

ELECTRICAL SYSTEM



SECTION EL

When you read wiring diagrams:

- Read GI section, "HOW TO READ WIRING DIAGRAMS".

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EL

WIRING DIAGRAM REFERENCE CHART

E.C.C.S.	EF & EC SECTION	POWER WINDOW, DOOR LOCK AND
LOCK-UP CONTROL SYSTEM	AT SECTION	MIRROR
ADJUSTABLE SHOCK ABSORBER ...	FA SECTION	HEATER AND AIR CONDITIONER
		BF SECTION
		MA SECTION

HARNESS CONNECTOR

Description

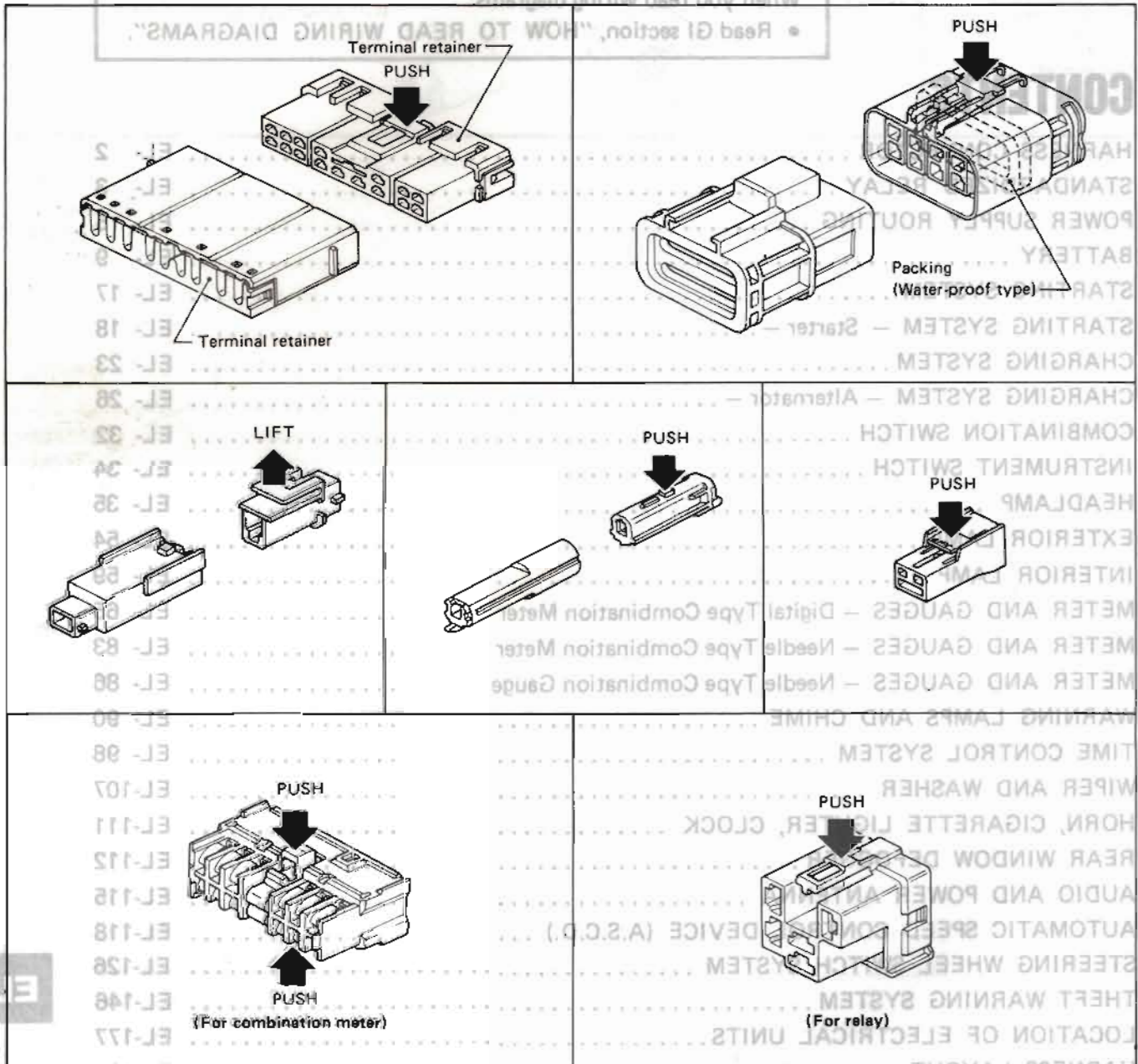
HARNESS CONNECTOR

- All harness connectors are designed so that they do not become loose or disconnected accidentally.
- The connector can be disconnected by pushing or lifting the locking section.

CAUTION:

Do not pull the harness when disconnecting the connector.

[Example]



SEL769D

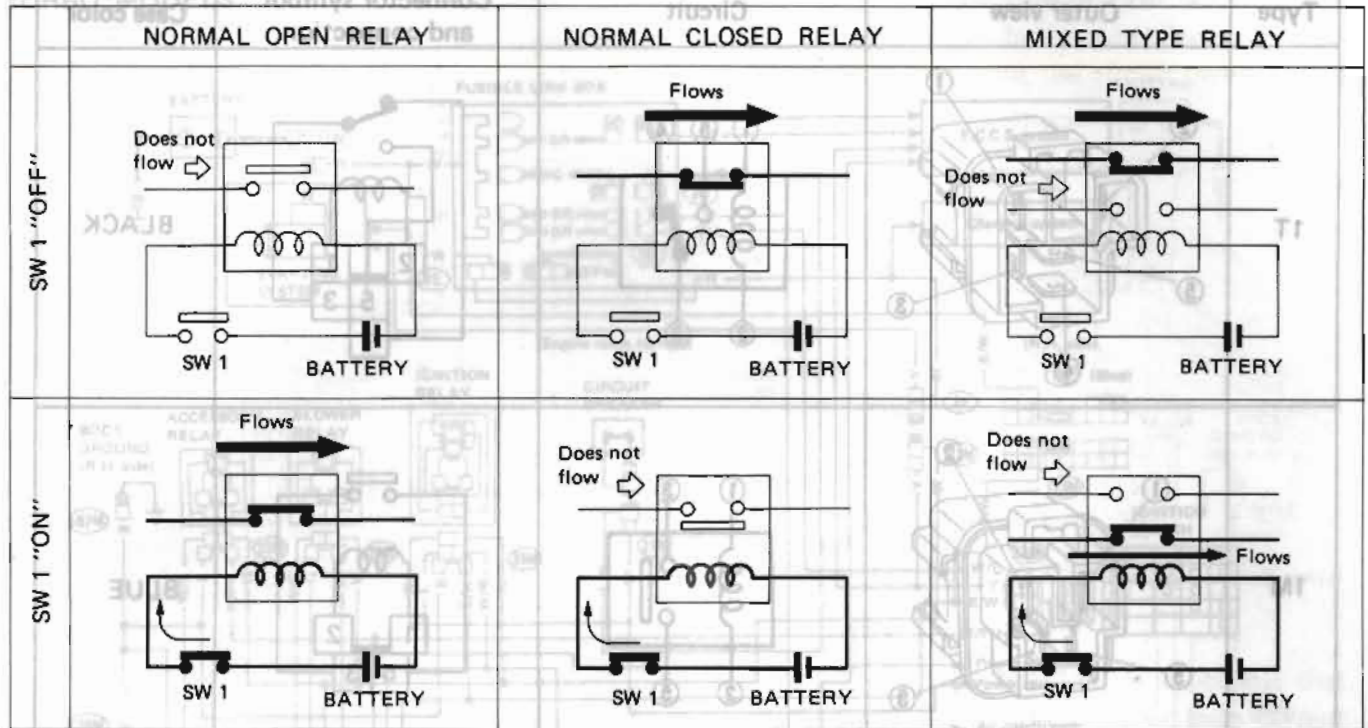
WIRING DIAGRAM REFERENCE CHART

EL-2

STANDARDIZI

Normal Open, Normal Closed and Mixed Type Relays

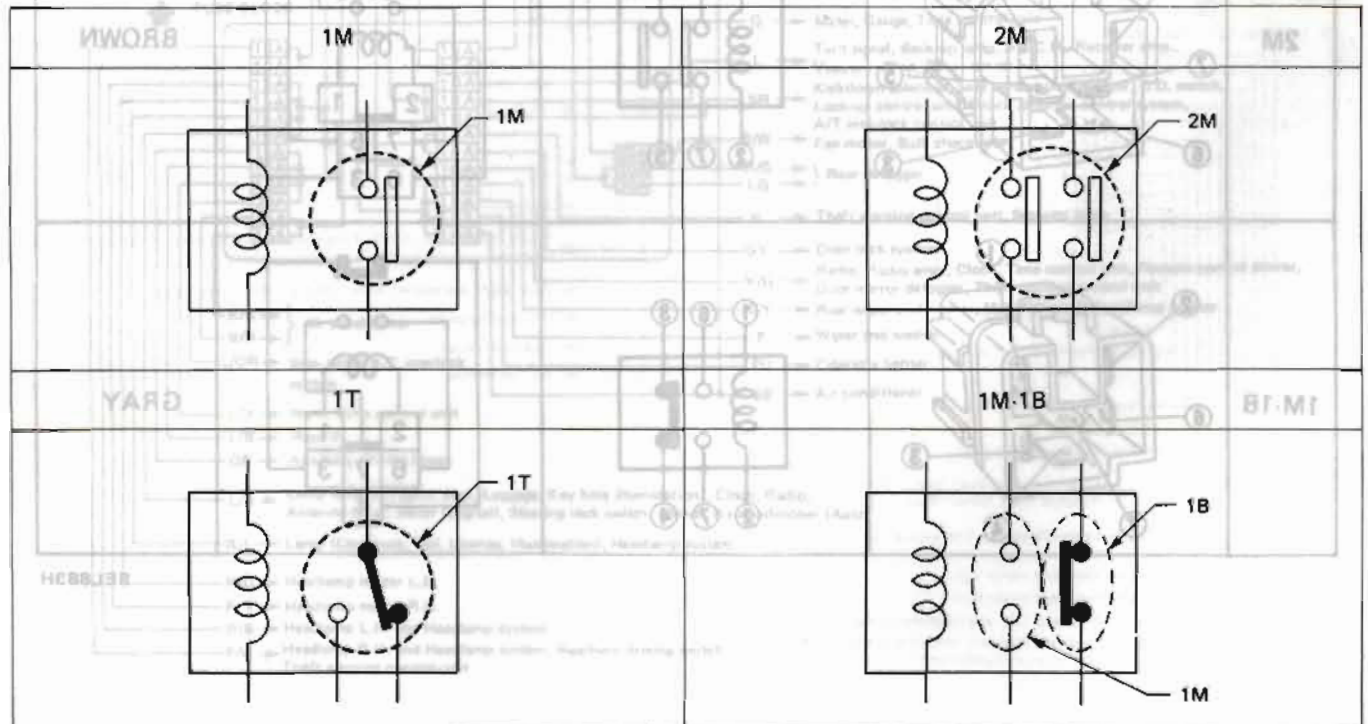
Relays can mainly be divided into three types: normal open, normal closed and mixed type relays.



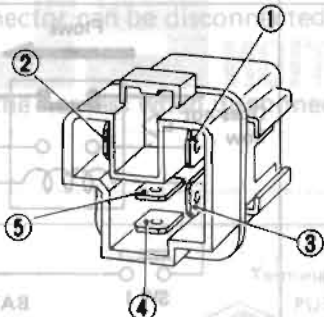
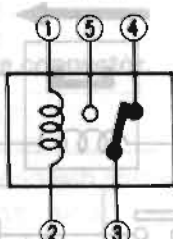
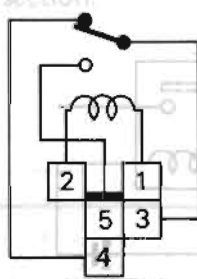
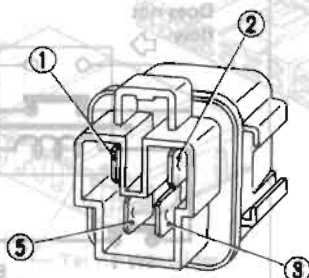
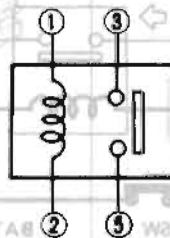
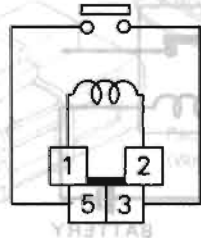
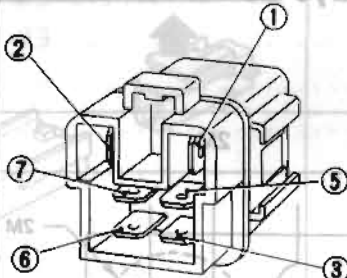
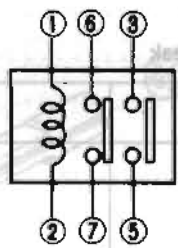
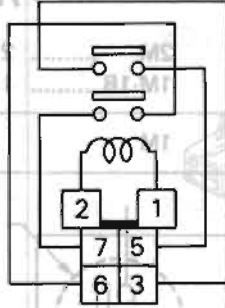
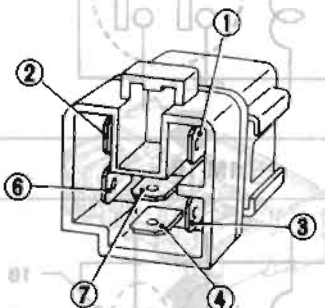
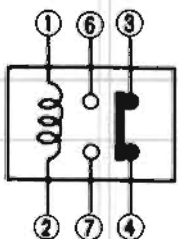
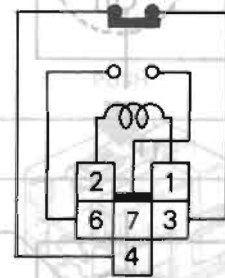
SEL881H

Type of Standardized Relays

1M 1 Make
 1T 1 Transfer
 2M 2 Make
 1M-1B 1 Make 1 Break



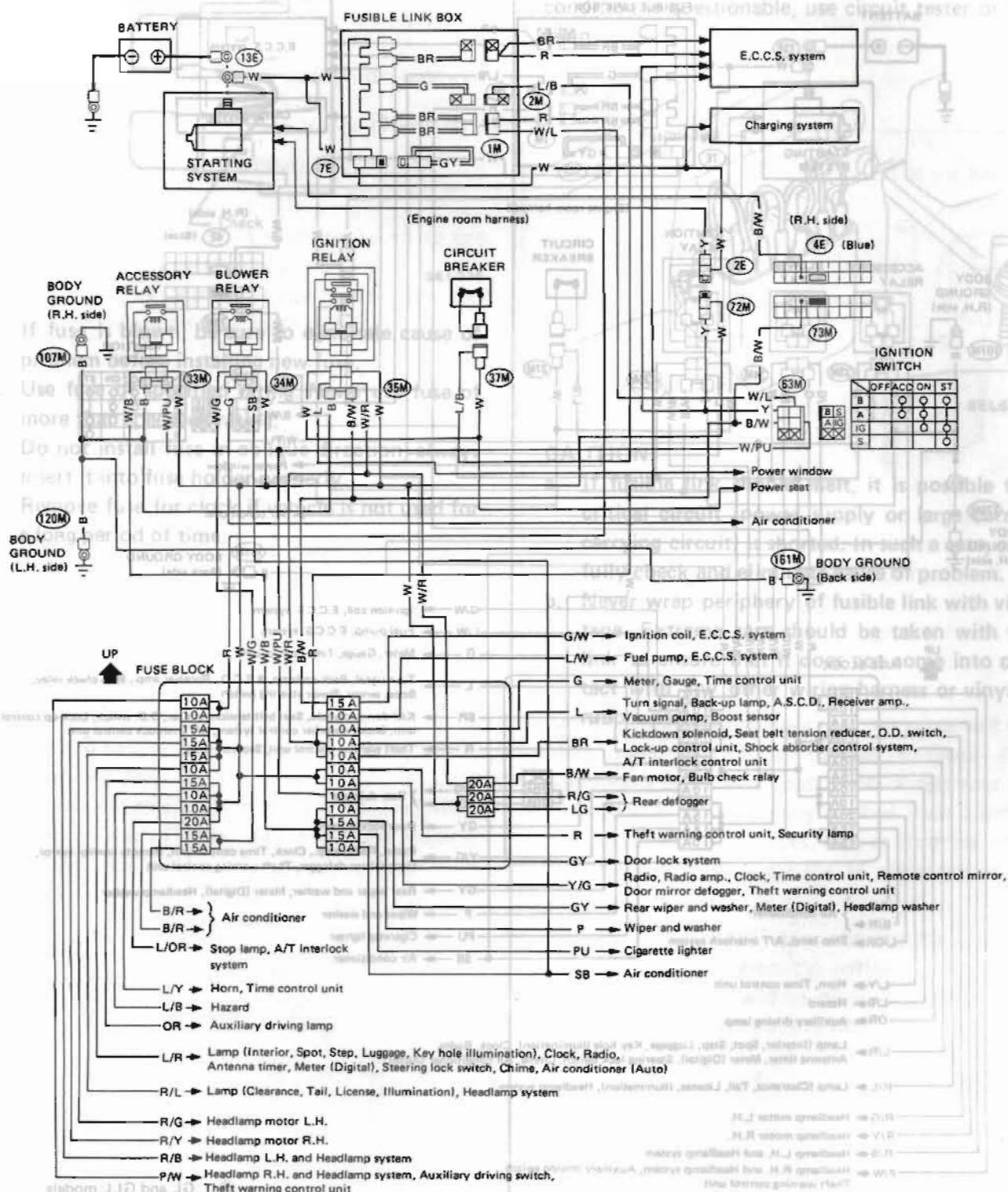
SEL882H

Type	Outer view	Circuit	Connector symbol and connection	Case color
1T				BLACK
1M				BLUE
2M				BROWN
1M-1B				GRAY

SEL883H

Wiring Diagram

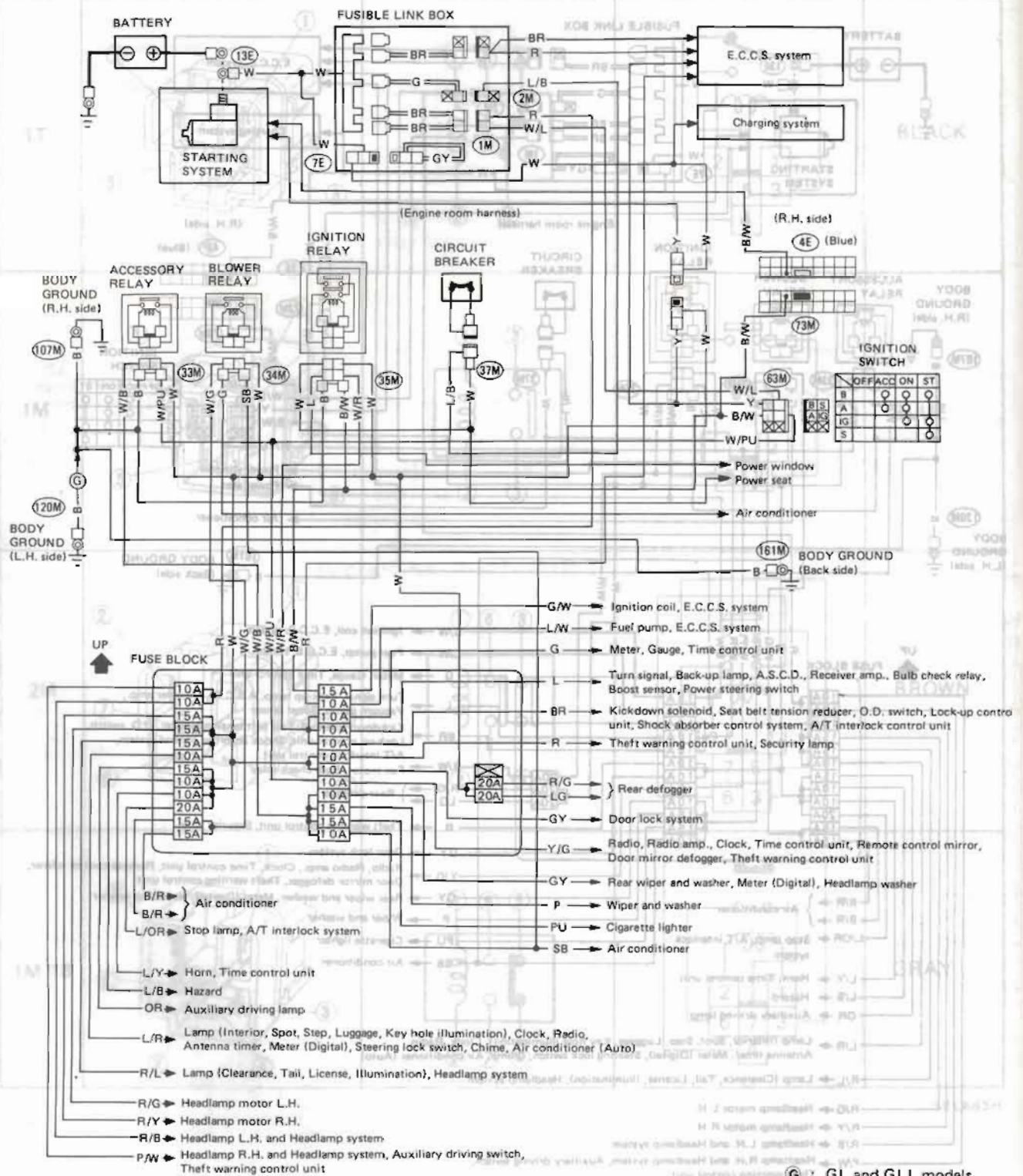
TURBO MODELS



POWER SUPPLY ROUTING

Wiring Diagram (Cont'd)

NON-TURBO MODELS

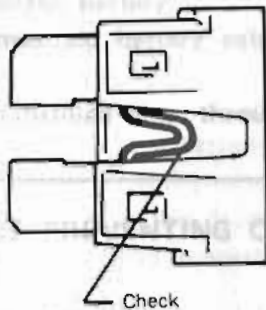


Ⓜ: GL and GLL models

SEL474K

POWER SUPPLY ROUTING

Fuse



SEL276

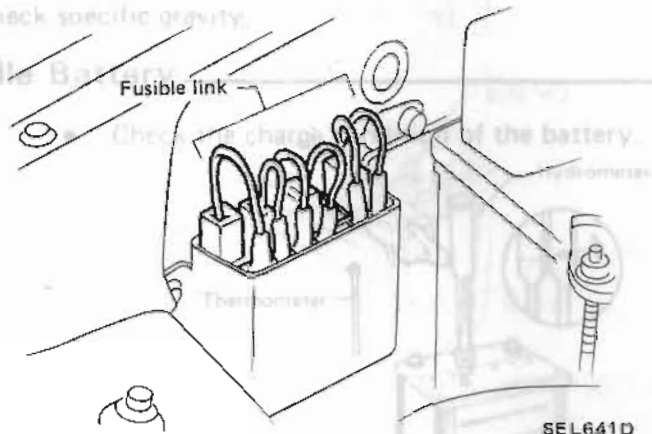
- If fuse is blown, be sure to eliminate cause of problem before installing new fuse.
- Use fuse of specified rating. Never use fuse of more than specified rating.
- Do not install fuse in oblique direction; always insert it into fuse holder properly.
- Remove fuse for clock if vehicle is not used for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

Remove negative terminal



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.



CAUTION:

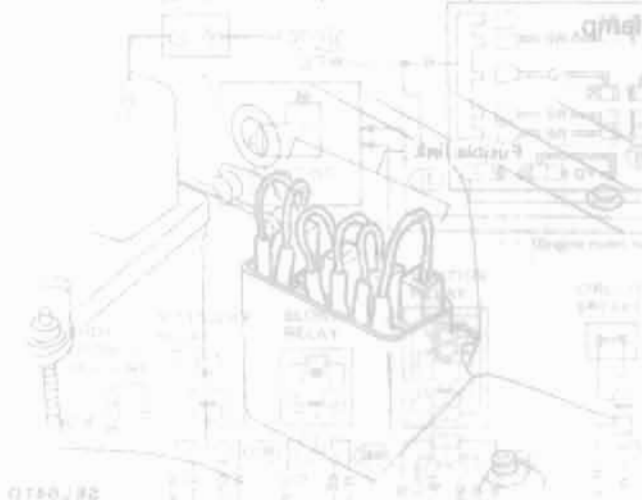
- If fusible link should melt, it is possible that critical circuit (power supply or large current carrying circuit) is shorted. In such a case, carefully check and eliminate cause of problem.
- Never wrap periphery of fusible link with vinyl tape. Extreme care should be taken with this link to ensure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

Do not allow battery fluid to come in contact with skin, eyes, fabrics, or painted surfaces. After touching a battery, do not touch or rub your eyes until you have thoroughly washed your hands. If the acid contacts the eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention.

Normally the battery does not require additional water. However, when the battery is used under severe conditions, adding distilled water may be necessary during the battery life.

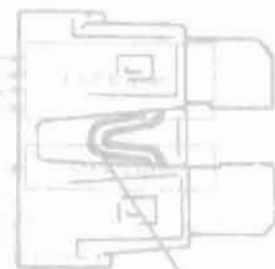
POWER SUPPLY ROUTING

Note: A melted fusible link can be detected by visual inspection or by feeling with finger tip. If its condition is questionable, use circuit tester or test



CAUTION:

- 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.
- 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.



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



BATTERY

CAUTION:

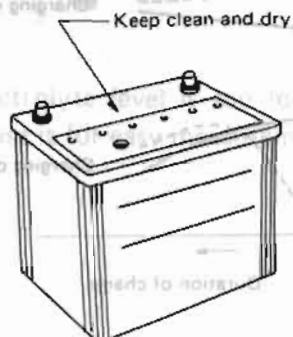
- If it becomes necessary to start the engine with a booster battery and jumper cables, use a 12-volt booster battery.
- After connecting battery cables, ensure that they are tightly clamped to battery terminals for good contact.
- Never add distilled water through the hole used to check specific gravity.

How to Handle Battery

METHODS OF PREVENTING OVER-DISCHARGE

The following precautions must be taken to prevent over-discharging a battery.

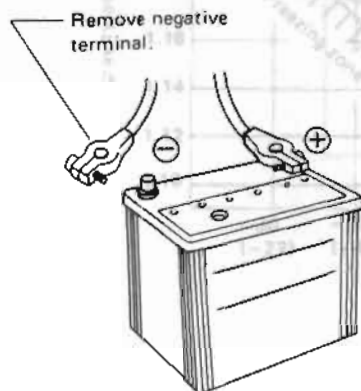
- The battery surface (particularly its top) should always be kept clean and dry.



SEL711E

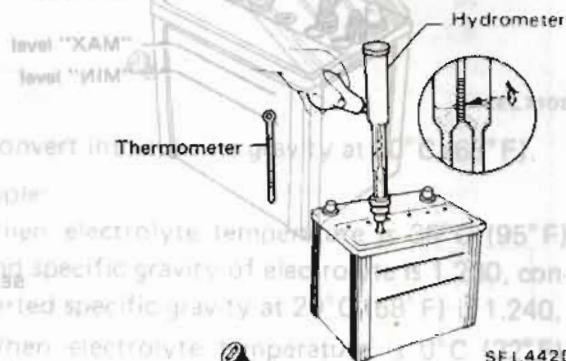
If the top surface of a battery is wet with electrolyte or water, leakage current will cause the battery to discharge. Always keep the battery clean and dry.

- When the vehicle is not going to be used over a long period of time, disconnect the negative battery terminal.



SEL712E

- Check the charge condition of the battery.



Periodically check the specific gravity of the electrolyte. Keep a close check on charge condition to prevent over-discharge.

CHECKING ELECTROLYTE LEVEL

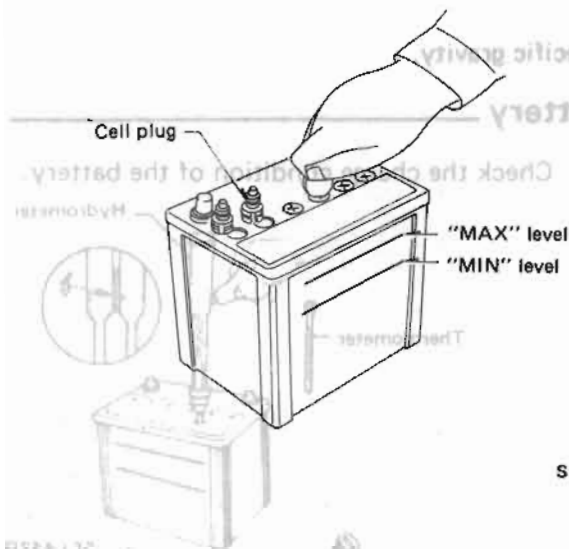
WARNING:

Do not allow battery fluid to come in contact with skin, eyes, fabrics, or painted surfaces. After touching a battery, do not touch or rub your eyes until you have thoroughly washed your hands. If the acid contacts the eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention.

Normally the battery does not require additional water. However, when the battery is used under severe conditions, adding distilled water may be necessary during the battery life.

How to Handle Battery (Cont'd)

- If the electrolyte level is low, remove cell plug using a suitable tool.
- Add distilled water up to the MAX level.



Periodically check the specific gravity of the electrolyte. Keep a close check on charge condition to prevent over-discharge.

CHECKING ELECTROLYTE LEVEL

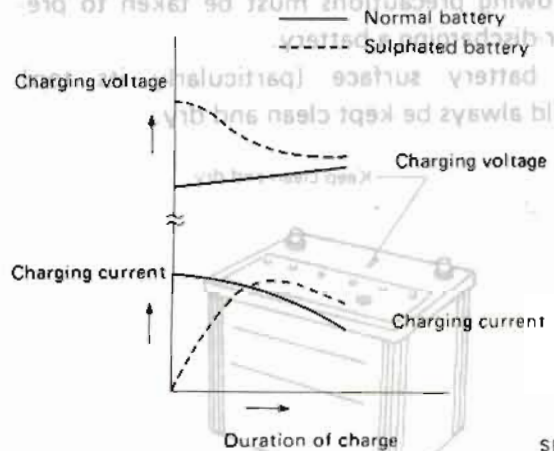
WARNING:

Do not allow battery fluid to come in contact with skin, eyes, fabrics or painted surfaces. After touching a battery, do not touch or rub your eyes until you have thoroughly washed your hands. If the acid contacts the eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention.

Normally the battery does not require additional water. However, when the battery is used under severe conditions, adding distilled water may be necessary during the battery life.

SULPHATION

When a battery has been left unattended for a long period of time and has a specific gravity of less than 1.100, it will be completely discharged, resulting in sulphation on the cell plates. Compared with a battery discharged under normal conditions, the current flow in a "sulphated" battery is not as smooth although its voltage is high during the initial stage of charging, as shown in the following figure.



If the top surface of a battery is wet with electrolyte or water, leakage current will cause the battery to discharge. Always keep the battery clean and dry.

When the vehicle is not going to be used over a long period of time, disconnect the negative battery terminal.

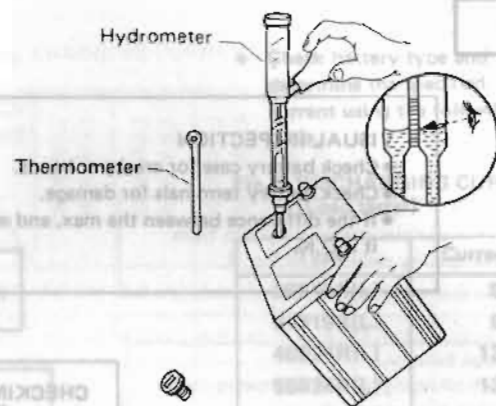
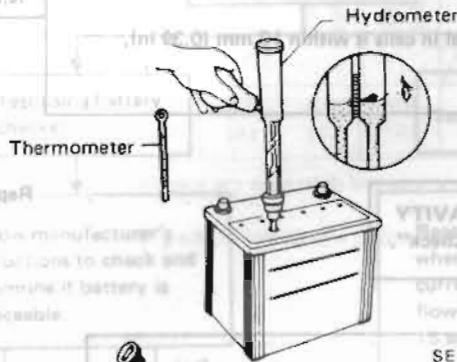


Specific Gravity Check

SPECIFIC GRAVITY CHECK

1. Read hydrometer and thermometer indications at eye level.

Read top level with scale.

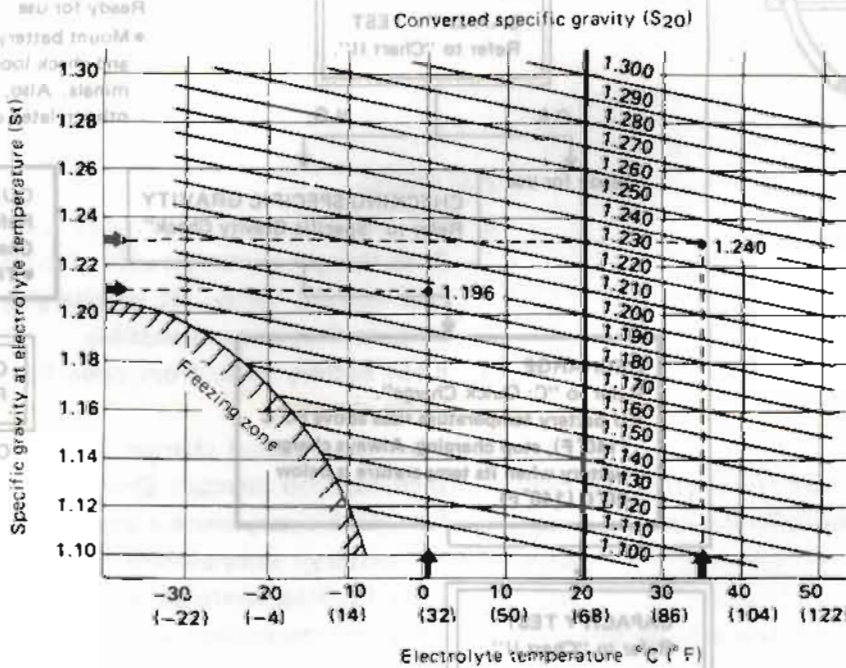


SEL710E

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

Example:

- When electrolyte temperature is 35°C (95°F) and specific gravity of electrolyte 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.

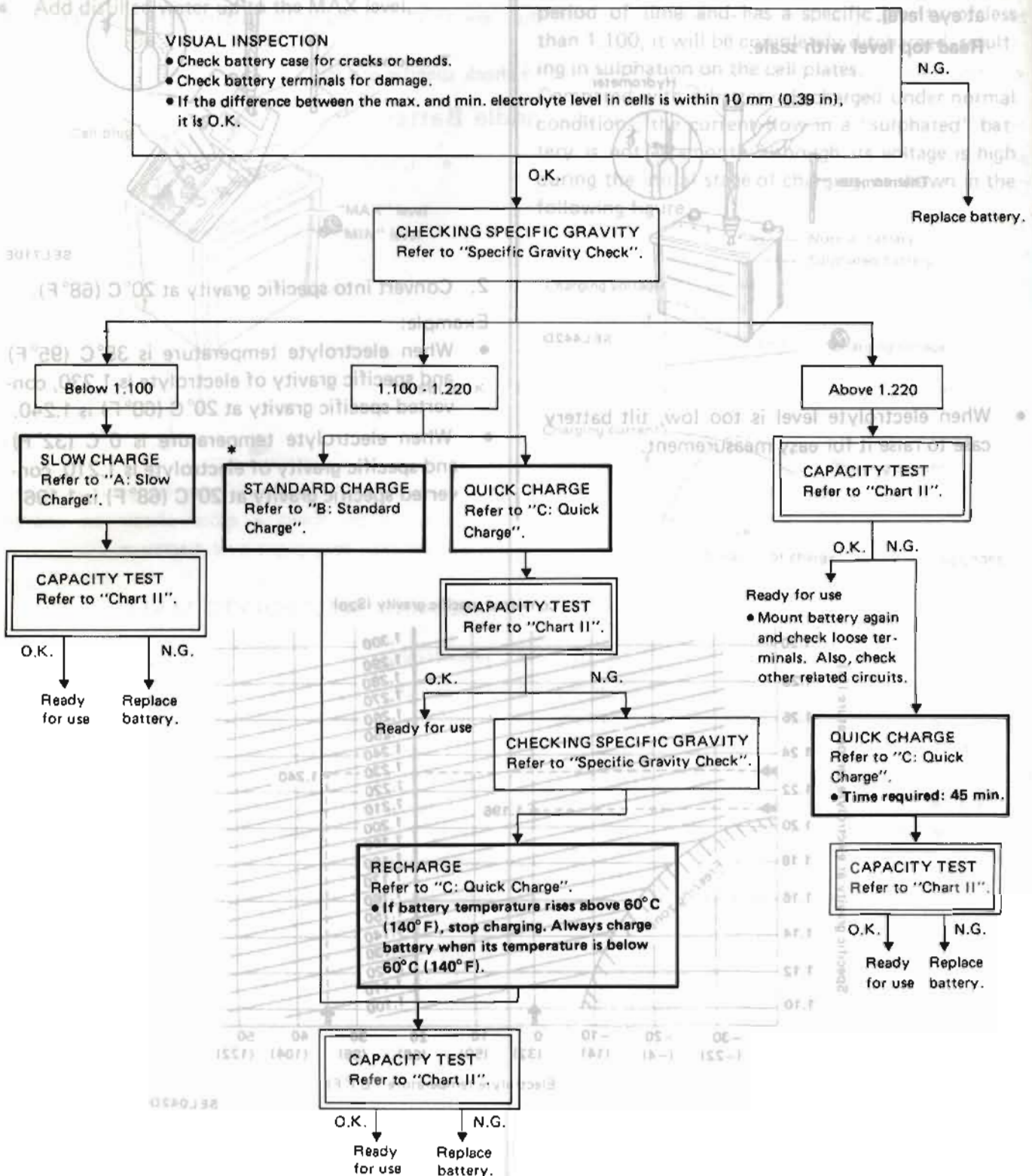


SEL042D

BATTERY

Battery Test and Charging Chart

Chart I



* "STANDARD CHARGE" is recommended in case that the vehicle is in storage after charging.

BATTERY

Battery Test and Charging Chart (Cont'd)

Chart II

CAPACITY TEST

Test using battery checker.

Follow manufacturer's instructions to check and determine if battery is serviceable.

O.K.

Ready for use

N.G.

Go to next step.

Test using load tester.

Read load tester voltage when specified discharging current (Refer to Fig. 1) flows through battery for 15 seconds.

Above 9.6 volts

O.K.

Ready for use

Below 9.6 volts

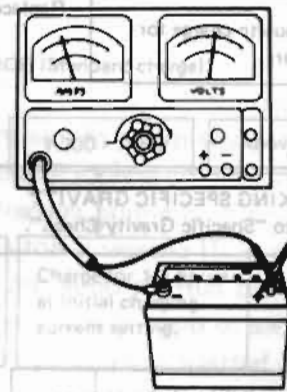
N.G.

Go to next step.

- Check battery type and determine the specified current using the following table.

Fig. 1 DISCHARGING CURRENT (Load tester)

Type	Current (A)
28B19R(L)	90
34B19R(L)	99
46B24R(L)	135
55B24R(L)	135
50D23R(L)	150
55D23R(L)	180
65D26R(L)	195
80D26R(L)	195
75D31R(L)	210
95D31R(L)	240
95E41R(L)	300
130E41R(L)	330



SEL697B

Battery Test and Charging Chart (Cont'd)

A: SLOW CHARGE

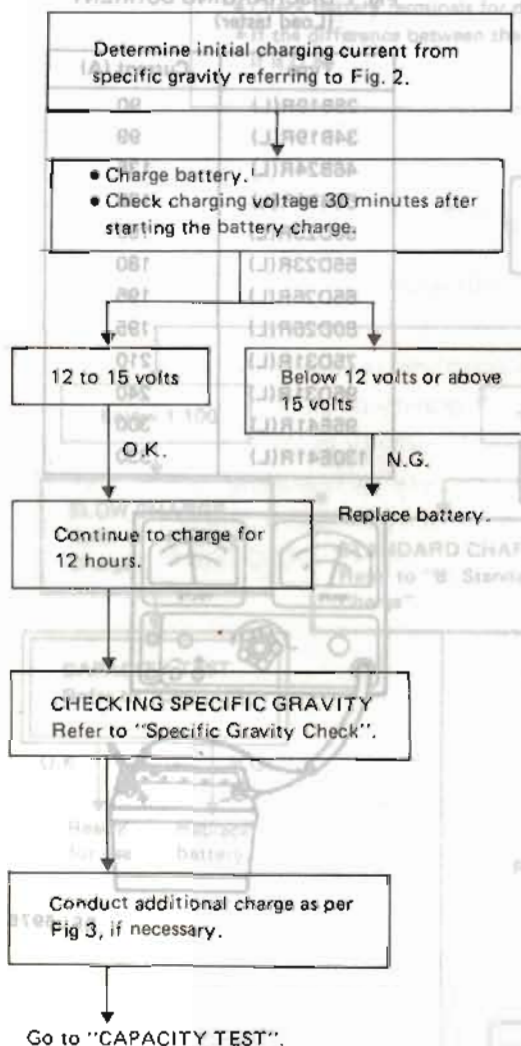
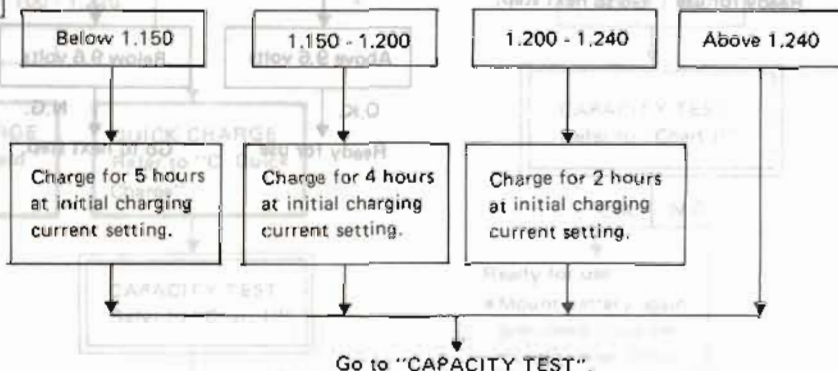


Fig. 2 INITIAL CHARGING CURRENT SETTING (Slow charge)

BATTERY TYPE CON- VERTED SPECIFIC GRAVITY	28B19R(L) 34B19R(L)	46B24R(L) 55B24R(L)	50D23R(L) 55D23R(L)	65D26R(L) 80D26R(L)	75D31R(L)	95D31R(L) 95E41R(L)	130E41R(L)
Below 1.100	4.0 (A)	5.0 (A)	7.0 (A)	8.0 (A)	9.0 (A)	10.0 (A)	14.0 (A)

- Check battery type and determine the specified current using the table shown above.
- After starting charging, adjustment of charging current is not necessary.

Fig. 3 ADDITIONAL CHARGE (Slow charge)



CAUTION:

- Set charging current to value specified in Fig. 2. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.
- Keep battery away from open flame while it is being charged.
- When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.
- If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).

Battery Test and Charging Chart (Cont'd)

B: STANDARD CHARGE

Fig. 4 INITIAL CHARGING CURRENT SETTING (Standard charge)

BATTERY TYPE CON- VERTED SPECIFIC GRAVITY	28B19R(L) 34B19R(L)	46B24R(L) 55B24R(L)	50D23R(L) 55D23R(L)	65D26R(L) 80D26R(L)	75D31R(L)	95D31R(L) 95E41R(L)	130E41R(L)
1.100 - 1.130	4.0 (A)	5.0 (A)	6.0 (A)	7.0 (A)	8.0 (A)	9.0 (A)	13.0 (A)
1.130 - 1.160	3.0 (A)	4.0 (A)	5.0 (A)	6.0 (A)	7.0 (A)	8.0 (A)	11.0 (A)
1.160 - 1.190	2.0 (A)	3.0 (A)	4.0 (A)	5.0 (A)	6.0 (A)	7.0 (A)	9.0 (A)
1.190 - 1.220	2.0 (A)	2.0 (A)	3.0 (A)	4.0 (A)	5.0 (A)	5.0 (A)	7.0 (A)

- Check battery type and determine the specified current using the table shown above.
- After starting charging, adjustment of charging current is not necessary.

Determine initial charging current from specific gravity, referring to Fig. 4.

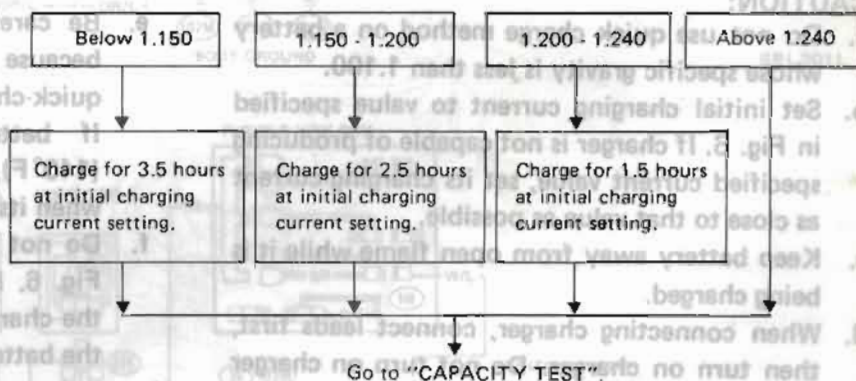
Charge battery for 8 hours.

CHECKING SPECIFIC GRAVITY
Refer to "Specific Gravity Check".

Conduct additional charge as per Fig. 5, if necessary.

Go to "CAPACITY TEST".

Fig. 5 ADDITIONAL CHARGE (Standard charge)



CAUTION:

- Do not use standard charge method on a battery whose specific gravity is less than 1.100.
- Set charging current to value specified in Fig. 4. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.
- Keep battery away from open flame while it is being charged.
- When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.
- If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).

BATTERY

Battery Test and Charging Chart (Cont'd)

C: QUICK CHARGE

Fig. 6 INITIAL CHARGING CURRENT SETTING AND CHARGING TIME (Quick charge)

Determine initial charging current setting and charging time from specific gravity, referring to Fig. 6.

Charge battery

Go to "CAPACITY TEST"

BATTERY TYPE CUR- RENT [A] CON- VERTED SPECIFIC GRAVITY	28B19R(L) 34B19R(L)	46B24R(L) 55B24R(L) 50D23R(L)	55D23R(L) 65D26R(L) 80D26R(L)	75D31R(L) 95D31R(L) 95E41R(L)	130E41R(L)
	10 (A)	15 (A)	20 (A)	30 (A)	40 (A)
1.100 - 1.130	2.5 hours				
1.130 - 1.160	2.0 hours				
1.160 - 1.190	1.5 hours				
1.190 - 1.220	1.0 hours				
Above 1.220	0.75 hours (45 min.)				

- Check battery type and determine the specified current using the table shown above.
- After starting charging, adjustment of charging current is not necessary.

CAUTION:

- Do not use quick charge method on a battery whose specific gravity is less than 1.100.
- Set initial charging current to value specified in Fig. 6. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.
- Keep battery away from open flame while it is being charged.
- When connecting charger, connect leads first, then turn on charger. Do not turn on charger first, as this may cause a spark.
- Be careful of a rise in battery temperature because a large current flow is required during quick-charge operation.
If battery temperature rises above 60°C (140°F), stop charging. Always charge battery when its temperature is below 60°C (140°F).
- Do not exceed the charging time specified in Fig. 6. Because if the battery is charged over the charging time, it can cause deterioration of the battery.

Service Data and Specifications

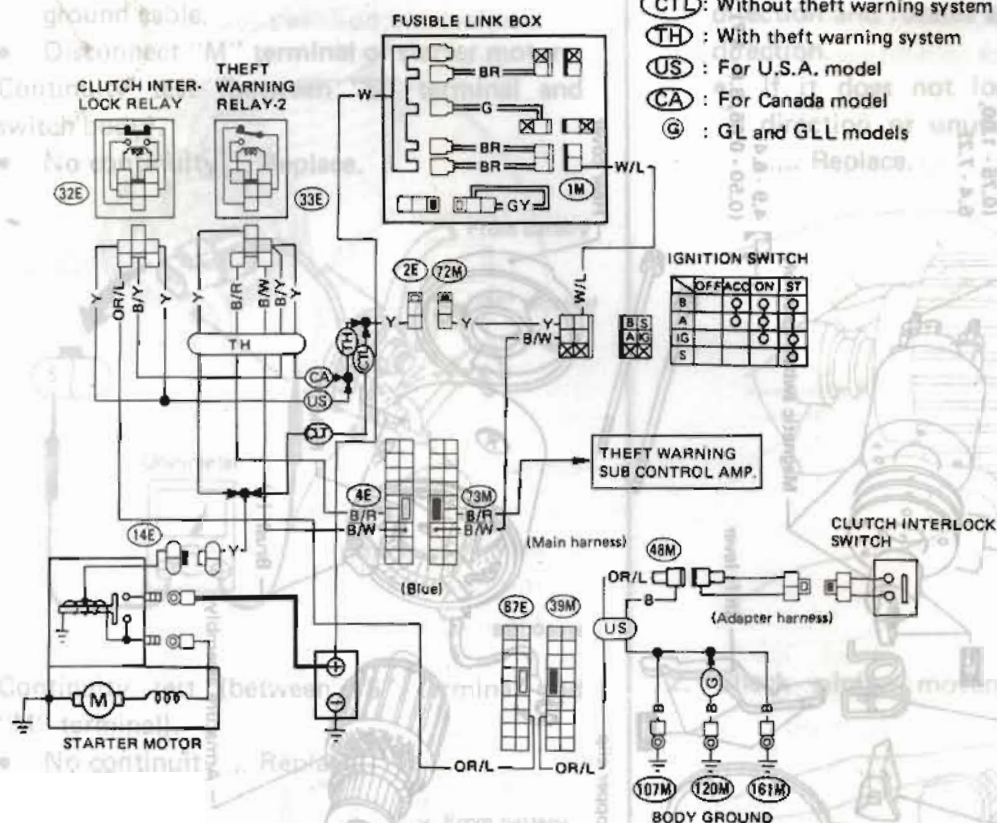
(S.D.S.)

