lamp cable (1R)
- 52M : To speaker R.H.
- 53M : Option connector (For heater)
- 54M : To blower motor
- 55M : To resistor
- 56M : To air conditioner relay
- 57M : To thermo switch
- 58M : To ground
- 59M : To fan switch
- 60M : To heater and air conditioner control panel illumination lamp
- 61M : To compressor switch
- 62M : To air conditioner warning lamp
- 63M : To console harness (For voltmeter and oil pressure gauge) (4WD)
- 64M : To parking brake switch
- 65M : To kickdown switch (A/T models)
- 66M : To detector (D)
- 67M : To auto-glow timer (D)
- 68M : To auto-glow timer (D)
- 69M : To diode (A/T models)
- 70M : To room lamp cable (1R)
- 71M : To speaker R.H.
- 72M : Option connector (For heater)
- 73M : To blower motor
- 74M : To resistor
- 75M : To air conditioner relay
- 76M : To thermo switch
- 77M : To ground
- 78M : To fan switch
- 79M : To heater and air conditioner control panel illumination lamp
- 80M : To compressor switch
- 81M : To air conditioner warning lamp
- 82M : To console harness (For voltmeter and oil pressure gauge) (4WD)
- 83M : To parking brake switch
- 84M : To kickdown switch (A/T models)
- 85M : To detector (D)
- 86M : To auto-glow timer (D)
- 87M : To auto-glow timer (D)
- 88M : To diode (A/T models)
- 89M : To room lamp cable (1R)
- 90M : To speaker R.H.
- 91M : Option connector (For heater)
- 92M : To blower motor
- 93M : To resistor
- 94M : To air conditioner relay
- 95M : To thermo switch
- 96M : To ground
- 97M : To fan switch
- 98M : To heater and air conditioner control panel illumination lamp
- 99M : To compressor switch
- 100M : To air conditioner warning lamp

- 67M : To intermittent wiper amplifier
- 68M : To horn relay
- 69M : To ground
- 70M : To ignition switch
- 71M : To stop lamp switch
- 72M : To turn signal flasher unit
- 73M : To hazard flasher unit
- 74M : To clutch switch
- 75M : To wiper and washer switch
- 76M : To lighting switch
- 77M : To turn signal switch
- 78M : To hazard switch

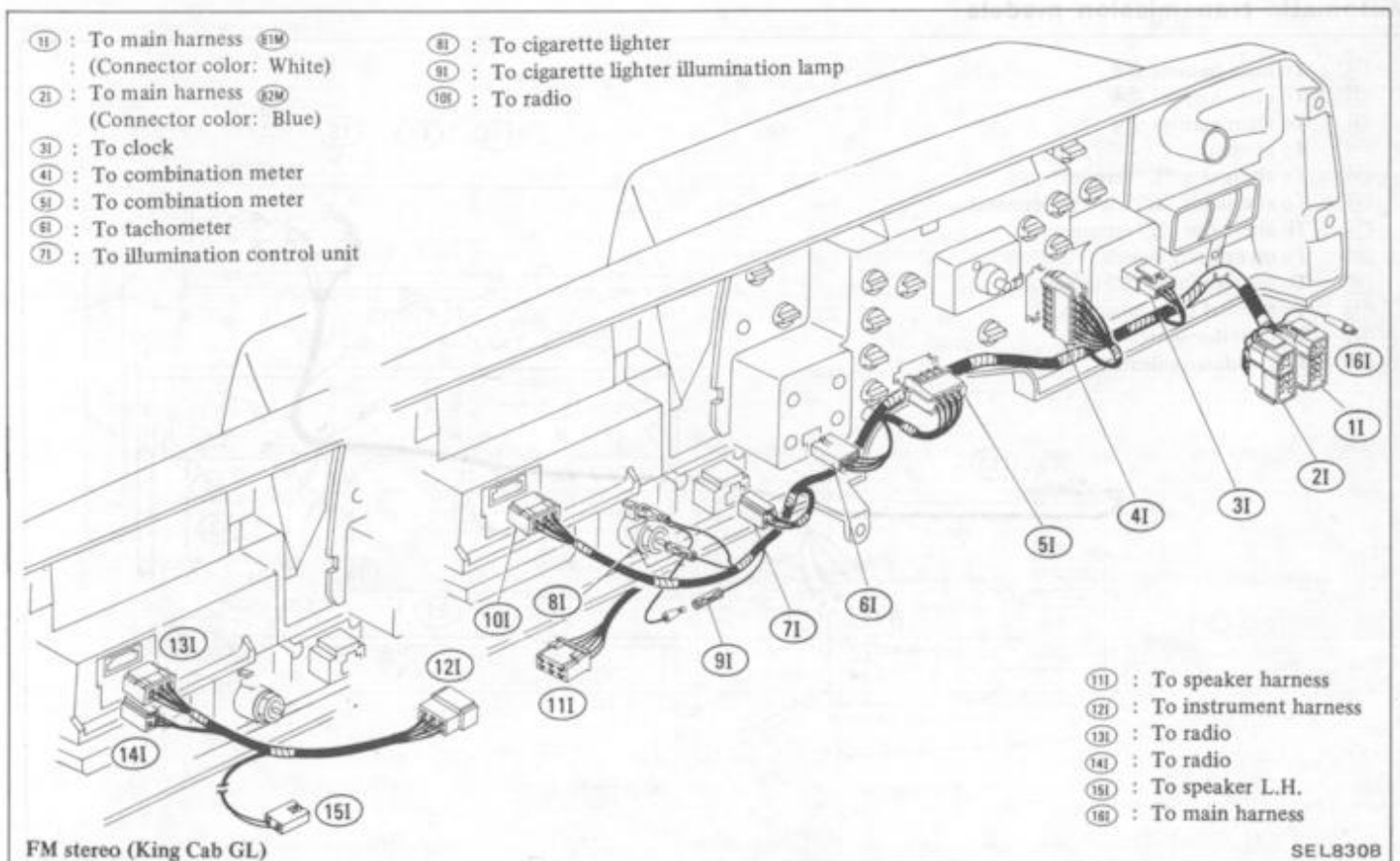
- 79M : To seat belt warning unit
- 80M : Option connector
- 81M : For rear window defogger (1R)
- 82M : Instrument harness (White)
- 83M : Instrument harness (Blue)
- 84M : To lock
- 85M : To headlamp relay
- 86M : To heater relay
- 87M : To auto-choke relay (G)
- 88M : To inhibitor relay (A/T models)

