ELECTRICAL SYSTEM

SECTION EL

CONTENTS

HOW TO READ DIAGRAMS

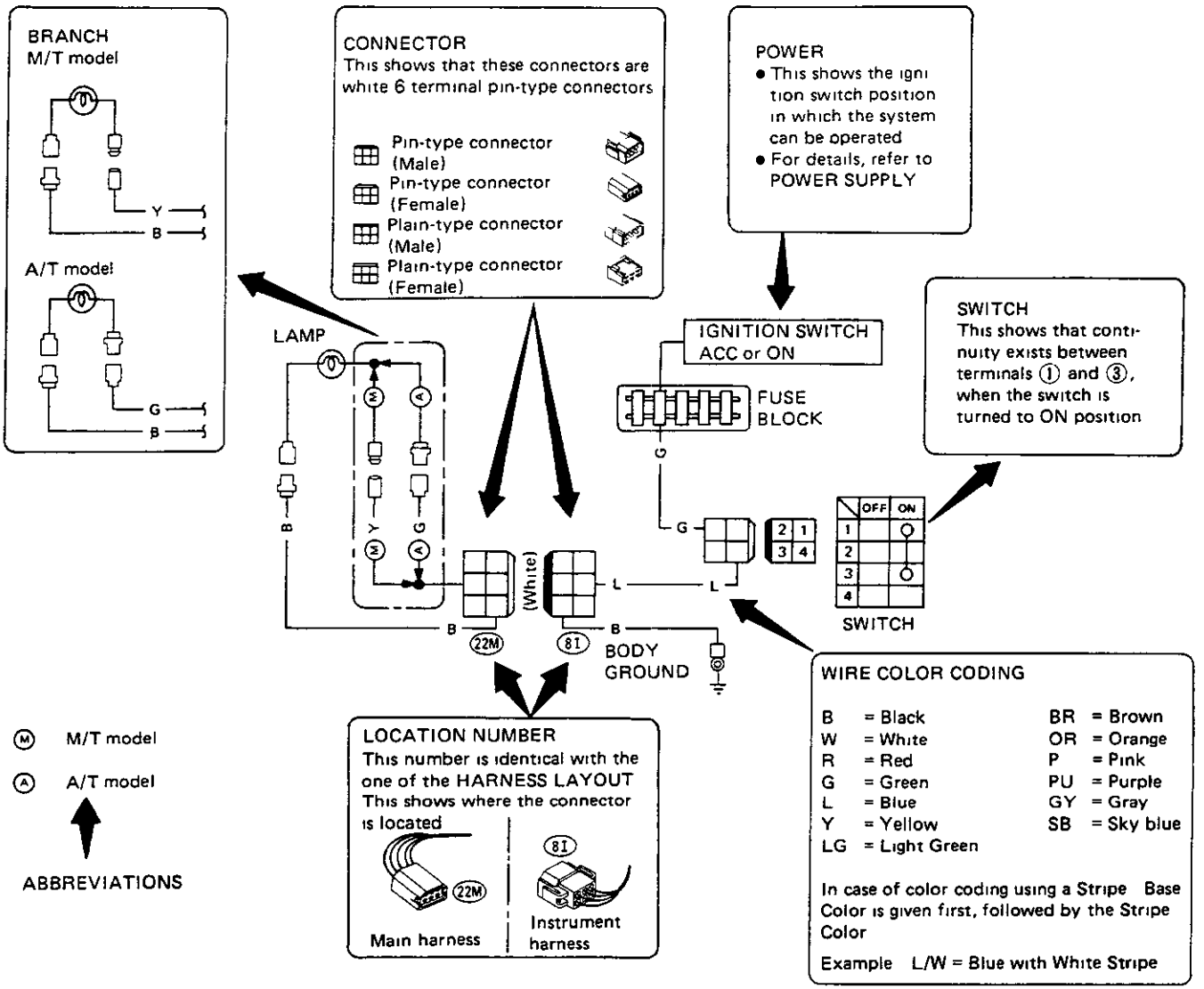
POWER SUPPLY ROUTING

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 an inoperative rear window defogger A quick check proves that meter and gauges 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 rear window defogger is common with the meter and gauges. Therefore, the cause of this specific problem must lie past the fuse, such as in the wiring, rear window defogger, or ground.

WIRING DIAGRAM

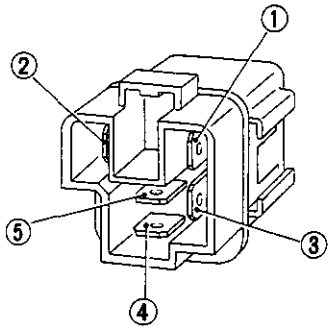
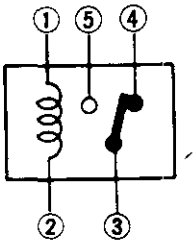
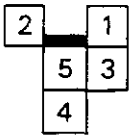
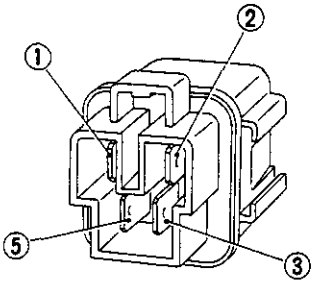
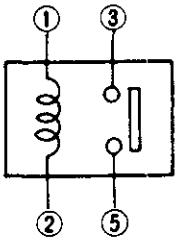
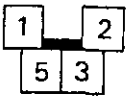
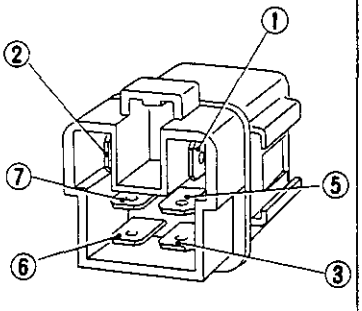
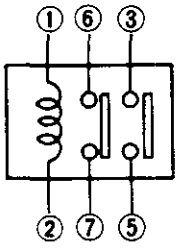
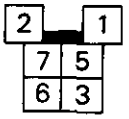
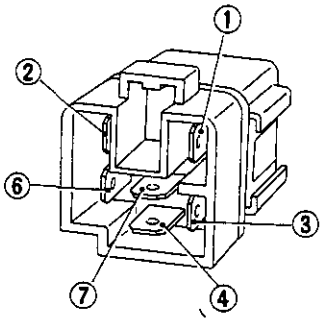
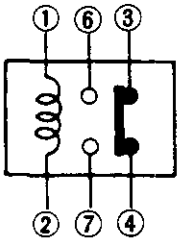
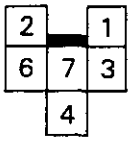
This diagram identifies types and number of connectors, electrical terminal positions in the connector, color coding of wires, and connector codes Refer to the following example

Example



SEL984C

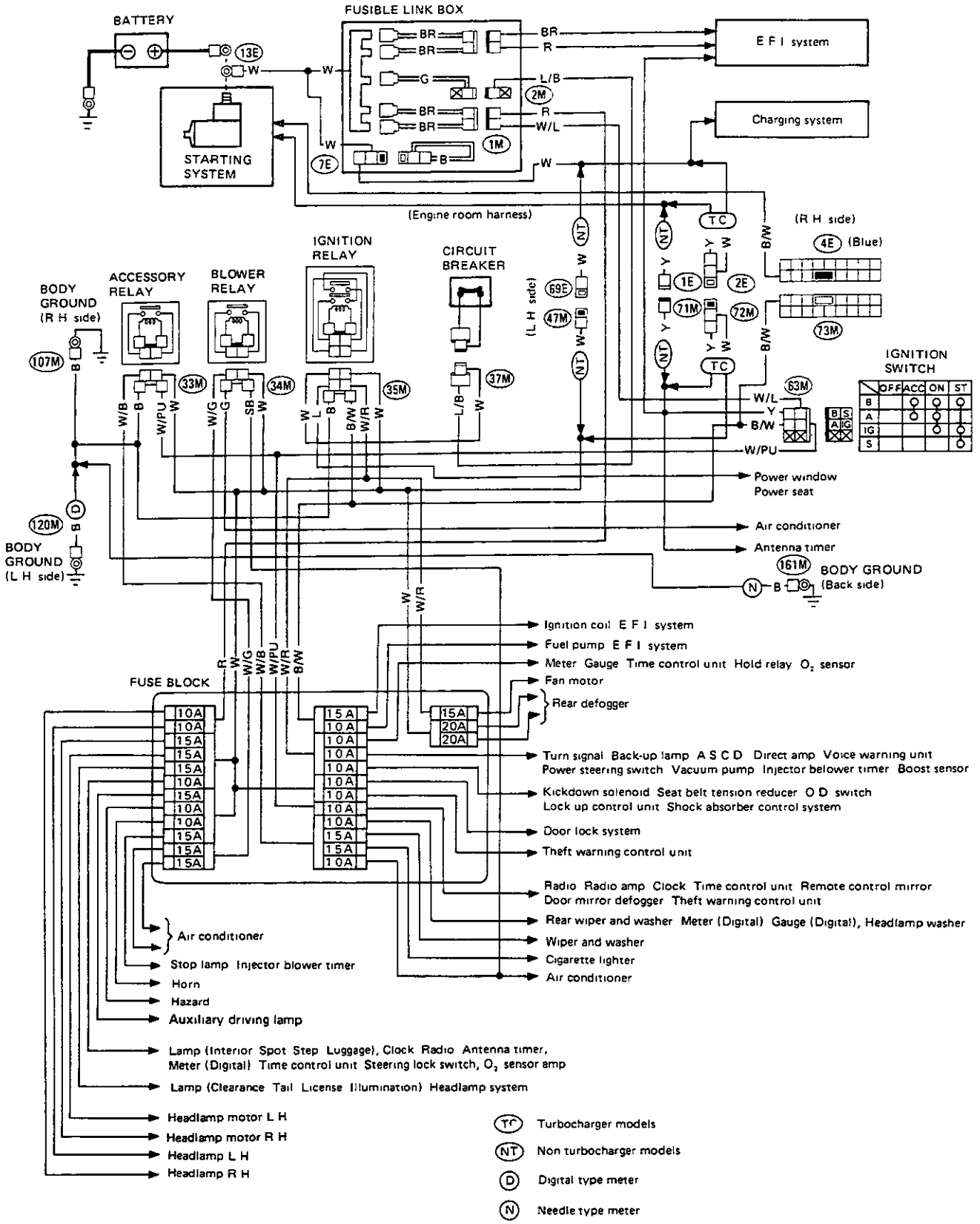
STANDARDIZED RELAY

Type	Outer view	Circuit	Symbols	Case color
1T				BLACK
1M				BLUE
2M				BROWN
1M 1B				GRAY

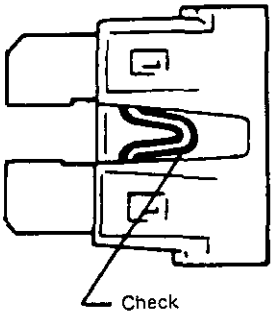
SEL639D

POWER SUPPLY ROUTING

Wiring Diagram



Fuse

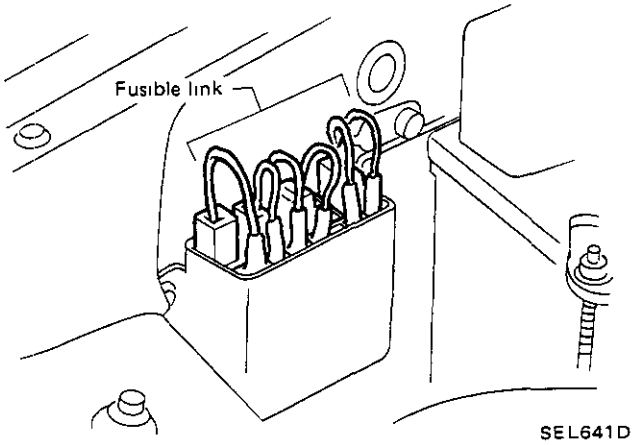


SEL276

a If fuse is blown, be sure to eliminate cause of problem before installing new fuse
b Use fuse of specified rating. Never use fuse of more than specified rating
c Do not install fuse in oblique direction, always insert it into fuse holder properly
d Remove fuse for clock if vehicle is not used for a long period of time.

Fusible Link

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



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CAUTION

a If fusible link should melt, it is possible that critical circuit (power supply or large current carrying circuit) is shorted In such a case, carefully check and eliminate cause of 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

CAUTION:

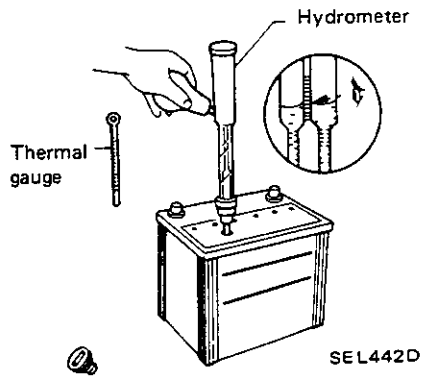
a. If it becomes necessary to start the engine with a booster battery and jumper cables, use a 12-volt booster battery
b. After connecting battery cables, ensure that they are tightly clamped to battery terminals for good contact
c. Never add distilled water through the hole used to check specific gravity.

Check

CHECKING SPECIFIC GRAVITY

1 Read hydrometer and thermal gauge indications as eye level.

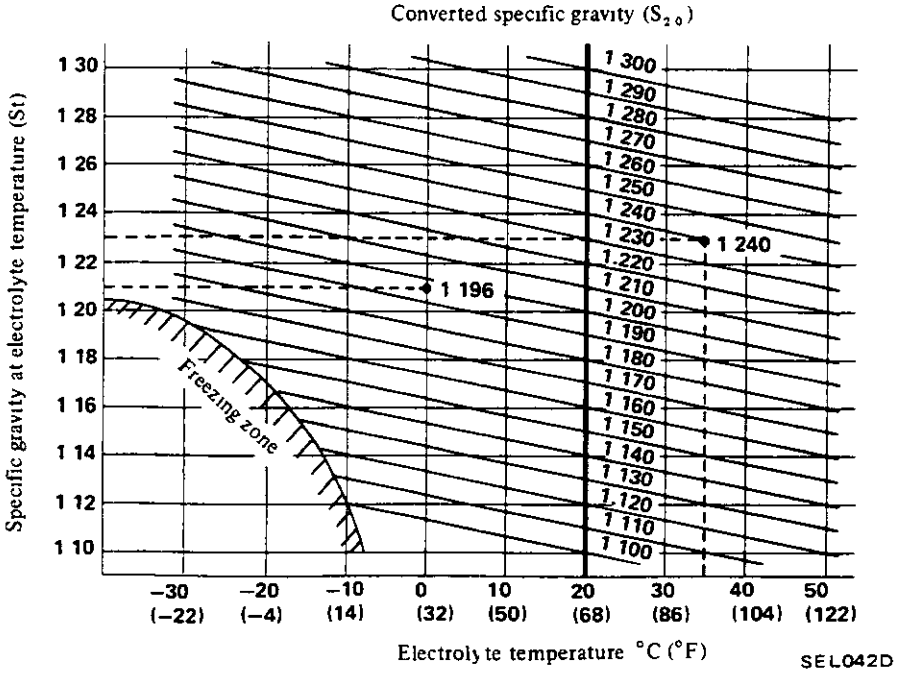
Read top level with scale.



2. Convert into specific gravity at 20°C (68°F).

Example

- When electrolyte temperature is 35°C (95°F) and specific gravity of electolyte is 1 230, converted specific gravity at 20°C (68°F) is 1 240
- When electrolyte temperature is 0°C (32°F) and specific gravity of electrolyte is 1.210, converted specific gravity at 20°C (68°F) is 1.196.

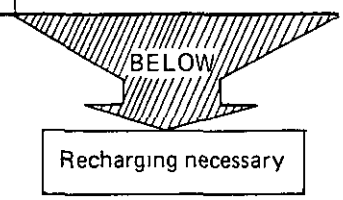


Check (Cont'd)

3 Determine charging condition of battery

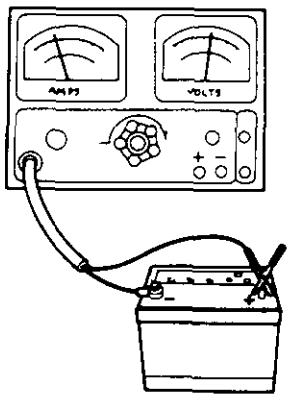
- If specific gravity converted at 20°C (68°F) is smaller than values shown below, battery should be recharged

Full charging specific gravity at 20°C (68°F)	Converted specific gravity at 20°C (68°F)
1 26	1 20
1 28	1 22



Test

BATTERY CAPACITY TEST



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1 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)
2 Hold this draw for 15 seconds, then look at voltage If voltage remains at 9 6 volts or above, THE BATTERY IS GOOD If voltage drops below 9 6 volts, then proceed to next test

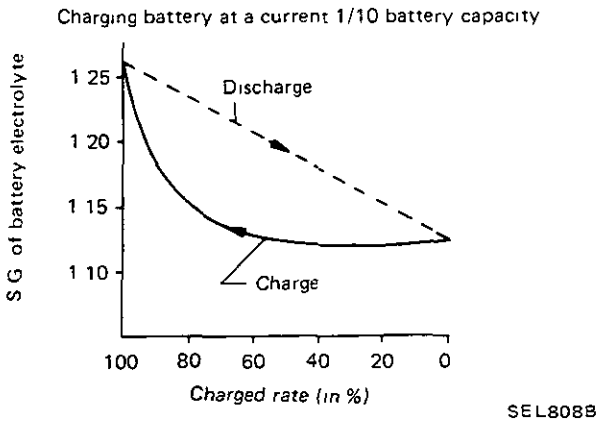
THREE-MINUTE CHARGE TEST

1 Connect 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

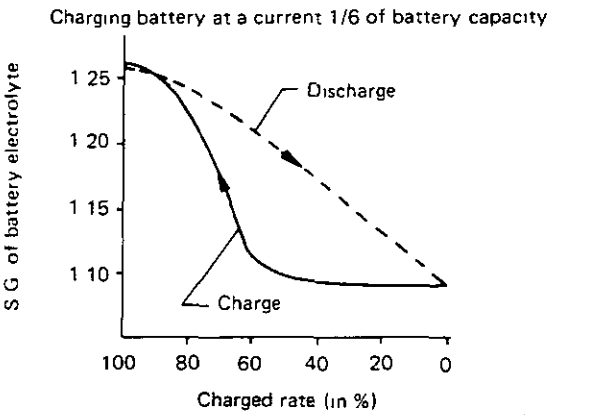
Charging

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



SEL808B



SEL809B

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

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).**

CHARGING CURRENT AND TIME REQUIRED FOR CHARGING

Charge the battery at 1/10 the current of battery capacity

Charging current	Time required
1/10 of battery capacity	Approx 8 - 10 hours
1/6 of battery capacity (But not more than 10-ampere)	Approx 4 - 5 hours

CAUTION:

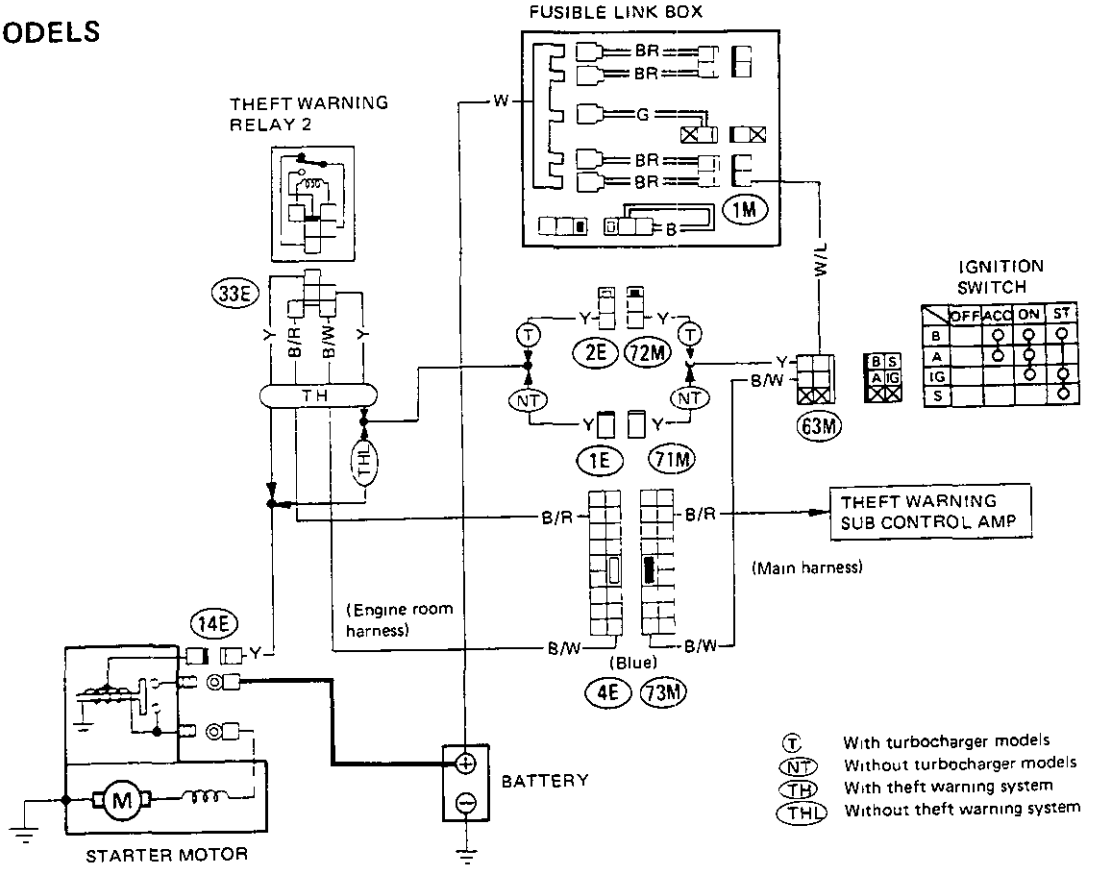
Do not use more than 10-ampere current flow to charge the battery quickly, as this will shorten the battery's service life.

Service Data and Specifications

Applied model		U S A	Canada
Type		55D23R-MF	N70Z-MF
		Maintenance-free	
Capacity	V-AH	12-60	12-70
Full charging specific gravity at 20°C (68°F)		1.26	1.28

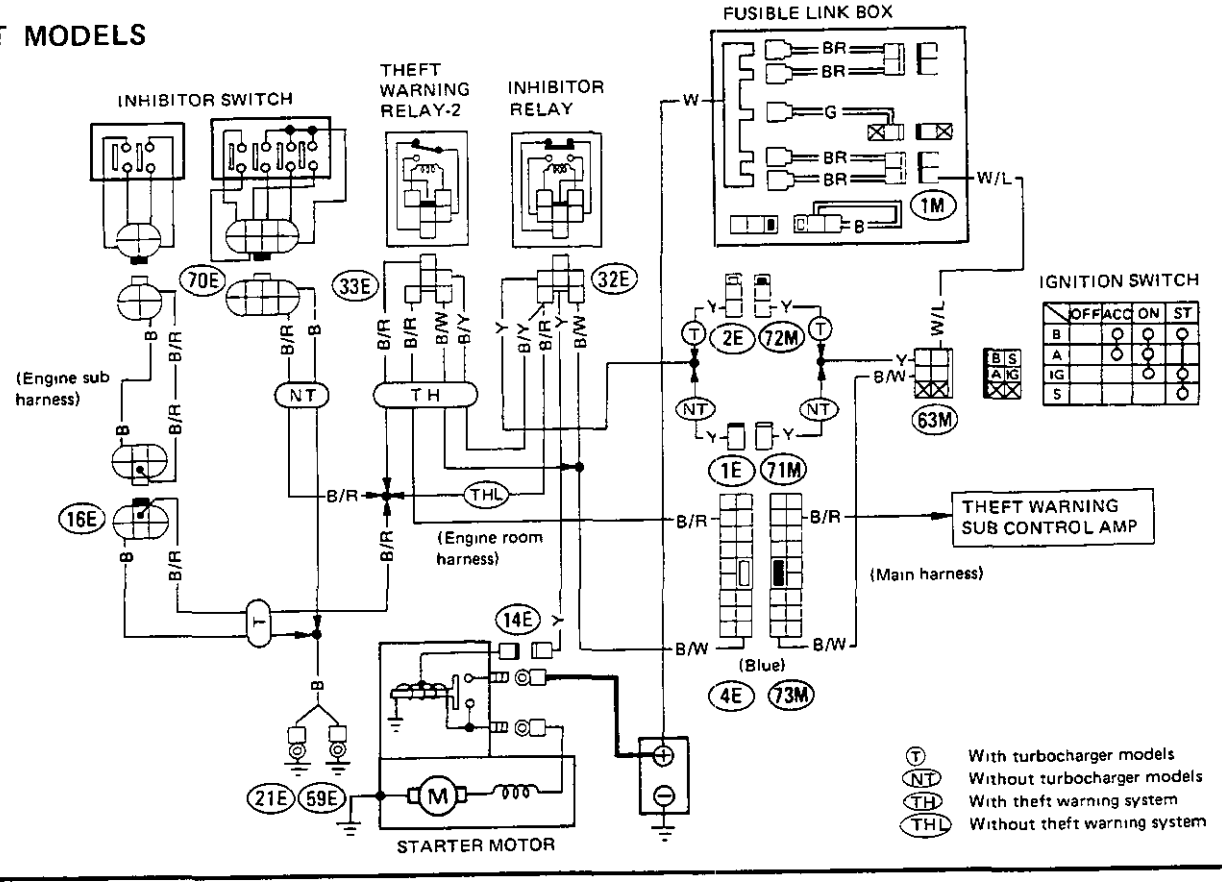
Wiring Diagram

M/T MODELS



SEL621D

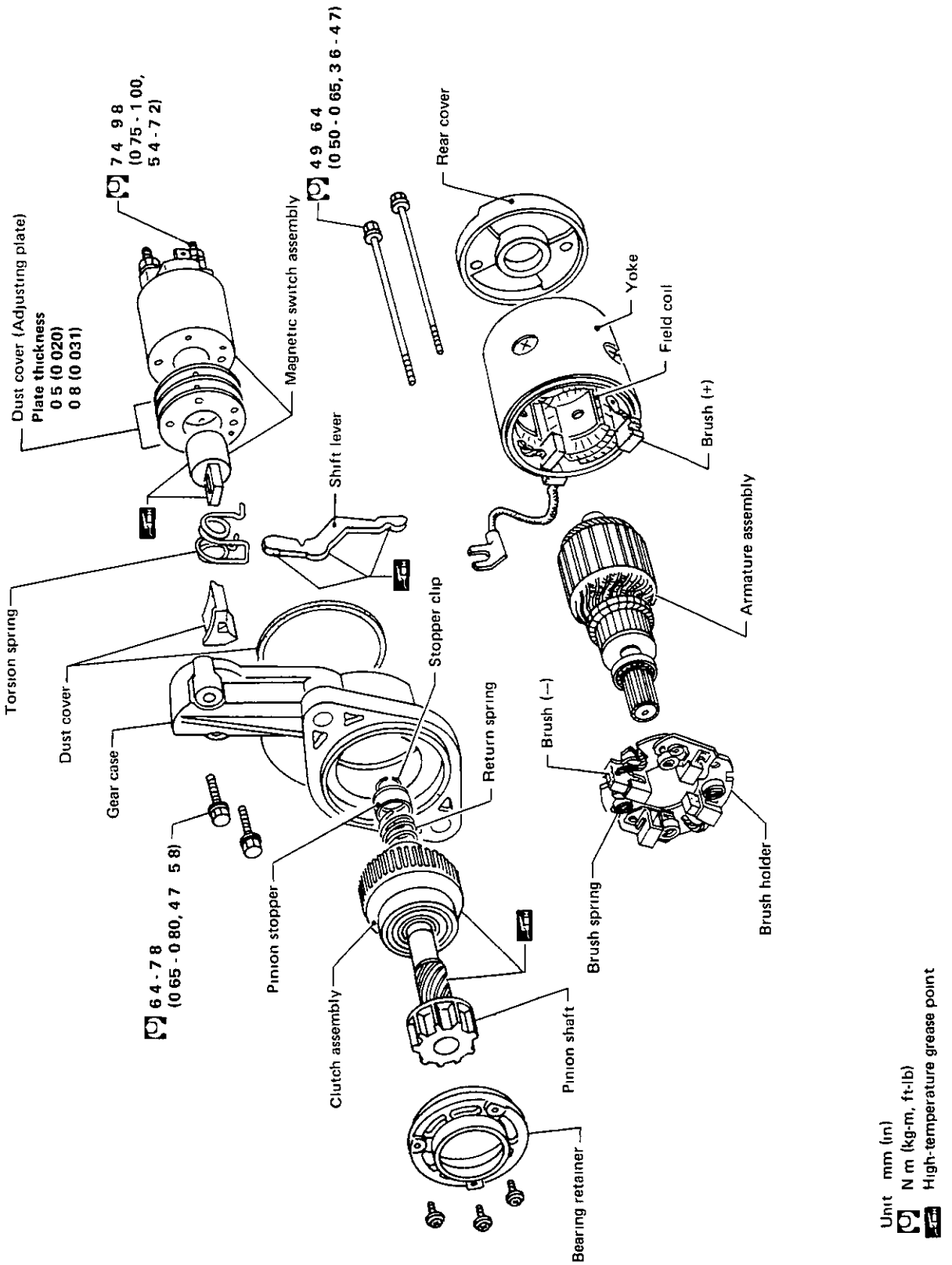
A/T MODELS



SEL622D

Construction

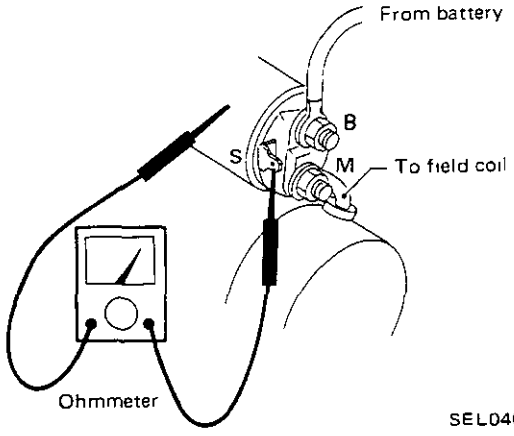
S114-374B



SEL623D

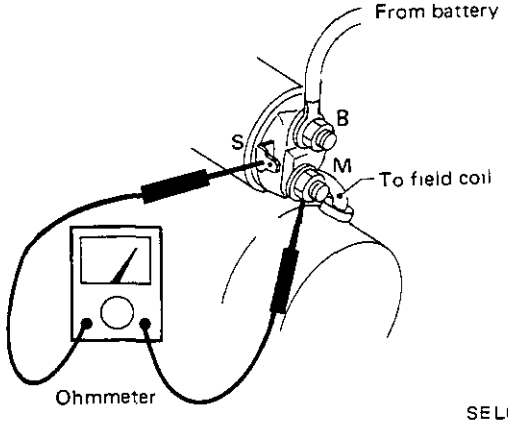
Magnetic Switch Check

1 Continuity test (between "S" terminal and switch body)
- No continuity Replace



SEL046D

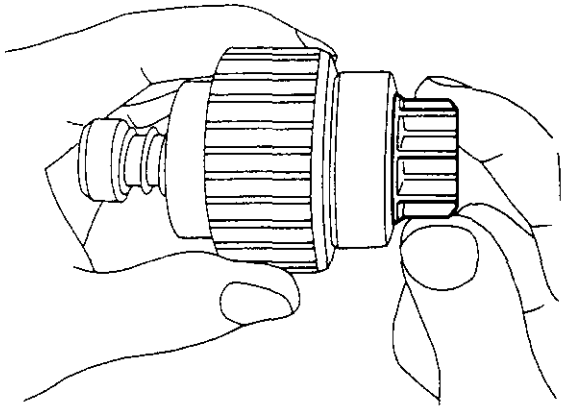
2 Continuity test (between "S" terminal and "M" terminal)
- No continuity Replace



SEL047D

Pinion/Clutch Check

1 Check clutch
Check pinion to see that it locks properly when turned in "drive" direction and rotates smoothly when turned in reverse


SEL569B

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

2 Inspect pinion teeth.
- Replace pinion if teeth are worn or damaged (Also check condition of ring gear teeth)

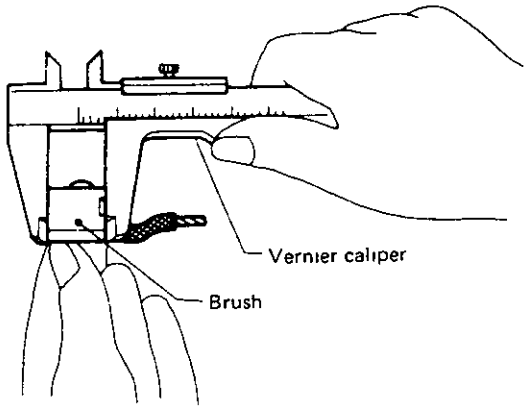
3 Inspect clutch gear teeth
- Replace clutch gear if teeth are worn or damaged (Also check condition of armature shaft gear teeth)

Brush Check

BRUSH

Check wear of brush

Wear limit length: 11 mm (0.43 in)

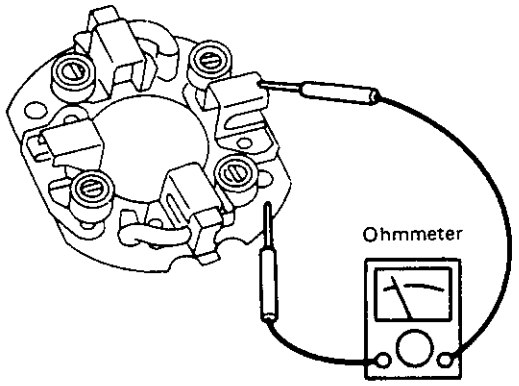


SEL626B

- Excessive wear Replace

BRUSH HOLDER

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



SEL568B

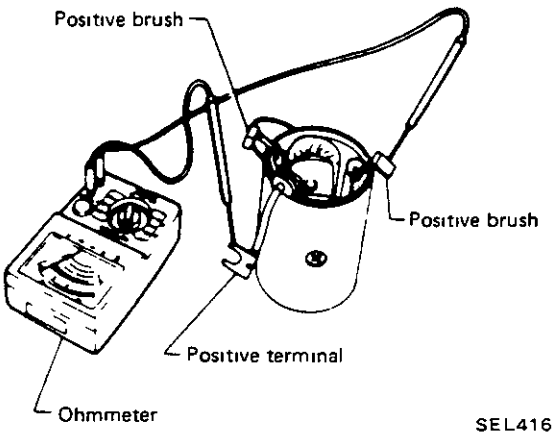
- Continuity exists . Replace

2 Check brush holder to see if it moves smoothly

- If brush holder is bent, replace it, if sliding surface is dirty, clean

Field Coil Check

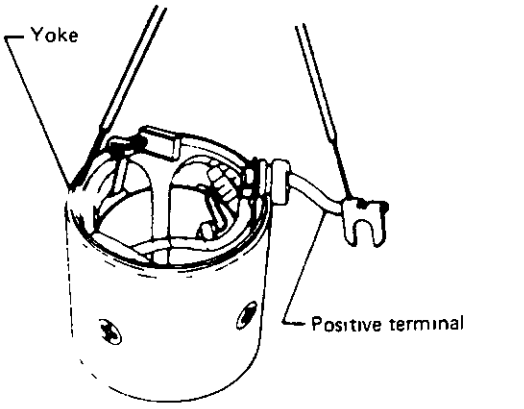
1 Continuity test (between field coil positive terminal and positive brushes)



SEL416A

- No continuity Replace field coil

2 Insulation test (between field coil positive terminal and yoke)

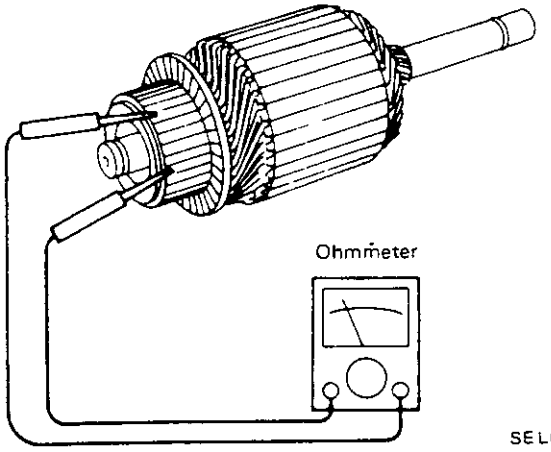


SEL417A

- Continuity exists Replace field coil

Armature Check

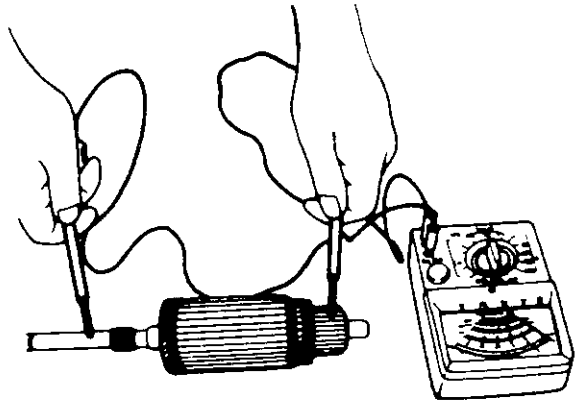
1 Continuity test (between two segments side by side)



SEL625B

- No continuity Replace

2 Insulation test (between each commutator bar and shaft)

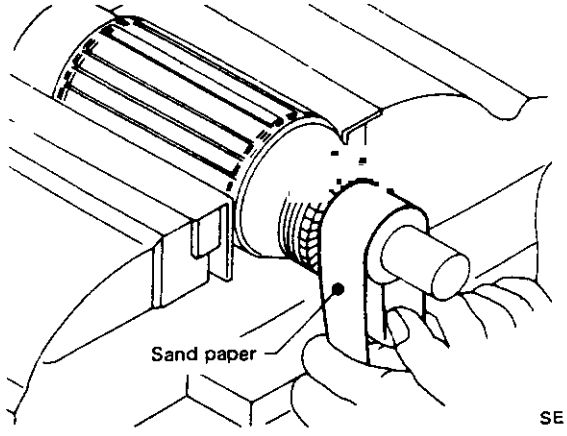


EE022

- Continuity exists Replace

3 Check commutator surface

- Rough . Sand lightly with No 500 - 600 sandpaper

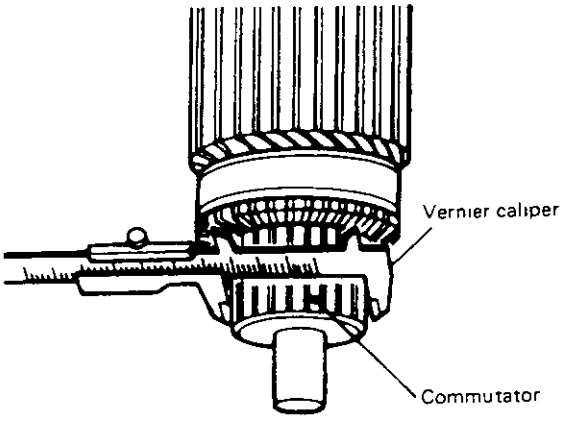


SEL624B

4 Check diameter of commutator

Commutator minimum diameter
29 mm (1 14 in)

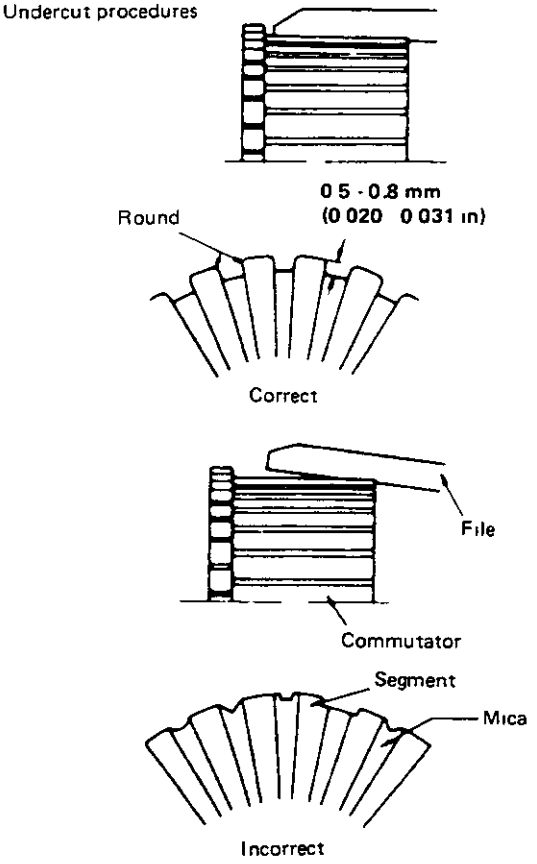
- Less than specified value Replace



SEL418A

5 Check depth of insulating mica from commutator surface

- Less than 0 2 mm (0 008 in) Undercut to 0 5 - 0 8 mm (0 020 - 0 031 in)



EE021

Reassembly

Carefully observe the following instructions

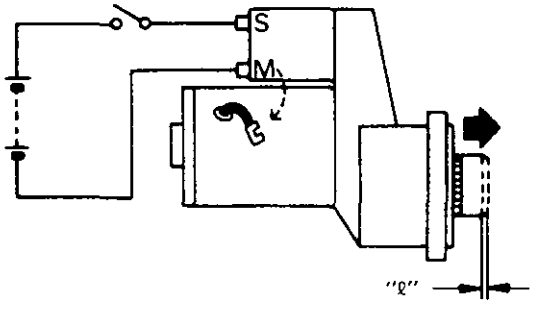
a. **Apply grease to:**

- Rear cover metal
- Gear case metal
- Frictional surface of pinion
- Moving portion of shift lever
- Plunger of magnetic switch

With pinion driven out by magnetic switch, push pinion back to remove slack and measure difference "ℓ" between the front edge of the pinion and the pinion stopper.

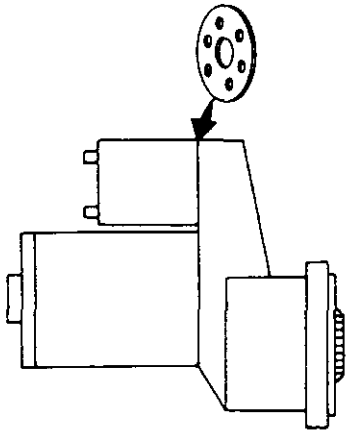
Difference "ℓ":

0.3 - 1.5 mm (0.012 - 0.059 in)



SEL497D

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

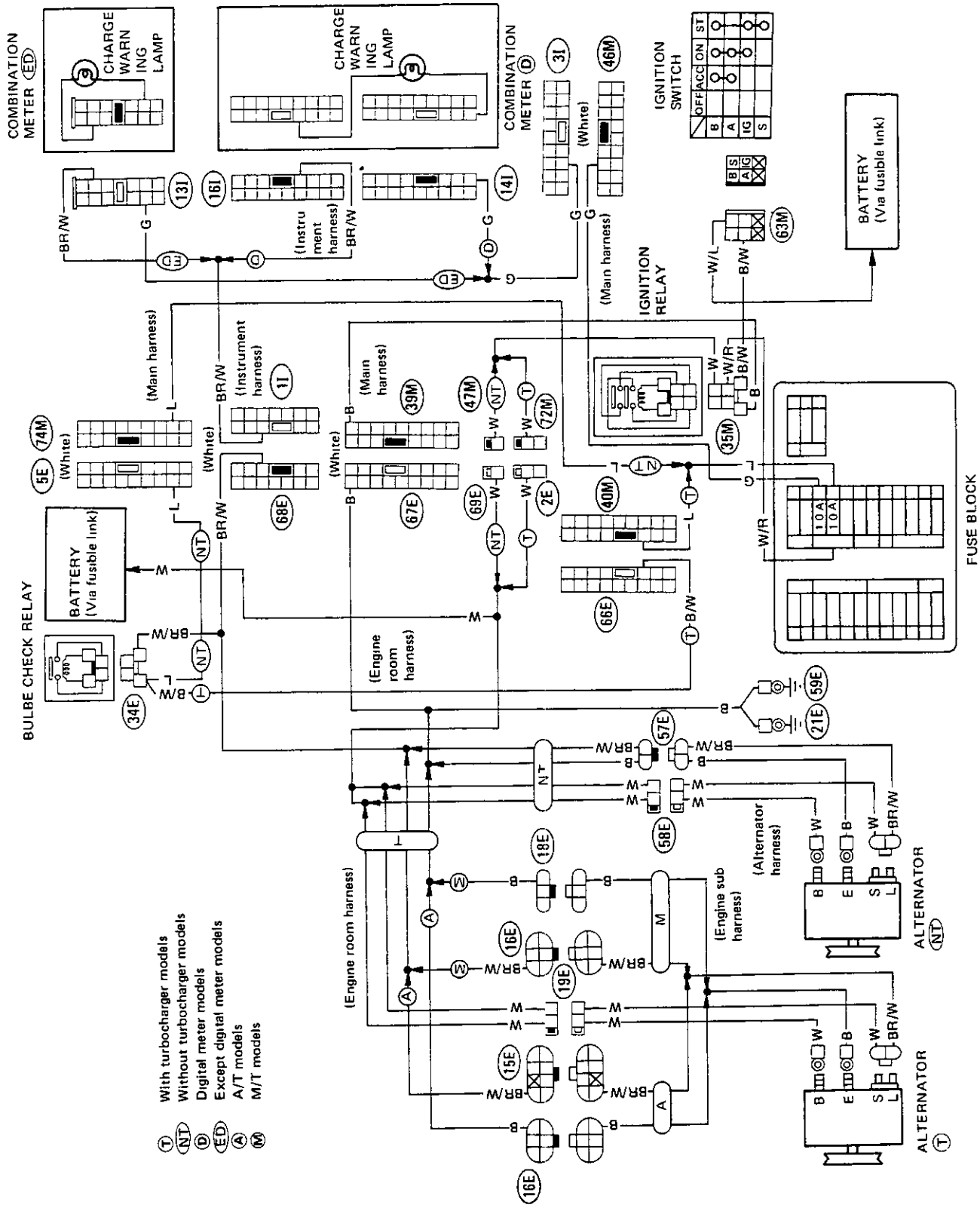


SEL573B

Service Data and Specification

Applied model			A11
Type			S114-374B
System voltage		V	12
No-load	Terminal voltage	V	11
	Current	A	Less than 100
	Revolution	rpm	More than 3,900
Outer diameter of commutator		mm (in)	More than 29 (1.14)
Minimum length of brush		mm (in)	11 (0.43)
Brush spring tension		N (kg, lb)	15.7 - 19.6 (1.6 - 2.0, 3.5 - 4.4)
Difference "ℓ" in height of pinion assembly		mm (in)	0.3 - 1.5 (0.012 - 0.059)

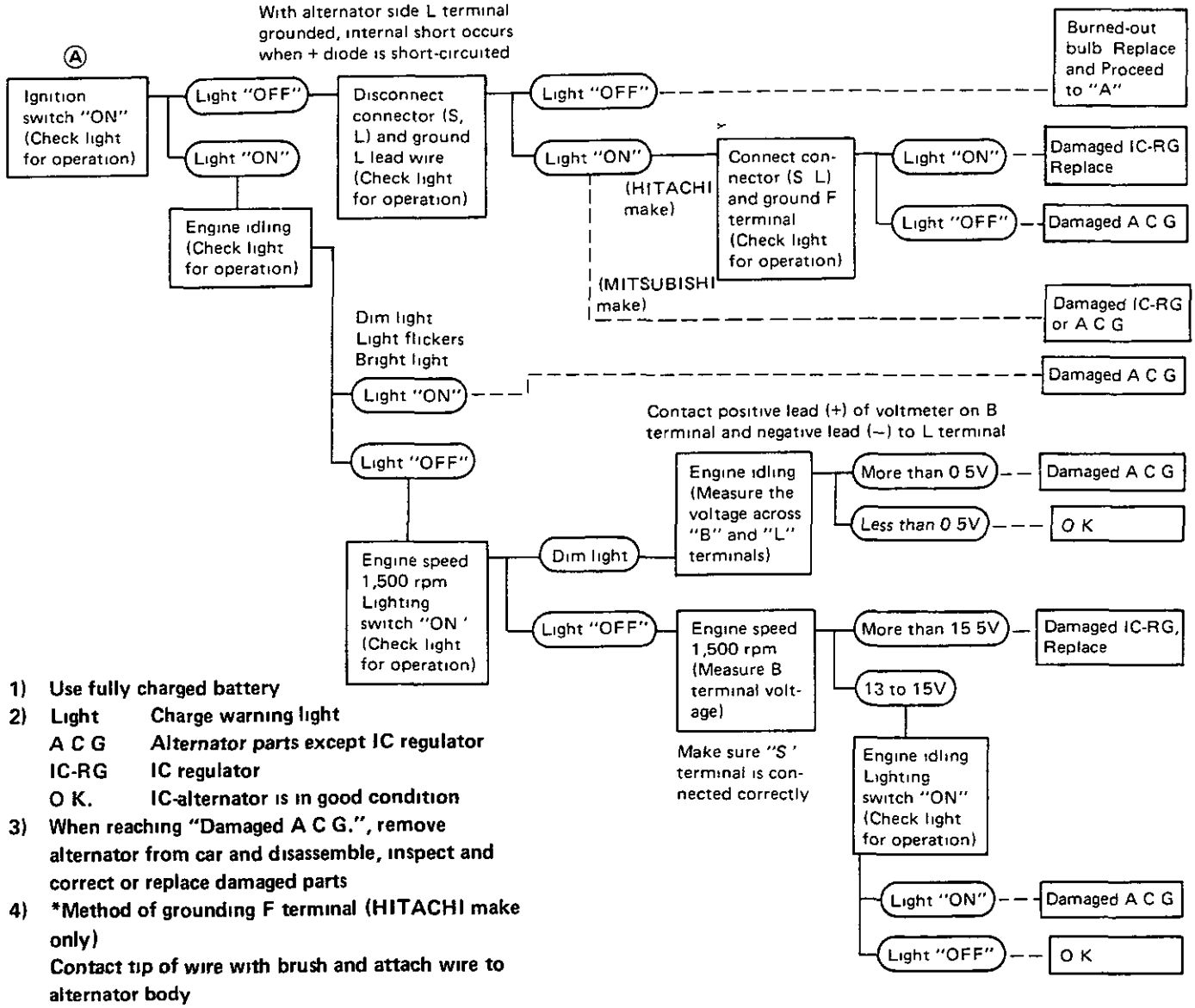
Wiring Diagram



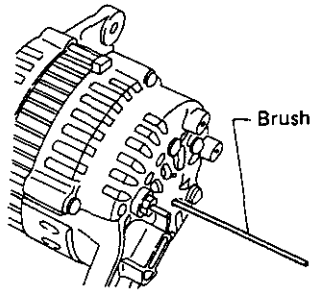
Trouble-Shooting

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

WITH IC REGULATOR



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 "Damaged A C G.", remove alternator from car and disassemble, inspect and correct or replace damaged parts**
4) ***Method of grounding F terminal (HITACHI make only)**
   Contact tip of wire with brush and attach wire to alternator body

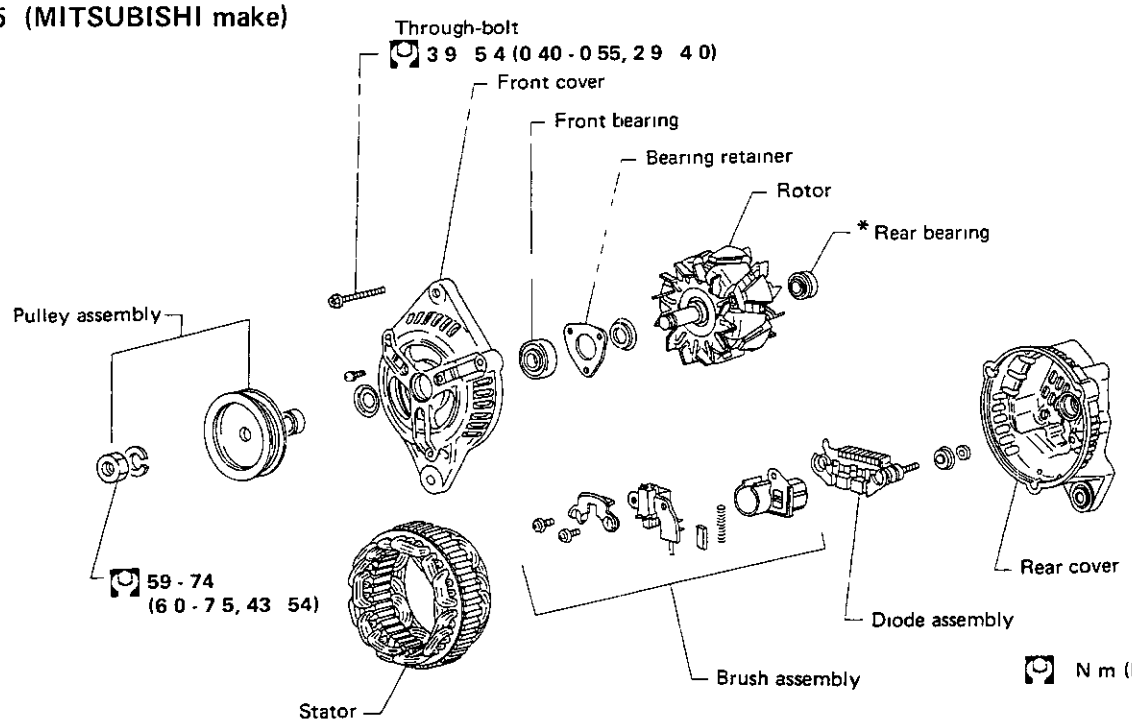


SEL766D

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

Construction

A2T48195 (MITSUBISHI make)

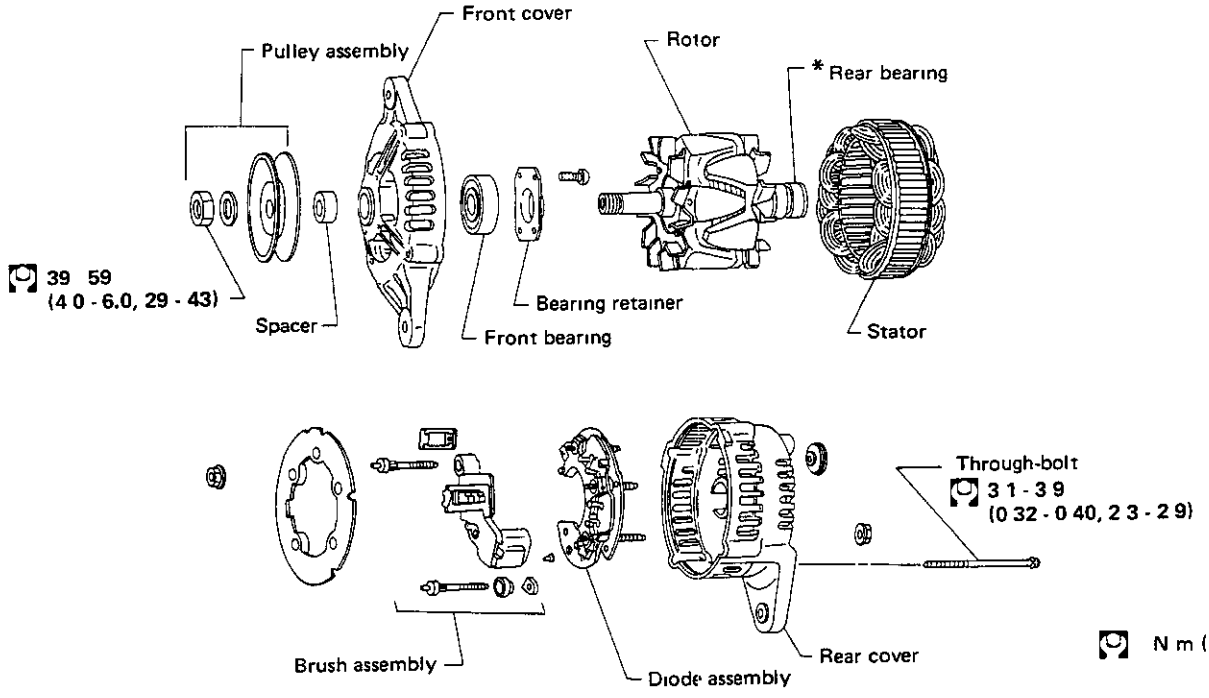


*Rear bearing

CAUTION.