Applied model	U.S.A.	U.S.A. option and Canada
Type	65D23R	75D31R
Capacity V-AH	12-60	12-70

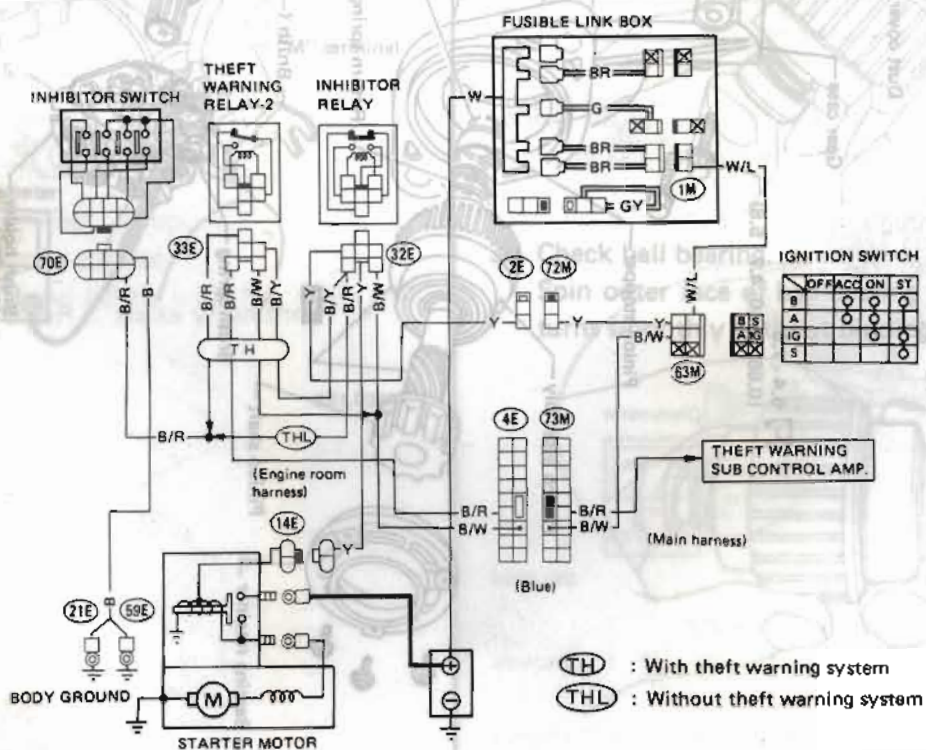
STARTING SYSTEM

Wiring Diagram

M/T MODEL



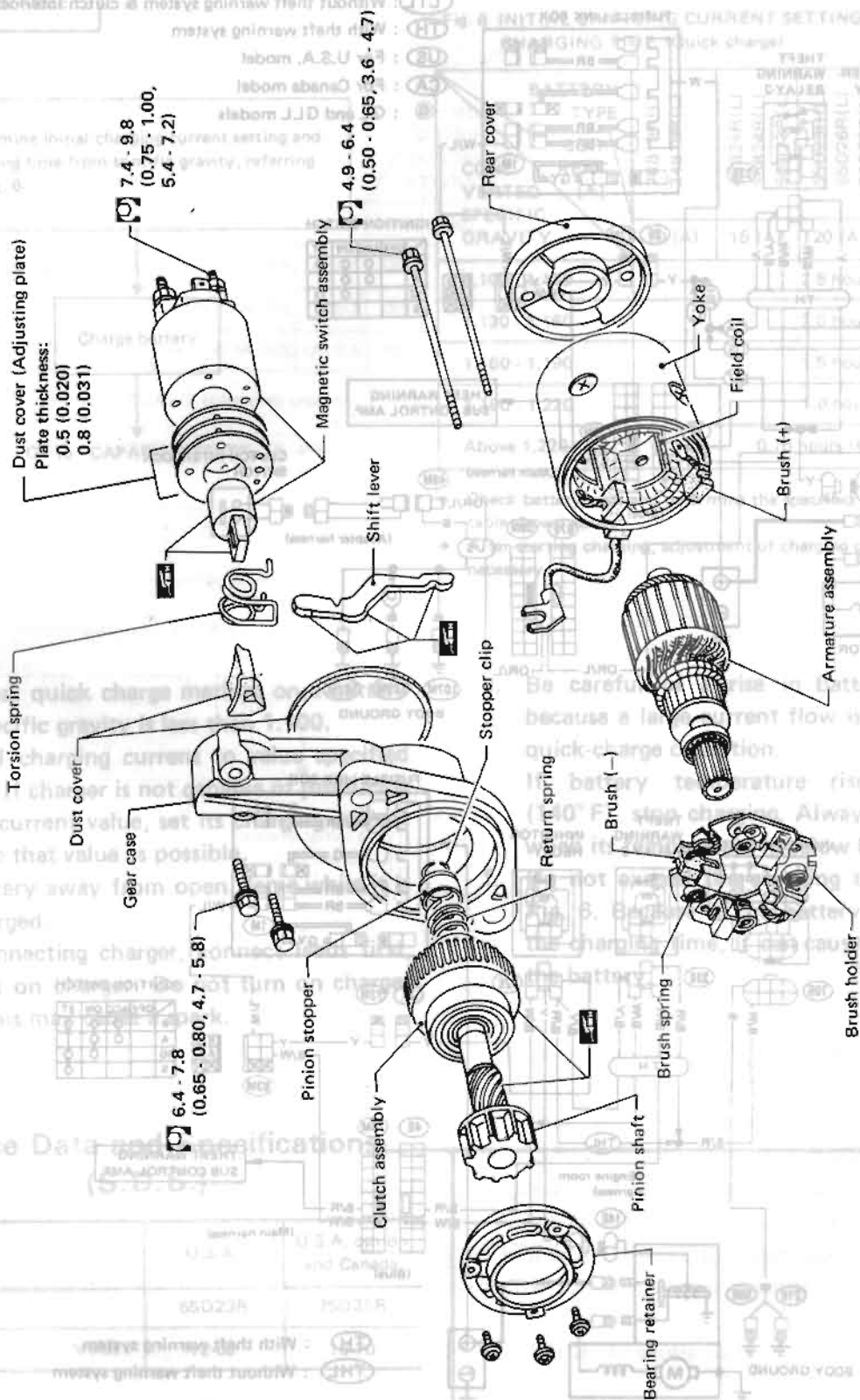
A/T MODEL



STARTING SYSTEM —Starter—

Construction

S114-458



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

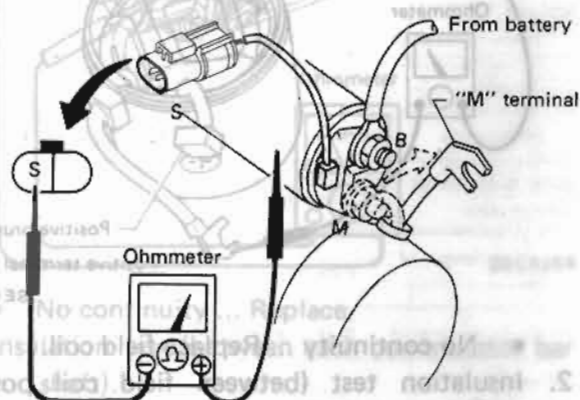
STARTING SYSTEM — Starter —

Magnetic Switch Check

- Before starting to check, disconnect battery ground cable;
- Disconnect "M" terminal of starter motor.

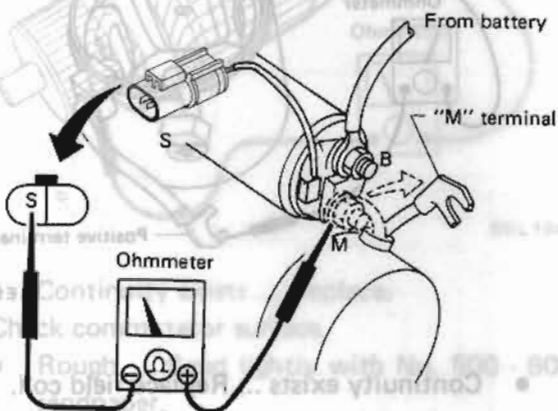
1. Continuity test (between "S" terminal and switch body).

- No continuity ... Replace.



2. Continuity test (between "S" terminal and "M" terminal).

- No continuity ... Replace.

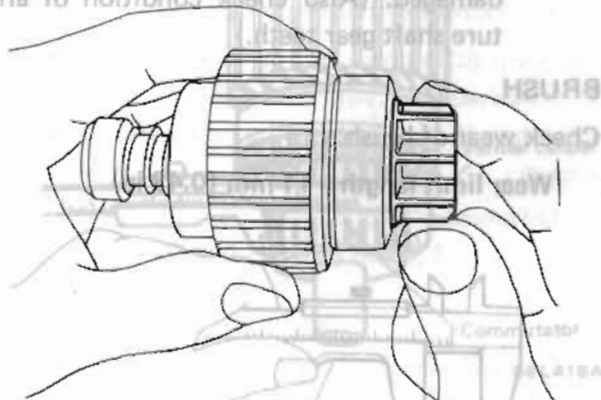


Pinion/Clutch Check

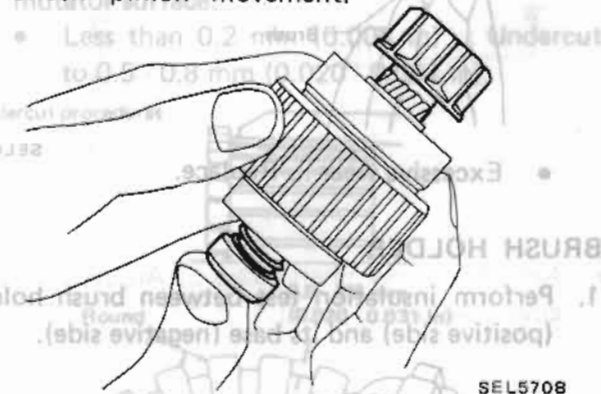
1. Check to see if clutch assembly locks in one direction and rotates smoothly in the opposite direction.

- If it does not lock (or locks) in either direction or unusual resistance is evident

Replace.

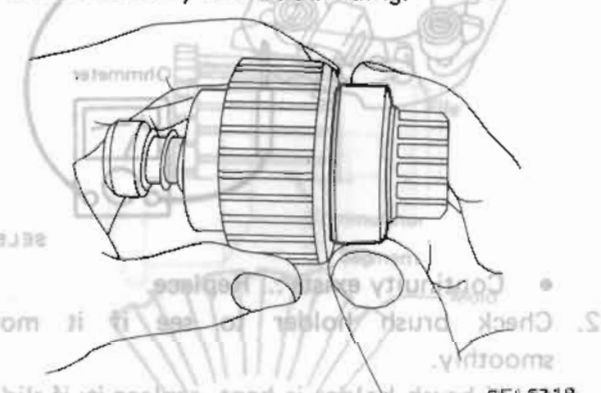


2. Check pinion movement.



3. Check ball bearing.

Spin outer race of ball bearing to ensure that it turns smoothly without binding.



- Abnormal resistance ... Replace.

STARTING SYSTEM—Starter—

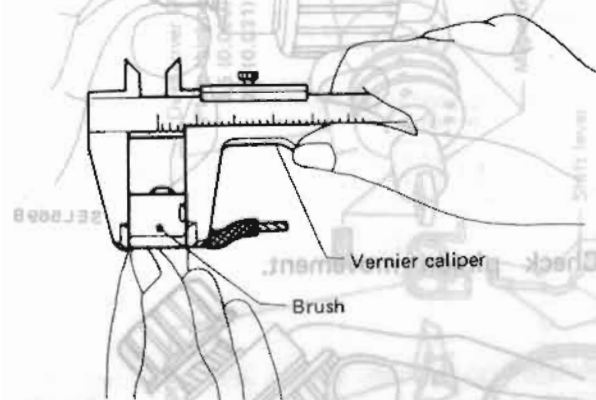
Brush Check

4. Inspection pinion teeth.
 - Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
5. Inspect reduction gear teeth.
 - Replace reduction gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)

BRUSH

Check wear of brush.

Wear limit length: 11 mm (0.43 in)

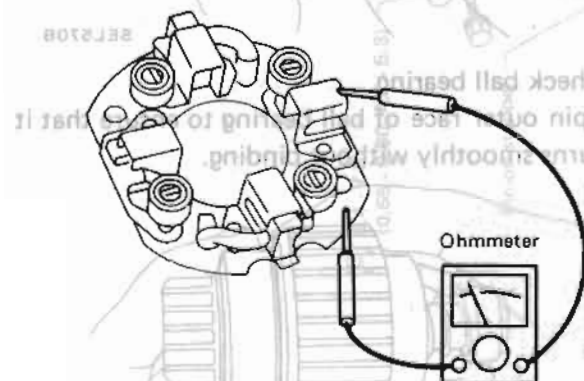


SEL626B

- Excessive wear ... Replace.

BRUSH HOLDER

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

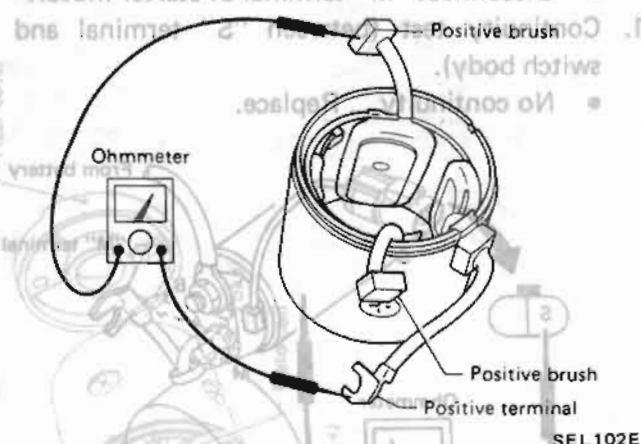


SEL568B

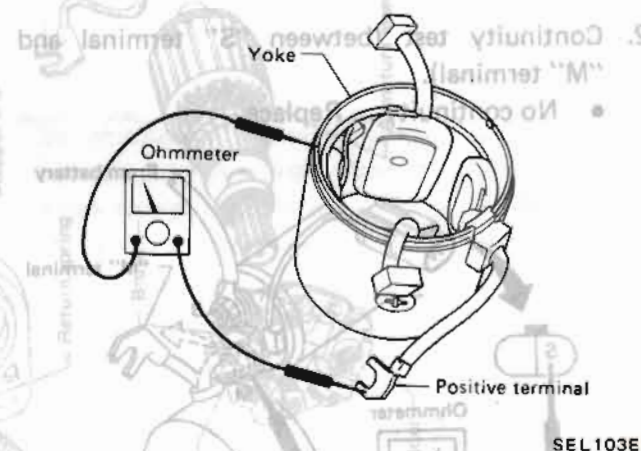
- Continuity exists ... Replace.
2. Check brush holder to see if it moves smoothly.
 - If brush holder is bent, replace it; if sliding surface is dirty, clean.

Field Coil Check

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



- No continuity ... Replace field coil.
2. Insulation test (between field coil positive terminal and yoke).

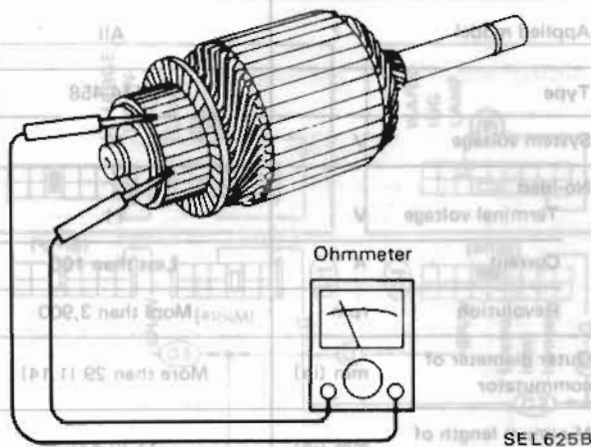


- Continuity exists ... Replace field coil.

STARTING SYSTEM — Starter —

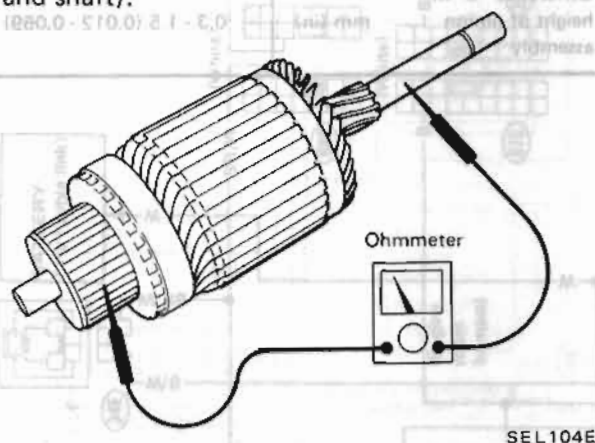
Armature Check

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



- No continuity ... Replace.

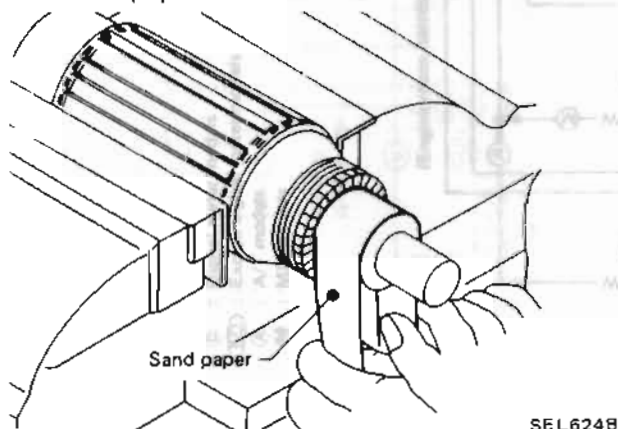
2. Insulation test (between each commutator bar and shaft).



- Continuity exists ... Replace.

3. Check commutator surface.

- Rough ... Sand lightly with No. 500 - 600 sandpaper.

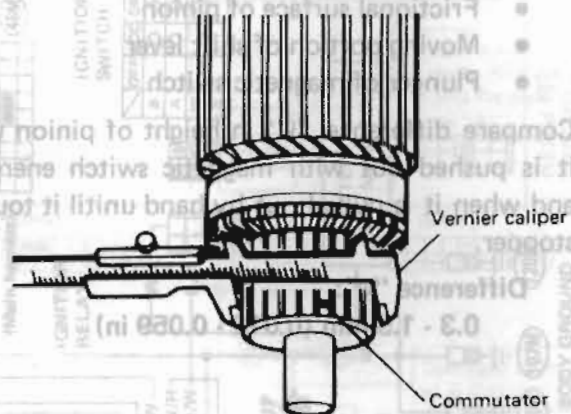


4. Check diameter of commutator.

Commutator minimum diameter:

29 mm (1.14 in)

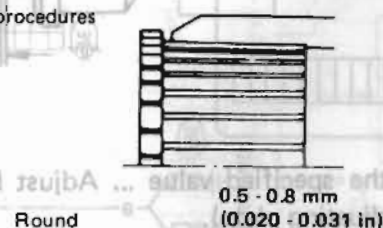
- Less than specified value ... Replace.



5. Check depth of insulating mold from commutator surface.

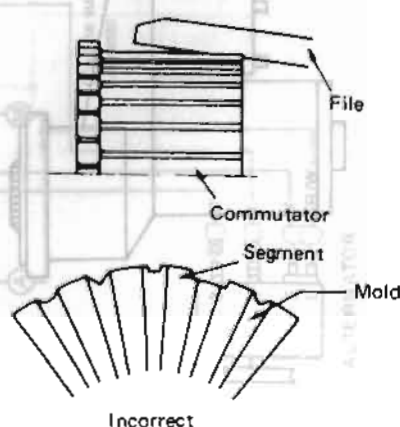
- Less than 0.2 mm (0.008 in) ... Undercut to 0.5 - 0.8 mm (0.020 - 0.031 in)

Undercut procedures



Round

Correct



EE021

STARTING SYSTEM —Starter—

Assembly

Service Data and Specifications

(S.D.S.)

Carefully observe the following instructions.

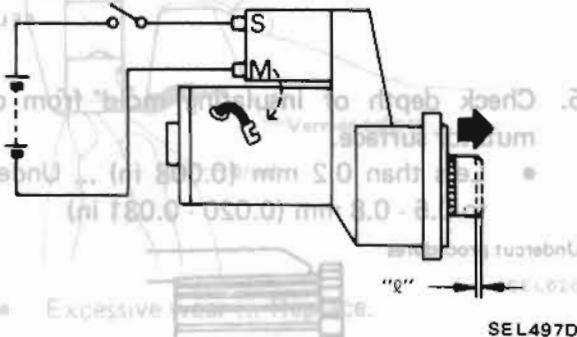
a. Apply grease to:

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

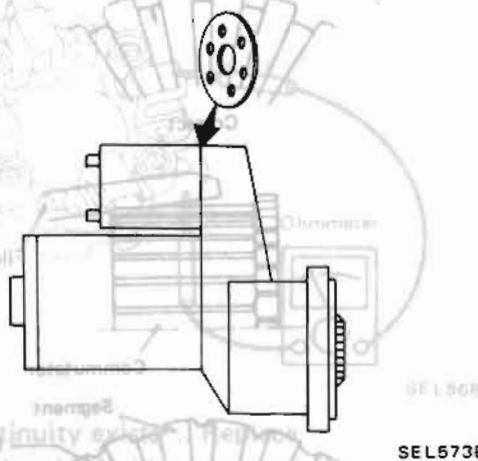
Compare difference "ℓ" in height of pinion when it is pushed out with magnetic switch energized and when it is pulled out by hand until it touches stopper.

Difference "ℓ":

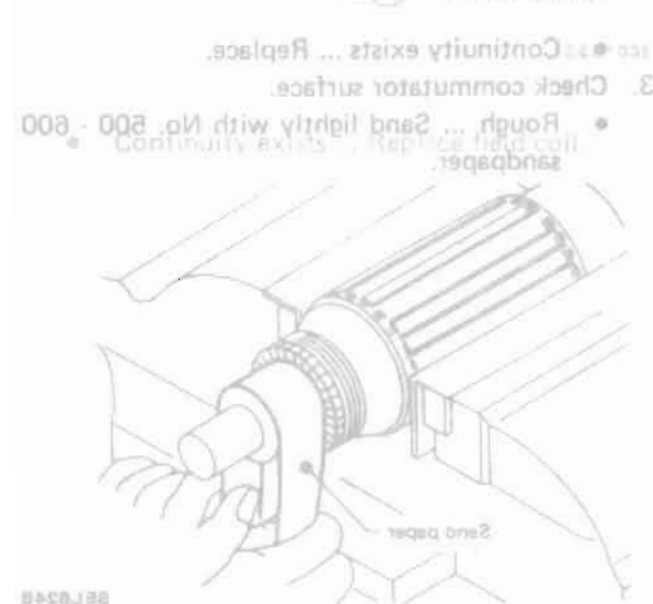
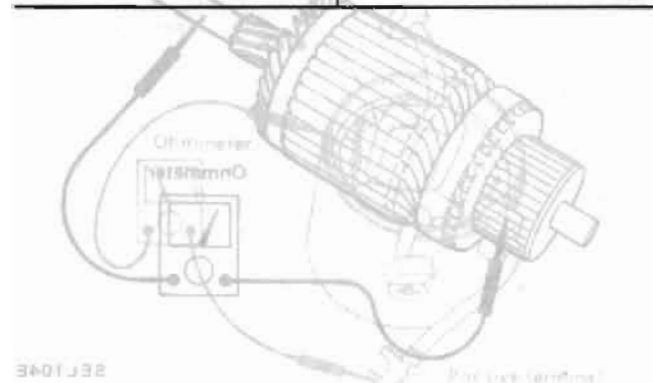
0.3 - 1.5 mm (0.012 - 0.059 in)



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



Applied model		All
Type		S114-458
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

TURBO MODEL When performing an alternator test, make sure that the battery is fully charged. A 30-amp voltmeter and suitable test probes are necessary for the test. The alternator can be checked easily by referring to the Inspection Table.



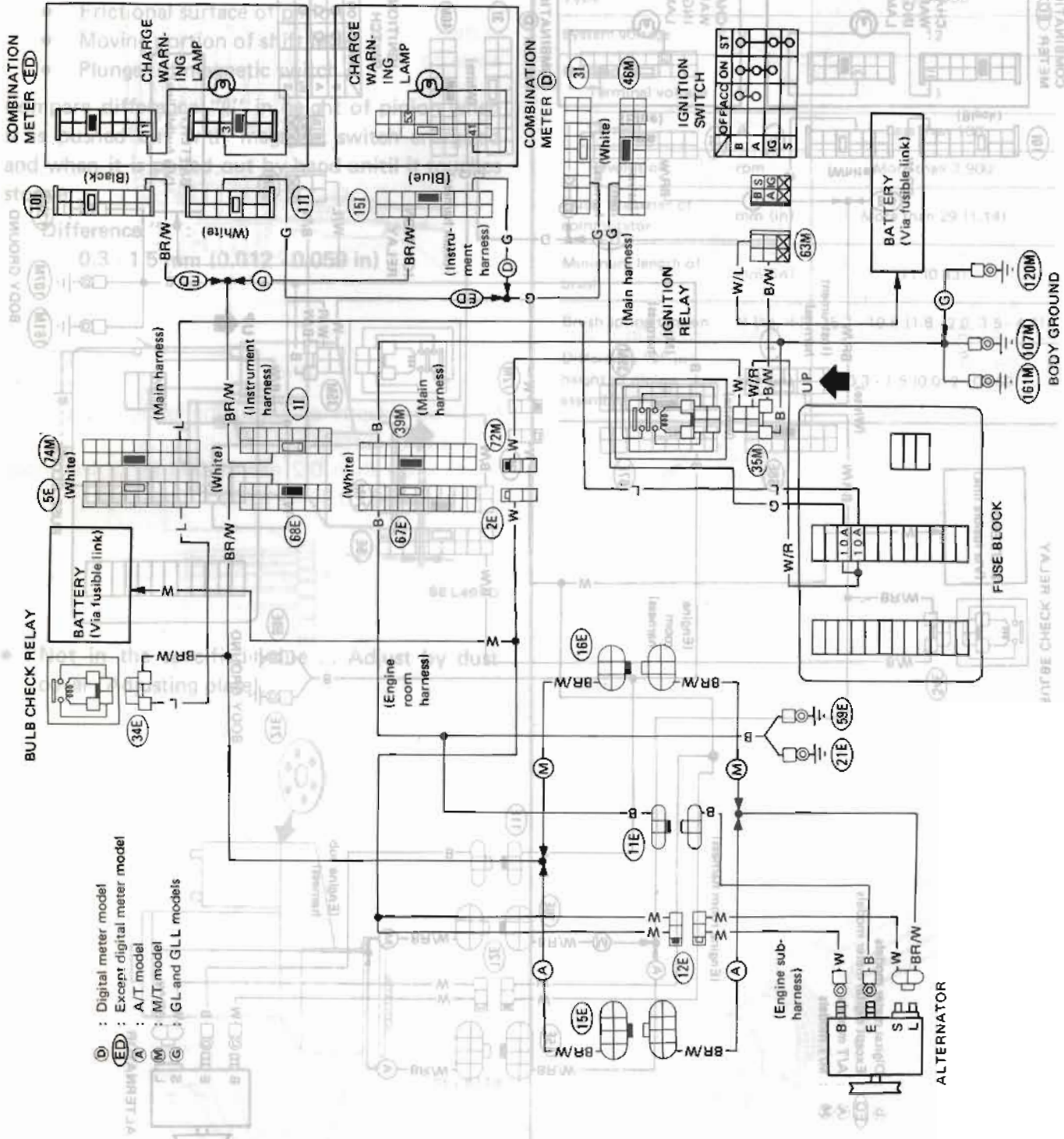
CHARGING SYSTEM

Wiring Diagram (Cont'd)

NON-TURBO MODEL

a. Apply grease to:

- Rear cover metal
- Gear case metal



CHARGING SYSTEM

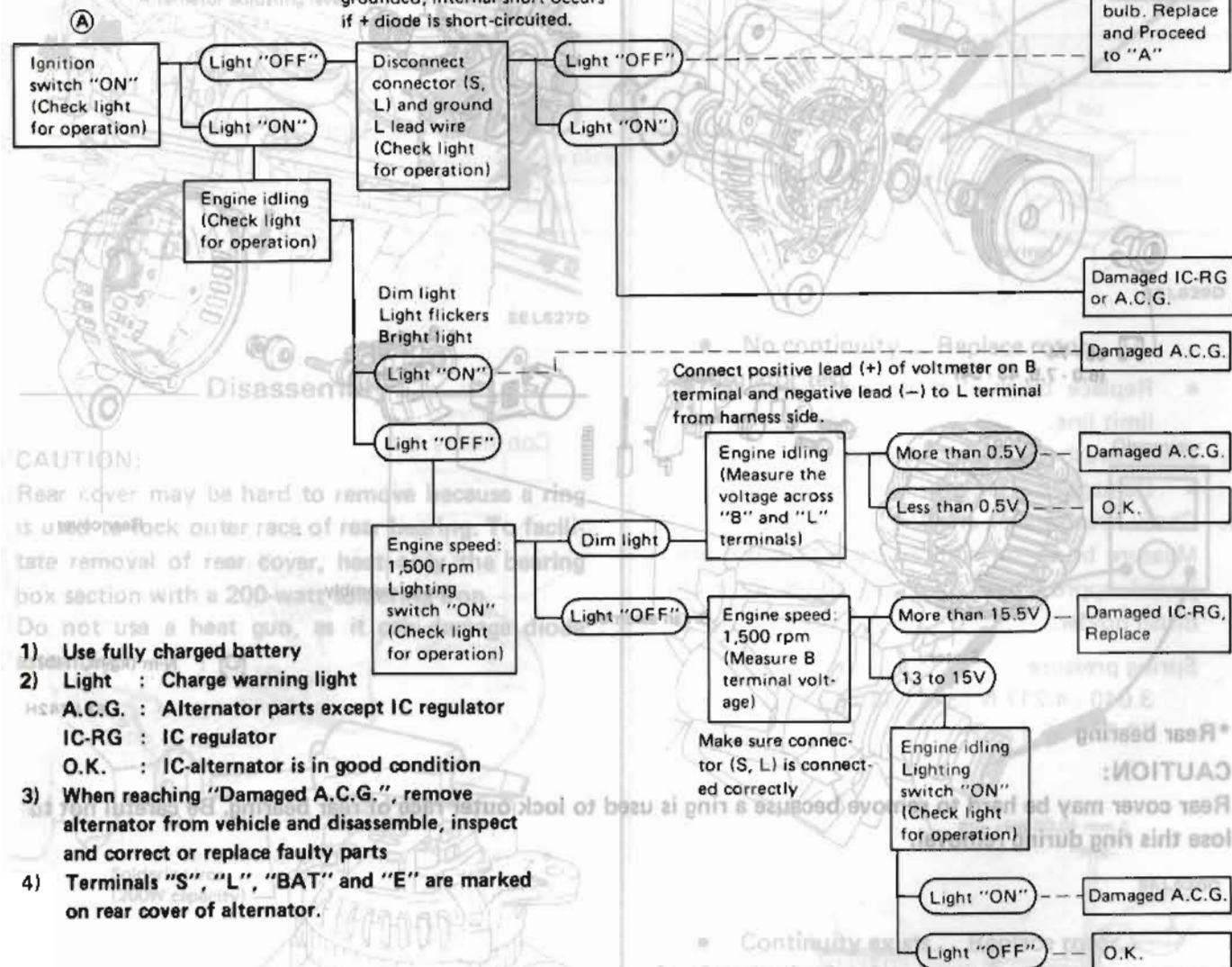
Trouble-shooting

Before conducting an alternator test, make sure that the battery is fully charged. A 30-volt voltmeter and suitable test probes are necessary for the test. The alternator can be checked easily by referring to the Inspection Table.

Before starting trouble-shooting, inspect the fusible link.

WITH IC REGULATOR

With alternator side L terminal grounded, internal short occurs if + diode is short-circuited.



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 vehicle and disassemble, inspect and correct or replace faulty parts

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

Construction

Through-bolt
 3.9 - 5.4
 (0.40 - 0.55, 2.9 - 4.0)

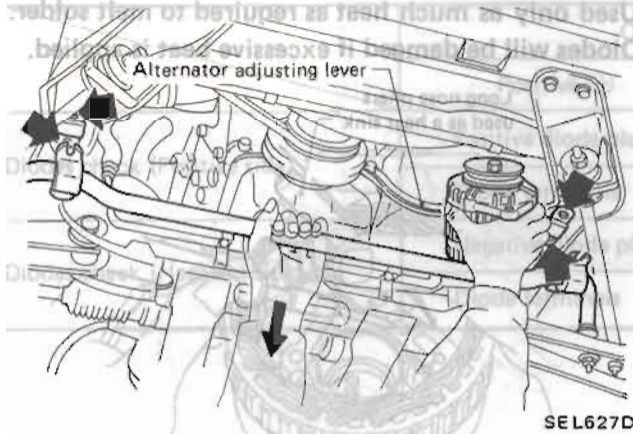
ng

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.

CHARGING SYSTEM —Alternator—

Removal

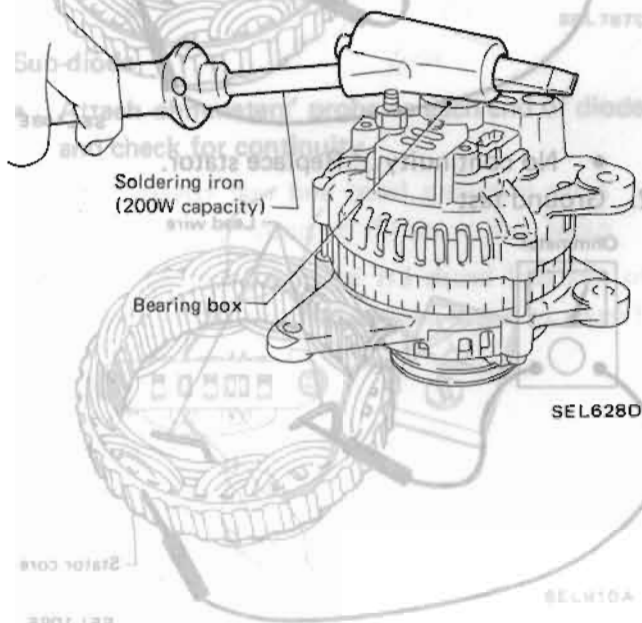
- Remove bolts from alternator.
- Remove bolts for front stabilizer.
- Manually move stabilizer down and remove alternator.



Disassembly

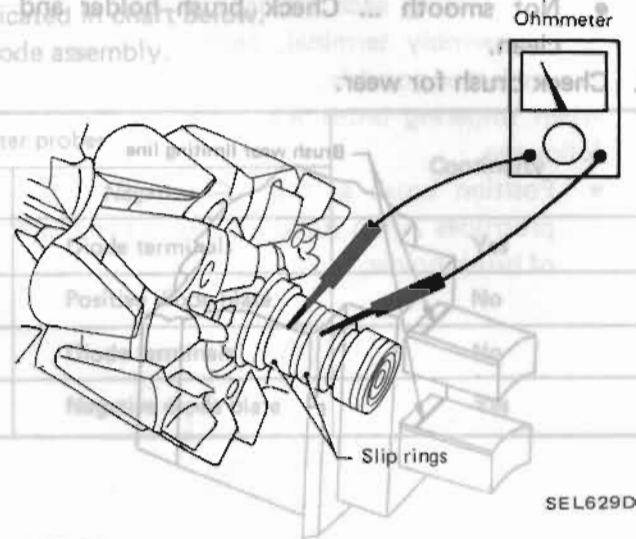
CAUTION:

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 only the bearing box section with a 200-watt soldering iron. Do not use a heat gun, as it can damage diode assembly.



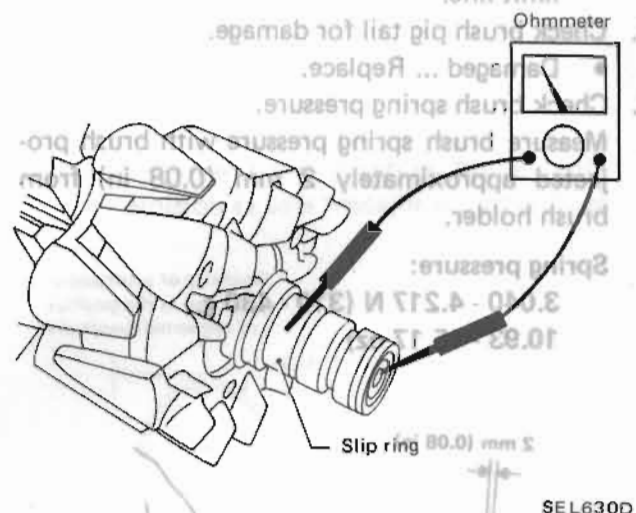
Rotor Slip Ring Check

1. Continuity test



- No continuity ... Replace rotor.

2. Insulator test



- Continuity exists ... Replace rotor.

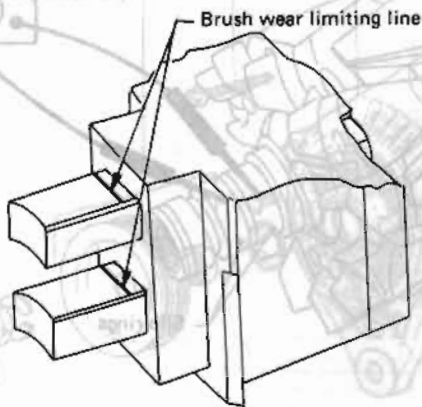
3. Check slip ring for wear.

Slip ring minimum outer diameter:
22.4 mm (0.882 in)

CHARGING SYSTEM — Alternator —

Brush Check

1. Check for smooth movement of brush.
 - Not smooth ... Check brush holder and clean.
2. Check brush for wear.

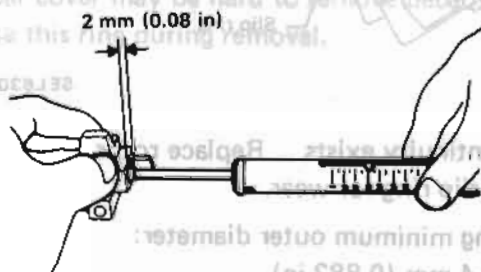


SEL631D

- 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:

3.040 - 4.217 N (310 - 430 g,
10.93 - 15.17 oz)



EE049

- Not in the specified value ... Replace.

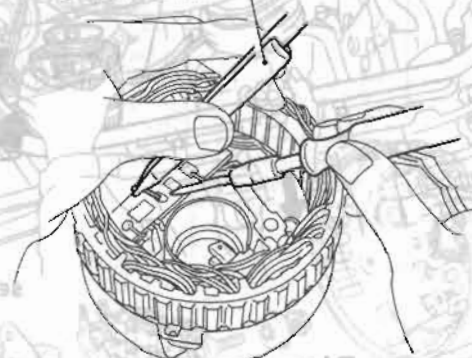
Stator Check

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

CAUTION:

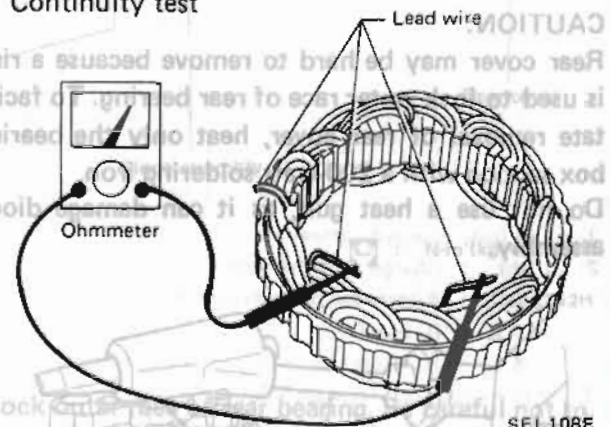
Used only as much heat as required to melt solder.
Diodes will be damaged if excessive heat is applied.

Long nose pliers
used as a heat sink



SEL054D

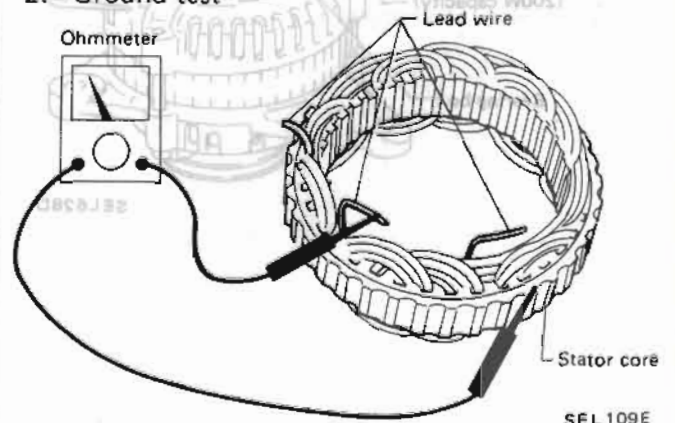
1. Continuity test



SEL108E

- No continuity ... Replace stator.

2. Ground test



SEL109E

- Continuity exists ... Replace stator.

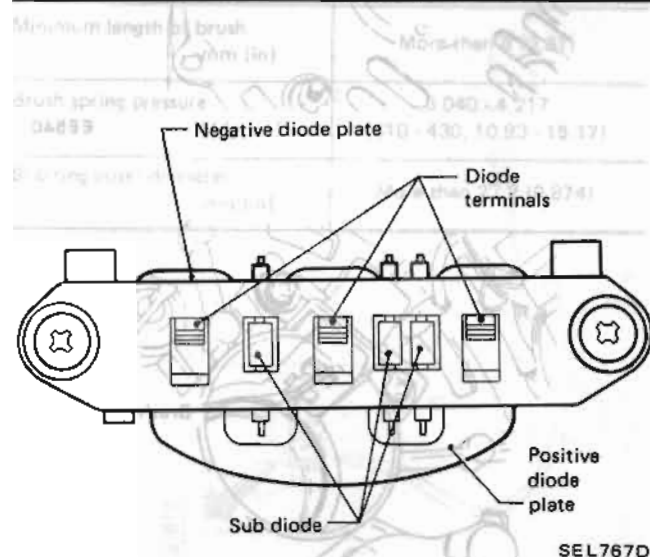
CHARGING SYSTEM — Alternator —

Diode Check

DIODE

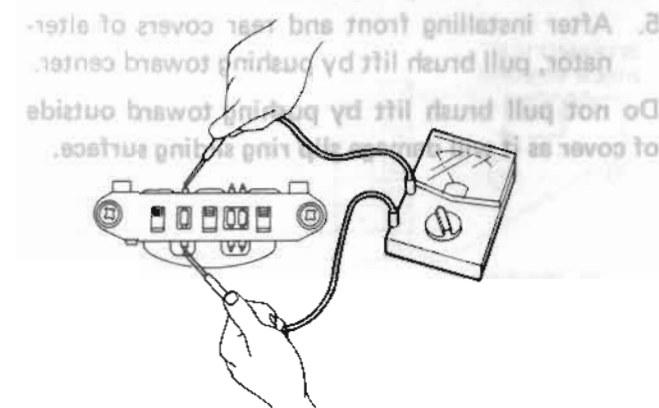
- Use an ohmmeter to check condition of diodes as indicated in chart below.
- If any of the test results is not satisfactory, replace diode assembly.

	Ohmmeter probes		Continuity
	Positive \oplus	Negative \ominus	
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



Sub-diode

- Attach ohmmeters' probe to each end of diode and check for continuity.



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

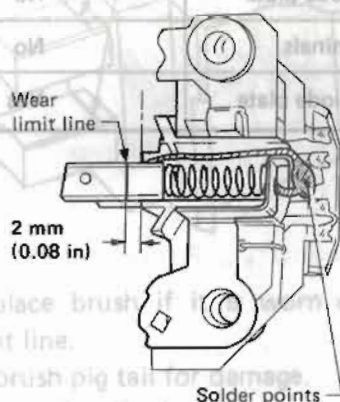


CHARGING SYSTEM—Alternator—

Assembly

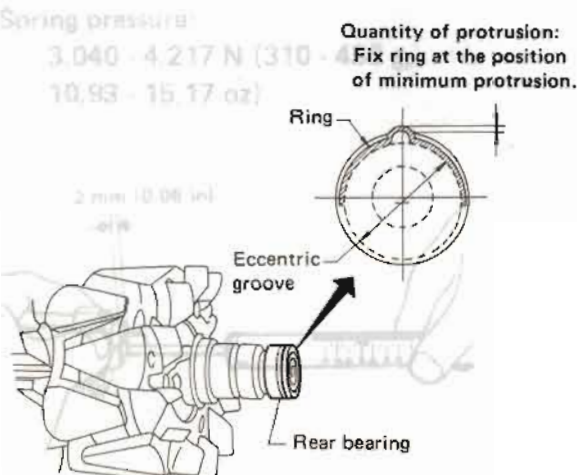
Carefully observe the following instructions.

1. When soldering each stator coil lead wire to diode assembly terminal, perform 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

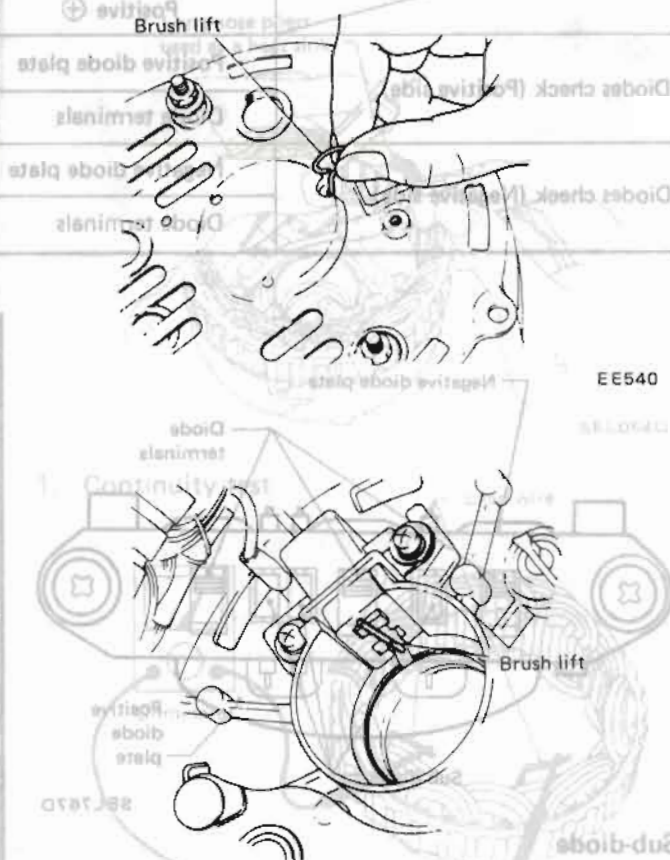
3. Fit ring into groove in rear bearing so that it is as close to the adjacent area as possible.



SEL633D

4. Before installing front cover with pulley and rotor to 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

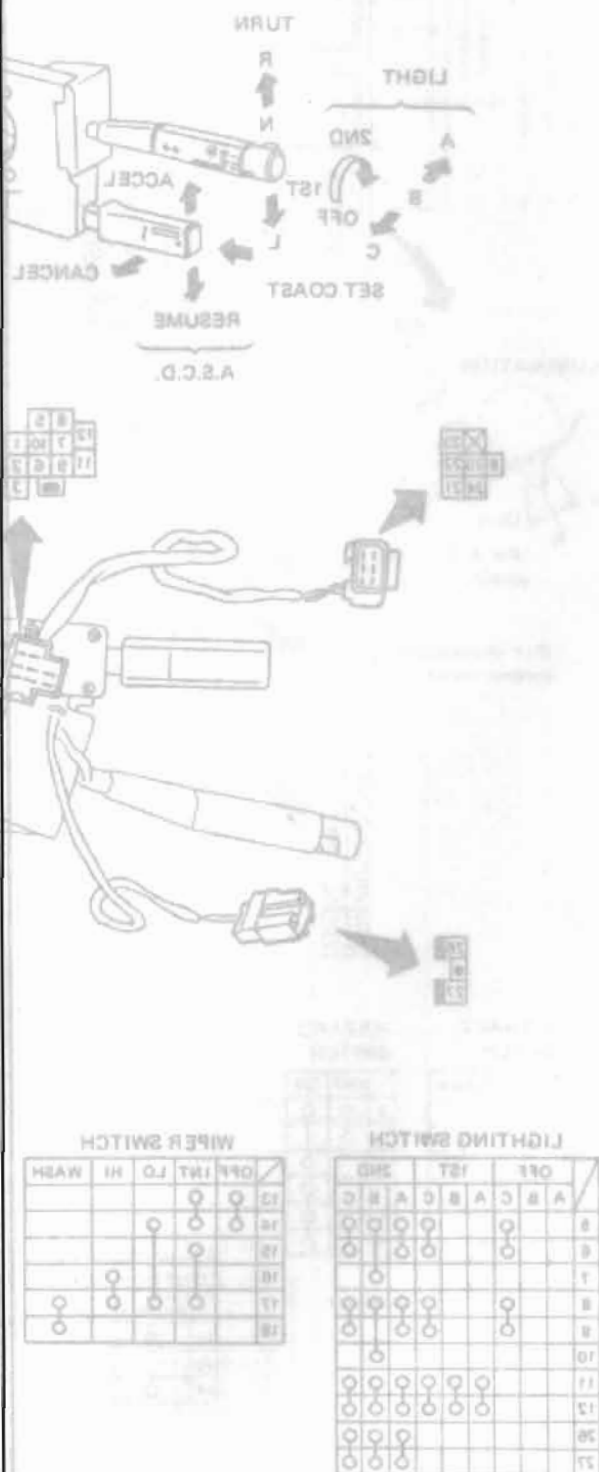
5. After installing front and rear covers of alternator, pull brush lift by pushing toward center.