- 89M : To intermittent wiper amplifier rheostat
- 90M : To intermittent time control rheostat
- (G) : Gasoline engine
- (D) : Diesel engine

MAIN HARNESS (Passenger compartment side-B), ROOM LAMP CABLE, REAR WINDOW DEFOGGER CABLE AND CONSOLE HARNESS



INSTRUMENT HARNESS

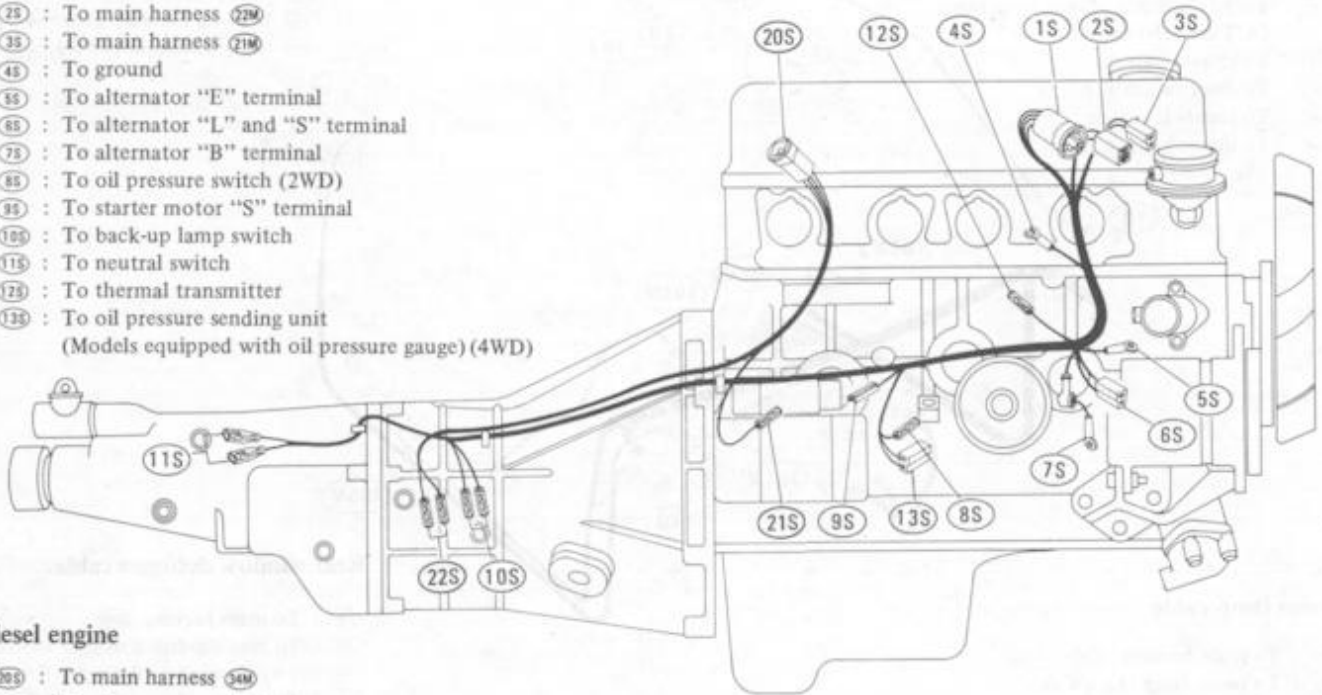


TRANSMISSION HARNESS

Manual transmission models

Gasoline engine

- ①5 : To main harness ②7M
- ②5 : To main harness ②2M
- ③5 : To main harness ②1M
- ④5 : To ground