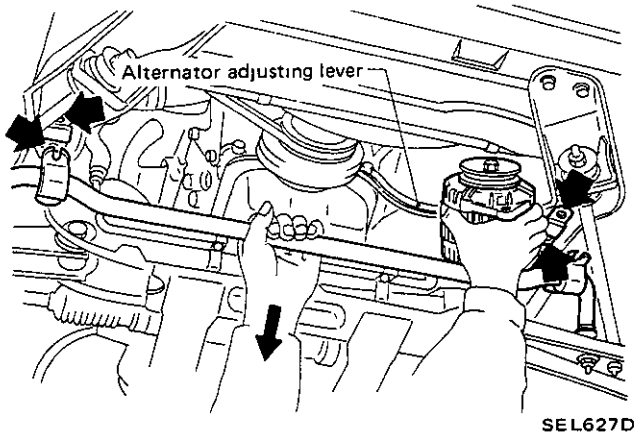
Rear cover may be hard to remove because a ring is used to lock outer race of rear bearing. Be careful not to lose this ring during removal.

LR170-701B (HITACHI make)



Removal

- Remove bolts from alternator
- Remove bolts for front stabilizer
- Manually move stabilizer down and remove alternator



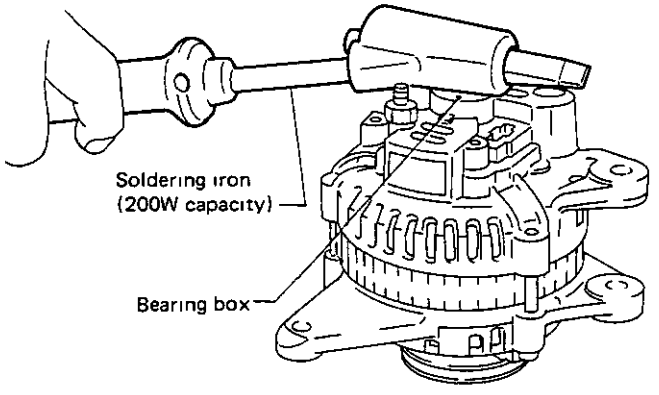
SEL627D

Disassembly

CAUTION.

Rear cover may be hard to remove because a ring is used to lock outer race of rear bearing To facilitate removal of rear cover, heat just bearing box section with a 200-watt soldering iron

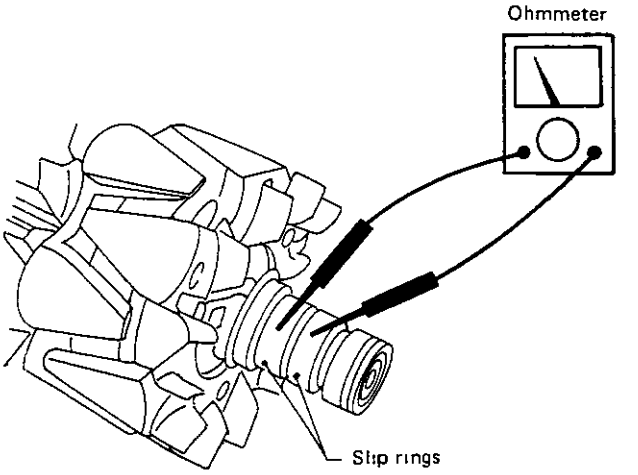
Do not use a heat gun, as it can damage diode assembly.



SEL628D

Rotor Slip Ring Check

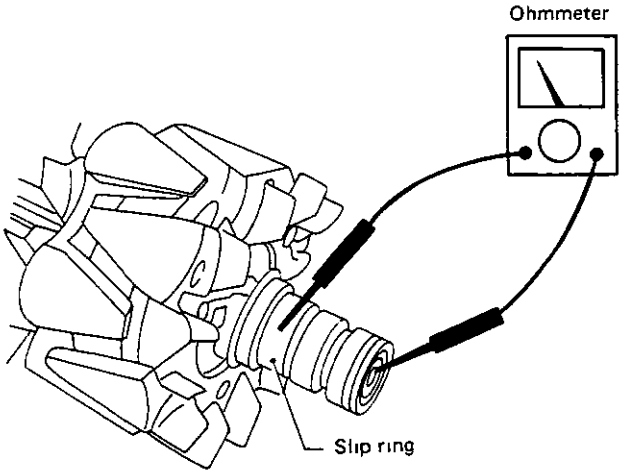
1. Continuity test



SEL629D

- No continuity Replace rotor

2. Insulator test



SEL630D

- Continuity exists . Replace rotor.

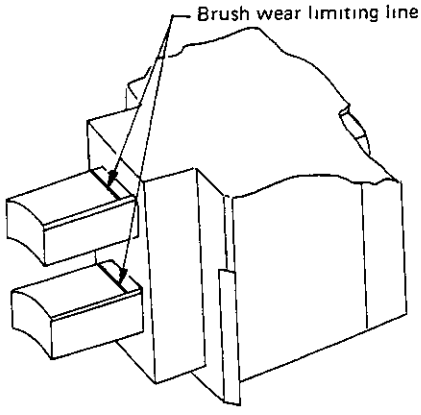
3. Check slip ring for wear.

Slip ring minimum outer diameter·
21.6 mm (0.850 in) [HITACHI make]
22.4 mm (0.882 in) [MITSUBISHI make]

Brush Check

1 Check smooth movement of brush
- Not smooth Check brush holder and clean

2 Check brush for wear



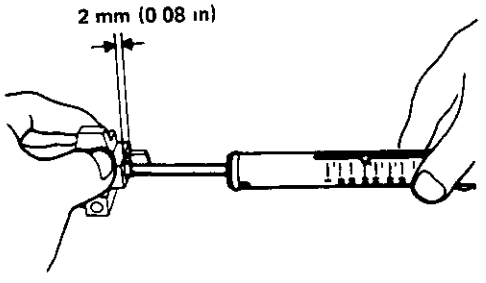
SEL631D

- Replace brush if it is worn down to the limit line

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.
1.471 - 3.531 N (150 - 360 g, 5.29 - 12.70 oz) [HITACHI make]
3.040 - 4 217 N (310 - 430 g, 10.93 - 15 17 oz) [MITSUBISHI make]



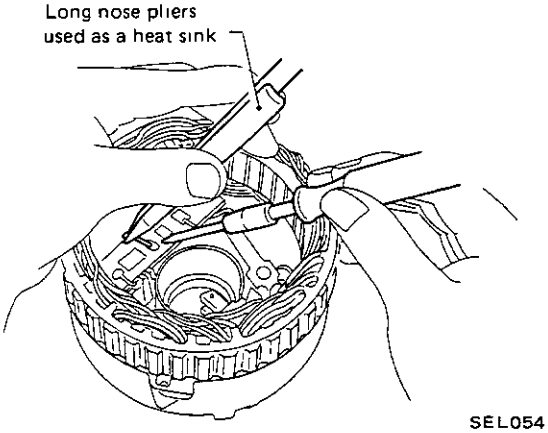
EE049

- Not in the specified value Replace

Stator Check

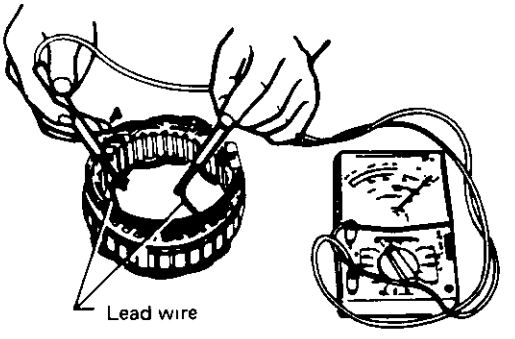
To test the stator or diode, you must separate them by unsoldering the connecting wires.

CAUTION.
Used only as much heat as required to melt solder. Diodes will be damaged by excessive heat.



SEL054D

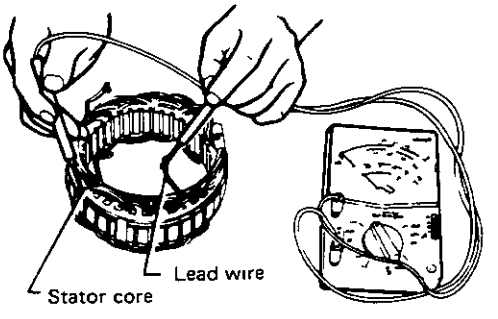
1 Continuity test



SEL070

- No continuity Replace stator

2 Ground test



SEL071

- Continuity exists Replace stator

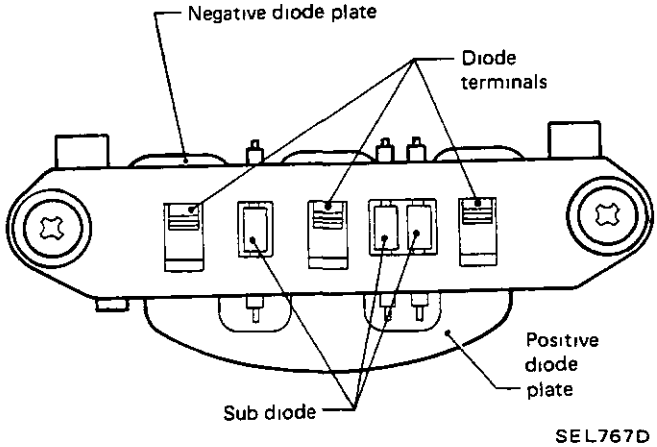
Diode Check

DIODE

- Use an ohmmeter to check condition of diodes as indicated in chart below
- If any of the test results is not satisfactory, replace diode assembly

	Ohmmeter probes		Continuity
	Positive ⊕	Negative ⊖	
Diodes check (Positive side)	Positive diode plate	Diode terminals	Yes
	Diode terminals	Positive diode plate	No
Diodes check (Negative side)	Negative diode plate	Diode terminals	No
	Diode terminals	Negative diode plate	Yes

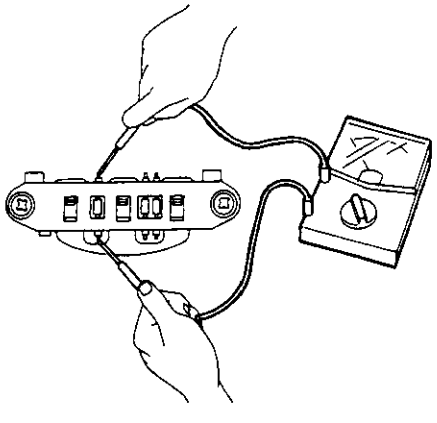
[MITSUBISHI make]



SEL767D

Sub-diode

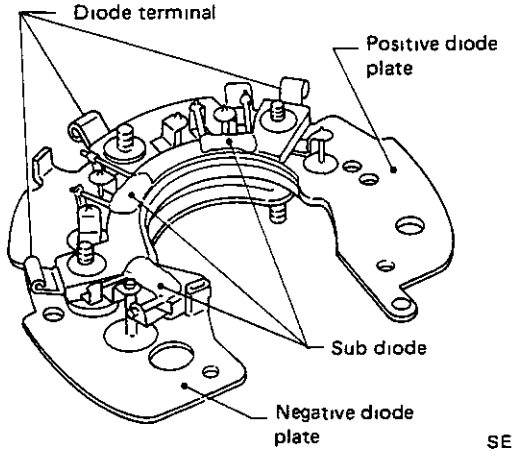
- Attach ohmmeter's probe to each end of diode to check for continuity.



SEL910A

- Continuity is N.G. ... Replace diode assembly.

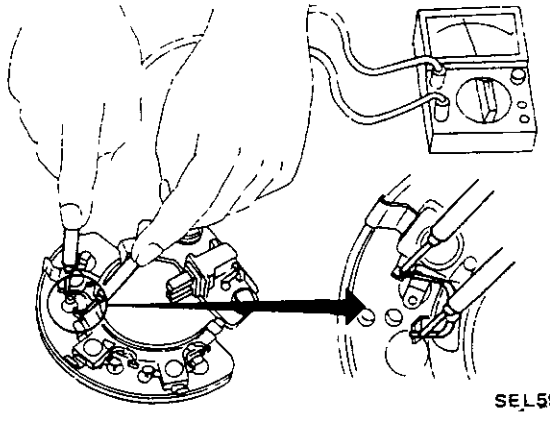
[HITACHI make]



SEL768D

Sub-diode

- Attach ohmmeter's probe to each end of diode to check for continuity.



SEL593A

- Continuity is N.G. . Replace diode assembly

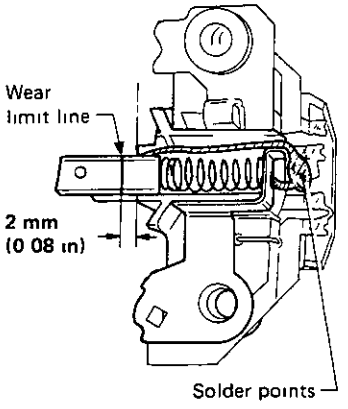
Reassembly

Carefully observe the following instructions

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

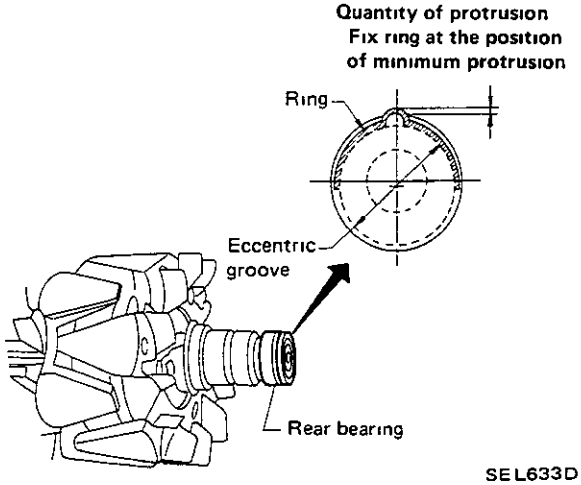
2 When soldering brush lead wire, observe the following

- Position brush so that its wear limit line protrudes 2 mm (0 08 in) beyond end face of brush holder



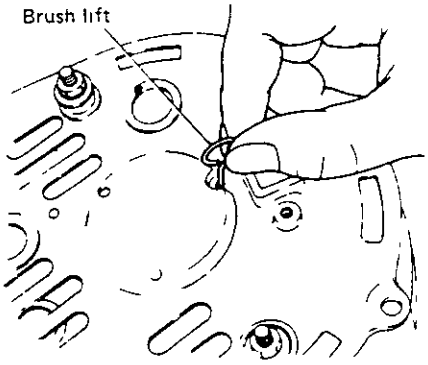
SEL632D

3 Fit ring into groove in rear bearing so that it is as close to the adjacent area as possible.

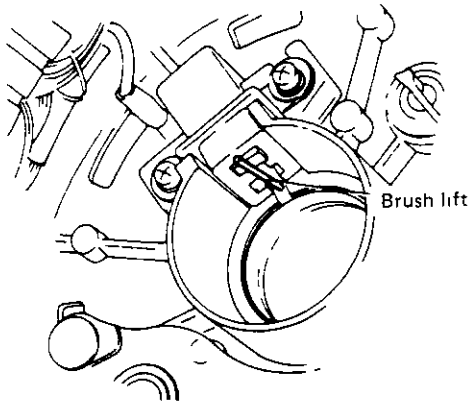


SEL633D

4 Before installing front cover with pulley and rotor with rear cover, push brush up with fingers and retain brush, by inserting brush lift into brush lift hole from outside
After installing, remove wire for brush lift



EE540



EE541

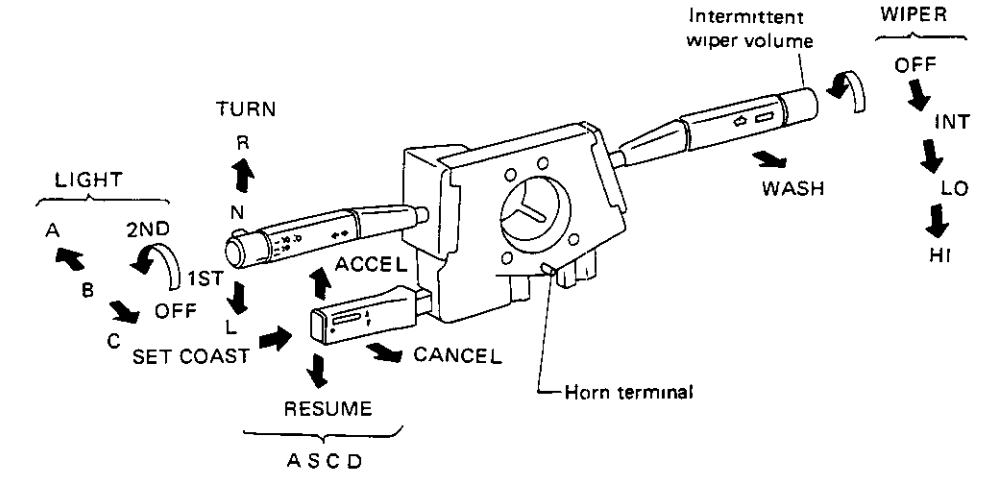
5 After installing front and rear sides of alternator, pull brush lift by pushing toward center

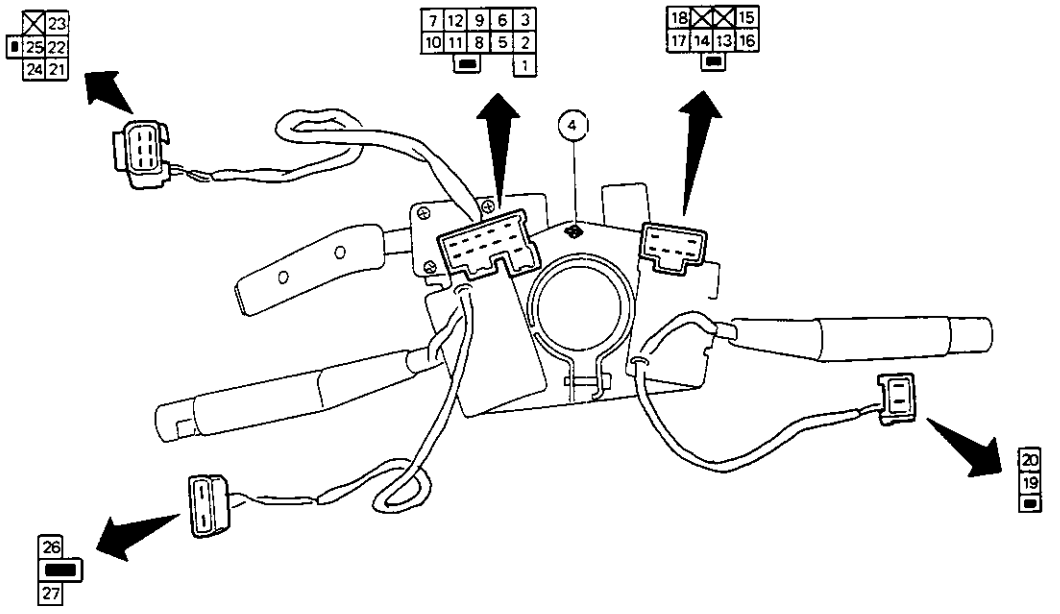
Do not pull brush lift by pushing toward outside of cover as it will damage slip ring sliding surface.

Service Data and Specification

Type	LR170-701B	A2T48195
Applied model	Without turbo charger models	With turbocharger models
Nominal rating V-A	12-70	
Ground polarity	Negative	
Minimum revolution under no-load (when 14 volts is applied) rpm	Less than 1,000	Less than 1,100
Hot output current A/rpm	More than 21/1,300 More than 50/2,500 More than 70/5,000	More than 21/1,300 More than 50/2,500
Regulated output voltage V	14 4 - 15 0	14 1 14 7
Minimum length of brush mm (in)	More than 5 5 (0 217)	More than 8 (0 31)
Brush spring pressure N (g, oz)	1,471 - 3,531 (150 - 360, 5 29 - 12 70)	3,040 4,217 (310 - 430, 10 93 - 15 17)
Slip ring outer diameter mm (in)	More than 21 6 (0 850)	More than 22 4 (0 882)

Check





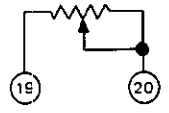
LIGHTING SWITCH

	OFF			1ST			2ND		
	A	B	C	A	B	C	A	B	C
5			○			○	○	○	○
6			○			○	○		○
7								○	
8			○			○	○	○	○
9			○			○	○		○
10								○	
11				○	○	○	○	○	○
12				○	○	○	○	○	○
26							○	○	○
27							○	○	○

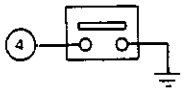
WIPER SWITCH

	OFF	INT	LO	HI	WASH
13	○	○			
14	○	○	○		
15		○	○	○	
16			○	○	
17		○	○	○	○
18					○

INTERMITTENT WIPER VOLUME



HORN SWITCH



ASCD SWITCH

	CANSEL	RESUME	ACCEL	SET COAST
21	○	○	○	○
22				○
23		○		
24			○	
25	○			

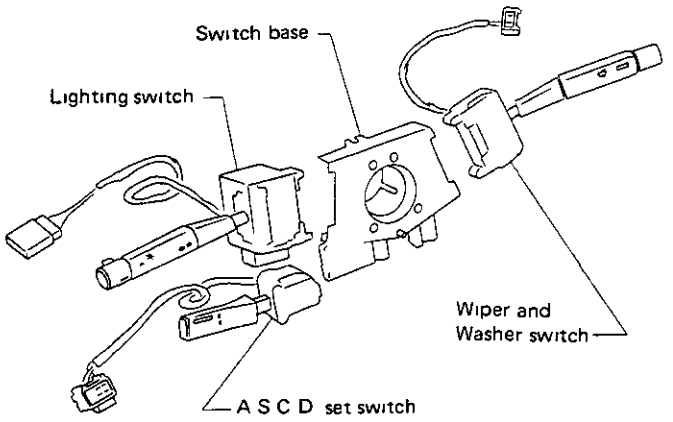
	R	N	L
1	○		○
2	○		
3			○

TURN SIGNAL SWITCH

SEL642D

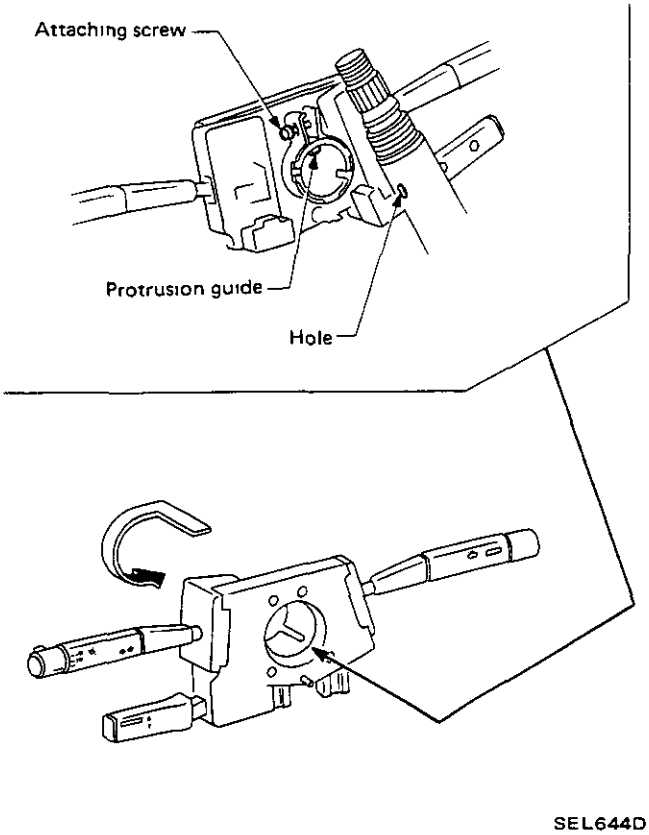
Replacement

Lighting switch, wiper & washer switch and A S C D switch can be replaced without removing combination switch base



SEL643D

To remove combination switch base, remove base attaching screw and turn after pushing on it

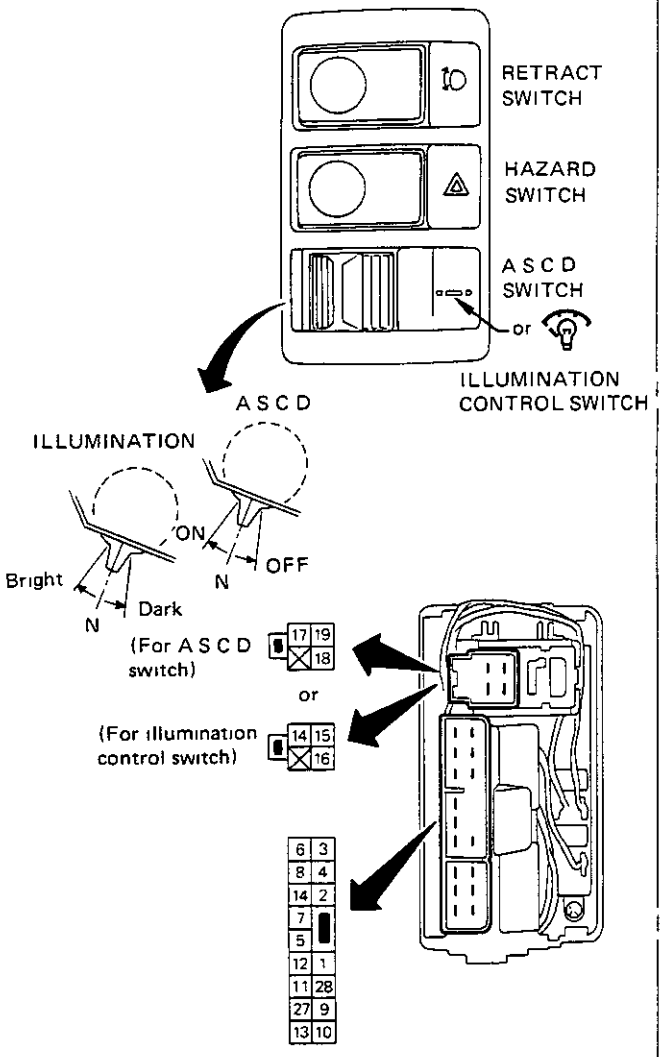


SEL644D

INSTRUMENT SWITCH

Check

INSTRUMENT SWITCH L.H



RETRACT SWITCH

	UP	DOWN
9	○	
10	○	○
11		○
12	○	○
27		○
28	○	
13	○	
E	○	Indicator
14	○	

HAZARD SWITCH

	OFF	ON
2	○	○
1	○	
7		○
3		○
4		○
5		○

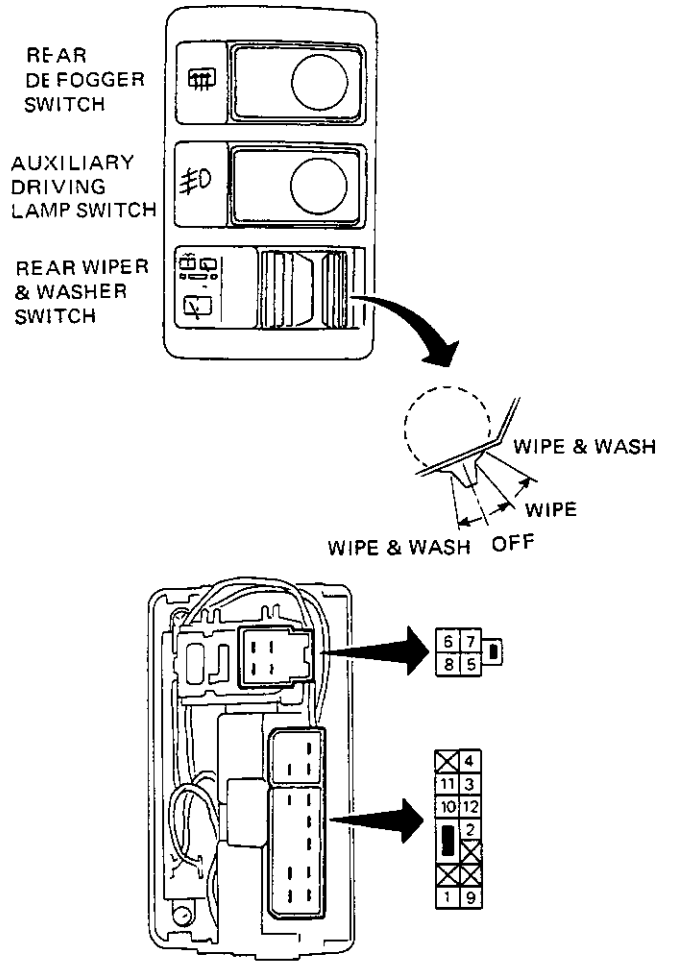
A S C D MAIN SWITCH

	OFF	N	ON
17		○	○
18		○	
19			○

ILLUMINATION CONTROL SWITCH

	BRIGHT	DARK
15	○	
16		○
14	○	○

INSTRUMENT SWITCH R.H.



REAR DEFOGGER SWITCH

	OFF	ON
2		○
		○
12		○
1		○
9		○

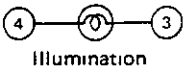
Indicator

REAR WIPER & WASHER SWITCH

	WIPE WASH	OFF	WIPE	WIPE WASH
5	○	○	○	○
6		○		
7	○			○
8	○		○	○

AUXILIARY DRIVING LAMP SWITCH

	OFF	ON
10		○
11		○

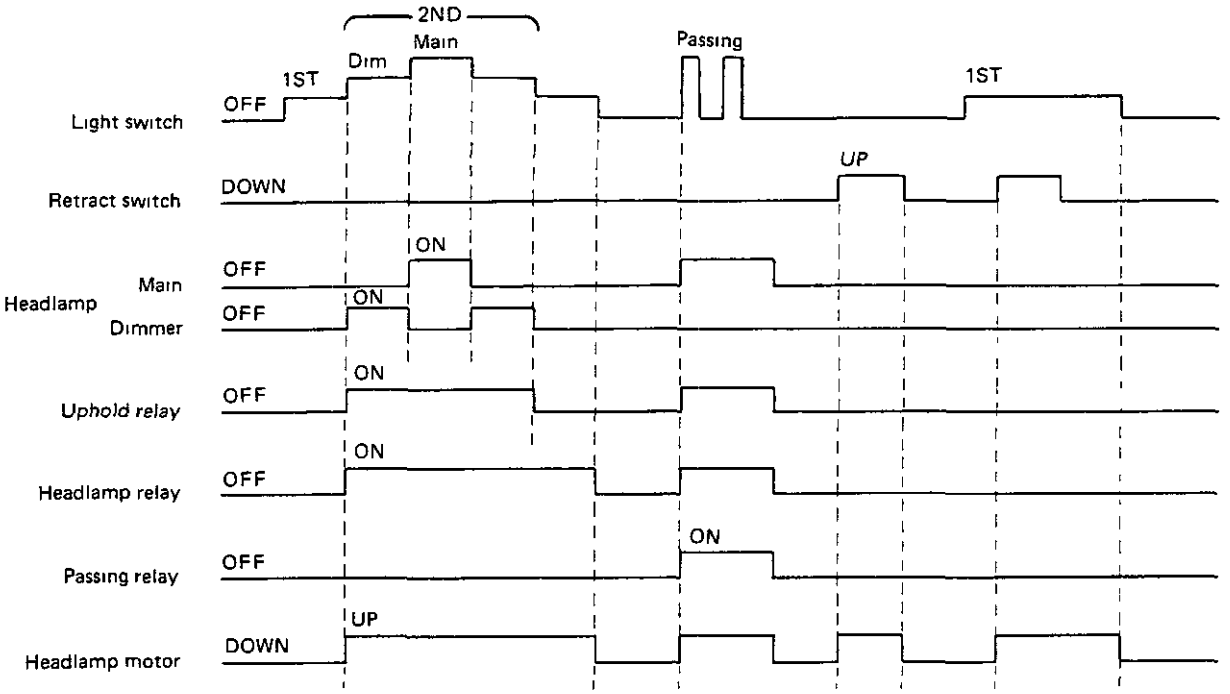


SEL645D

- For removal, refer to "INSTRUMENT" in BF section

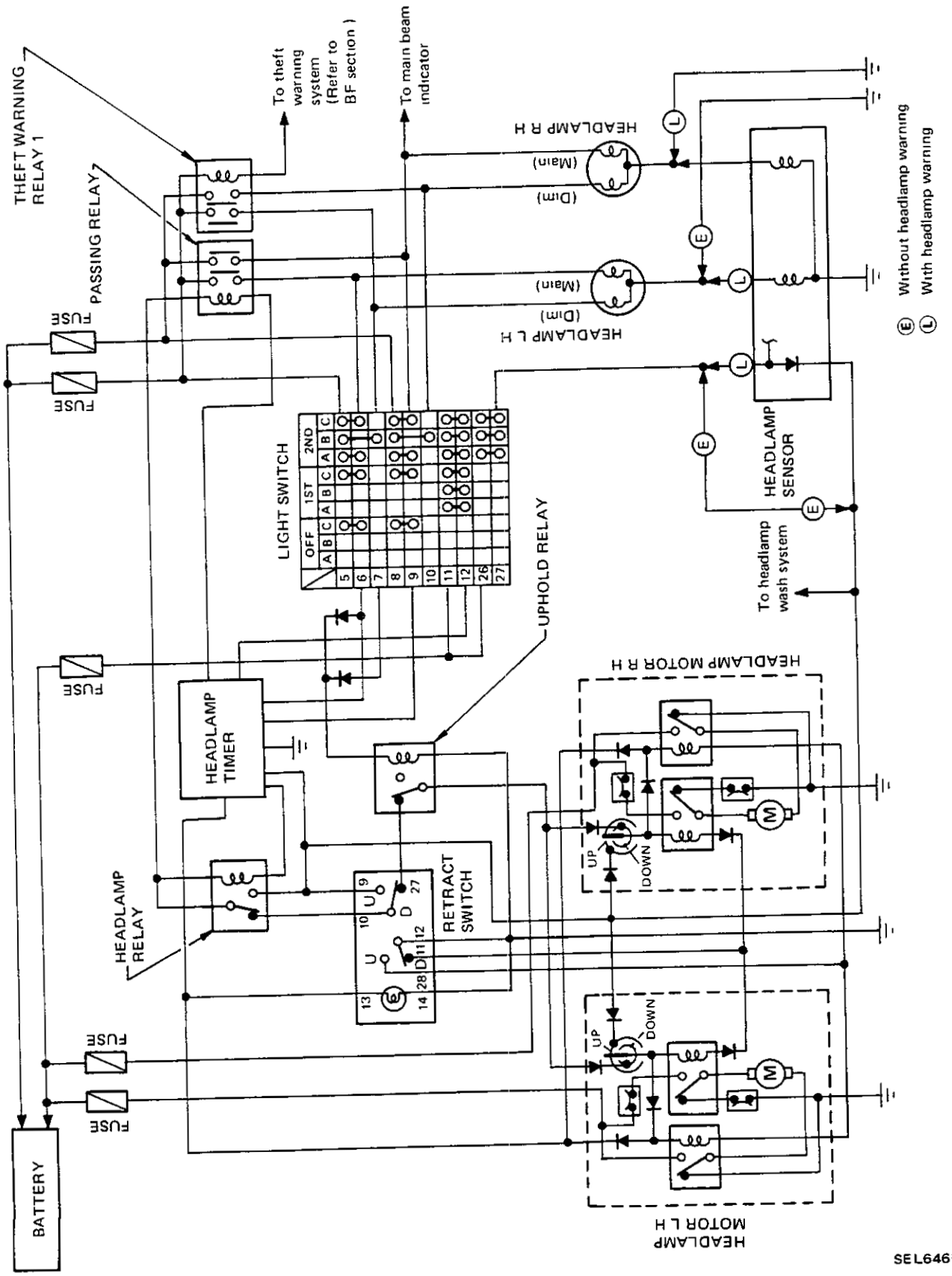
Operation

- The following chart depicts the operational modes of relays and headlamp motors in relation to the positions of the headlamp and retract switches

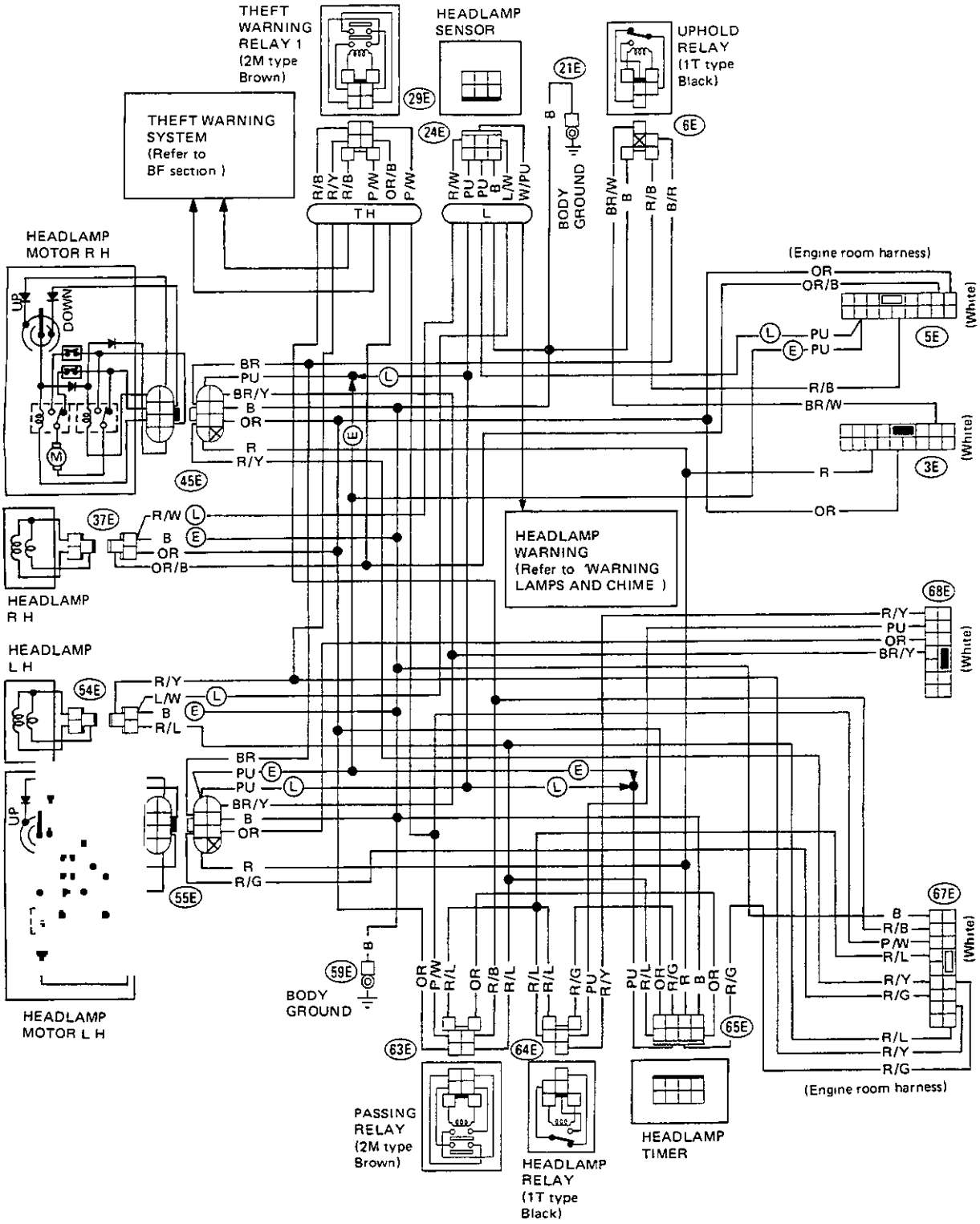


SEL743D

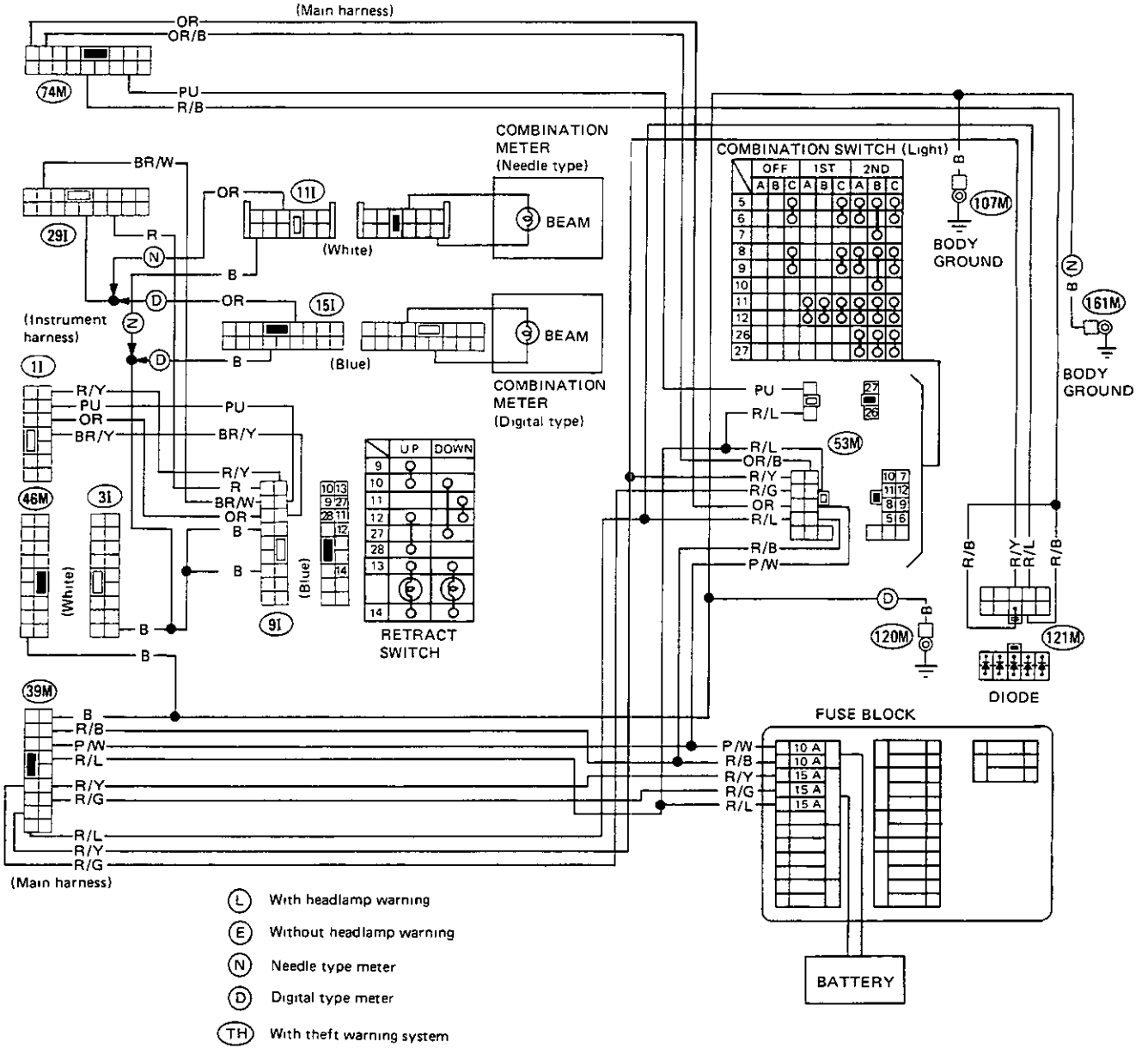
Schematic


THEFT WARNING RELAY 1
PASSING RELAY
To theft warning system (Refer to BF section)
To main beam indicator
HEADLAMP R H
(Main)
(Dim)
HEADLAMP L H
(Main)
(Dim)
Without headlamp warning
With headlamp warning
FUSE
FUSE
LIGHT SWITCH
OFF
1ST
2ND
HEADLAMP SENSOR
To headlamp wash system
UPHOLD RELAY
FUSE
HEADLAMP TIMER
HEADLAMP MOTOR R H
UP
DOWN
HEADLAMP RELAY
RETRACT SWITCH
FUSE
FUSE
BATTERY
HEADLAMP MOTOR L H
SEL646D

Wiring Diagram

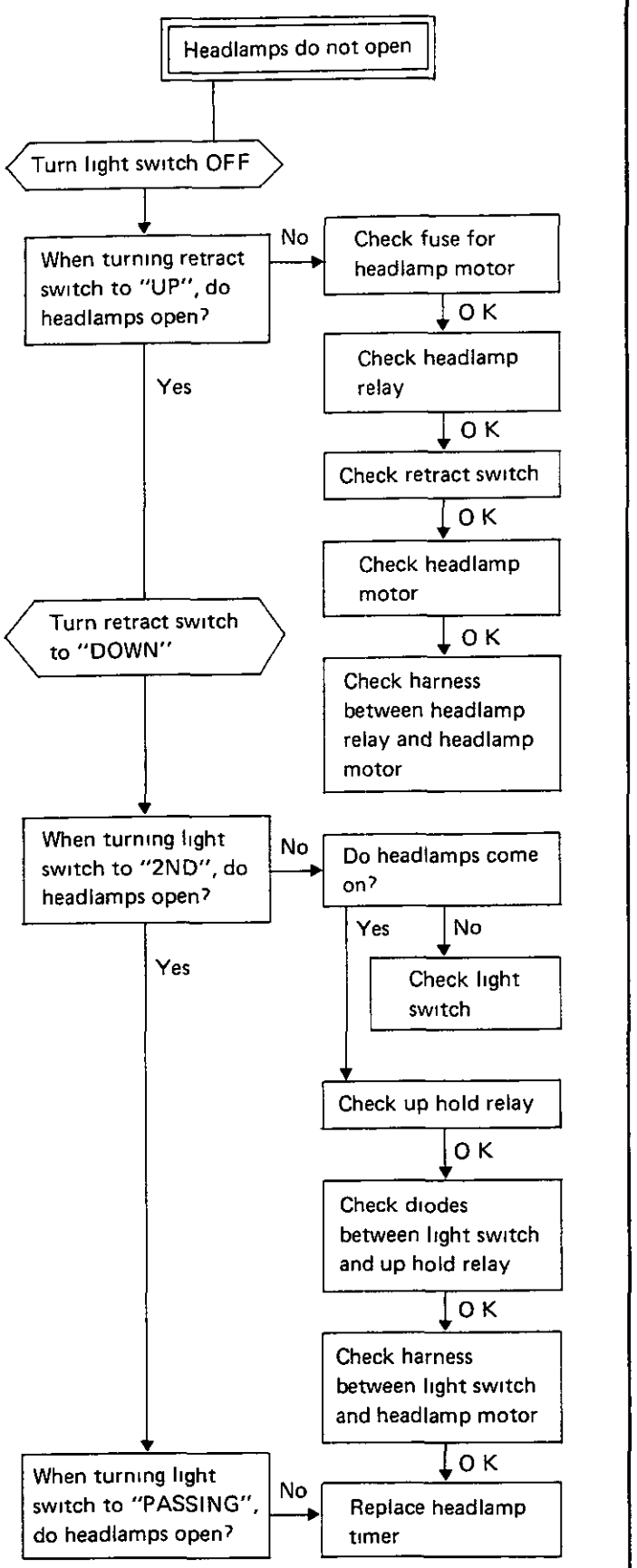


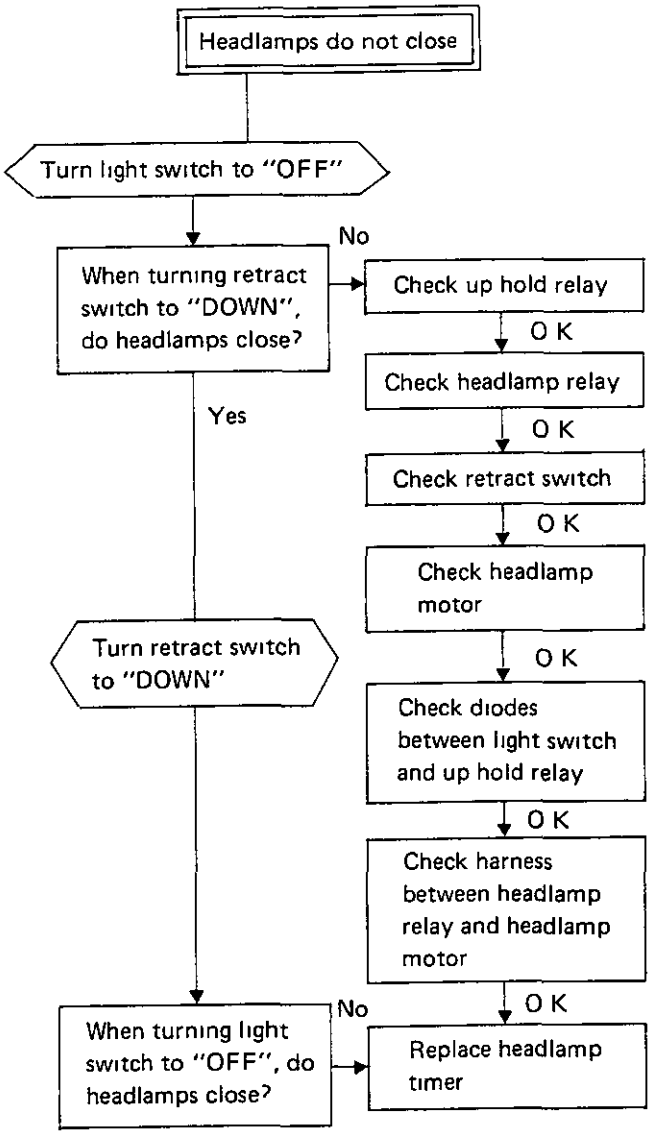
Wiring Diagram (Cont'd)