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

CHARGING SYSTEM —Alternator—

— Service Data and Specifications (S.D.S.)

Type	A2T48195B
Applied model	All
Nominal rating	V-A
Ground polarity	Negative
Minimum revolution under no-load (when 14 volts is applied)	rpm
Hot output current	More than 21/1,300 More than 50/2,500
Regulated output voltage	V
Minimum length of brush	mm (in)
Brush spring pressure	N (g, oz)
Slip ring outer diameter	mm (in)



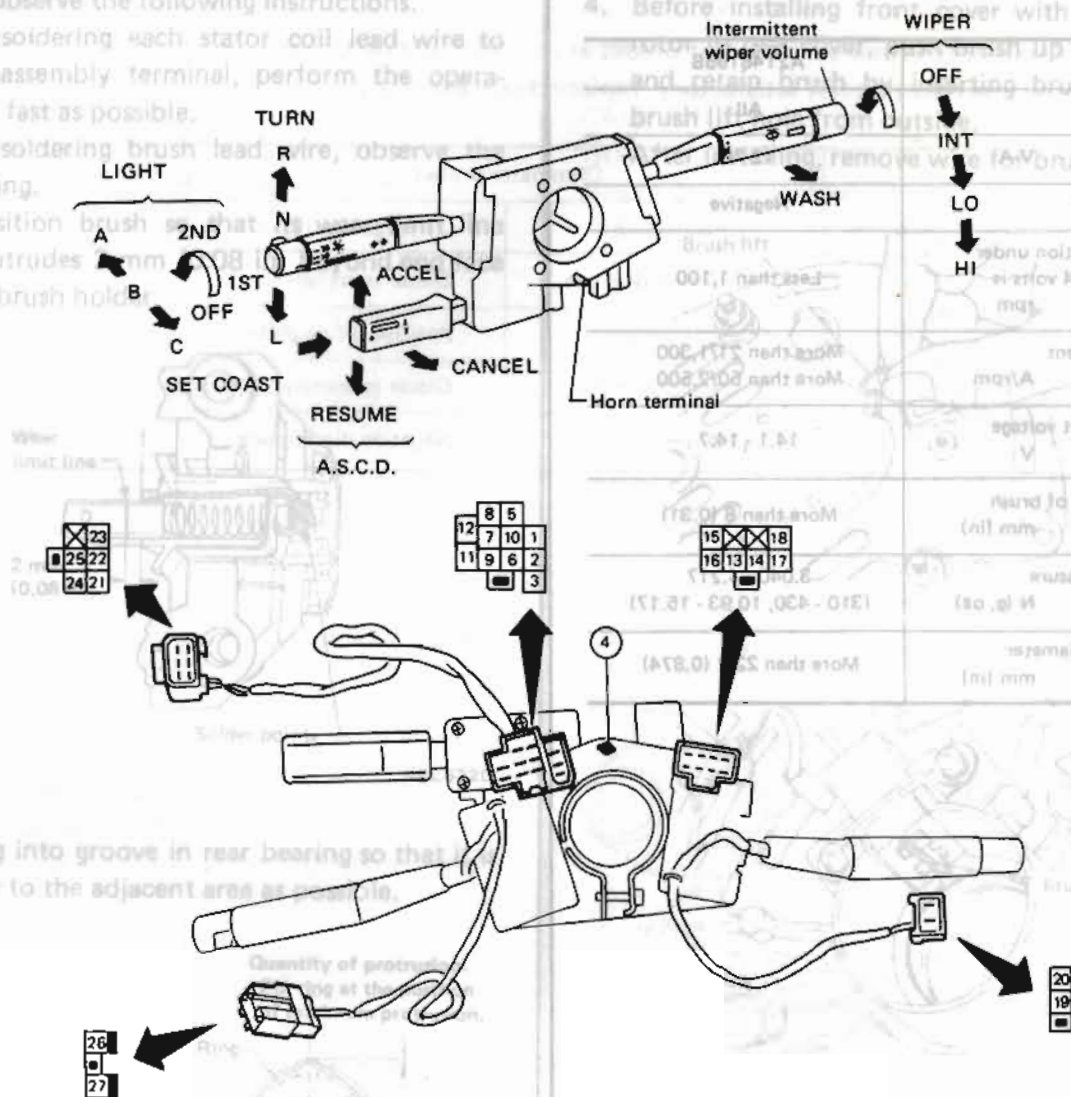
COMBINATION SWITCH

Check

Carefully observe the following instructions.

- When soldering each stator coil lead wire to diode assembly terminal, perform the operation as fast as possible.
- When soldering brush lead wire, observe the following.

- Position brush so that it protrudes 1.0 mm of brush holder.

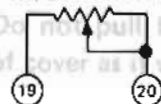


- Fit ring into groove in rear bearing so that it is close to the adjacent area as possible.

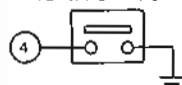
LIGHTING SWITCH											
	OFF			1ST			2ND				
	A	B	C	A	B	C	A	B	C		
5											
6											
7											
8											
9											
10											
11											
12											
26											
27											

WIPER SWITCH									
	OFF		INT		LO		HI		WASH
	13	14	15	16	17	18	19	20	
13									
14									
15									
16									
17									
18									

INTERMITTENT WIPER VOLUME



HORN SWITCH



A.S.C.D. SWITCH

	CANCEL		RESUME		ACCEL		SET COAST	
	21	22	23	24	25	26	27	28
21								
22								
23								
24								
25								

	R		N		L	
	1	2	3	4	5	6
1						
2						
3						

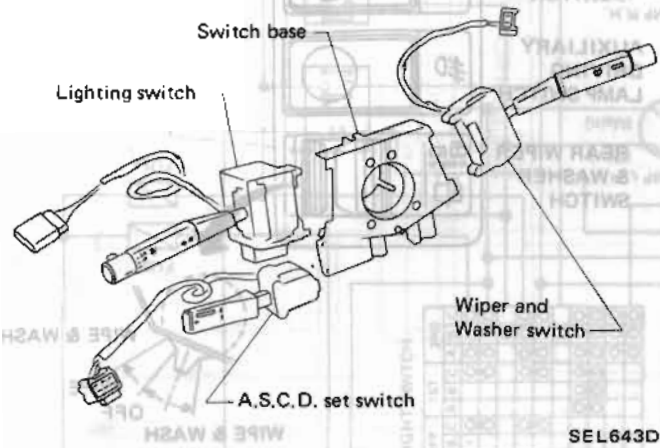
TURN SIGNAL SWITCH

SEL332L

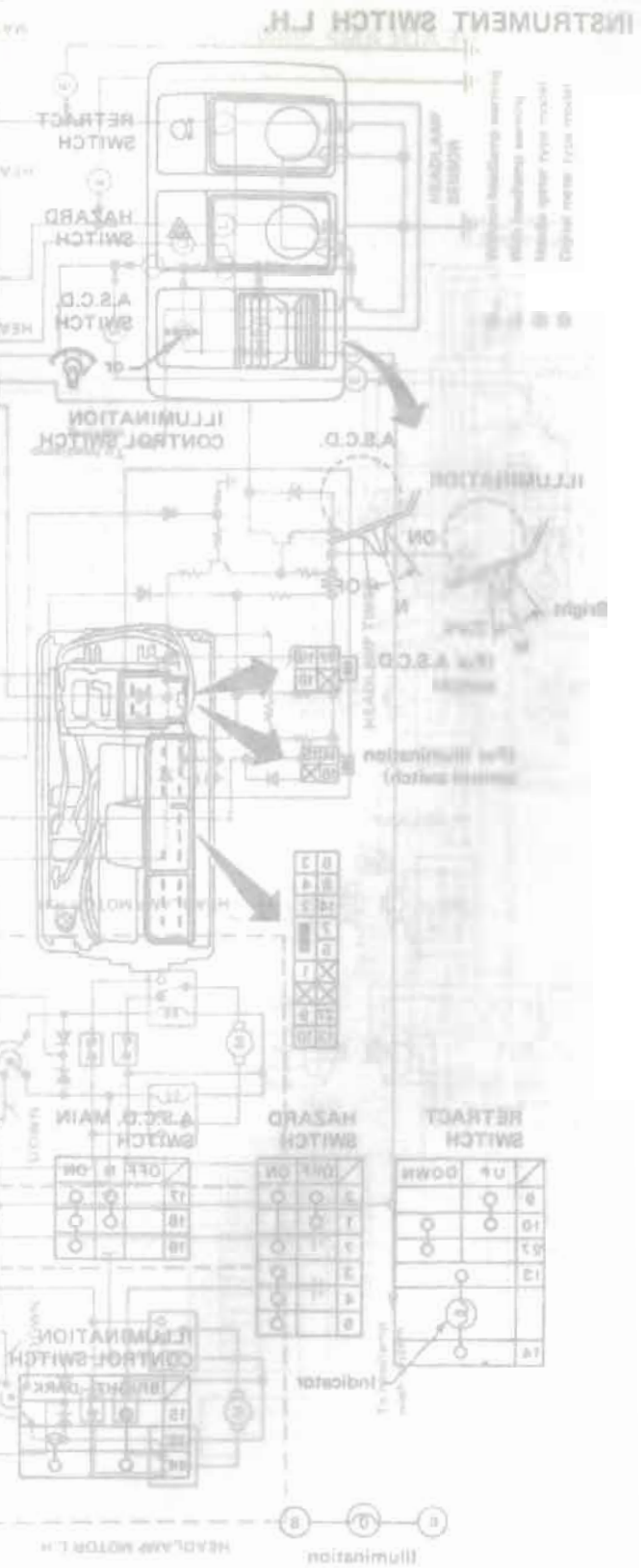
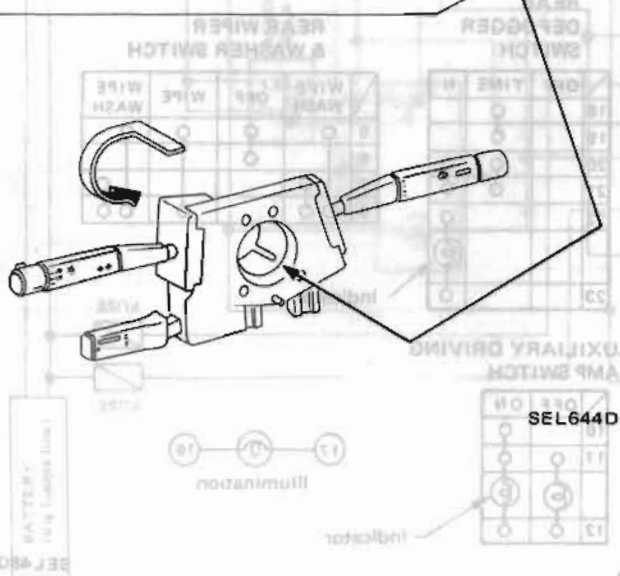
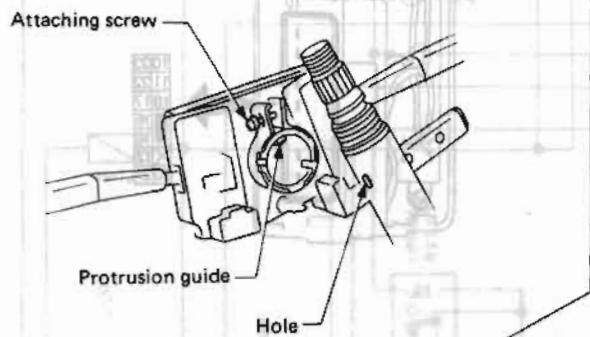
COMBINATION SWITCH

Replacement

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



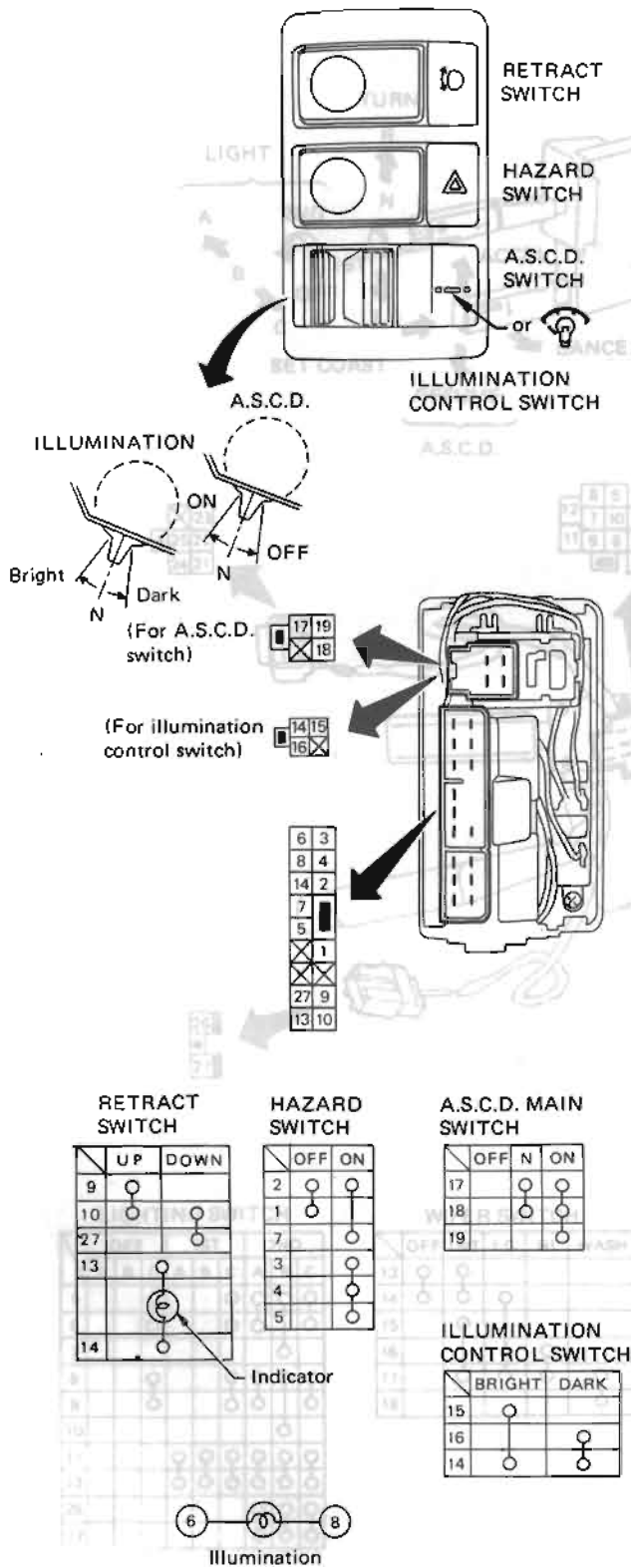
To remove combination switch base, remove base attaching screw and turn after pushing on it.



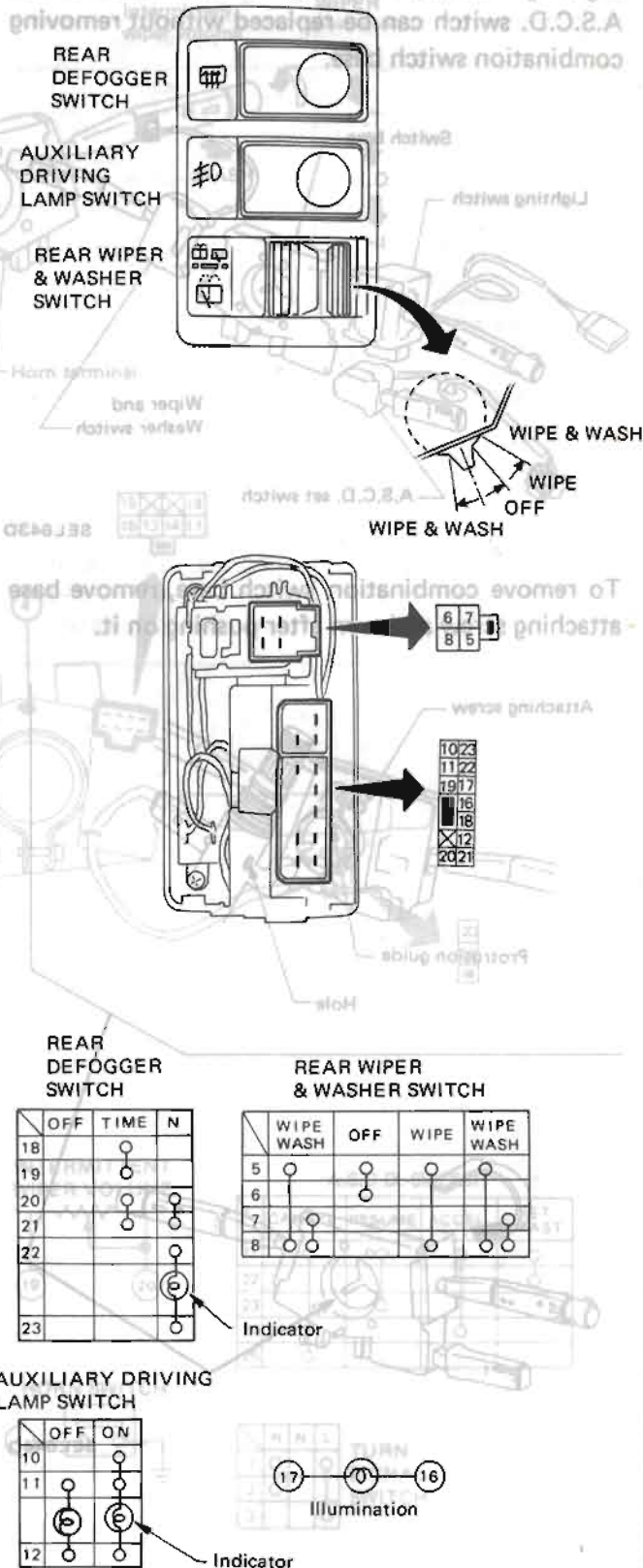
INSTRUMENT SWITCH

Check

INSTRUMENT SWITCH L.H.



INSTRUMENT SWITCH R.H.

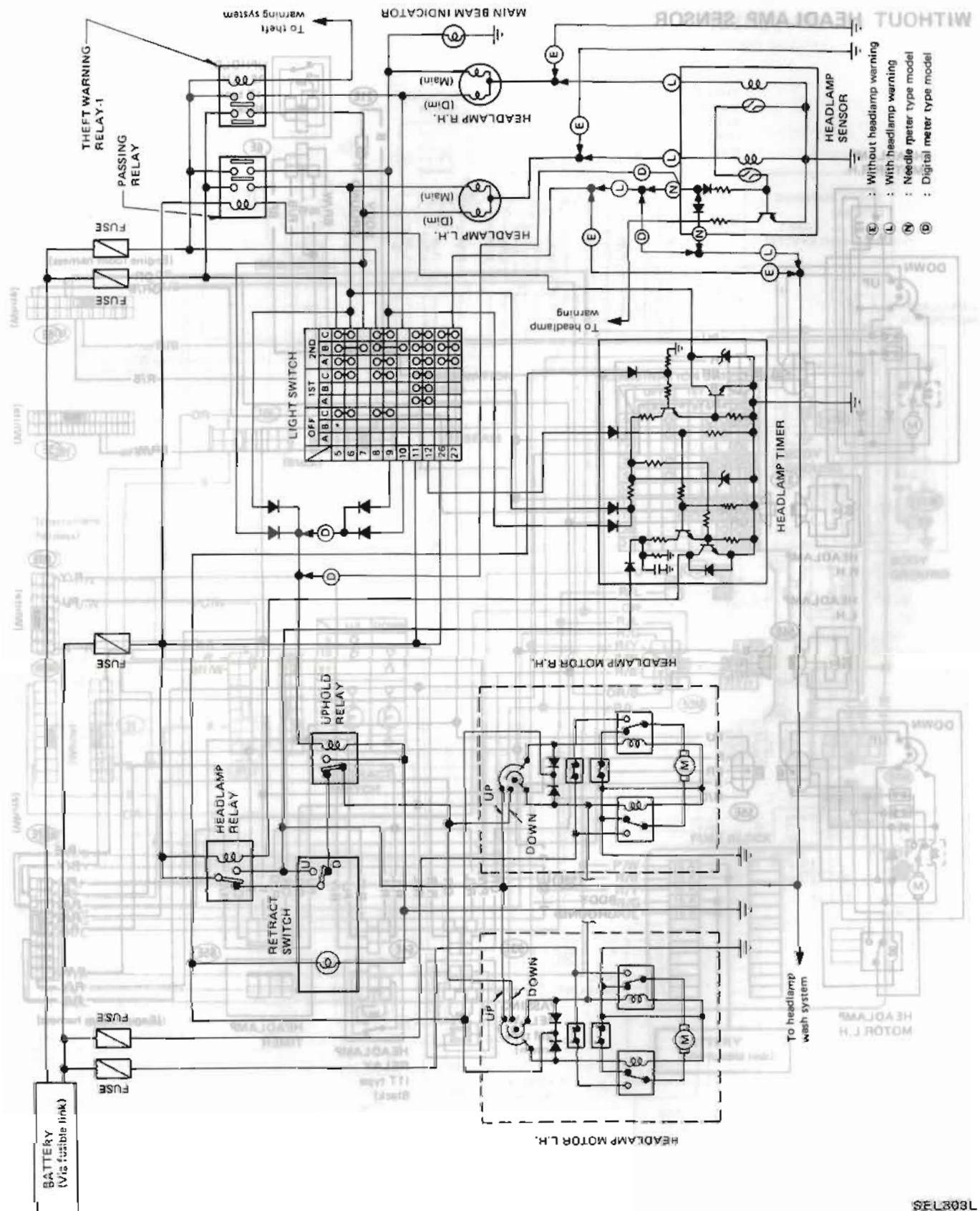


- For removal, refer to "INSTRUMENT" in BF section.

SEL480K

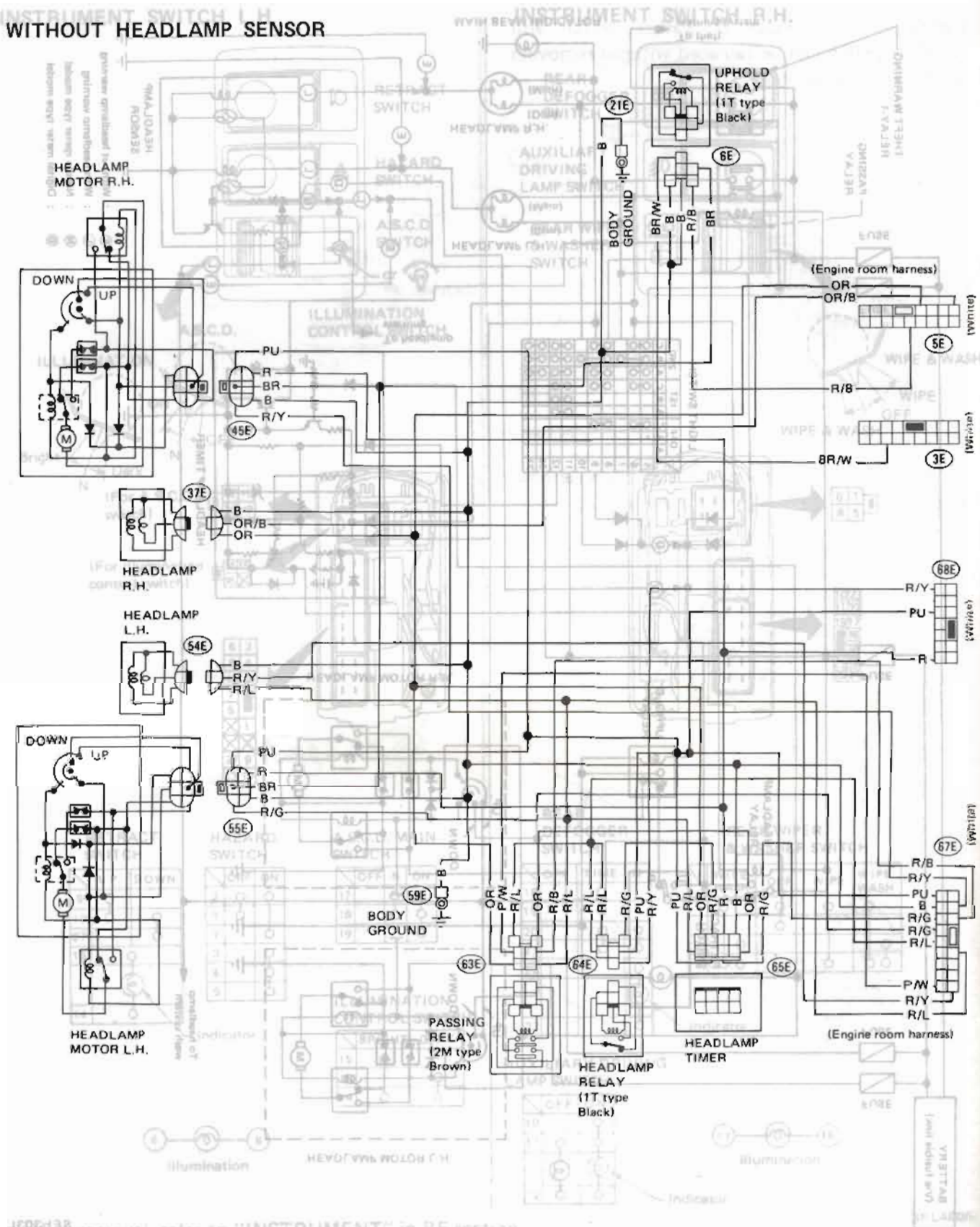
HEADLAMP

Schematic

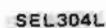


Wiring Diagram

WITHOUT HEADLAMP SENSOR



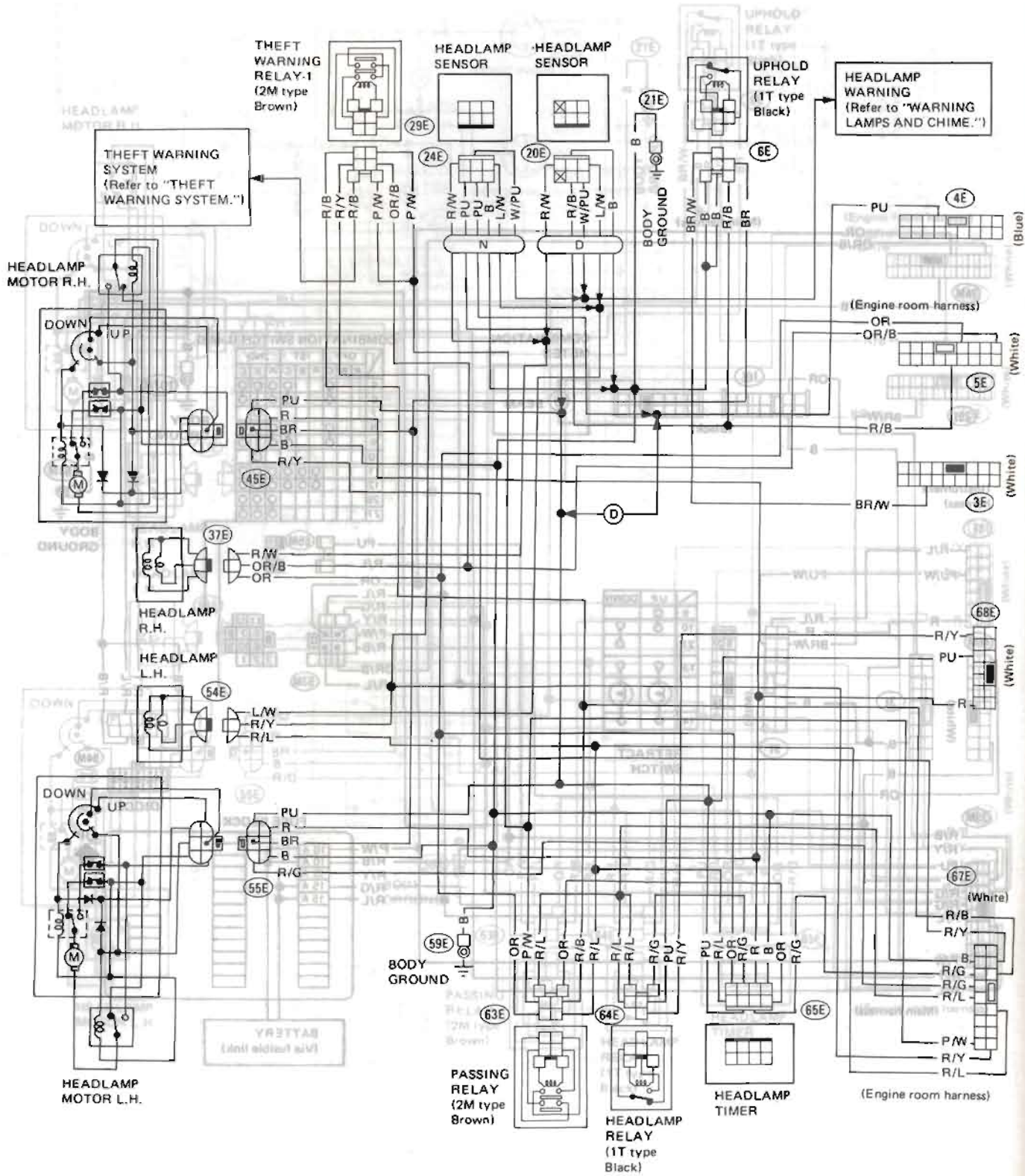
Wiring Diagram (Cont'd)



HEADLAMP

Wiring Diagram (Cont'd)

WITH HEADLAMP SENSOR



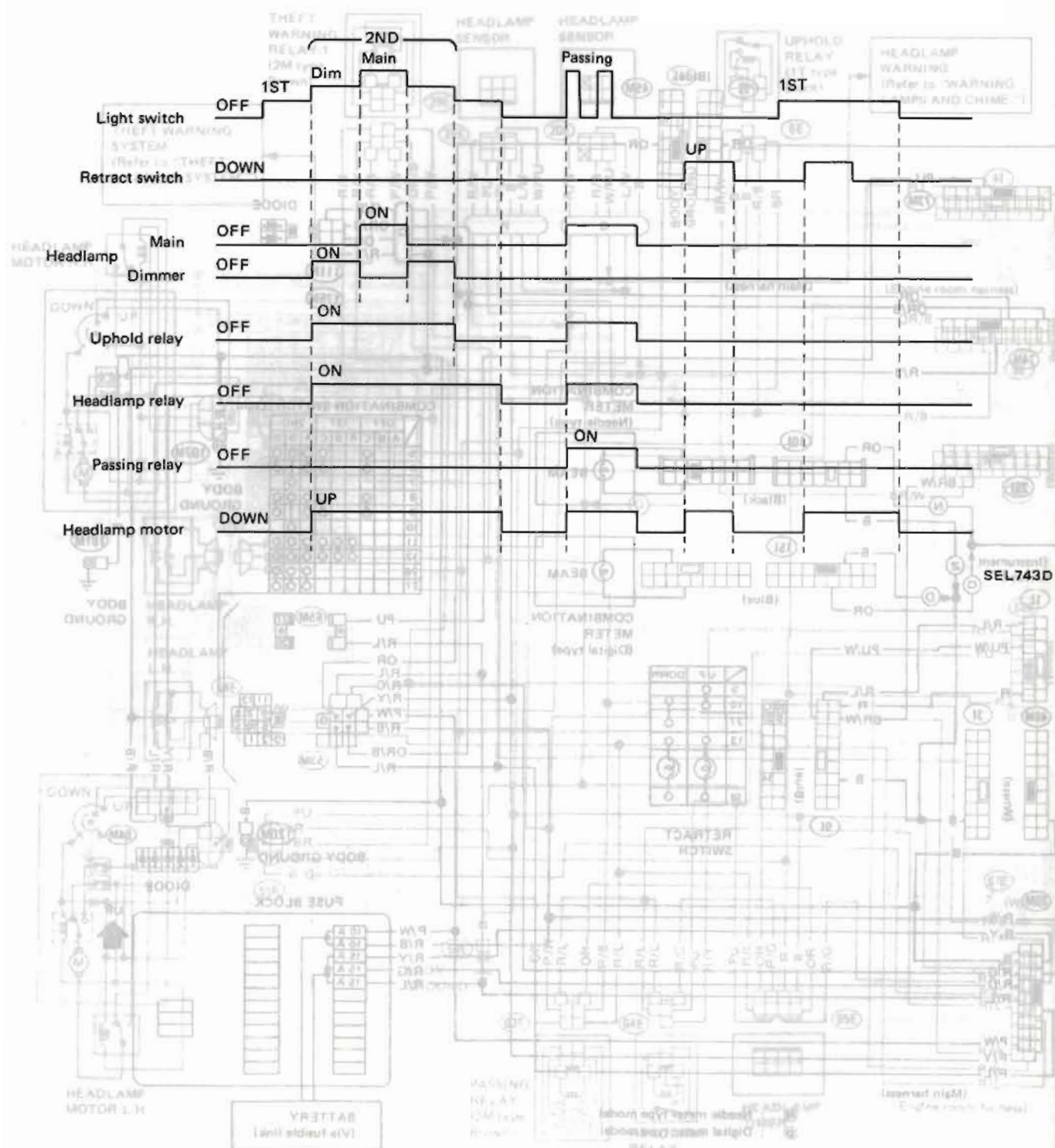
Wiring Diagram (Cont'd)

EL-39

HEADLAMP

Operation

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



SEL743D

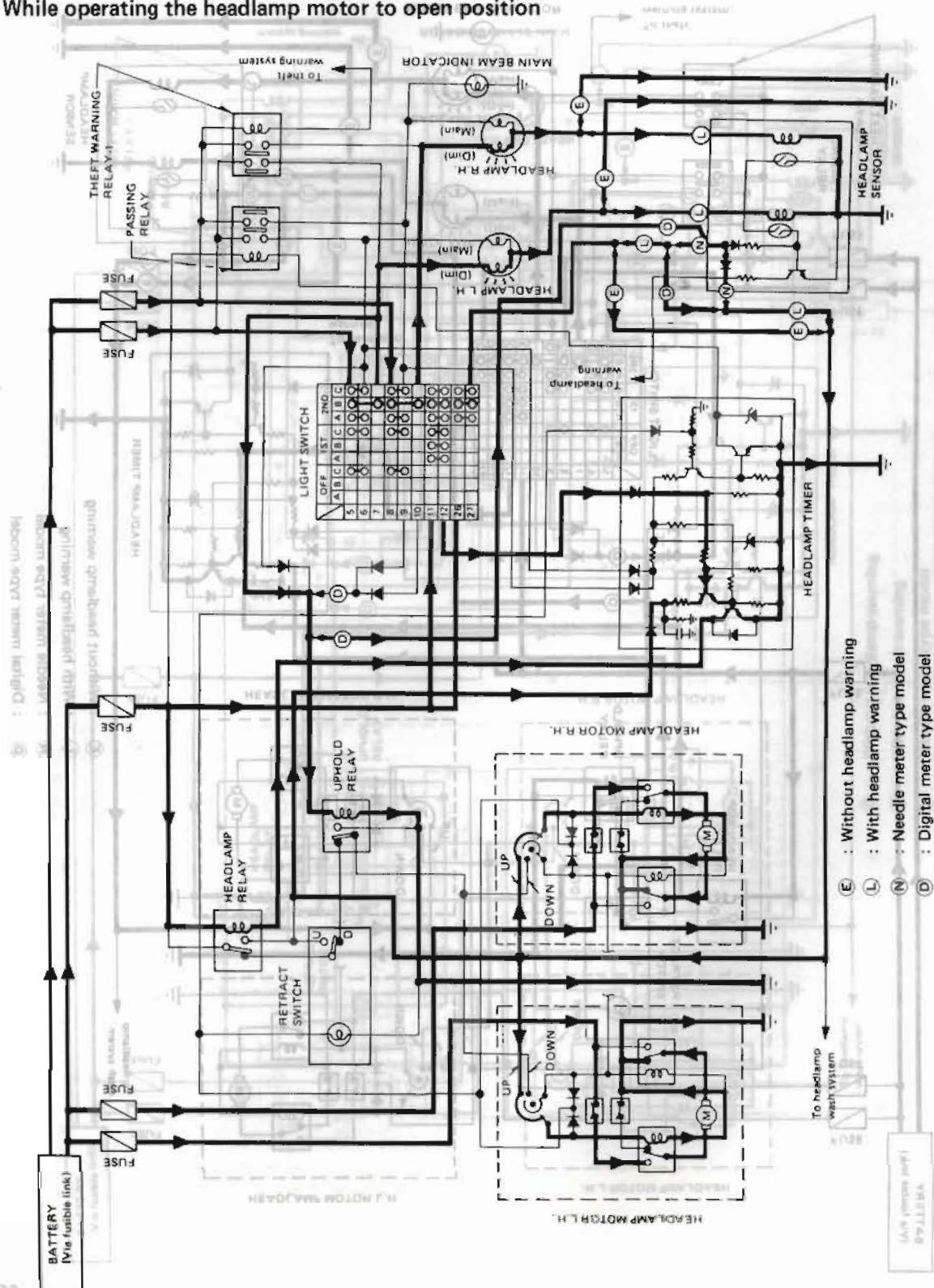
HEADLAMP

Description

CIRCUIT OPERATION

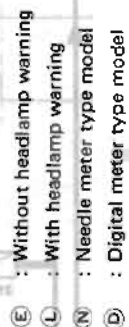
[A] When lighting switch is switched from "1ST" → "2ND"

A-1: While operating the headlamp motor to open position



Description (Cont'd)

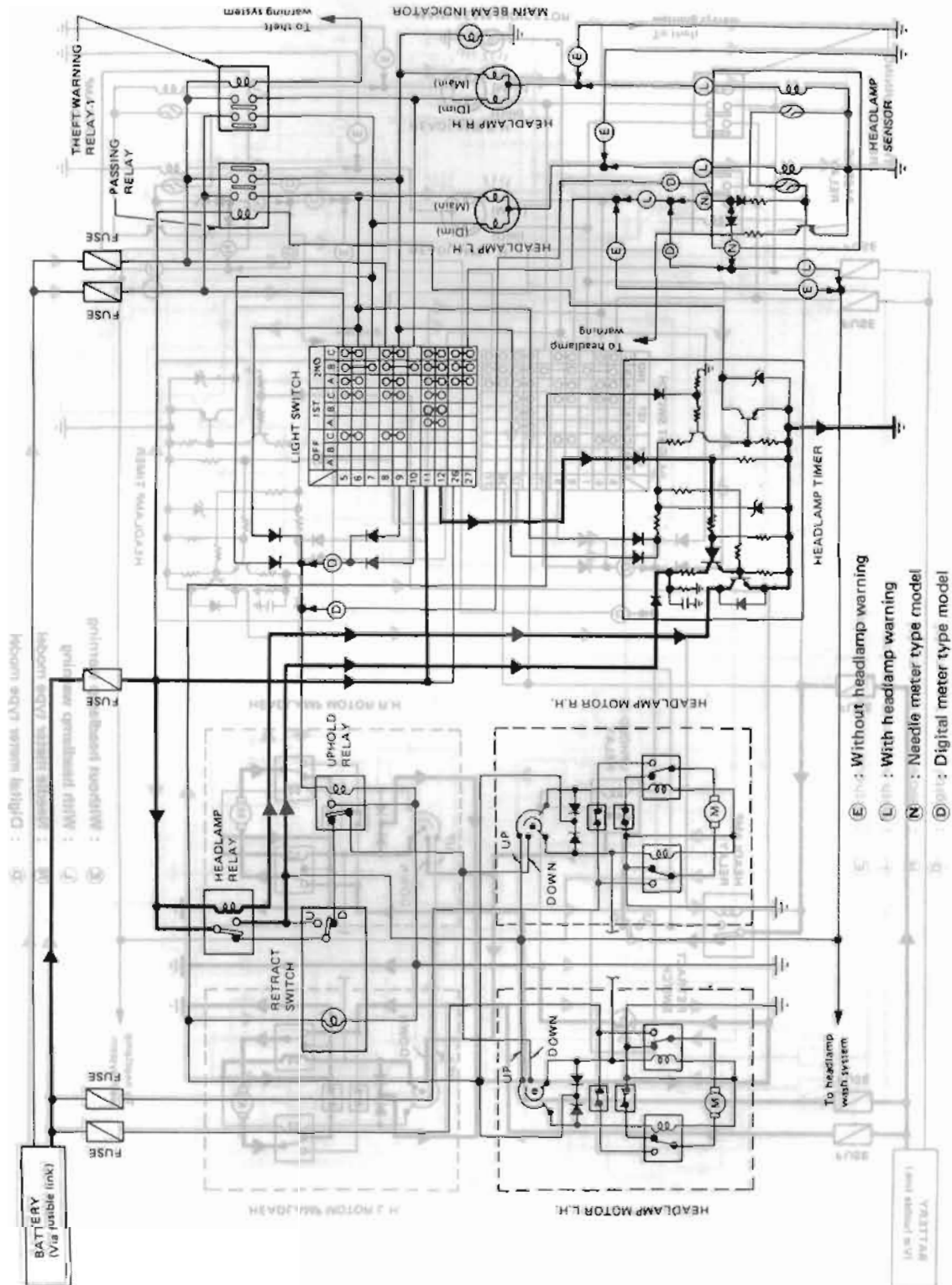
When lighting switch is switched from "1ST" to "2ND" position, the lighting switch and retract switch



HEADLAMP

Description (Cont'd)

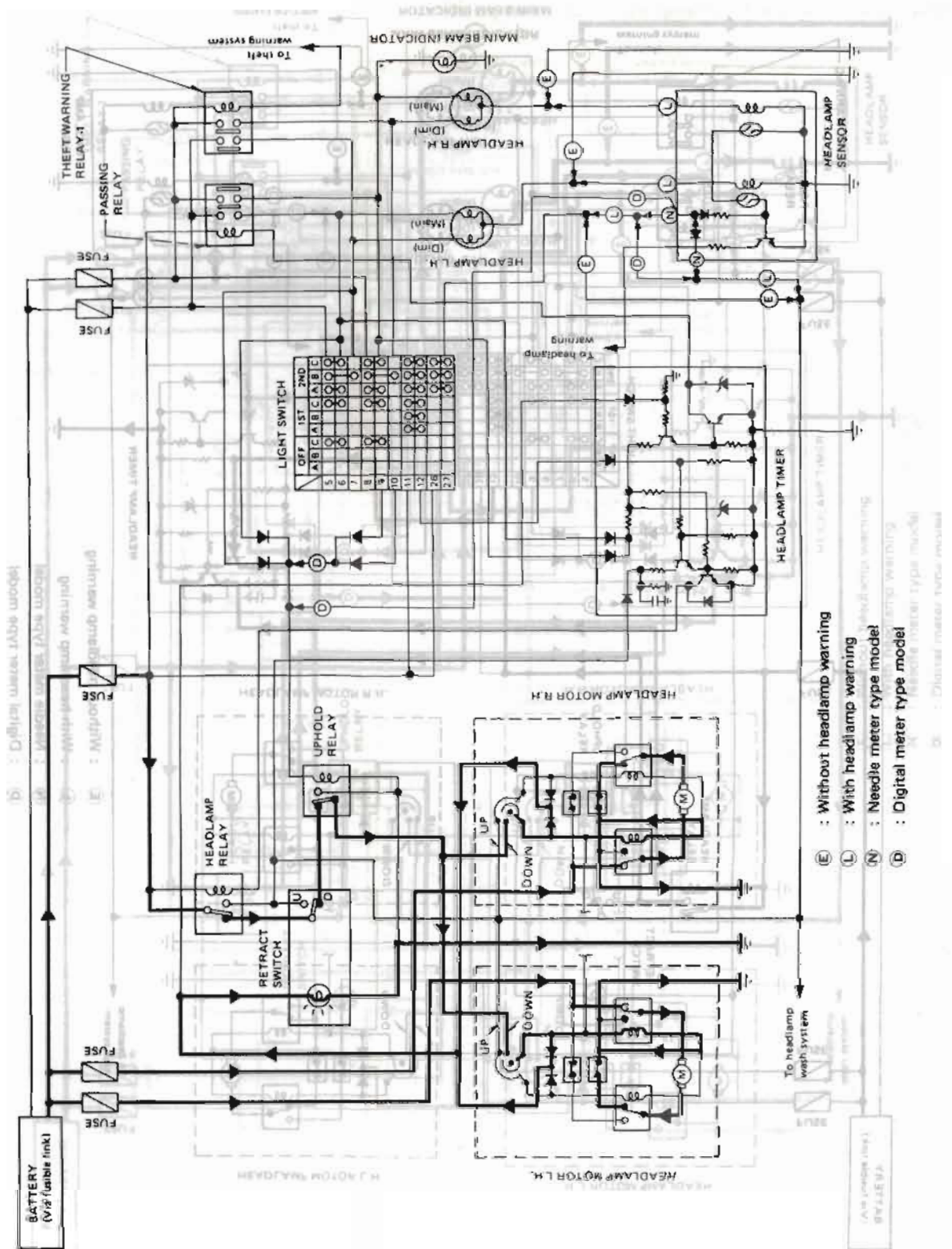
- [B] When lighting switch is switched from "2ND" to "1ST" (Headlamp goes out and keeps up by headlamp timer and headlamp relay.) [C] When lighting switch is switched from "1ST" to "OFF" (Headlamp goes out and keeps up by headlamp timer and headlamp relay.)