- ⑤5 : To alternator "E" terminal
- ⑥5 : To alternator "L" and "S" terminal
- ⑦5 : To alternator "B" terminal
- ⑧5 : To oil pressure switch (2WD)
- ⑨5 : To starter motor "S" terminal
- ⑩5 : To back-up lamp switch
- ⑪5 : To neutral switch
- ⑫5 : To thermal transmitter
- ⑬5 : To oil pressure sending unit
(Models equipped with oil pressure gauge) (4WD)



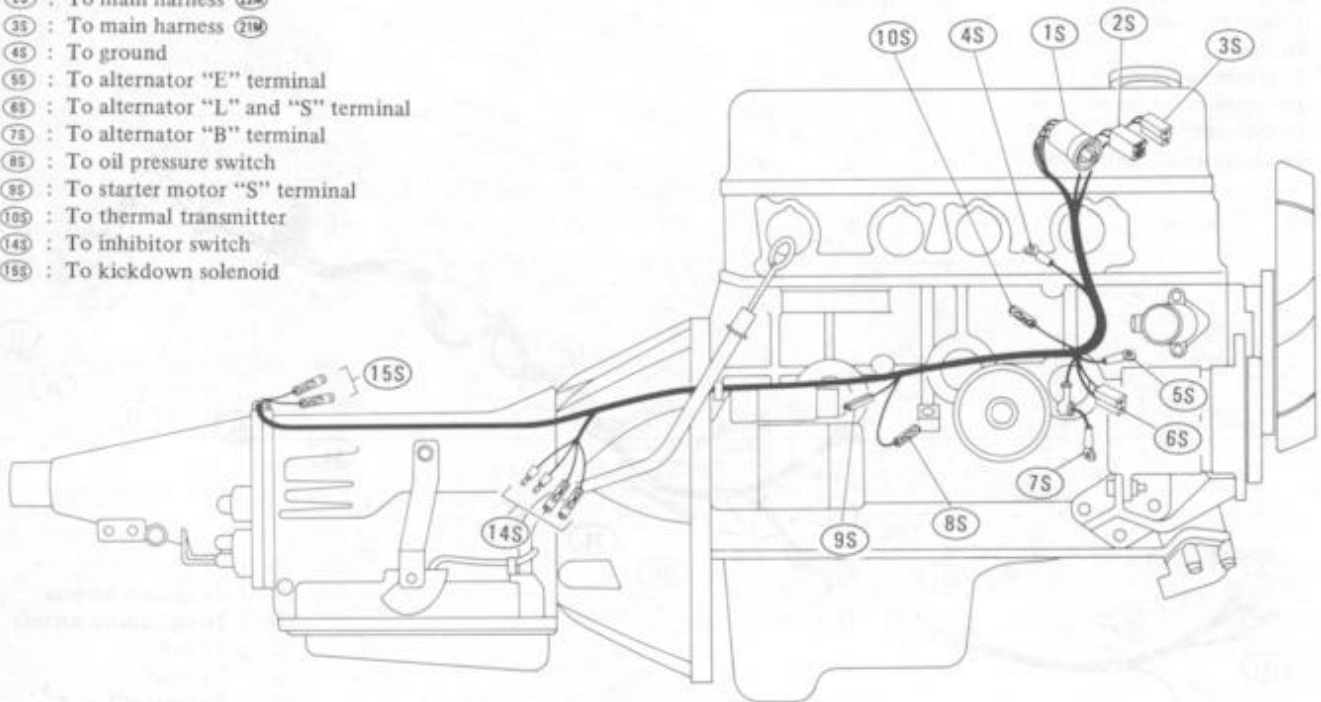
Diesel engine

- ②0S : To main harness ③4M
- ②1S : To oil pressure switch
- ②2S : To back-up lamp switch