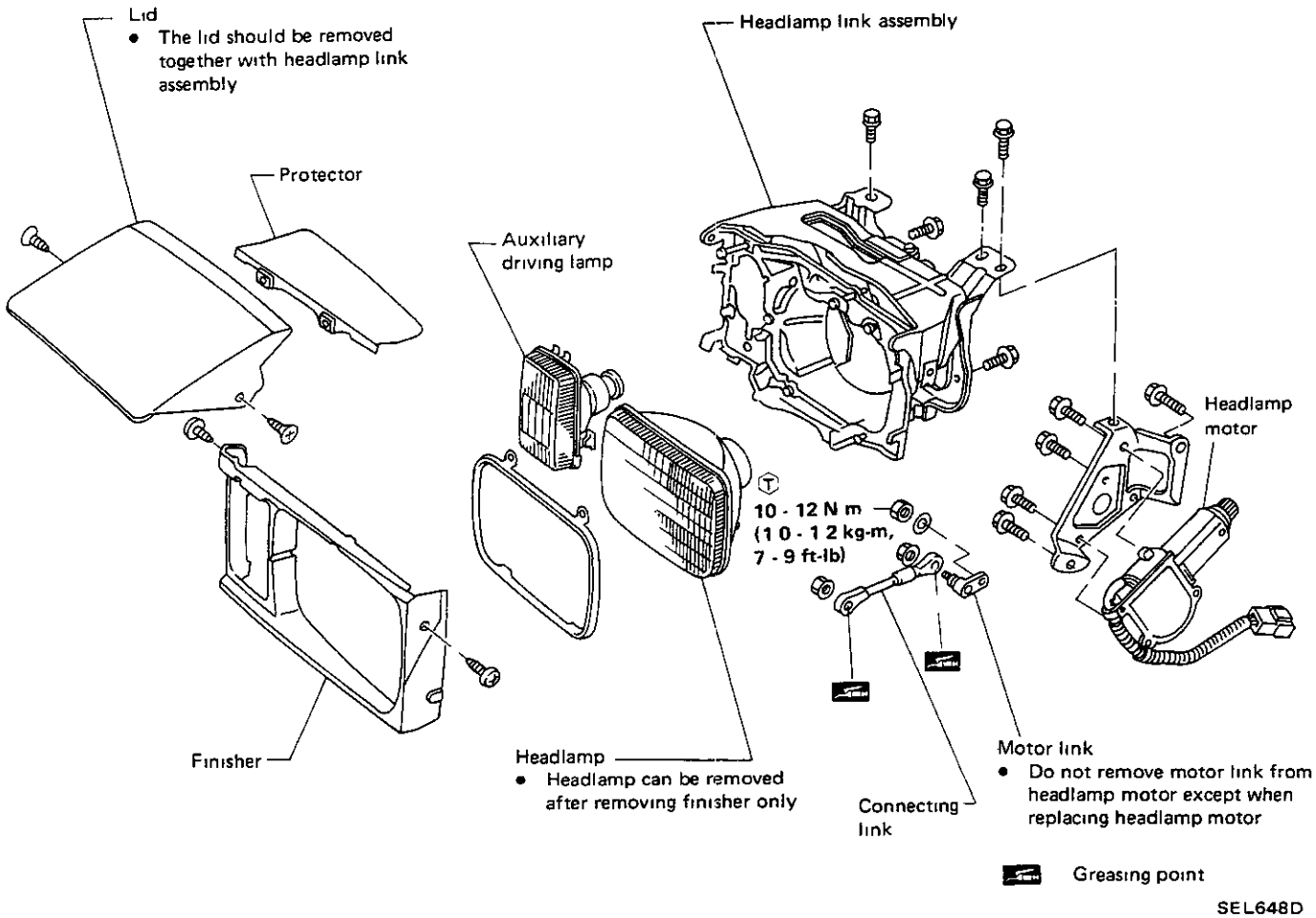
SEL647D

Trouble-shooting





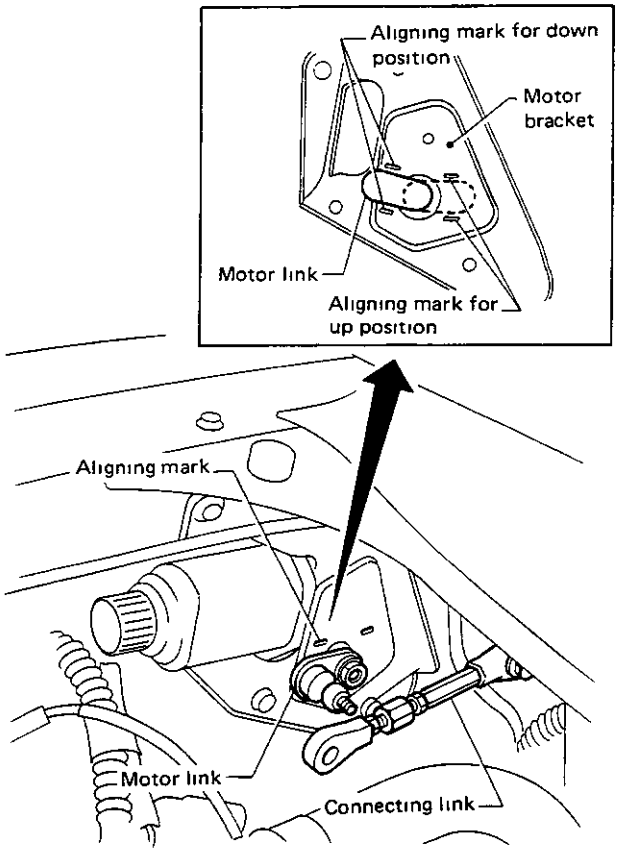
Removal


Lid
• The lid should be removed together with headlamp link assembly
Protector
Auxiliary driving lamp
Headlamp link assembly
Headlamp motor
10 - 12 N m
(1.0 - 1.2 kg-m, 7 - 9 ft-lb)
Finisher
Headlamp
• Headlamp can be removed after removing finisher only
Connecting link
Motor link
• Do not remove motor link from headlamp motor except when replacing headlamp motor
Greasing point
SEL648D

Installation

1 Set the headlamp motor to "DOWN" position
- Connect harness to headlamp motor and set retract switch to "DOWN" Headlamp motor can now be set to "DOWN" with retract switch

2 Install the headlamp link assembly and headlamp motor in the body
3 Install the connecting link
- When installing the link to the motor, make sure the motor link is installed as shown below

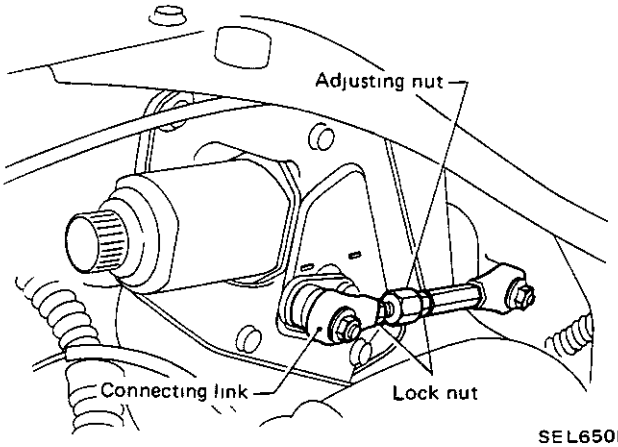


SEL649D

Adjustment

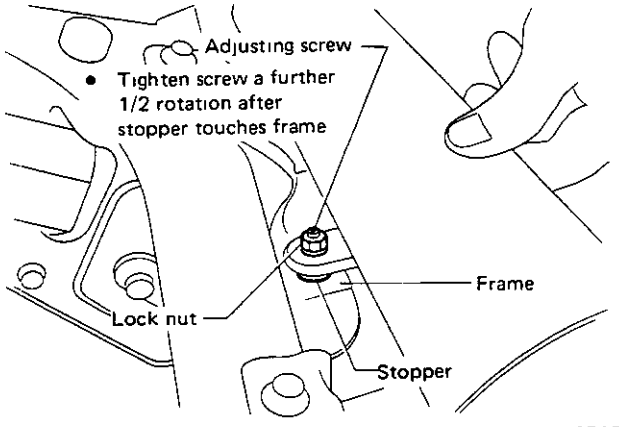
- After installing connecting link, always adjust it as follows

1) Set the headlamp to "DOWN" position
2) Adjust connecting link so that the lid is properly aligned with hood and fender



SEL650D

3) Set the headlamp to "UP" position
4) Adjust stopper screw



SEL651D

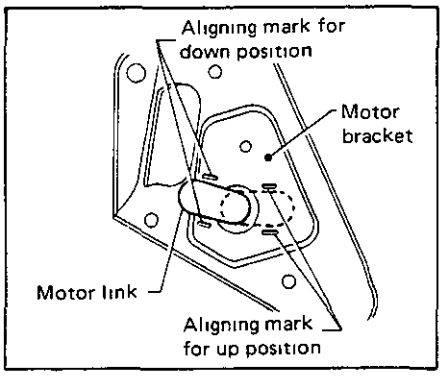
Headlamp Motor Check

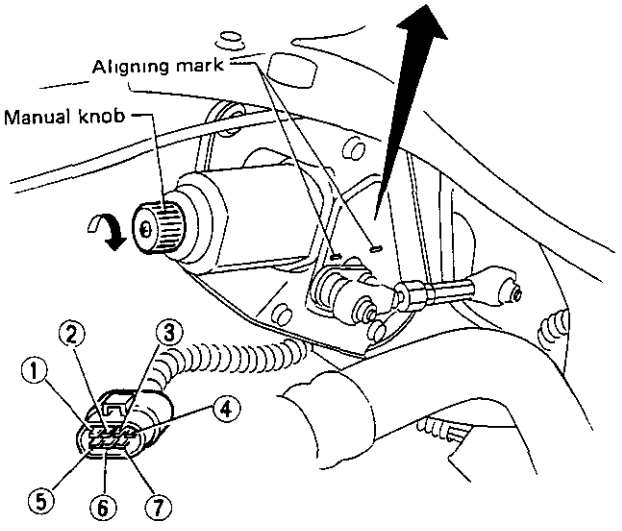
- Use an ohmmeter to check for continuity in headlamp motor circuit while rotating motor with manual knob

CAUTION·

Prior to performing continuity test, disconnect ground cable from battery.

Headlamp	Ohmmeter probe		Continuity
	(+)	(−)	
DOWN	⑤	①	Yes
	①	⑤	No
	⑦	①	Yes
	①	⑦	No
UP	⑤	②	Yes
	②	⑤	No
	⑦	②	Yes
	②	⑦	No





SEL652D

Aiming Adjustment

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

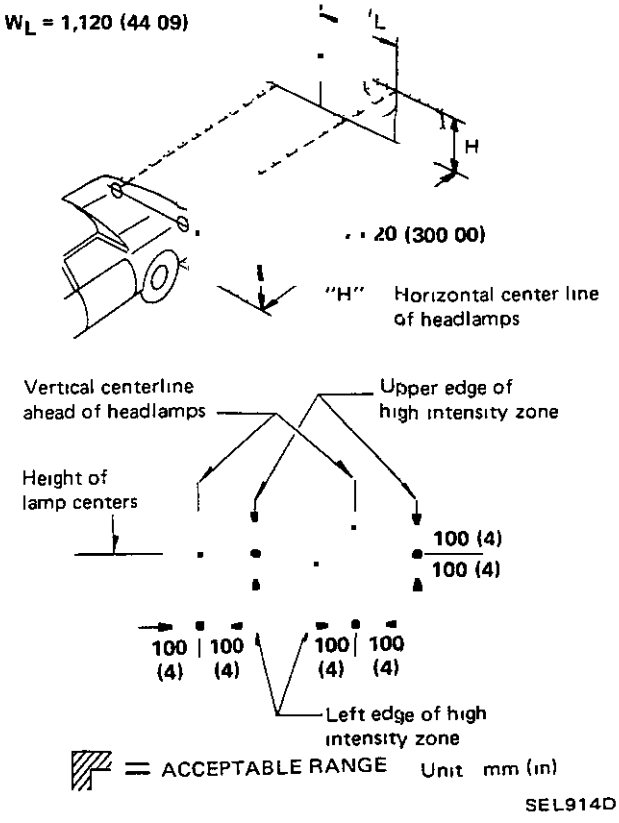
For details, refer to the regulations in your own country.

CAUTION:

a **Keep all tires inflated to correct pressures.**

b. **Place vehicle and tester on one and same flat surface.**

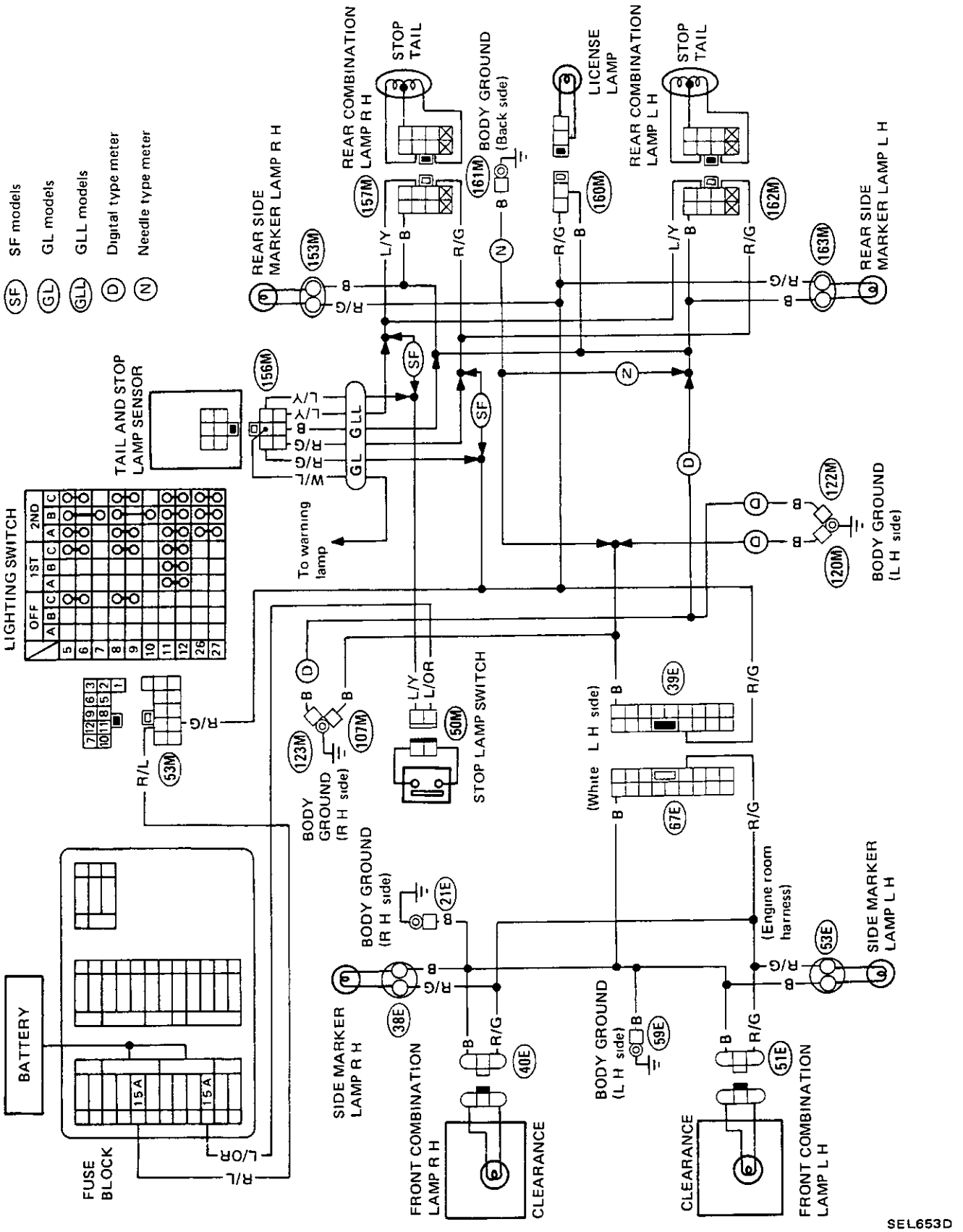
c **See that there is no load in vehicle (coolant, engine oil filled up to correct level and full fuel tank) other than the driver (or equivalent weight placed in driver's position).**



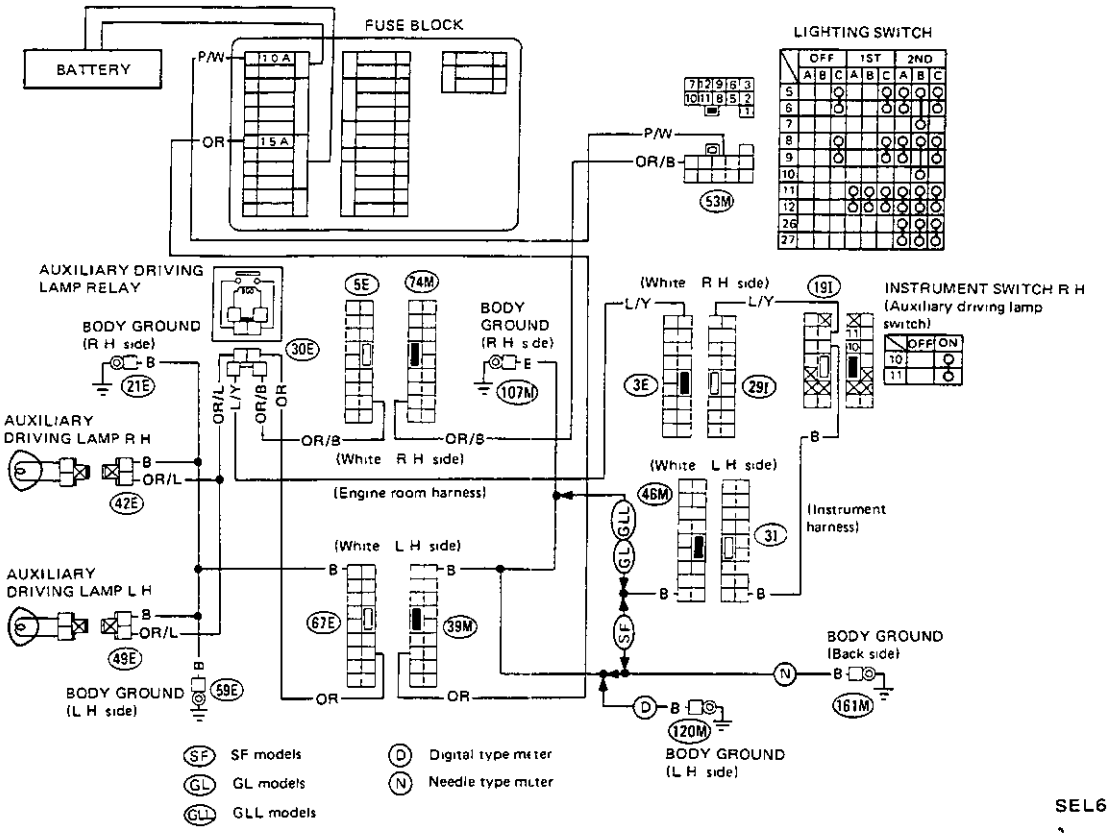
SEL914D

- **Adjust headlamps so that upper edge and left edge of high intensity zone are within the acceptable range as shown in the figure above**
- **Dotted lines in illustration show center of headlamp.**

Clearance, License, Tail and Stop Lamps/Wiring Diagram

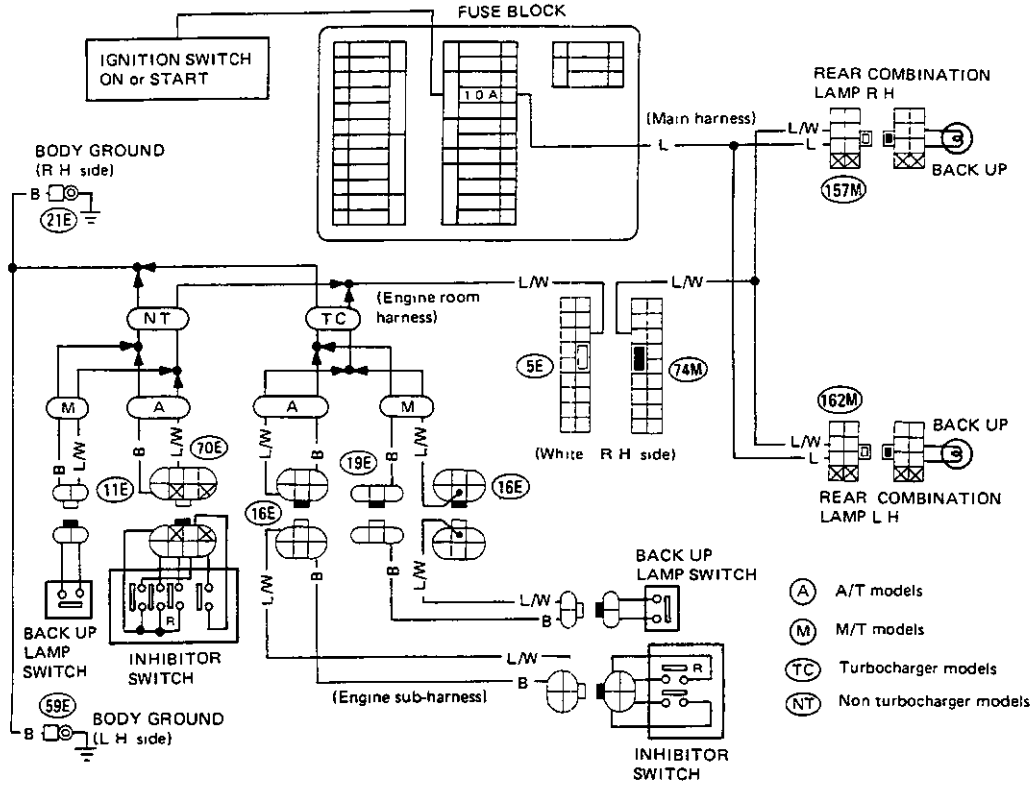


Auxiliary Driving Lamp/Wiring Diagram



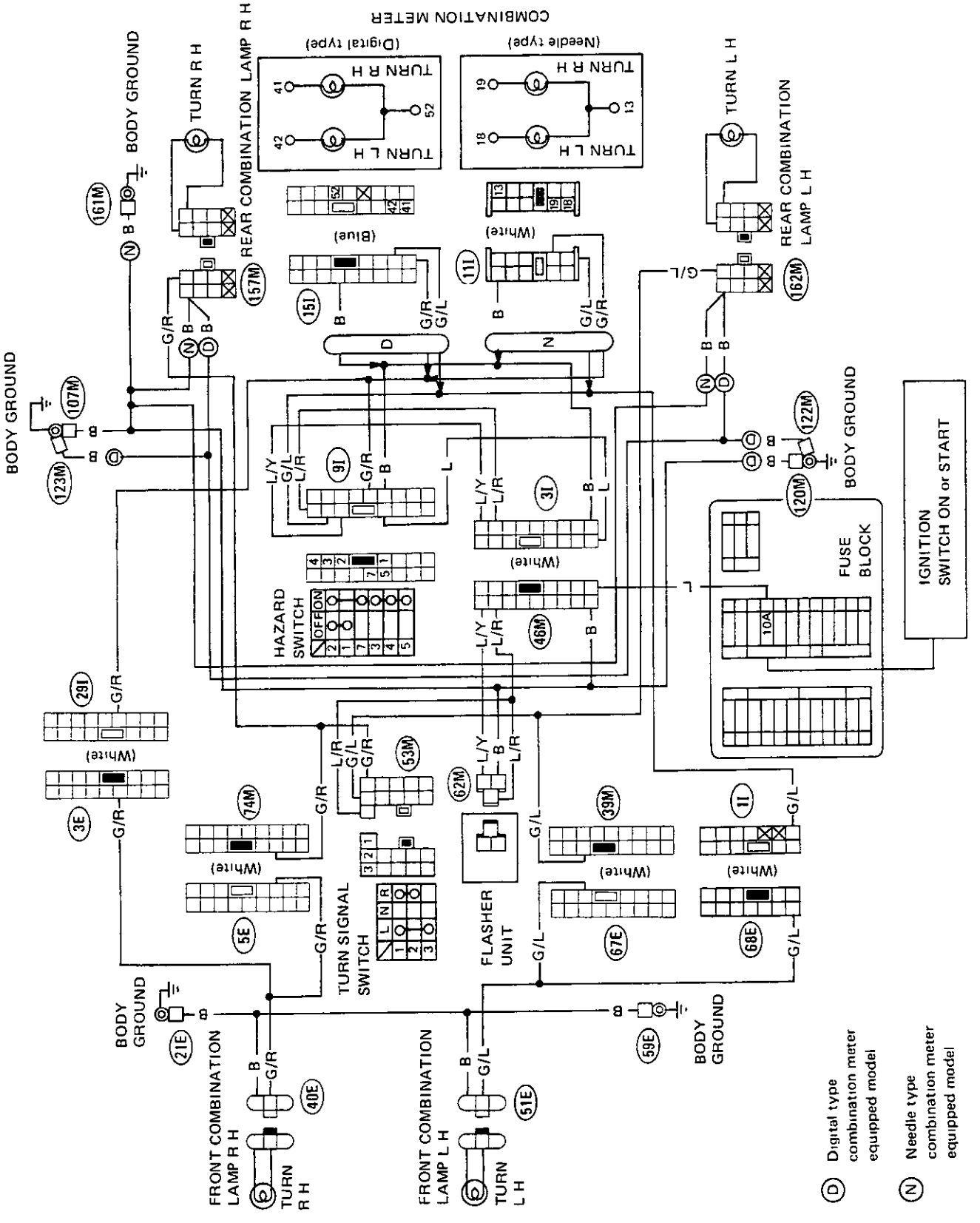
SEL654D

Back-up Lamp/Wiring Diagram



SEL655D

Turn Signal and Hazard Warning Lamps/Wiring Diagram

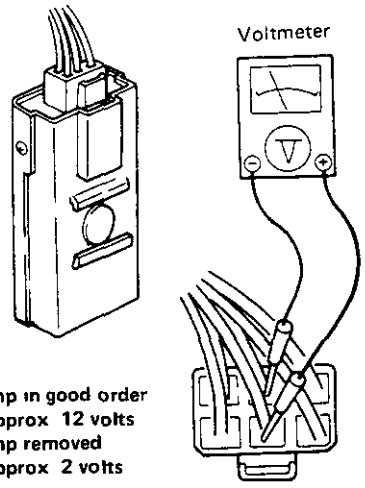


Stop and Tail Lamp Sensor Check

- Before checking, ensure that bulbs meet specifications

STOP LAMP

Stop lamp switch on

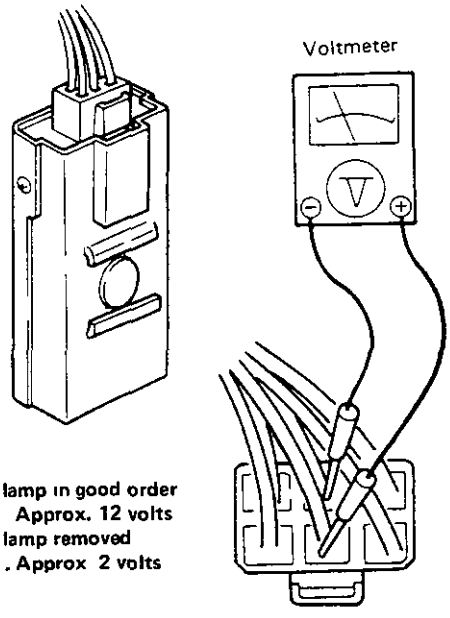


Stop lamp in good order
Approx 12 volts
Stop lamp removed
Approx 2 volts

SEL170B

TAIL LAMP

Lighting switch on



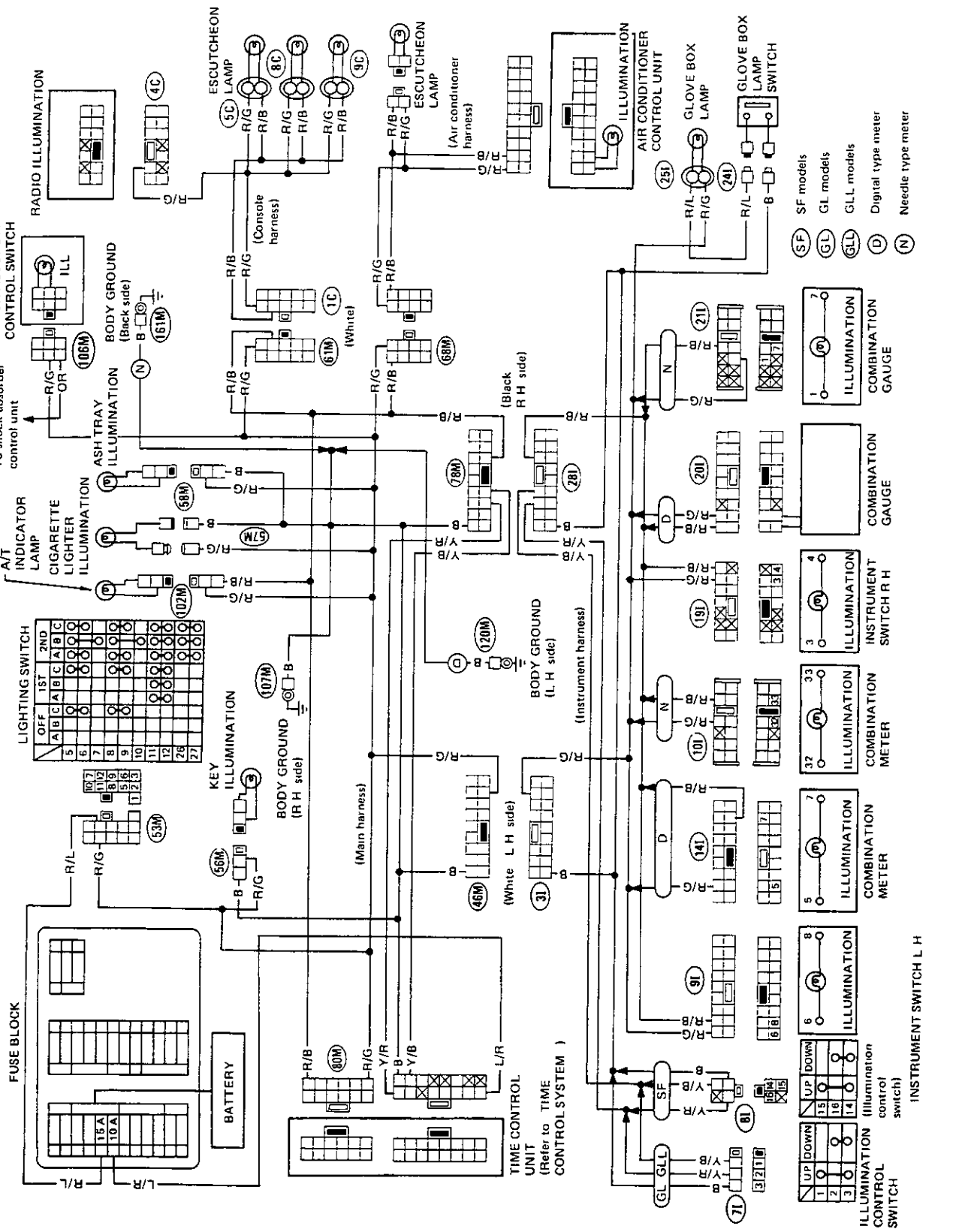
Tail lamp in good order
Approx. 12 volts
Tail lamp removed
Approx 2 volts

SEL171B

Bulb Specifications

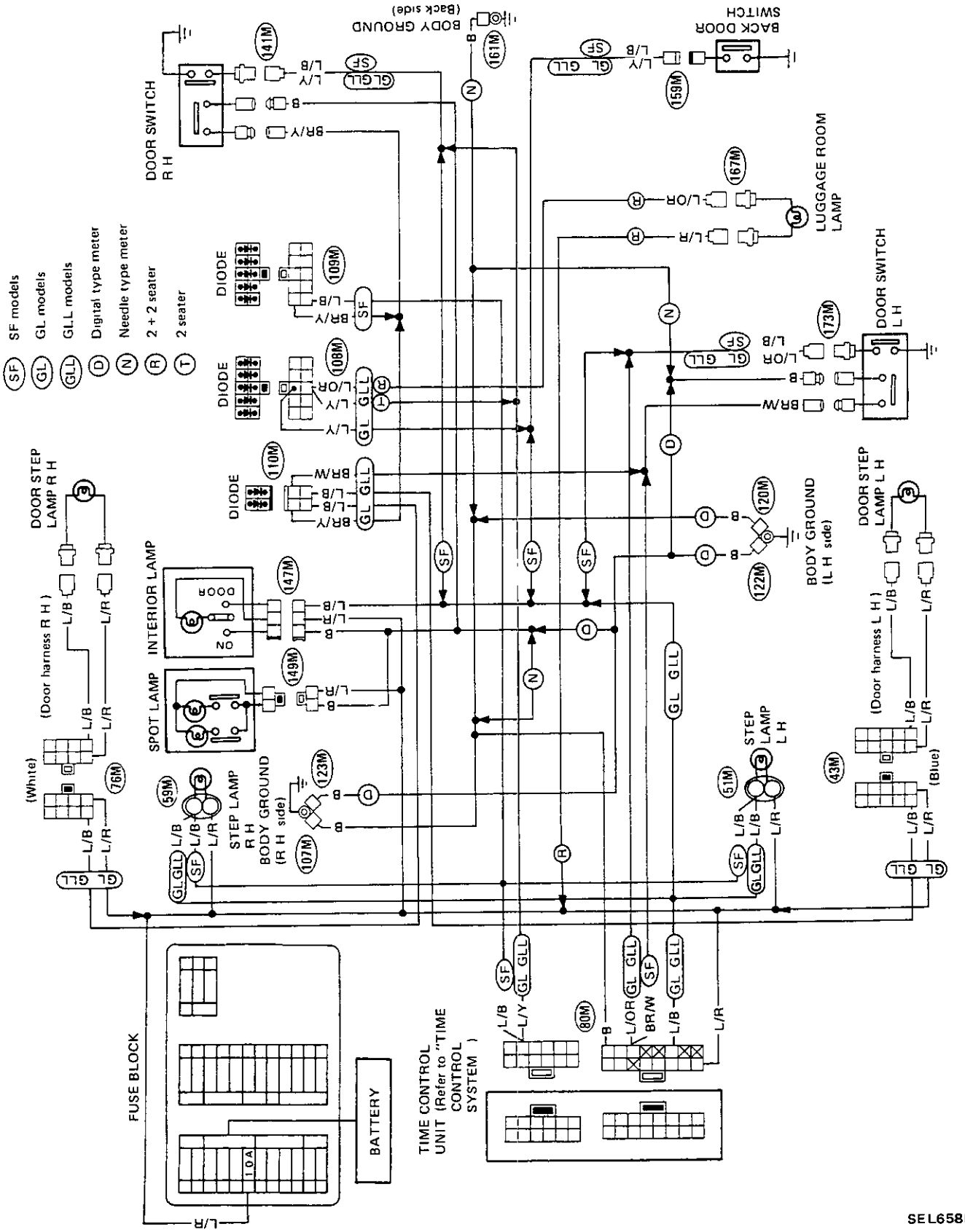
Item	Wattage (W)	SAE trade number
Headlamp	65, 35	H6054
Auxiliary driving lamp	55	–
Front combination lamp	27/8	1157
Front side marker lamp	3 4	158
Rear side marker lamp	3 4	158
Rear combination lamp		
Turn signal	27/8	1157
Stop/Tail	27/8	1157
Back-up	27	1073
License plate lamp	4 0	–
Interior lamp	10	–
Spot lamp	8	–
Rear (luggage) compartment lamp	3 4	–
Door step lamp	5	–
Leg room lamp	2	–

Illumination/Wiring Diagram



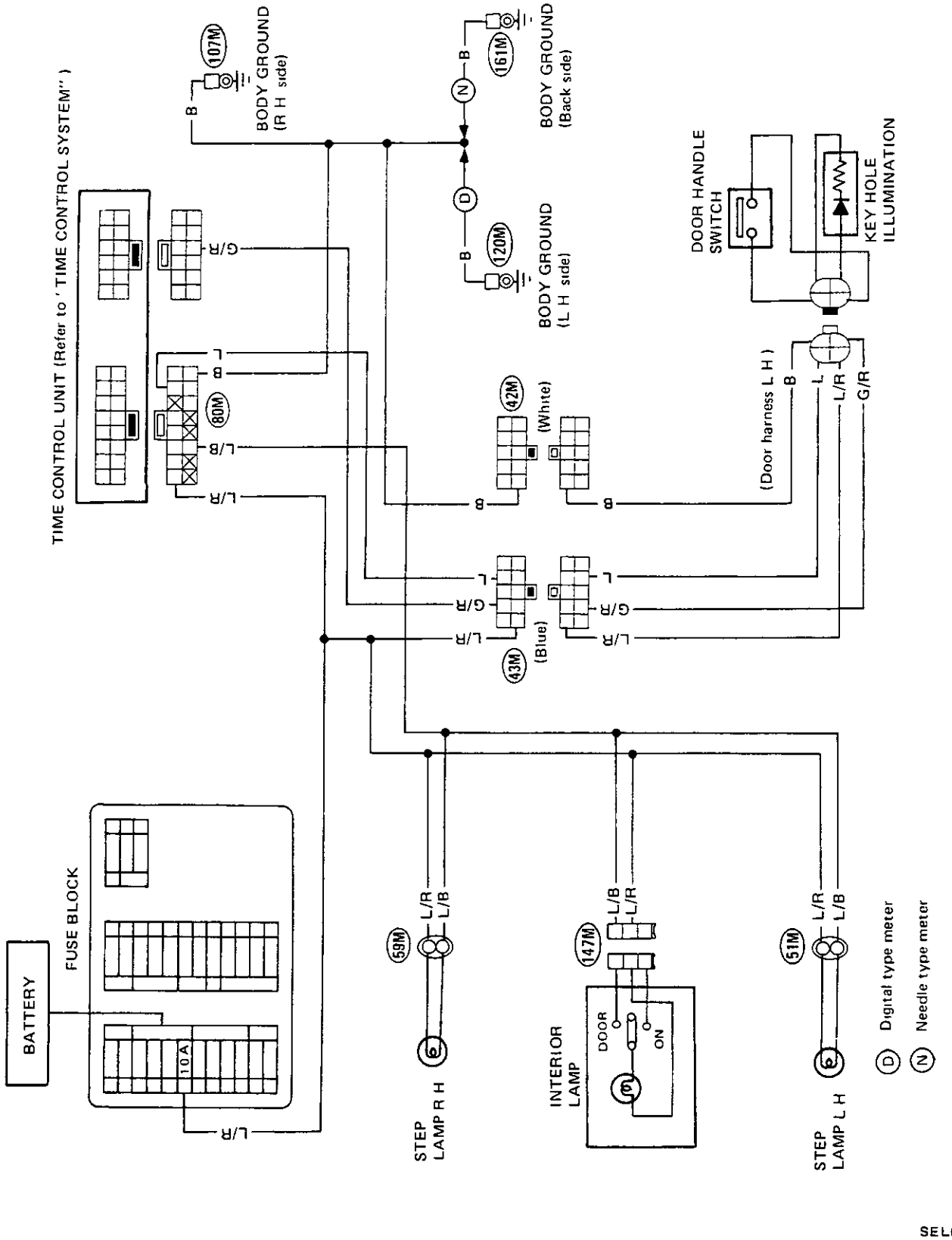
SEL657D

Interior, Luggage and Step Lamps/Wiring Diagram



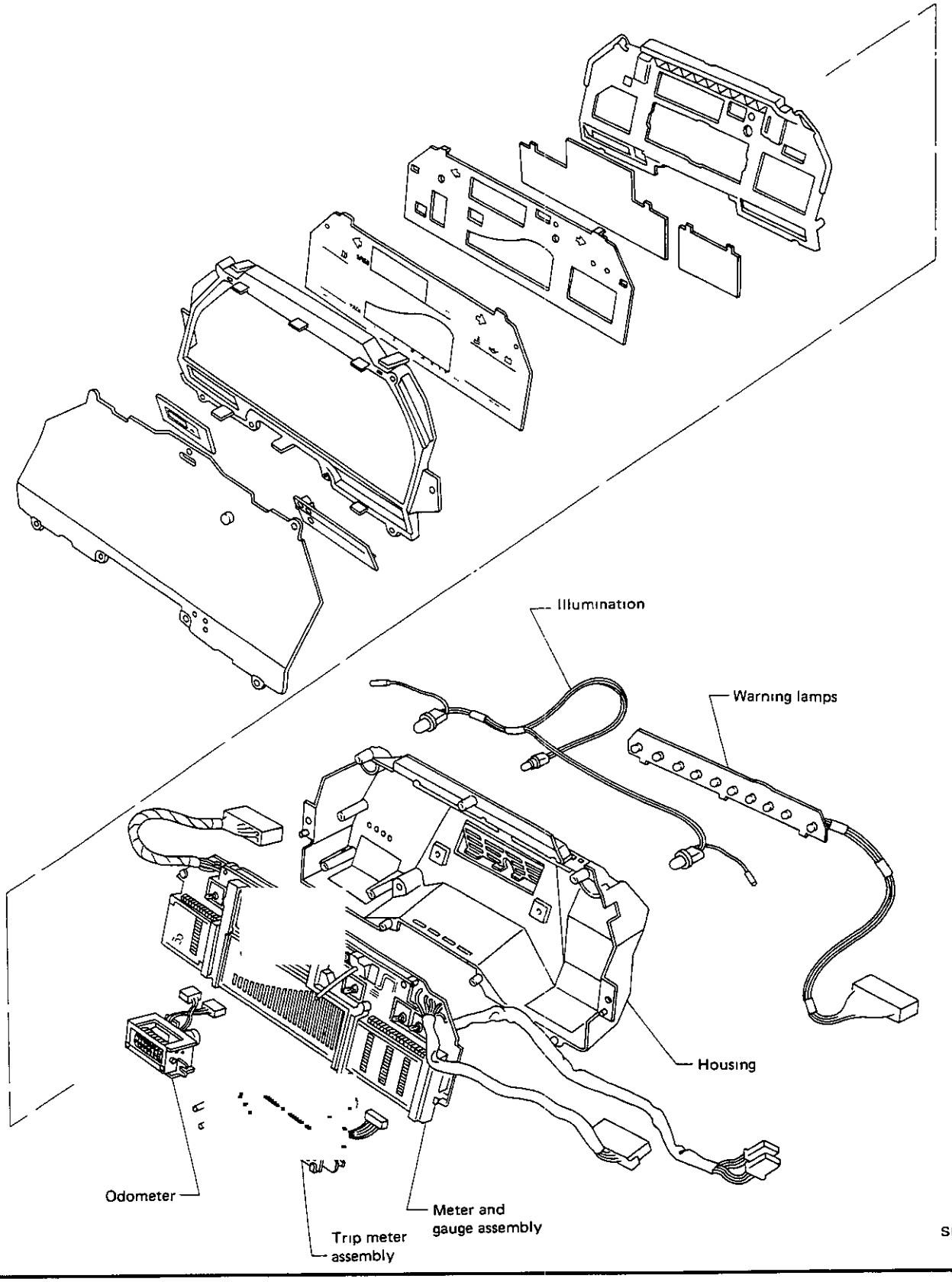
INTERIOR LAMP

Illuminated Entry System and Door Key Illumination/Wiring Diagram

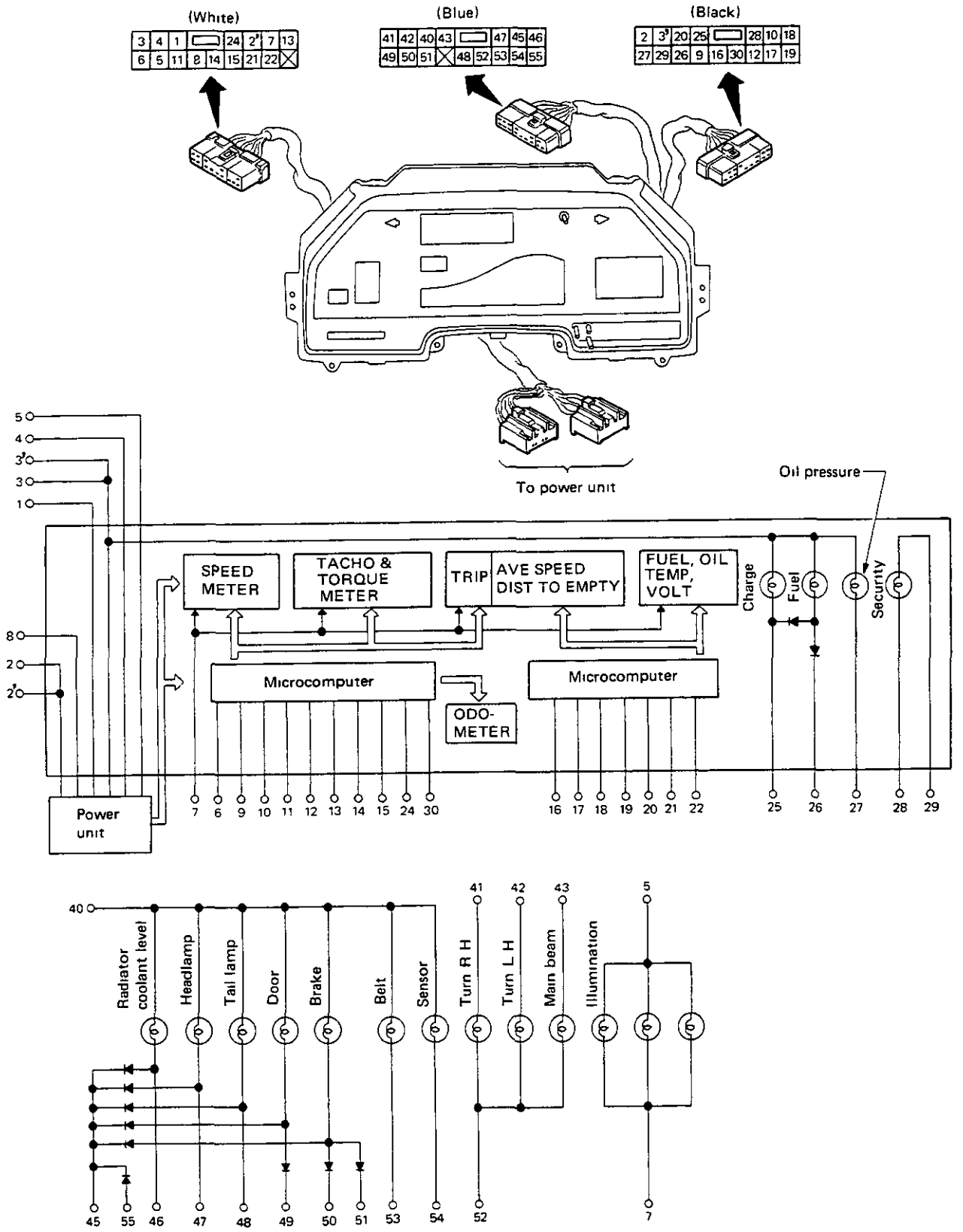


Combination Meter

CAUTION:
No electrical terminal should be touched with bare hands.