HEADLAMP

Description (Cont'd)

- [C] When lighting switch is switched from "1ST" → "OFF" (While operating the headlamp motor to closed position)

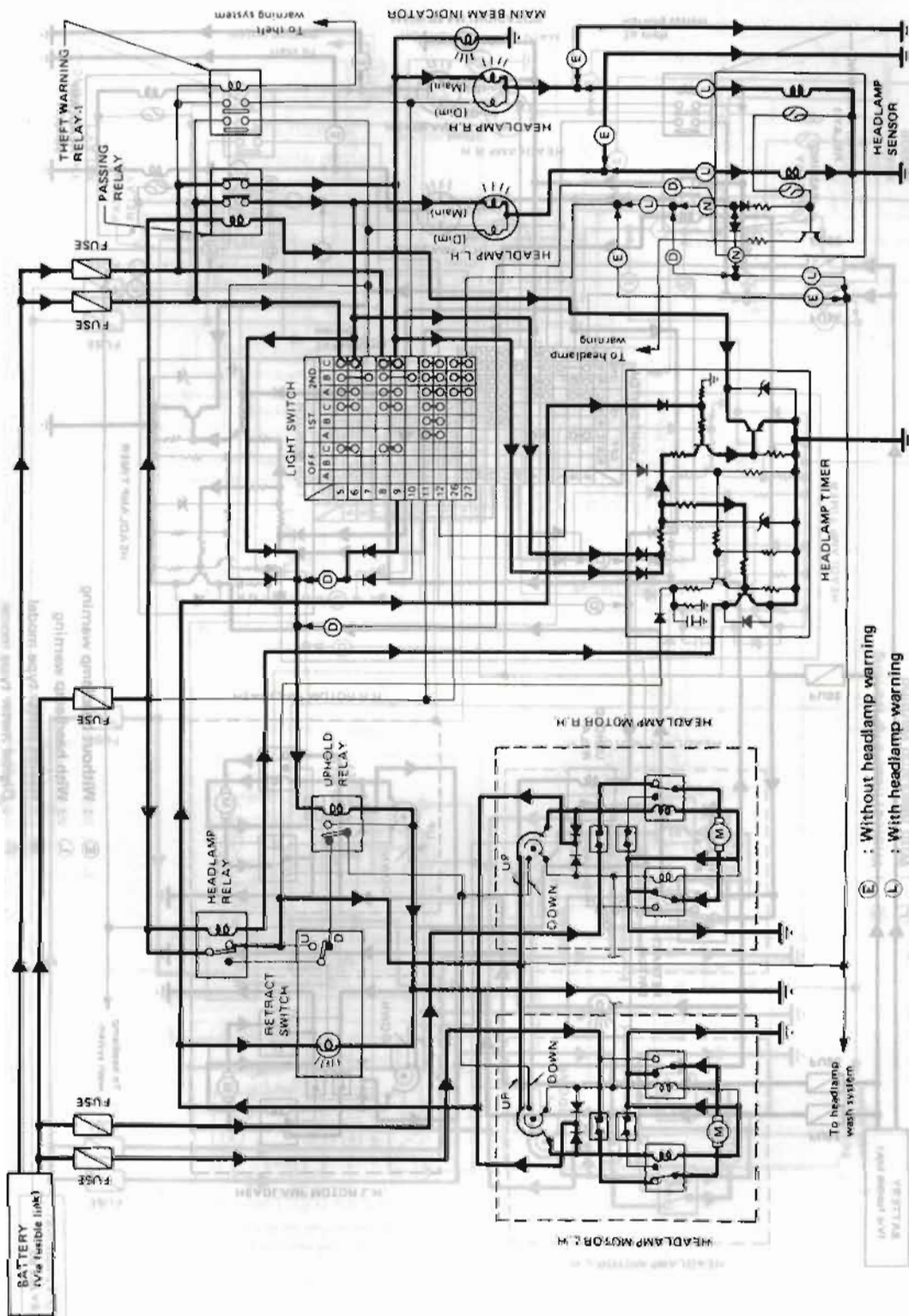


HEADLAMP

Description (Cont'd)

[D] When retractor switch is turned ON

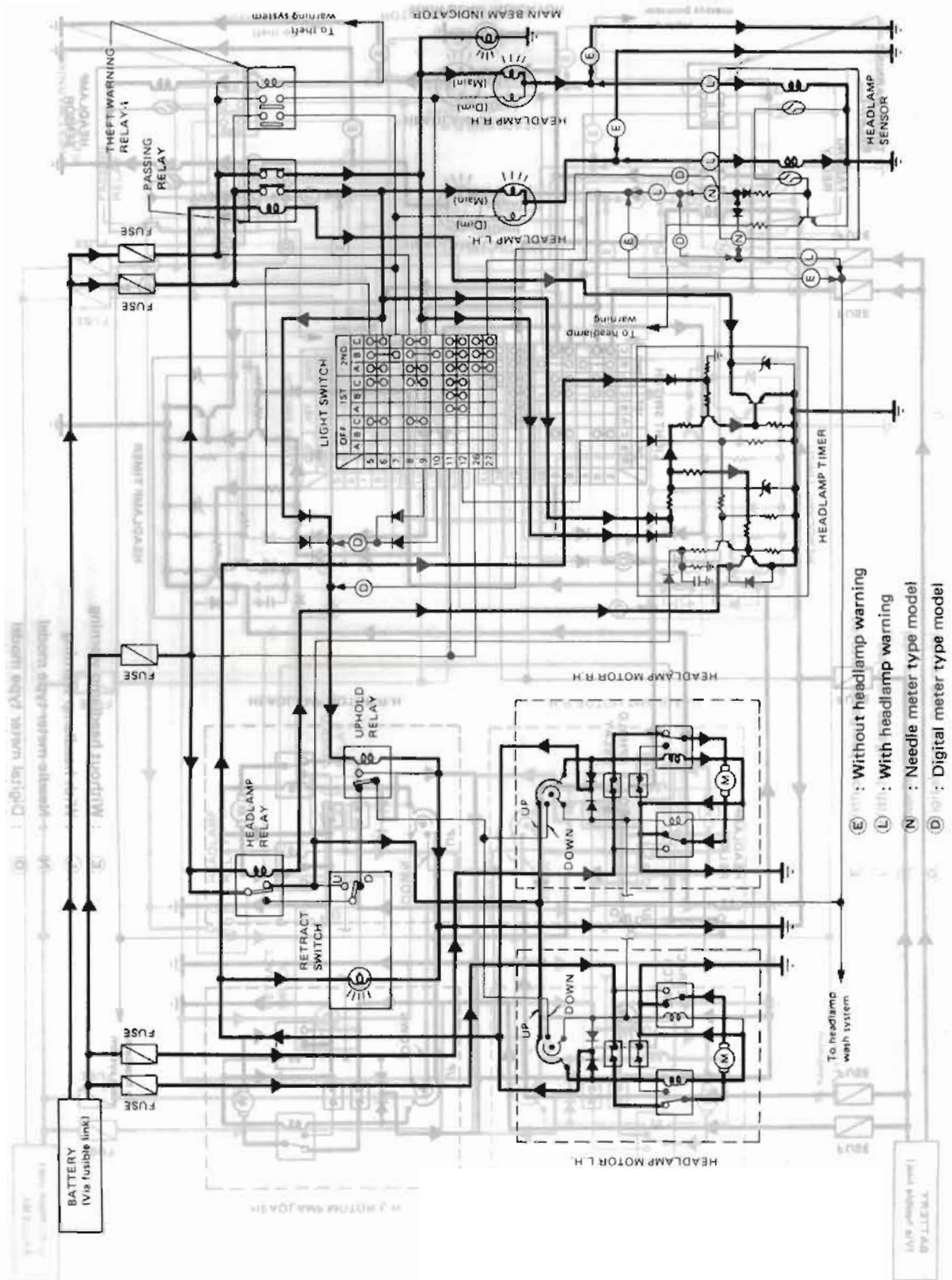
D-1: When lighting switch is switched to "PASSING"



HEADLAMP

Description (Cont'd)

D-2: After releasing lighting switch from "PASSING" OFF (While operating the headlamp motor to open position)



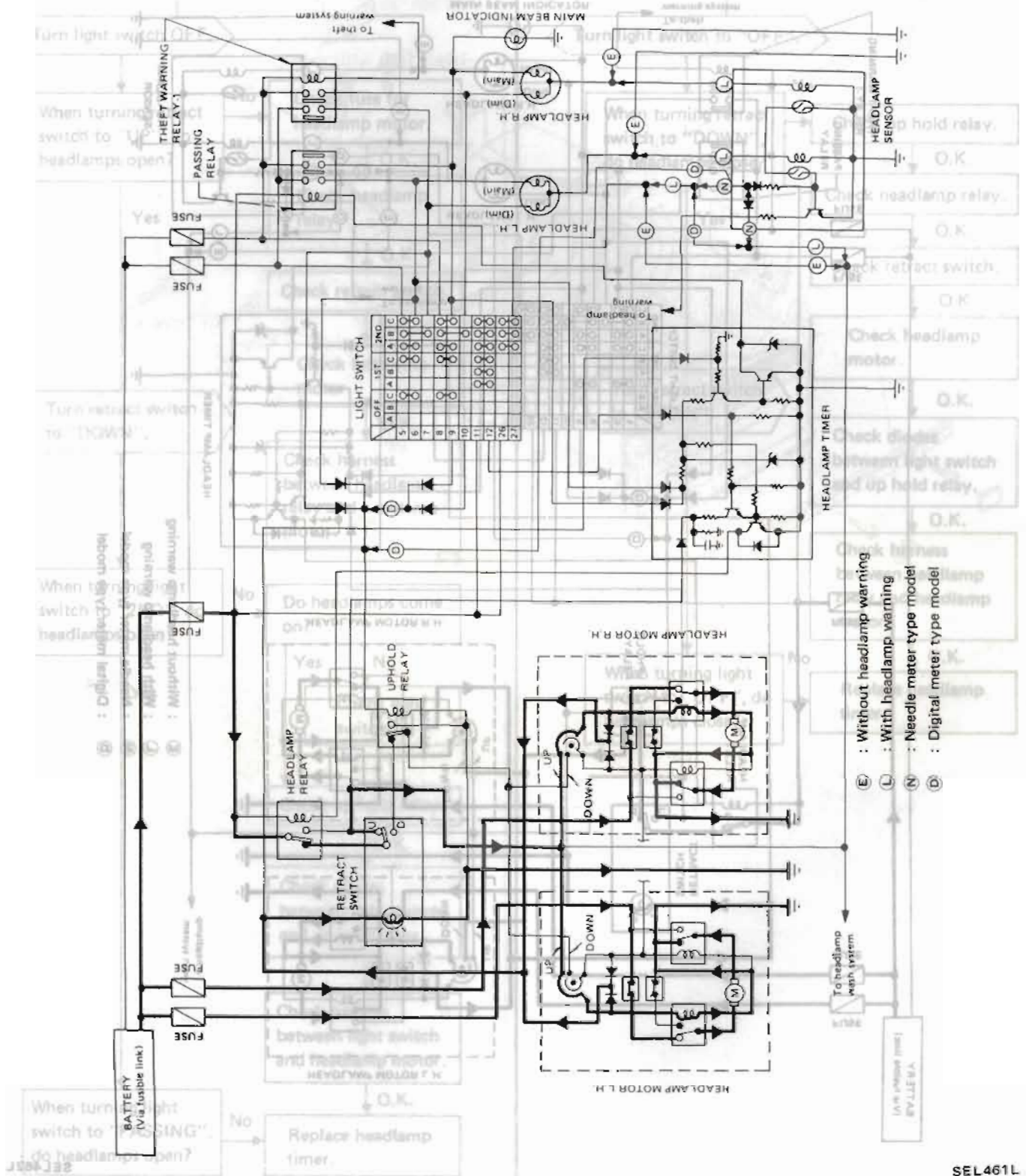
Closing operation is the same as [C] when lighting switch is switched from "1ST" → "OFF"

HEADLAMP

Description (Cont'd)

- [E] When retractor switch is turned ON
(While operating the headlamp motor to open position)

- [F] When retractor switch is turned OFF
(While operating the headlamp motor to open position)

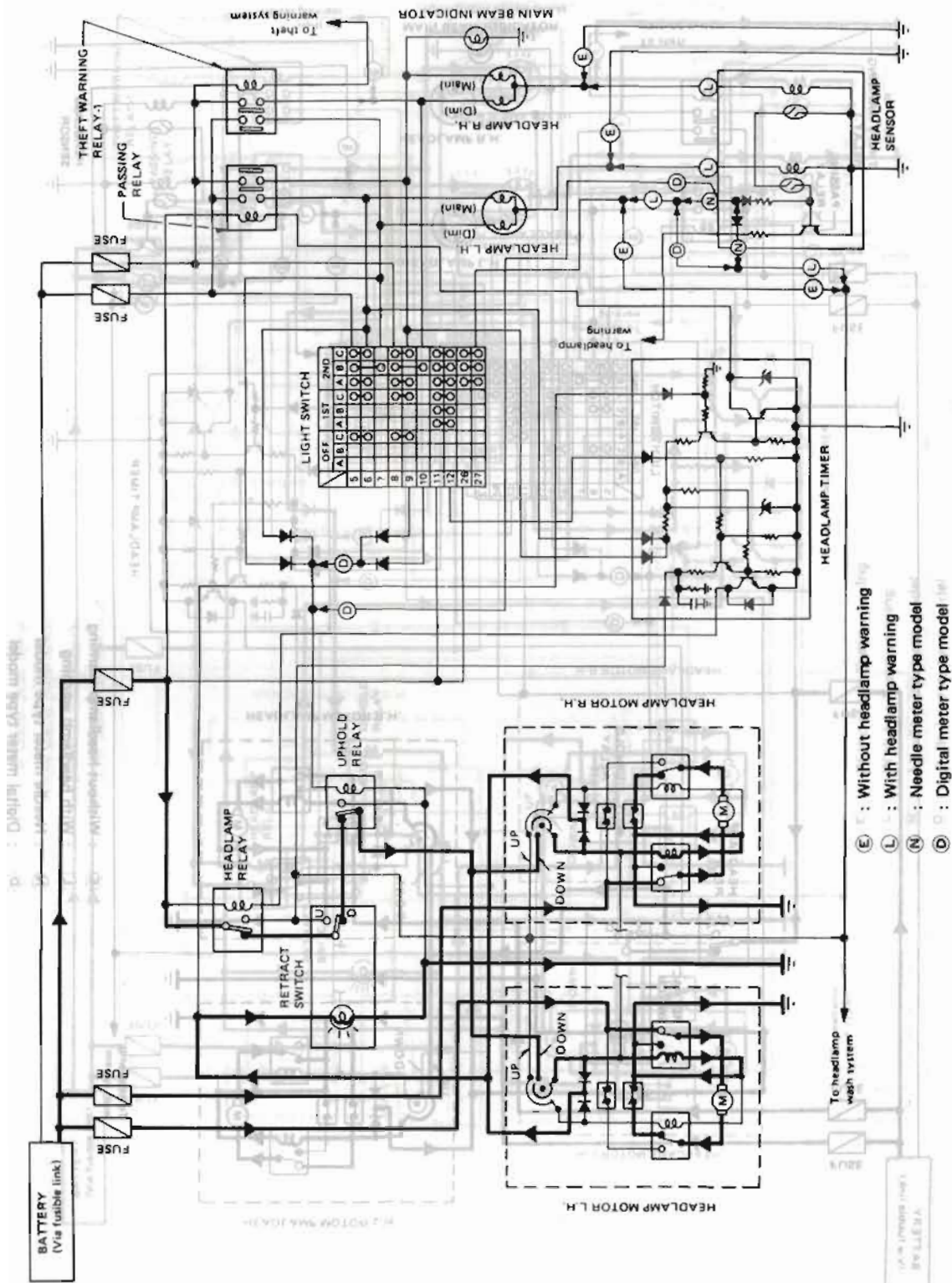


SEL461L

HEADLAMP

Description (Cont'd)

- [F] When retractor switch is turned OFF (While operating the headlamp motor to closed position)



- (E) : Without headlamp warning
(L) : With headlamp warning
(N) : Needle meter type model
(D) : Digital meter type model

HEADLAMP

Trouble-shooting

Headlamps do not open.

Turn light switch OFF.

When turning retract switch to "UP", do headlamps open?

No

Check fuse for headlamp motor.

O.K.

Check headlamp relay.

O.K.

Check retract switch.

O.K.

Check headlamp motor.

O.K.

Check harness between headlamp relay and headlamp motor.

Turn retract switch to "DOWN".

When turning light switch to "2ND", do headlamps open?

No

Do headlamps come on?

Yes

Check light switch.

O.K.

Check diodes between light switch and up hold relay.

O.K.

Check harness between light switch and headlamp motor.

O.K.

When turning light switch to "PASSING", do headlamps open?

No

Replace headlamp timer.

Headlamps do not close.

Turn light switch to "OFF".

When turning retract switch to "DOWN", do headlamps close?

No

Check up hold relay.

O.K.

Check headlamp relay.

O.K.

Check retract switch.

O.K.

Check headlamp motor.

O.K.

Check diodes between light switch and up hold relay.

O.K.

Check harness between headlamp relay and headlamp motor.

O.K.

When turning light switch to "OFF", do headlamps close?

No

Replace headlamp timer.

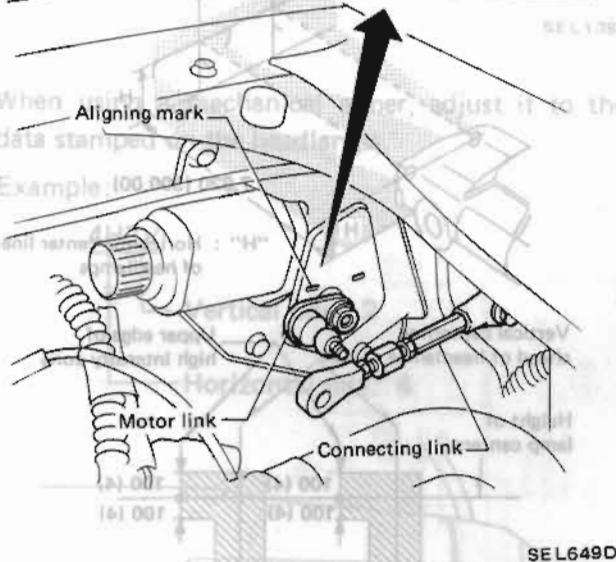
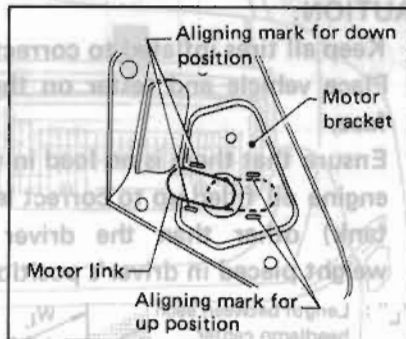
Removal



HEADLAMP

Installation

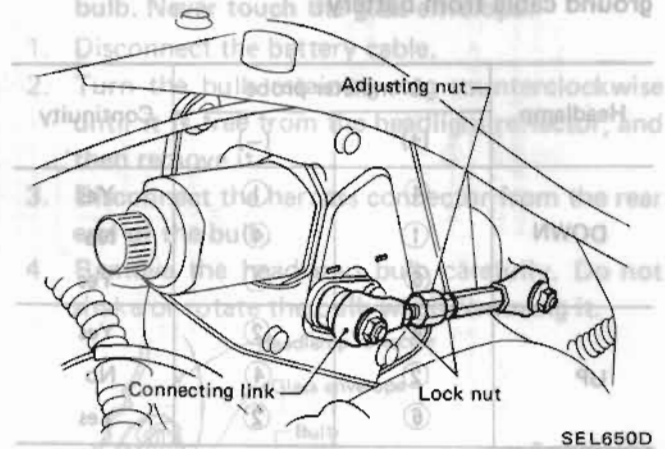
1. Set the headlamp motor to "DOWN" position.
- Connect harness to headlamp motor and set retract switch to "DOWN". Headlamp motor can now be set to "DOWN" with retract switch.
2. Install the headlamp link assembly and headlamp motor in the body.
3. Install the connecting link.
- When installing the link to the motor, make sure the motor link is installed as shown below.



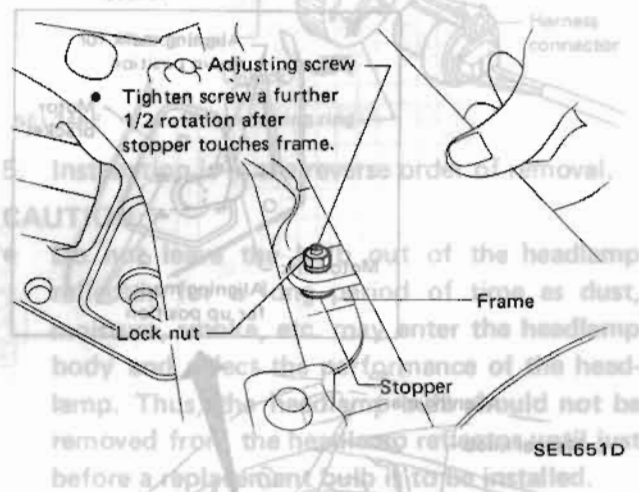
Adjustment

- 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.



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



HEADLAMP

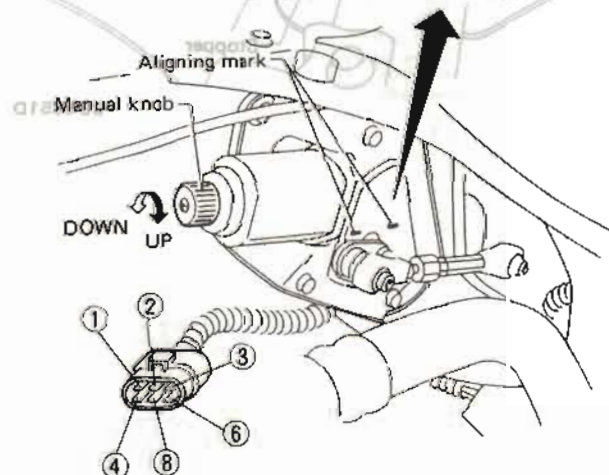
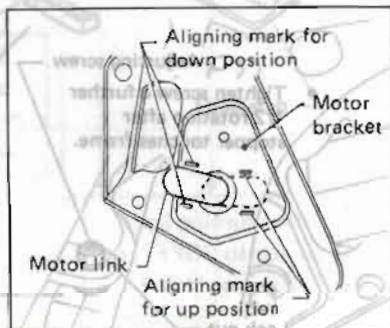
Headlamp Motor Check

- 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	④	①	Yes
	①	④	No
	⑥	①	Yes
UP	④	②	Yes
	②	④	No
	⑥	②	Yes



SEL333L

Aiming Adjustment

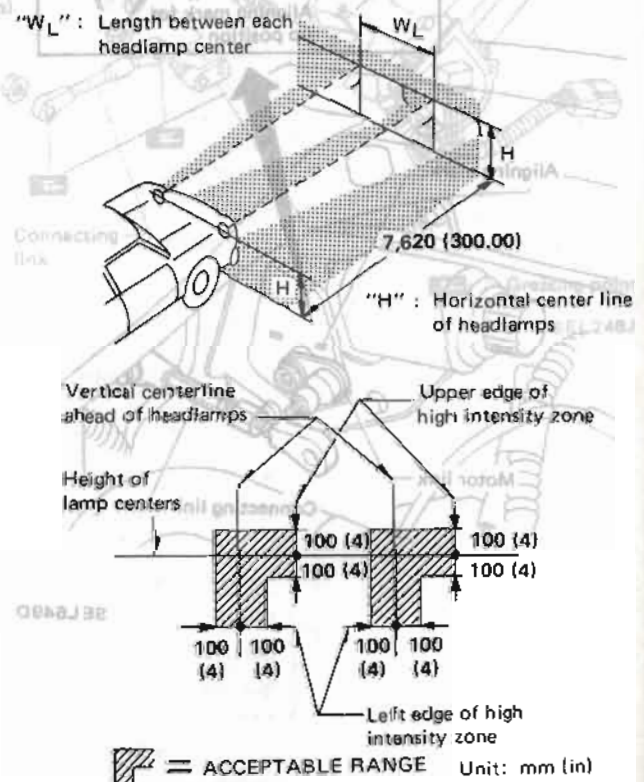
When performing headlamp aiming adjustment, use an aiming machine, aiming wall screen or headlamp tester. For operating instructions of any aimer, it should be in good repair, calibrated and used according to respective operation manuals supplied with the unit.

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

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

CAUTION:

- Keep all tires inflated to correct pressures.
- Place vehicle and tester on the same flat surface.
- Ensure 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.

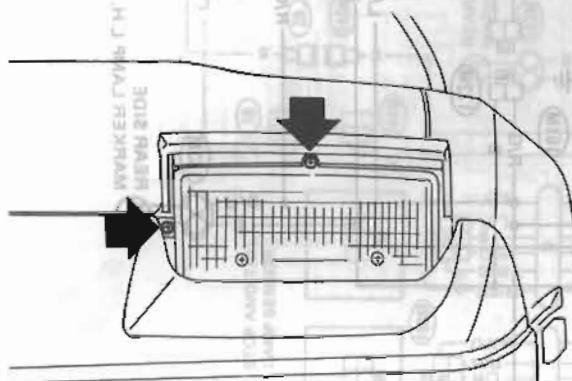
HEADLAMP

Aiming Adjustment (Cont'd)

Bulb Replacement

LOW BEAM

1. Turn headlamp low beam on.
 2. Use adjusting screws to perform aiming adjustment.
- Before adjusting headlamps, remove covers.
 - First tighten the adjust screw all the way and then make adjustment by loosening the screw.



SEL138J

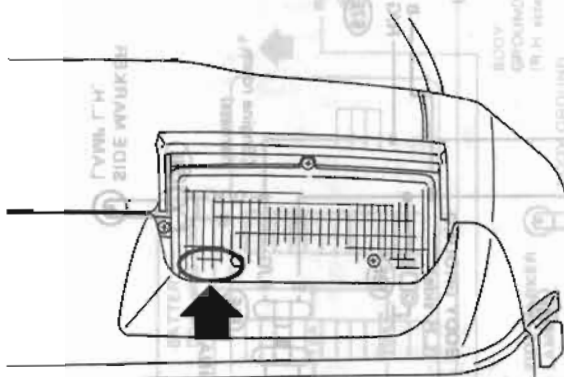
When using a mechanical aimer, adjust it to the data stamped on the headlamps.

Example:

4H2V

Vertical side: 2

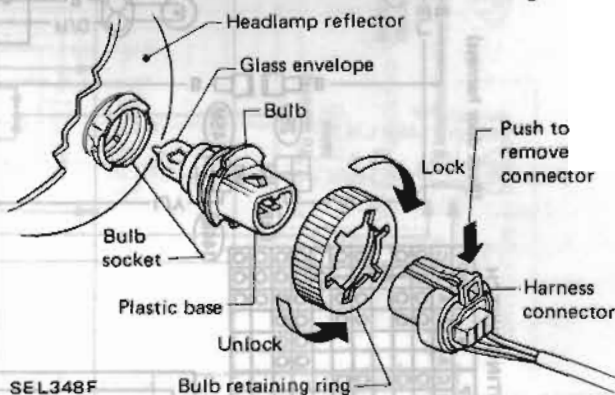
Horizontal side: 4



SEL139J

The headlamp is a semi-sealed beam type which uses a replaceable halogen bulb. A bulb can be replaced from the engine compartment side without removing the headlamp body.

- Grasp only its plastic base when handling the bulb. Never touch the glass envelope.
1. Disconnect the battery cable.
 2. Turn the bulb retaining ring counterclockwise until it is free from the headlight reflector, and then remove it.
 3. Disconnect the harness connector from the rear end of the bulb.
 4. Remove the headlamp bulb carefully. Do not shake or rotate the bulb when removing it.



SEL348F

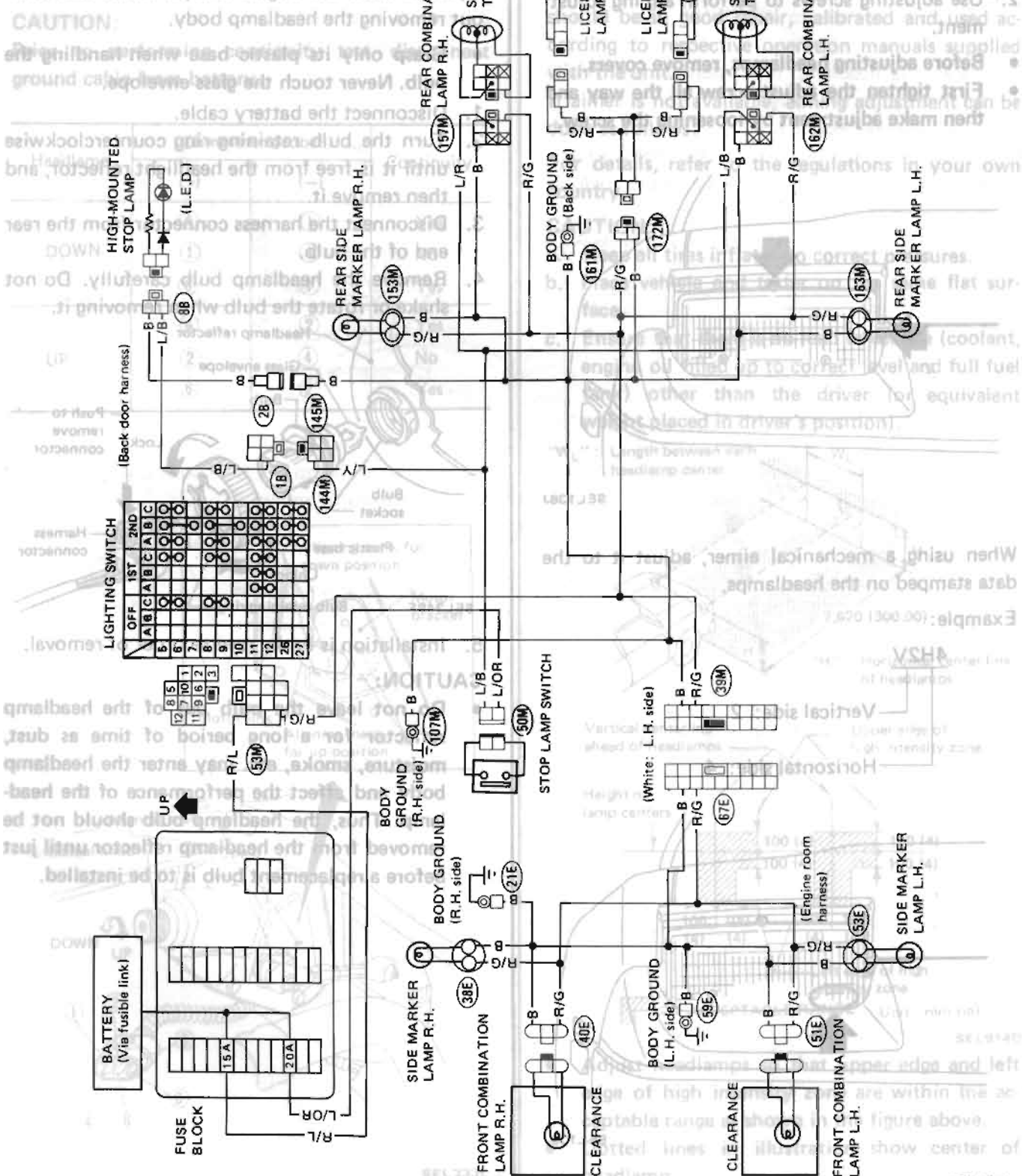
5. Installation is in the reverse order of removal.

CAUTION:

- Do not leave the bulb out of the headlamp reflector for a long period of time as dust, moisture, smoke, etc. may enter the headlamp body and affect the performance of the headlamp. Thus, the headlamp bulb should not be removed from the headlamp reflector until just before a replacement bulb is to be installed.

Clearance, License, Tail and Stop Lamps/Wiring Diagram

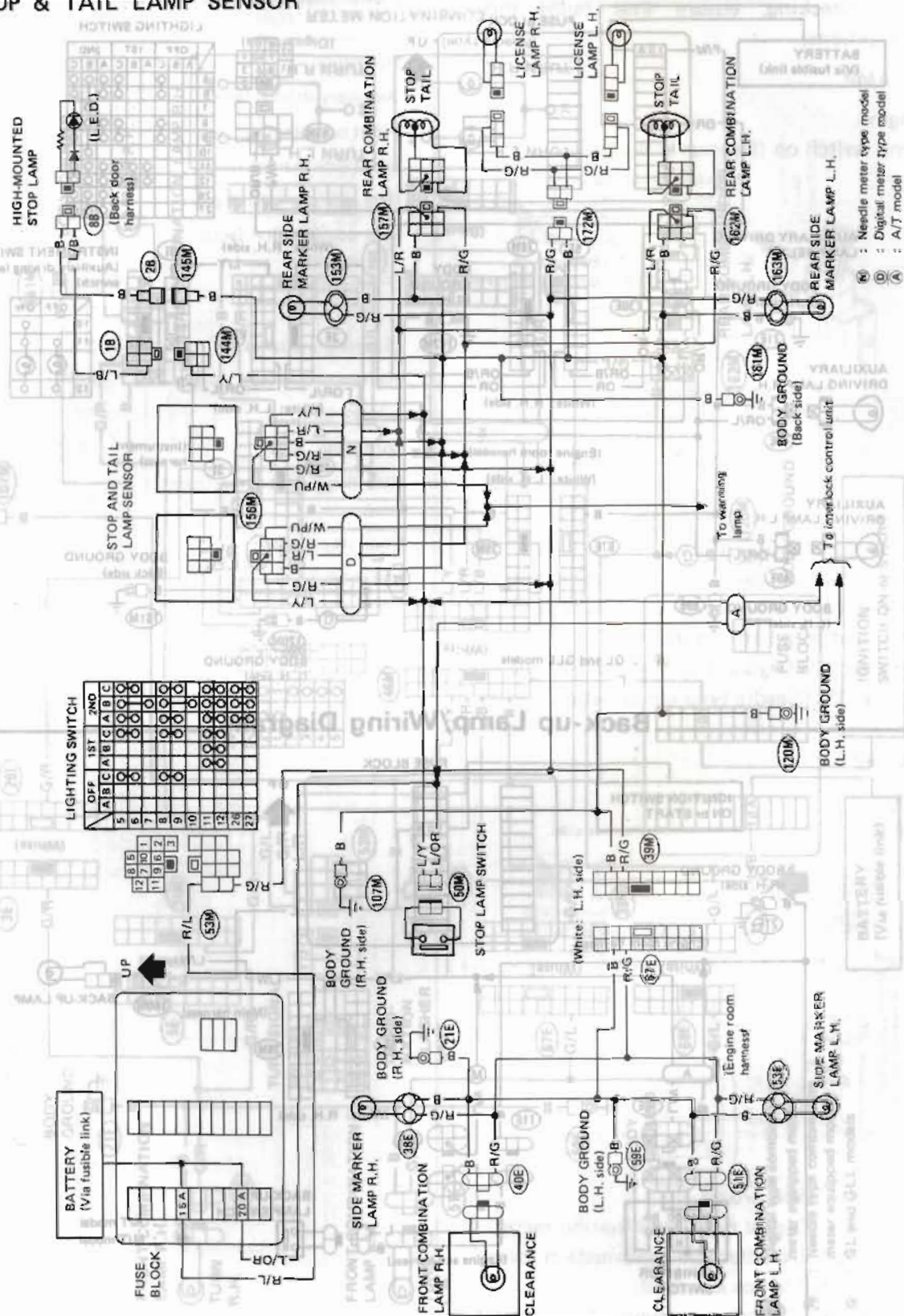
NO



EXTERIOR LAMP

Clearance, License, Tail and Stop Lamps/Wiring Diagram (Cont'd)

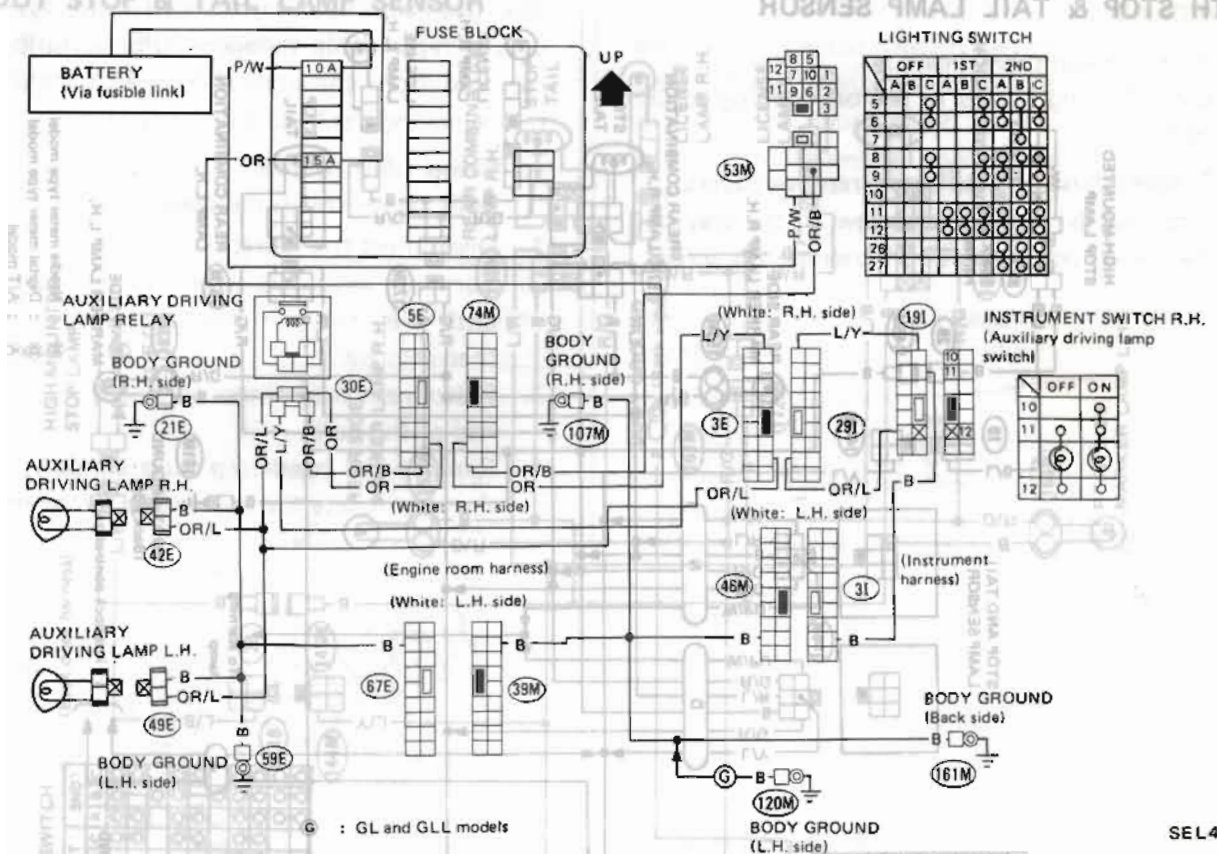
WITH STOP & TAIL LAMP SENSOR



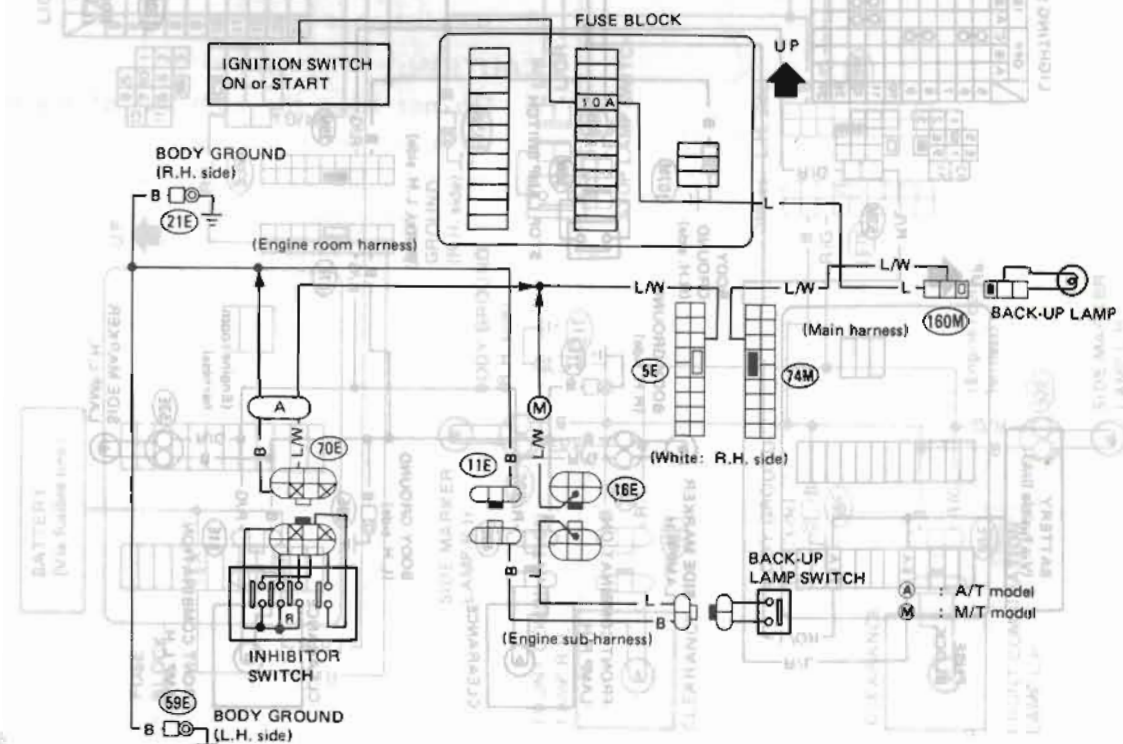
SEL307L

EXTERIOR LAMP

Auxiliary Driving Lamp/Wiring Diagram

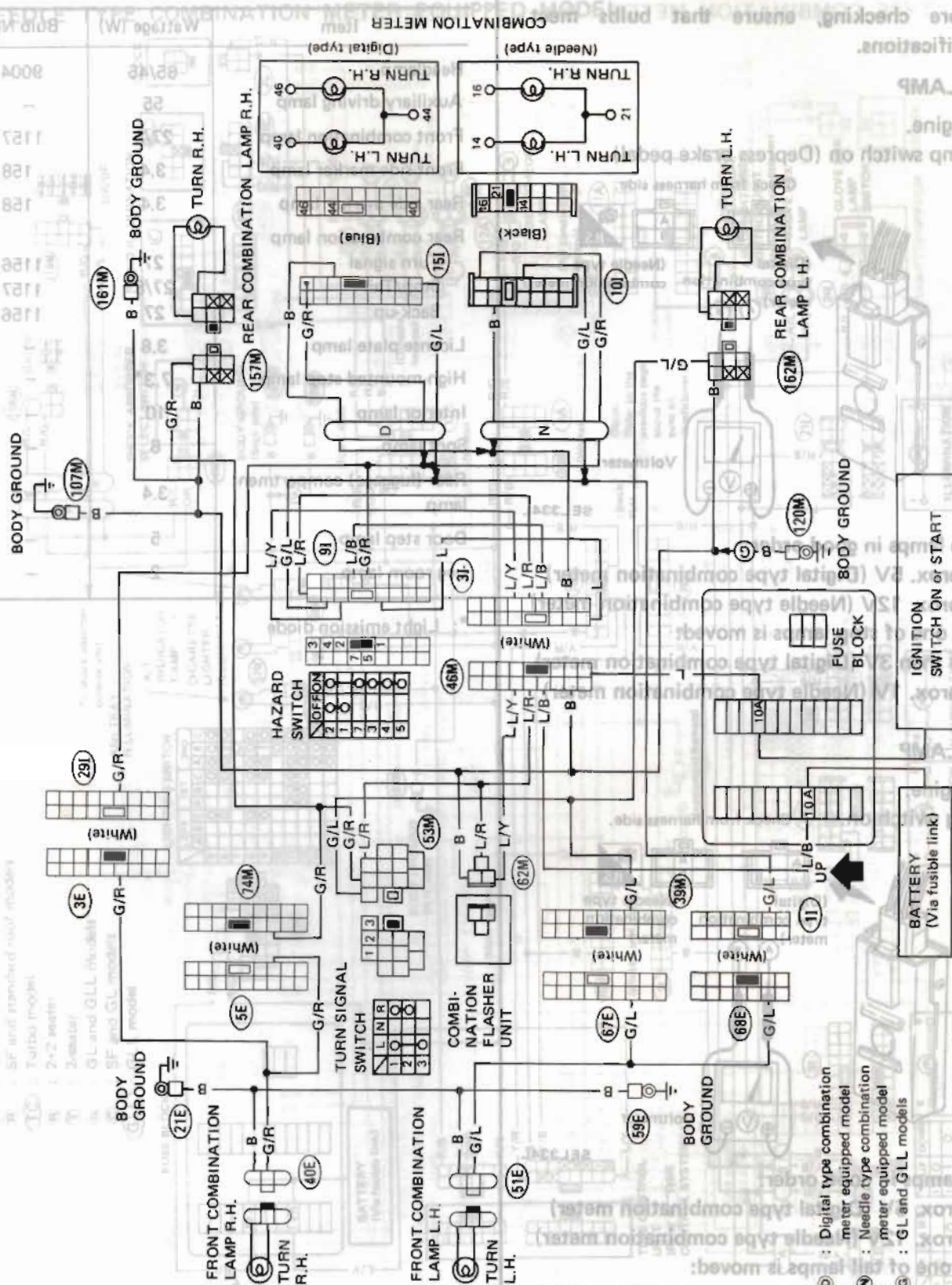


Back-up Lamp/Wiring Diagram



EXTERIOR LAMP

Turn Signal and Hazard Warning Lamps/Wiring Diagram



EXTERIOR LAMP

Stop and Tail Lamp Sensor Check

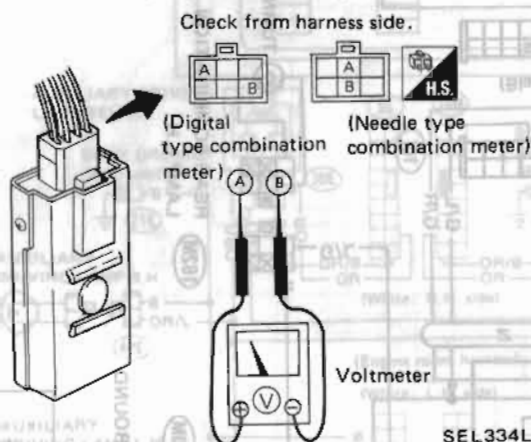
Bulb Specifications

- Before checking, ensure that bulbs meet specifications.

STOP LAMP

Start engine.

Stop lamp switch on (Depress brake pedal).



All stop lamps in good order:

Approx. 5V (Digital type combination meter)

Approx. 12V (Needle type combination meter)

At least one of stop lamps is moved:

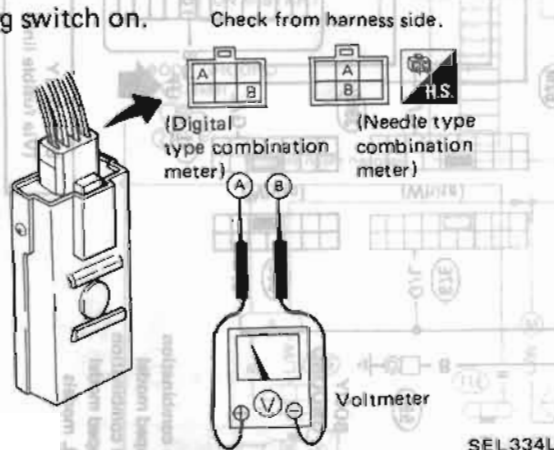
Less than 3V (Digital type combination meter)

Approx. 1V (Needle type combination meter)

TAIL LAMP

Start engine.

Lighting switch on.