SEL831B

Automatic transmission models

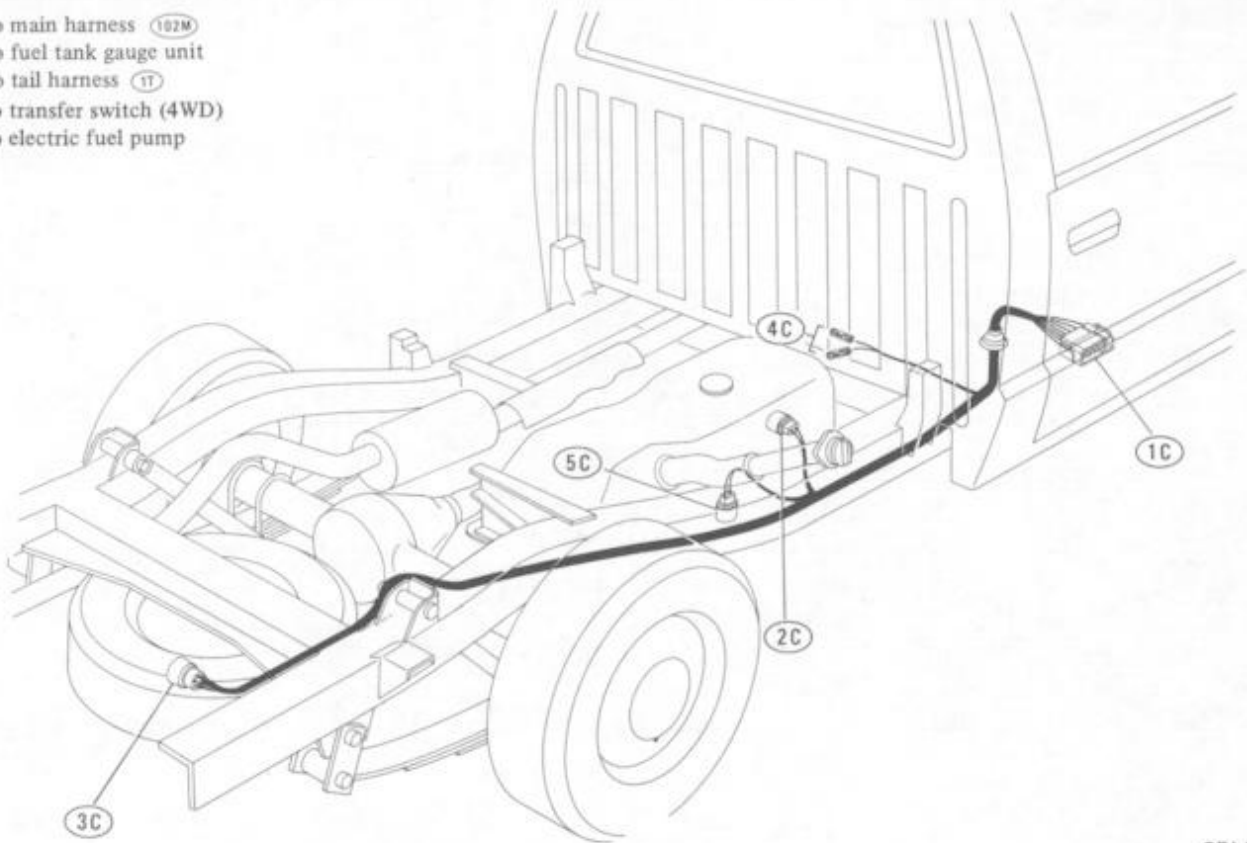
- ①5 : To main harness ②9M
- ②5 : To main harness ②2M
- ③5 : To main harness ②1M
- ④5 : To ground
- ⑤5 : To alternator "E" terminal
- ⑥5 : To alternator "L" and "S" terminal
- ⑦5 : To alternator "B" terminal
- ⑧5 : To oil pressure switch
- ⑨5 : To starter motor "S" terminal
- ⑩5 : To thermal transmitter
- ⑭3 : To inhibitor switch
- ⑮5 : To kickdown solenoid



SEL832B

CHASSIS HARNESS

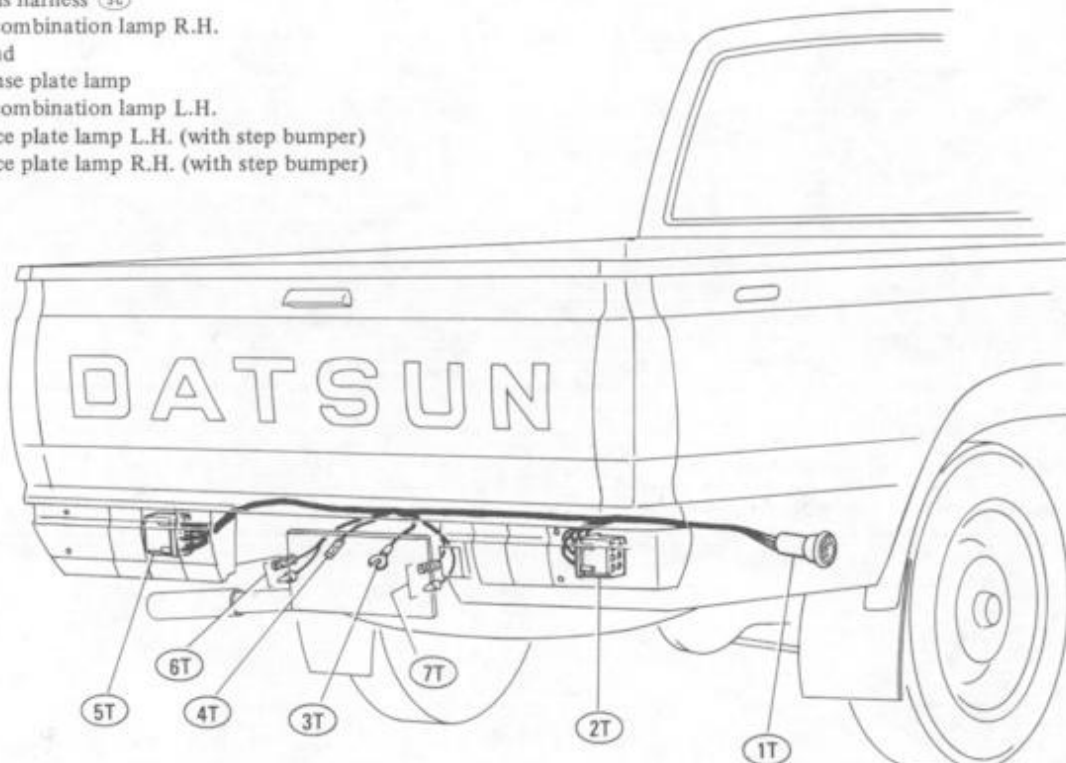
- ①C : To main harness ⑩2M
- ②C : To fuel tank gauge unit
- ③C : To tail harness ①T
- ④C : To transfer switch (4WD)
- ⑤C : To electric fuel pump