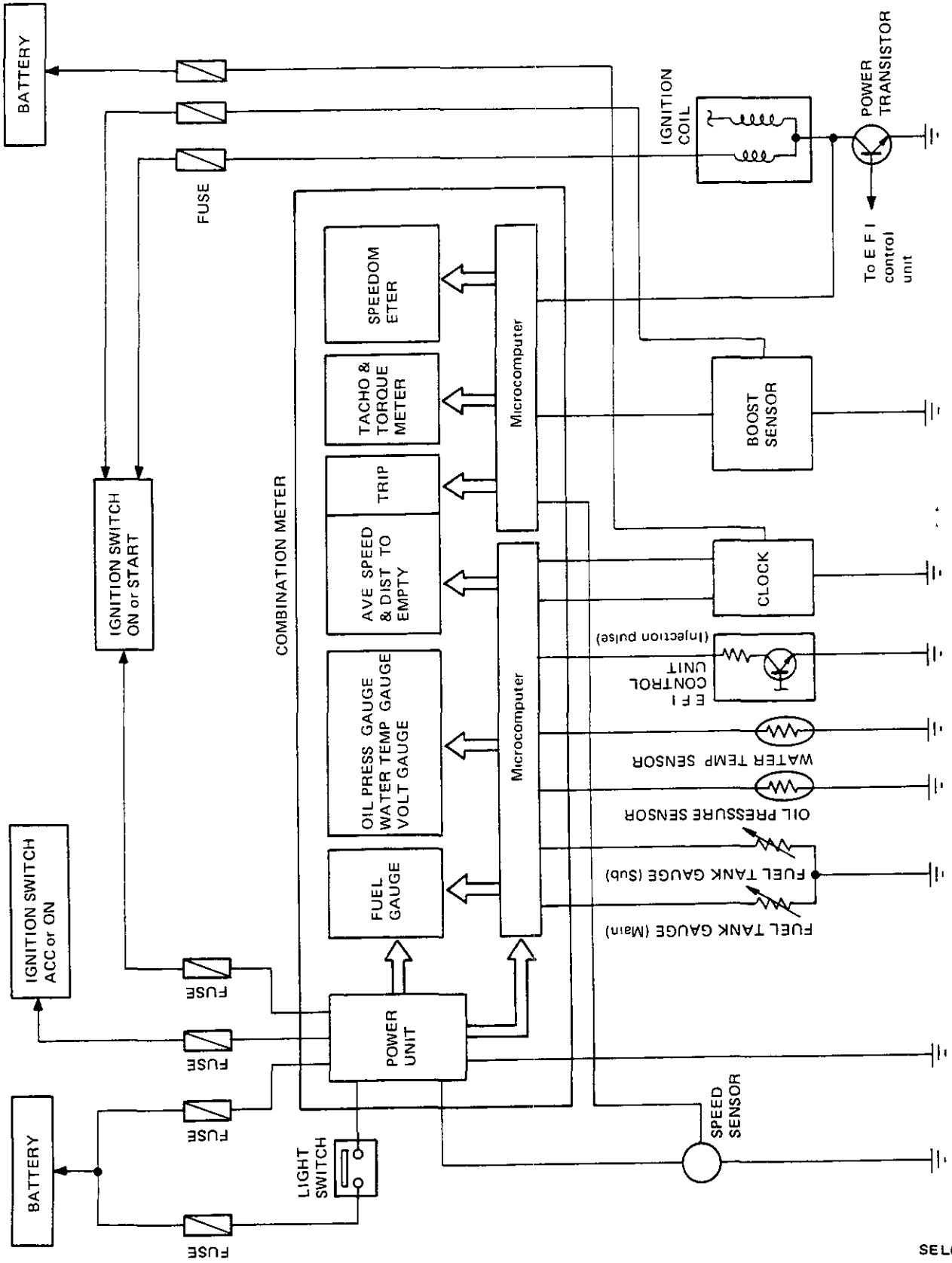


Combination Meter (Cont'd)

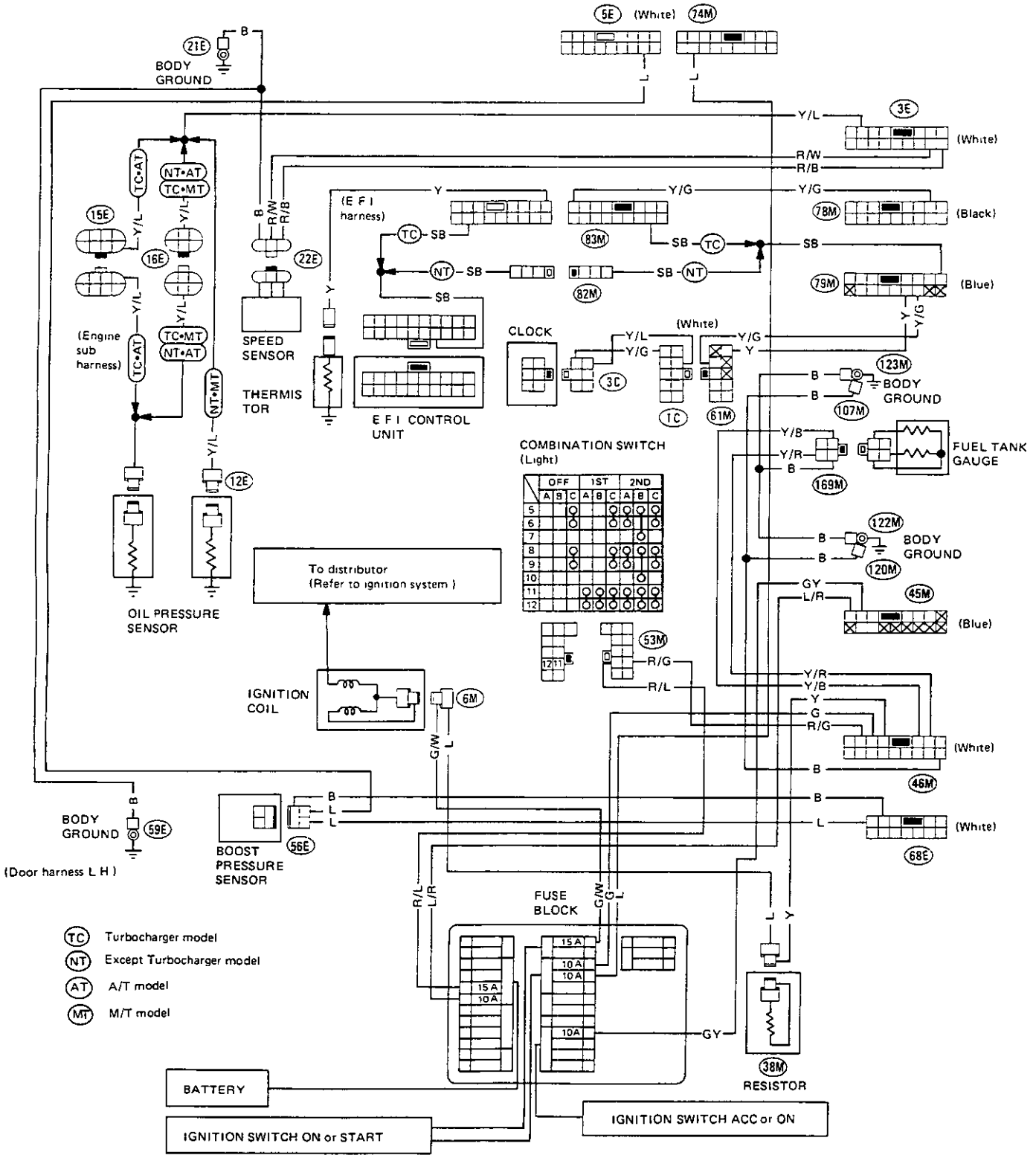


SEL661D

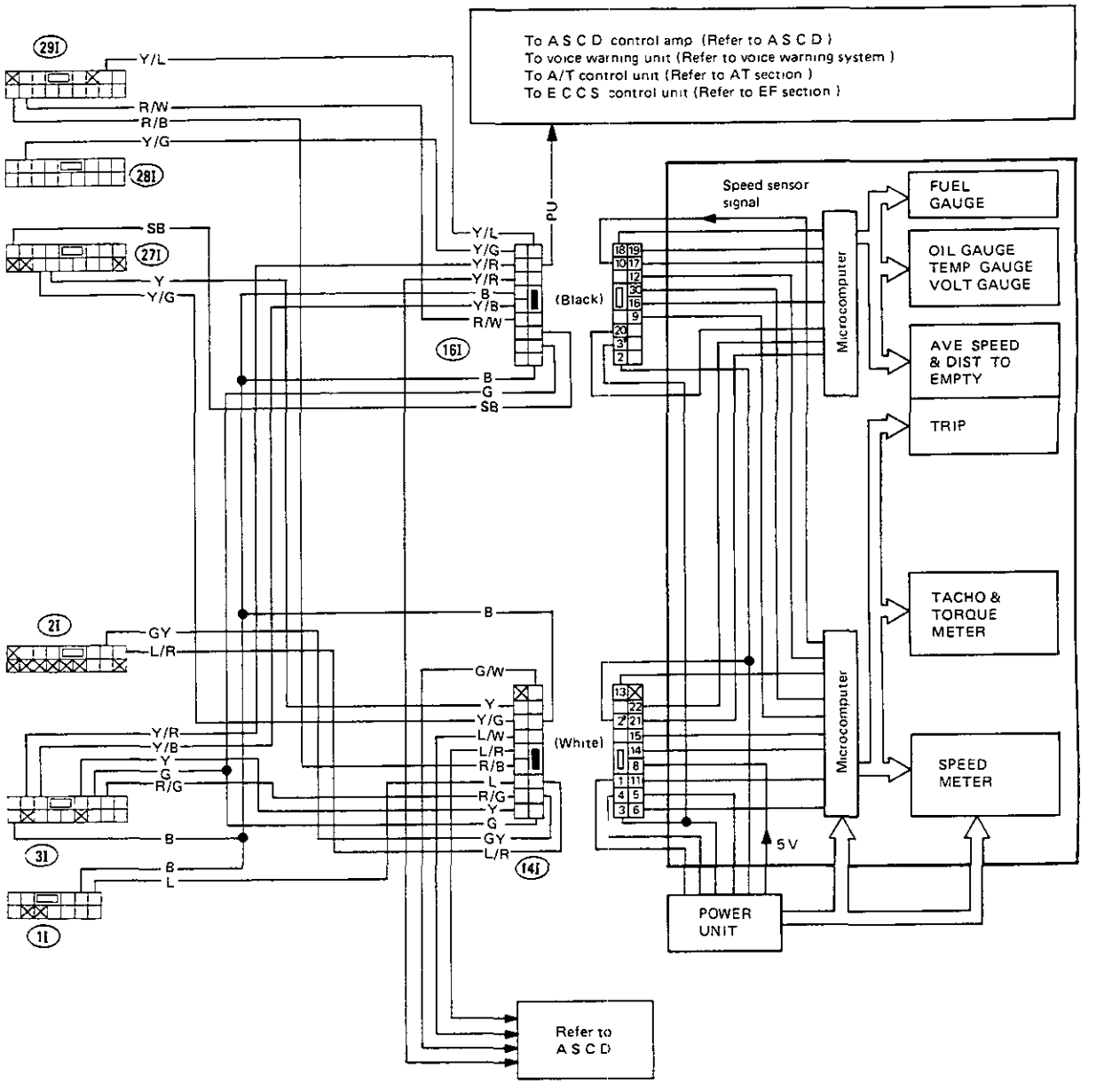
Schematic


BATTERY
FUSE
IGNITION COIL
POWER TRANSISTOR
To E F I control unit
COMBINATION METER
SPEEDOM ETER
TACHO & TORQUE METER
TRIP
AVE SPEED & DIST TO EMPTY
OIL PRESS GAUGE WATER TEMP GAUGE VOLT GAUGE
FUEL GAUGE
Microcomputer
Microcomputer
BOOST SENSOR
CLOCK
E F I CONTROL UNIT
(Injection pulse)
WATER TEMP SENSOR
OIL PRESSURE SENSOR
FUEL TANK GAUGE (Sub)
FUEL TANK GAUGE (Main)
IGNITION SWITCH ON or START
IGNITION SWITCH ACC or ON
POWER UNIT
SPEED SENSOR
LIGHT SWITCH
SEL662D

Wiring Diagram

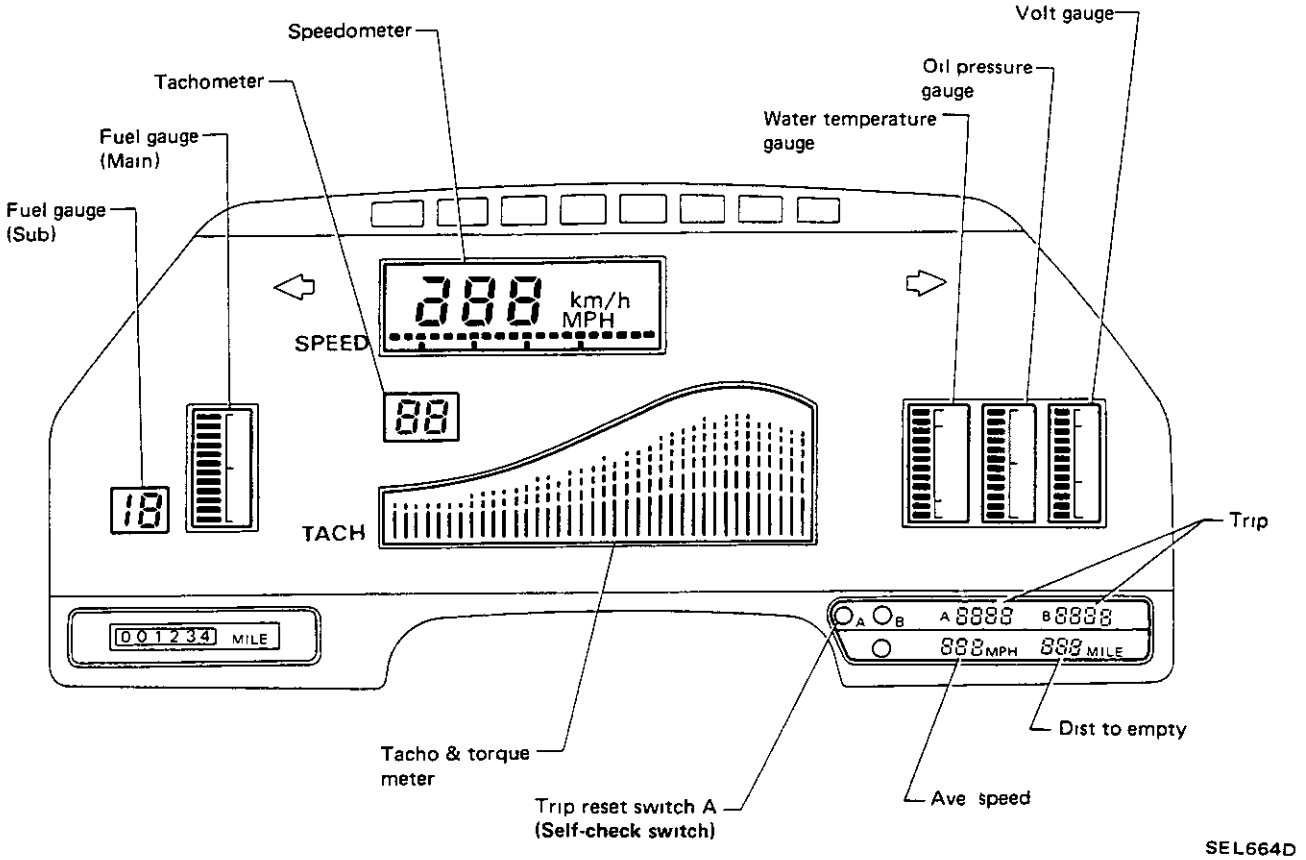


Wiring Diagram (Cont'd)



SEL663D

Display Check



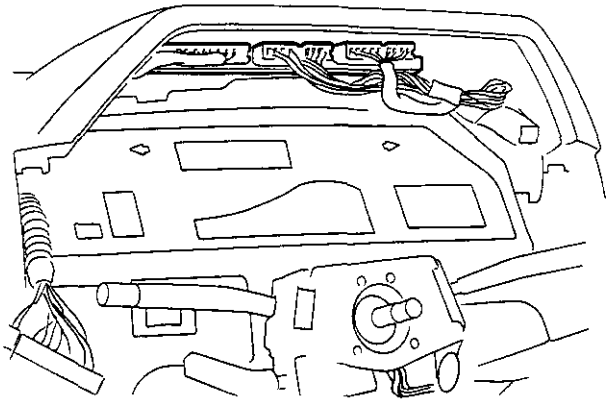
Display Check (Cont'd)

- Digital combination meter is provided with a self-check function to determine whether or not meter itself is malfunctioning.

Test procedure

(1) While pushing trip reset switch A, switch ignition switch from "OFF" to "ON" Trip reset switch A should remain pushed in until self-check operation start
(2) Meter starts to automatically perform self-check. Segments for meters and gauges should illuminate one after another.
(3) If any particular segment remains off, combination meter itself is faulty.

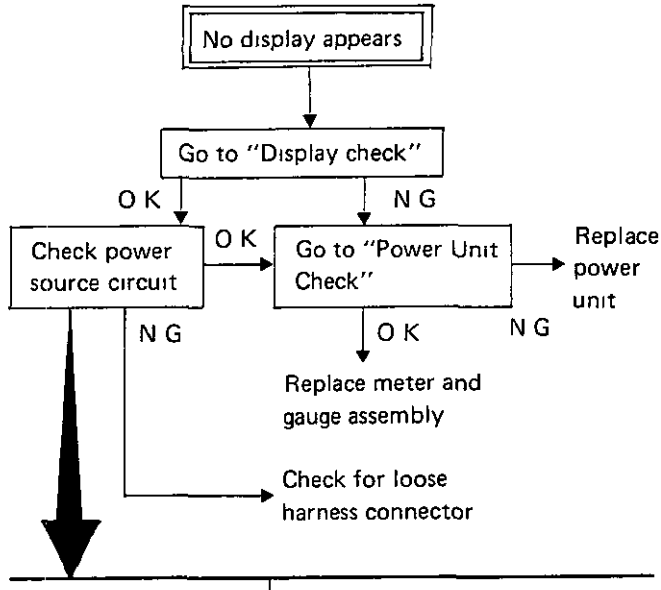
Preparation for Trouble-shooting



SEL665D

- Remove nut which holds instrument switch
- Remove instrument switch
- Remove cluster lid A

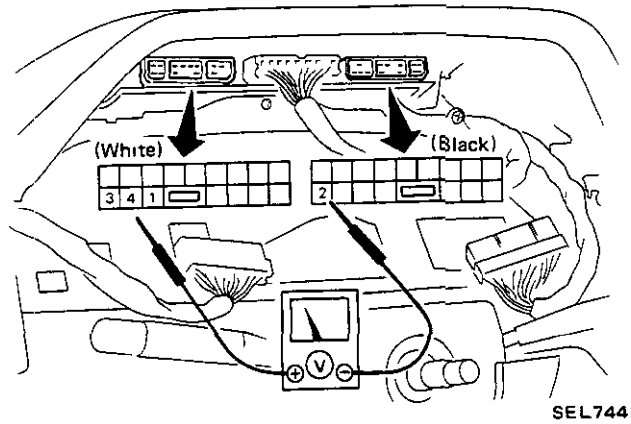
Trouble-shooting



Voltmeter terminals		Ignition switch position		
(+)	(−)	OFF	ACC	ON
①	②	Approx 12V	12V	12V
③	②	0V	0V	Approx 12V
④	②	0V	Approx 12V	Approx 12V

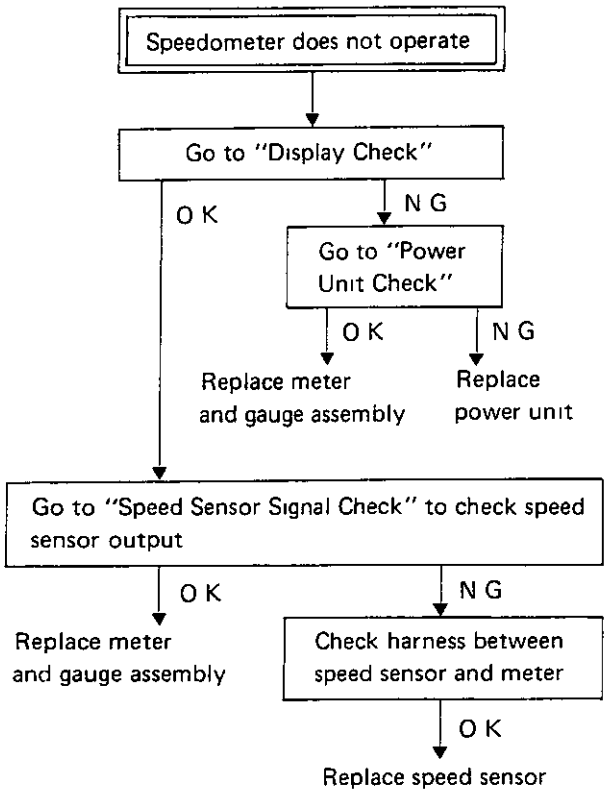
Ohmmeter terminals		Ignition switch OFF
(+)	(−)	
②	Body ground	*Continuity exists*

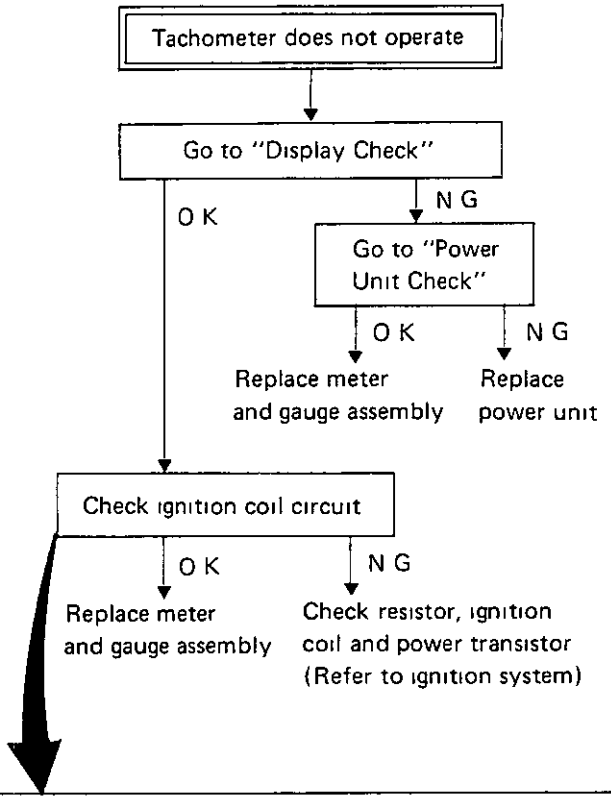
- Disconnect meter harness connector as shown below



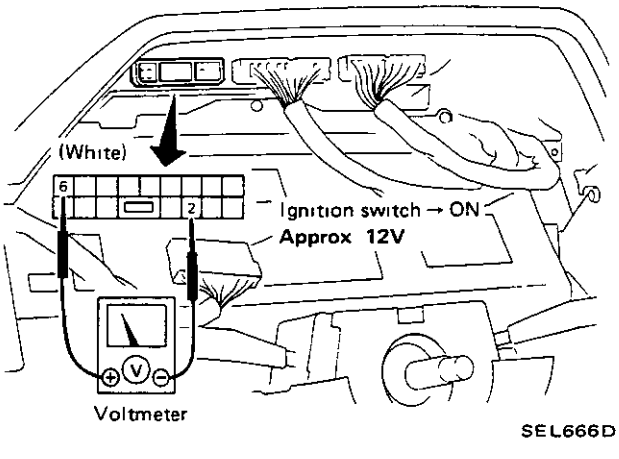
SEL744D

Trouble-shooting (Cont'd)

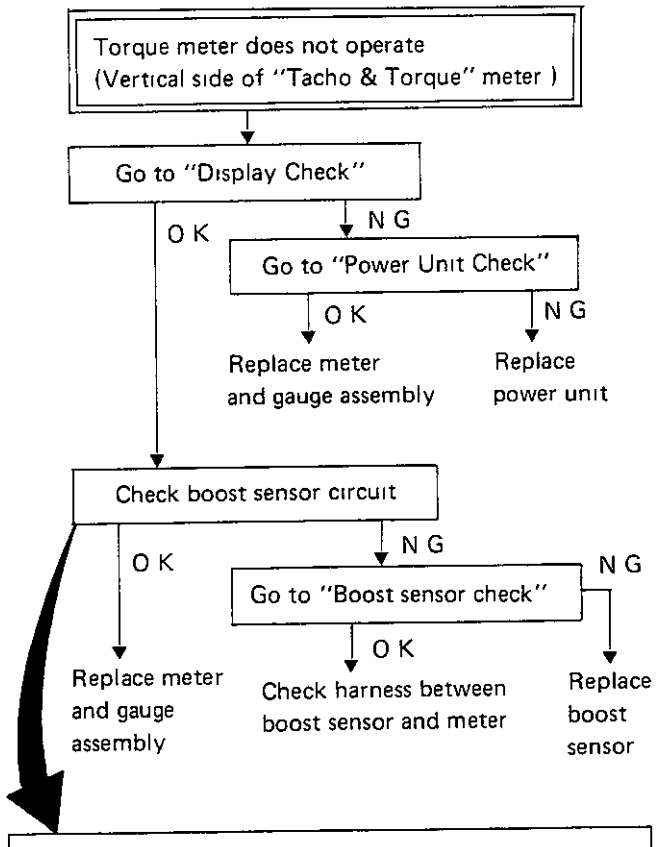




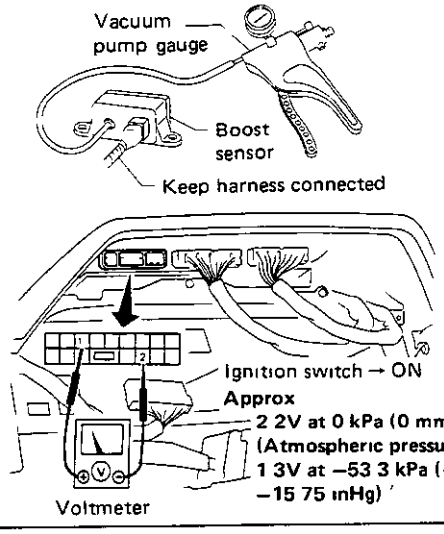
1 Disconnect meter harness connector (white)
2 Turn ignition switch to "ON".
3 Check terminal voltage between ⑥ and ②

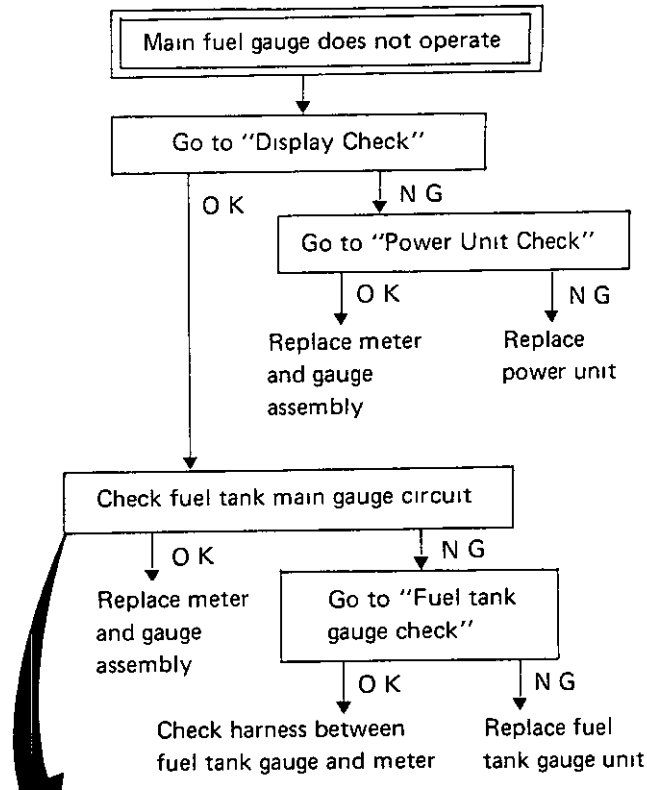


Trouble-shooting (Cont'd)

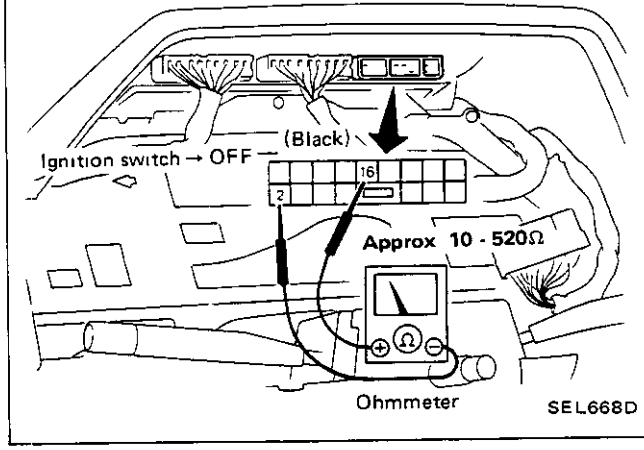


1 Disconnect meter harness connector (white)
2 Connect vacuum pump gauge to boost sensor vacuum hose
3 Turn the ignition switch to "ON"
4 Apply vacuum pressure to boost sensor by vacuum pump gauge and measure voltage across ⑪ and ②

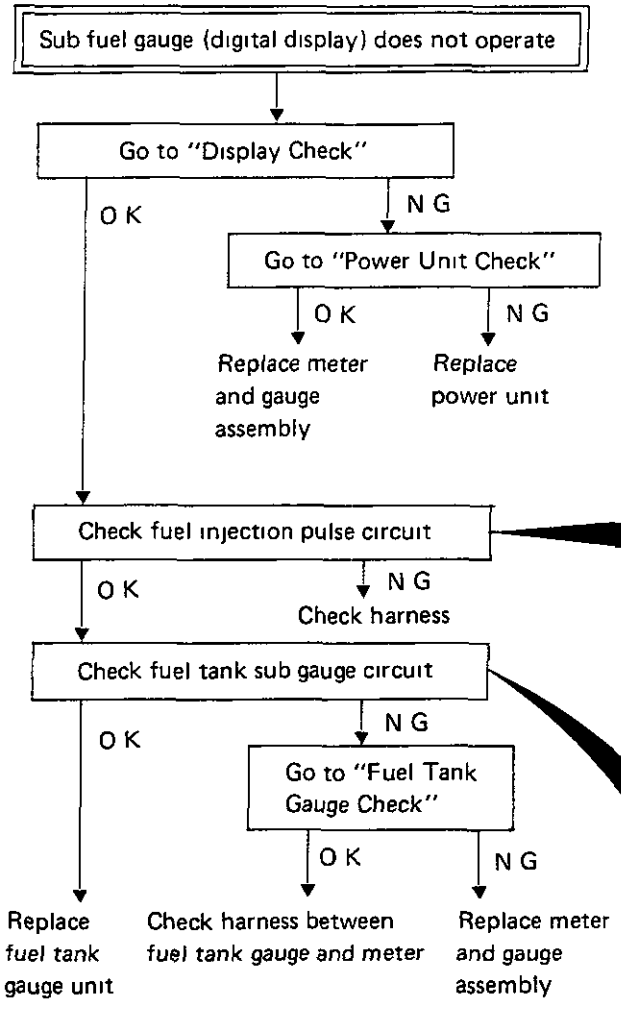




1 Disconnect meter harness connector (black)
2 Turn ignition switch to "OFF"
3 Measure resistance between ⑯ and ②

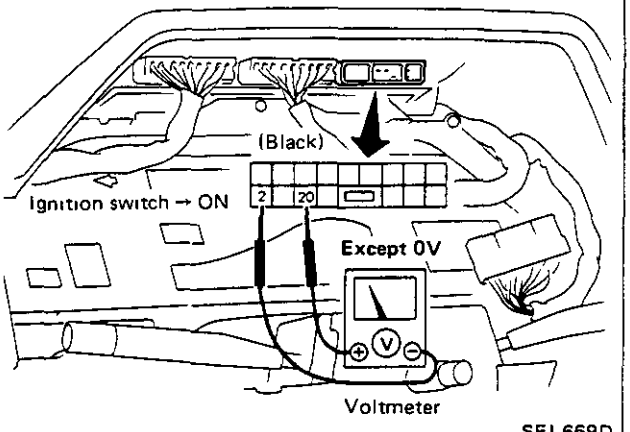


Trouble-shooting (Cont'd)



FUEL INJECTION PULSE CIRCUIT CHECK

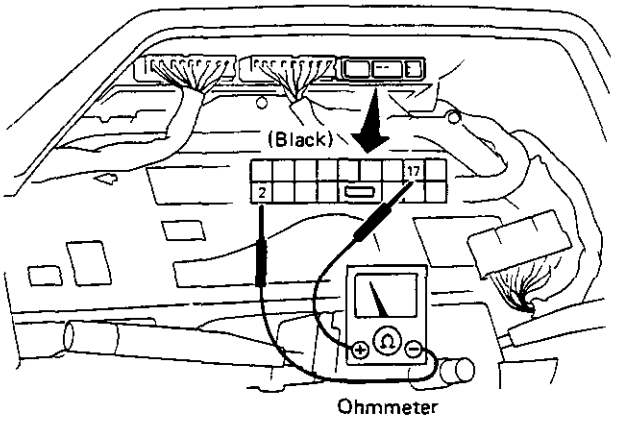
1 Disconnect meter harness connector (black)
2. Turn ignition switch to "ON"
3 Check for voltage across ⑳ and ②.



SEL669D

FUEL TANK SUB GAUGE CIRCUIT CHECK

1 Turn ignition switch to "OFF"
2. Measure resistance between ⑰ and ②.



Ignition switch → OFF

Fuel residue	Resistance
Less than 4ℓ	∞
5 - 20ℓ	Approx 4 - 930Ω
More than 20ℓ	Less than 4Ω

SEL670D

Trouble-shooting (Cont'd)

Water temp, oil pressure and volt gauges do not operate at the same time

→ Go to "Display Check"

- OK → Replace meter and gauge assembly
- NG → Go to "Power Unit Check"
  - OK → Replace meter and gauge assembly
  - NG → Replace power unit

Only volt gauge does not operate

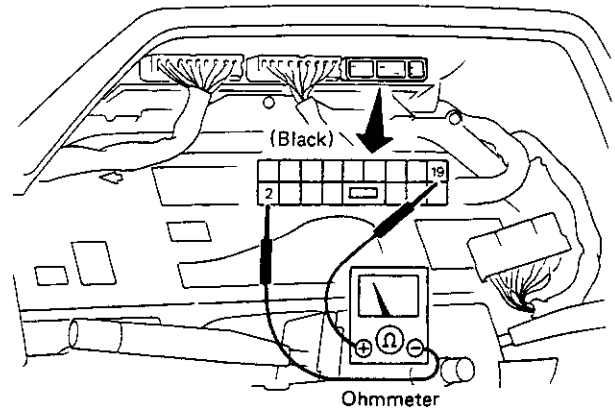
→ Replace meter and gauge assembly

Only water temp gauge does not operate

→ Go to "Display Check"

- OK → Check water temp sensor (thermistor) circuit
  - OK → Replace meter and gauge assembly
  - NG → Go to "Thermistor Check"
    - OK → Check harness between thermistor and meter
    - NG → Replace thermistor
- NG → Replace meter and gauge assembly

1 Disconnect meter harness connector (black)
2 Turn ignition switch to "OFF"
3 Measure resistance between ⑲ and ②



Ignition switch → OFF

Engine coolant temperature	Resistance
60°C or less	70Ω or more
60°C or more	Approx 10 - 70Ω

SEL671D

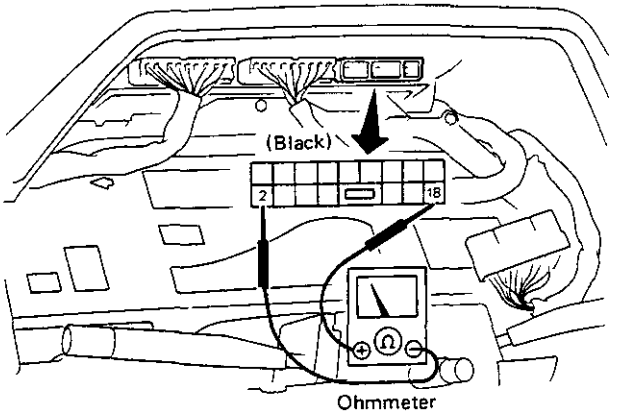
Trouble-shooting (Cont'd)

Only oil pressure gauge does not operate

→ Go to "Display Check"

- O K → Check oil pressure sensor circuit
  - O K → Replace meter and gauge assembly
  - N G → Go to "Oil Pressure Sensor Check"
    - O K → Check harness between oil pressure sensor and meter
    - N G → Replace oil pressure sensor
- N G → Replace meter and gauge assembly

1 Disconnect meter harness connector (black)
2 Measure resistance between ⑱ and ② when engine stopping and running



Ohmmeter

Engine	Resistance
Stop	Approx 75Ω or more
Idling	Approx 60Ω or less

SEL672D

"Trip", "Ave speed" and "Dist to empty" meters do not operate at the same time

→ Go to "Display Check"

- O K → Replace trip meter assembly
- N G → Go to "Power Unit Check"
  - O K → Replace trip meter assembly
  - N G → Replace power unit

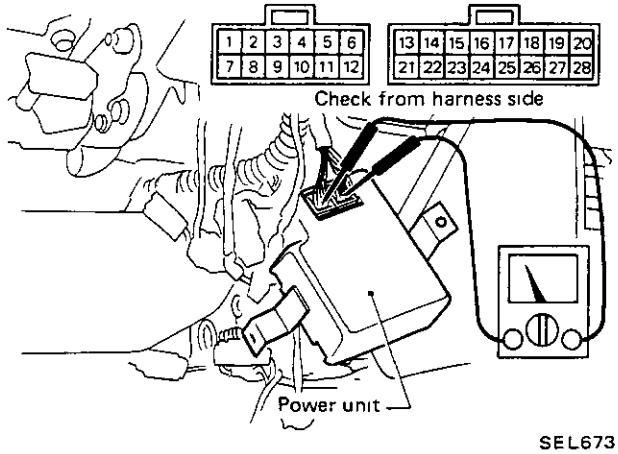
Only "Ave speed" meter does not operate

→ Go to "Display Check"

- O K → Check clock for proper operation
  - O K → Check harness between clock and meter
    - O K → Replace trip meter assembly
  - N G → Replace clock
- N G → Replace trip meter assembly

Power Unit Check

- Remove power unit with harness connected
- Perform voltage and continuity tests Refer to chart below



SEL673D

- Turn ignition switch to "ON"

Voltmeter terminal (+)	Voltmeter terminal (−)	Voltage [V]	Remarks
①	⑦	Approx 12	Check when no display appears
②	⑦	Approx 5	Check when no display appears
④	⑦	Approx 16	Check when no display appears
⑧	⑦	Approx 5	Check when no display appears
⑦	③	Approx 22	Check when no display appears
⑦	⑨	Approx 28 5	Check when no display appears
⑦	⑪	More than 6	For speedometer
⑦	㉑	More than 6	For tachometer
⑦	㉓	More than 6	For Temp, Oil, Volt gauge
⑦	㉕	More than 6	For Fuel gauge
⑦	㉗	More than 6	For "Trip", "Ave speed" & "Dist to empty" meter

- Turn ignition switch to "OFF"

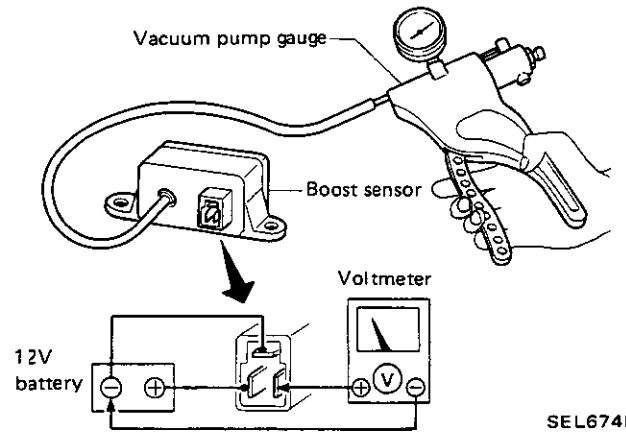
Ohmmeter (+)	Ohmmeter (−)	Continuity	Remarks
⑦	Body ground	Yes	Check when no display appears

If specified voltage or continuity is not produced, replace power unit.

Boost Sensor Check

1 Connect vacuum pump gauge to boost sensor vacuum hose
2 Disconnect harness connector from boost sensor and connect battery and voltmeter as shown
3 Apply vacuum pressure to boost sensor by vacuum pump gauge and measure voltages

Approx. 2.2V at 0 kPa (0 mmHg, 0 inHg) (Atmospheric pressure)
Approx. 1 3V at −53.3 kPa (−400 mmHg, −15 75 inHg)



SEL674D

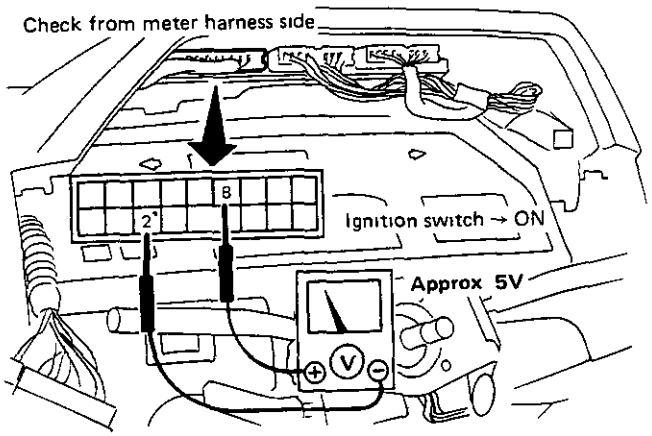
Speed Sensor Signal Check

SPEED SENSOR OUTPUT CHECK

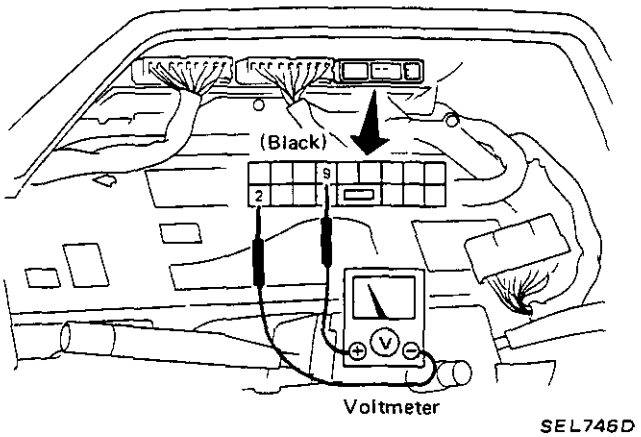
When speedometer is functioning properly, this test is not necessary. Go to "Meter Output check"

1 Remove cluster lid A
2 Connect a voltmeter between ⑧ and ② on combination meter side. Combination meter harness connector should remain connected to instrument harness
3 Switch ignition switch from "OFF" to "ON" Voltmeter should indicate approximately 5 volts when switch is "ON"

If voltmeter indicates no voltage, go to "Power Unit Check".

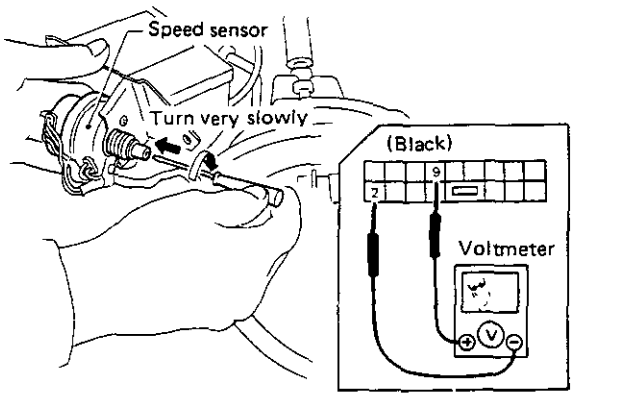


4 Turn ignition switch to "OFF"
5 Disconnect speedometer cable from speed sensor and remove speed sensor with harness connected.
6. Disconnect combination meter harness from instrument harness as shown below, and connect a voltmeter across ⑨ and ②



7 Turn ignition switch "OFF" → "ON"
8 Slowly turn speed sensor rotor shaft with a suitable screwdriver to make sure voltmeter pointer deflects

Do not turn rotor shaft quickly as voltmeter deflects 24 times per revolution of rotor shaft



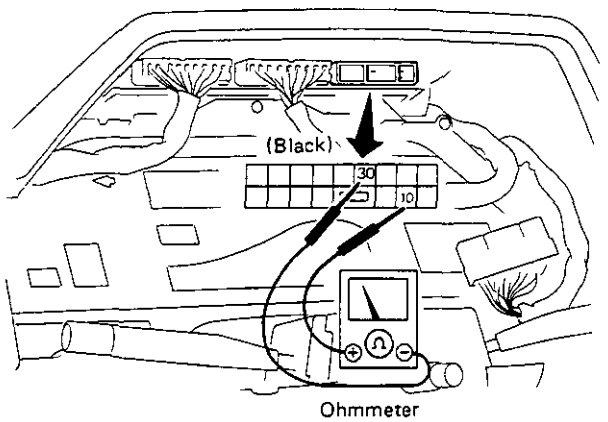
If voltmeter pointer does not deflect, replace speed sensor.

Speed Sensor Signal Check (Cont'd)

METER OUTPUT CHECK

- **Combination meter emits speed sensor signal to control E C.C.S. control unit, A.S.C D. control unit, voice warning unit and A/T control unit.**

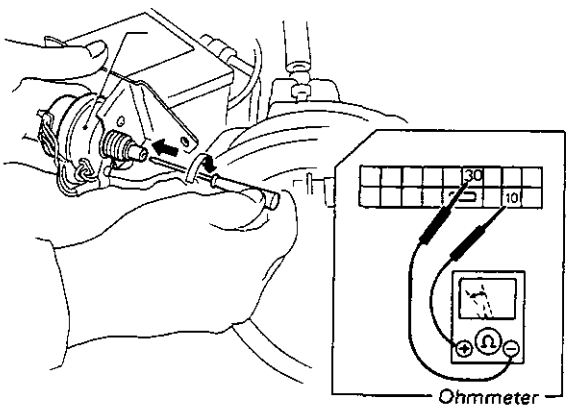
1 Disconnect speedometer cable from speed sensor and remove speed sensor with harness connected
2 Remove cluster lid A.
3 Disconnect combination meter harness from instrument harness as shown, and connect an ohmmeter between ⑩ and ㉚



SEL748D

4 Turn ignition switch "OFF" → "ON".
5 Slowly turn speed sensor rotor shaft with a suitable screwdriver to make sure ohmmeter pointer deflects.

Ohmmeter pointer deflects twice for each rotation of rotor shaft



SEL749D

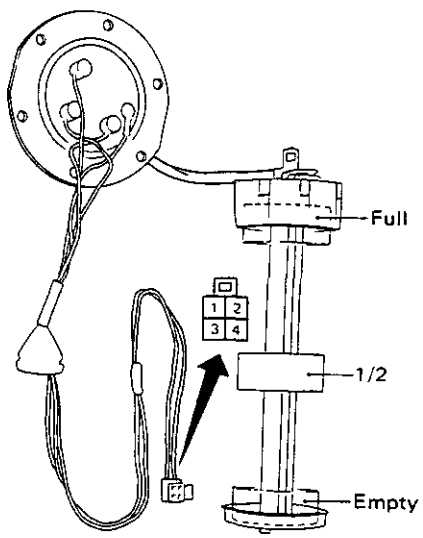
If ohmmeter pointer does not deflect, go to "Speed Sensor Output Check". (Refer to back page)

Fuel Tank Gauge Check

- For removal, refer to FE section

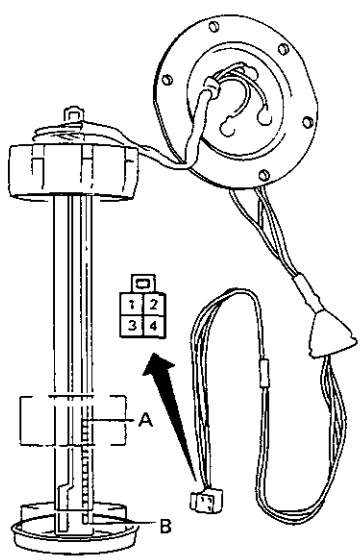
Ohmmeter terminal (+)	Ohmmeter terminal (−)	Float position	Resistance value
②	①	Full	Approx 10 - 20Ω
		Empty	Approx 480 - 520Ω
		1/2	Approx 100 - 110Ω
③	①	A	Approx 4Ω or below
		B	Approx 870 - 930Ω
④	①	B	0Ω

Main gauge



SEL675D

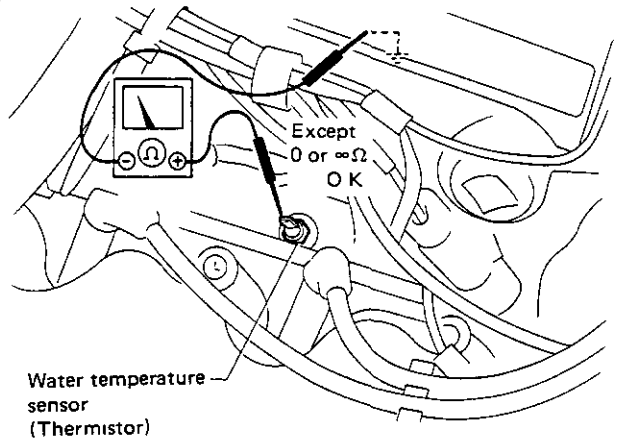
Sub gauge



SEL676D

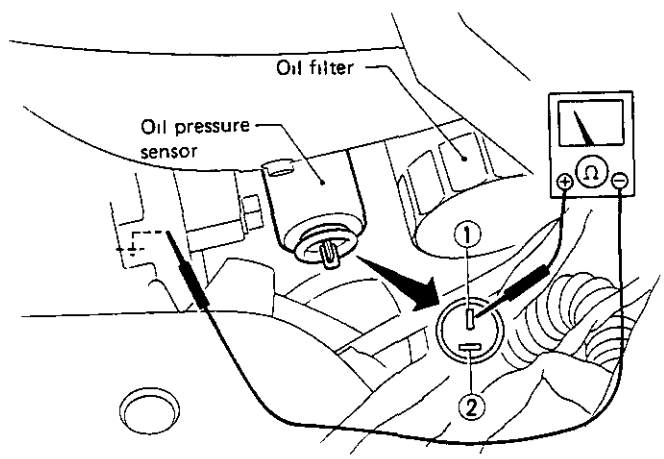
Water Temp Sensor Check

Cylinder head R H side



SEL677D

Oil Pressure Sensor Check



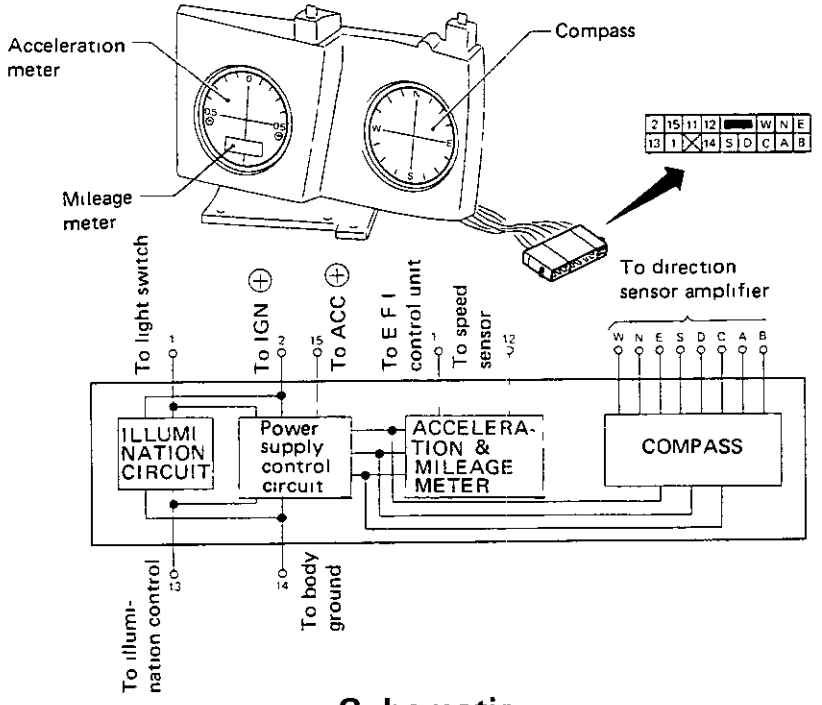
SEL678D

Ohmmeter terminal (+)	Ohmmeter terminal (−)	With engine stopped	With engine running (idling)
①	Engine ground	0Ω	∞
②		More than 74Ω	Less than 60Ω

Combination Gauge

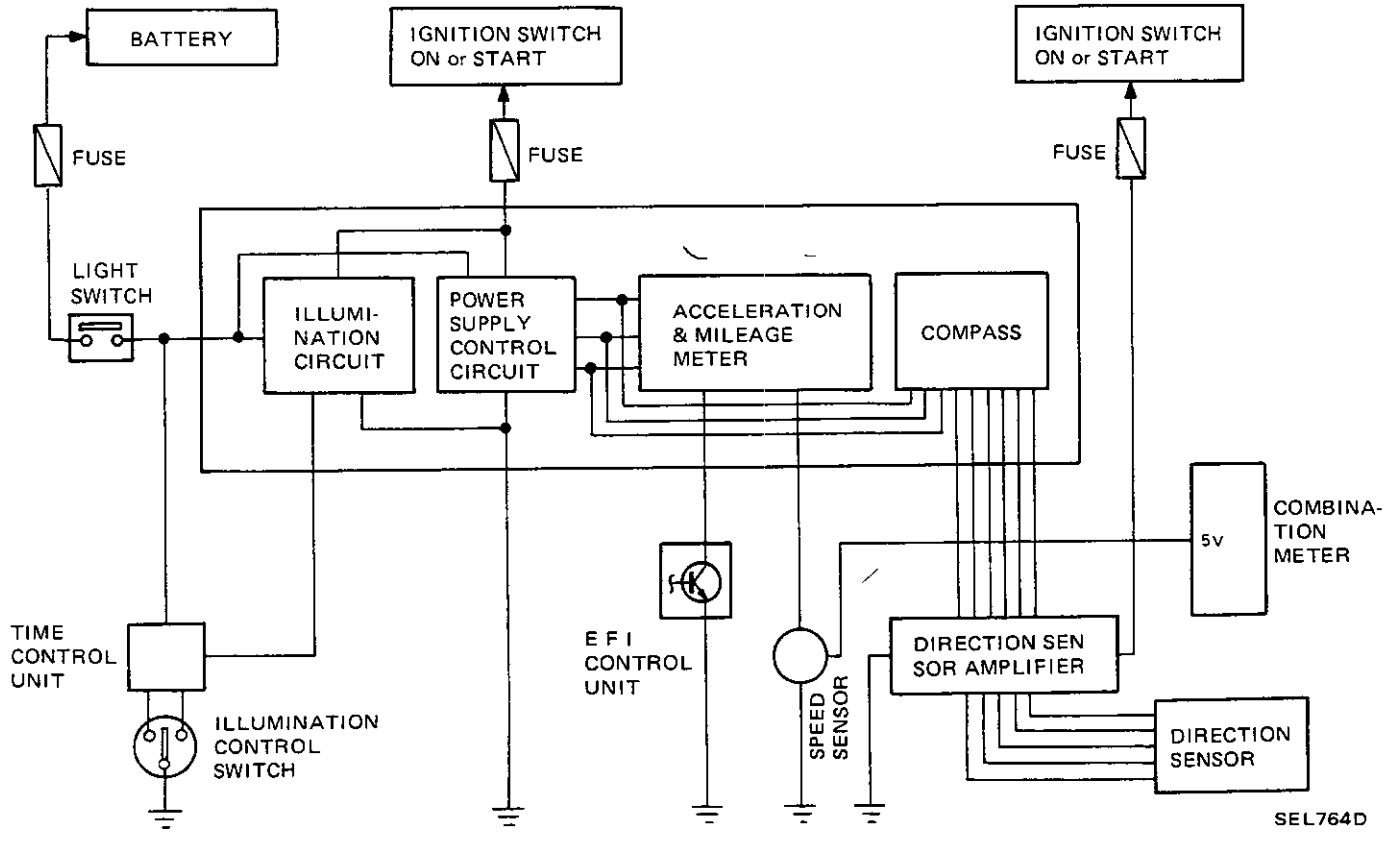
CAUTION:

- Never touch the combination gauge terminal with bare hands
- Digital type combination gauge should not be disassembled



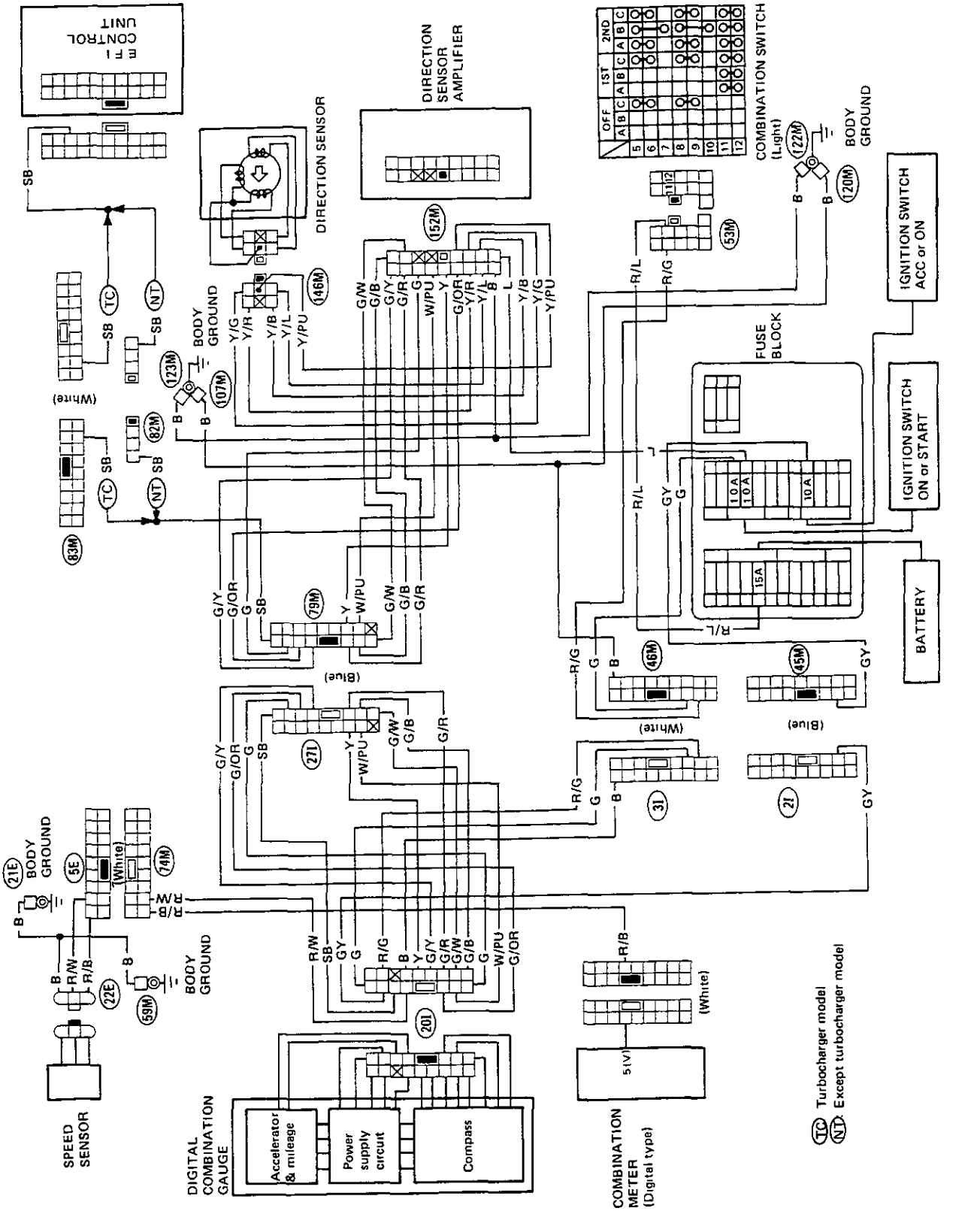
SEL679D

Schematic



SEL764D

Wiring Diagram



Trouble-shooting

No display appears

↓

Check power supply circuit for combination gauge

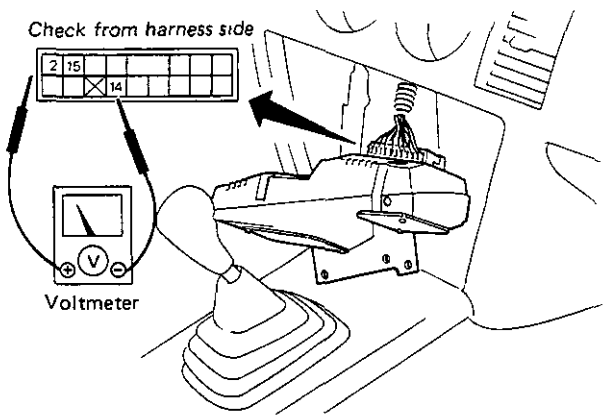
↓ O K → Replace combination gauge

↓ N G → Check harness

Voltmeter terminal		Ignition switch position		
(+)	(−)	OFF	ACC	ON
②	⑭	0V	0V	Approx 12V
⑮	⑭	0V	Approx 12V	Approx 12V

Ohmmeter terminal		Ignition switch OFF
(+)	(−)	
⑭	Body ground	Continuity exists

- Remove radio and A/C control assembly from center console and remove combination gauge with harness connected



SEL681D

Display illumination will not darken when light switch is "ON"

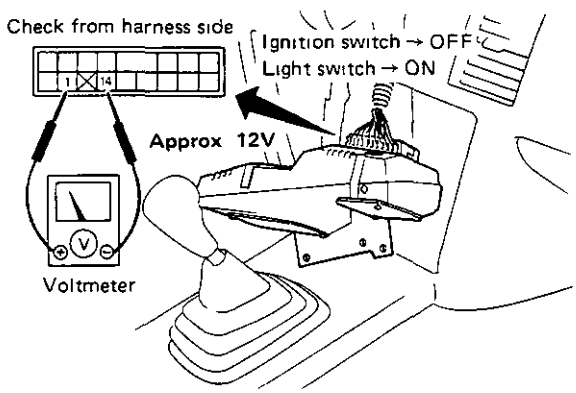
↓

Check light switch circuit for combination gauge

↓ O K → Replace combination gauge

↓ N G → Check harness

1 Remove radio and A/C control assembly and remove combination gauge with harness connected.
2 Turn ignition switch to "OFF"
3 Turn light switch to "ON"
4 Measure voltage across ① and ⑭



SEL682D

Trouble-shooting (Cont'd)

COMPASS

Compass will not indicate direction in which vehicle is being driven

↓

Face vehicle toward the North to make sure arrow points to "N"

Display deviates by one graduation

↓

Slowly turn volume ① until arrow moves from Ⓐ (Ⓒ) to Ⓒ (Ⓐ) Then slowly return volume ① until arrow points to point Ⓑ

Display deviates by two or more graduations

↓

When arrow deviates toward West, move switch ② to (+), when it deviates toward the East, move switch to (−) Return switch ② to Neutral when arrow stays between points Ⓐ and Ⓒ

↓

Face vehicle toward the East to make sure arrow points to "E"

Display deviates by one graduation

↓

Slowly turn volume ③ until arrow moves from Ⓓ (Ⓕ) to Ⓕ (Ⓓ) Then slowly return volume ③ until arrow points to point Ⓔ

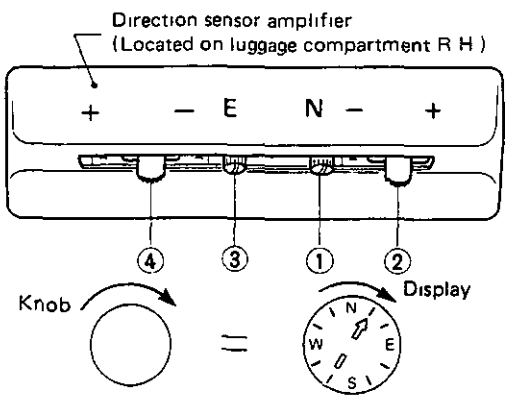
Display deviates by two or more graduations

↓

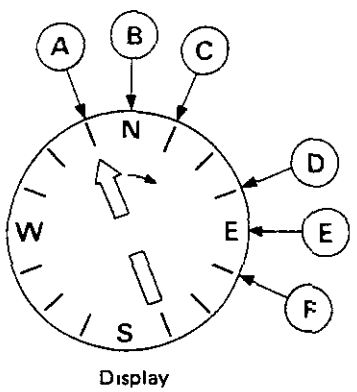
When arrow deviates toward the North, move switch ④ to (+), when it deviates toward the South, move switch to (−) Return switch ④ to Neutral when arrow stays between points Ⓓ and Ⓕ

↓

Again face vehicle toward the North to make sure arrow points to "N"

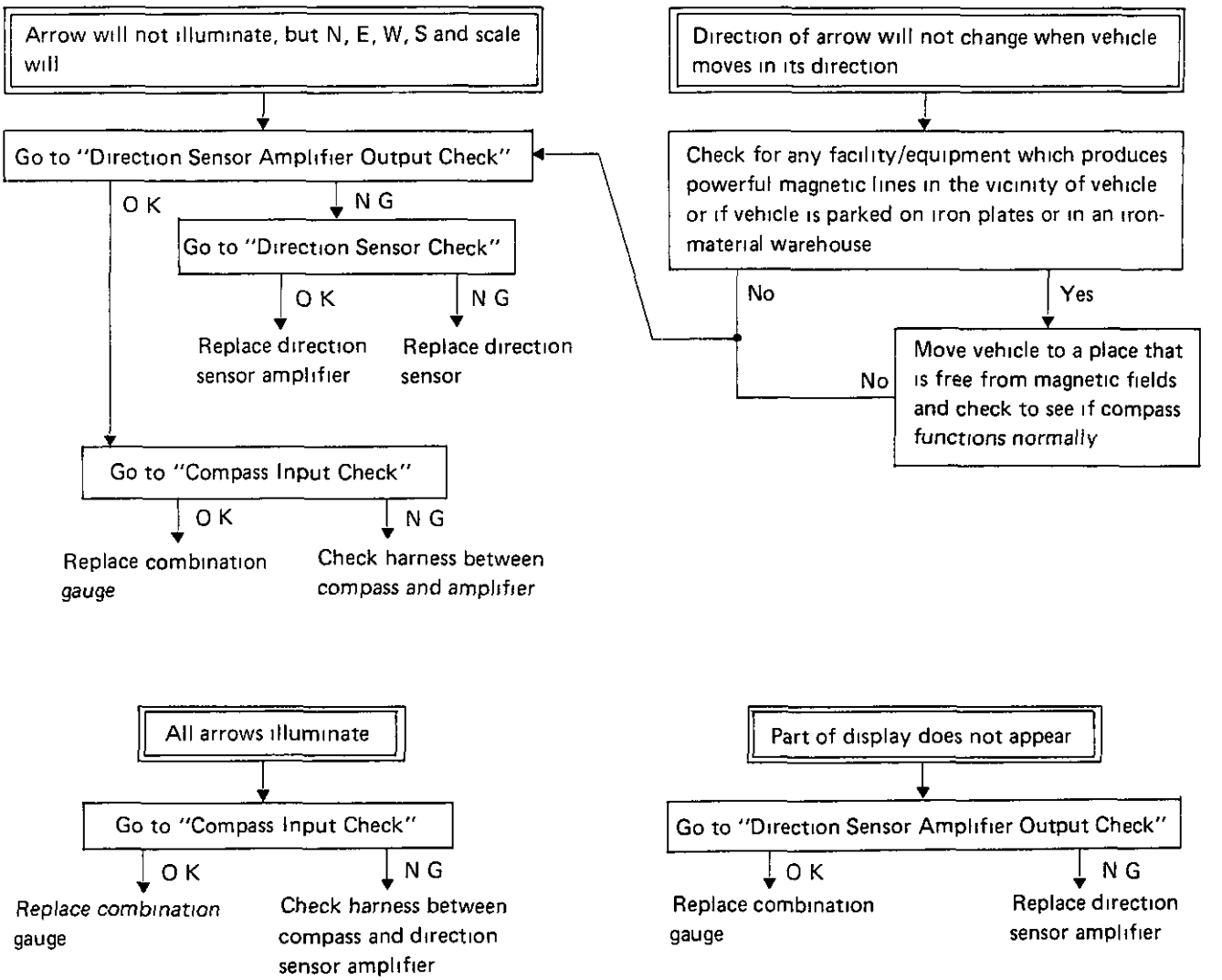


SEL683D

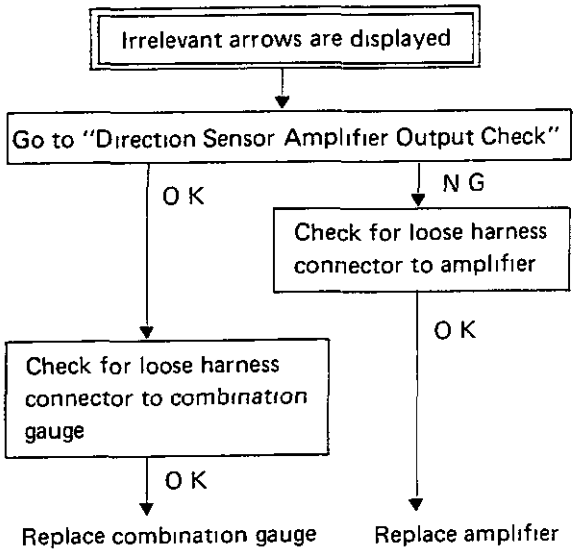


SEL684D

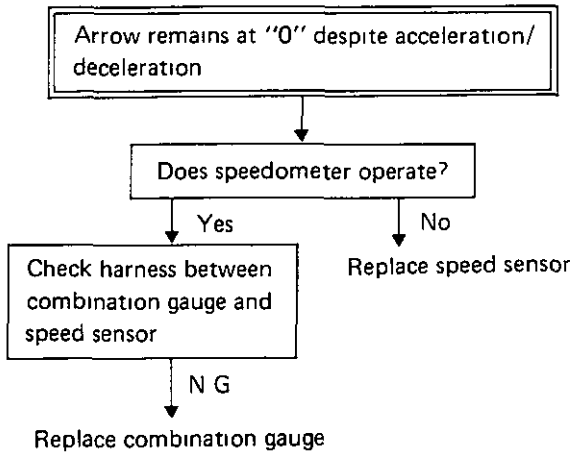
Trouble-shooting (Cont'd)

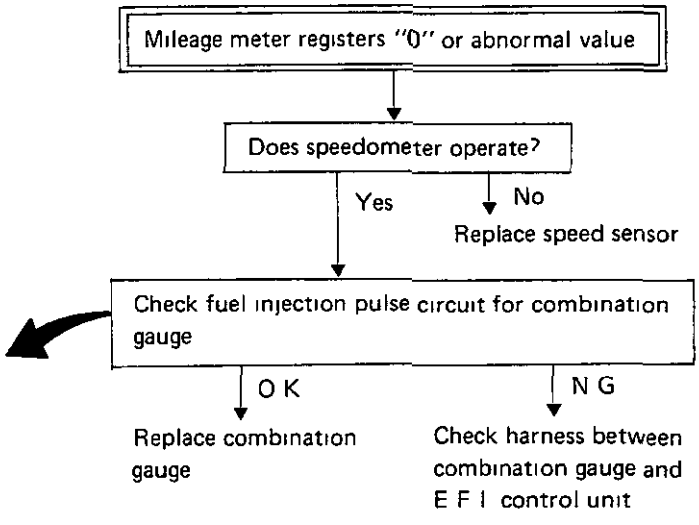


Trouble-shooting (Cont'd)

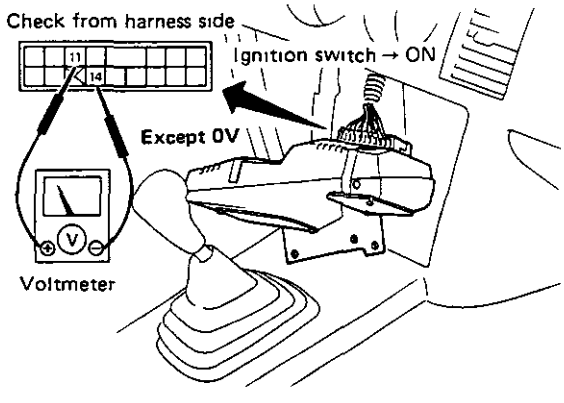


ACCELERATION & MILEAGE METERS



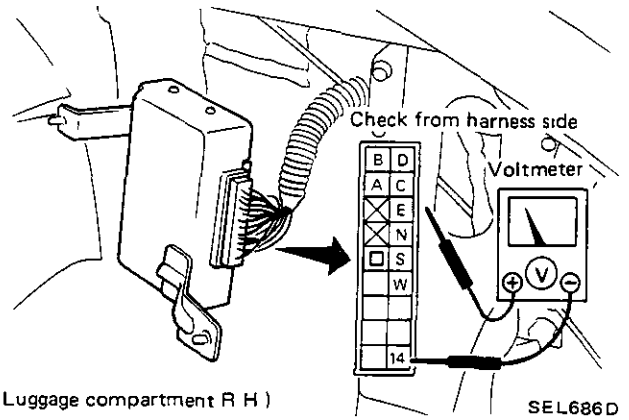


1 Remove radio and A/C control assembly from center console Remove combination gauge with harness connected
2. Turn ignition switch to "ON"
3 Check to determine if voltage is produced across ⑪ and ⑭



Direction Sensor Amplifier Output Check

- Connect direction sensor amplifier harness (if disconnected)
- Using a directional magnet, determine the direction in which car faces. Check voltage across terminals as indicated in chart below
- Turn ignition switch to "ON"

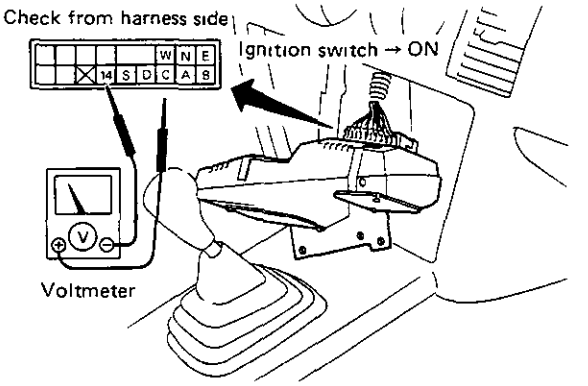


(Luggage compartment R H)

SEL686D

Compass Input Check

- Remove radio and A/C control assembly from center console and remove combination gauge with harness connected
- Check voltages across terminals as indicated in chart below
- Turn ignition switch ON

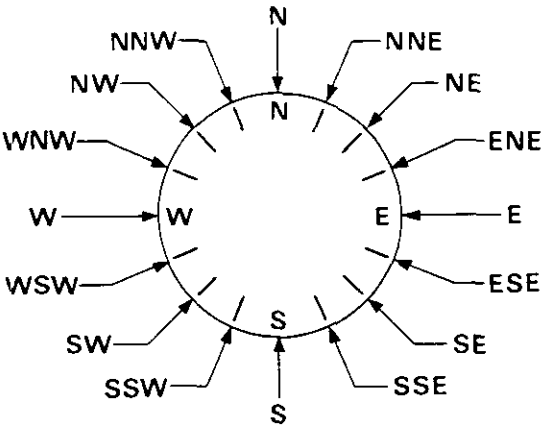


SEL687D

Voltmeter terminal (−) / (+)		⑭							
		Ⓝ	Ⓔ	Ⓢ	Ⓦ	Ⓑ	Ⓐ	Ⓒ	Ⓓ
Direction in which vehicle faces	NW	1	0	0	0	0	1	1	1
	NNW	1	0	0	0	1	0	1	1
	N	1	0	0	0	1	1	0	1
	NNE	1	0	0	0	1	1	1	0
	NE	0	1	0	0	1	1	1	0
	ENE	0	1	0	0	1	1	0	1
	E	0	1	0	0	1	0	1	1
	ESE	0	1	0	0	0	1	1	1
	SE	0	0	1	0	0	1	1	1
	SSE	0	0	1	0	1	0	1	1
	S	0	0	1	0	1	1	0	1
	SSW	0	0	1	0	1	1	1	0
	SW	0	0	0	1	1	1	1	0
	WSW	0	0	0	1	1	1	0	1
	W	0	0	0	1	1	0	1	1
	WNW	0	0	0	1	0	1	1	1

1 More than 4V
0 Less than 1V

CAUTION:
Before performing voltage measurements, ensure that there is no equipment or facility which would produce powerful magnet lines in the vicinity of vehicle.

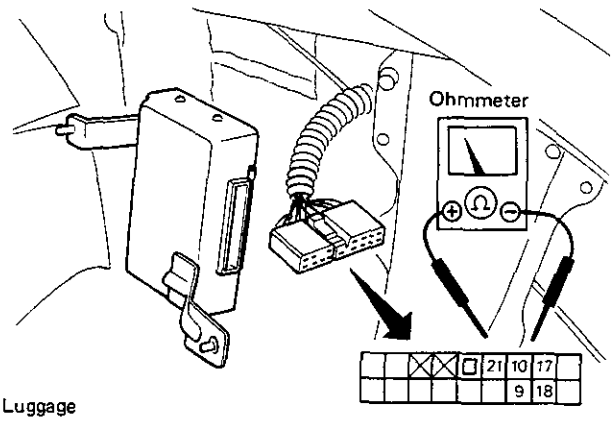


SEL688D

Direction Sensor Check

- Disconnect harness connector from direction sensor amplifier
- Measure resistance values between terminals on harness side

Ohmmeter terminal		Resistance
(+)	(−)	
⑨	㉑	Approx 20 - 35Ω
⑩	㉑	Approx 20 - 35Ω
⑰	⑱	Approx 10 - 20Ω

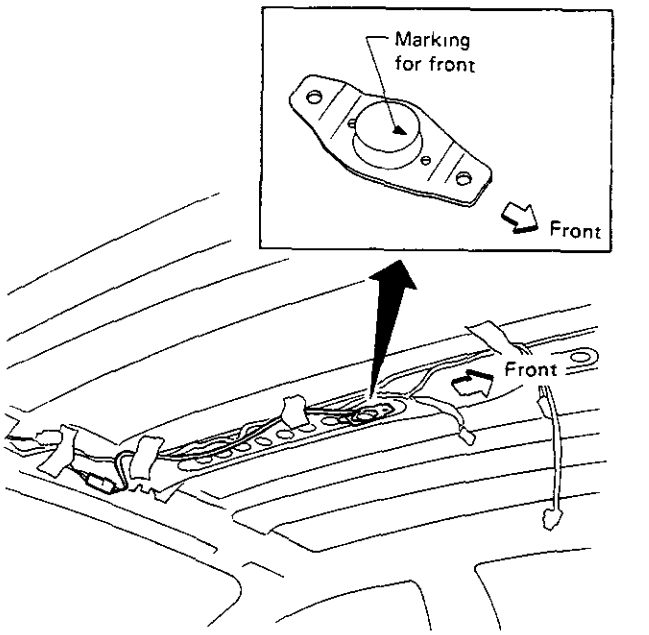


(Luggage compartment R H)

SEL689D

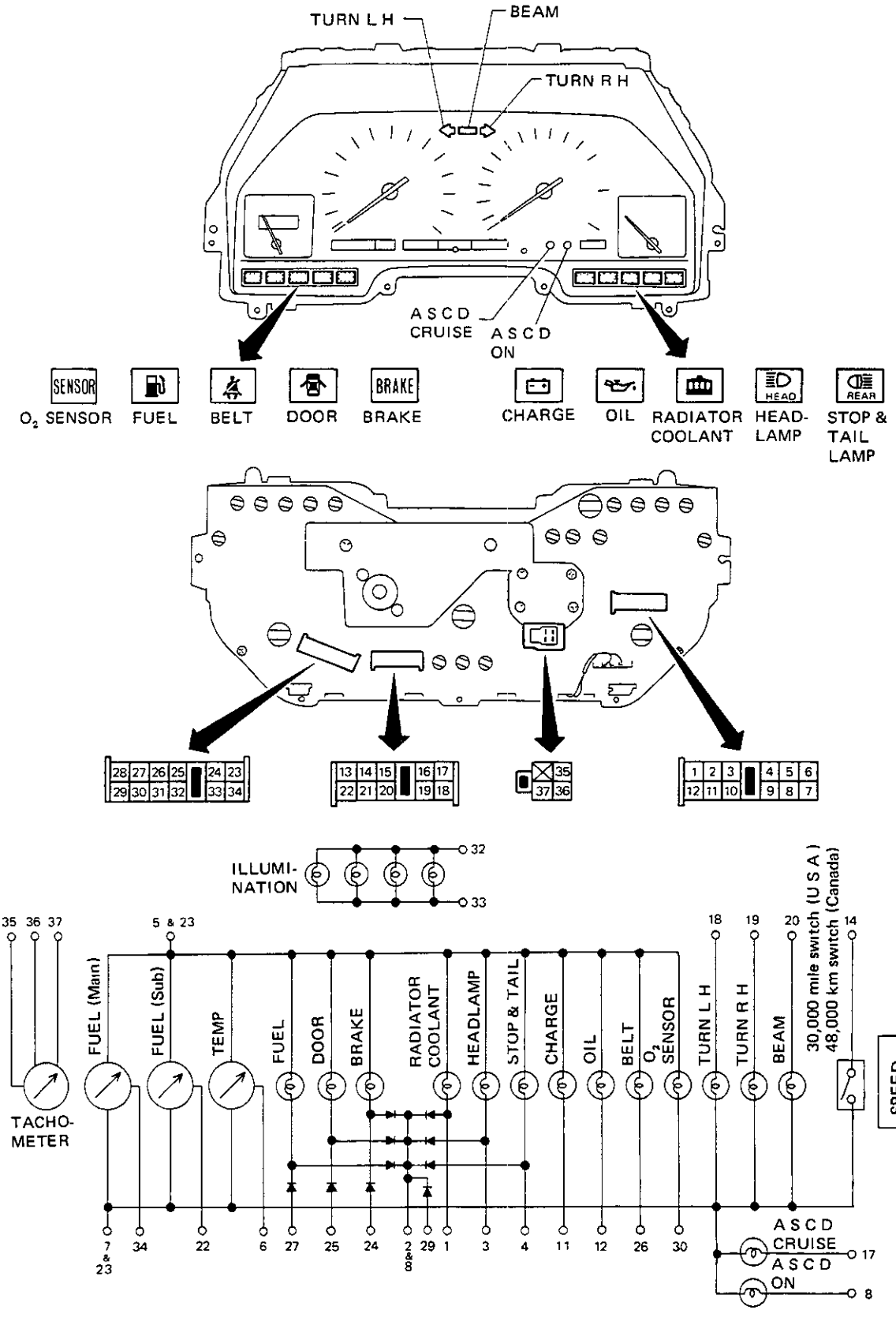
Direction Sensor Installation

- When installing direction sensor in the vehicle, face it in the direction as shown in figure below



SEL742D

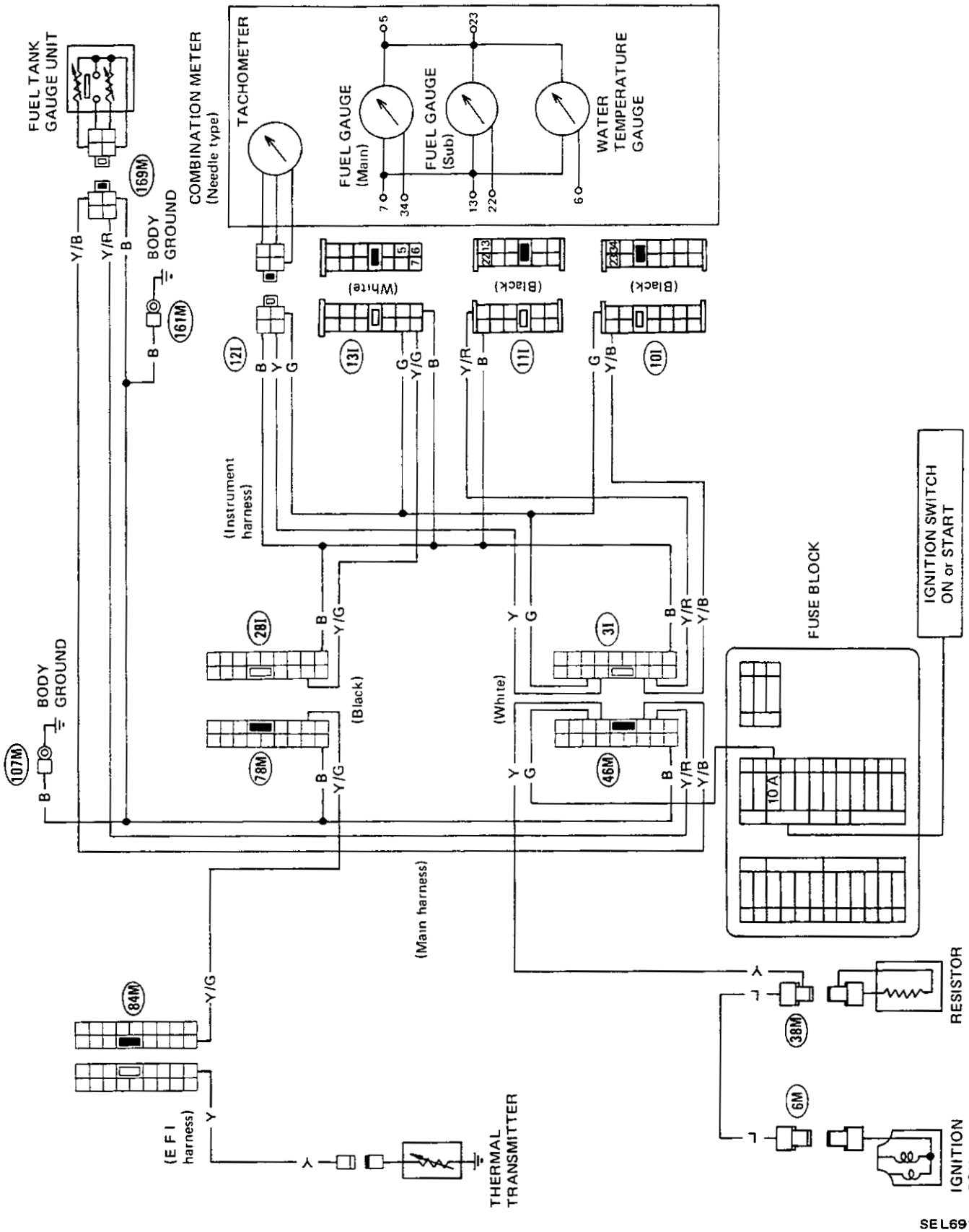
Combination Meter



SEL690D

METER AND GAUGES —Needle Type Combination Meter

Tacho, Fuel and Water Temperature Gauges/Wiring Diagram

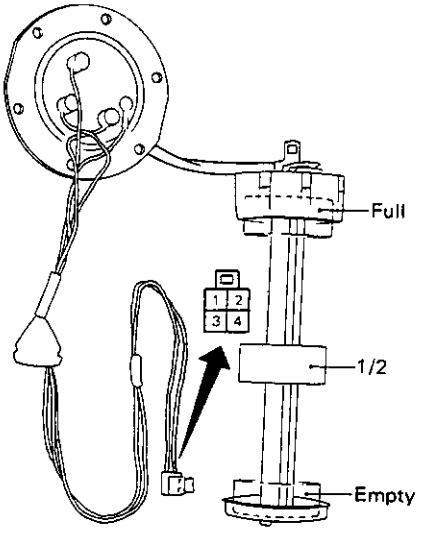


Fuel Tank Gauge Check

- For removal, refer to FE section

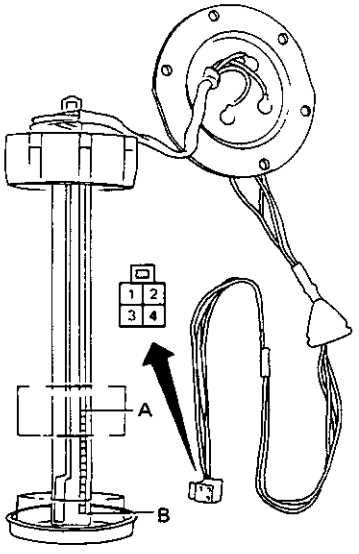
Ohmmeter terminal		Float position	Resistance value
(+)	(−)		
②	①	Full	Approx 6Ω
		Empty	Approx 80Ω
		1/2	Approx 30 - 35Ω
③	①	A	More than 60Ω
		B	Less than 6Ω

Main gauge



SEL675D

Sub gauge

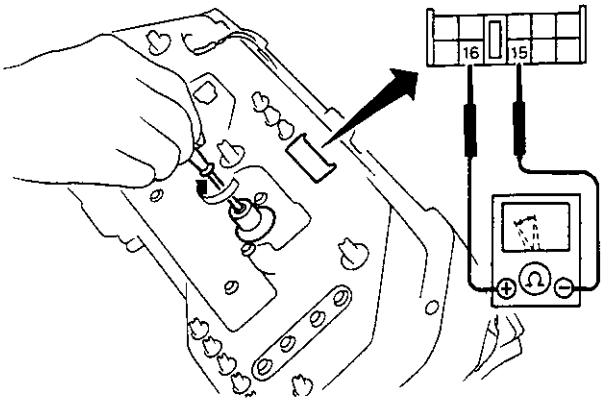


SEL676D

Speed Sensor Signal Check

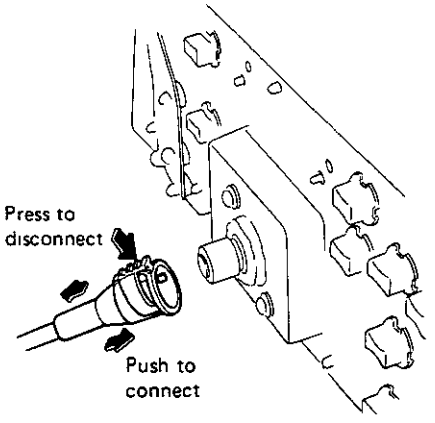
- Speed sensor is built into the speedometer
- Turn speedometer slowly using small screwdriver, and check continuity of speed sensor circuit

Continuity exists two times for each turn . O K.



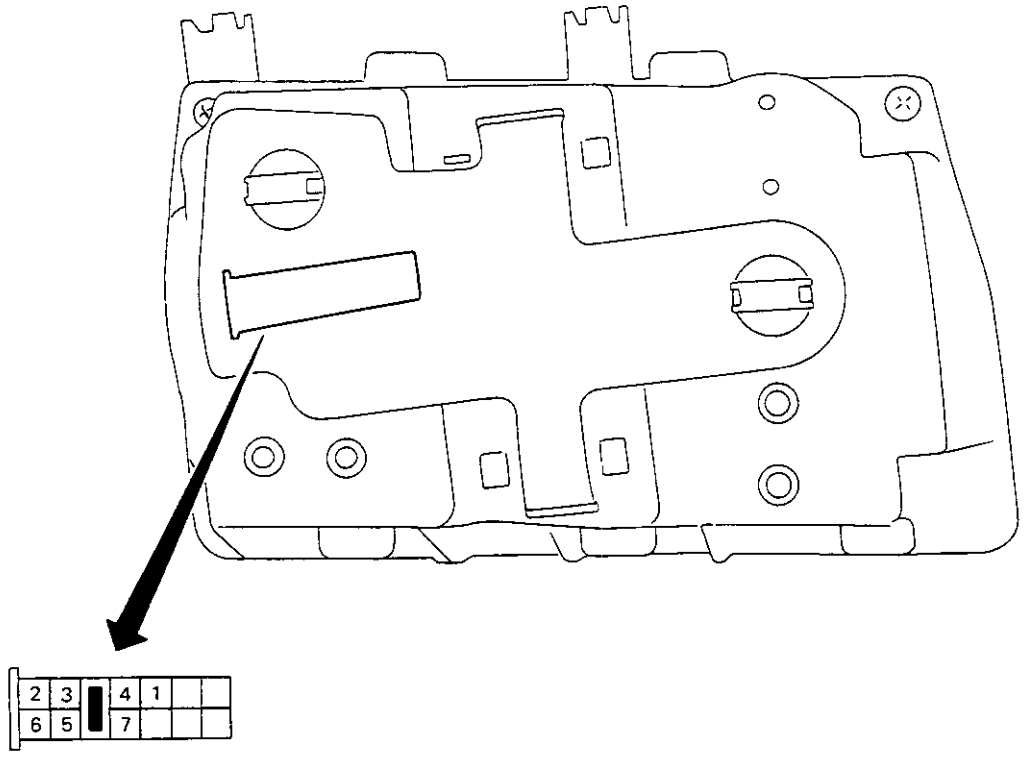
SEL696D

Speedometer Cable Removal



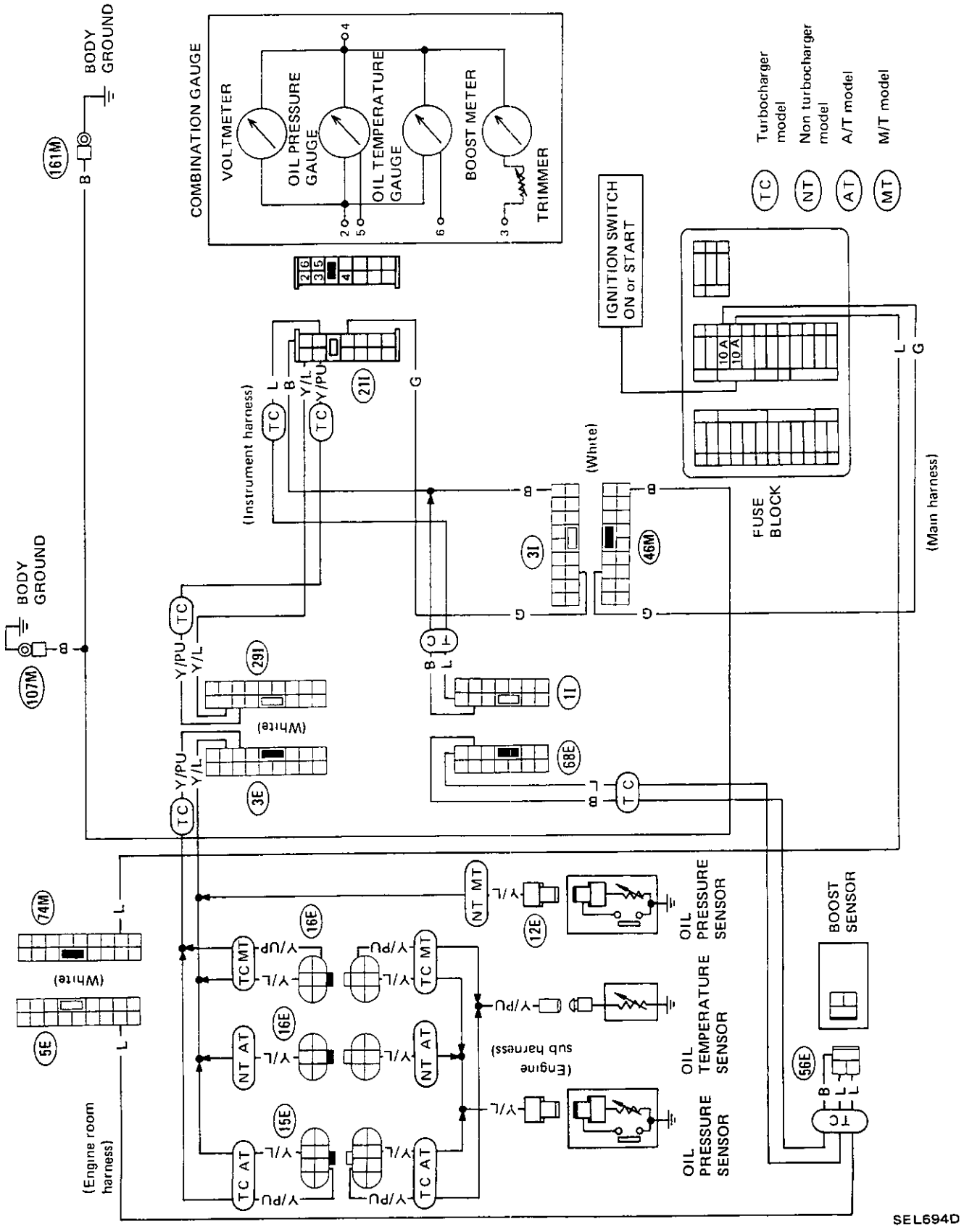
SEL692D

Combination Gauge



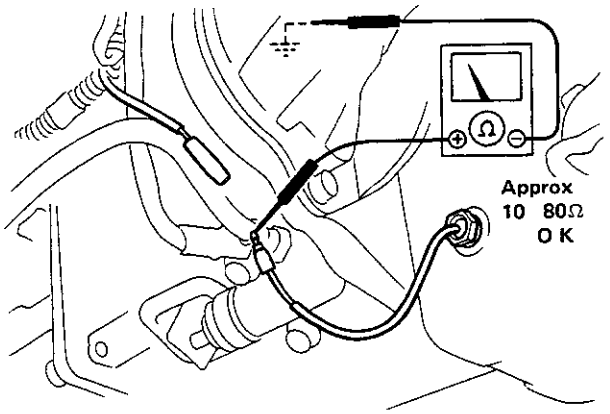
SEL693D

Oil Temp, Oil Pressure, Boost and Volt Gauges/Wiring Diagram



Oil Temp. Sensor Check

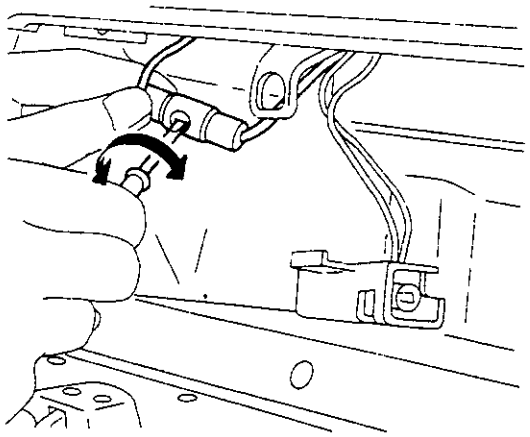
1 Warm up engine
2 Stop engine and turn ignition switch OFF
3 Check resistance of oil temp sensor



SEL695D

Boost Gauge Trimmer Adjustment

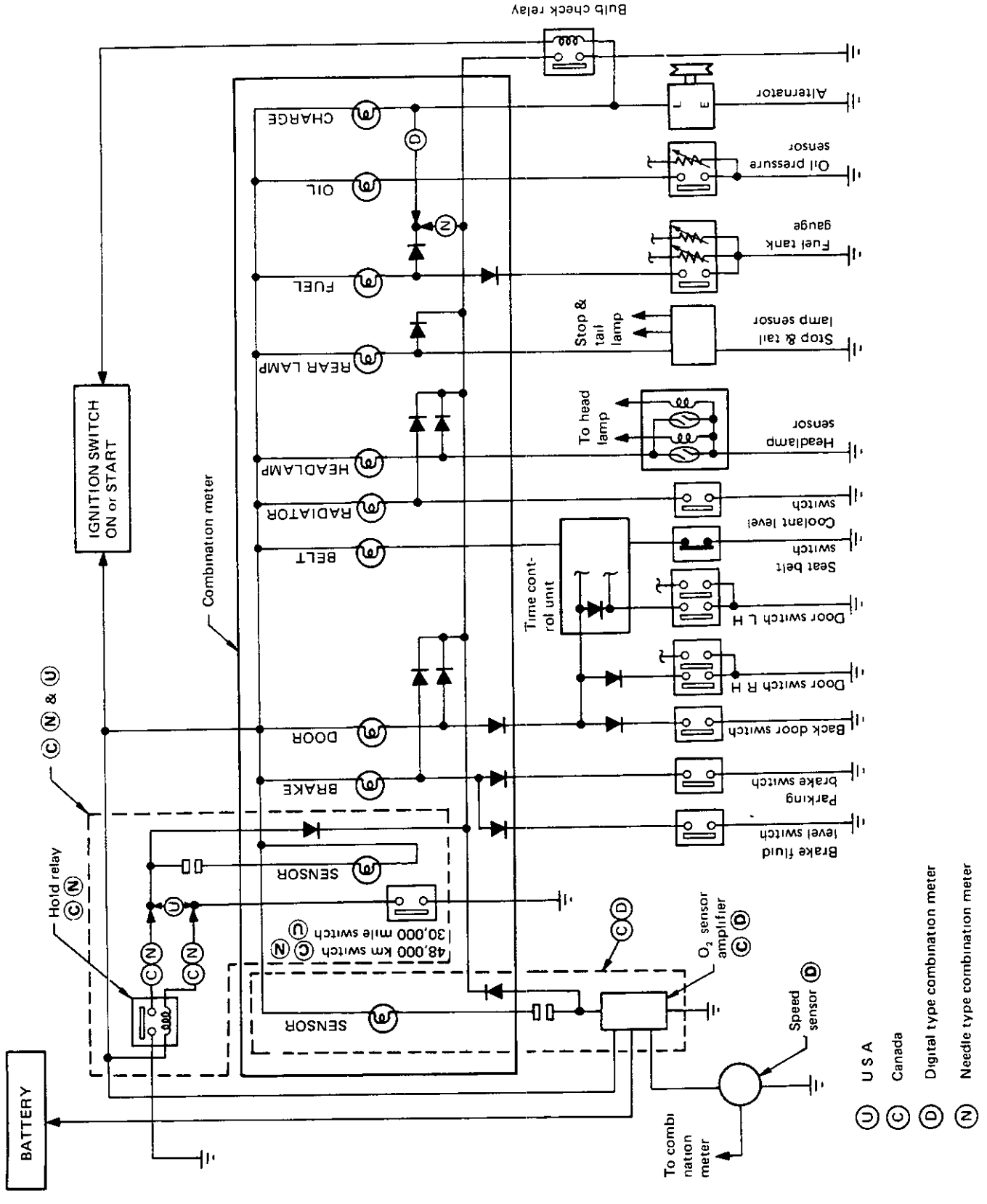
- When boost gauge does not give proper reading, adjust 0 kPa (0 mmHg, 0 inHg) point with the trimmer located on interior upper wall of glove box
- Use a screwdriver to adjust trimmer