All tail lamps in good order:

Approx. 5V (Digital type combination meter)

Approx. 12V (Needle type combination meter)

At least one of tail lamps is moved:

Less than 3V (Digital type combination meter)

Approx. 1V (Needle type combination meter)

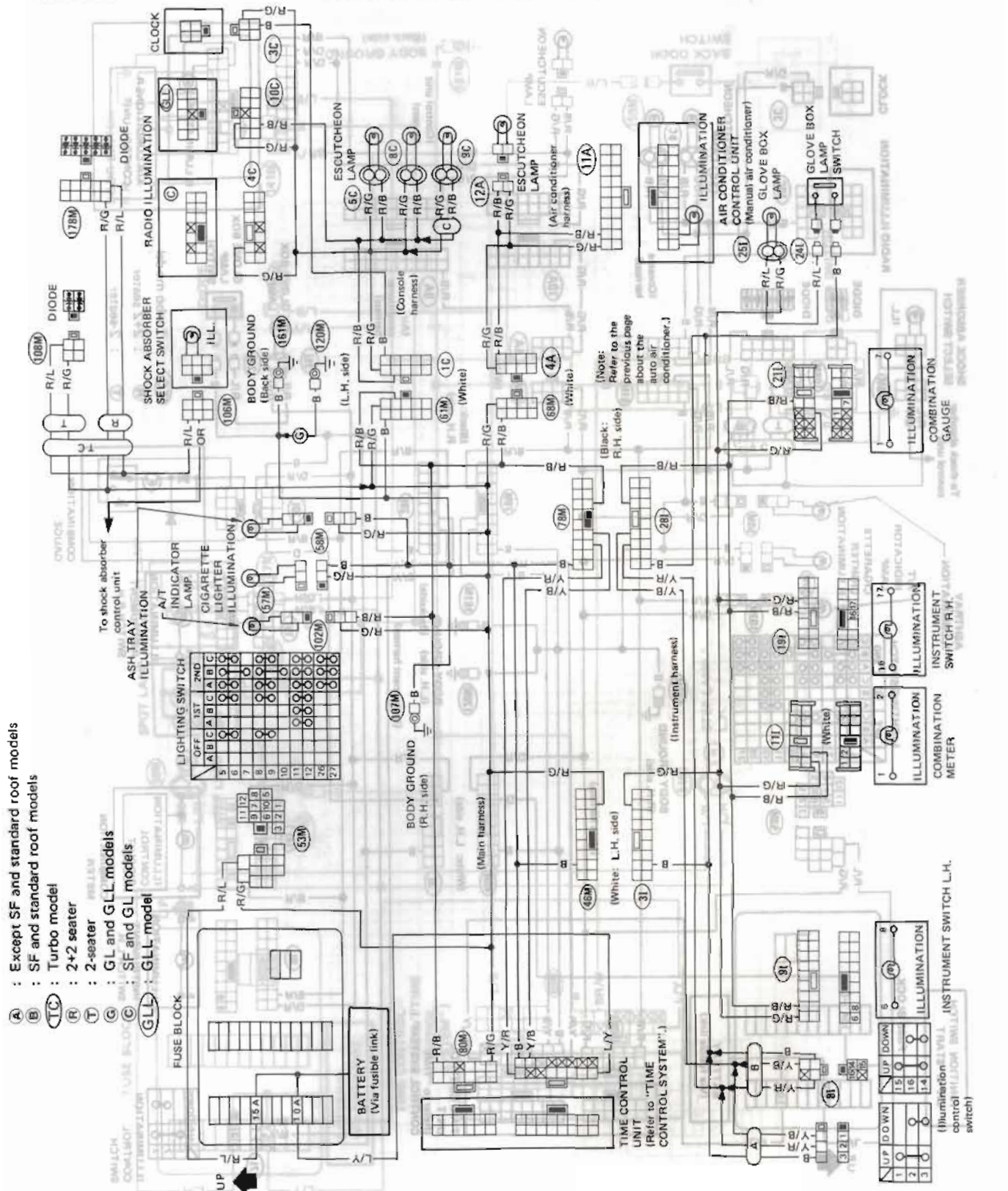
Item	Wattage (W)	Bulb No.
Headlamp	65/45	9004
Auxiliary driving lamp	55	—
Front combination lamp	27/8	1157
Front side marker lamp	3.4	158
Rear side marker lamp	3.4	158
Rear combination lamp		
Turn signal	27	1156
Stop/Tail	27/8	1157
Back-up	27	1156
License plate lamp	3.8	—
High-mounted stop lamp	7.3*	—
Interior lamp	10	—
Spot lamp	8	—
Rear (luggage) compartment lamp	3.4	—
Door step lamp	5	—
Leg room lamp	2	—

*: Light emission diode

INTERIOR LAMP

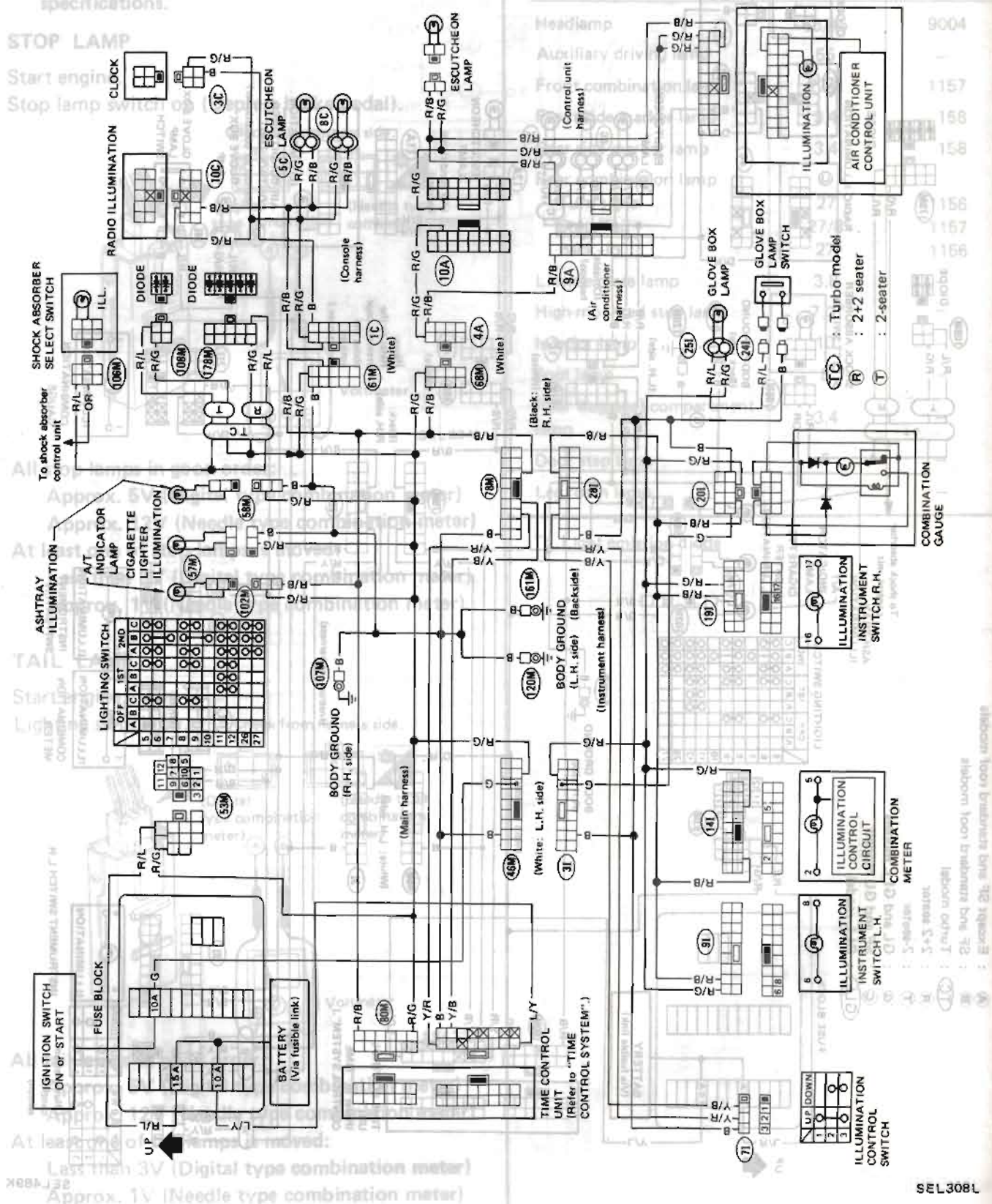
Illumination/Wiring Diagram

NEEDLE TYPE COMBINATION METER EQUIPPED MODEL



SEL489K

DIGITAL TYPE COMBINATION METER EQUIPPED MODEL (GLL)

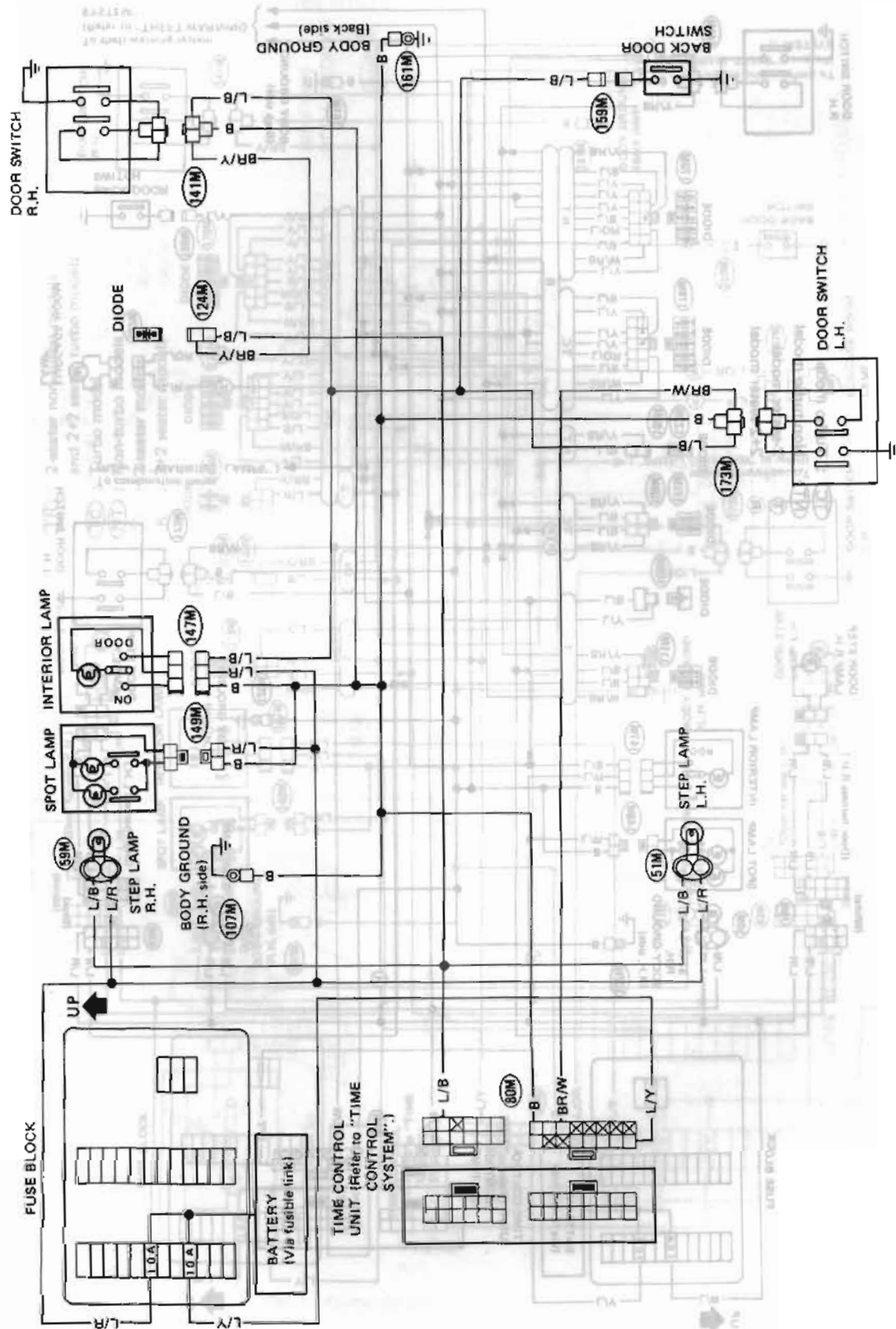


INTERIOR LAMP

Interior, Luggage and Step Lamps/Wiring Diagram

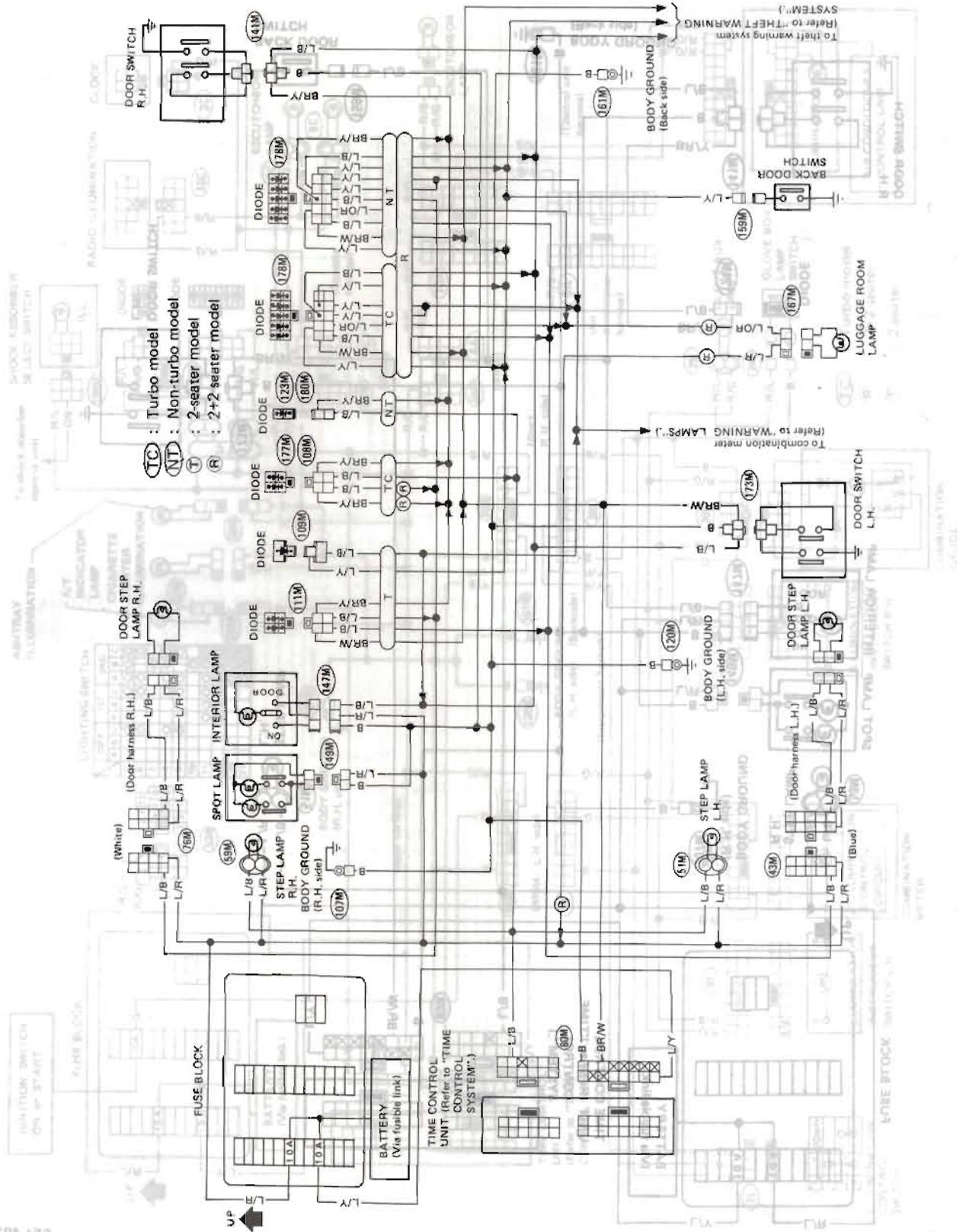
SF MODEL

GT MODEL



IGL MODEL TYPE COMBINATION METER EQUIPPED MODEL (GLL)

8F MODEL



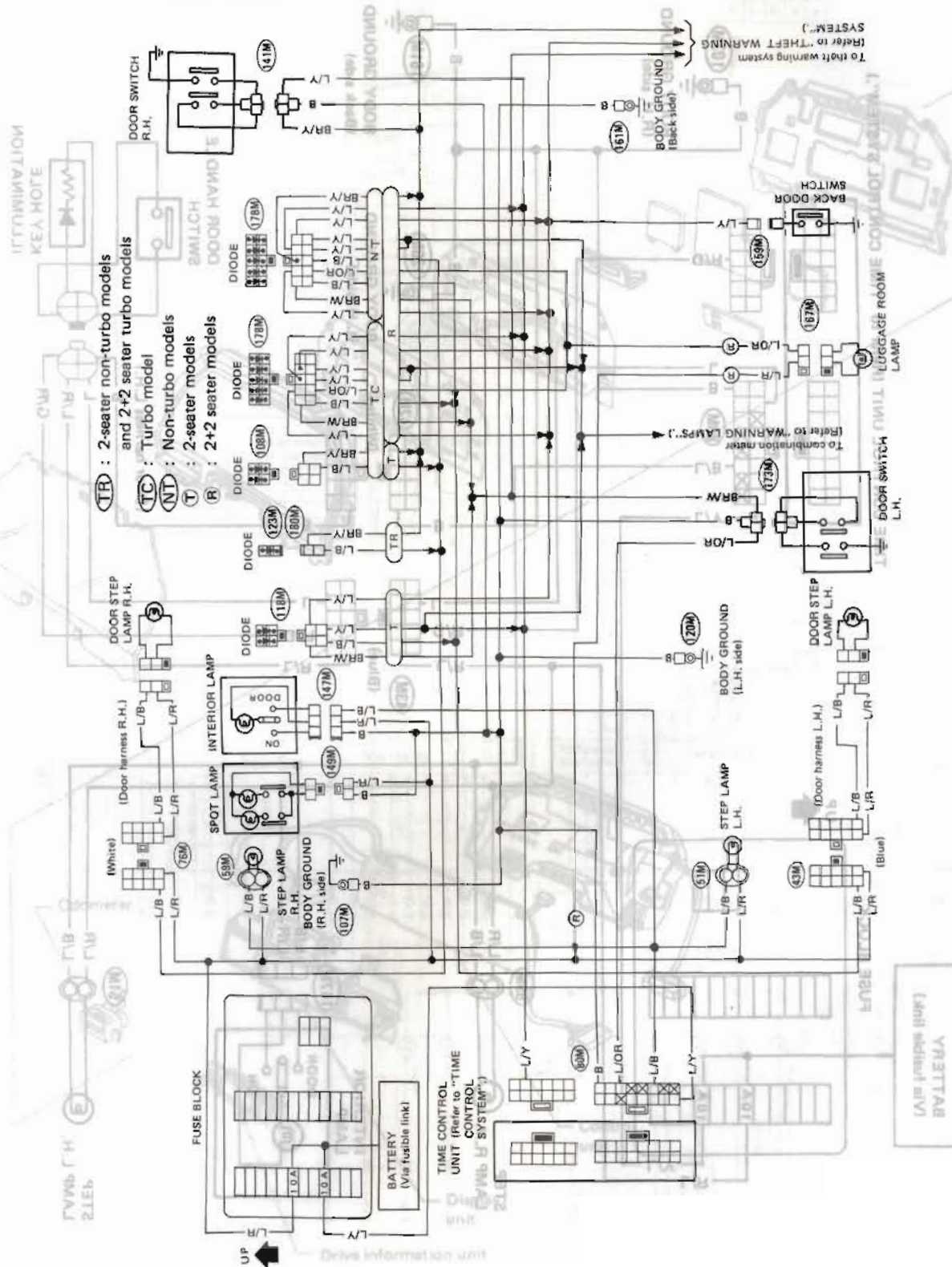
SEL492K

SEL492K

INTERIOR LAMP

Interior, Luggage and Step Lamps/Wiring Diagram (Cont'd)

GLL MODEL

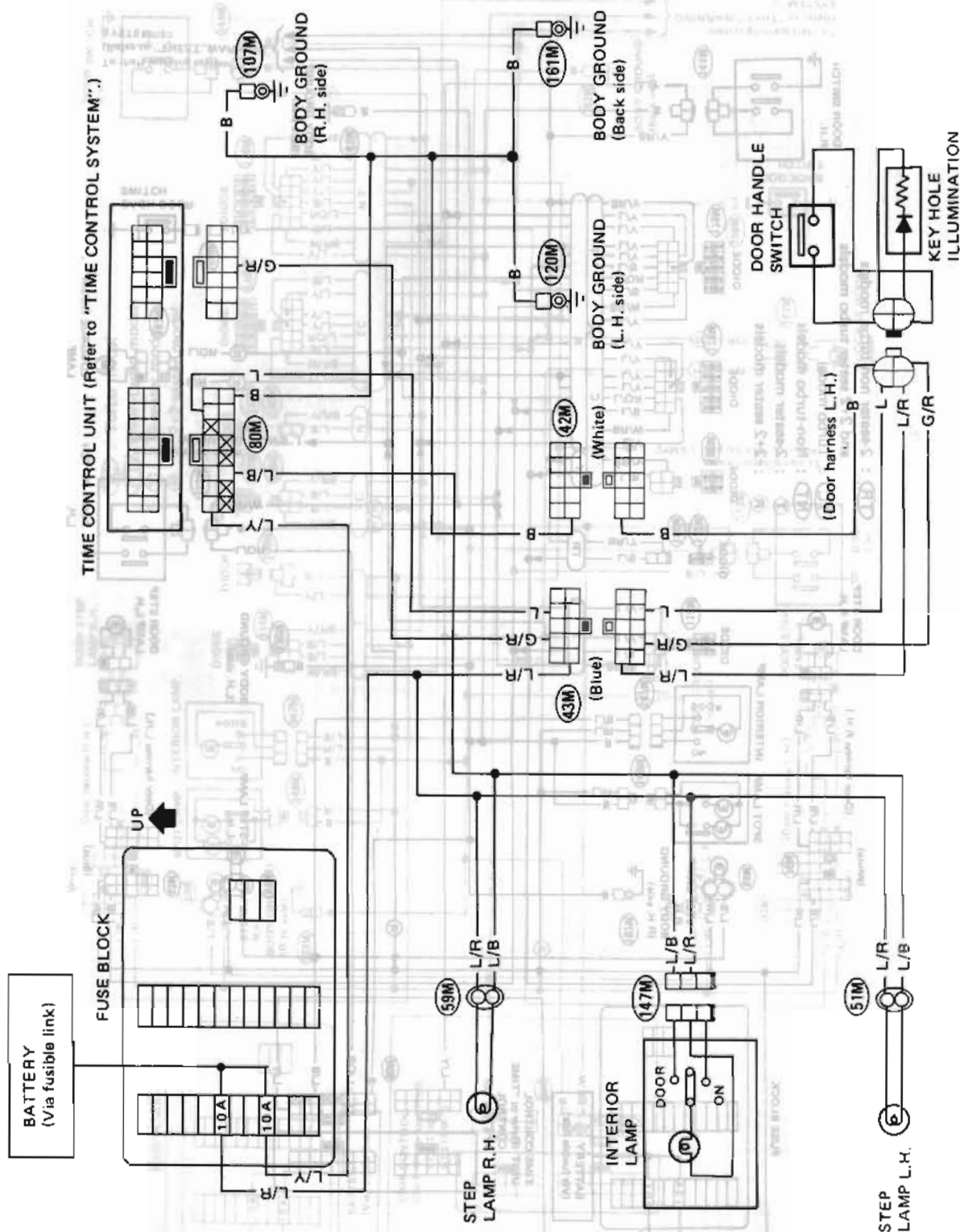


INTERIOR LAMP

Illuminated Entry System and Door Key Illumination/Wiring Diagram

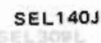
MODEL

MODEL



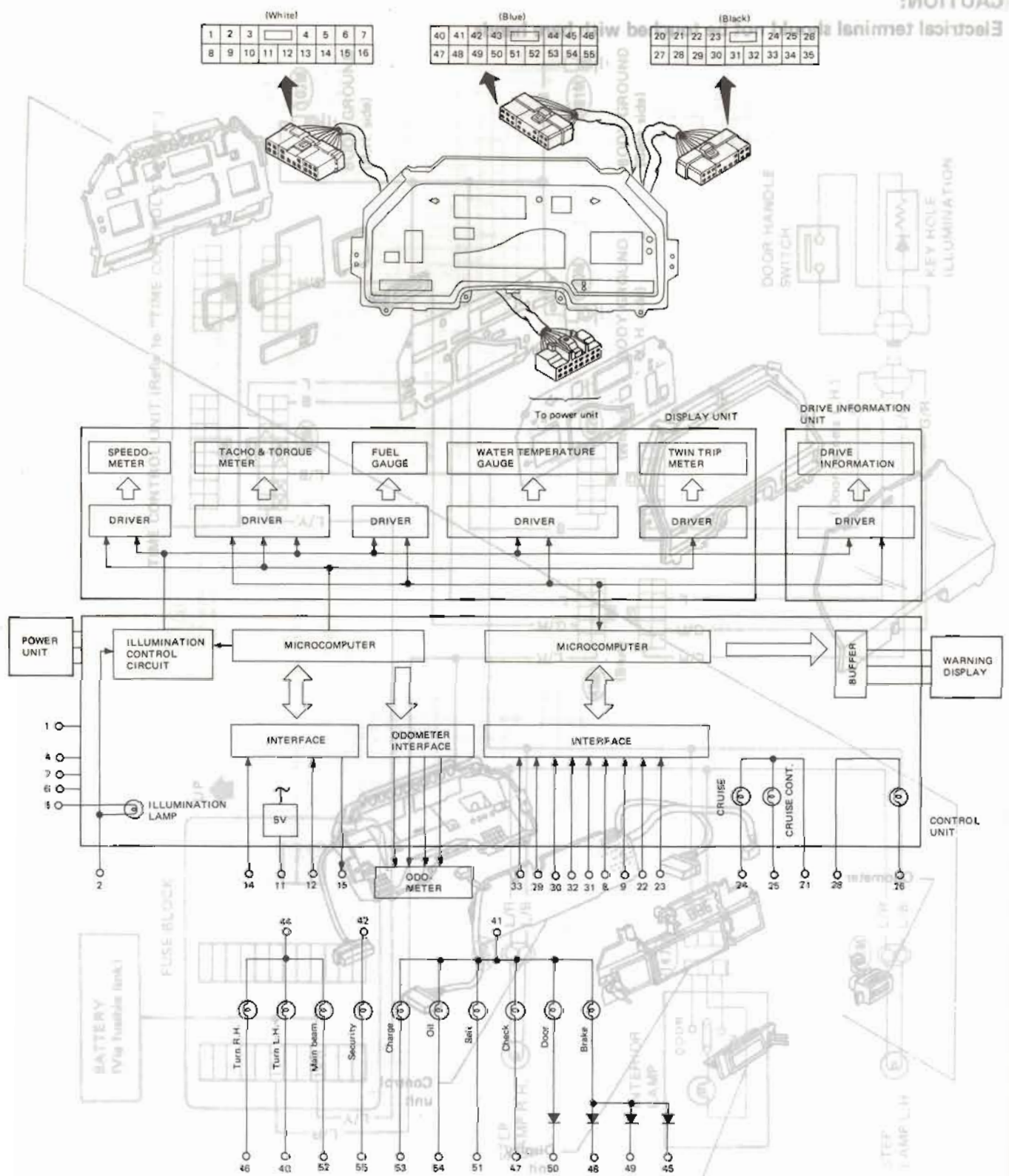
Combination Meter

Electrical terminal should not be touched with bare hands.



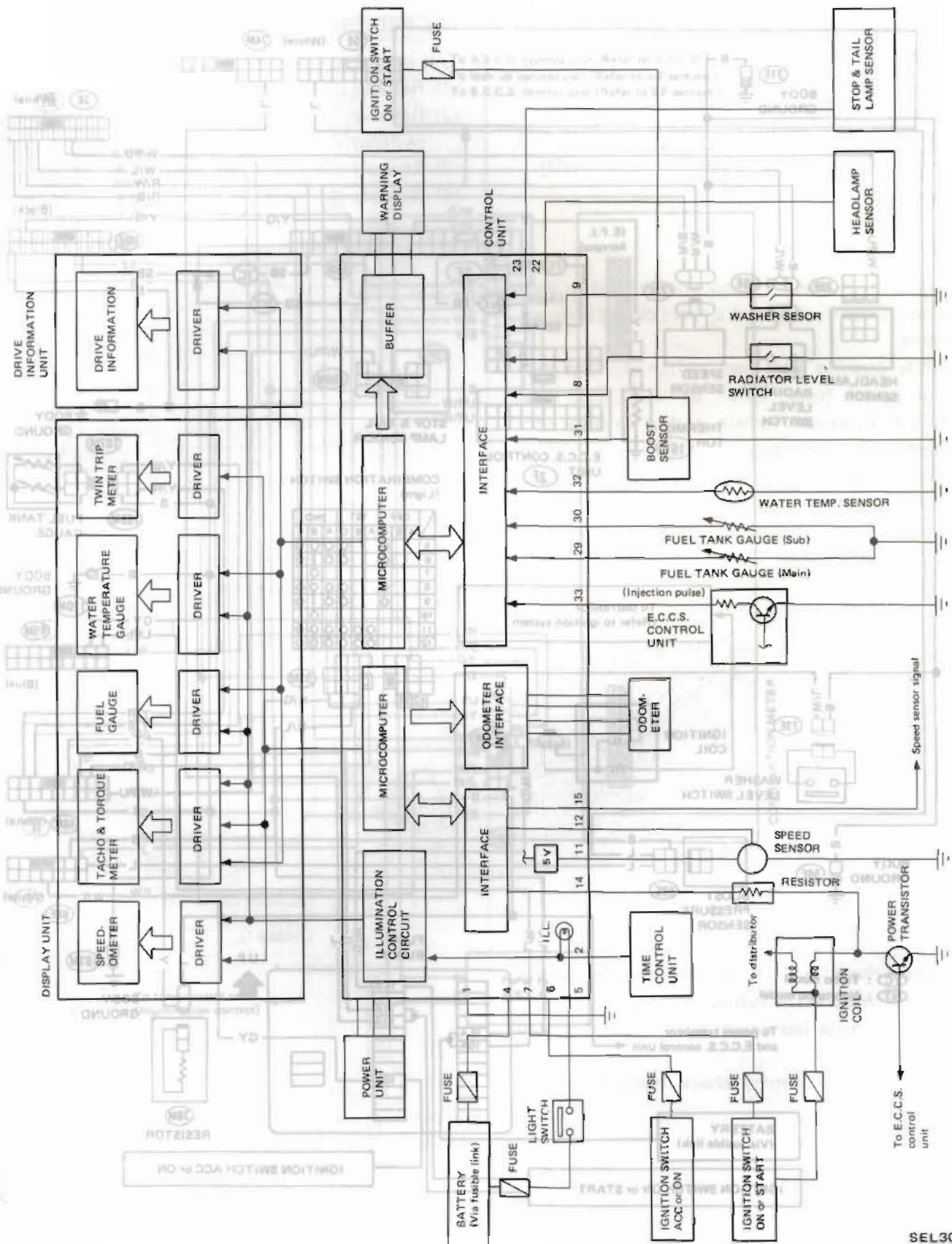
METER AND GAUGES — Digital Type Combination Meter

Combination Meter (Cont'd)



METER AND GAUGES — Digital Type Combination Meter

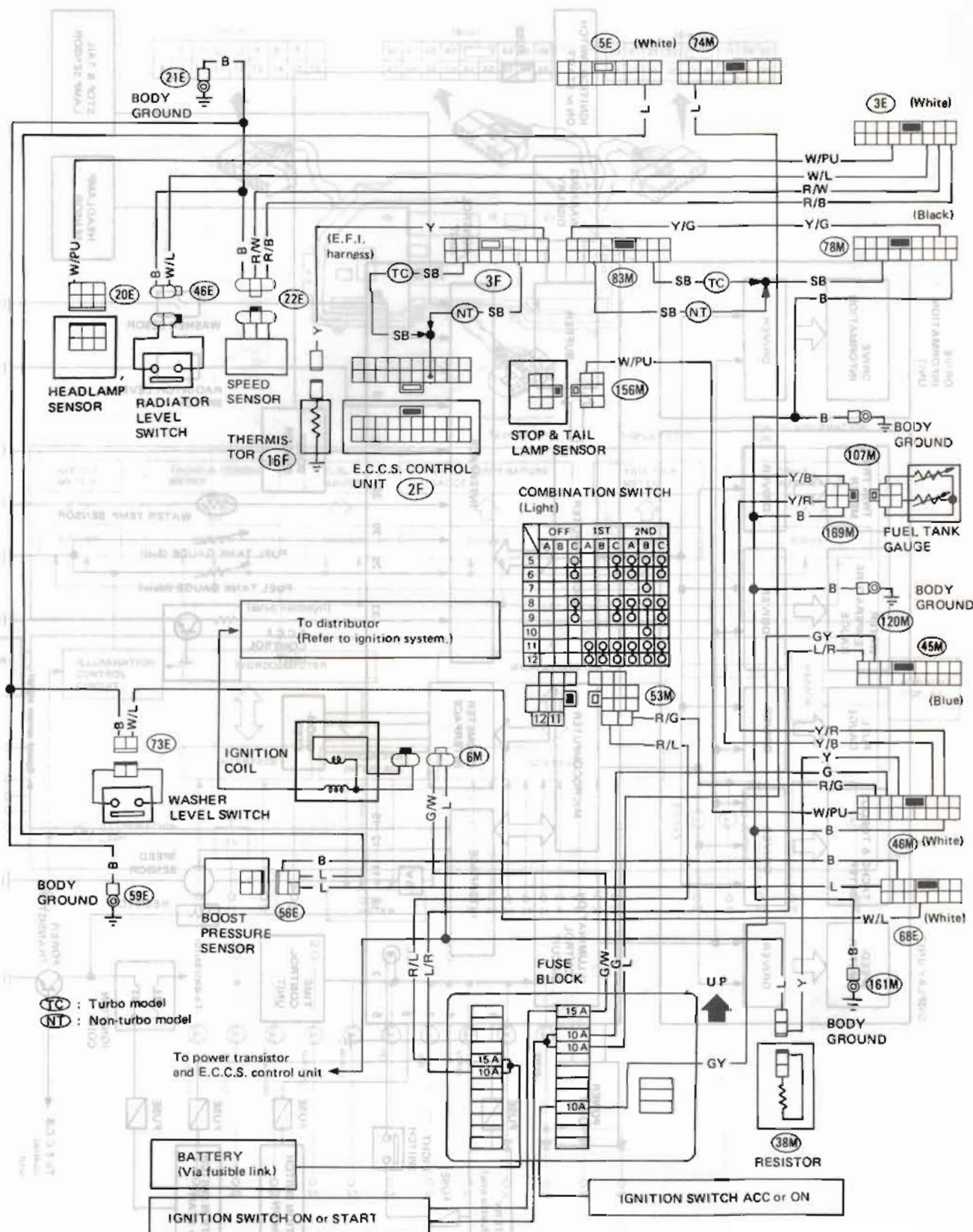
Schematic



SEL309L

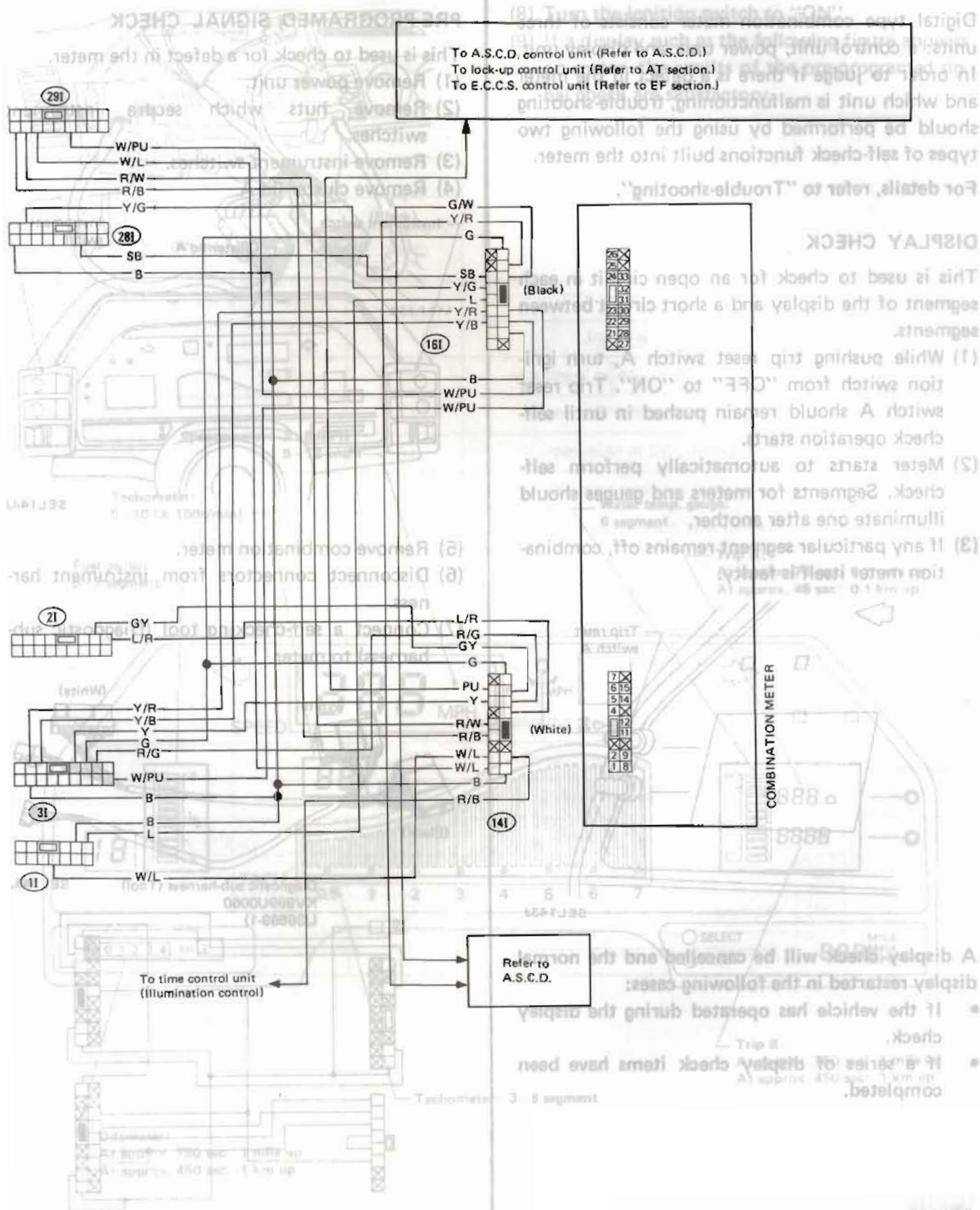
METER AND GAUGES — Digital Type Combination Meter

Wiring Diagram



METER AND GAUGES — Digital Type Combination Meter

Wiring Diagram (Cont'd)



METER AND GAUGES — Digital Type Combination Meter

Self-check

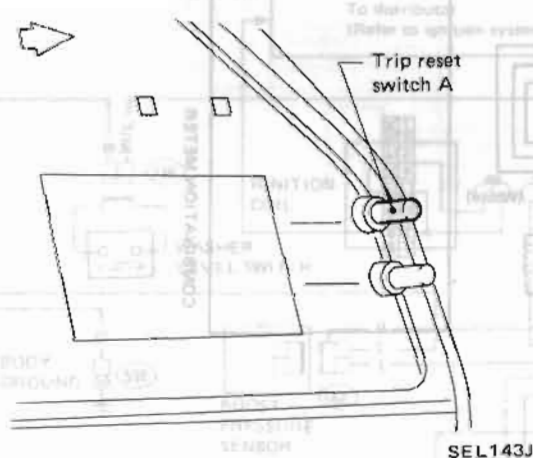
Digital type combination meter consists of three units: a control unit, power unit, and display unit. In order to judge if there is a defect in the meter and which unit is malfunctioning, trouble-shooting should be performed by using the following two types of self-check functions built into the meter.

For details, refer to "Trouble-shooting".

DISPLAY CHECK

This is used to check for an open circuit in each segment of the display and a short circuit between segments.

- (1) While pushing trip reset switch A, turn ignition switch from "OFF" to "ON". Trip reset switch A should remain pushed in until self-check operation starts.
- (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.



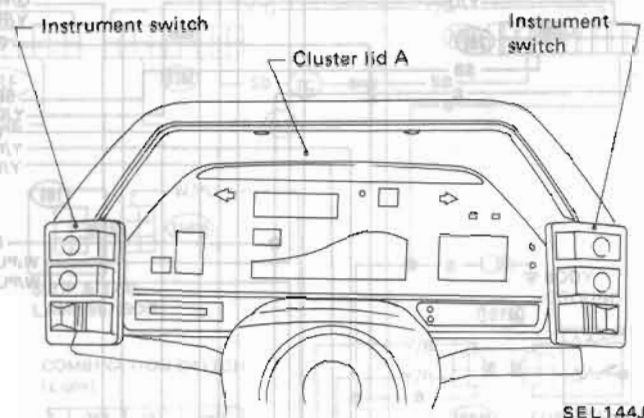
A display check will be cancelled and the normal display restarted in the following cases:

- If the vehicle has operated during the display check.
- If a series of display check items have been completed.

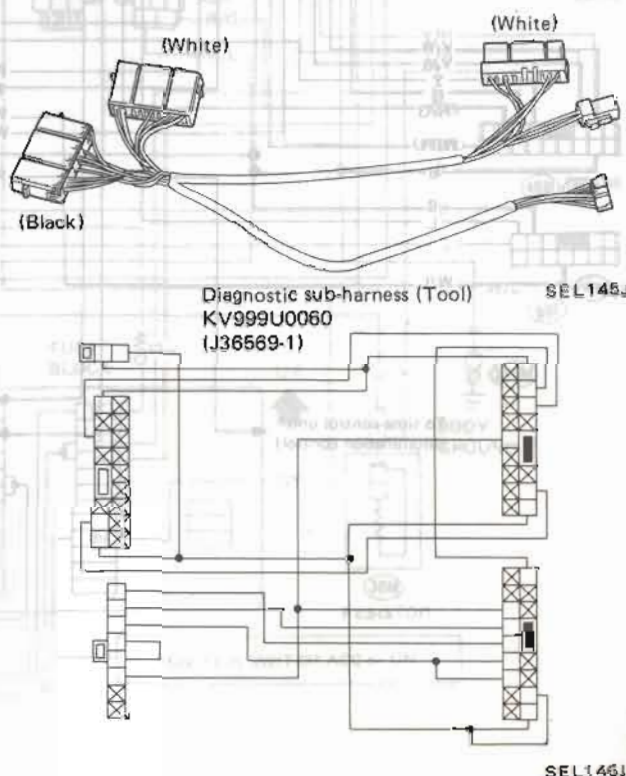
PRE-PROGRAMED SIGNAL CHECK

This is used to check for a defect in the meter.

- (1) Remove power unit.
- (2) Remove nuts which secure instrument switches.
- (3) Remove instrument switches.
- (4) Remove cluster lid A.

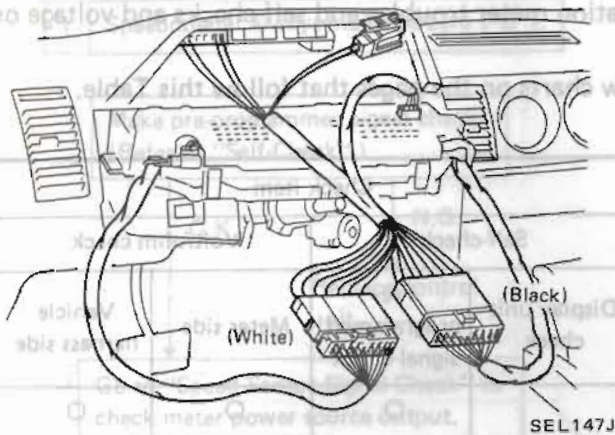


- (5) Remove combination meter.
- (6) Disconnect connectors from instrument harness.
- (7) Connect a self-checking tool (Diagnostic sub-harness) to meter.

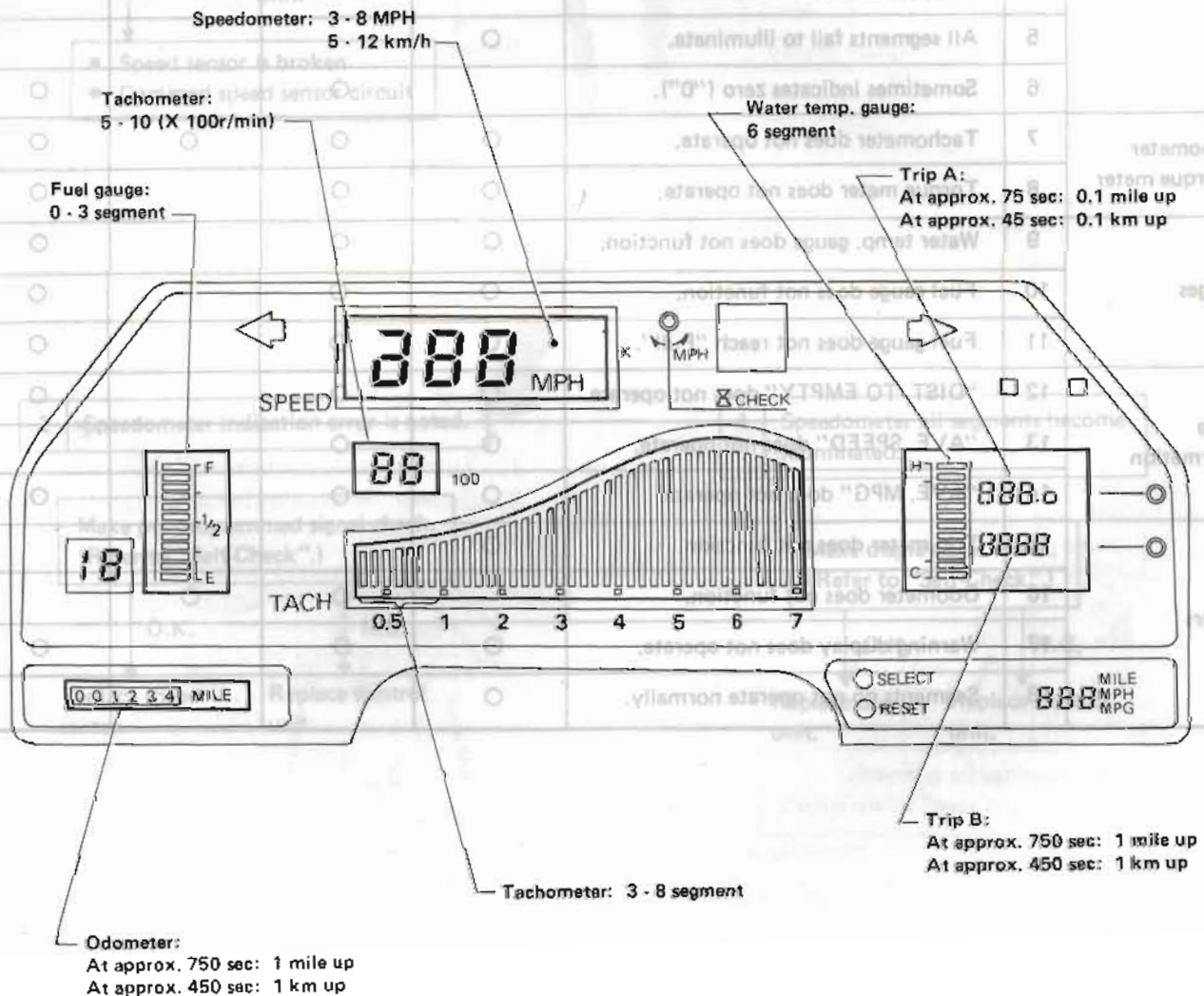


METER AND GAUGES — Digital Type Combination Meter

Self-check (Cont'd)



- (8) Turn the ignition switch to "ON".
- (9) If a display such as the following figure appears on meter, the results of the pre-programed signal check are satisfactory.



SEL148J

METER AND GAUGES — Digital Type Combination Meter

Trouble-shooting — Quick Reference Table—

The following Quick Reference Table lists various combination meter troubles and self-checks and voltage or resistance checks to be made.

For trouble-shooting procedures, refer to the pertinent flow charts on the pages that follow this Table.

Reference flow chart number	Trouble condition	Check item			
		Self-check		Volt/ohm check	
		Display unit check	Pre-programmed signal check	Meter side	Vehicle harness side
Speedometer	1 Always indicates zero ("0").		○	○	○
	2 Indication error is noted.		○		○
	3 Indicated value changes irregularly.		○		○
	4 All segments become illuminated.	○			
	5 All segments fail to illuminate.	○			
	6 Sometimes indicates zero ("0").		○		○
Tachometer & torque meter	7 Tachometer does not operate.	○	○	○	○
	8 Torque meter does not operate.	○	○		○
Gauges	9 Water temp. gauge does not function.	○	○		○
	10 Fuel gauge does not function.	○	○		○
	11 Fuel gauge does not reach "Full".	○	○		○
Drive information	12 "DIST. TO EMPTY" does not operate.	○	○		○
	13 "AVE. SPEED" does not operate.	○	○		
	14 "AVE. MPG" does not operate.	○	○		○
Others	15 Trip meter does not function.	○			
	16 Odometer does not function.		○	○	
	17 Warning display does not operate.	○	○		○
	18 Segments do not operate normally.	○			

METER AND GAUGES — Digital Type Combination Meter

Trouble-shooting Flow Chart

1 Speedometer always indicates zero ("0").

Make pre-programmed signal check.
(Refer to "Self-Check".)

O.K.

N.G.

Replace control unit.

Go to "Speed Sensor Signal Check" to check meter power source output.

O.K.

N.G.

Replace control unit.

- Speed sensor is broken
- Damaged speed sensor circuit

2 Speedometer indication error is noted.

Make pre-programmed signal check.
(Refer to "Self-Check".)

O.K.

N.G.

Replace speed sensor.

Replace control unit.

3 Speedometer indicated value changes irregularly.

To see if display changes, lightly tap on control unit and display unit with screwdriver while making pre-programmed signal check.

O.K.

N.G.

Replace control unit

- Speed sensor is broken.
- Damaged speed sensor circuit.

4 Speedometer all segments become illuminated.

Make display unit check.
(Refer to "Self-Check".)

O.K.

N.G.

Replace display unit.

Replace control unit.

METER AND GAUGES — Digital Type Combination Meter

Trouble-shooting Flow Chart (Cont'd)

5 Speedometer all segments fail to illuminate.

Go to "Power Unit Check" to check power unit output voltage for speedometer.

O.K.

N.G.

Replace power unit.

Make display unit check.
(Refer to "Self-Check".)

O.K.

N.G.

Replace control unit.

Replace display unit.

6 Speedometer sometimes indicates zero ("0").

While making pre-programmed signal check, lightly tap on control unit and display unit with screw-driver to see if display changes.

O.K.

N.G.

Replace control unit.

- Speed sensor is broken.
- Damaged speed sensor circuit.

7 Tachometer does not operate.

Make pre-programmed signal check.
(Refer to "Self-Check".)

O.K.

Check tachometer input signal circuit.

O.K.

N.G.

- Malfunctioning ignition circuit

Replace control unit.

Make display unit check.
(Refer to "Self-Check".)

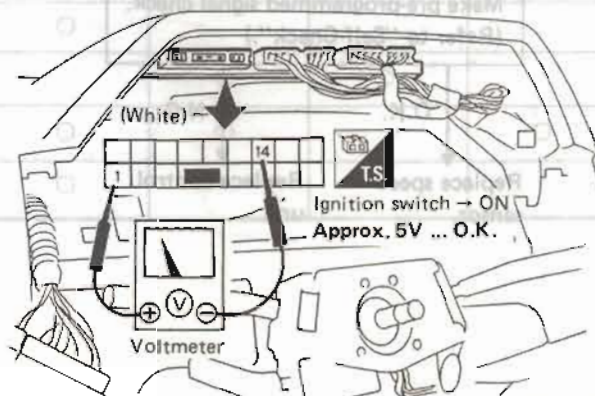
O.K.

N.G.

Replace control unit.

Replace display unit.

1. Turn ignition switch to "ON".
2. Connect voltmeter between ① and ⑭.



METER AND GAUGES — Digital Type Combination Meter

Trouble-shooting Flow Chart (Cont'd)

8 Torque meter does not operate.

Make pre-programmed signal check.
(Refer to "Self-Check".)

O.K.

N.G.

Check boost sensor circuit.

O.K.

N.G.

Replace
control unit.

Go to "Boost
Sensor Check".

O.K.

N.G.

• Damaged boost
sensor circuit

Replace
boost sensor.

Make display unit check. (Refer to
"Self-Check".)

O.K.

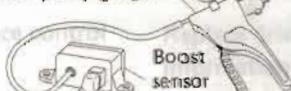
N.G.

Replace control
unit.

Replace display
unit.

1. Disconnect meter harness connector (Black).
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 ① and ②.

Vacuum pump gauge



Keep harness connected

FUEL INJECTION CHECK

Ignition switch → ON
Approx.

2.2V at 0 kPa (0 mmHg, 0 inHg)
(Atmospheric pressure)
1.3V at -63.3 kPa (-400 mmHg,
-15.75 inHg)

Voltmeter

SEL155J

9 Water temp. gauge does not function.

Make pre-programmed signal check.
(Refer to "Self-Check".)

O.K.

N.G.

Check water temp.
sensor (thermistor) circuit.

O.K.

N.G.

Replace
control unit.

Go to "Thermistor
Check".

O.K.

N.G.

• Damaged boost
sensor circuit

Replace
thermistor.

Make display unit check. (Refer to
"Self-Check".)

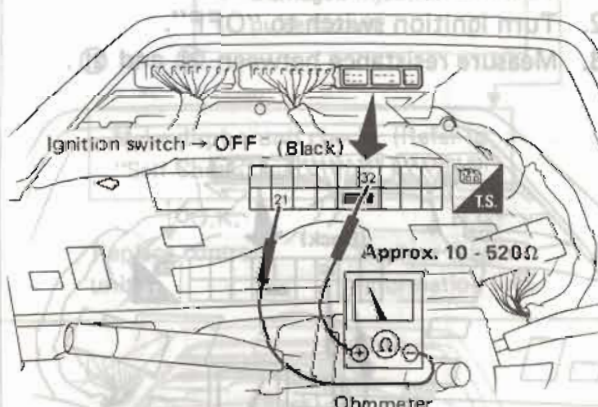
O.K.

N.G.

Replace control
unit.

Replace display
unit.

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



Ignition switch → OFF

Engine coolant temperature	Resistance
60°C (140°F) or less	70Ω or more
60°C (140°F) or more	Approx. 10 - 70Ω

SEL156J

METER AND GAUGES — Digital Type Combination Meter

Trouble-shooting Flow Chart (Cont'd)

10 Fuel gauge does not function.

Make pre-programmed signal check.
(Refer to "Self-Check".)

O.K.

N.G.

Check fuel tank
gauge circuit.

O.K.

N.G.

Replace
control unit.

Go to "Fuel Tank
Gauge unit Check".

O.K.

N.G.

- Damaged fuel
tank gauge unit
circuit.

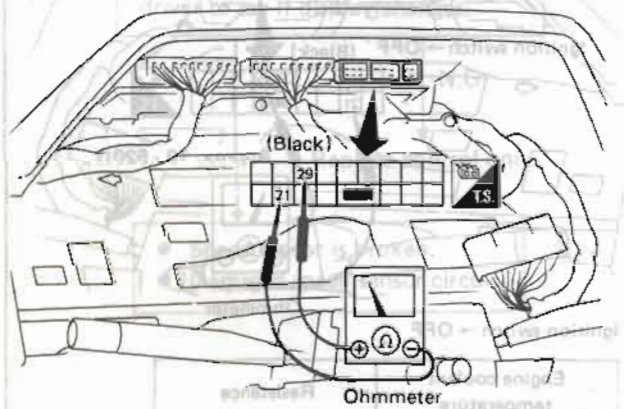
Replace fuel
tank gauge unit.

Make display unit check. (Refer to
"Self-Check".)

Replace control
unit.

Replace display
unit.

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



11 Fuel gauge does not reach "Full".

Make pre-programmed signal check.
(Refer to "Self-Check".)