SEL833B

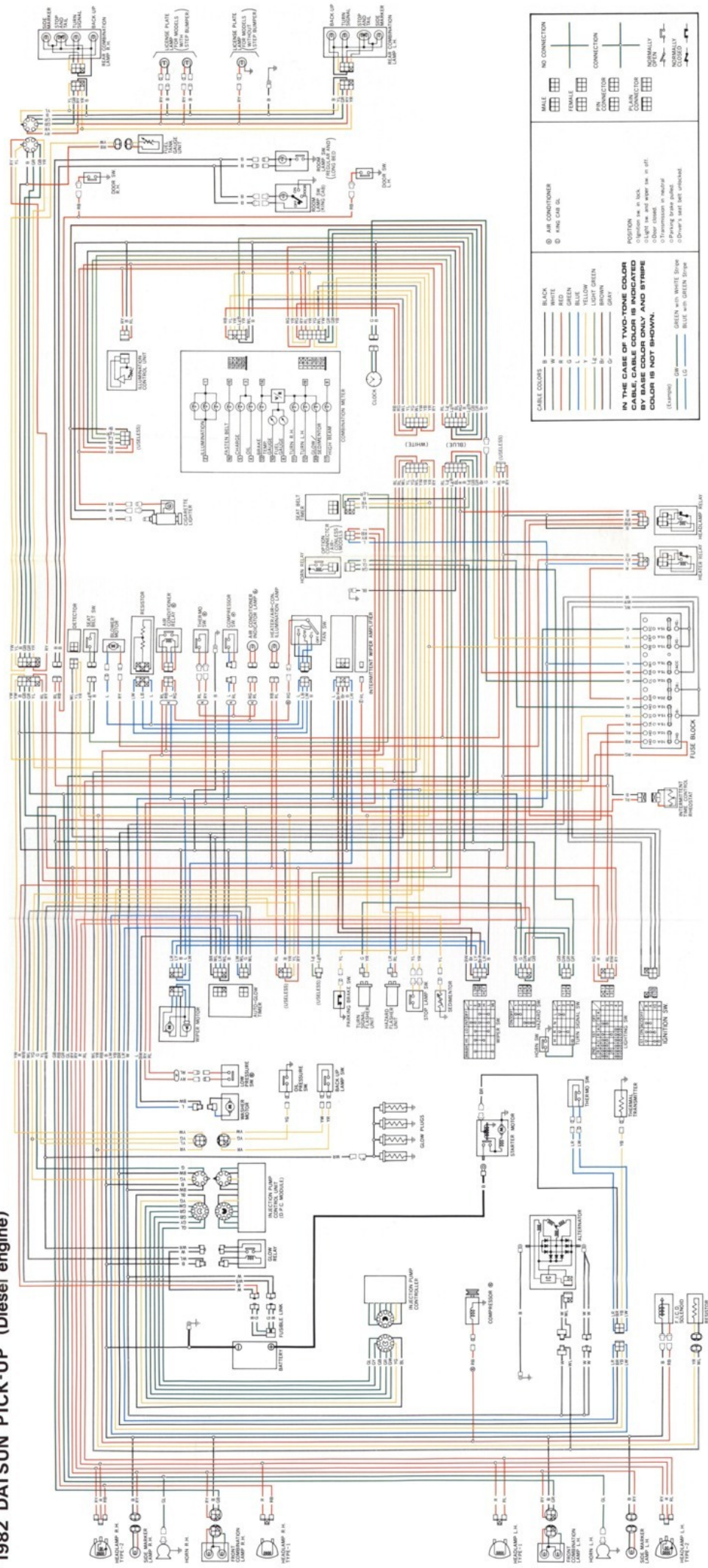
TAIL HARNESS

- ①T : To chassis harness ③C
- ②T : To rear combination lamp R.H.
- ③T : To ground
- ④T : To license plate lamp
- ⑤T : To rear combination lamp L.H.
- ⑥T : To license plate lamp L.H. (with step bumper)
- ⑦T : To license plate lamp R.H. (with step bumper)