SEL273B

- For checking oil pressure sensor and boost sensor, refer to pages EL-53 and 56

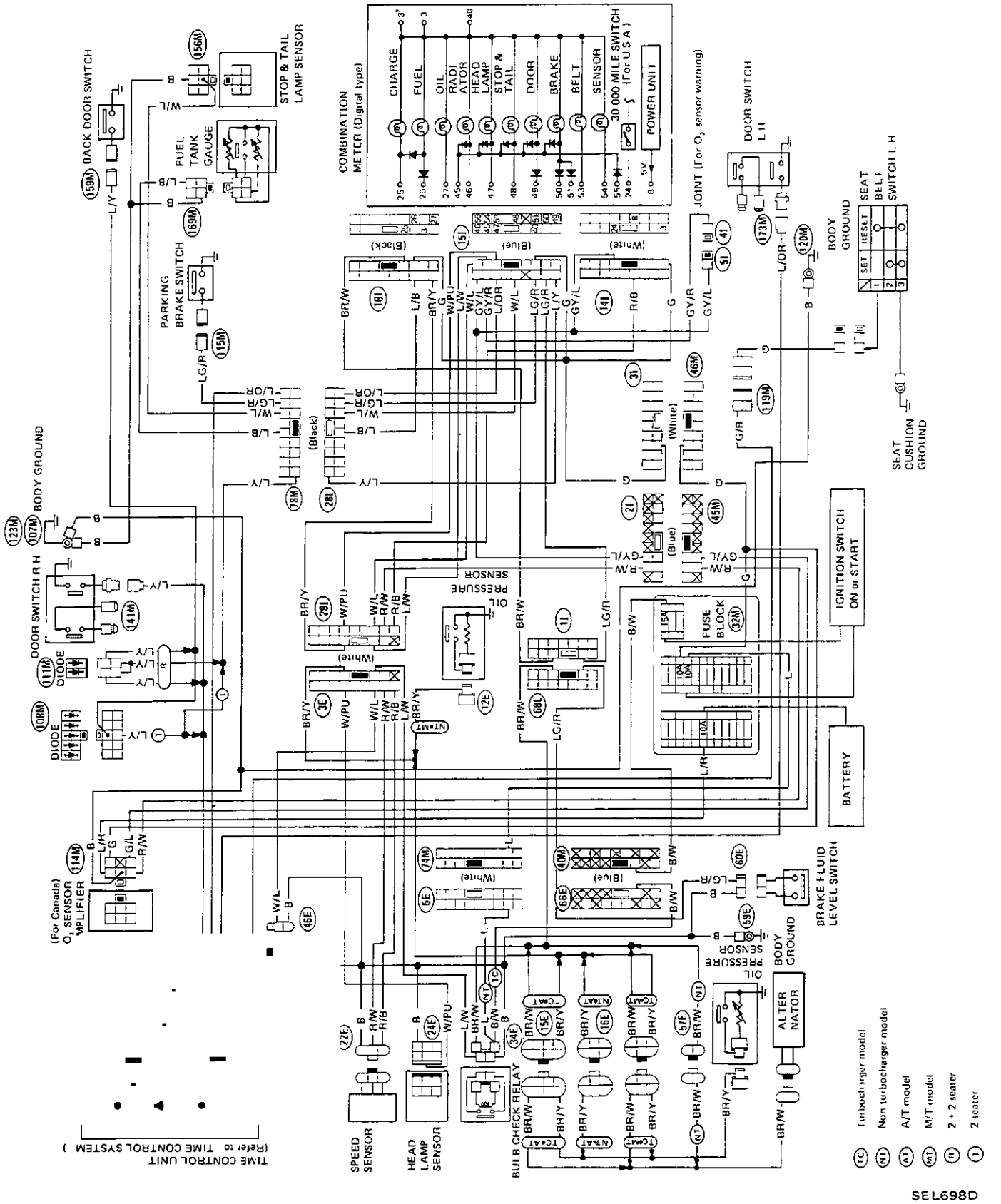
Schematic



SEL697D

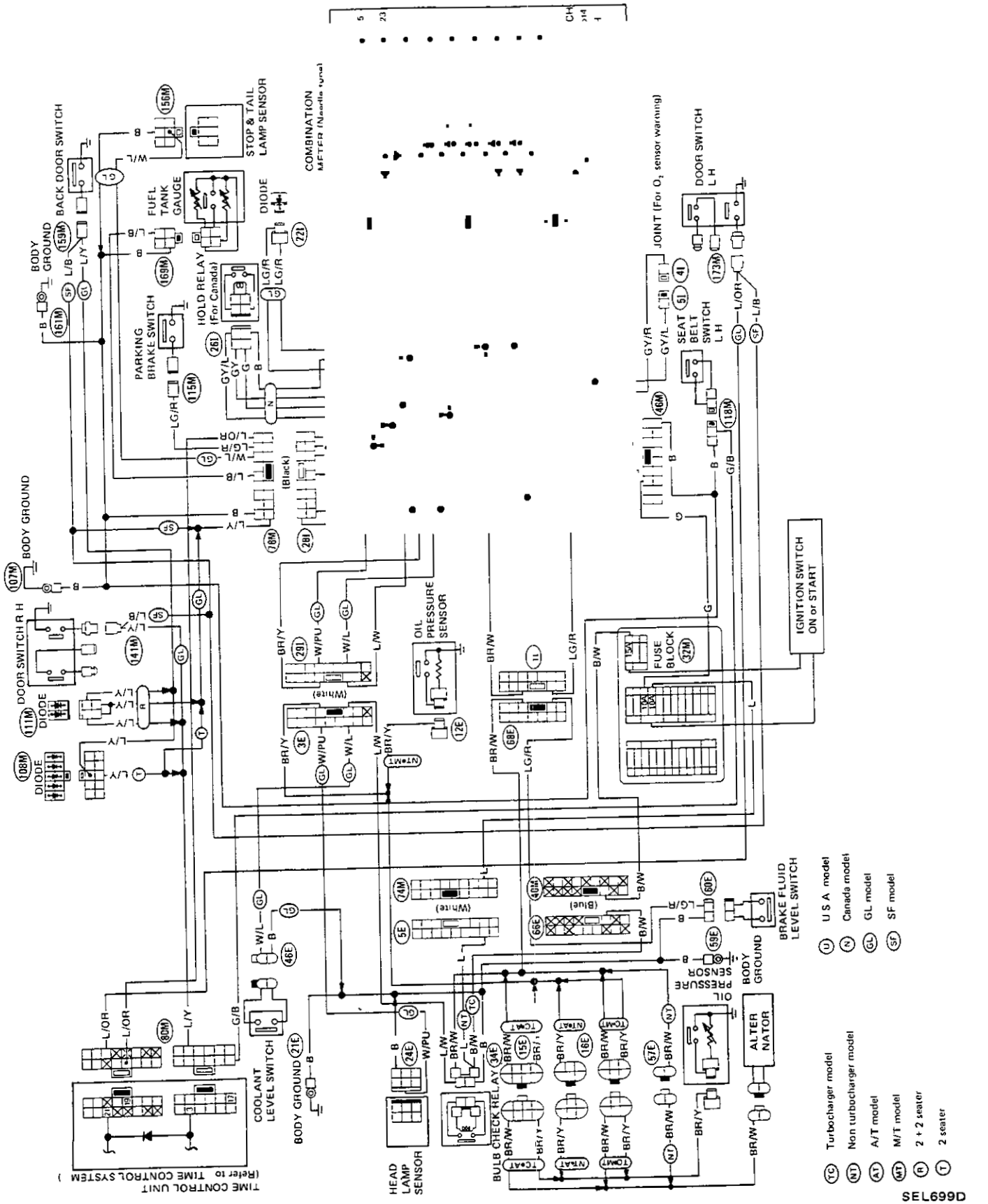
WARNING LAMPS AND CHIME

— Warning Lamps/Wiring Diagram— For Digital Type Combination Meter— —

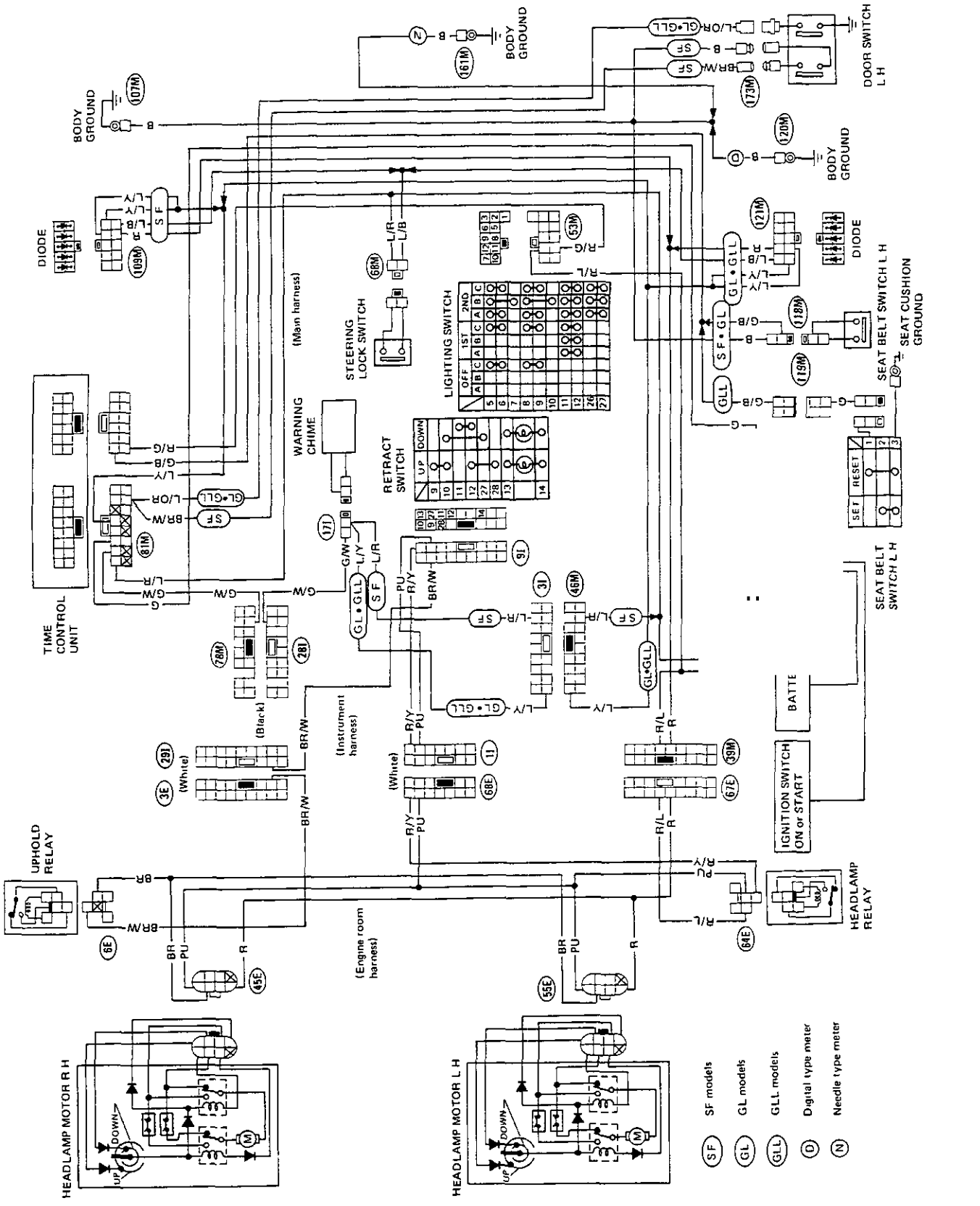


SEL698D

Warning Lamps/Wiring Diagram— For Needle Type Combination Meter—



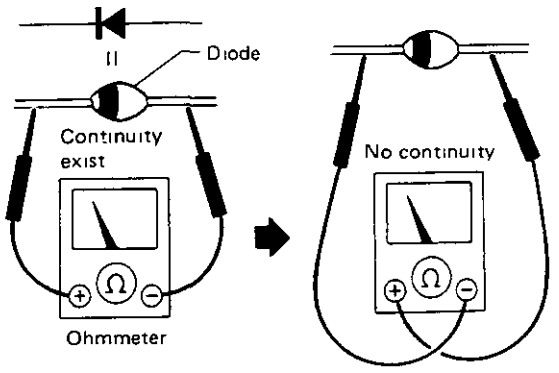
Warning Chime/Wiring Diagram



SEL793D

Diode Check

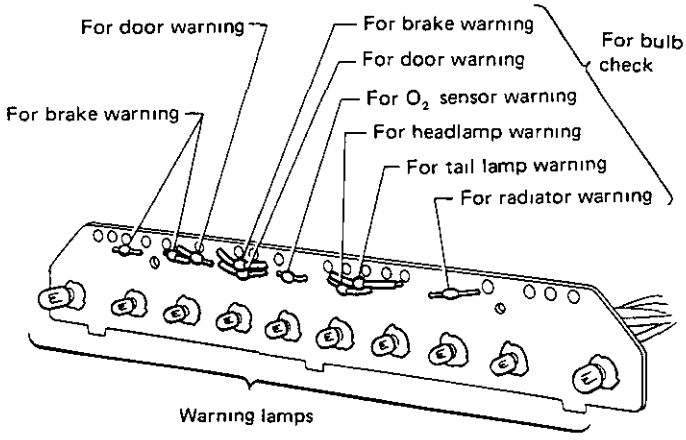
- Check continuity using an ohmmeter
- Diode is functioning properly if test results are as shown below



SEL700D

DIGITAL TYPE COMBINATION METER

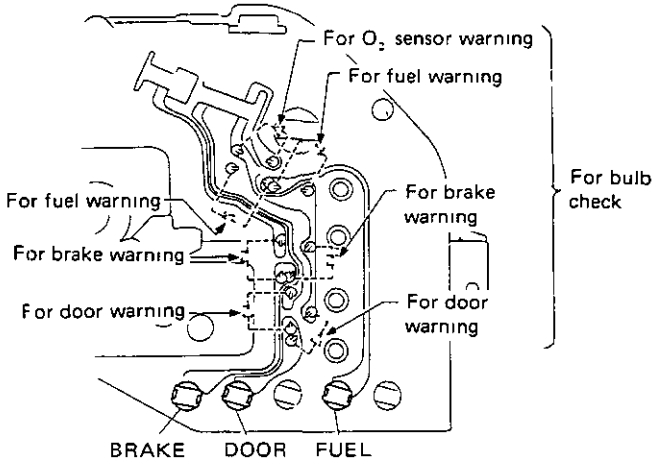
- Diodes for warning lamps are located on the panel where warning bulbs are fitted

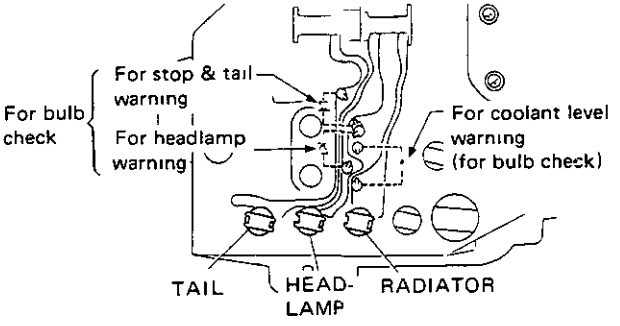


SEL701D

NEEDLE TYPE COMBINATION METER

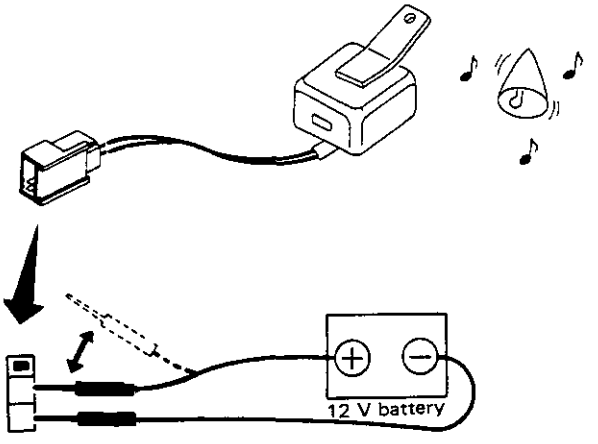
- Diodes for warning lamps are built into the combination meter printed circuit





SEL702D

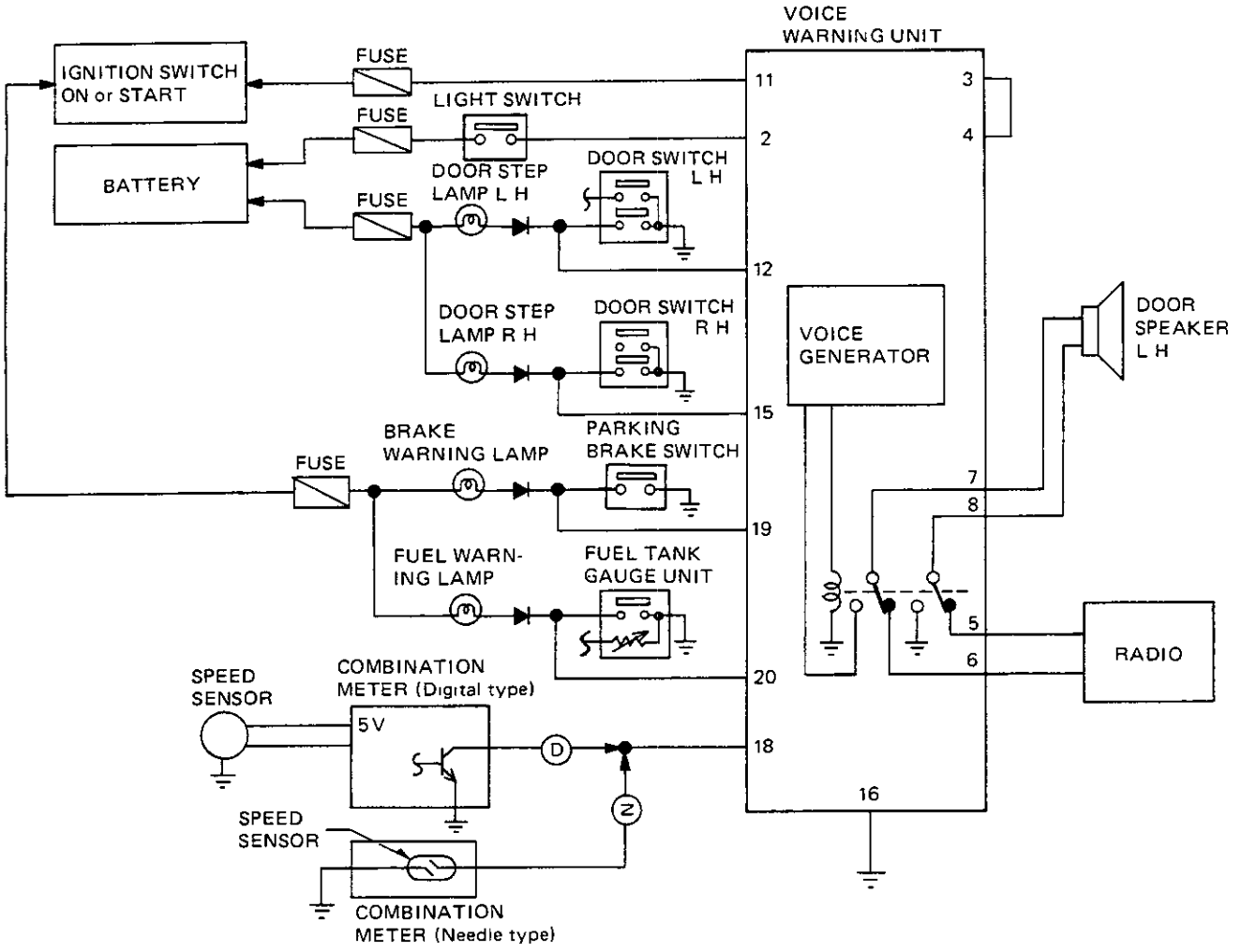
Warning Chime Check



SEL875D

VOICE WARNING SYSTEM

Schematic

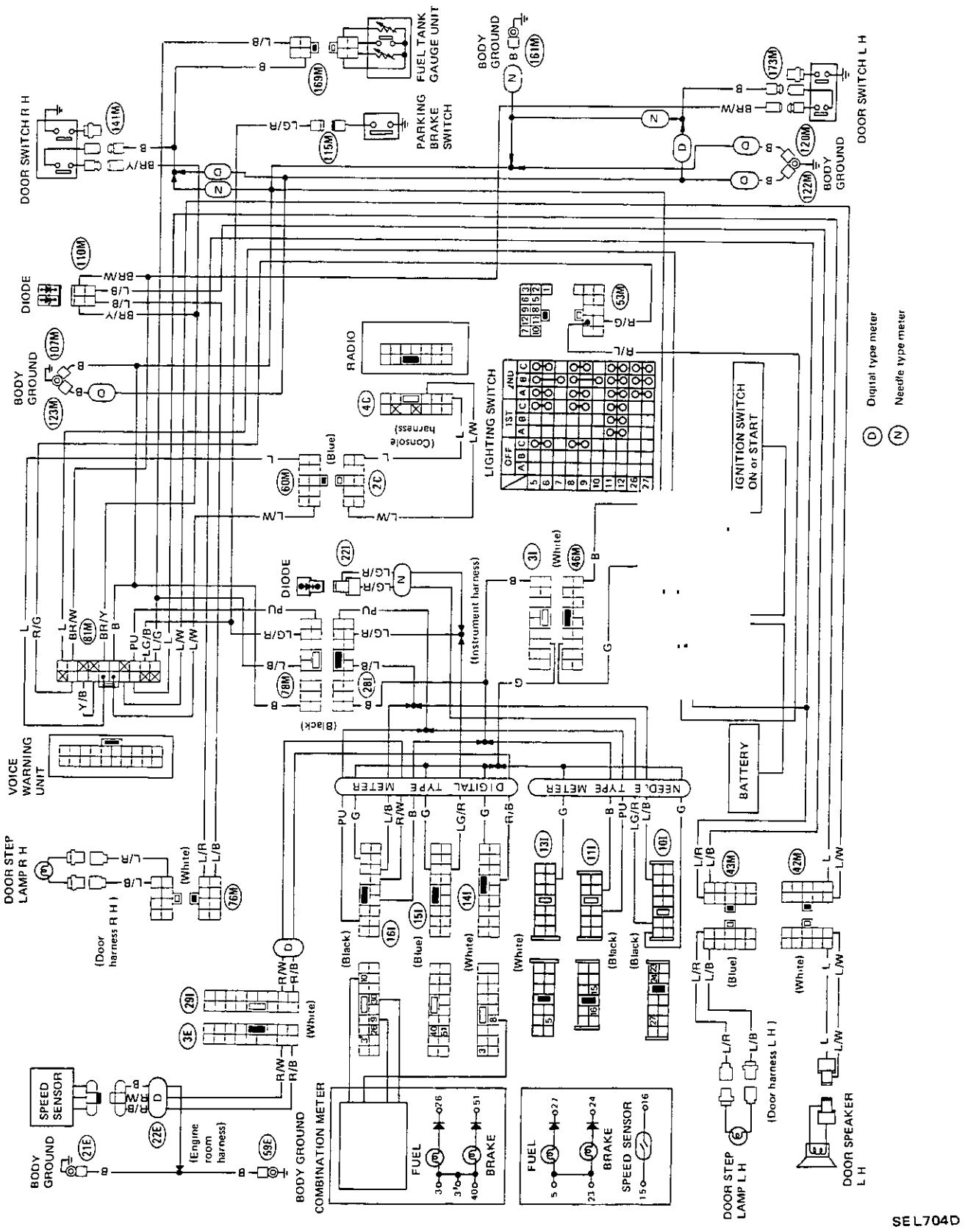


(D) Digital type meter
(N) Needle type meter

SEL703D

VOICE WARNING SYSTEM

Wiring Diagram



VOICE WARNING SYSTEM

Operational Check

Item	Condition			Voice Warning
Left door	Ignition switch "ON"	Door switch L H is "ON" (Left door is open)	Speed switch is "ON" Vehicle speed is more than 10 km/h (6 MPH)	"Left door is open"
Right door		Door switch R H is "ON" (Right door is open)		"Right door is open"
Parking brake		Parking brake switch is "ON"		"Parking brake is ON"
Fuel level		Fuel level less than 10ℓ (2-5/8 US gal, 2-1/4 Imp gal)	–	"Fuel level is low"
Light	Ignition switch "OFF"	Door switch L H is "ON" (Left door is open)	Lighting switch is "ON"	"Lights are ON"

- If the warning is not properly given under the above condition, go to "Trouble-Shooting".

Trouble-shooting

NO VOICE WARNING IS GIVEN

Ignition sw "ACC"

Check if speaker in driver's door produces sound when radio is turned "ON"

N G → Check harness connector running to driver's door speaker

O K

Ignition sw "OFF"

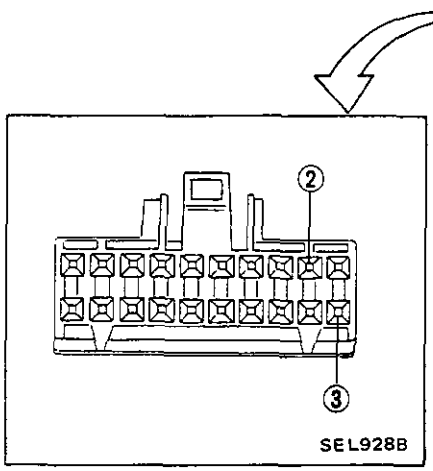
Check voice warning switch

N G → Replace voice warning switch

O K

Disconnect connector running to voice warning device and check voltage at each terminal of connector

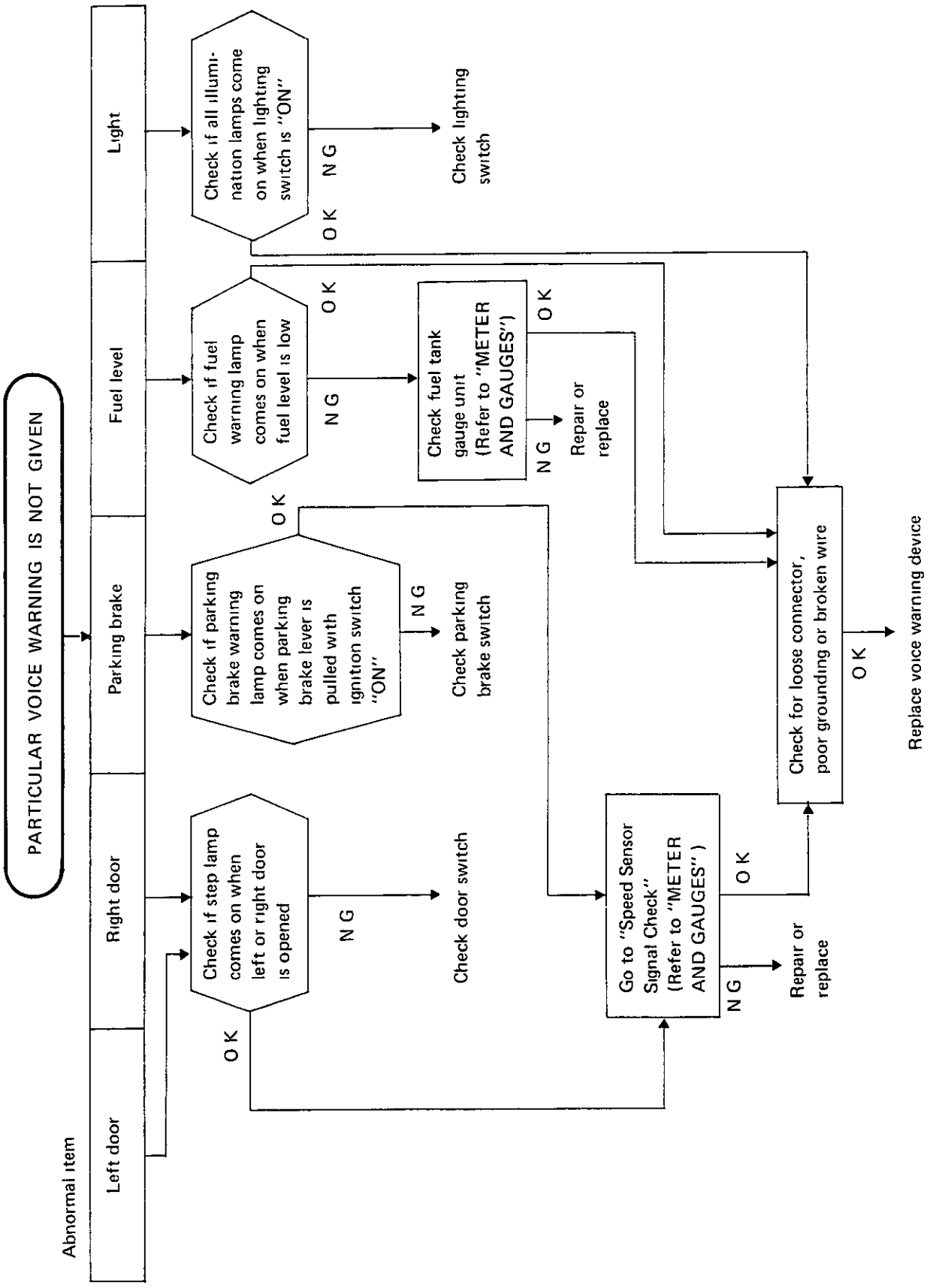
Voltmeter		Condition	Normal
Positive terminal	Negative terminal		
②	Body ground	Lighting switch "ON"	More than 9V
③		Ignition key "ON"	More than 9V



O K → Replace voice warning device

N G → Check harness

Trouble-shooting (Cont'd)



TIME CONTROL SYSTEM

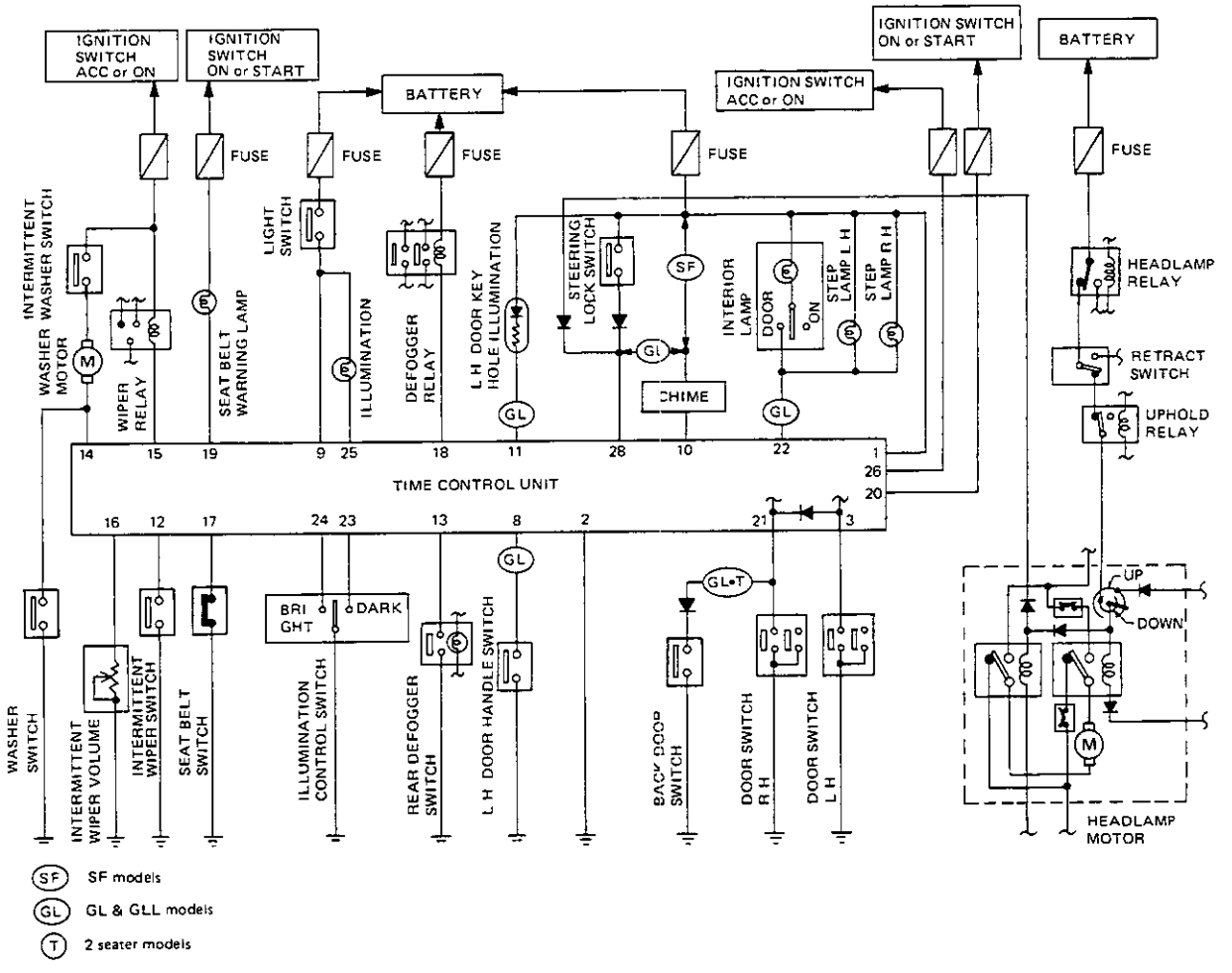
Schematic

CAUTION

Never touch the terminals of time control unit with bare hands.

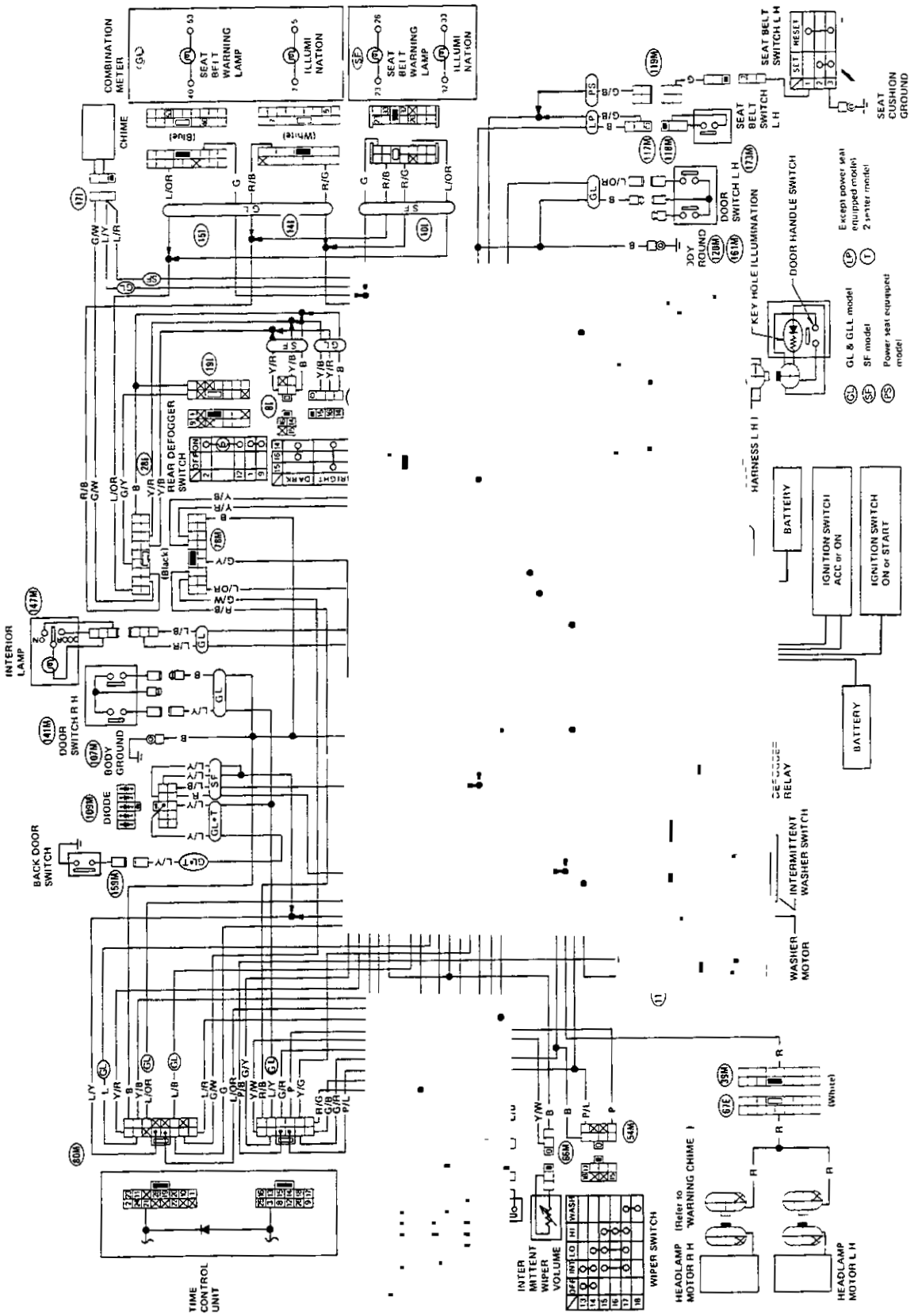
- Time control unit has the following functions

1) Intermittent wiper control timer
2) Interior lamp timer
3) Door key hole illumination timer
4) Illumination control timer
5) Light warning timer
6) Key warning timer
7) Seat belt warning timer
8) Rear defogger timer



SEL705D

Wiring Diagram

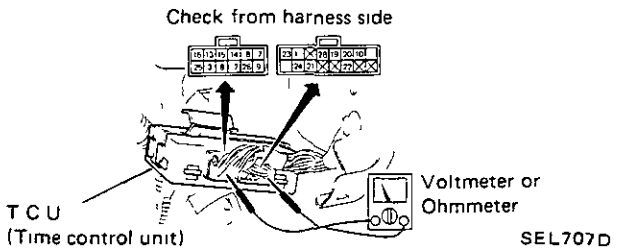


SEL706D

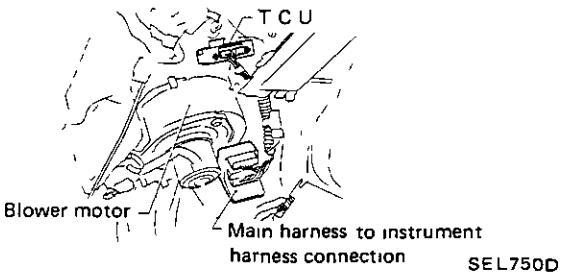
TIME CONTROL SYSTEM

Preparation for Trouble-shooting

1 Remove R H dash side cover and remove blower motor
2 Remove time control unit with harness connected
3 Connect main harness to instrument harness (if disconnected)



SEL707D

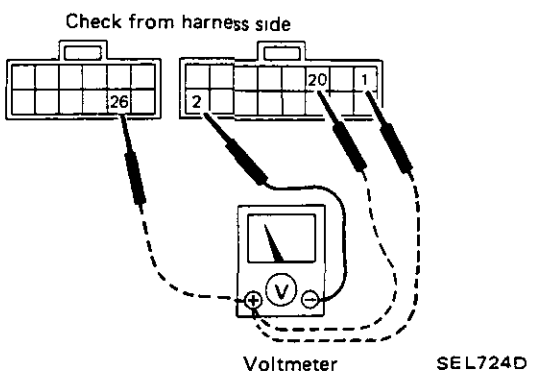


SEL750D

Power Supply Cercuit Check

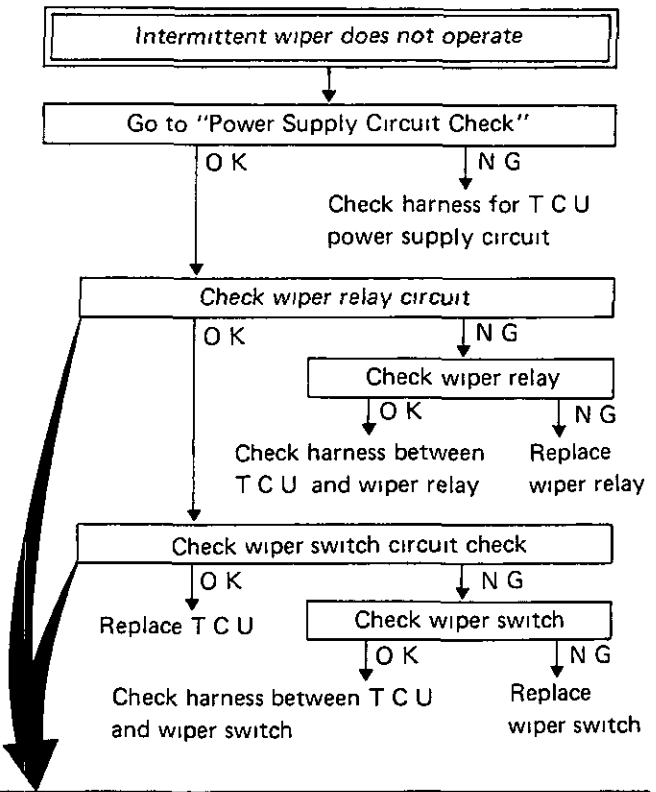
Voltmeter terminals		Ignition switch position		
(+)	(–)	OFF	ACC	ON
①	②	Approx 12V	Approx 12V	Approx 12V
⑳	②	0V	0V	Approx 12V
㉖	②	0V	Approx 12V	Approx 12V

Ohmmeter terminals		Continuity
(+)	(–)	
②	Body ground	Yes



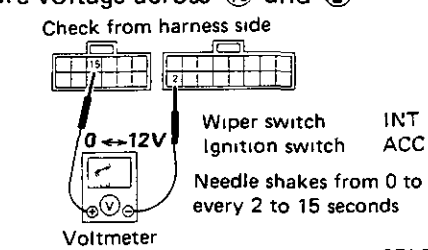
SEL724D

Trouble-shooting



WIPER RELAY CIRCUIT CHECK

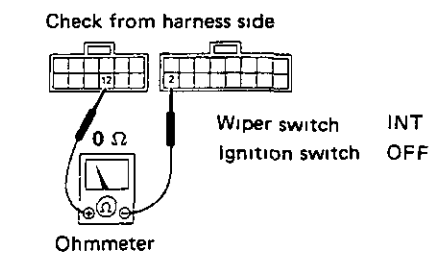
1 Turn wiper switch to "INT"
2 Turn ignition switch to "ACC"
3 Measure voltage across ⑮ and ②



SEL708D

WIPER SWITCH CIRCUIT CHECK

1 Turn wiper switch to "INT"
2. Turn ignition switch to "OFF".
3 Check continuity between ⑫ and ②



SEL709D

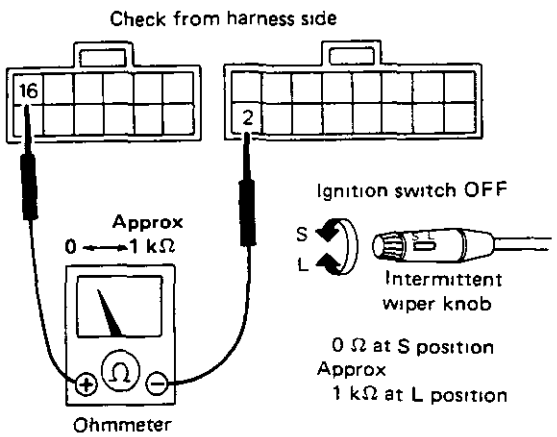
Trouble-shooting (Cont'd)

Intermittent time of wiper cannot be adjusted

Check intermittent wiper volume circuit

- OK → Replace T C U
- NG → Check intermittent wiper volume
  - OK → Check harness between T C U and intermittent wiper volume
  - NG → Replace wiper switch

1 Turn ignition switch to "OFF"
2 Measure resistance between ⑯ and ② while turning intermittent wiper volume.



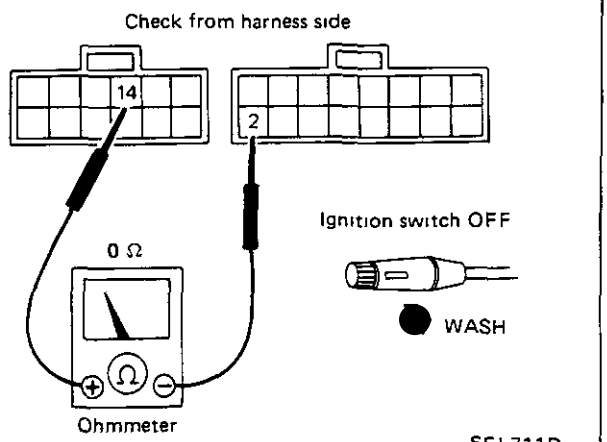
SEL710D

Wiper and washer activate individually but not in combination

Check washer switch circuit

- OK → Replace T C U
- NG → Check harness between T C U and washer switch

1 Turn ignition switch to "OFF".
2 Turn washer switch to "ON"
3 Check continuity between ⑭ and ②



SEL711D

Trouble-shooting (Cont'd)

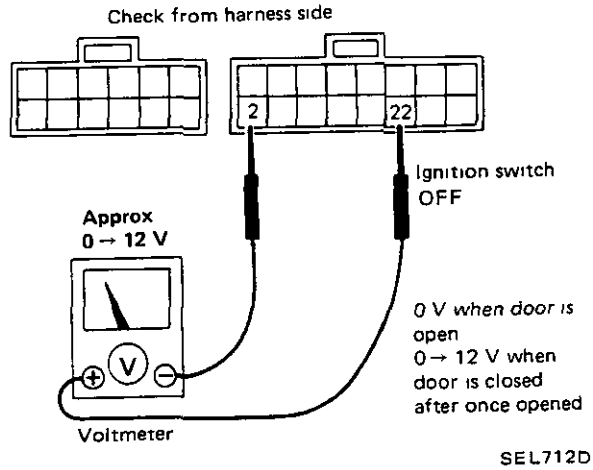
Interior lamp and step lamps do not fade out after all doors are closed

Check if door warning lamp goes off after all doors are closed

- O K → Go to "Power Supply Circuit Check"
  - O K → Check interior lamp circuit
    - O K → Replace T C U
    - N G → Check harness between T C U and interior lamp
  - N G → Check harness for T C U power supply circuit
- N G → Check door switch

INTERIOR LAMP CIRCUIT CHECK

1 Turn ignition switch to "OFF"
2 Measure voltage across ㉒ and ②



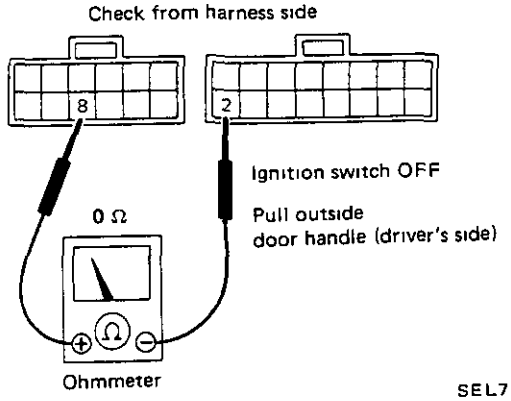
Illuminated entry system will not operate (Interior lamp will not illuminate when outside door handle on driver's side is pulled)

Check if interior lamp fades out after all doors are closed

- O K → Check door handle switch circuit check
  - O K → Replace T C U
  - N G → Check door handle switch
    - O K → Check harness between T C U and door handle switch
- N G → Go to "Interior lamp circuit check"
  - O K → Check door handle switch circuit check
  - N G → Check harness between T C U and interior lamp

DOOR HANDLE SWITCH CIRCUIT CHECK

1 Turn ignition switch to "OFF"
2 Pull outside door handle (driver's side).
3 Check continuity between ⑧ and ②



Trouble-shooting (Cont'd)

Door key hole illumination does not come on even if driver's side door handle is pulled

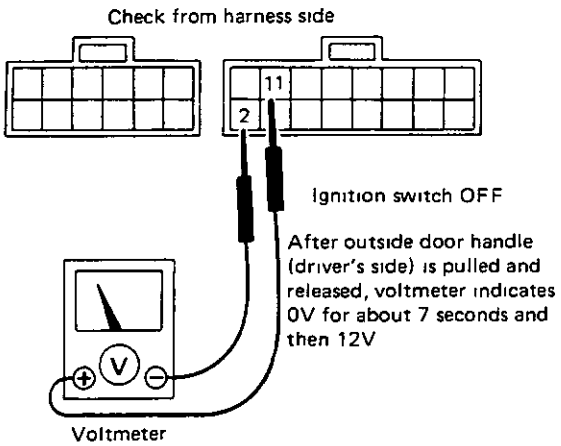
→ Go to "Power Supply Circuit Check"

- O K → Check key hole illumination circuit
- N G → Check harness for T C U power supply circuit

Check key hole illumination circuit

- O K → Go to "Door handle switch circuit check" (Refer to back page)
  - O K → Replace T C U
  - N G → Check harness between T C U and door handle switch
- N G → Check key hole illumination and diode
  - O K → Check harness between T C U and key hole illumination

1 Turn ignition switch to "OFF"
2 Pull outside door handle (driver's side)
3 Measure voltage across ⑪ and ②



SEL714D

Illumination control system does not actuate

Check light switch circuit

- O K → Check illumination circuit
- N G → Check harness between T C U and light switch

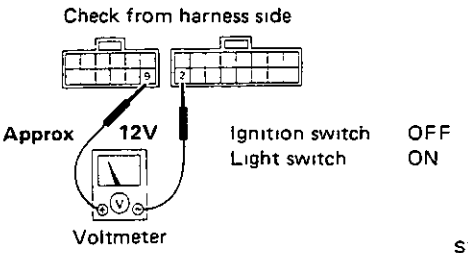
Check illumination circuit

- O K → Check illumination control circuit
- N G → Check for loose harness connector

Check illumination control circuit

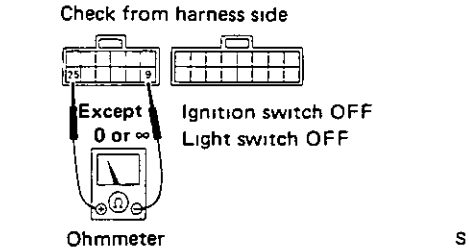
- O K → Replace T C U
- N G → Check illumination control switch

LIGHT SWITCH CIRCUIT CHECK



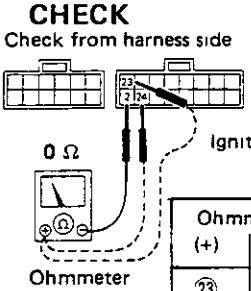
SEL715D

ILLUMINATION CIRCUIT CHECK



SEL716D

ILLUMINATION CONTROL CIRCUIT CHECK



Ohmmeter (+)	Ohmmeter (−)	Illumination control switch: DARK	Illumination control switch: BRIGHT
㉓	②	0 Ω	Except 0 Ω
㉔	②	Except 0 Ω	0 Ω

SEL717D

Trouble-shooting (Cont'd)

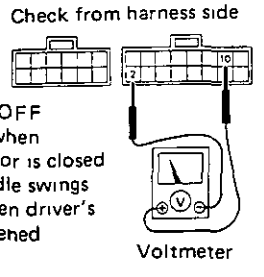
Warning chime does not activate

→ Go to "Power Supply Circuit Check"

- O K → Check chime circuit
  - O K → Go to "Light switch circuit check" (Refer to back page)
    - O K → Check steering lock switch circuit
      - O K → Replace T C U
      - N G → Check steering lock switch
    - N G → Check harness between T C U and light switch
  - N G → Check chime, and harness between T C U and chime
- N G → Check harness for T C U power supply circuit

CHIME CIRCUIT CHECK

1 Turn ignition switch to "OFF"
2 Measure voltage across ⑩ and ② when driver's door is opened and closed

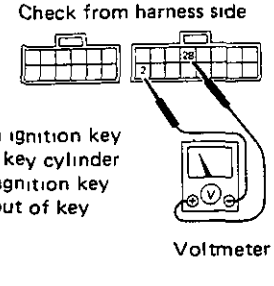


Ignition switch OFF
- Approx 12V when driver's side door is closed
- Voltmeter needle swings (0 ↔ 12V) when driver's side door is opened

SEL718D

STEERING LOCK SWITCH CIRCUIT CHECK

1 Turn ignition switch to "OFF"
2 Check voltage between ㉘ and ②



- 12V when ignition key is set into key cylinder
- 0V when ignition key is pulled out of key cylinder

SEL719D

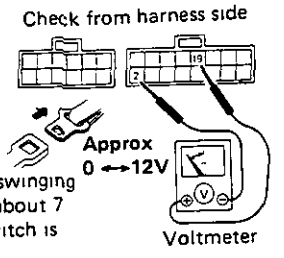
Seat belt warning lamp does not go off nor come on

→ Go to "Power Supply Circuit Check"

- O K → Check belt warning circuit
  - O K → Check seat belt switch circuit
    - O K → Replace T C U
    - N G → Check seat belt switch, and harness between T C U and seat belt switch
  - N G → Check warning lamp
- N G → Check harness for T C U power supply circuit

BELT WARNING CIRCUIT CHECK

1 Unfasten seat belt.
2 Measure voltage across ⑲ and ② when ignition switch is "ON"

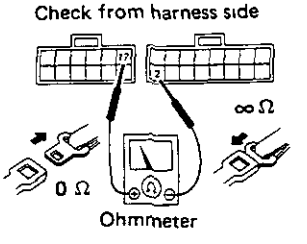


Voltmeter needle keeps swinging (approx 0 ↔ 12V) for about 7 seconds after ignition switch is turned ON

SEL720D

SEAT BELT SWITCH CIRCUIT CHECK

1 Turn ignition switch to "OFF"
2. Unfasten driver's seat belt.
3. Check for continuity between ⑰ and ②
4 Fasten driver's seat belt
5 Check to determine if continuity does not exist between ⑰ and ②



SEL721D

Trouble-shooting (Cont'd)

Rear defogger does not activate, or does not go off automatically

↓

Go to "Power Supply Circuit Check"

O K ↓ / N G ↓ Check harness for T C U power supply circuit

Check rear defogger circuit

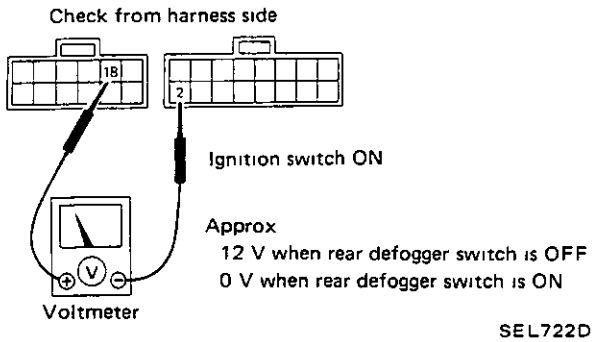
O K ↓ / N G ↓ Check rear defogger relay, and harness between T C U and rear defogger relay

Check defogger switch circuit

O K ↓ Replace T C U / N G ↓ Check defogger switch, and harness between T C U and defogger switch