O.K.

N.G.

Check fuel tank
gauge circuit.

O.K.

N.G.

Replace
control unit.

Go to "Fuel Tank
Gauge unit Check".

O.K.

N.G.

- Damaged fuel
tank gauge unit
circuit.

Replace fuel
tank gauge unit.

Make display unit check. (Refer to
"Self-Check".)

Replace control
unit.

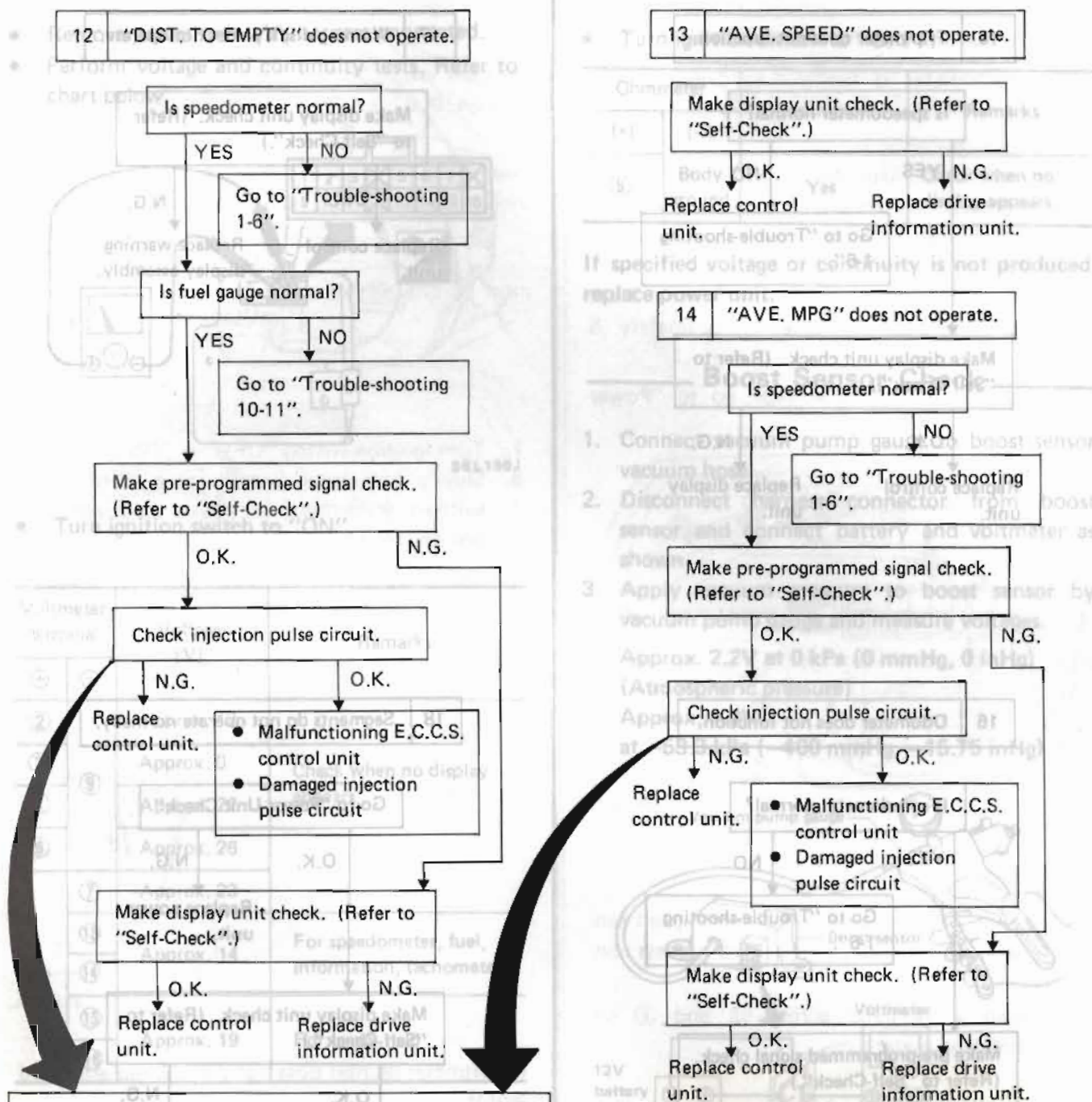
Replace display
unit.

1. Turn the ignition switch to "ON".
2. Turn the ignition switch to "OFF".
3. Turn the ignition switch to "ON".
4. Apply vacuum pressure to the sensor by vacuum pump gauge and measure voltage across ① and ②.
5. Connect vacuum pump gauge to sensor vacuum hose.
6. Disconnect meter harness connector (Black).



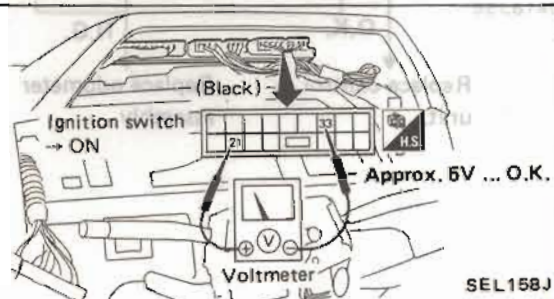
METER AND GAUGES — Digital Type Combination Meter

Trouble-shooting Flow Chart (Cont'd)



FUEL INJECTION PULSE CIRCUIT CHECK

1. Turn ignition switch to "ON".
2. Connect voltmeter between ③③ and ②①.



METER AND GAUGES — Digital Type Combination Meter

Trouble-shooting Flow Chart (Cont'd)

15 Trip meter does not function.

Is speedometer normal?

YES

NO

Go to "Trouble-shooting 1-6".

Make display unit check. (Refer to "Self-Check".)

O.K.

N.G.

Replace control unit.

Replace display unit.

16 Odometer does not function.

Is speedometer normal?

YES

NO

Go to "Trouble-shooting 1-6".

Make pre-programmed signal check. (Refer to "Self-Check".)

O.K.

N.G.

Replace control unit.

Replace odometer assembly.

17 Warning display does not operate.

Make display unit check. (Refer to "Self-Check".)

O.K.

N.G.

Replace control unit.

Replace warning display assembly.

18 Segments do not operate normally.

Go to "Power Unit Check"

O.K.

N.G.

Replace power unit.

Make display unit check. (Refer to "Self-Check".)

O.K.

N.G.

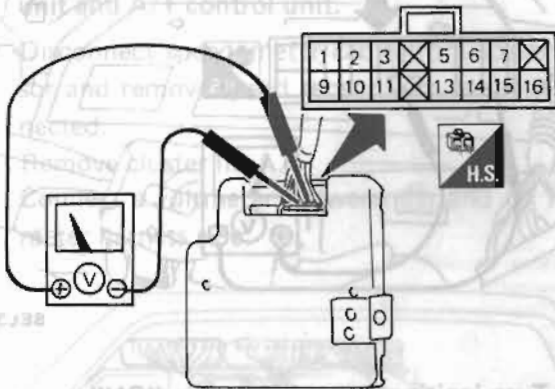
Replace control unit.

Replace display unit.

METER AND GAUGES — Digital Type Combination Meter

Power Unit Check

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



SEL159J

- Turn ignition switch to "ON".

Voltmeter terminal		Voltage [V]	Remarks
+	-		
②		Approx. 12	
③	⑨	Approx. 0	Check when no display appears.
⑤		Approx. 22	
⑥		Approx. 26	
	⑦	Approx. 23	
	⑬	Approx. 14	For speedometer, fuel, information, tachometer
⑨	⑭		
	⑮	Approx. 19	For temp., trip
	⑯		

- Turn ignition switch to "OFF".

Ohmmeter		Continuity	Remarks
(+)	(-)		
⑨	Body ground	Yes	Check when no display appears.

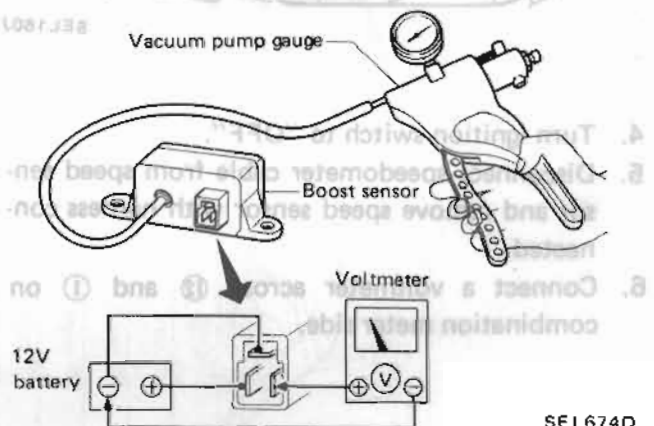
If specified voltage or continuity is not produced, replace power unit.

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

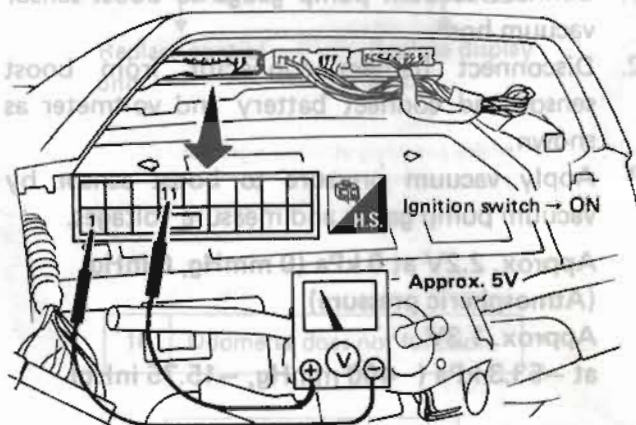
Speed Sensor Signal Check

SPEED SENSOR OUTPUT CHECK

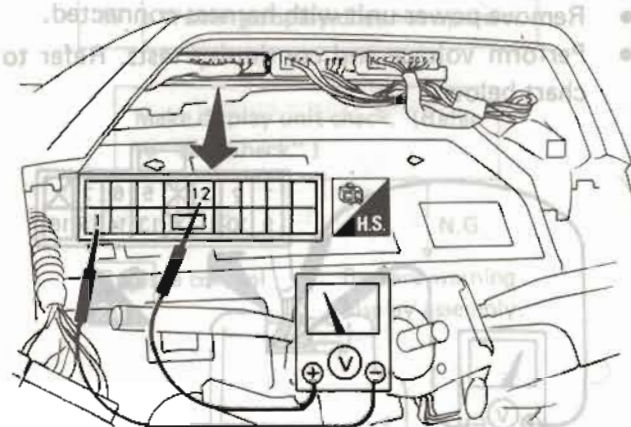
When speedometer is functioning properly, this test is not necessary. Go to "Meter Output check".

1. Remove cluster lid A.
2. Connect a voltmeter between ⑪ and ① on combination meter side. Combination meter harness connector should remain connected to instrument harness.
3. Turn 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".

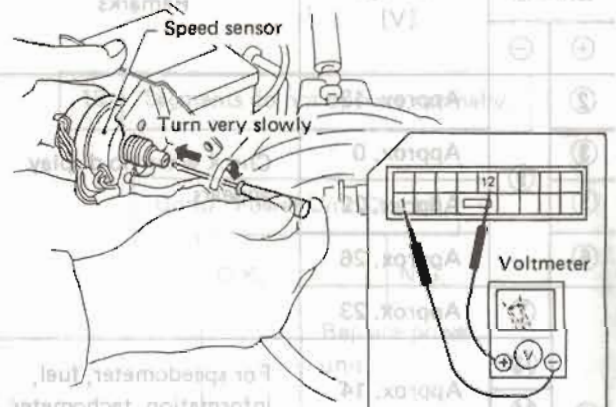


4. Turn ignition switch to "OFF".
5. Disconnect speedometer cable from speed sensor and remove speed sensor with harness connected.
6. Connect a voltmeter across ⑫ and ① on combination meter side.



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.



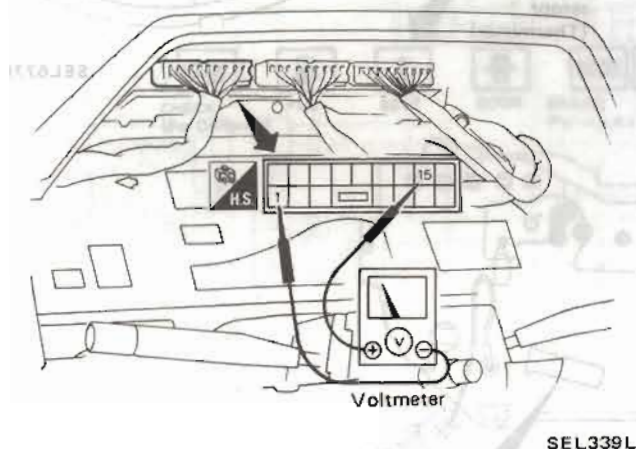
If voltmeter pointer does not deflect, replace speed sensor.

METER AND GAUGES — Digital Type Combination Meter

Speed Sensor Signal Check (Cont'd)

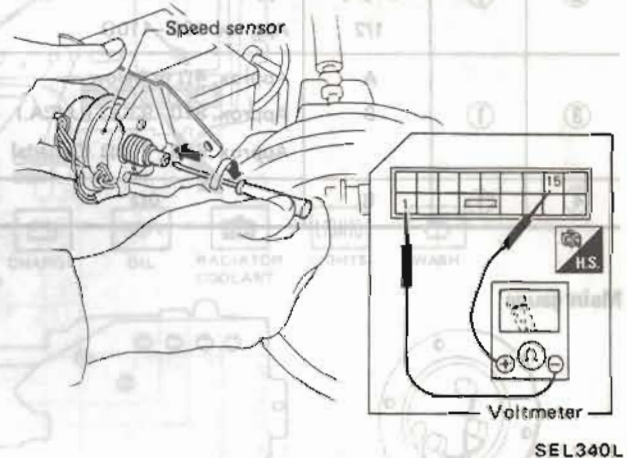
METER OUTPUT CHECK

- Combination meter emits speed sensor signal to control E.C.C.S. control unit, A.S.C.D. control unit 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. Connect a voltmeter between ⑮ and ① from meter harness side.



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 should deflect twice for each rotation or rotor shaft.



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

METER AND GAUGES — Digital Type Combination Meter

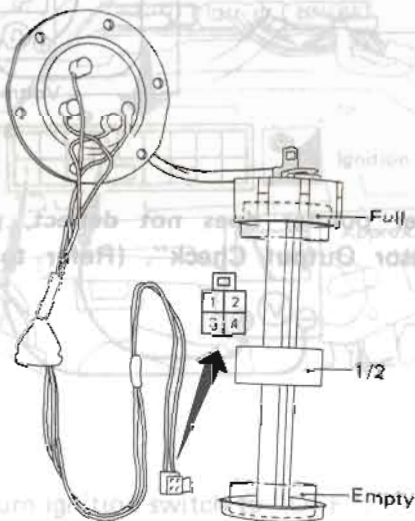
Fuel Tank Gauge Check

Water Temp. Sensor Check

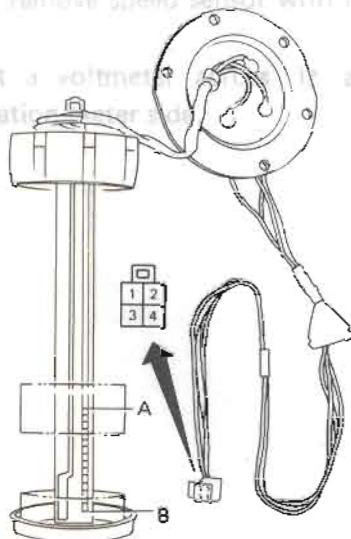
- For removal, refer to FE section.

Ohmmeter terminal		Float position	Resistance value
(+)	(-)		
②	①	Full	Approx. 1 Ω
		Empty	Approx. 480 - 520 Ω
		1/2	Approx. 100 - 110 Ω
③	①	A	Approx. 4 Ω or below
		B	Approx. 870 - 930 Ω (U.S.A.)
			Approx. 650 - 700 Ω (Canada)
④	①	B	0 Ω

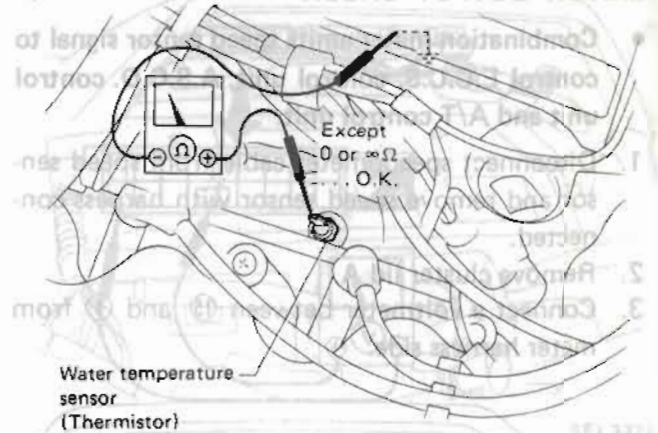
Main gauge



Sub gauge



Cylinder head R.H. side



SEL677D

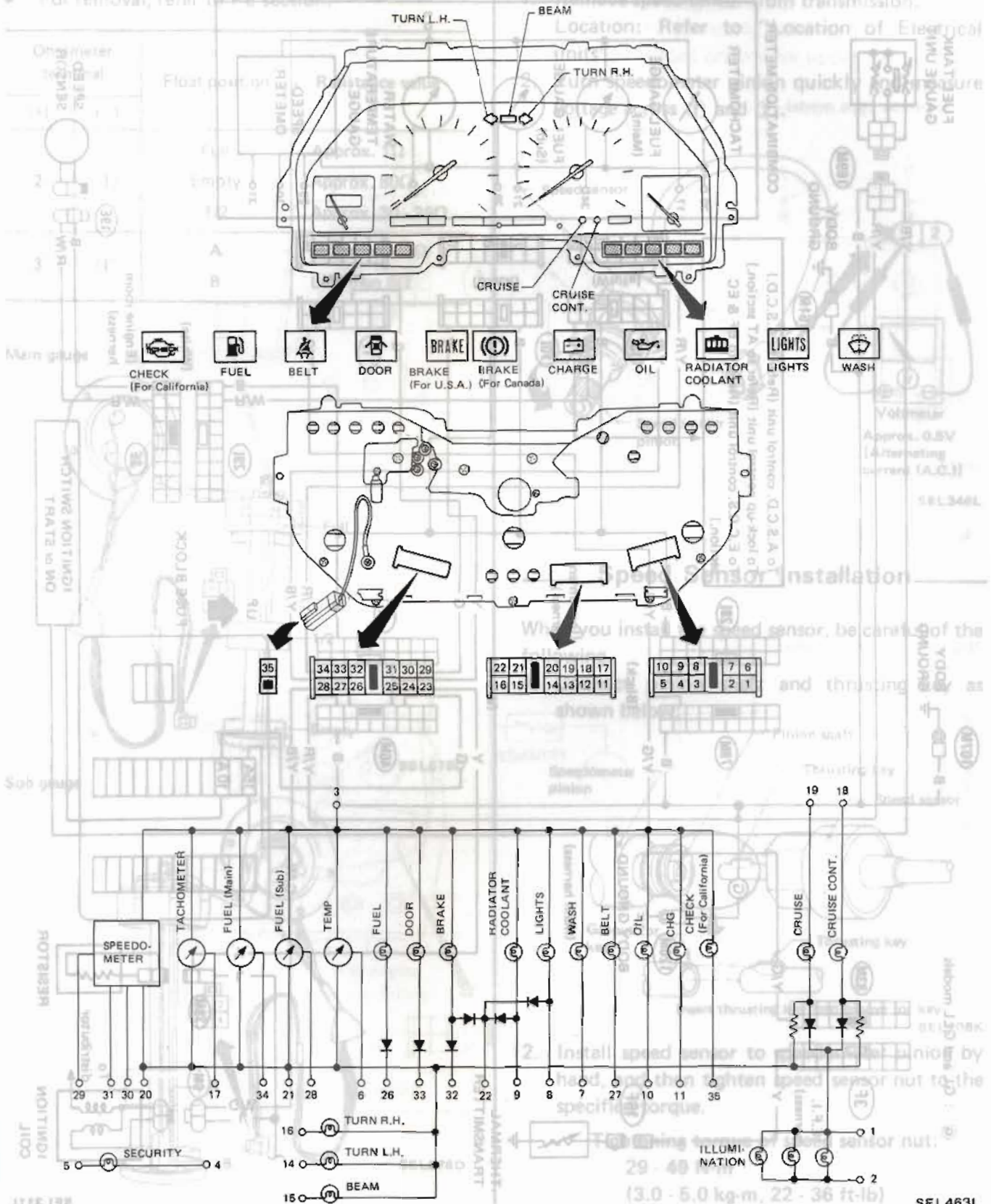


If voltmeter pointer does not deflect, replace thermistor sensor.

METER AND GAUGES — Needle Type Combination Meter

Combination Meter

• For removal, refer to E-5 section.



SEL463L

Speedometer, Tachometer, Fuel and Water Temperature Gauges/Wiring Diagram



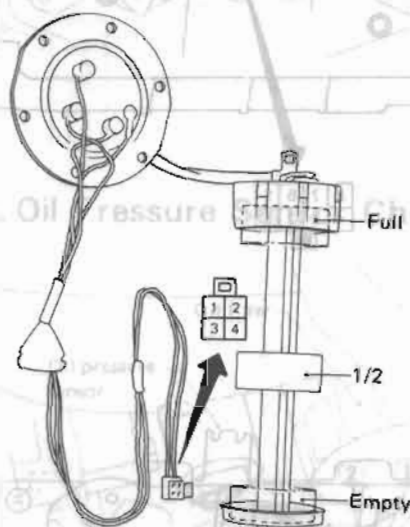
METER AND GAUGES — Needle Type Combination Meter

Fuel Tank Gauge Check

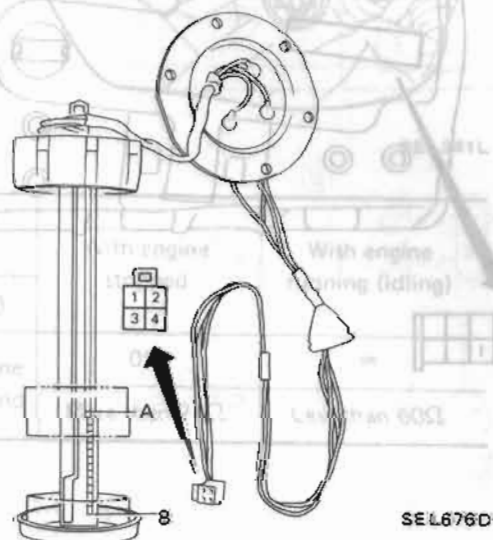
- For removal, refer to FE section.

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

Main gauge

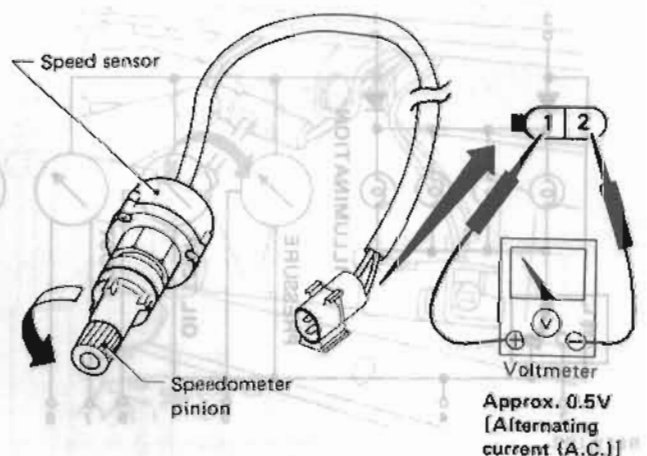


Sub gauge



Speed Sensor Signal Check

- Remove speed sensor from transmission. Location: Refer to "Location of Electrical units" or located on interior upper wall of glove box.
- Turn speedometer pinion quickly and measure voltage across ① and ②.

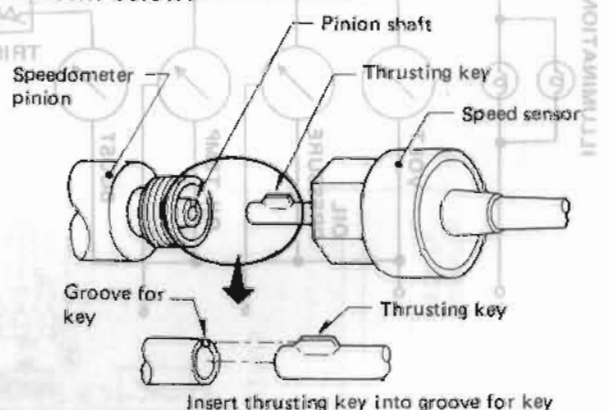


- For checking boost sensor, refer to page EL-79.

Speed Sensor Installation

When you install the speed sensor, be careful of the following.

- Connect pinion shaft and thrusting key as shown below:



- Install speed sensor to speedometer pinion by hand, and then tighten speed sensor nut to the specified torque.

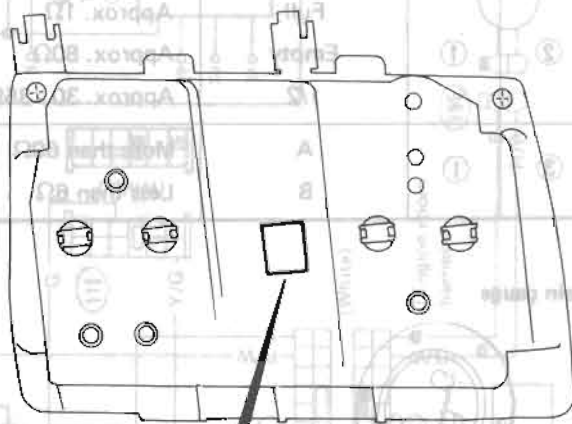
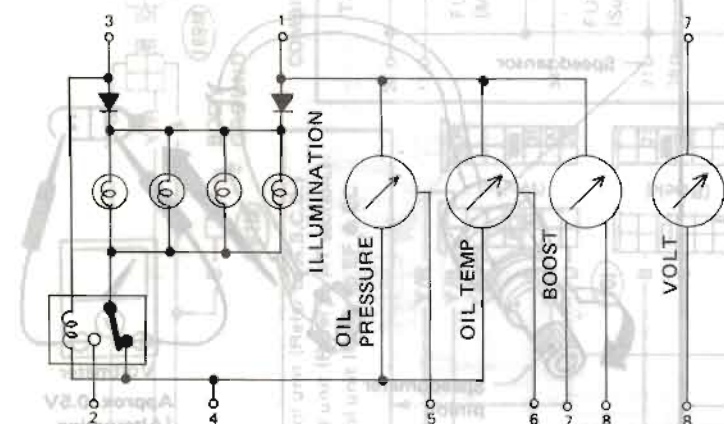
Tightening torque of speed sensor nut:

29 - 49 N·m
(3.0 - 5.0 kg-m, 22 - 36 ft-lb)

METER AND GAUGES — Needle Type Combination Gauge

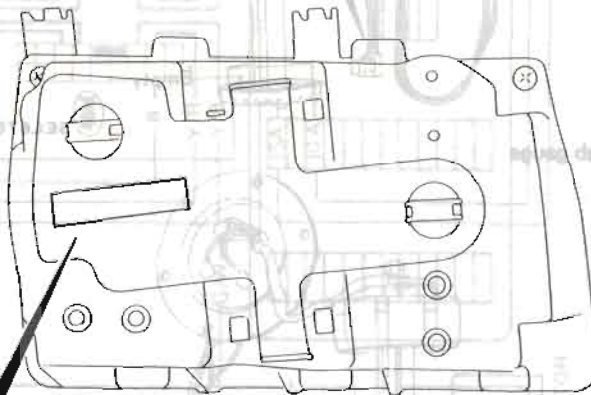
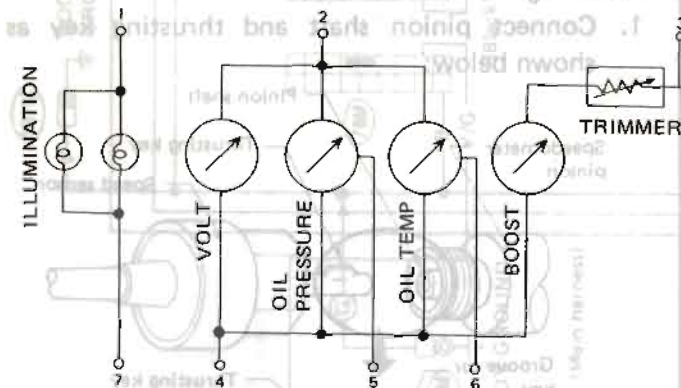
Combination Gauge

Digital meter type model



8	7	6	5
4	3	2	1

Needle meter type model

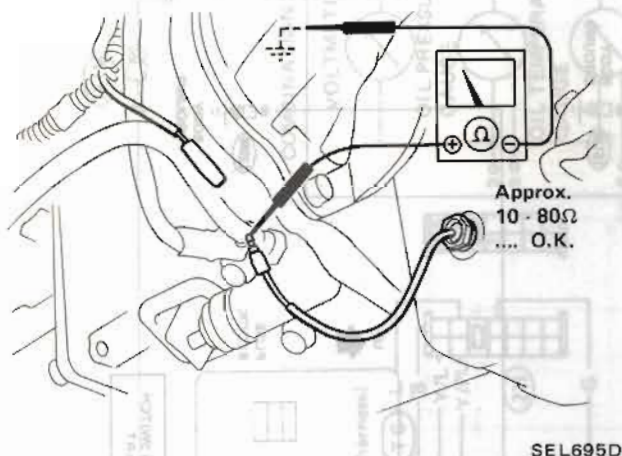


5	6		7			
4	3		2	1		

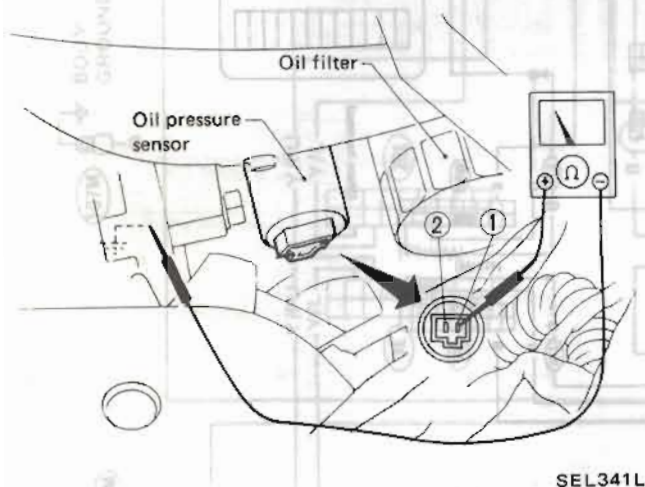
METER AND GAUGES — Needle Type Combination Gauge

Oil Temp. Sensor Check

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



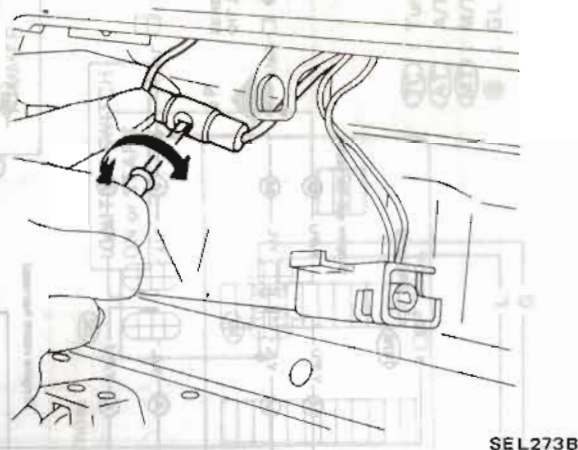
Oil Pressure Sensor Check



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

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.

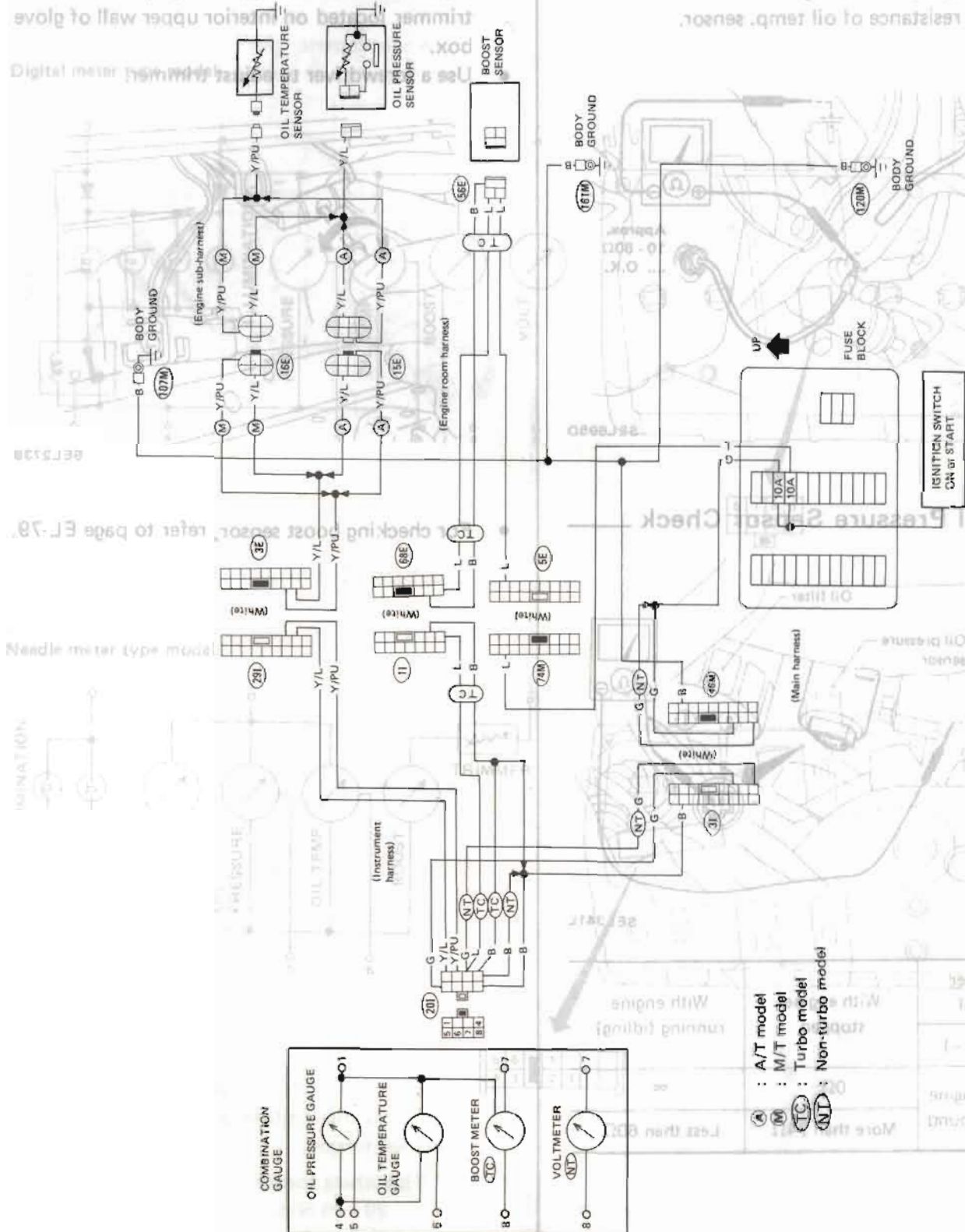


- For checking boost sensor, refer to page EL-79.

METER AND GAUGES — Needle Type Combination Gauge

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

DIGITAL METER TYPE MODEL

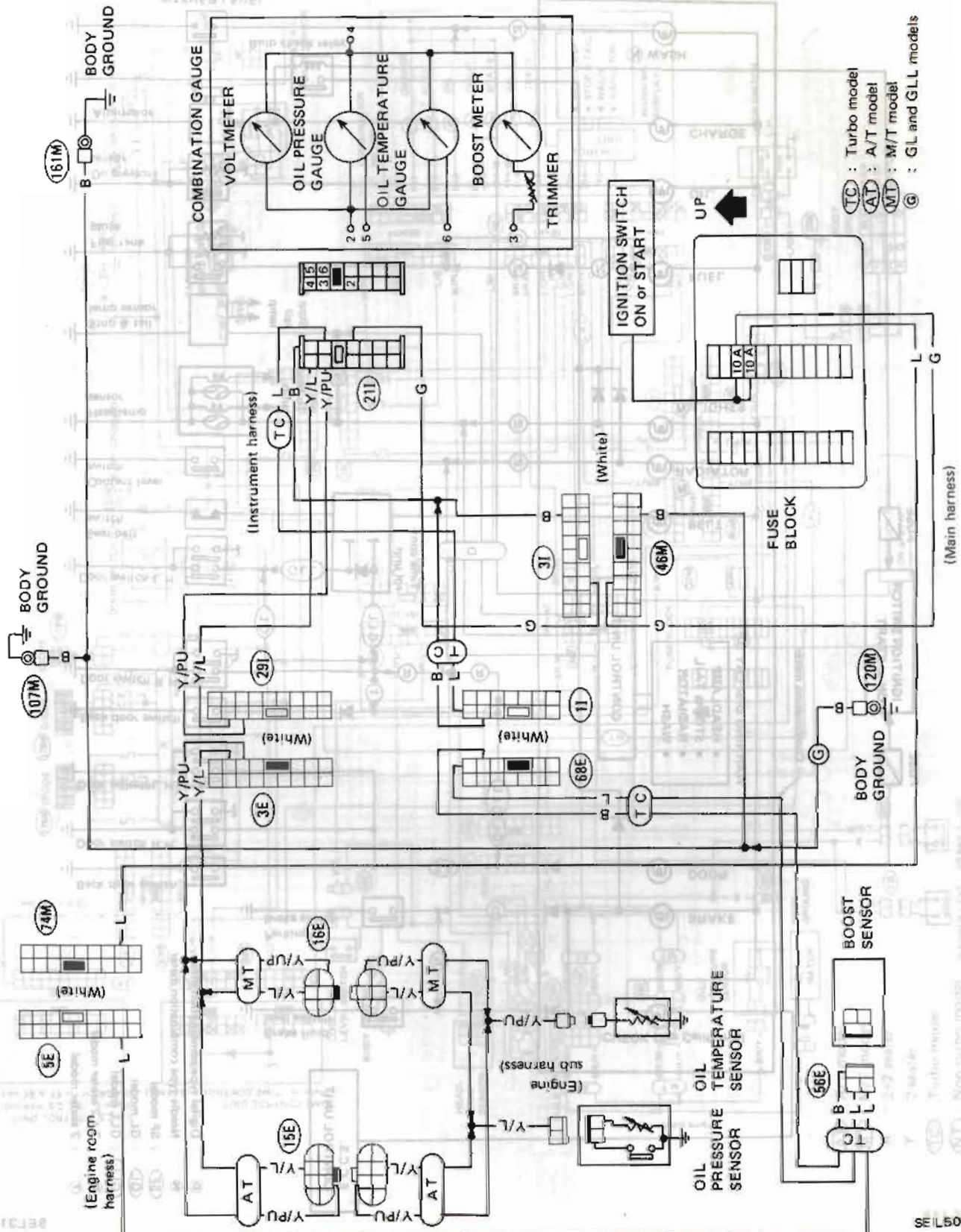


SEL501K

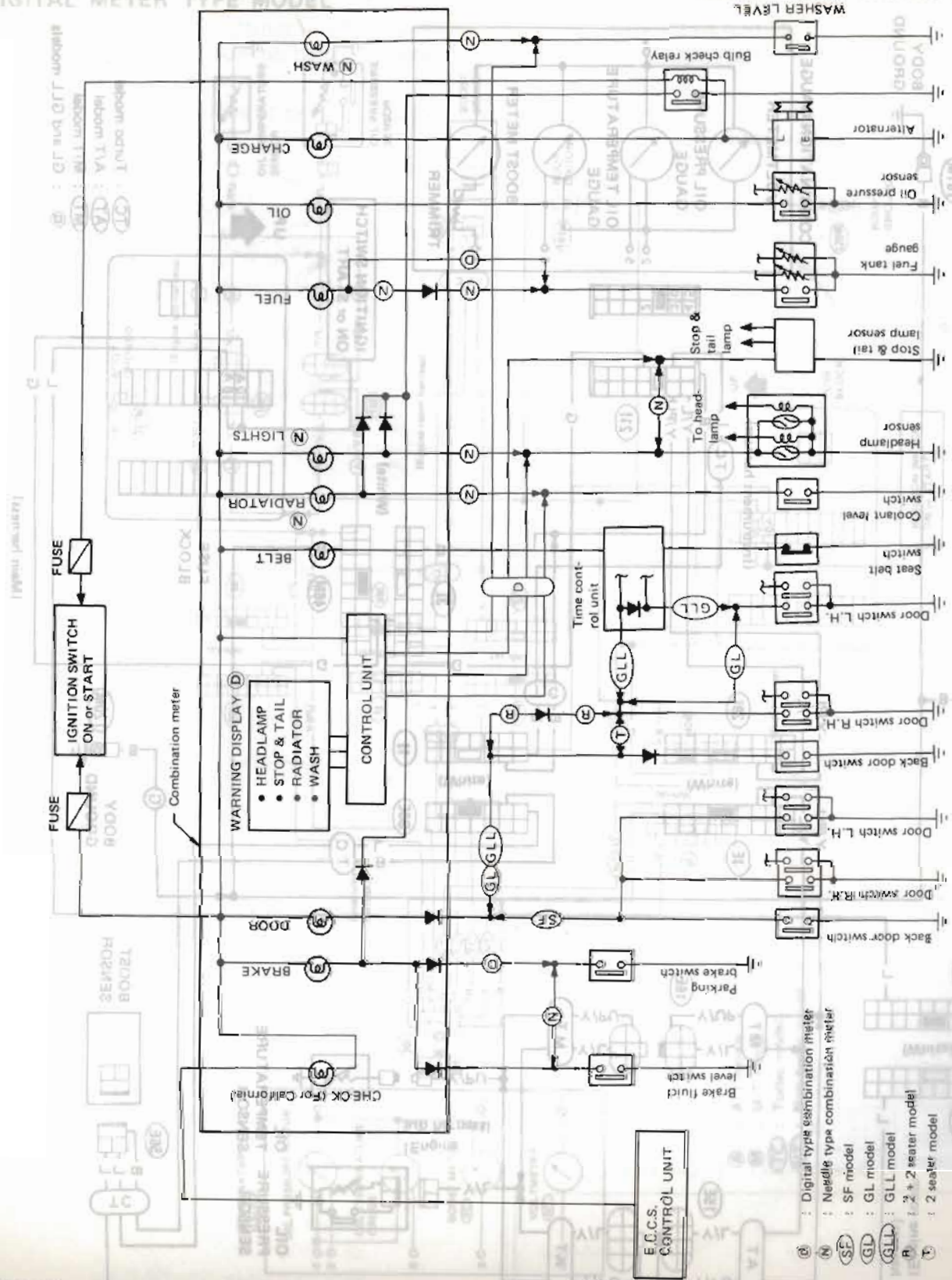
METER AND GAUGES — Needle Type Combination Gauge

— Oil Temp., Oil Pressure, Boost and Volt Gauges/Wiring Diagram (Cont'd) —

NEEDLE METER TYPE MODEL

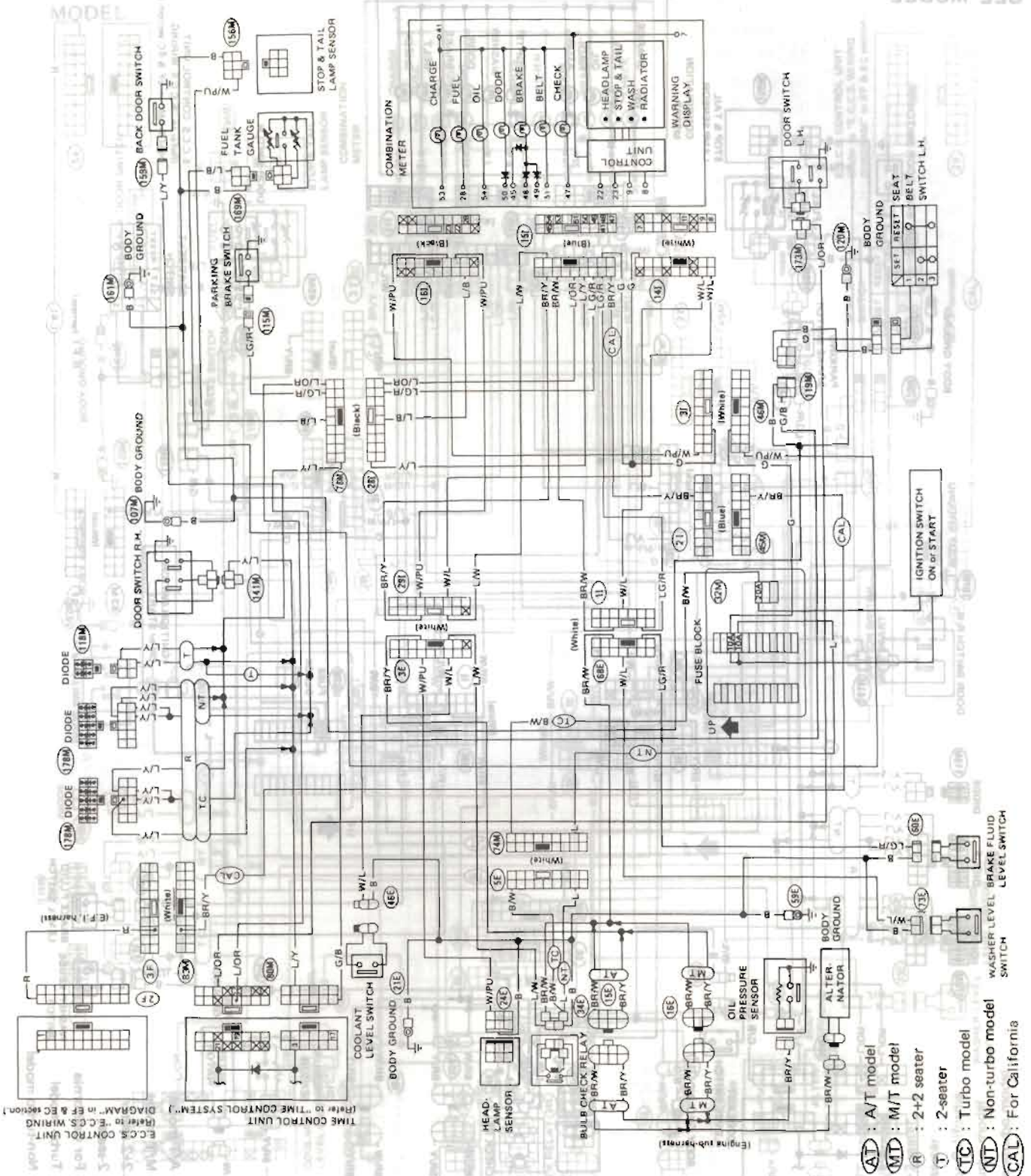


Schematic



WARNING LAMPS AND CHIME

— Warning Lamps/Wiring Diagram— For Digital Type Combination Meter —
 — For Needle Type Combination Meter (Cont'd) —

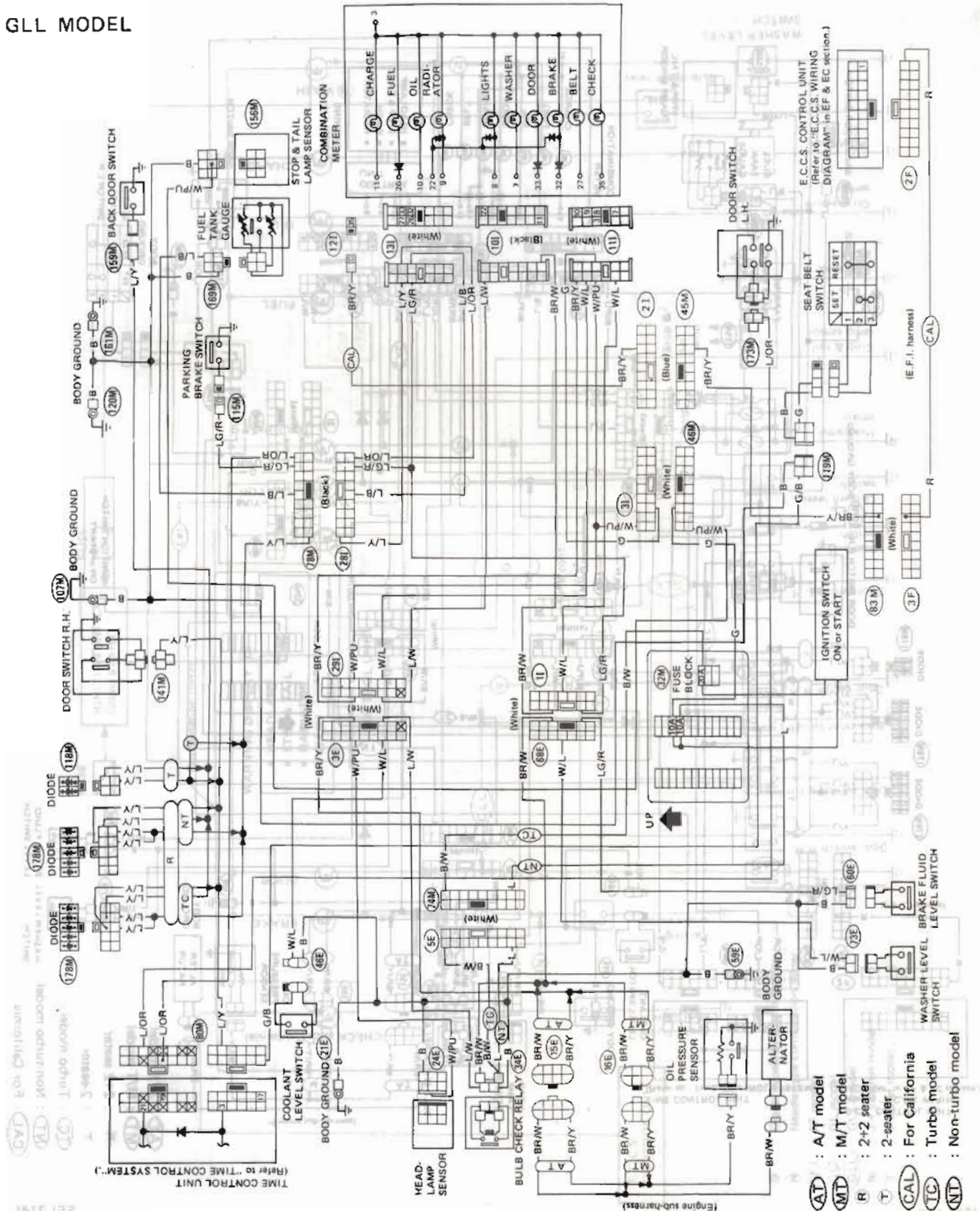


- AT : A/T model
- MT : M/T model
- R : 2+2 seater
- T : 2-seater
- TC : Turbo model
- NT : Non-turbo model
- CAL : For California