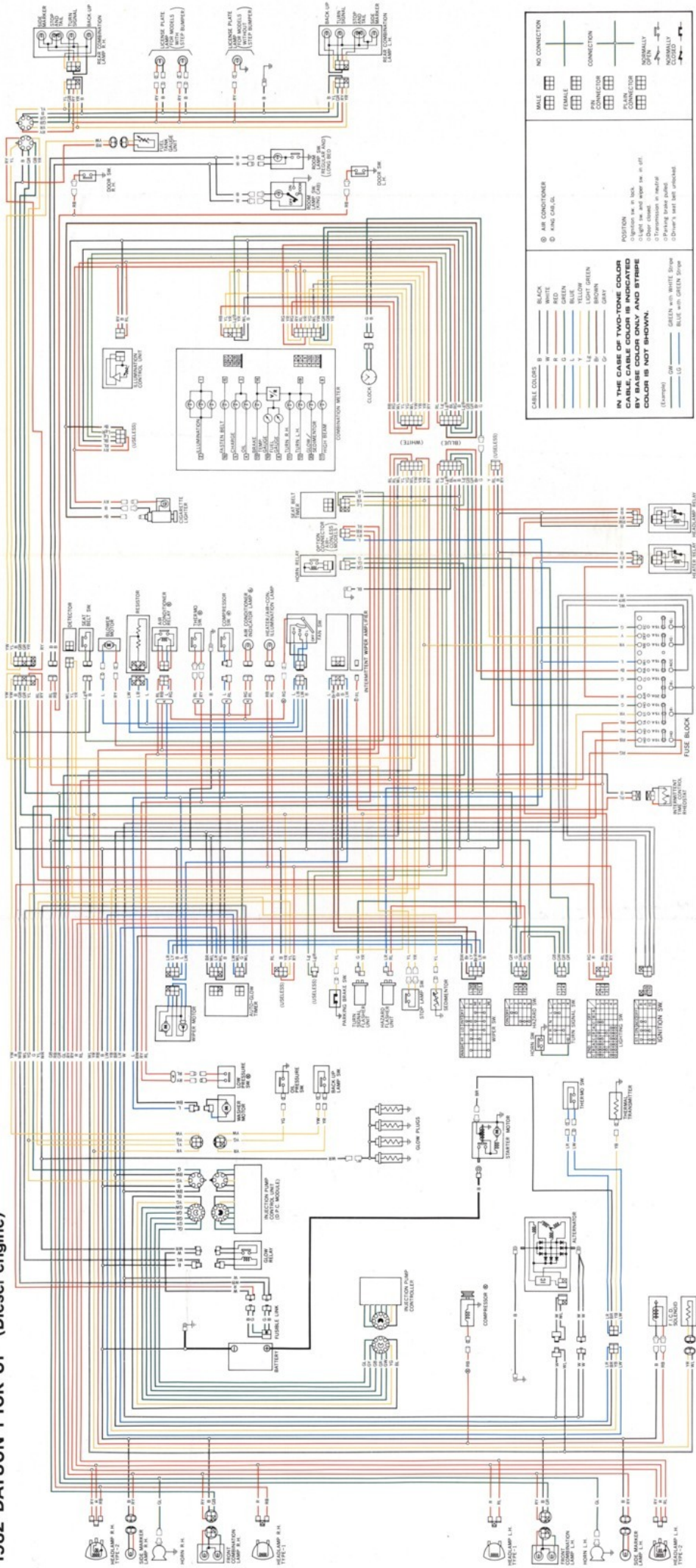


SEL834B

1982 DATSUN PICK-UP (Diesel engine)



1982 DATSUN PICK-UP (Diesel engine)



INCH TO METRIC CONVERSION TABLE

(Rounded-off for automotive use)