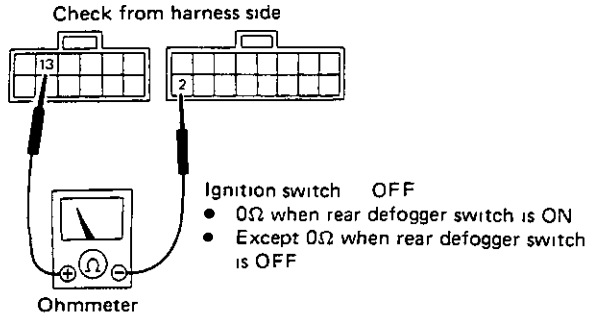
REAR DEFOGGER CIRCUIT CHECK

1. Turn ignition switch to "ON"
2. Measure voltage across ⑱ and ② while operating rear defogger switch



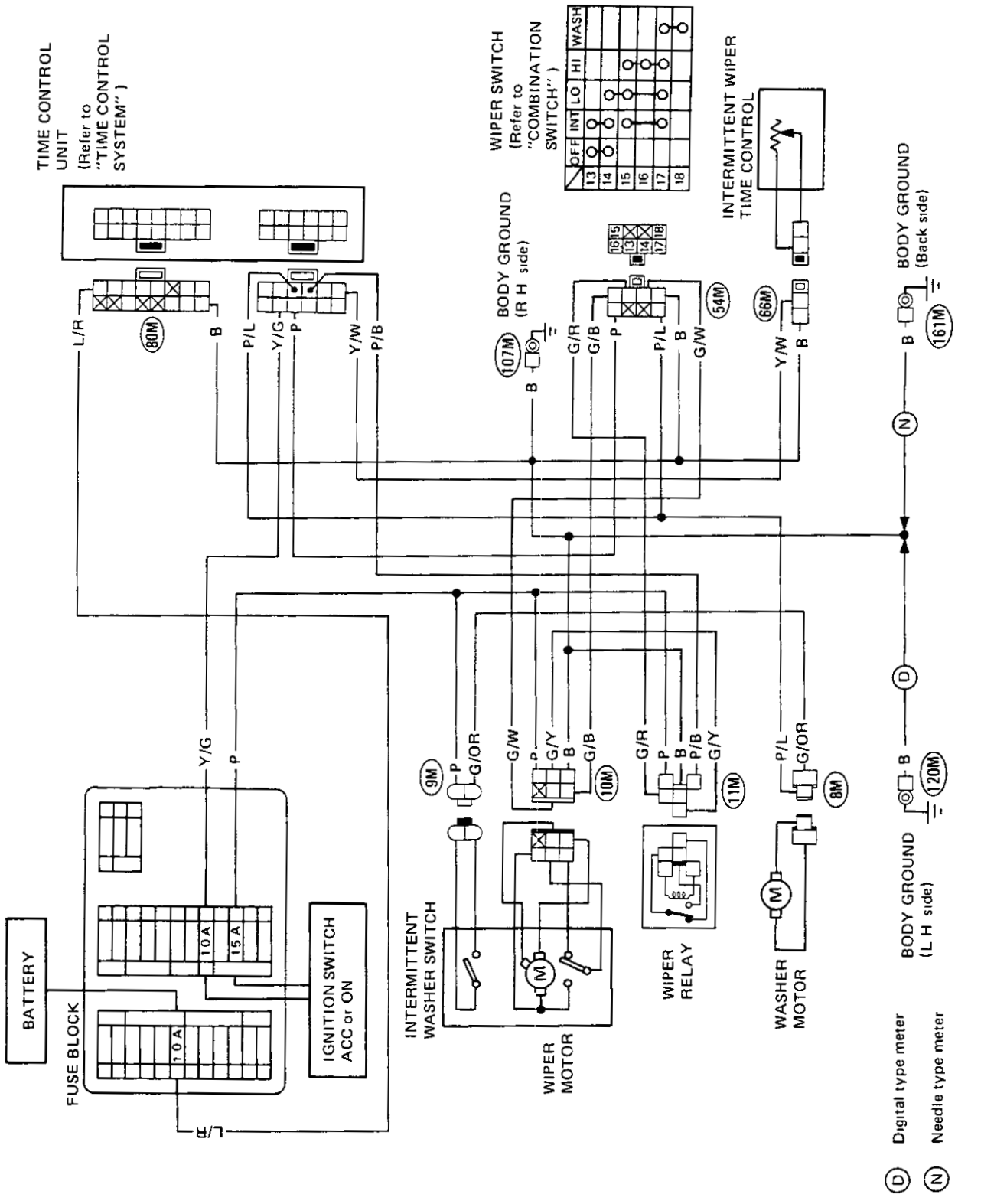
SEL722D

DEFOGGER SWITCH CIRCUIT CHECK

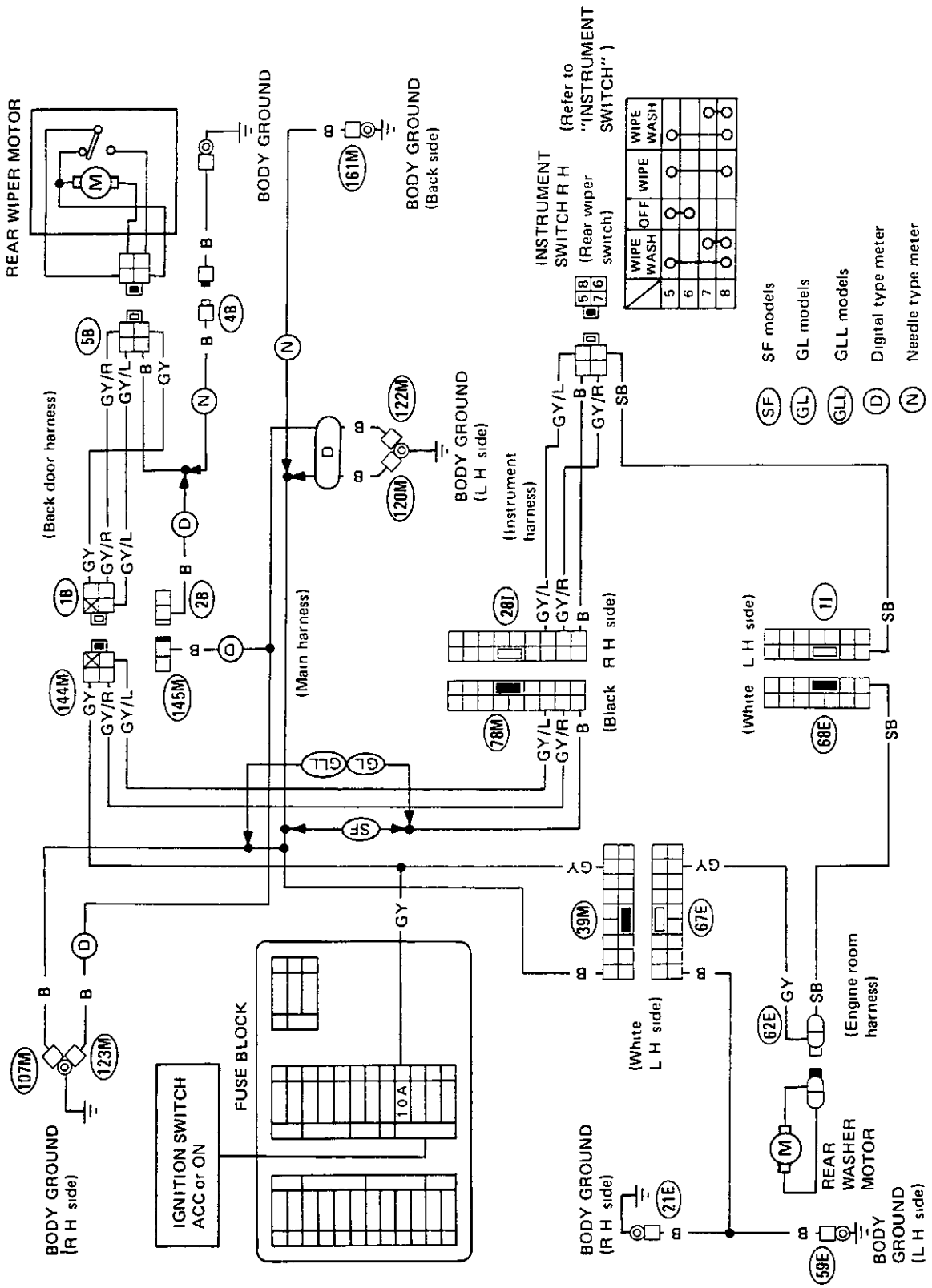


SEL723D

Windshield Wiper and Washer/Wiring Diagram

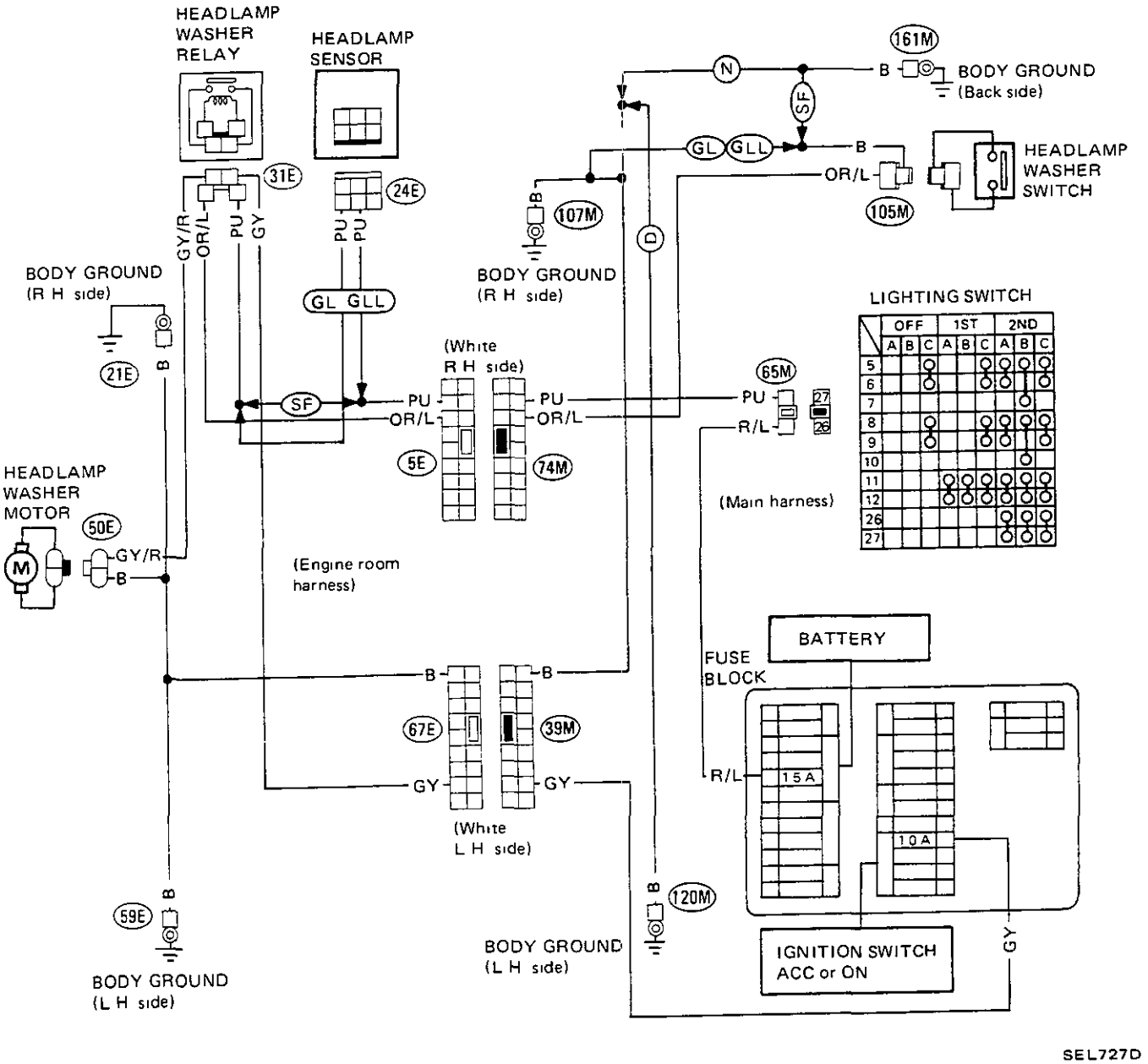


Rear Wiper and Washer/Wiring Diagram



SEL726D

Headlamp Washer/Wiring Diagram



SF SF models

GL GL models

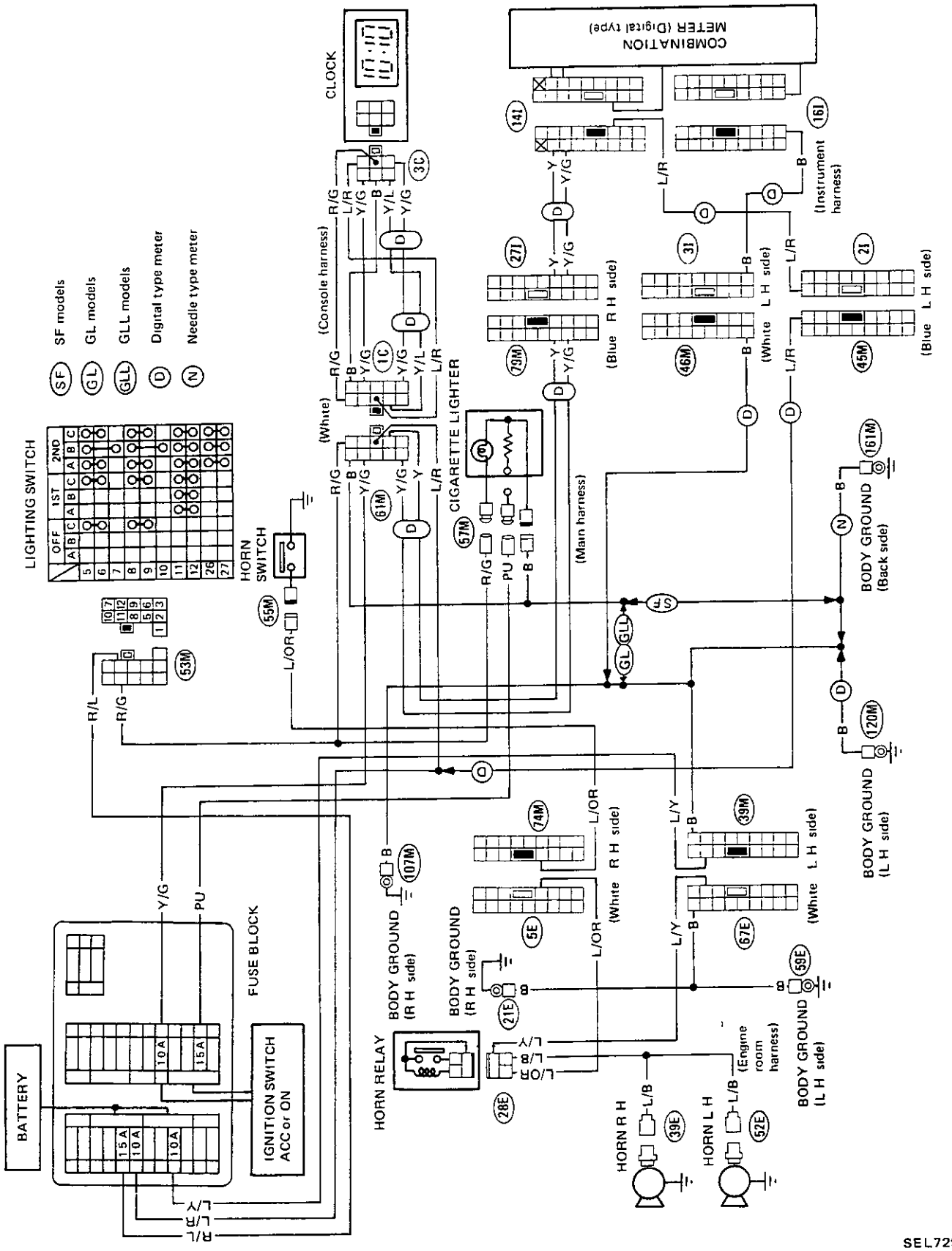
GLL GLL models

D Digital type meter

N Needle type meter

HORN, CIGARETTE LIGHTER, CLOCK

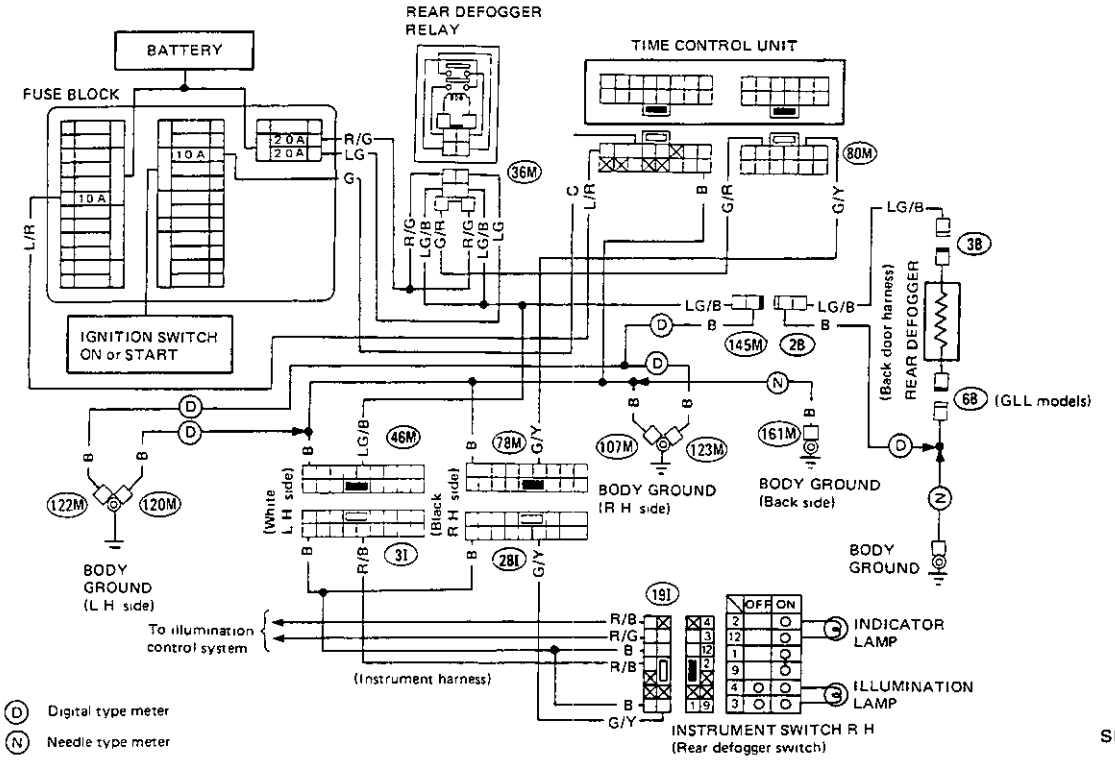
Wiring Diagram



SEL729D

REAR WINDOW DEFOGGER

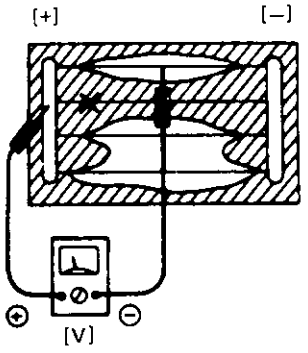
Wiring Diagram



SEL730D

Filament Check

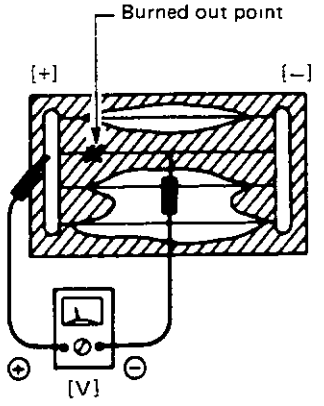
1 Attach probe circuit tester (in volt range) to middle portion of each filament



6 volts (normal filament)

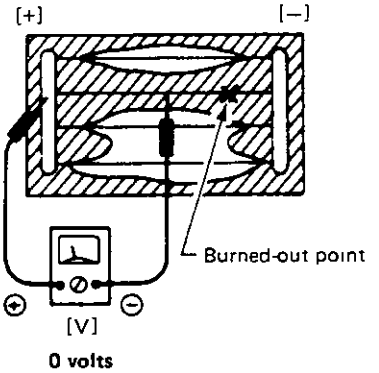
SEL263

2 If a filament is burned out, circuit tester registers 0 or 12 volts



12 volts

SEL264

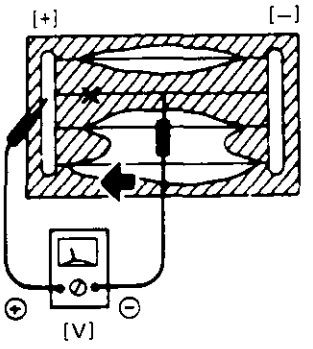


0 volts

SEL265

Filament Check (Cont'd)

3 To locate burned out point, move probe to left and right along filament to determine point where tester needle swings abruptly



SEL266

Filament Repair

REPAIR EQUIPMENT

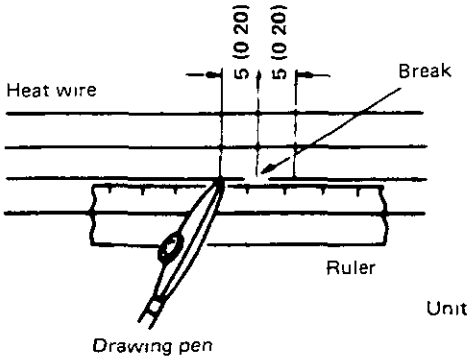
1 Conductive silver composition (Dupont No 4817 or equivalent)
2 Ruler, 30 cm (11 8 in) long
3 Drawing pen
4 *Heat gun*
5 Alcohol
6 Cloth

REPAIRING 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.

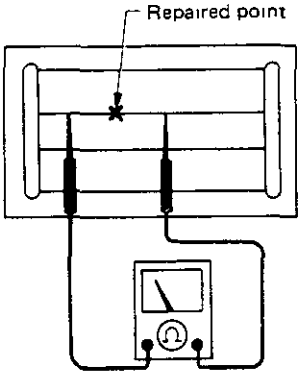


Unit mm (in)

BE540

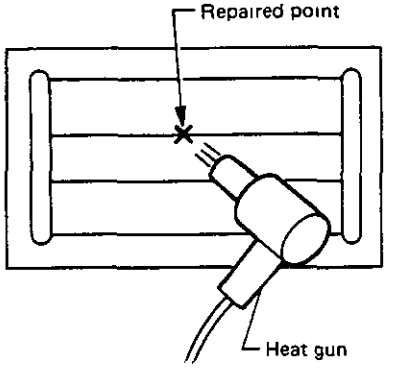
4 After repair has been completed, check repaired wire for continuity This check should be conducted 10 minutes after silver composition is deposited

Do not touch repaired area while test is being conducted



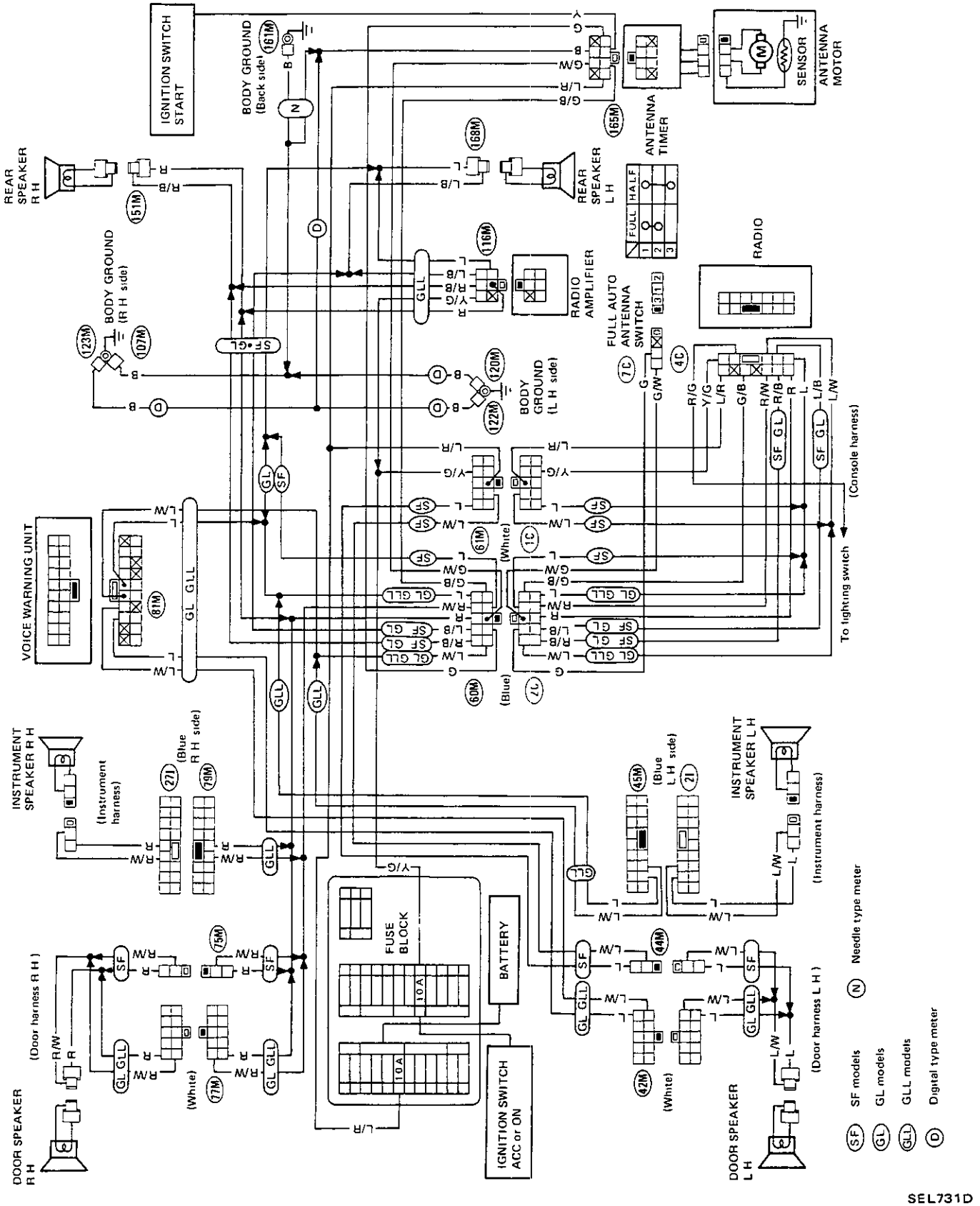
SEL012D

5 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.



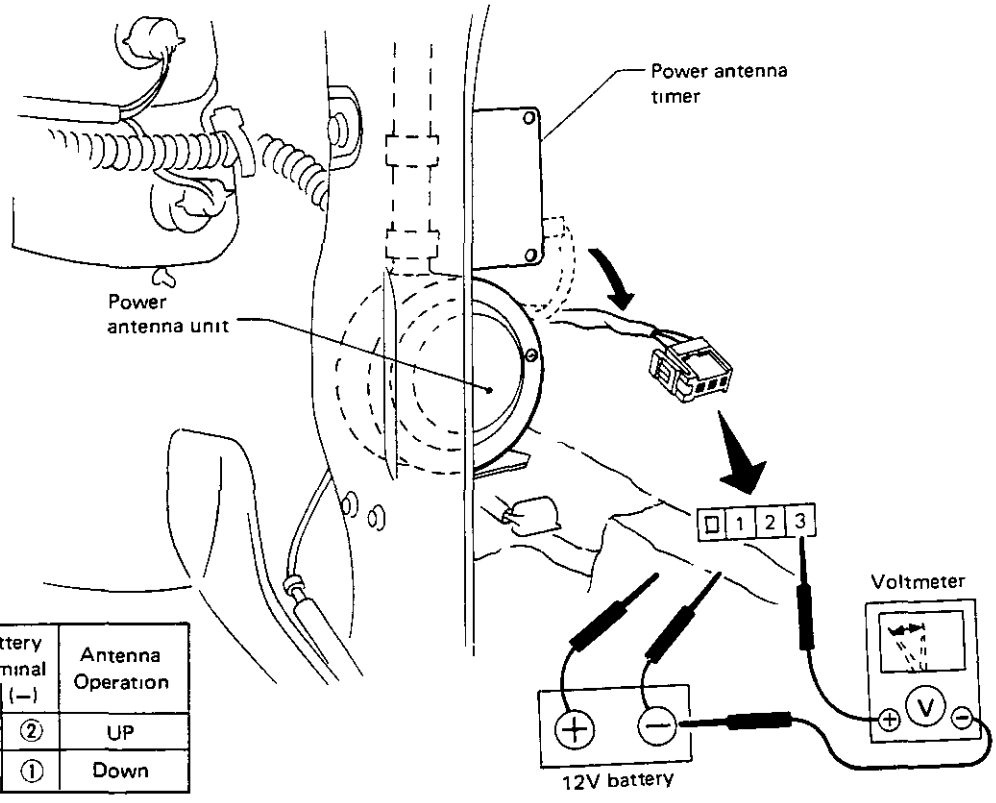
SEL013D

Wiring Diagram



SEL731D

Power Antenna Motor Check



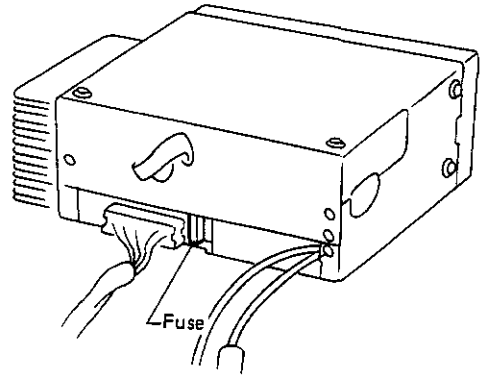
Battery terminal (+)	Battery terminal (−)	Antenna Operation
①	②	UP
②	①	Down

SEL732D

1 Disconnect, at connector, harness between power antenna unit and antenna timer.
2 Apply 12-volt battery voltage across ① and ② to make sure antenna rod extends and retracts
3. Connect a voltmeter across terminal ③ and ground terminal of battery.
4 Check to determine if voltmeter varies between 0 and 12 volts (approx) in relation to movement of antenna rod when 12-volt battery voltage is applied across ① and ②

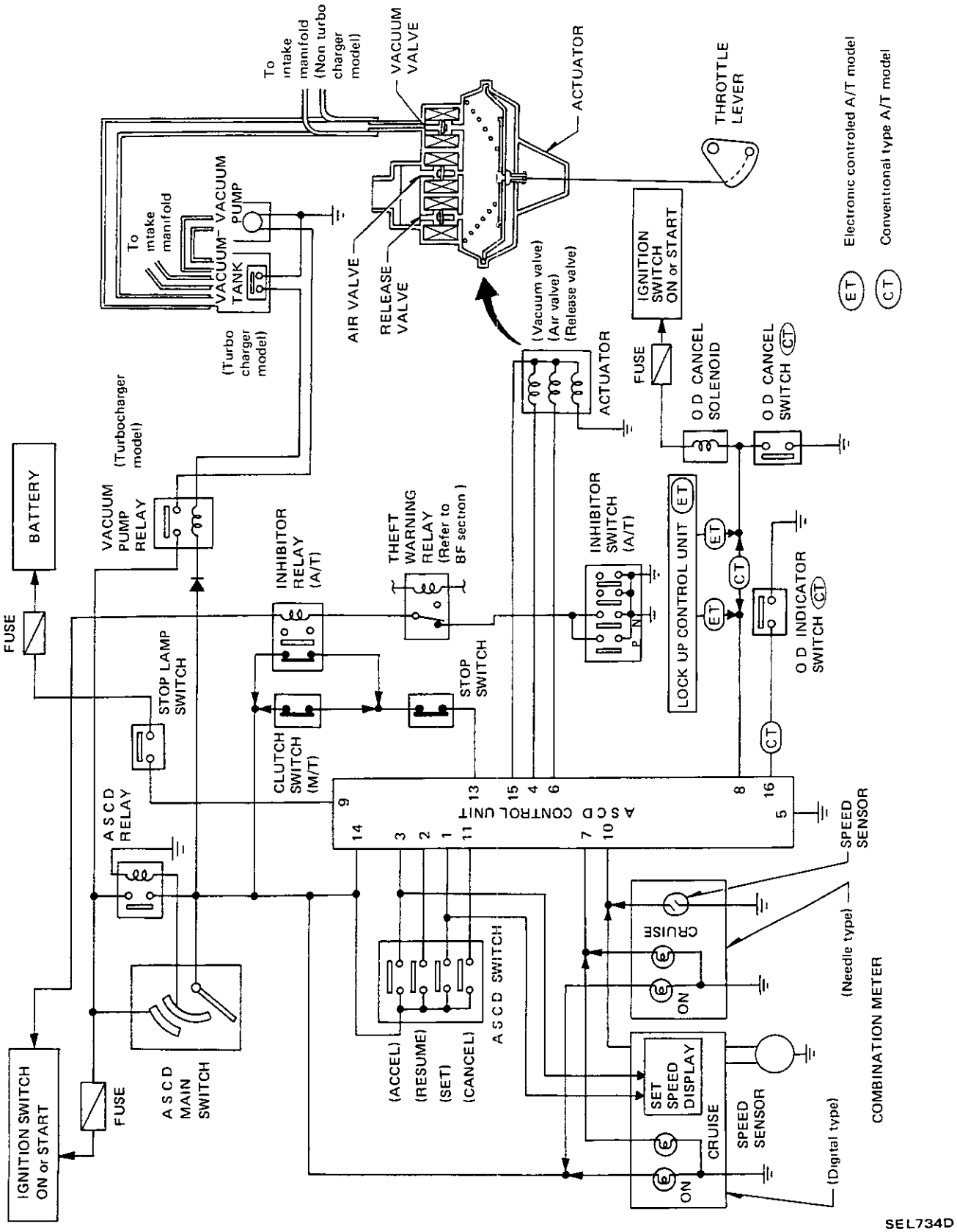
- **If above test results are not satisfactory, replace antenna motor.**

Radio Fuse Check

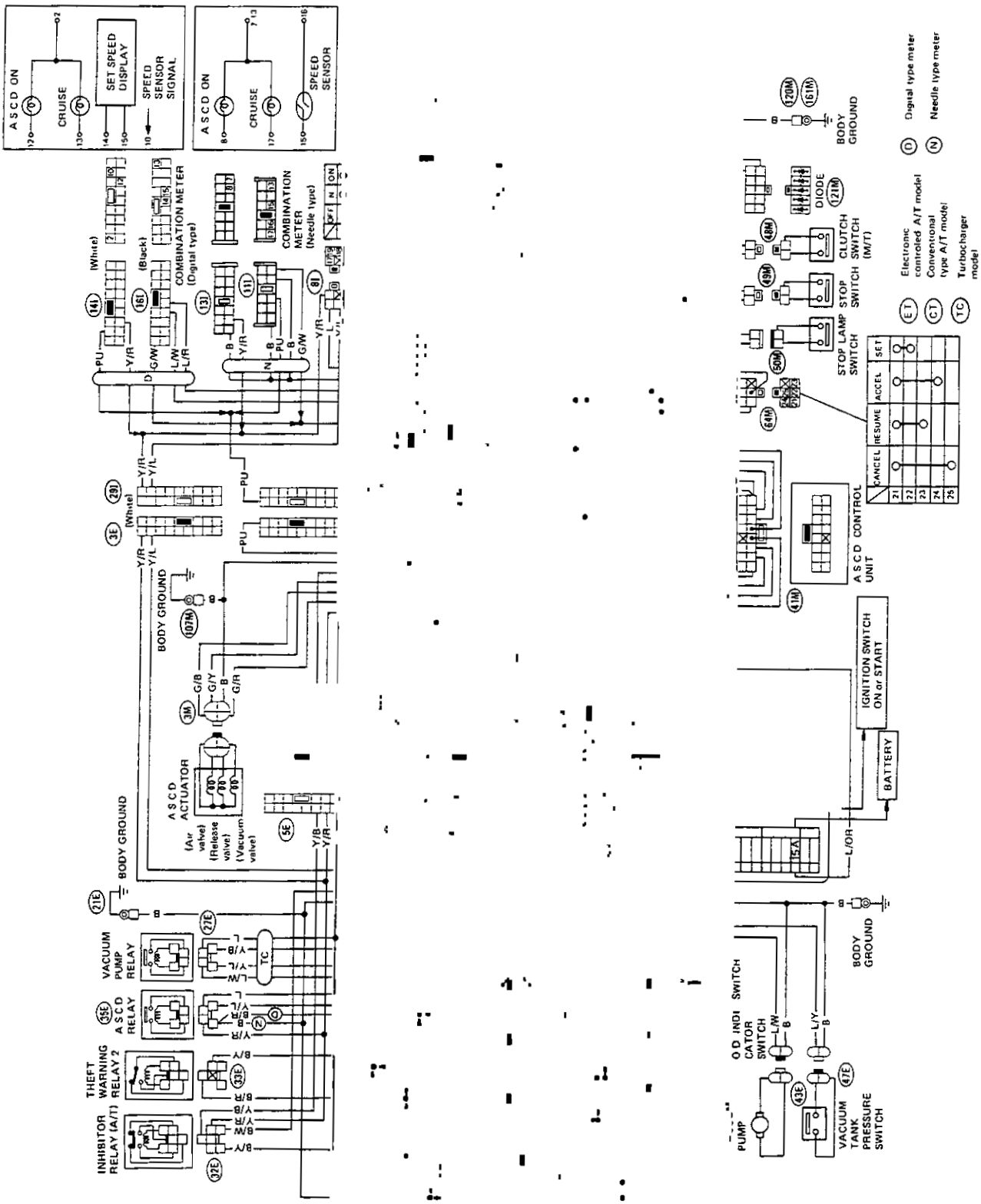


SEL733D

Schematic


To intake manifold (Non turbo charger model)
VACUUM VALVE
ACTUATOR
THROTTLE LEVER
To intake manifold
VACUUM TANK
VACUUM PUMP
(Turbo charger model)
AIR VALVE
RELEASE VALVE
(Vacuum valve) (Air valve) (Release valve)
IGNITION SWITCH ON or START
FUSE
O D CANCEL SOLENOID
O D CANCEL SWITCH (CT)
ACTUATOR
(Turbocharger model)
BATTERY
VACUUM PUMP RELAY
INHIBITOR RELAY (A/T)
THEFT WARNING RELAY (Refer to BF section)
INHIBITOR SWITCH (A/T)
LOCK UP CONTROL UNIT (ET)
O D INDICATOR SWITCH (CT)
FUSE
STOP LAMP SWITCH
STOP SWITCH
CLUTCH SWITCH (M/T)
A S C D CONTROL UNIT
ASCD RELAY
SPEED SENSOR
CRUISE
ON
(Needle type)
COMBINATION METER
A S C D SWITCH
(ACCEL)
(RESUME)
(SET)
(CANCEL)
SET SPEED DISPLAY
CRUISE
ON
SPEED SENSOR
(Digital type)
IGNITION SWITCH ON or START
FUSE
A S C D MAIN SWITCH
Electronic controled A/T model
Conventional type A/T model
SEL734D

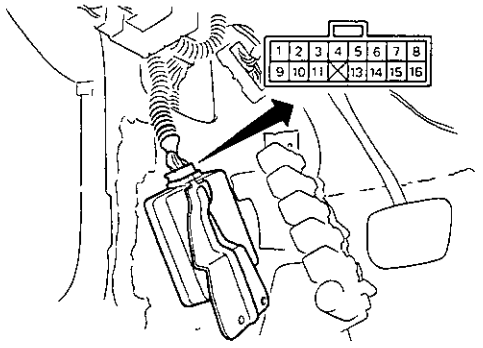
Wiring Diagram



SEL735D

Preparation for Trouble-shooting

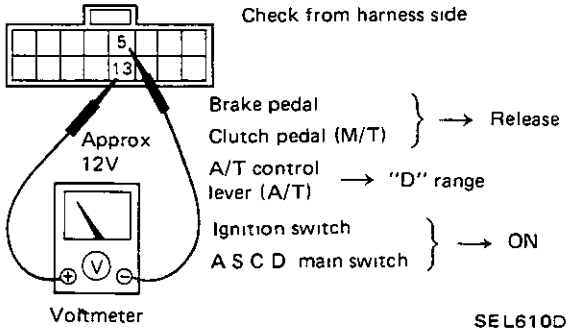
- Remove A S C D control unit with harness connected.



SEL736D

POWER SUPPLY CIRCUIT CHECK

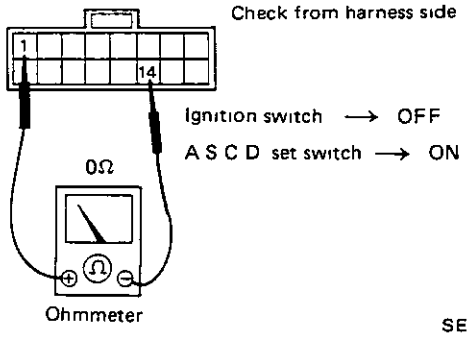
1 Release brake and clutch pedals
2 Turn ignition switch to "ON"
3 Turn A S.C.D main switch to "ON"
4. Check voltage between ⑬ and ⑤



SEL610D

SET SWITCH CIRCUIT CHECK

1. Turn ignition switch to "OFF".
2 Push A.S.C.D. set switch
3 Check continuity between ① and ⑭



SEL611D

Trouble-shooting

A S C D control unit cannot be set properly

Turn A S C D main switch "OFF" and then "ON" to make sure indicator (located above combination meter) illuminates

- Yes → Check for loose vacuum hose → O K → Check power supply circuit for A S C D control unit
- No → Check A S C D main switch and A S C D relay

Check power supply circuit for A S C D control unit

- O K → Check set switch circuit for A S C D control unit
- N G → Check stop switch, clutch switch (M/T model), inhibitor relay and inhibitor switch (A/T model)
  - O K → Check harness between A S C D power supply circuit
  - N G → Repair or replace

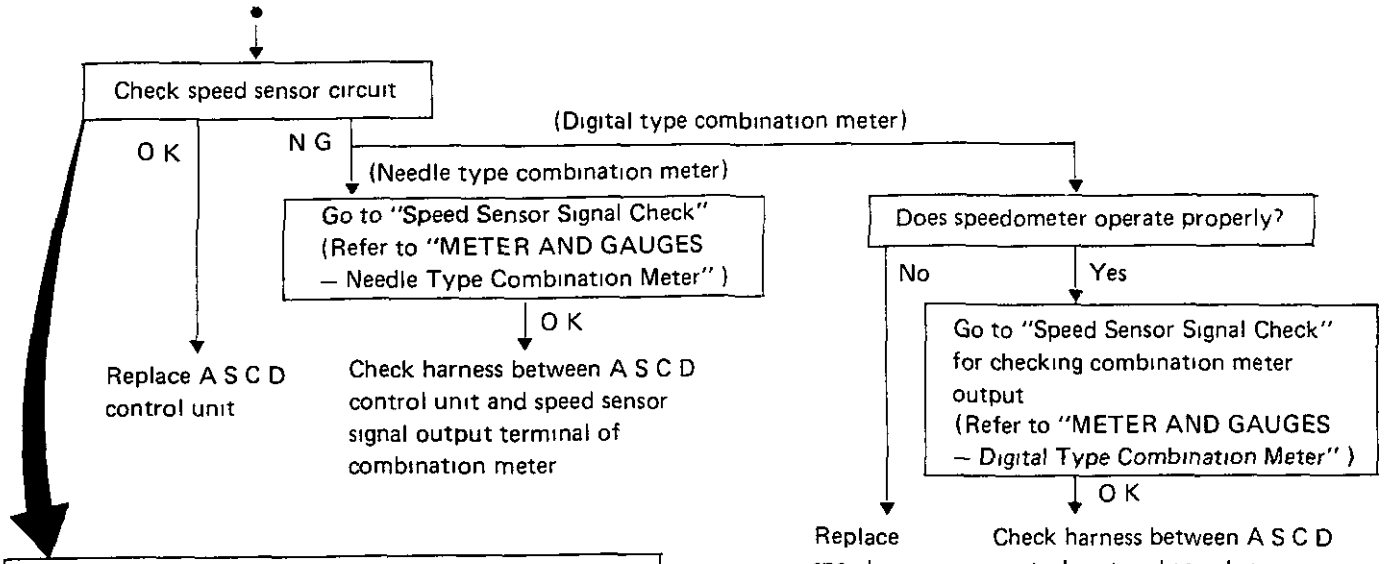
Check set switch circuit for A S C D control unit

- O K → Go to "A S C D Actuator Check"
- N G → Check set switch, and harness between control unit and set switch

Go to "A S C D Actuator Check"

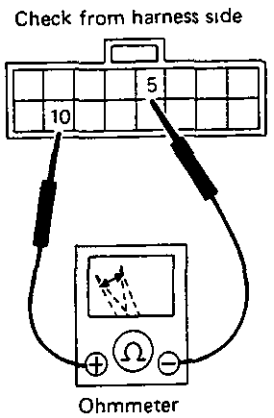
- O K → * (Next page)
- N G → Replace actuator

Trouble-shooting (Cont'd)



1. Turn ignition switch to "OFF"
2. Disconnect speedometer cable from transmission
3. Connect an ohmmeter between ⑩ and ⑤.
4. Slowly turn speedometer cable pinion by hand to make sure ohmmeter pointer deflects

- **Ohmmeter pointer deflects twice per rotation of pinion.**



Trouble-shooting (Cont'd)

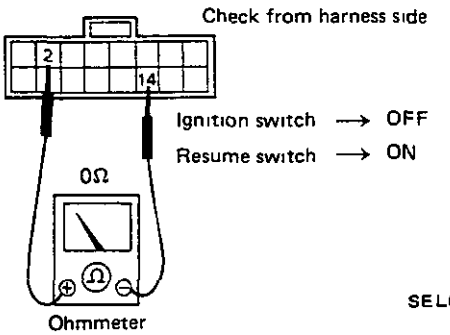
Resume switch will not operate

Check resume switch circuit

- O K → Replace A S C D control unit
- N G → Check resume switch

RESUME SWITCH CIRCUIT CHECK

1. Turn ignition switch to "OFF"
2. Turn resume switch to "ON".
3. Check continuity between ② and ⑭



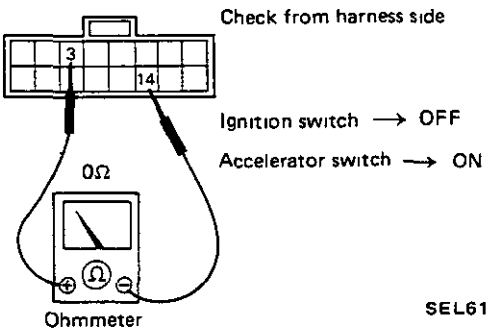
Accelerate switch will not operate

Check accelerate switch circuit

- O K → Replace A.S C D control unit
- N G → Check accelerate switch

ACCELERATE SWITCH CIRCUIT CHECK

1. Turn ignition switch to "OFF".
2. Turn accelerate switch to "ON"
3. Check continuity between ③ and ⑭



Engine hunts

Check vacuum hose for breakage, cracks or fracture

- O K → Does A S C D wire move smoothly?
- N G → Repair or replace hose

Does A S C D wire move smoothly?

- O K → Go to "Actuator Check"
- N G → Repair or replace wire

Go to "Actuator Check"

- O K → Replace A S C D control unit
- N G → Replace actuator

Large difference between set vehicle speed and actual speed

Check A S C D wire and actuator move smoothly

- O K → Check vacuum hose for breakage, cracks or fracture
- N G → Replace wire or actuator

Check vacuum hose for breakage, cracks or fracture

- O K → Go to "Actuator Check"
- N G → Repair or replace hose

Go to "Actuator Check"

- O K → Replace A.S C D control unit
- N G → Replace actuator

Trouble-shooting (Cont'd)

A/T model only
- When A S C D is set while vehicle is operating in "O D " range, O D will be cancelled and shifting to O D cannot be made thereafter
- While vehicle is being driven using A S C D in "O D " range, O D will not be cancelled even if actual car speed is 6 km/h (4 MPH) lower than set speed (Set speed cannot be maintained)

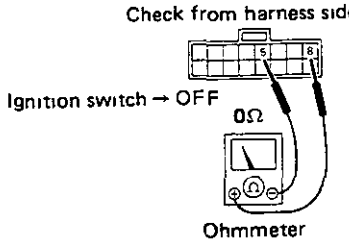
Check O D cancel circuit for A S C D control unit

OK → Replace A S C D control unit

NG →
- **Electronic-controlled A/T** Check harness between lock-up control unit and A S C D control unit
- **Conventional A/T** Check harness between O D. cancel solenoid, O D. cancel switch and A S C D control unit

ELECTRONIC-CONTROLLED A/T EQUIPPED MODEL (E4N71B)

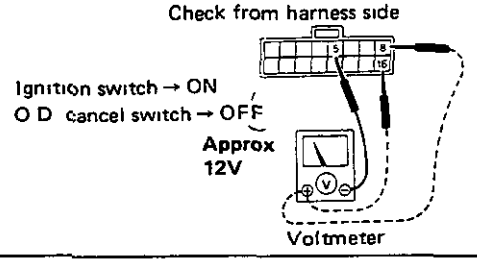
- Turn ignition switch to "OFF".
- Check continuity between ⑧ and ⑤



SEL737D

CONVENTIONAL A/T EQUIPPED MODEL (4N71B)

- Turn ignition switch to "ON"
- Turn O D. cancel switch to "OFF".
- Check voltage ⑧ - ⑤ and ⑯ - ⑤

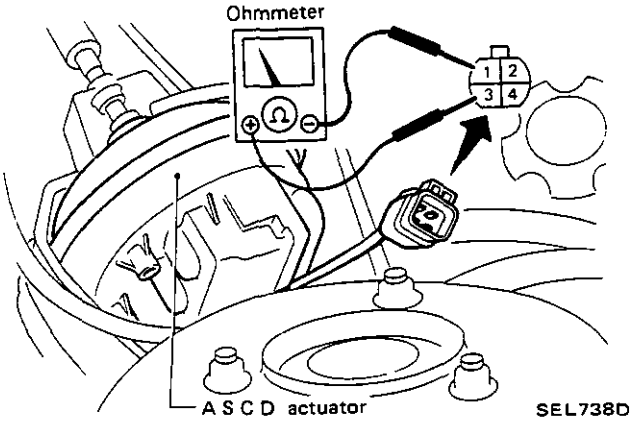


SEL741D

A.S.C.D. Actuator Check

1. Check continuity between terminal ① and terminals ②, ③ and ④.

Continuity exist ... O.K.

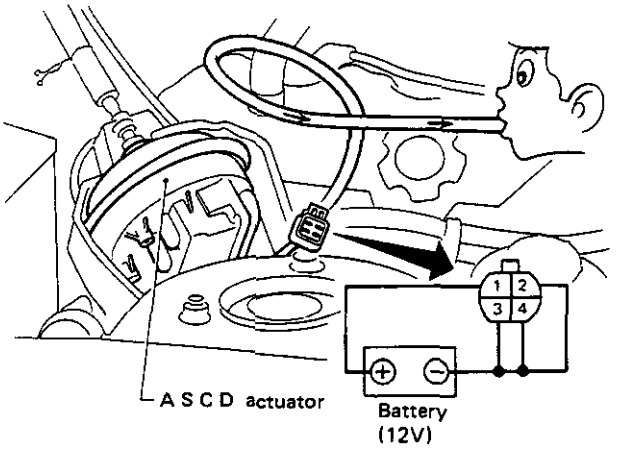


SEL738D

CAUTION:
Do not attempt to remove valves from actuator.