WARNING LAMPS AND CHIME

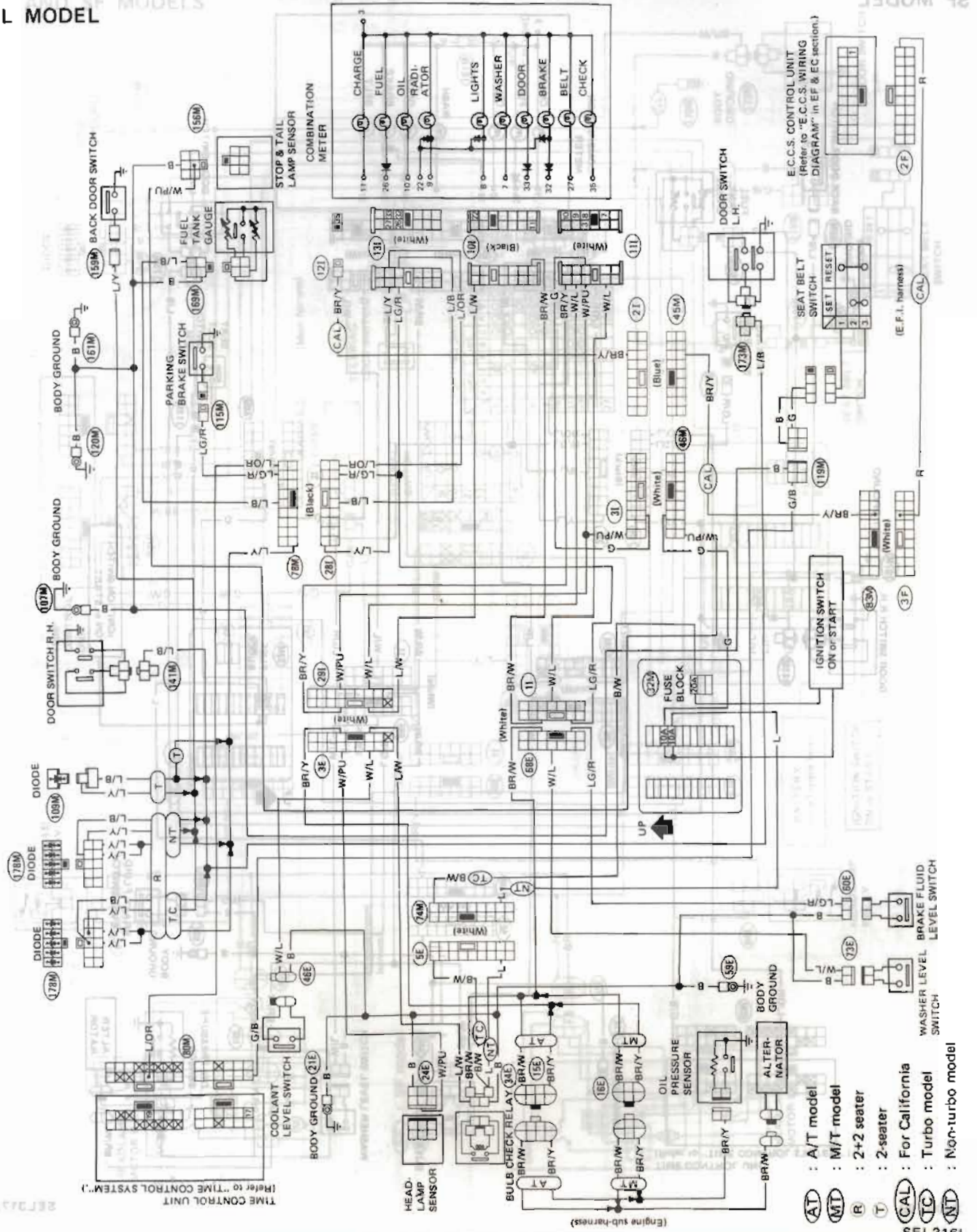
— Warning Lamps/Wiring Diagram — For Needle Type Combination Meter —

GLL MODEL



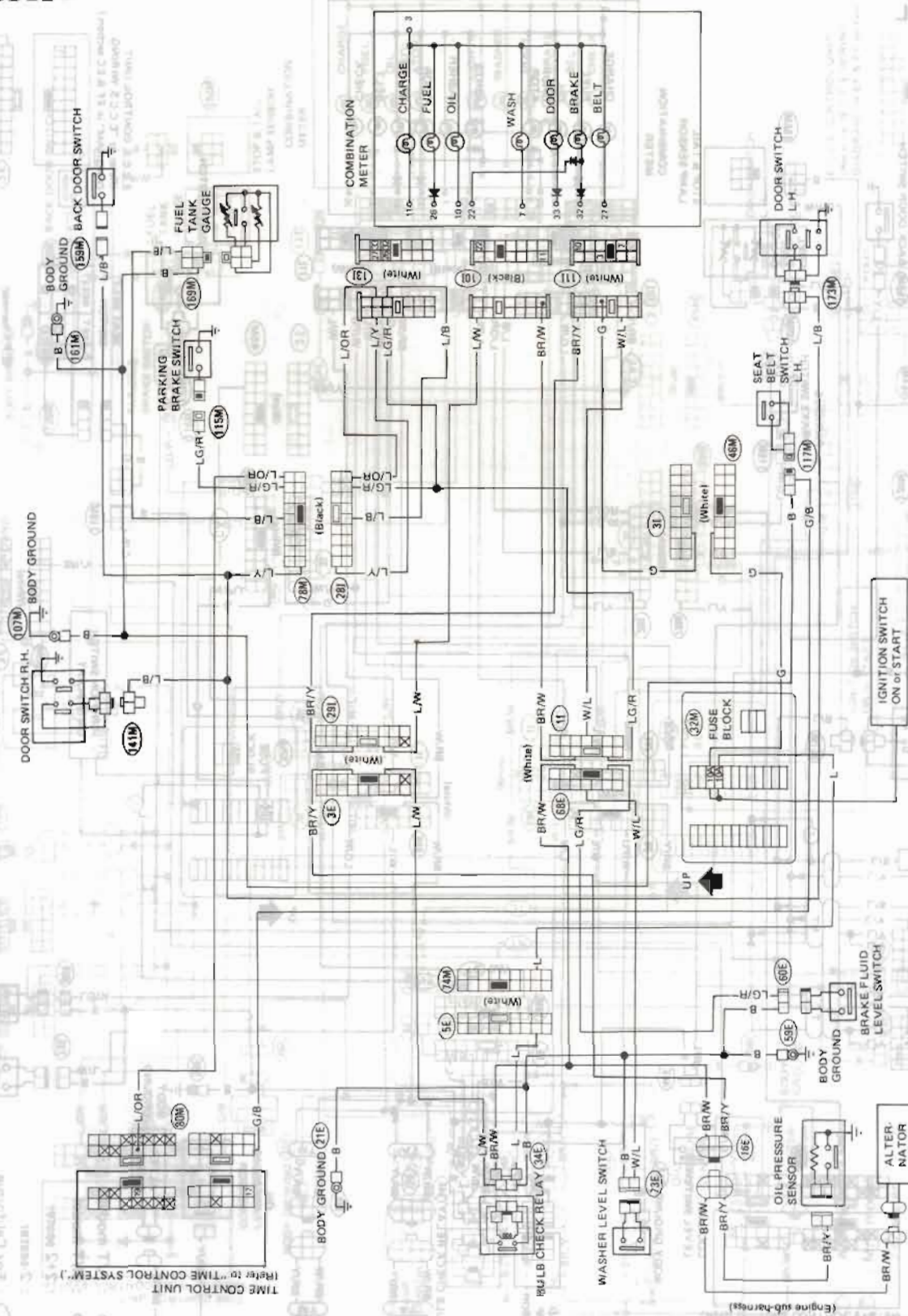
—For Needle Type Combination Meter (Cont'd)—

GL MODEL



Warning Lamps/Wiring Diagram

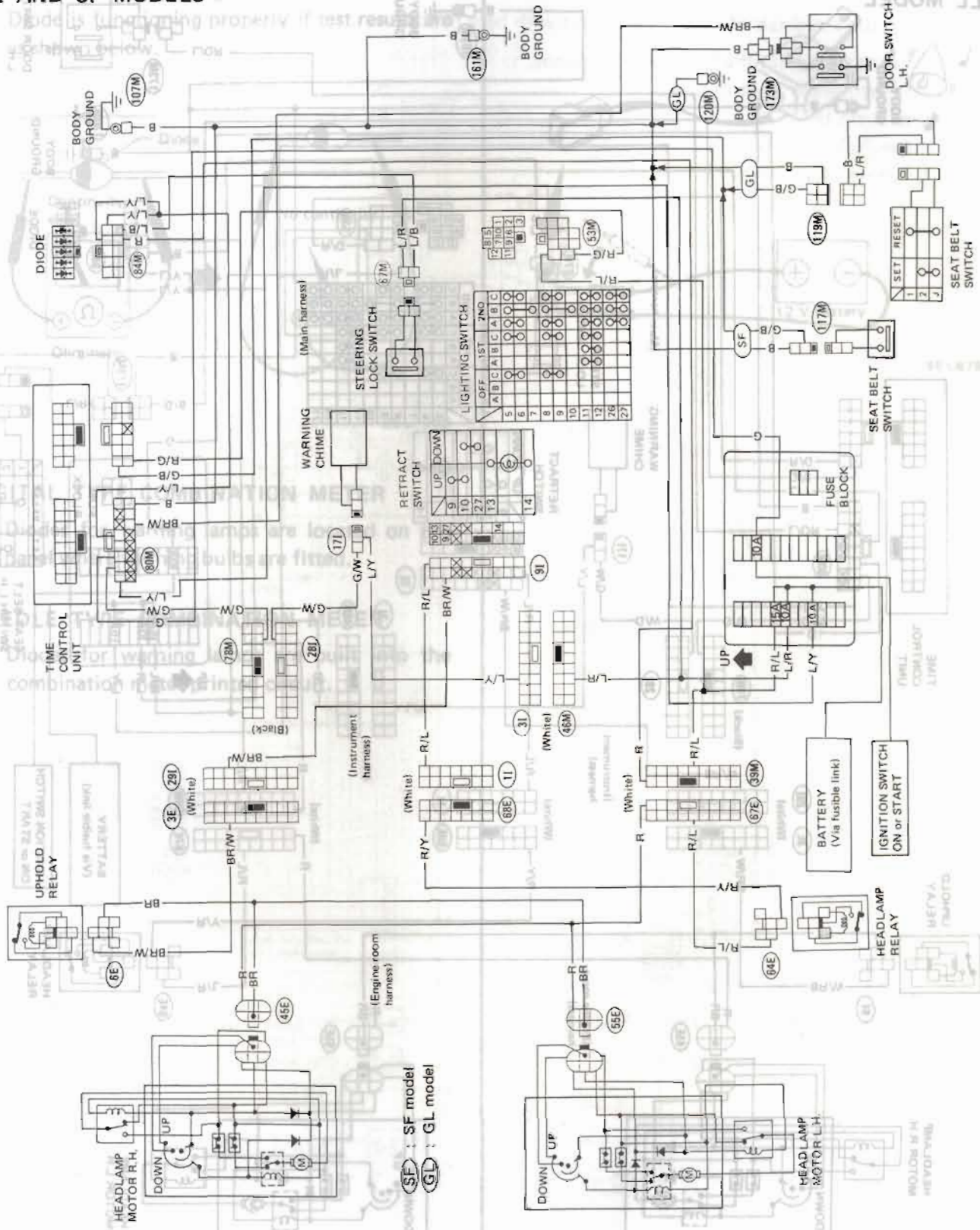
SF MODEL



WARNING LAMPS AND CHIME

Warning Chime/Wiring Diagram

GL AND SF MODELS



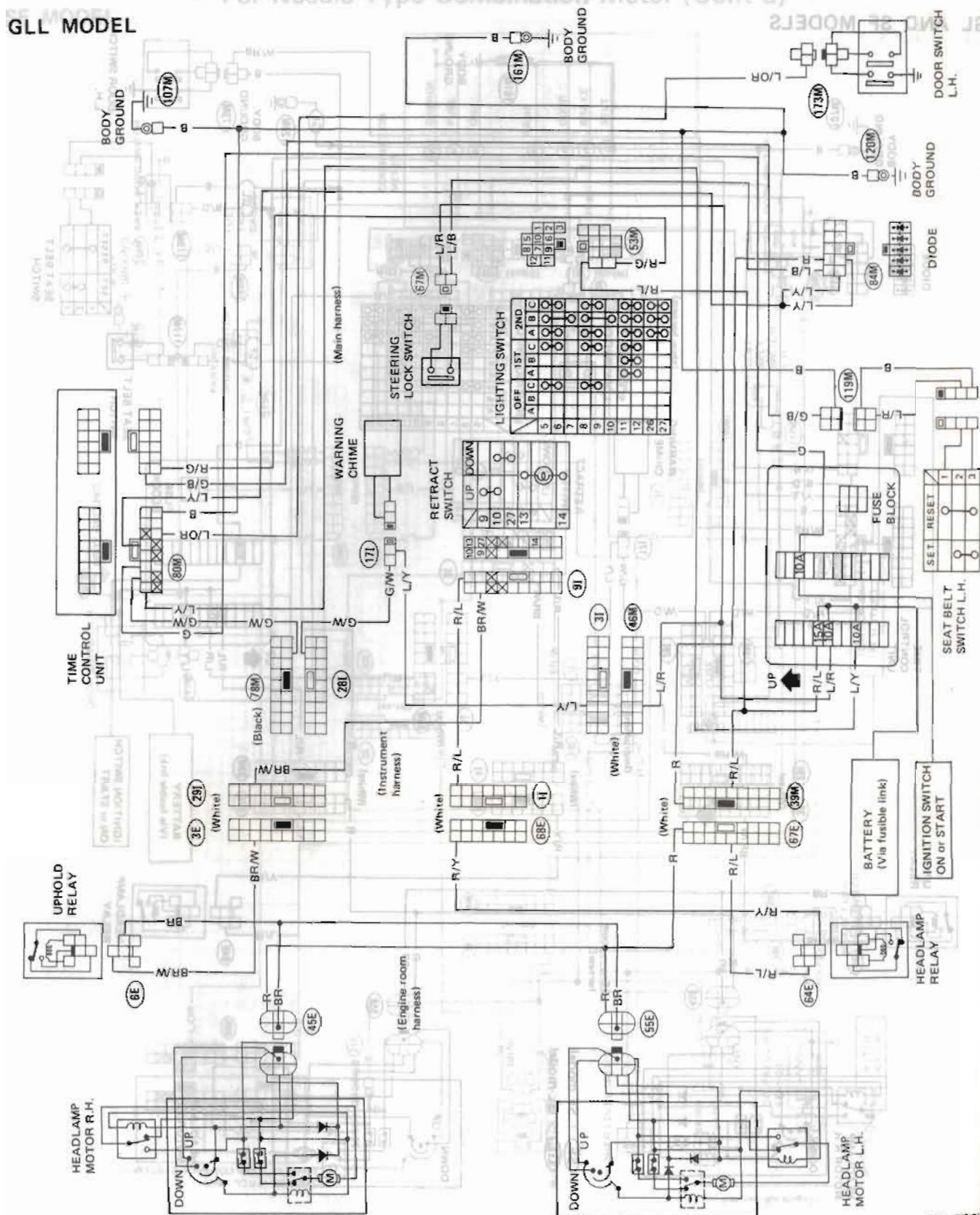
SEL508K

WARNING LAMPS AND CHIME

Warning Chime/Wiring Diagram (Cont'd)

— For Needle Type Combination Meter (Cont'd) —

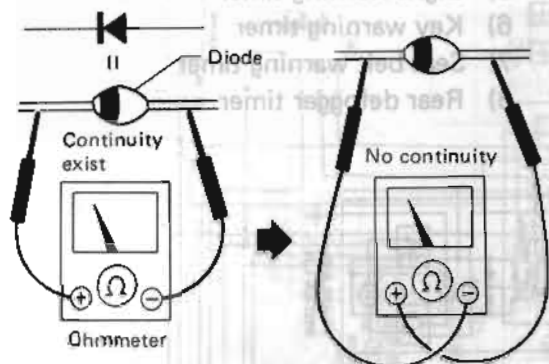
GLL MODEL



WARNING LAMPS AND CHIME

Diode Check

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



SEL700D

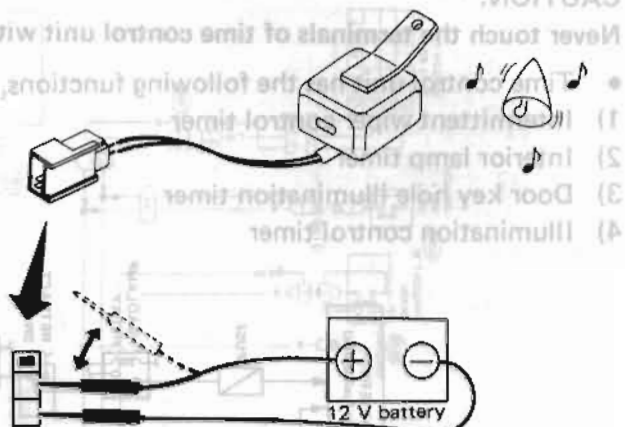
DIGITAL TYPE COMBINATION METER

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

NEEDLE TYPE COMBINATION METER

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

Warning Chime Check



SEL875D

Schematic

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

- 1) Intermittent wiper control timer
- 2) Interior lamp timer
- 3) Door key hole illumination timer
- 4) Illumination control timer

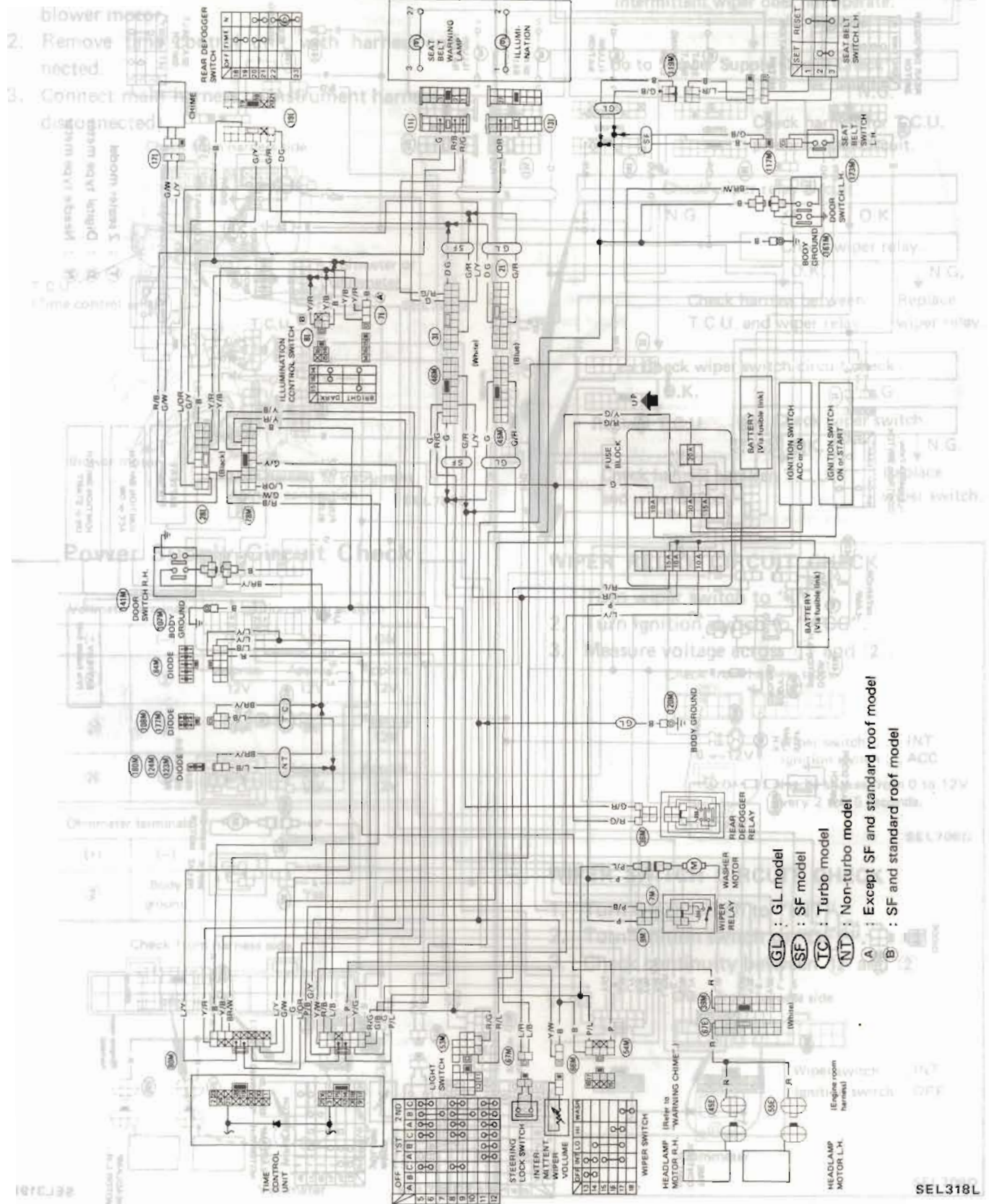
- 5) Light warning timer
- 6) Key warning timer
- 7) Seat belt warning timer
- 8) Rear defogger timer



TIME CONTROL SYSTEM

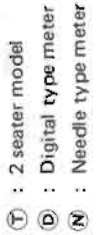
Wiring Diagram

GL AND SF MODELS



Wiring Diagram (Cont'd)

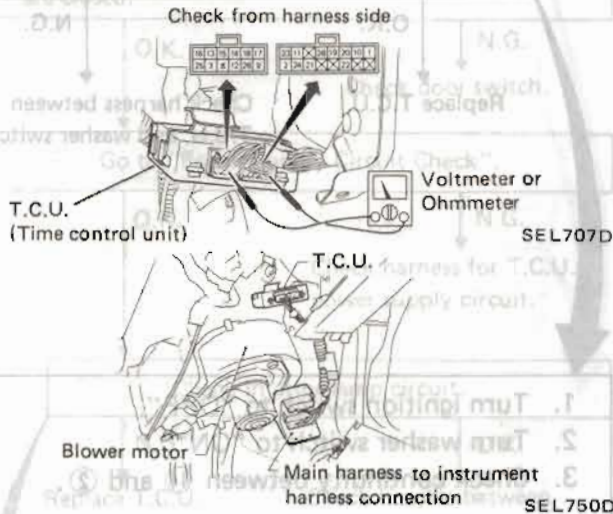
GL AND SF MODELS



TIME CONTROL SYSTEM

Preparation for Trouble-shooting

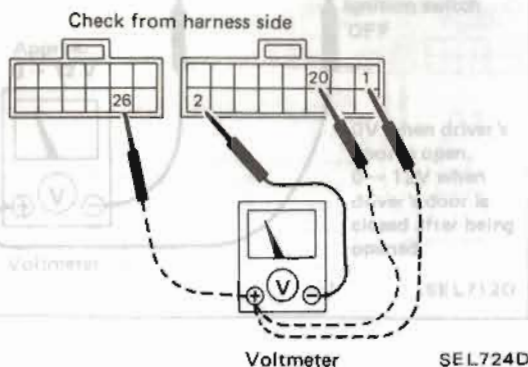
1. Remove R.H. dash side cover and remove blower motor.
2. Remove time control unit with harness connected.
3. Connect main harness to instrument harness (if disconnected).



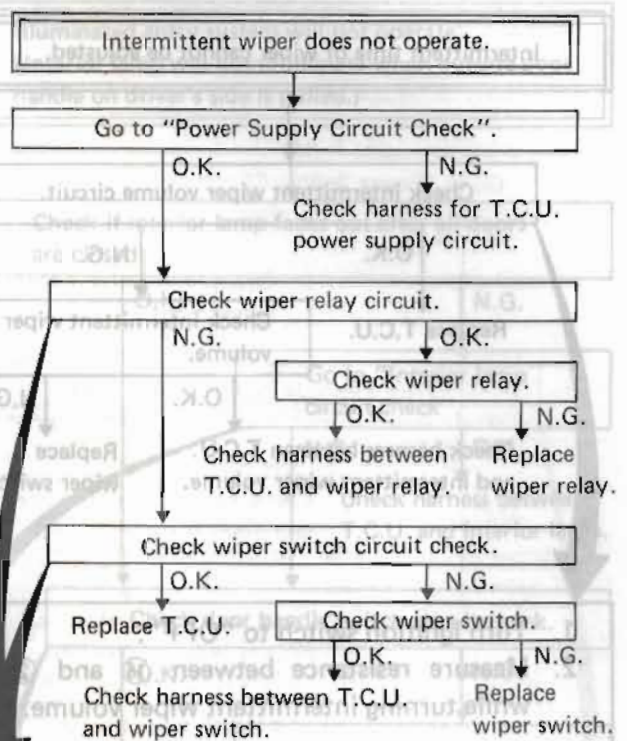
Power Supply Circuit Check

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

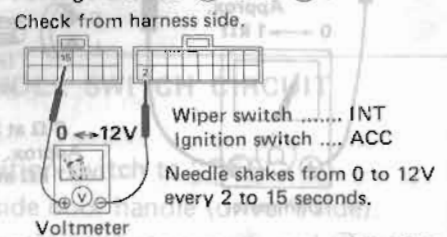


Trouble-shooting



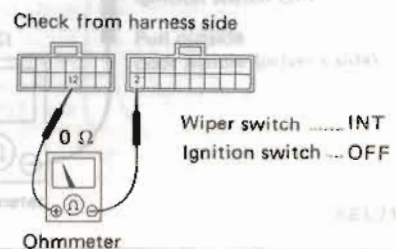
WIPER RELAY CIRCUIT CHECK

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



WIPER SWITCH CIRCUIT CHECK

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



TIME CONTROL SYSTEM

Trouble-shooting (Cont'd)

Intermittent time of wiper cannot be adjusted.

Check intermittent wiper volume circuit.

O.K.

Replace T.C.U.

N.G.

Check intermittent wiper volume.

O.K.

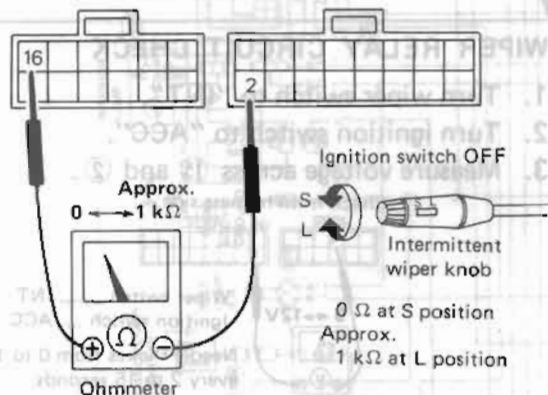
Check harness between T.C.U. and intermittent wiper volume.

N.G.

Replace wiper switch.

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

Check from harness side



Wiper and washer activate individually but not in combination.

Check washer switch circuit.

O.K.

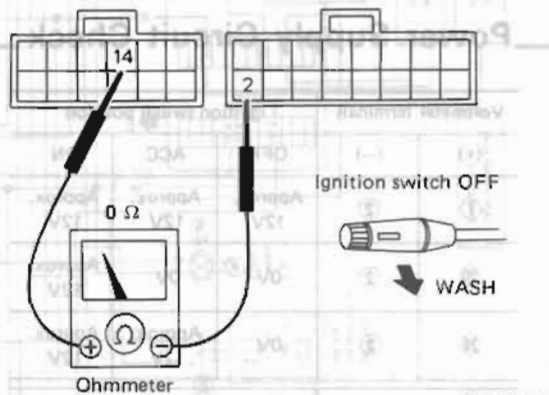
Replace T.C.U.

N.G.

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.

Check from harness side



TIME CONTROL SYSTEM

Trouble-shooting (Cont'd)

Interior lamp and step lamps do not fade out after driver's door is closed.

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

O.K.

Check door switch.

N.G.

Go to "Power Supply Circuit Check".

O.K.

Check harness for T.C.U. power supply circuit.

N.G.

Check interior lamp circuit.

N.G.

Replace T.C.U.

Check harness between T.C.U. and interior lamp.

O.K.

INTERIOR LAMP CIRCUIT CHECK

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

Check from harness side



Approx.
0 → 12 V

Ignition switch
OFF

0V when driver's
door is open.
0 → 12V when
driver's door is
closed after being
opened.

Voltmeter

SEL712D

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.

N.G.

Go to "Interior lamp circuit check".

N.G.

O.K.

Check harness between T.C.U. and interior lamp.

Check door handle switch circuit check.

O.K.

N.G.

Check door handle switch.

O.K.

Replace T.C.U.

Check harness between T.C.U. and door handle switch.

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.

Check from harness side



0 Ω

Ignition switch OFF

Pull outside
door handle (driver's side)

Ohmmeter

SEL713D

TIME CONTROL SYSTEM

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".

N.G.

O.K.

Check harness for T.C.U. power supply circuit.

Check key hole illumination circuit.

N.G.

O.K.

Check key hole illumination and diode.

O.K.

Check harness between T.C.U. and key hole illumination.

Go to "Door handle switch circuit check". (Refer to back page.)

O.K.

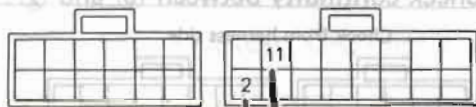
N.G.

Replace T.C.U.

Check harness between T.C.U. and door handle switch.

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

Check from harness side.



Ignition switch OFF

After outside door handle (driver's side) is pulled and released, voltmeter indicates 0V for about 7 seconds and then 12V.

Voltmeter

SEL714D

Illumination control system does not actuate.

Check light switch circuit.

O.K.

N.G.

Check harness between T.C.U. and light switch.

Check illumination circuit.

O.K.

N.G.

Check for loose harness connector.

Check illumination control circuit.

O.K.

N.G.

Replace T.C.U.

Check illumination control switch.

LIGHT SWITCH CIRCUIT CHECK

Check from harness side.



Approx. 12V

Voltmeter

Ignition switch ... OFF
Light switch ON

SEL715D

ILLUMINATION CIRCUIT CHECK

Check from harness side



Except ∞

Ohmmeter

Ignition switch OFF
Light switch OFF

SEL716D

ILLUMINATION CONTROL CIRCUIT CHECK

Check from harness side



0 Ω

Ohmmeter

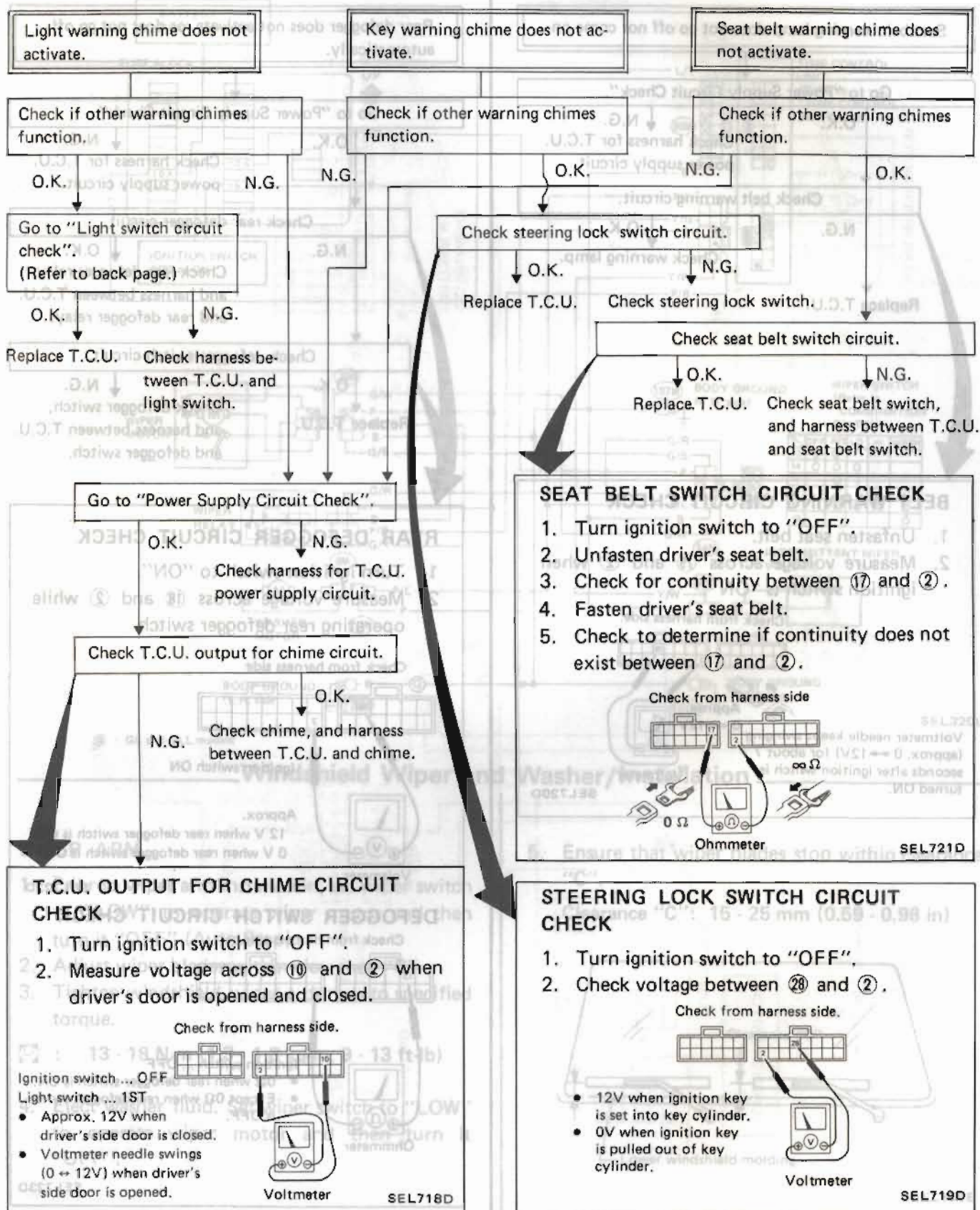
Ignition switch OFF

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

SEL717D

TIME CONTROL SYSTEM

Trouble-shooting (Cont'd)



TIME CONTROL SYSTEM

Trouble-shooting (Cont'd)

Seat belt warning lamp does not go off nor come on.

Go to "Power Supply Circuit Check".

O.K.

N.G.

Check harness for T.C.U. power supply circuit.

Check belt warning circuit.

N.G.

O.K.

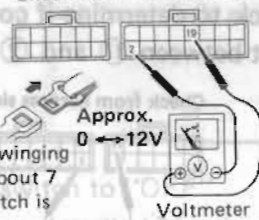
Check warning lamp.

Replace T.C.U.

BELT WARNING CIRCUIT CHECK

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

Check from harness side.



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

SEL720D

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.

N.G.

O.K.

Check rear defogger relay, and harness between T.C.U. and rear defogger relay.

Check defogger switch circuit.

O.K.

N.G.

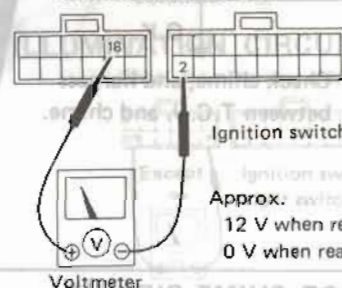
Replace T.C.U.

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 ① and ② while operating rear defogger switch.

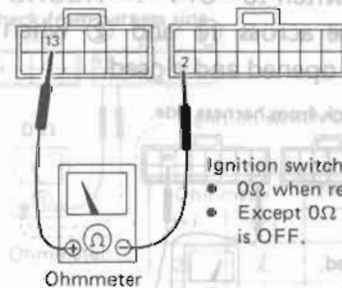
Check from harness side



SEL722D

DEFOGGER SWITCH CIRCUIT CHECK

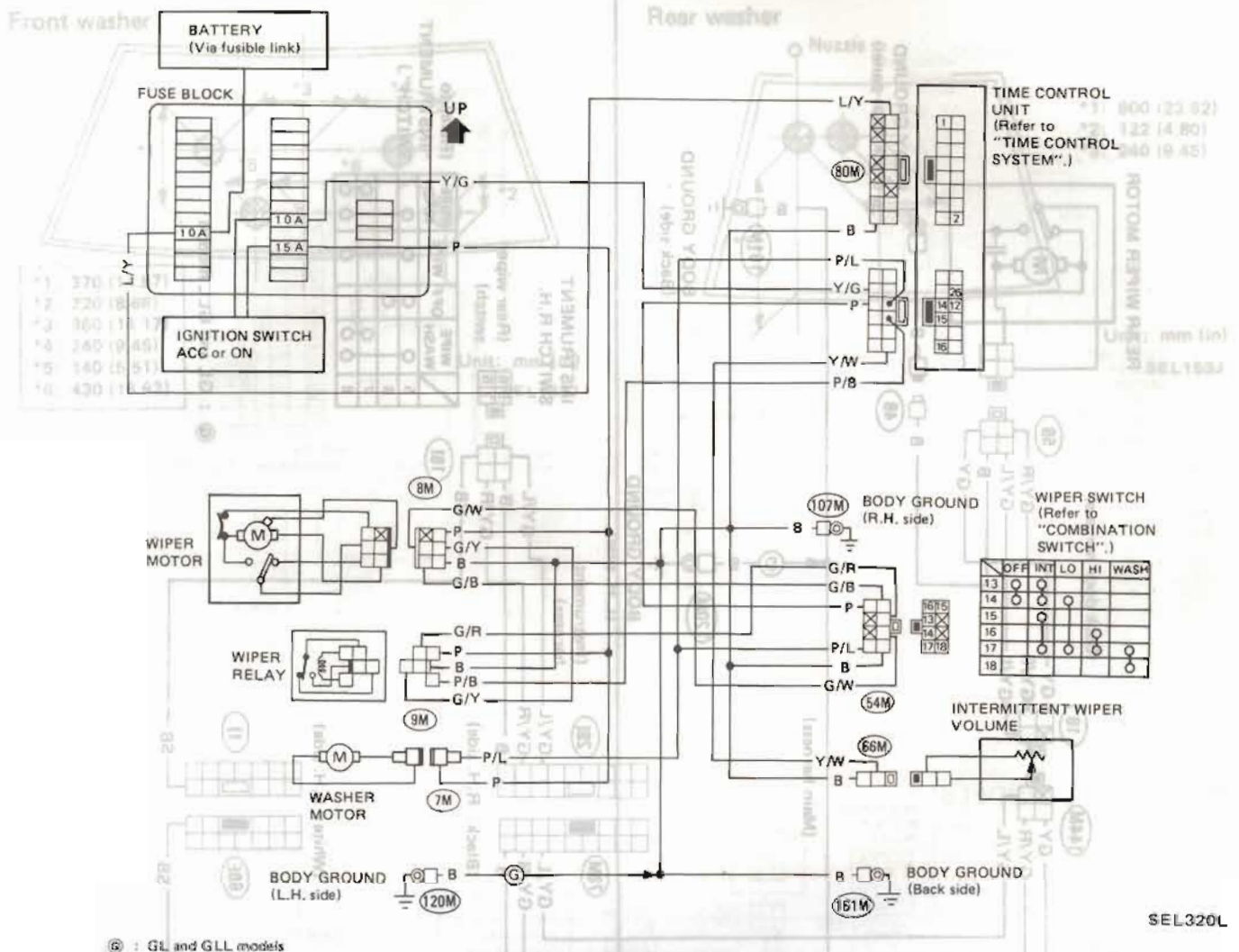
Check from harness side.



SEL723D

WIPER AND WASHER

Windshield Wiper and Washer/Wiring Diagram



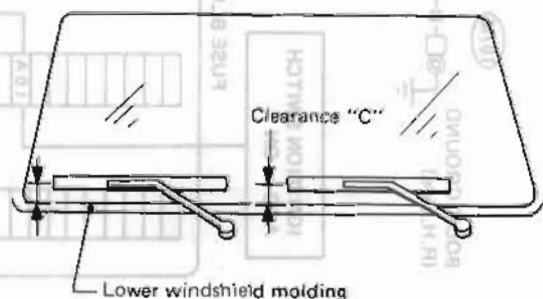
Windshield Wiper and Washer/Installation

WIPER ARM

1. Prior to wiper arm installation, set wiper switch to "LOW" to operate wiper motor and then turn it "OFF" (Auto Stop).
2. Adjust wiper blades within clearance "C".
3. Tighten windshield wiper arm nuts to specified torque.
 □ : 13 - 18 N·m (1.3 - 1.8 kg-m, 9 - 13 ft-lb)
4. Eject washer fluid. Set wiper switch to "LOW" to operate wiper motor and then turn it "OFF".

5. Ensure that wiper blades stop within clearance "C".

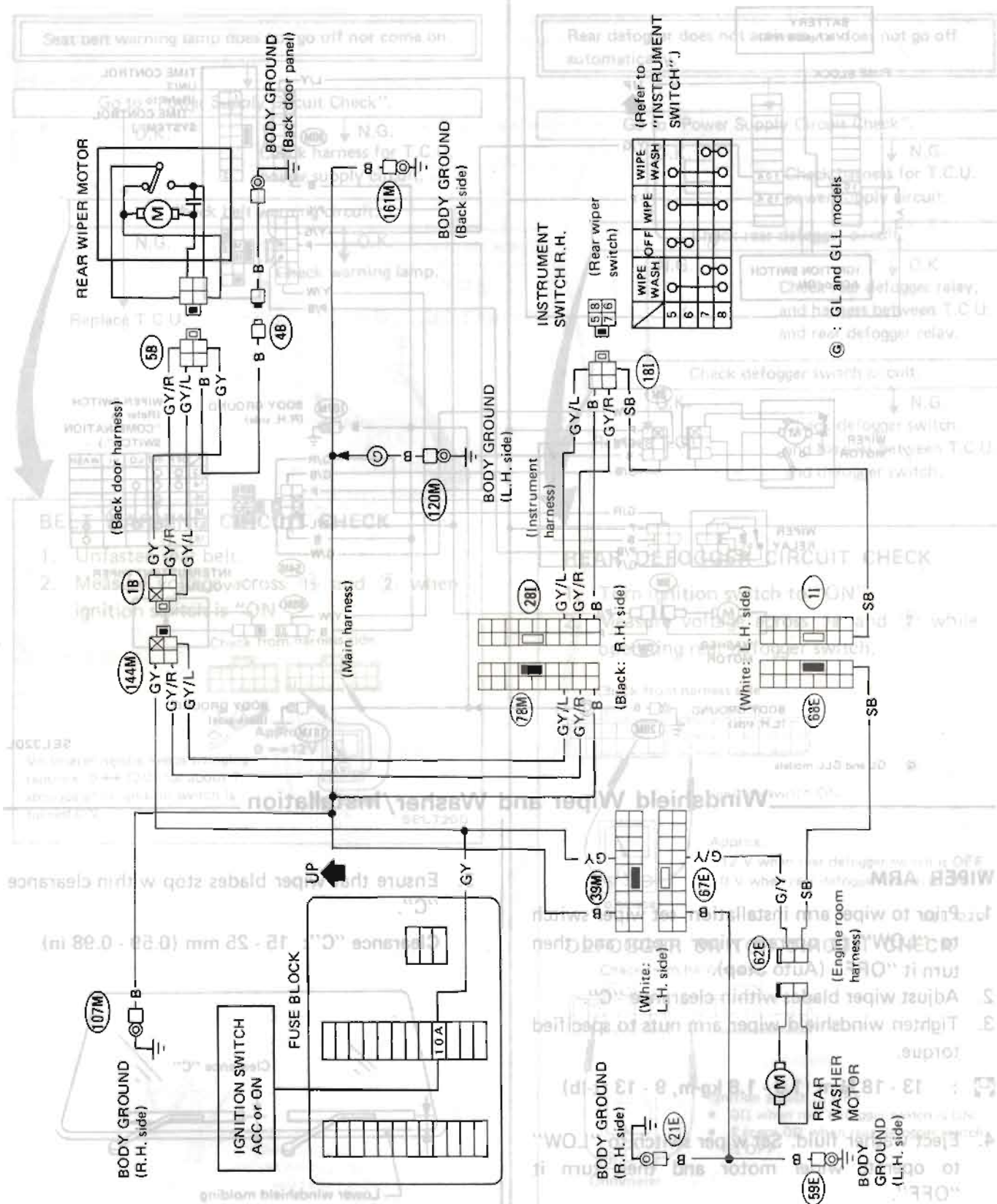
Clearance "C": 15 - 25 mm (0.59 - 0.98 in)



SEL355E

WIPER AND WASHER

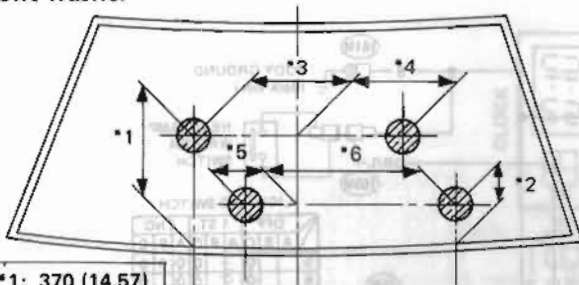
Rear Wiper and Washer/Wiring Diagram



WIPER AND WASHER

Washer Nozzle Adjustment

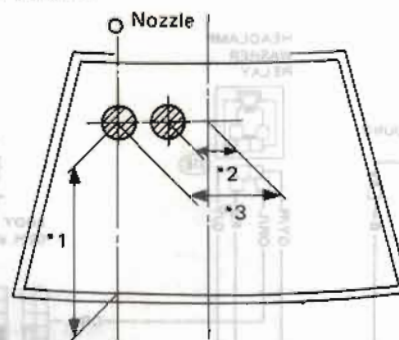
Front washer



- *1: 370 (14.57)
- *2: 220 (8.66)
- *3: 360 (14.17)
- *4: 240 (9.45)
- *5: 140 (5.51)
- *6: 430 (16.93)

Unit: mm (in)
SEL152J

Rear washer



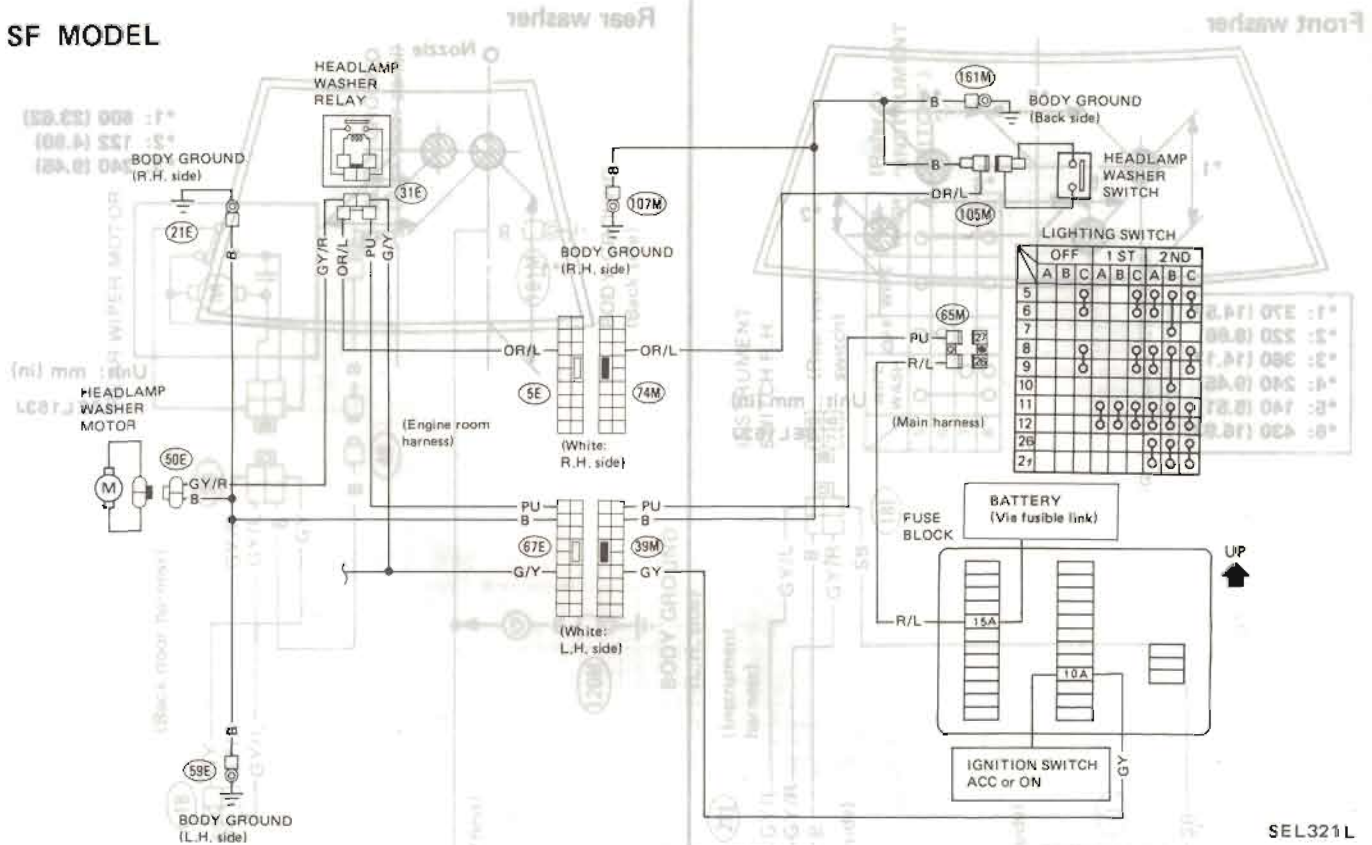
- *1: 600 (23.62)
- *2: 122 (4.80)
- *3: 240 (9.45)