inches	mm	inches	mm
.100	2.54	.610	15.49
.110	2.79	.620	15.75
.120	3.05	.630	16.00
.130	3.30	.640	16.26
.140	3.56	.650	16.51
.150	3.81	.660	16.76
.160	4.06	.670	17.02
.170	4.32	.680	17.27
.180	4.57	.690	17.53
.190	4.83	.700	17.78
.200	5.08	.710	18.03
.210	5.33	.720	18.29
.220	5.59	.730	18.54
.230	5.84	.740	18.80
.240	6.10	.750	19.05
.250	6.35	.760	19.30
.260	6.60	.770	19.56
.270	6.86	.780	19.81
.280	7.11	.790	20.07
.290	7.37	.800	20.32
.300	7.62	.810	20.57
.310	7.87	.820	20.83
.320	8.13	.830	21.08
.330	8.38	.840	21.34
.340	8.64	.850	21.59
.350	8.89	.860	21.84
.360	9.14	.870	22.10
.370	9.40	.880	22.35
.380	9.65	.890	22.61
.390	9.91	.900	22.86
.400	10.16	.910	23.11
.410	10.41	.920	23.37
.420	10.67	.930	23.62
.430	10.92	.940	23.88
.440	11.18	.950	24.11
.450	11.43	.960	24.38
.460	11.68	.970	24.64
.470	11.94	.980	24.89
.480	12.19	.990	25.15
.490	12.45	1.000	25.40
.500	12.70	2.000	50.80
.510	12.95	3.000	76.20
.520	13.21	4.000	101.60
.530	13.46	5.000	127.00
.540	13.72	6.000	152.40
.550	13.97	7.000	177.80
.560	14.22	8.000	203.20
.570	14.48	9.000	228.60
.580	14.73	10.000	254.00
.590	14.99	20.000	508.00
.600	15.24		

METRIC TO INCH CONVERSION TABLE

(Rounded-off for automotive use)

mm	inches	mm	inches
1	.0394	51	2.008
2	.079	52	2.047
3	.118	53	2.087
4	.157	54	2.126
5	.197	55	2.165
6	.236	56	2.205
7	.276	57	2.244
8	.315	58	2.283
9	.354	59	2.323
10	.394	60	2.362
11	.433	61	2.402
12	.472	62	2.441
13	.512	63	2.480
14	.551	64	2.520
15	.591	65	2.559
16	.630	66	2.598
17	.669	67	2.638
18	.709	68	2.677
19	.748	69	2.717
20	.787	70	2.756
21	.827	71	2.795
22	.866	72	2.835
23	.906	73	2.874
24	.945	74	2.913
25	.984	75	2.953
26	1.024	76	2.992
27	1.063	77	3.031
28	1.102	78	3.071
29	1.142	79	3.110
30	1.181	80	3.150
31	1.220	81	3.189
32	1.260	82	3.228
33	1.299	83	3.268
34	1.339	84	3.307
35	1.378	85	3.346
36	1.417	86	3.386
37	1.457	87	3.425
38	1.496	88	3.465
39	1.535	89	3.504
40	1.575	90	3.543
41	1.614	91	3.583
42	1.654	92	3.622
43	1.693	93	3.661
44	1.732	94	3.701
45	1.772	95	3.740
46	1.811	96	3.780
47	1.850	97	3.819
48	1.890	98	3.858
49	1.929	99	3.898
50	1.969	100	3.937

QUICK REFERENCE CHART: PICK-UP 1982

ENGINE TUNE-UP DATA Z22

Item	Model	U.S.A.			Canada	
		California	Non-California		2WD	4WD
Engine model		Z22				
Firing order		1-3-4-2				
Idle speed	rpm	850:100	800:100	650:100	800:100	850:100
	M/T	650:100 (in "D" position)				
	A/T					
Ignition timing (degree B.T.D.C. at idle speed)		31°				
"CO" % at idle speed		Idle mixture screw is preset and sealed at factory.				
Fast idle adjustment (At 2nd cam step) mm (in)	M/T	0.81 - 0.95 (0.0319 - 0.0374)				
	A/T	0.97 - 1.11 (0.0382 - 0.0437)				
B.C.D.D. operating pressure (At sea level) kPa (mmHg, inHg)		-90.0±2.7 (-600±20, -23.62±0.79)				
Dash pot	M/T					
Touch speed	rpm	1,400 - 1,600				
Vacuum break	mm (in)	3.12 - 3.72 (0.1228 - 0.1465)		2.62 - 3.22 (0.1031 - 0.1268)		
Valve clearance (Hot)	Intake	0.30 (0.012)				
	Exhaust	0.30 (0.012)				
Drive belt deflection (load)	mm (in)	Adjust deflection of used belt		Set deflection of new belt		
Alternator		12 - 15 (0.47 - 0.59)		8 - 11 (0.31 - 0.43)		
Air conditioner compressor		7 - 10 (0.28 - 0.39)		5 - 8 (0.20 - 0.31)		
Power steering pump		15 - 18 (0.59 - 0.71)		12 - 15 (0.47 - 0.59)		
Applied pressed force	N (kg, lb)	96 (10, 22)				
Radiator cap relief pressure	kPa (kg/cm ² , psi)	88 (0.9, 13)				
Cooling system leakage testing pressure	kPa (kg/cm ² , psi)	157 (1.6, 23)				
Compression pressure	Standard	1,177 (12.0, 171)/260				
	Minimum	883 (9.0, 126)/260				
High tension cable resistance	kΩ	Less than 30				
Spark plug	Intake side	BPR6ES				
	Exhaust side	BPR6ES				
	Gap	0.8 - 0.9 (0.031 - 0.036)				
Battery	Type	NS60MF			NS70MF	
	Capacity	V-AH 12 - 60			12 - 65	
Tightening torque		N-m	kg-m	ft-lb		
Cylinder head		69 - 78	7.0 - 8.0	51 - 58		
Rocker cover bolt		8 - 10	0.8 - 1.0	5.8 - 7.2		
Manifold bolt and nut		16 - 21	1.6 - 2.1	12 - 15		

* Ignition timing should be checked with distributor vacuum hose disconnected and plugged up.