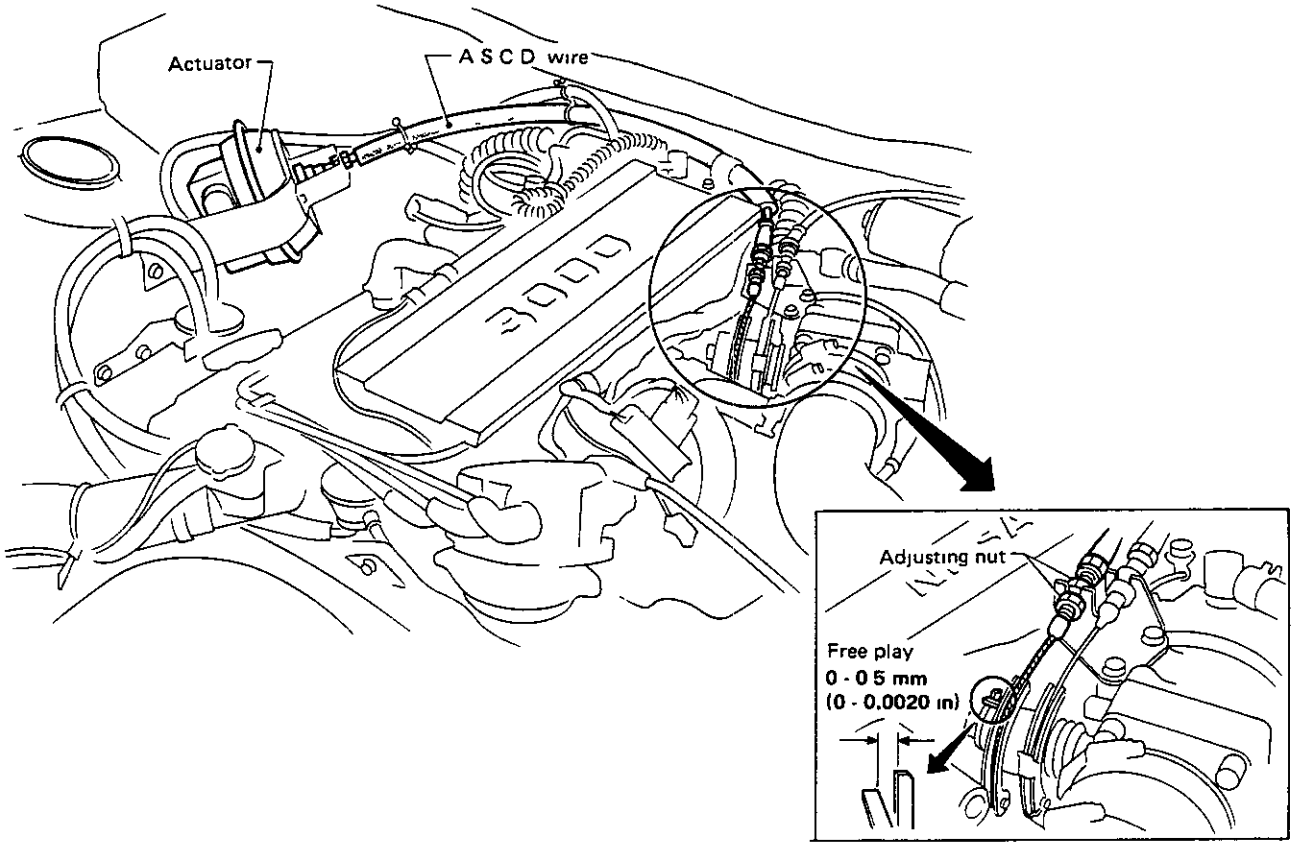
2 Connect battery (approx 12V) to harness connector of actuator as shown below, and apply vacuum to actuator
If diaphragm moves smoothly, actuator is O.K.

CAUTION·
When checking actuator by applying vacuum, do not apply engine vacuum directly as it is too strong to check actuator properly.



SEL739D

A.S.C.D. Wire Adjustment



SEL740D

CAUTION:

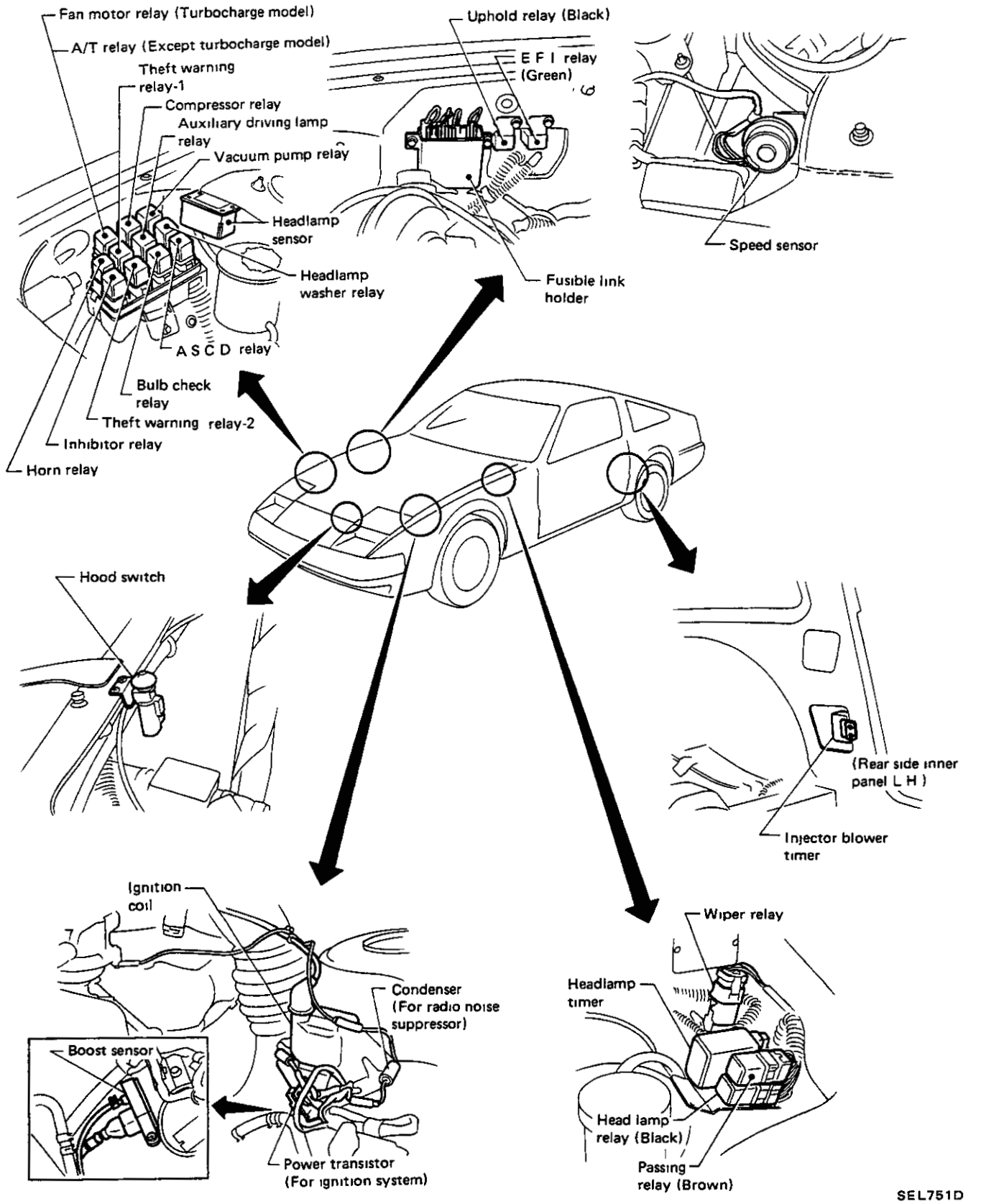
- **Be careful not to twist wire when removing it.**
- **Do not tense wire excessively during adjustment.**

Without depressing the accelerator pedal, adjust wire tension with adjusting nut

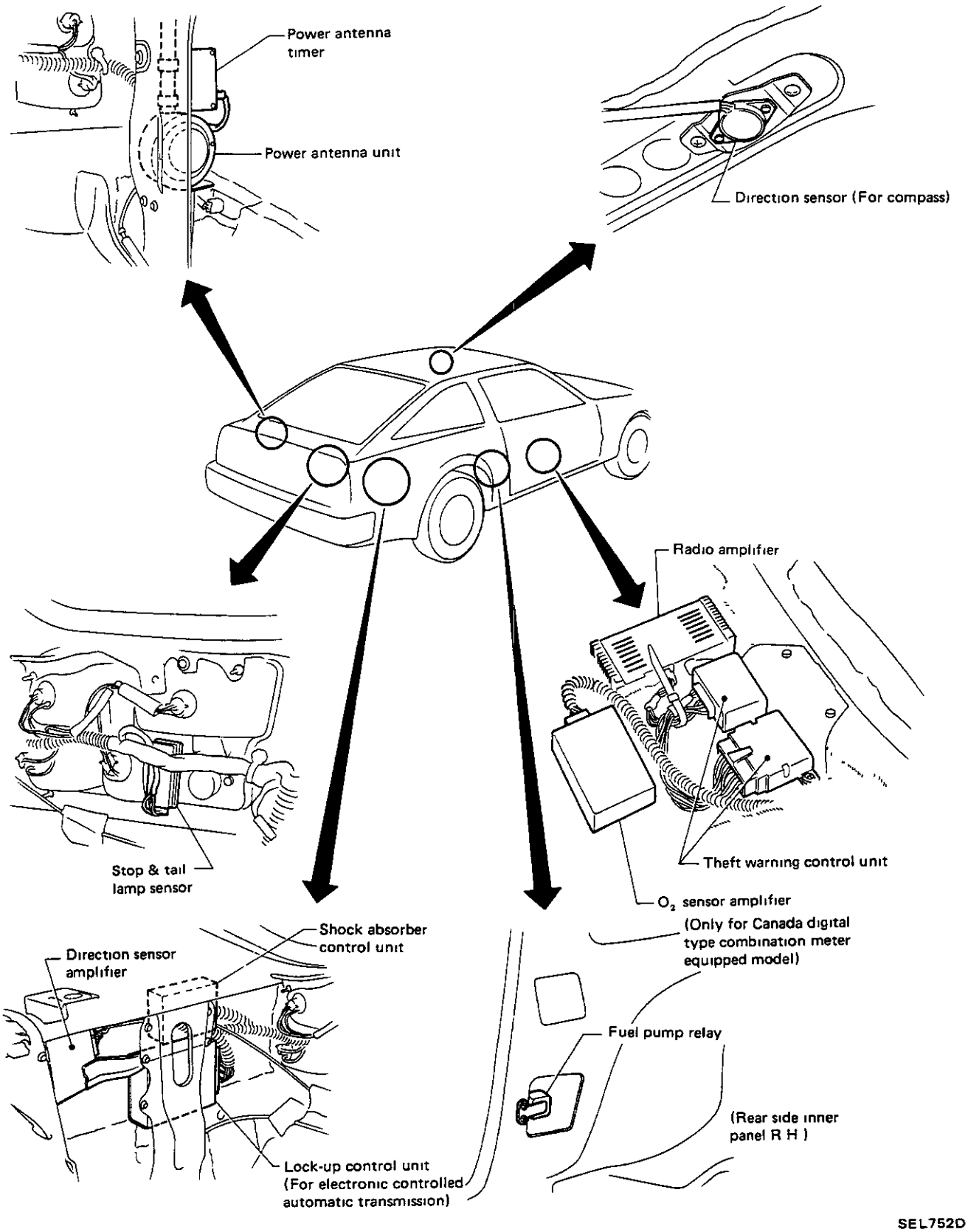
Wire free play (at throttle lever):
0 - 0.5 mm (0 - 0.020 in)

- For A S.C.D. stop switch and clutch switch adjustment, refer to BR and CL sections.
- For vacuum pump and tank check, refer to HA section.

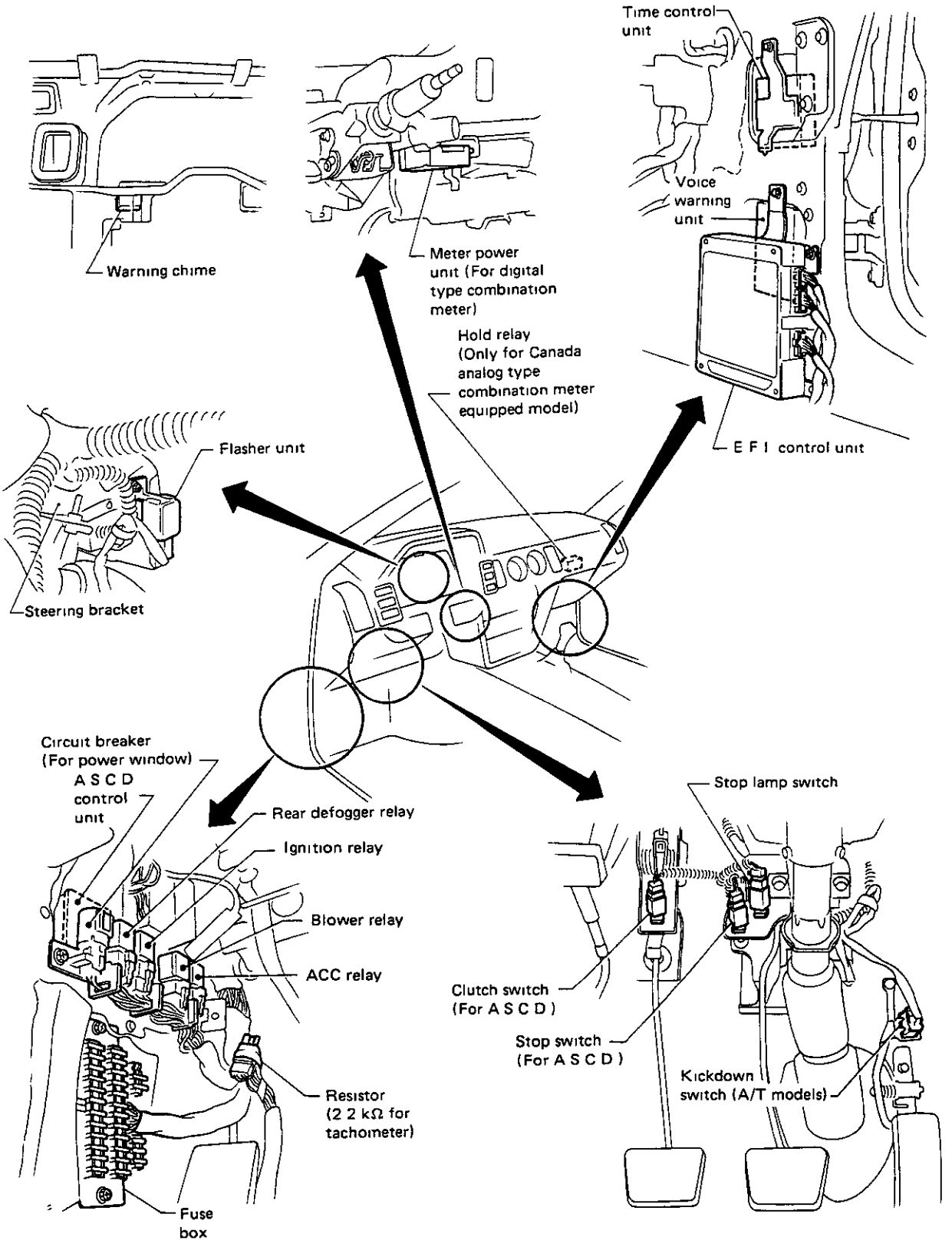
LOCATION OF ELECTRICAL UNITS



LOCATION OF ELECTRICAL UNITS

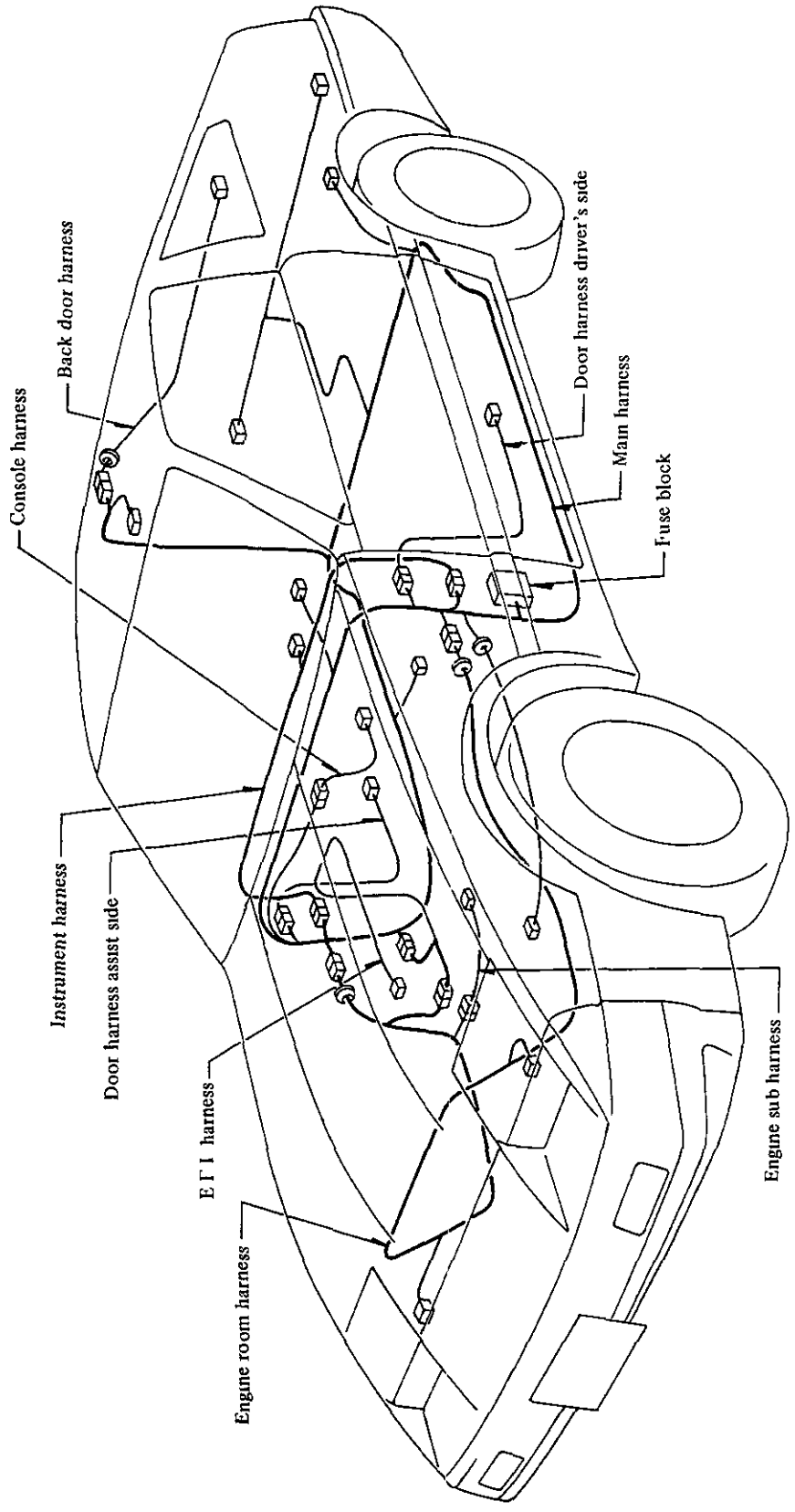


LOCATION OF ELECTRICAL UNITS



SEL753D

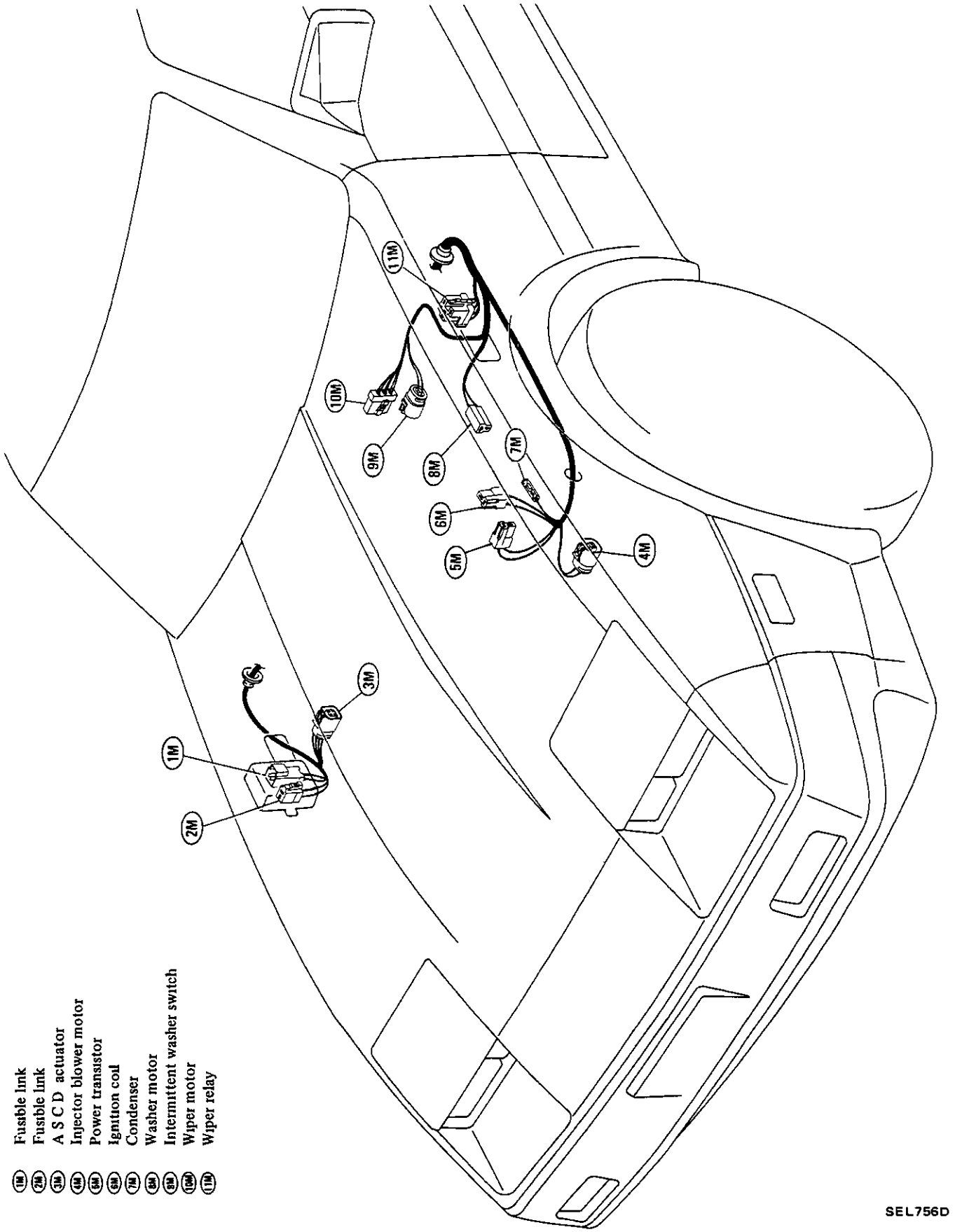
Outline



SEL754D

HARNESS LAYOUT

Main Harness



(1M) Fusible link
(2M) Fusible link
(3M) A S C D actuator
(4M) Injector blower motor
(5M) Power transistor
(6M) Ignition coil
(7M) Condenser
(8M) Washer motor
(9M) Intermittent washer switch
(10M) Wiper motor
(11M) Wiper relay

SEL756D

(32M) Fuse block
(33M) Accessory relay
(34M) Blower relay
(35M) Ignition relay
(36M) Rear defogger relay
(37M) Circuit breaker (Power window equipped model)
(38M) Resistor
(39M) . To (67E) (White)
(40M) To (66E) (Blue)

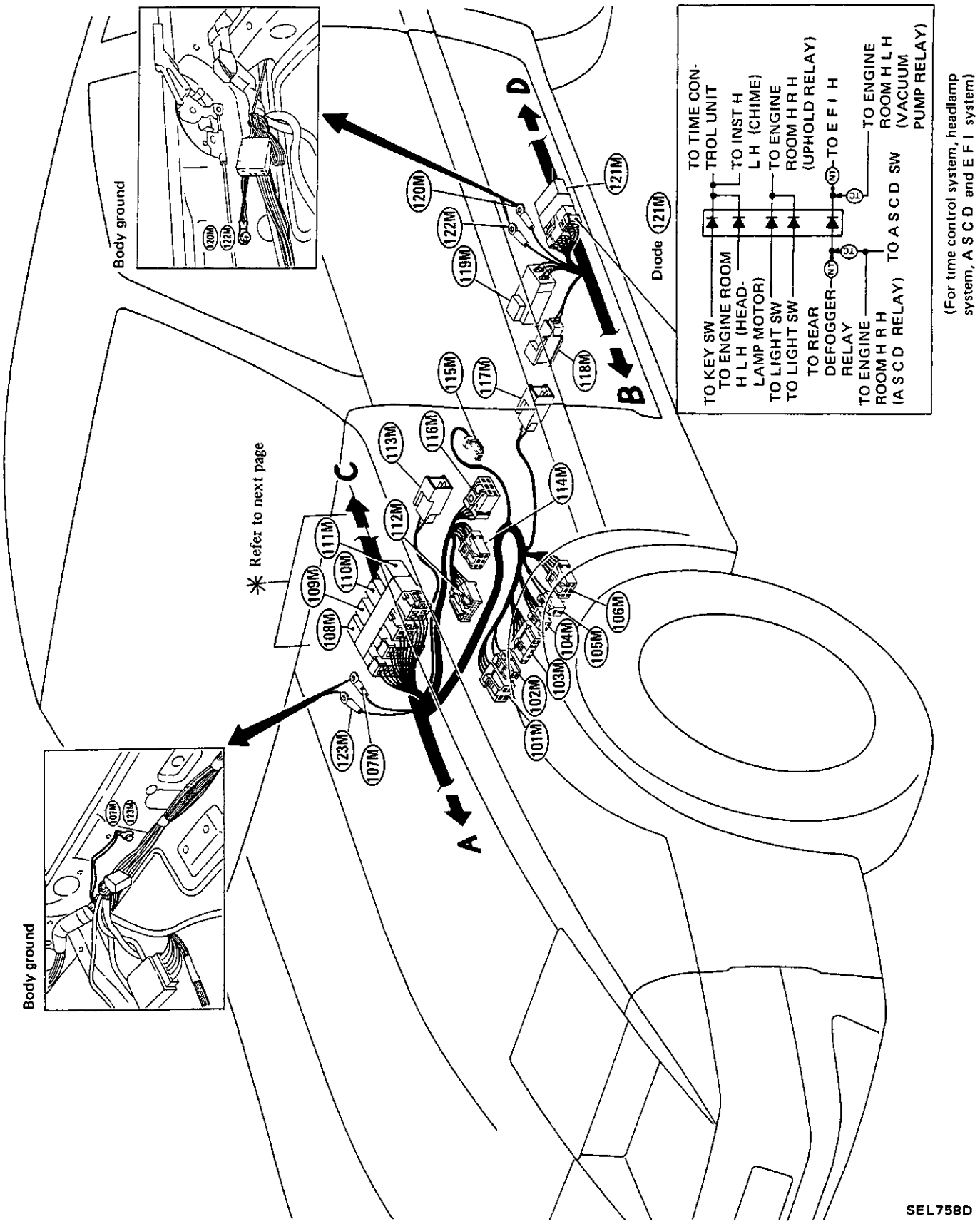
(41M) A S C D control unit
(42M) To door harness L H (White)
(43M) To door harness L H (Blue)
(44M) To door harness L H (SF models)
(45M) To (2I) (Blue) (GLL models)
(46M) To (3I) (White)
(47M) To (69E) (Non-turbocharger models)
(48M) . Clutch switch (A S C D)
(49M) . Stop switch (A S C D)
(50M) Stop lamp switch
(51M) Step lamp L H
(52M) Kickdown switch (A/T models)
(53M) Lighting switch
(54M) Wiper switch
(55M) Horn switch
(56M) Key lamp

(57M) Cigarette lighter
(58M) Ash tray lamp
(59M) Step lamp R H
(60M) . To (2C) (Blue)
(61M) To (1C) (White)
(62M) Flasher unit
(63M) Ignition switch
(64M) A S C D switch
(65M) Headlamp switch
(66M) Intermittent wiper time control
(67M) Steering lock switch
(68M) Air conditioner harness
(69M) Air conditioner harness
(70M) Air conditioner harness
(71M) To (1E) (Non-turbocharger models)
(72M) To (2E) (Turbocharger models)
(73M) To (4E) (Blue)
(74M) To (5E) (White)
(75M) To door harness R H (SF models)
(76M) To door harness R H (GL and GLL models)
(77M) To door harness R H (GL and GLL models)

(78M) To (28I) (Black)
(79M) . To (27I) (Blue) (GLL models)
(80M) Time control unit
(81M) Voice warning unit
(82M) To E F I harness (Non-turbocharger models)
(83M) To E F I harness

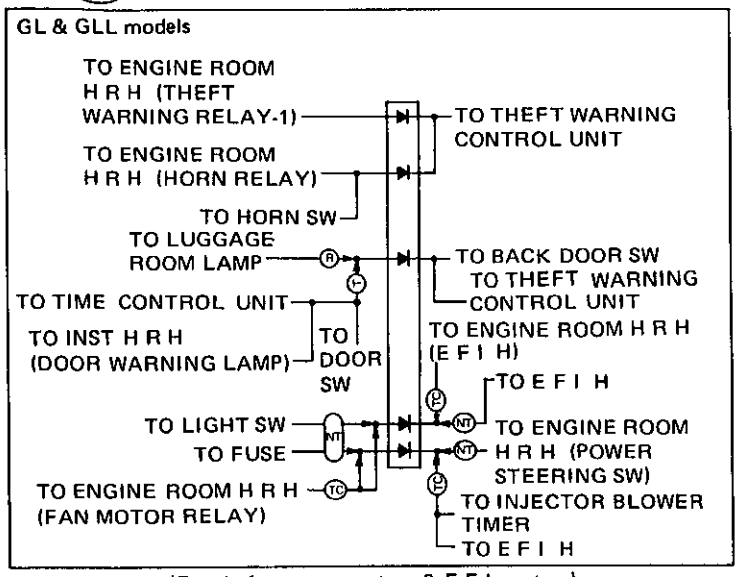
SEL757D

Main Harness (Cont'd)



Diode (108M)

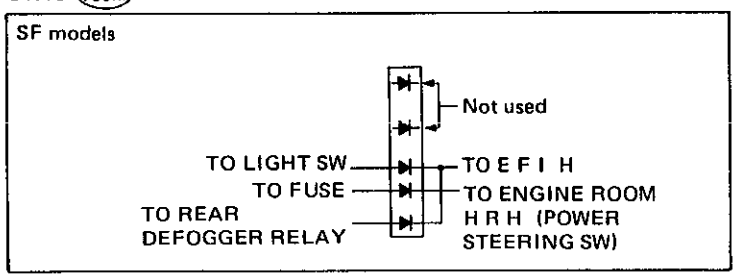
GL & GLL models



(For theft warning system & E F I system)

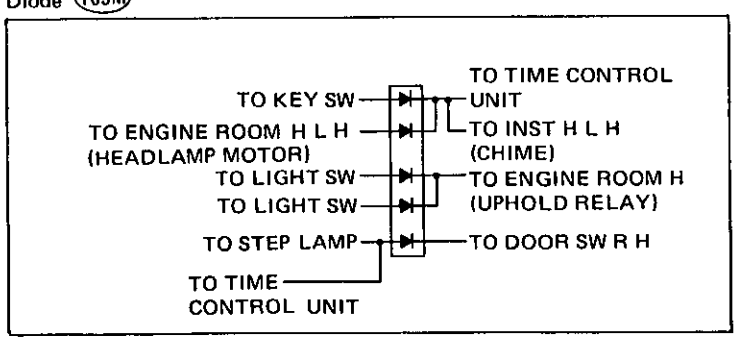
Diode (108M)

SF models



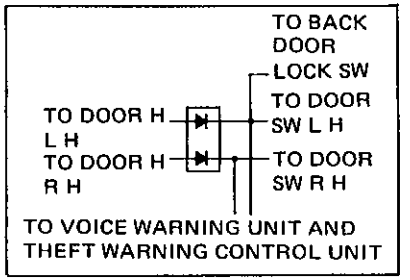
(For E F I system)

Diode (109M)



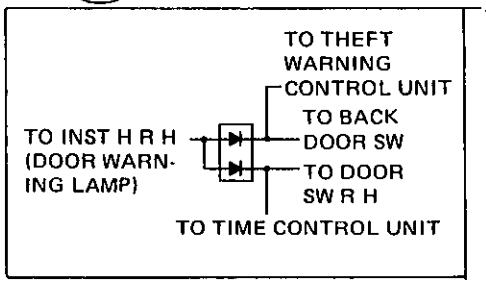
(For headlamp system & time control system)

Diode (110M)



(For voice warning system & theft warning system)

Diode (111M) ✳

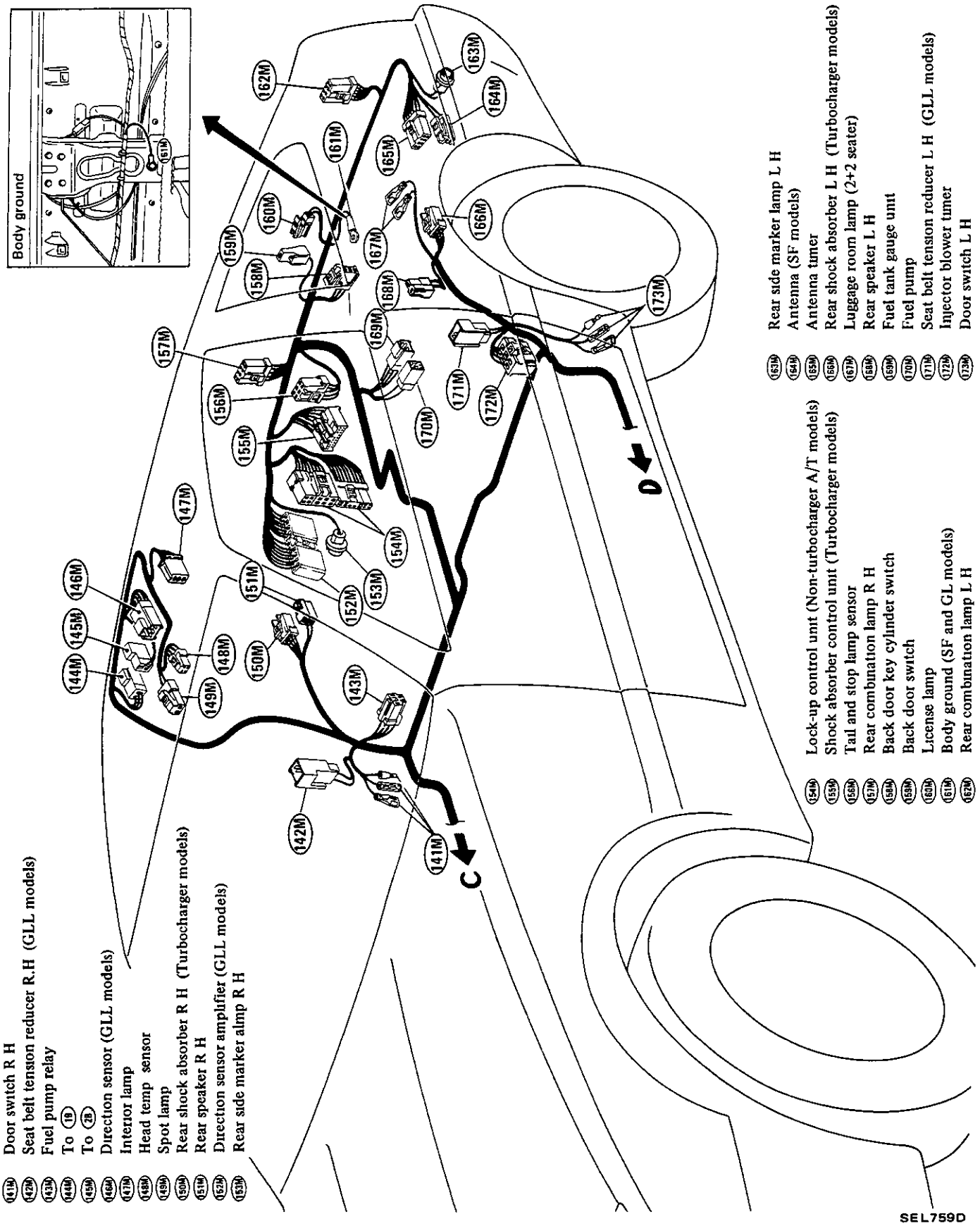


(For theft warning system & time control system)

Ⓣ Turbocharger models
Ⓝ Non turbocharger models
Ⓡ 2+2 seater
Ⓣ 2 seater

101M Door mirror defogger switch
102M A/T indicator lamp
103M Remote control mirror switch
104M O D switch (A/T models)
105M Headlamp cleaner switch
106M Shock absorber switch (Turbocharger models)
107M Body ground
108M Diode
109M Diode (SF models)
110M Diode (GL and GLL models)
111M Diode (2+2 seater)
112M Theft warning control unit
113M Seat belt switch R H (GLL models)
114M O_2 sensor control amp (GLL models)
115M Parking brake switch
116M Radio amplifier (GLL models)
117M Seat belt switch L H (SF models)
118M Seat belt switch L H (GL models)
119M To power seat harness (GLL models)
120M Body ground (GLL models)
121M Didoe (GL and GLL models)
122M Body ground (GLL models)
123M Body ground (GLL models)

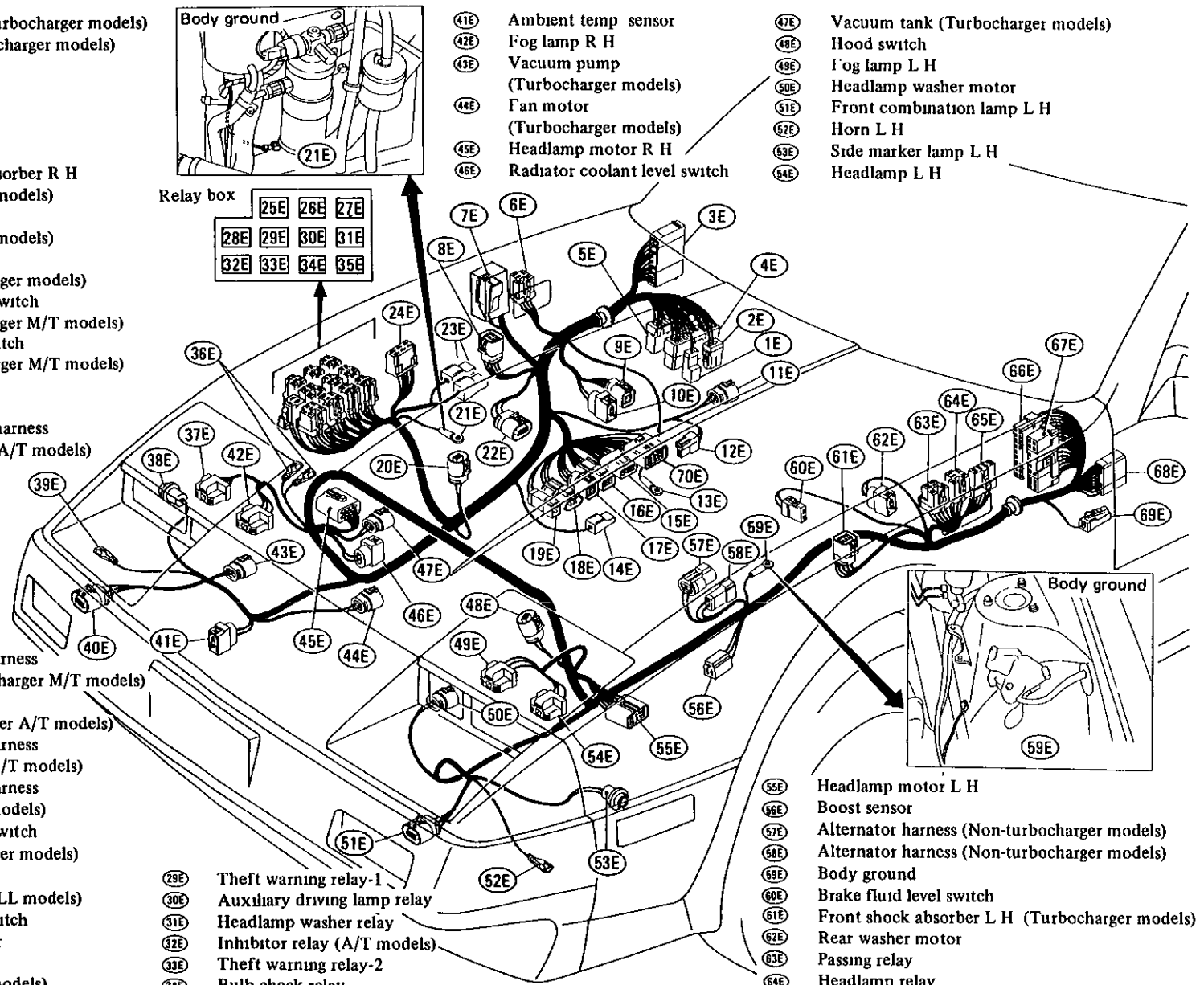
Main Harness (Cont'd)



141M Door switch R H
142M Seat belt tension reducer R.H (GLL models)
143M Fuel pump relay
144M To (1B)
145M To (2B)
146M Direction sensor (GLL models)
147M Interior lamp
148M Head temp sensor
149M Spot lamp
150M Rear shock absorber R H (Turbocharger models)
151M Rear speaker R H
152M Direction sensor amplifier (GLL models)
153M Rear side marker almp R H

154M Lock-up control unit (Non-turbocharger A/T models)
155M Shock absorber control unit (Turbocharger models)
156M Tail and stop lamp sensor
157M Rear combination lamp R H
158M Back door key cylinder switch
159M Back door switch
160M License lamp
161M Body ground (SF and GL models)
162M Rear combination lamp L H

163M Rear side marker lamp L H
164M Antenna (SF models)
165M Antenna timer
166M Rear shock absorber L H (Turbocharger models)
167M Luggage room lamp (2+2 seater)
168M Rear speaker L H
169M Fuel tank gauge unit
170M Fuel pump
171M Seat belt tension reducer L H (GLL models)
172M Injector blower timer
173M Door switch L H



1E To 71M (Non-turbocharger models)
2E To 72M (Turbocharger models)
3E To 29 (White)
4E To 73M (Blue)
5E To 74M (White)
6E Uphold relay
7E Fusible link
8E Front shock absorber R H (Turbocharger models)
9E E F I harness (Turbocharger models)
10E E F I harness (Non-turbocharger models)
11E Back-up lamp switch (Non-turbocharger M/T models)
12E Oil pressure switch (Non-turbocharger M/T models)
13E Battery
14E Starter motor
15E To engine sub harness (Turbocharger A/T models)
16E To engine sub harness (A/T and turbocharger M/T models)
17E Shift switch (Non-turbocharger A/T models)
18E To engine sub harness (Turbocharger M/T models)
19E To engine sub harness (Turbocharger models)
20E Power steering switch (Non-turbocharger models)
21E Body ground
22E Speed sensor (GLL models)
23E Low-pressure switch
24E Headlamp sensor
25E Fan motor relay (Turbocharger models)
A/T relay (Non-turbocharger A/T models)
26E Compressor relay
27E Vacuum pump relay (Turbocharger models)
28E Horn relay
29E Theft warning relay-1
30E Auxiliary driving lamp relay
31E Headlamp washer relay
32E Inhibitor relay (A/T models)
33E Theft warning relay-2
34E Bulb check relay
35E A S C D relay
36E Water cock air valve
37E Headlamp R H
38E Side marker lamp R H
39E Horn R H
40E Front combination lamp R H
41E Ambient temp sensor
42E Fog lamp R H
43E Vacuum pump (Turbocharger models)
44E Fan motor (Turbocharger models)
45E Headlamp motor R H
46E Radiator coolant level switch
47E Vacuum tank (Turbocharger models)
48E Hood switch
49E Fog lamp L H
50E Headlamp washer motor
51E Front combination lamp L H
52E Horn L H
53E Side marker lamp L H
54E Headlamp L H
55E Headlamp motor L H
56E Boost sensor
57E Alternator harness (Non-turbocharger models)
58E Alternator harness (Non-turbocharger models)
59E Body ground
60E Brake fluid level switch
61E Front shock absorber L H (Turbocharger models)
62E Rear washer motor
63E Passing relay
64E Headlamp relay
65E Headlamp timer
66E To 40M (Blue)
67E To 39M (White)
68E To 11 (White)
69E To 47M (Non-turbocharger models)
70E Inhibitor switch (Non-turbocharger models)

SEL755D

Diode (22I)

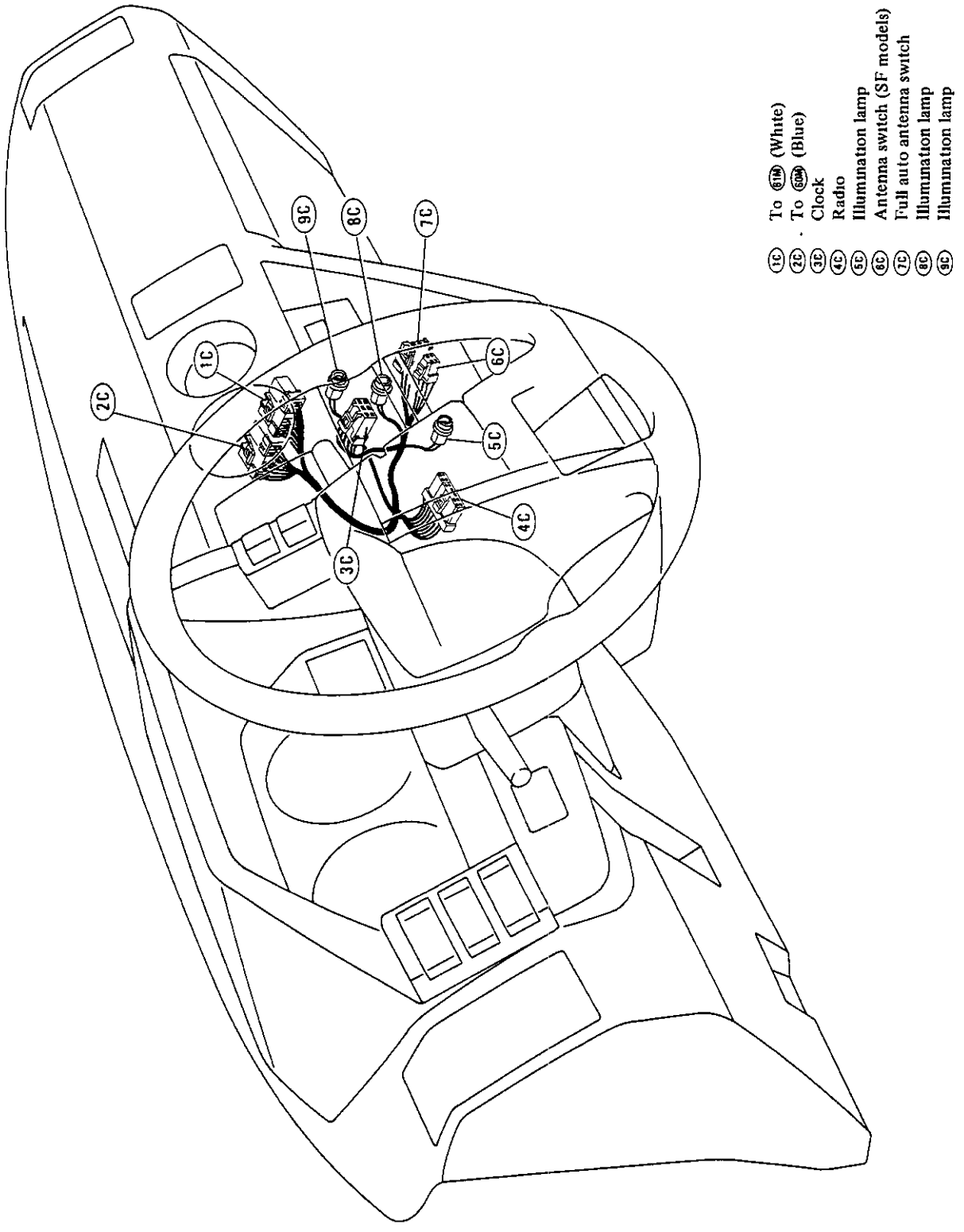
(For voice warning system)

(1I) To (68E) (White)
(2I) To (45M) (Blue) (GLL models)
(3I) To (46M) (White)
(4I) Joint
(5I) Joint
} (For O_2 sensor warning lamp)
(6I) Speaker L H (GLL models)
(7I) Illumination control switch
(8I) Instrument switch L H
(9I) Instrument switch L H
(10I) Combination meter (Black)
(11I) Combination meter (White)
(12I) Combination meter (White)
(13I) Combination meter (White)
} Needle type meter
(14I) Combination meter (White)
(15I) Combination meter (Blue)
(16I) Combination meter (Black)
} Digital type meter
(17I) Chime
(18I) Instrument switch R H
(19I) Instrument switch R H
(20I) Combination gauge (GLL models)
(21I) Combination gauge (SF and GL models)
(22I) Diode (Voice warning system equipped models except GLL models)
(23I) Speaker R H (GLL models)
(24I) Glove box lamp switch
(25I) Glove box lamp
(26I) Hold relay (Canada models)
(27I) To (79M) (Blue) (GLL models)
(28I) To (78M) (Black)
(29I) To (3E) (White)

SEL760D

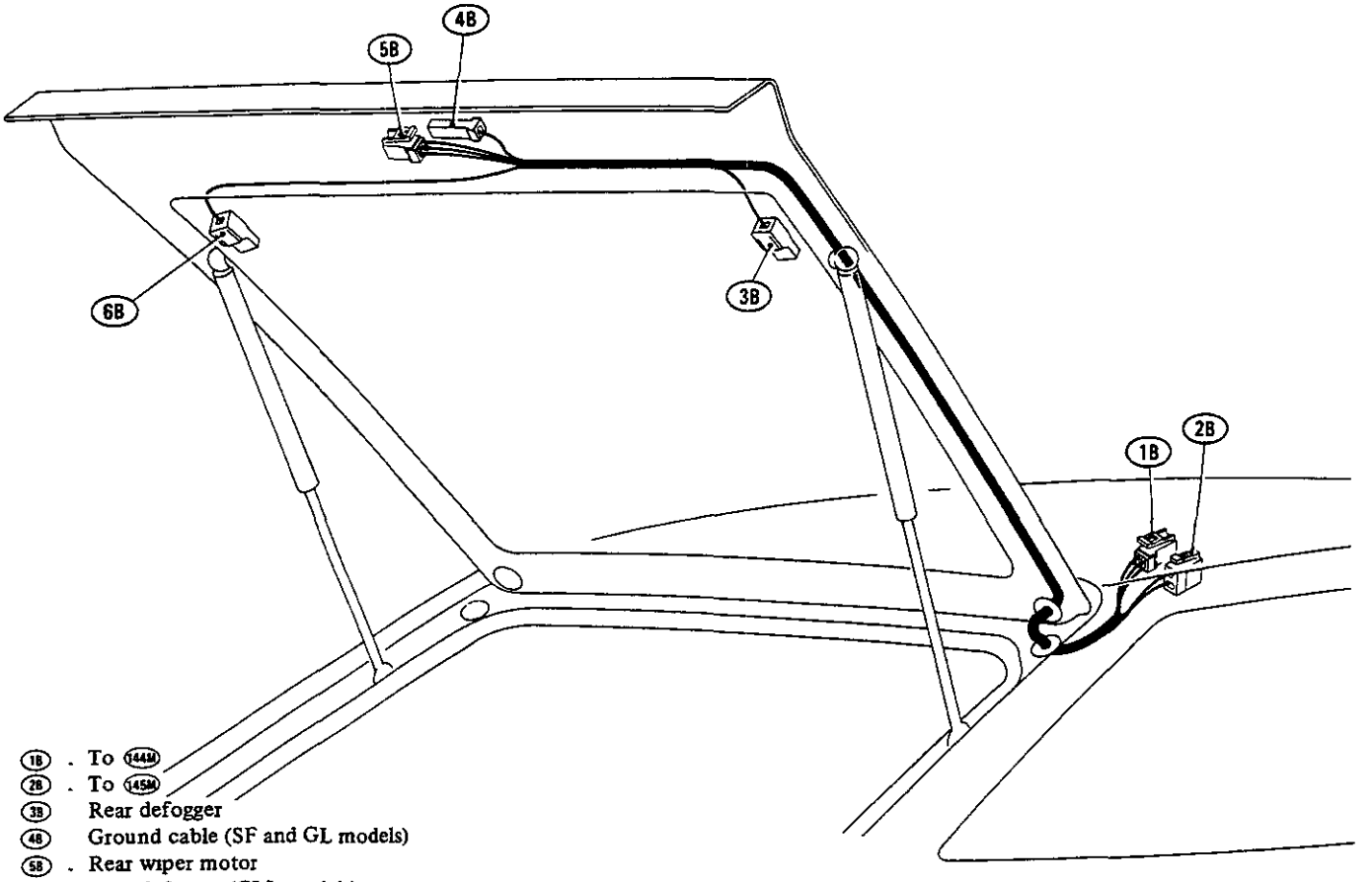
HARNESS LAYOUT

Console Harness



SEL761D

Back Door Harness



(1B) . To (144M)
(2B) . To (145M)
(3B) Rear defogger
(4B) Ground cable (SF and GL models)
(5B) . Rear wiper motor
(6B) Rear defogger (GLL models)

SEL762D