ENGINE TUNE-UP DATA SD22

Item	Model	U.S.A.		Canada		
		California	Non-California		2WD	4WD
Engine model		SD22				
Firing order		1-3-4-2				
Idle speed	rpm	700 [±] 100				
Injection timing (B.T.D.C. at idle speed)	degree	18°	20°			
Initial injection nozzle pressure	kPa (kg/cm ² , psi)	9,807 - 10,297 (100 - 105, 1,422 - 1,493)				
Dash pot Touch speed	rpm	1,280 - 1,350				
Valve clearance (Hot)	Intake	0.35 (0.014)				
	Exhaust	0.35 (0.014)				
Drive belt deflection (Applied pressed force 98N (10 kg, 22 lb))	mm (in)	8 - 12 (0.31 - 0.47)				
Compression pressure	Standard	2,942 (30, 427)/200				
	Minimum	2,452 (25, 356)/200				
Radiator cap relief pressure	kPa (kg/cm ² , psi)	88 (0.9, 13)				
Cooling system leakage testing pressure	kPa (kg/cm ² , psi)	157 (1.6, 23)				
Battery	Type	NX120-7MF				
	Capacity	80				
Tightening torque		N-m	kg-m	ft-lb		
Cylinder head	Main bolt	118 - 147	12 - 15	87 - 108		
	Sub bolt	49 - 64	5.0 - 6.5	36 - 47		
Rocker cover bolt		10 - 13	1.0 - 1.3	7 - 9		
Manifold bolts or nuts		15 - 18	1.5 - 1.8	11 - 13		

EXPORT SERVICE DEPARTMENT
NISSAN MOTOR CO., LTD.
 17-1, Ginza 6-Chome, Chuo-ku, Tokyo 104, Japan

Printed in Japan

BRAKE

Item	Unit: mm (in)
Disc brake	
Pad minimum thickness	2.0 (0.079)
Rotor repair limit	
Runout	Less than 0.15 (0.0059)
Parallelism	
circumferential direction	Less than 0.03 (0.0012)
Minimum thickness	10.5 (0.413)
Drum brake	
Lining minimum thickness	1.5 (0.059)
Drum repair limit	
Maximum inner diameter	255.5 (10.06)
Radial runout	Less than 0.12 (0.0047)
Out-of-roundness	Less than 0.015 (0.0006)
Taper	Less than 0.02 (0.0008)

CLUTCH PEDAL

Item	Unit: mm (in)
Height	171 - 177 (6.73 - 6.97)
Free play	1 - 5 (0.04 - 0.20)

WHEEL ALIGNMENT (Unladen)

Item	Model	2WD	4WD
Camber	degree	0° - 1°	
Center	degree	50° - 1°50'	1°10' - 2°10'
Toe-in	mm (in)	5 - 7 (0.20 - 0.28)	
	degree	14' - 19' (On both sides)	
Turning angle	degree		
Toe-out turn (Inside/Outside)		20°/18°	18.5°/18°
Inside		34° - 36°	29° - 33°
Outside		30° - 32°	27° - 29°

* Tankful of fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools, mats in designed position.

FRONT WHEEL BEARING

Item	Model	2WD	4WD
Tightening torque	N-m (kg-m, ft-lb)	34 - 39 (3.5 - 4.0, 25 - 29)	147 - 196 (15 - 20, 108 - 145)
Return angle	degree	45°	
Preload (At hub bolt)	N (kg, lb)	New seal Less than 28.4 (2.9, 6.4)	9.8 - 42.2 (1.0 - 4.3, 2.2 - 9.5)
		Used seal Less than 11.8 (1.2, 2.6)	

WHEEL AND TIRE

Item	Model	2WD			4WD	
		Regular Bed & Long Bed	King Cab	Heavy duty	Regular Bed & Long Bed	King Cab
Applied Model						
Tire size		7.00-14(B)	185SR14(B)	195SR14(B)	E78-14LT(D)	G78-15(B) GR78-15(B)
Inflation pressure* psi (kPa)	Moderate Load	Front 22 (152)	24 (165)	24 (165)	26 (179)	26 (193)
	Heavy Load	Front 22 (152)	24 (165)	24 (165)	26 (179)	26 (193)
		Rear 22 (152)	24 (165)	28 (193)	40 (275)	26 (193)
Wheel nut tightening torque	N-m (kg-m, ft-lb)	118 - 147 (12 - 15, 87 - 108)				

* Tire pressure should be checked when tires are COLD.

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