Unit: mm (in)
SEL153J

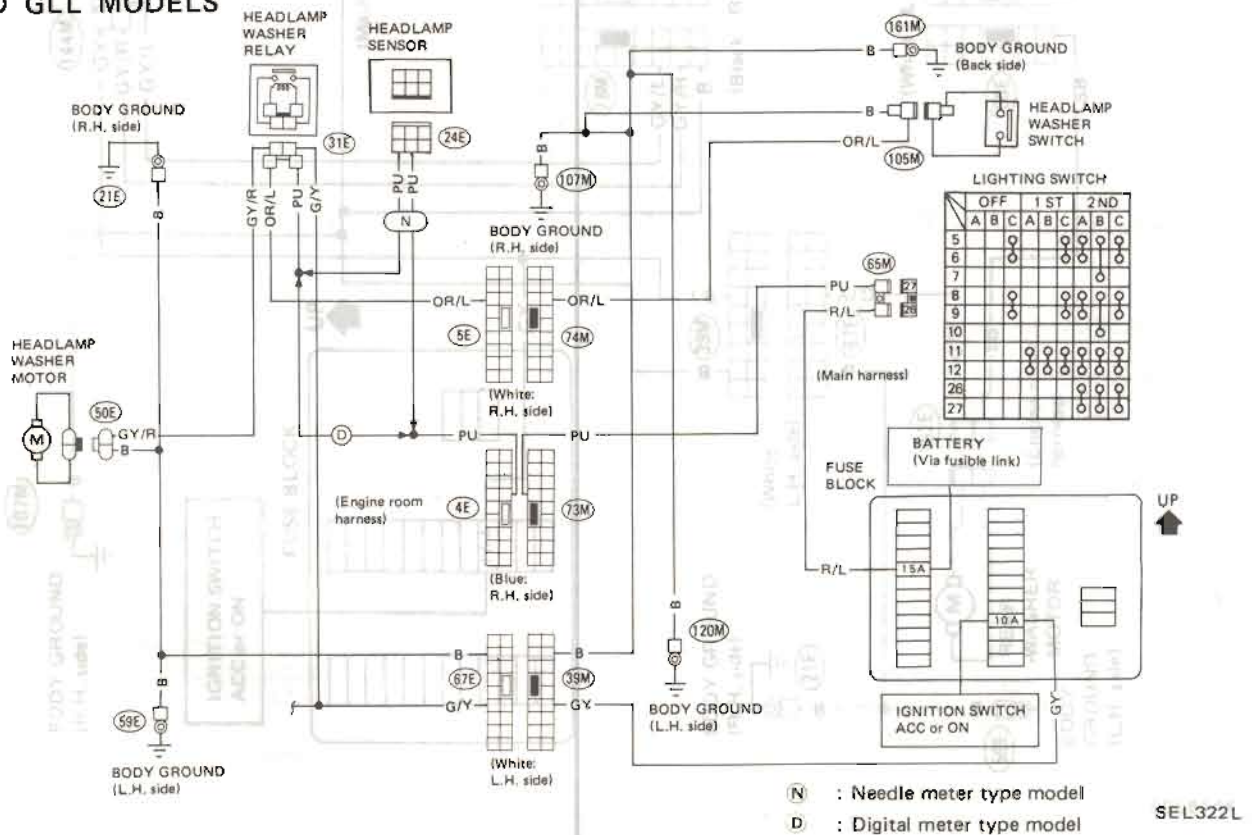
WIPER AND WASHER

Headlamp Washer/Wiring Diagram

SF MODEL

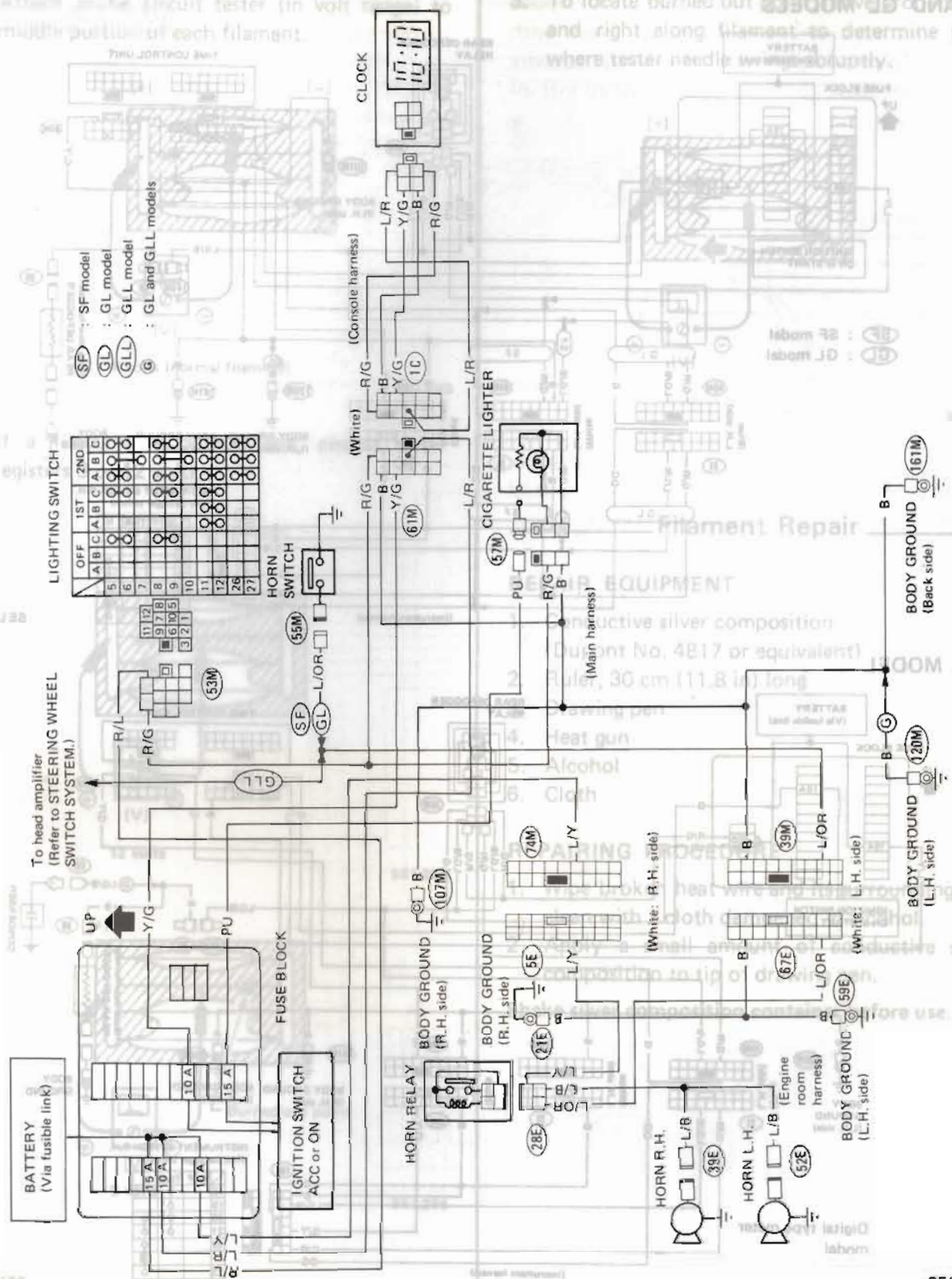


GL AND GLL MODELS



HORN, CIGARETTE LIGHTER, CLOCK

Wiring Diagram



Headlamp Washer/Wiring Diagram

SF AND GL MODELS

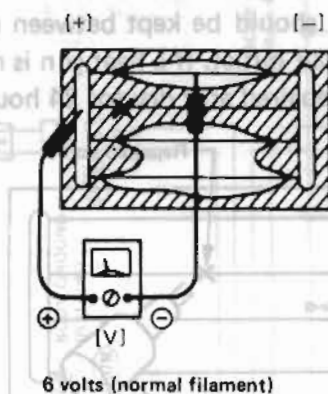


SEL323L

REAR WINDOW DEFOGGER

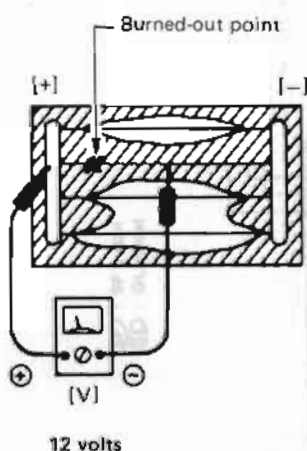
Filament Check

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

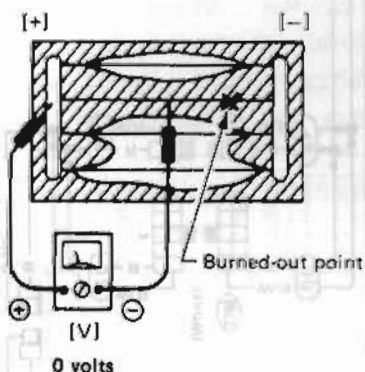


SEL263

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

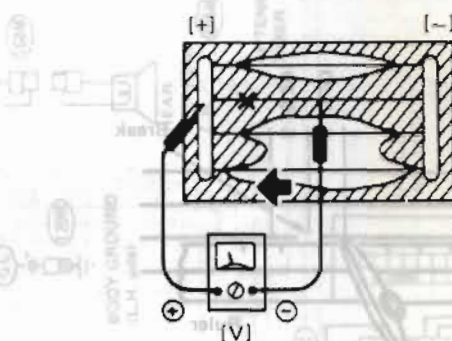


SEL264



SEL265

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

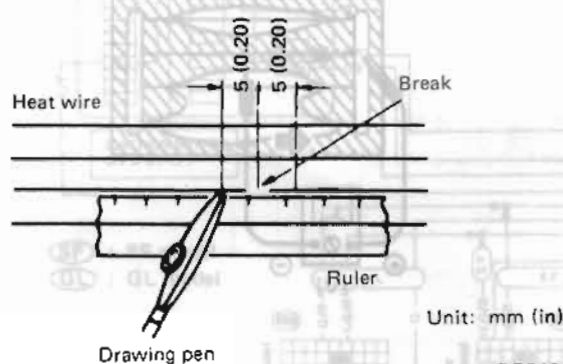
1. Wipe broken heat wire and its surrounding area clean with a cloth dampened in alcohol.
2. Apply a small amount of conductive silver composition to tip of drawing pen.

Shake silver composition container before use.

REAR WINDOW DEFOGGER

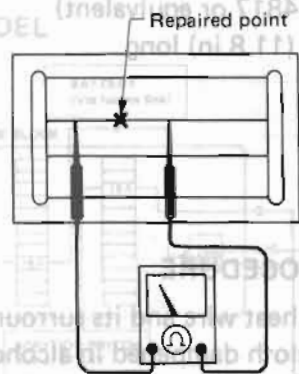
Filament Repair (Cont'd)

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

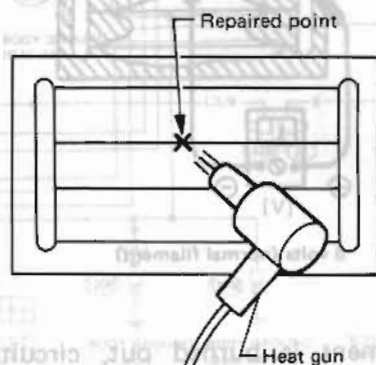


4. After repair has been completed, check repaired wire for continuity. This check should be conducted 10 minutes after silver composition is deposited.

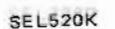
Do not touch repaired area while test is being conducted.



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.



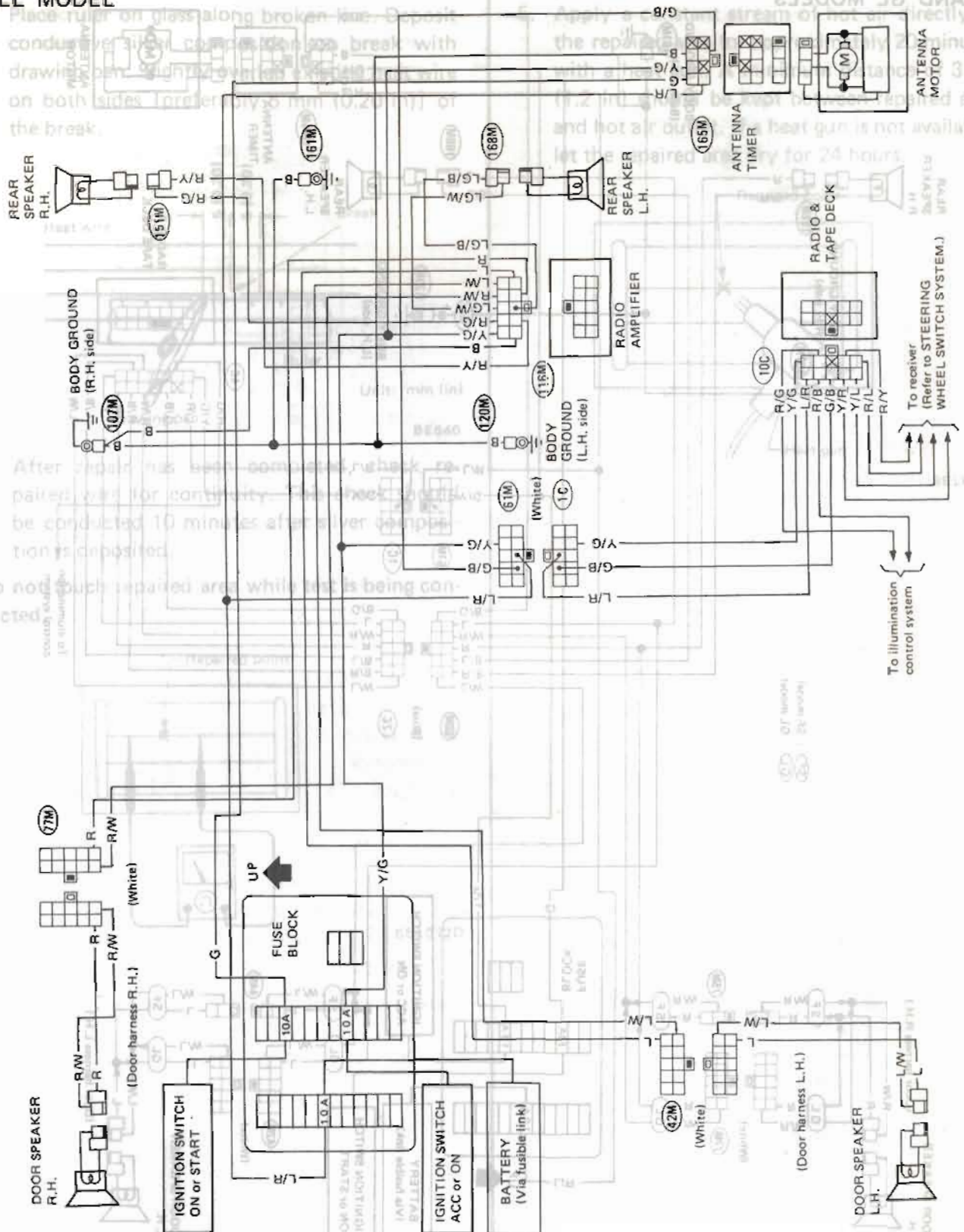
Wiring Diagram

[illegible]

AUDIO AND POWER ANTENNA

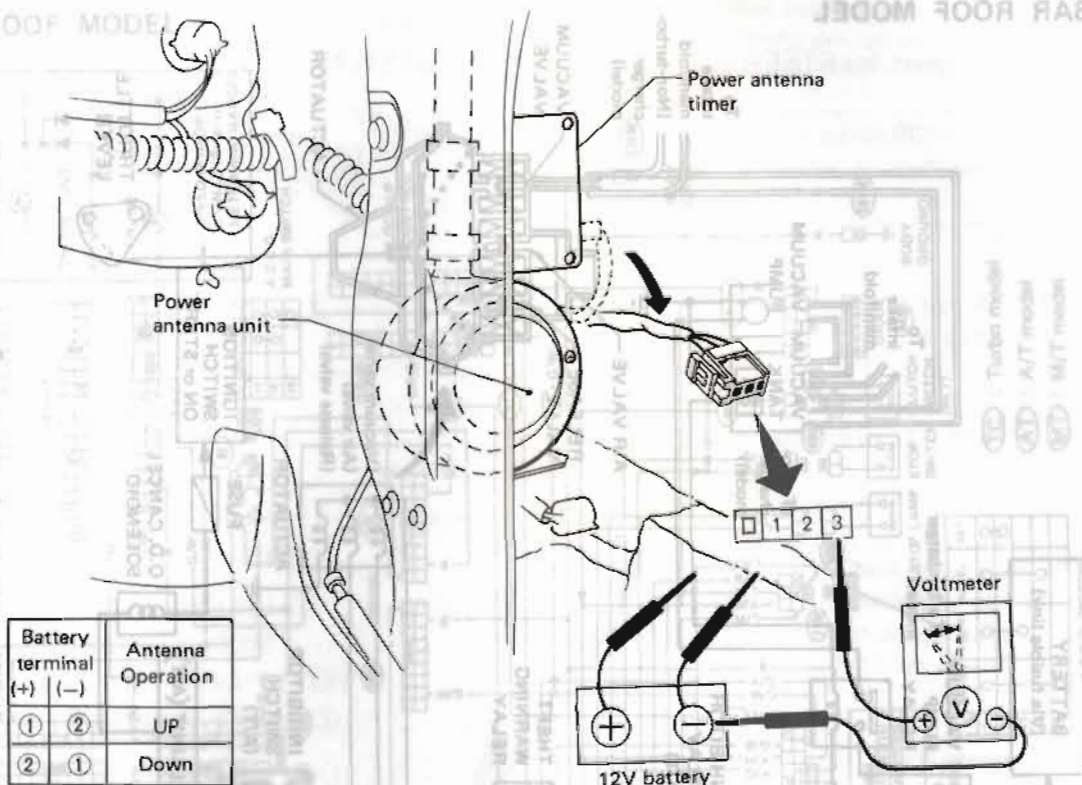
Wiring Diagram (Cont'd)

GLL MODEL



AUDIO AND POWER ANTENNA

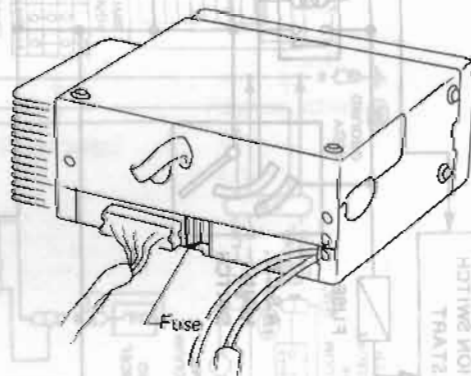
Power Antenna Motor Check



SEL732D

Radio Fuse Check

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.



SEL733D

Schematic

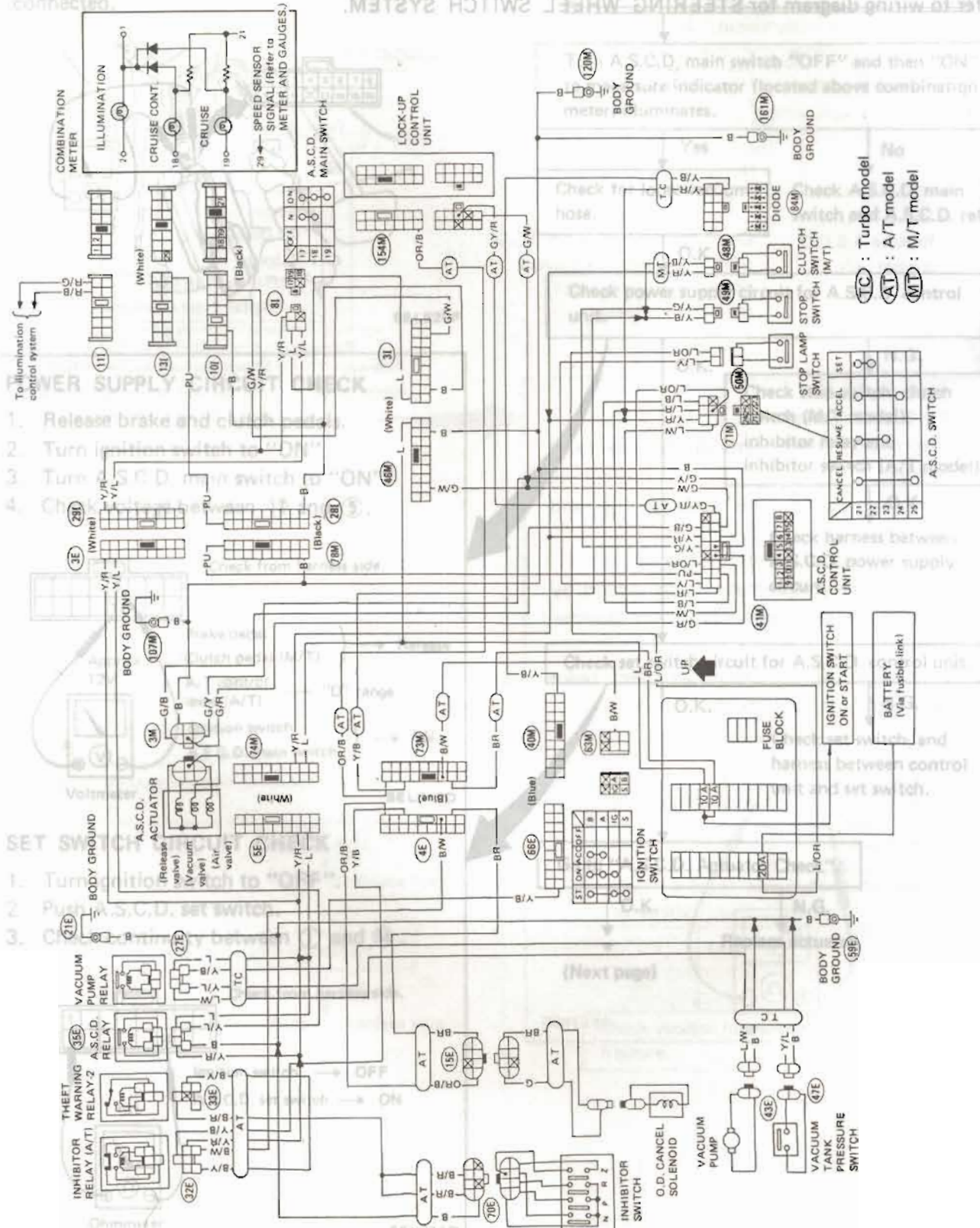
[illegible]

Note: For digital type combination meter equipped model, refer to schematic for STEERING WHEEL SWITCH SYSTEM.

AUTOMATIC SPEED CONTROL DEVICE (A.S.C.D.)

Wiring Diagram

GL T-BAR ROOF MODEL



SEL326L

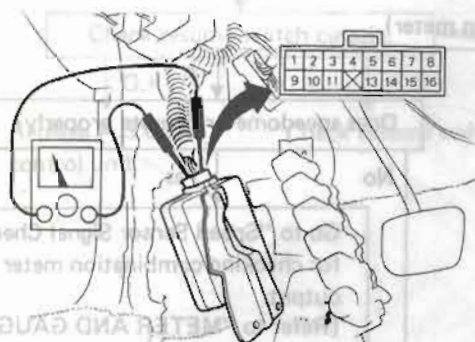
Wiring Diagram (Cont'd)

Refer to wiring diagram for STEERING WHEEL SWITCH SYSTEM.

AUTOMATIC SPEED CONTROL DEVICE (A.S.C.D.)

—Preparation for Trouble-shooting— Trouble-shooting—

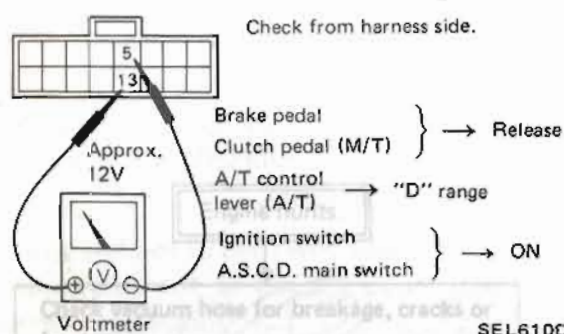
- Remove A.S.C.D. control unit with harness connected.



SEL520F

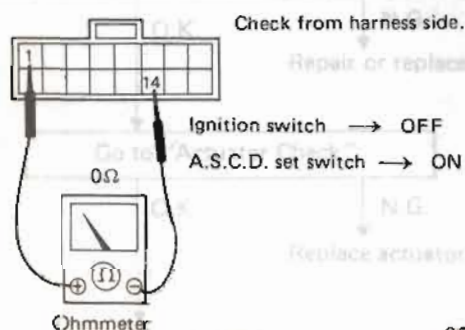
POWER SUPPLY CIRCUIT CHECK

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



SET SWITCH CIRCUIT CHECK

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



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

No

Check for loose vacuum hose.

Check A.S.C.D. main switch and A.S.C.D. relay.

O.K.

Check power supply circuit for A.S.C.D. control unit.

O.K.

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.

Check set switch circuit for A.S.C.D. control unit.

O.K.

N.G.

Check set switch, and harness between control unit and set switch.

Go to "A.S.C.D. Actuator Check".

O.K.

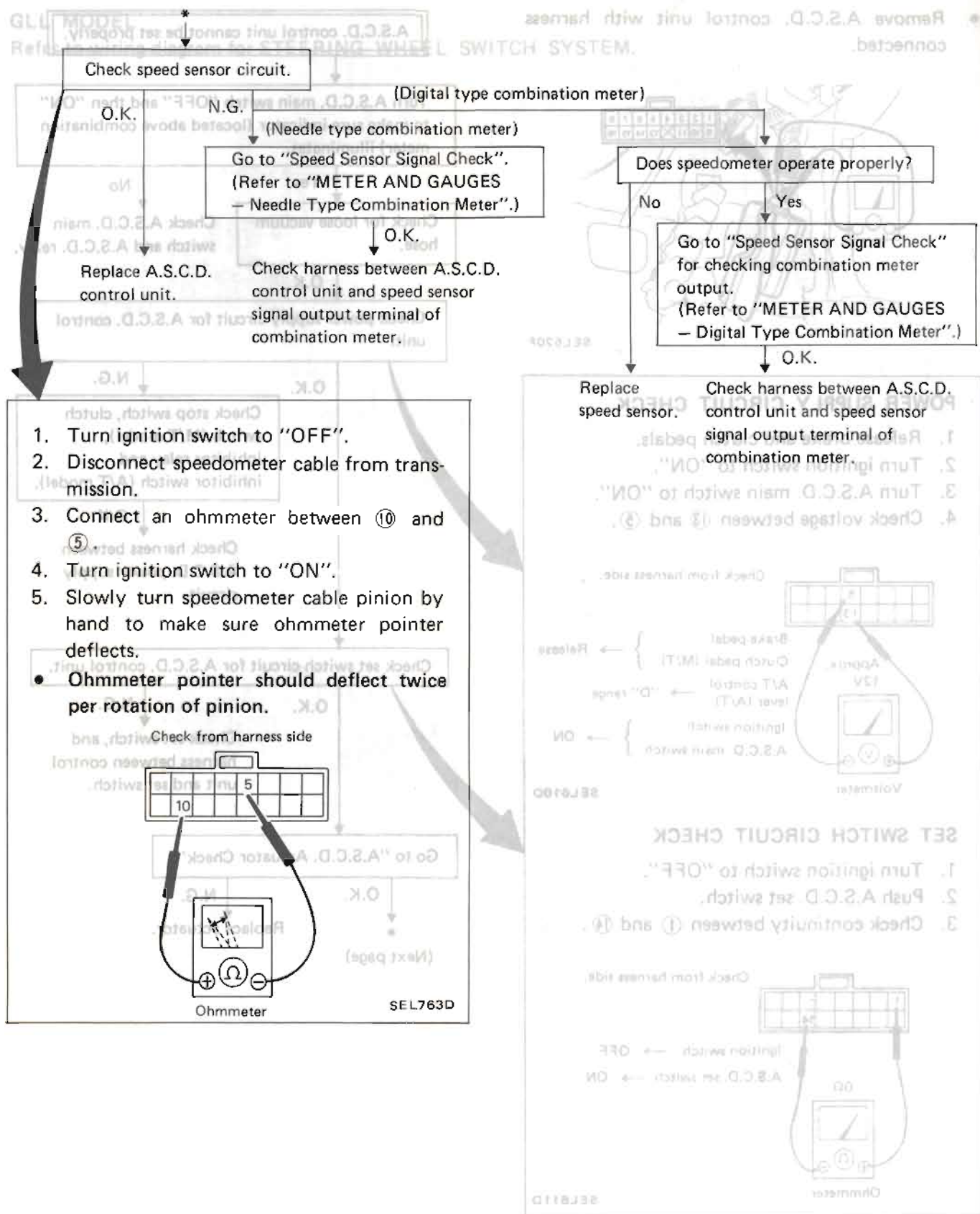
N.G.

(Next page)

Replace actuator.

AUTOMATIC SPEED CONTROL DEVICE (A.S.C.D.)

Trouble-shooting (Cont'd)



AUTOMATIC SPEED CONTROL DEVICE (A.S.C.D.)

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.

Accelerate switch will not operate.

Check accelerate switch circuit.

O.K.

Replace A.S.C.D. control unit.

N.G.

Check accelerate switch.

Engine hunts.

Check vacuum hose for breakage, cracks or fracture.

O.K.

N.G.

Repair or replace hose.

Does A.S.C.D. wire move smoothly?

O.K.

N.G.

Repair or replace wire.

Go to "Actuator Check".

O.K.

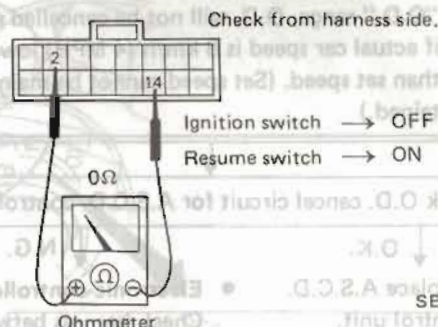
N.G.

Replace actuator.

Replace A.S.C.D. control unit.

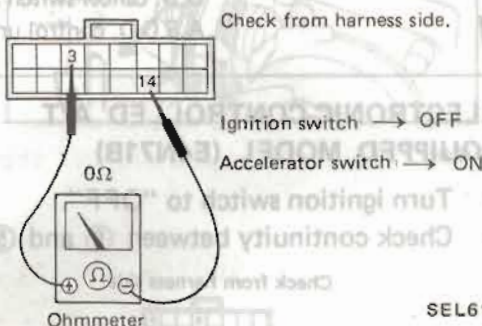
RESUME SWITCH CIRCUIT CHECK

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



ACCELERATE SWITCH CIRCUIT CHECK

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



Large difference between set vehicle speed and actual speed.

Check A.S.C.D. wire and actuator move smoothly.

O.K.

N.G.

Replace wire or actuator.

Check vacuum hose for breakage, cracks or fracture.

O.K.

N.G.

Repair or replace hose.

Go to "Actuator Check".

O.K.

N.G.

Replace A.S.C.D. control unit.

Replace actuator.

AUTOMATIC SPEED CONTROL DEVICE (A.S.C.D.)

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.

O.K.

Replace A.S.C.D. control unit.

N.G.

- **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.

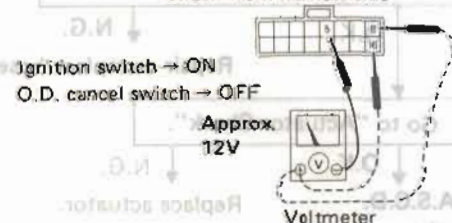
Check from harness side



CONVENTIONAL A/T EQUIPPED MODEL (4N71B)

- Turn ignition switch to "ON".
- Turn O.D. cancel switch to "OFF".
- Check voltage ⑧ - ⑤ and ⑩ - ⑤.

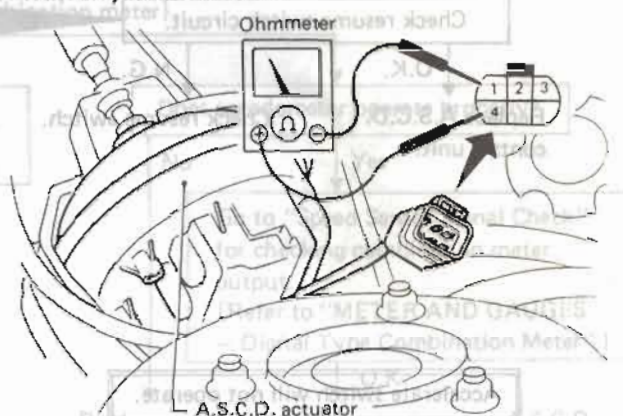
Check from harness side



A.S.C.D. Actuator Check

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

Continuity exist ... O.K.



CAUTION:

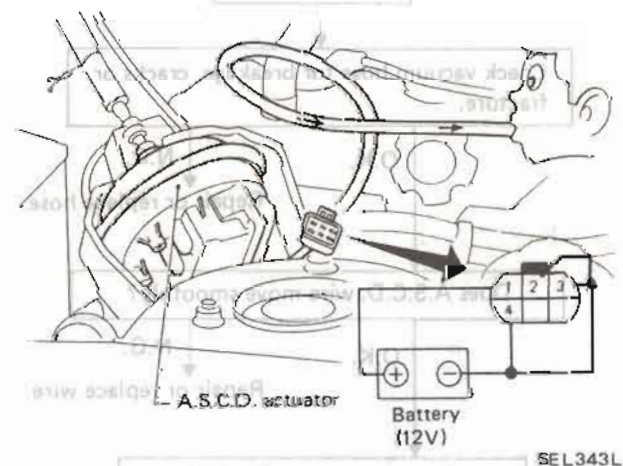
Do not attempt to remove valves from actuator.

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.

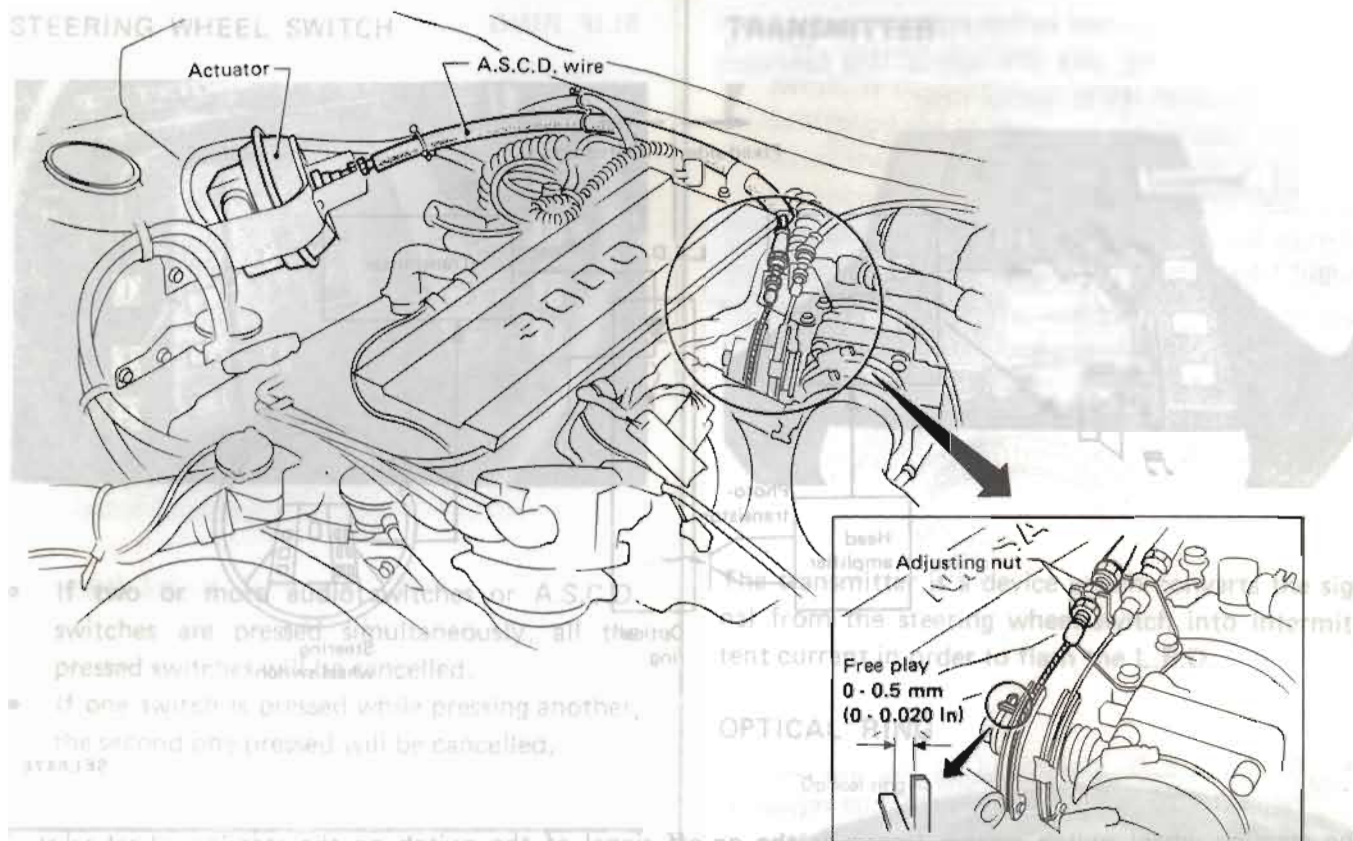
CAUTION:

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



AUTOMATIC SPEED CONTROL DEVICE (A.S.C.D.)

A.S.C.D. Wire Adjustment



CAUTION:

- Be careful not to twist wire when removing it.
- Be careful not to pinch vacuum hose when installing actuator.
- Do not tighten 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.



STEERING WHEEL SWITCH SYSTEM

Trouble-shooting / Description

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 if actual speed is less than 40 km/h (25 MPH) (lower than set speed limit speed cannot be targeted).

A.S.C.D.



Audio



Receiver

Head amplifier

Photo-transistor

Optical ring

L.E.D.

Transmitter

Steering wheel switch

The steering wheel switch system transmits the on-off signal of the switch on the steering wheel to the receiver optically and operates A.S.C.D. and audio.

HOW TO TRANSMIT SWITCH SIGNAL OPTICALLY

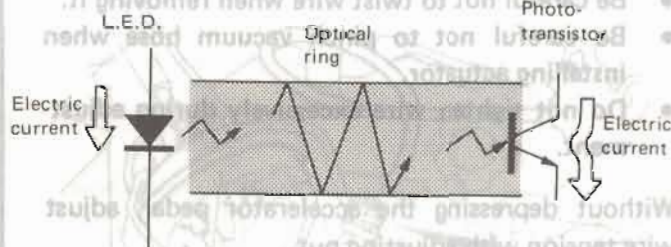
- (1) The on-off signal of the switch on the steering wheel is converted into an L.E.D. on-off signal by the transmitter.
- (2) This L.E.D. signal (optical signal) is transmitted to the photo-transistor through the optical ring.
- (3) The optical signal is re-converted into electrical signal by the photo-transistor and transmitted to the receiver. Receiver controls A.S.C.D. and radio.

By the three steps mentioned above, the on-off signal of the switch on the steering wheel is optically transmitted.

1. Check continuity between terminal ① and terminal ②. ③ and ④. If O.K.

2. Connect battery (approx. 12V) to harness connector of actuator as shown below, and apply vacuum to actuator.

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



L.E.D. (Light Emitting Diode):

A diode which emits light when voltage is applied.

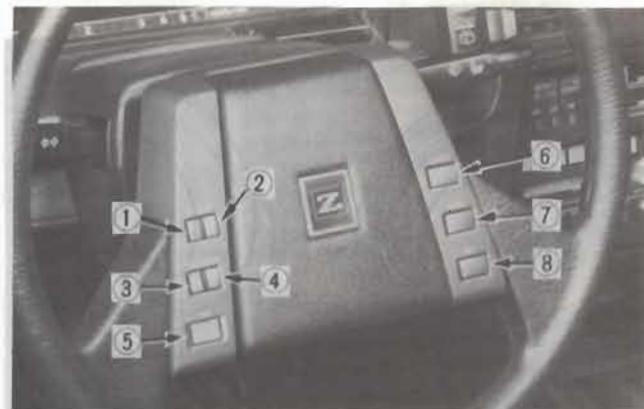
Photo-transistor:

A transistor which allows current to flow when light is applied.

STEERING WHEEL SWITCH SYSTEM

Description (Cont'd)

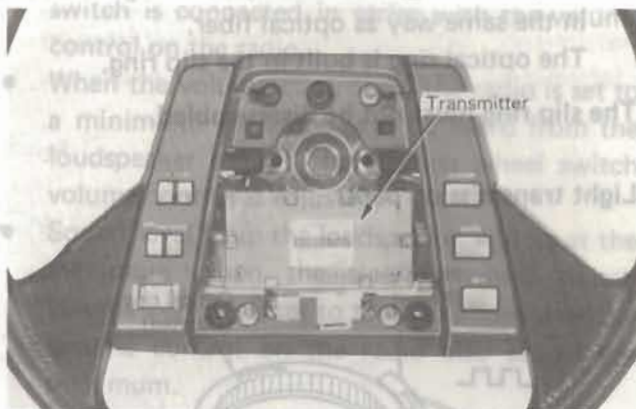
STEERING WHEEL SWITCH



- If two or more audio switches or A.S.C.D. switches are pressed simultaneously, all the pressed switches will be cancelled.
- If one switch is pressed while pressing another, the second one pressed will be cancelled.

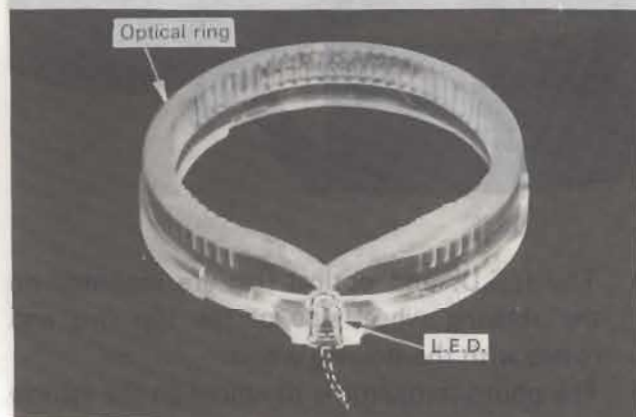
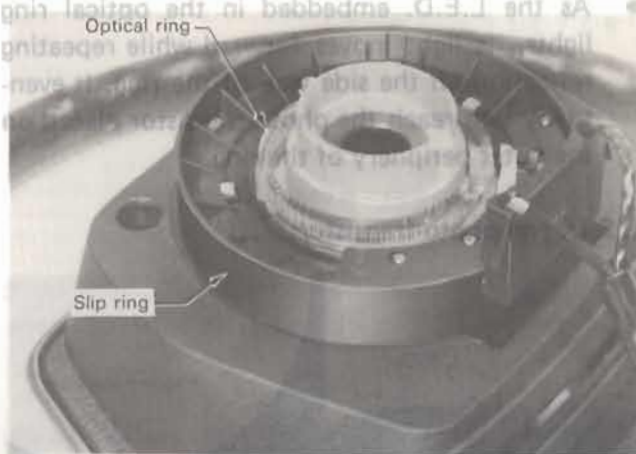
	Switch	Function
For Audio	① SW	Power ON/OFF
	② PLAY	Tape deck play
	③ AM/FM	AM/FM band selection
	④ SCAN	SCAN tuning (for radio) Auto program search (for tape deck)
	⑤ VOL	Volume
For A.S.C.D.	⑥ RESUME	Deceleration and resuming
	⑦ ACCEL	Acceleration
	⑧ SET	Cruising speed setting

TRANSMITTER



The transmitter is a device which converts the signal from the steering wheel switch into intermittent current in order to flash the L.E.D.

OPTICAL RING



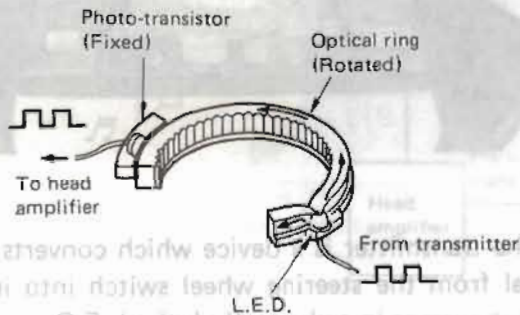
STEERING WHEEL SWITCH SYSTEM

Description (Cont'd)

- The steering wheel switch system uses an acrylic optical ring, and this optical ring functions in the same way as optical fiber. The optical ring is built in the slip ring.

The slip ring must not be disassembled.

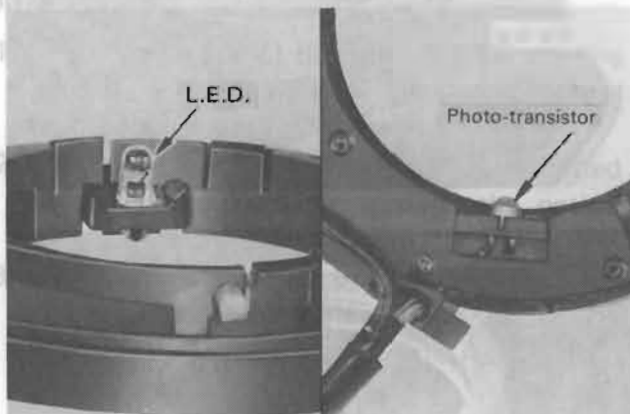
Light transmission path:



SEL649E

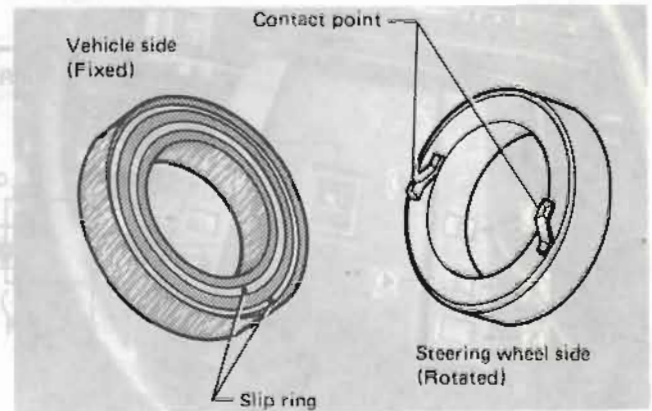
- As the L.E.D. embedded in the optical ring lights, its light moves forward while repeating reflection on the side wall of the ring. It eventually will reach the photo-transistor placed on the outer periphery of the ring.

L.E.D. and photo-transistor:



- The L.E.D. and optical ring are mounted on the steering wheel side of the slip ring and rotate with the steering wheel.
- The photo-transistor is mounted on the vehicle side of the slip ring and it does not rotate.

SLIP RING

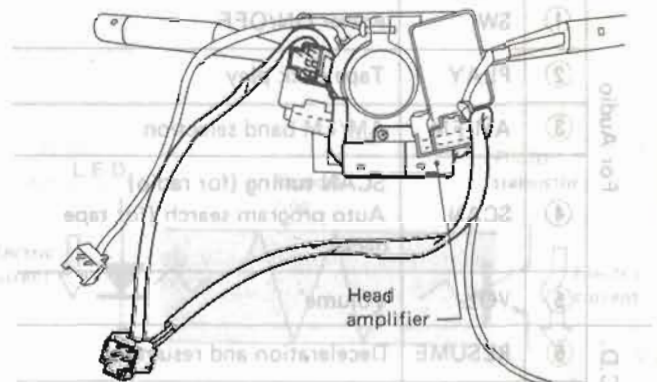


SEL650E

- Power for the transmitter is fed from the vehicle side through the slip ring.
- The horn switch circuit is connected to the vehicle side through the slip ring.

The slip ring must not be disassembled.

HEAD AMPLIFIER



SEL651E

The photo-transistor allows a minimal amount of current to flow as it receives light. The head amplifier amplifies this current and sends it to the receiver.

Photo-transistor:

A transistor which allows current to flow when light is applied.

STEERING WHEEL SWITCH SYSTEM

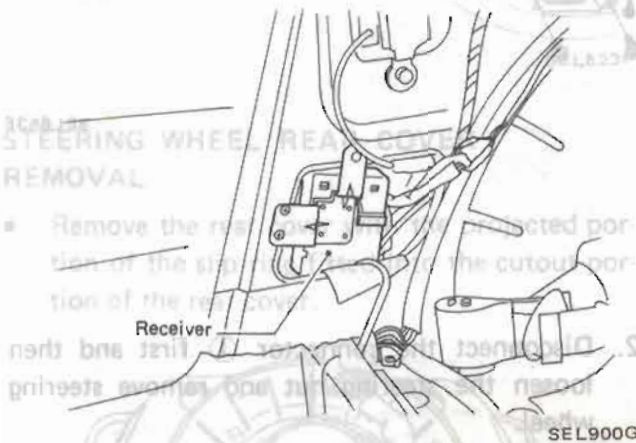
Description (Cont'd)

RECEIVER

2 seater model

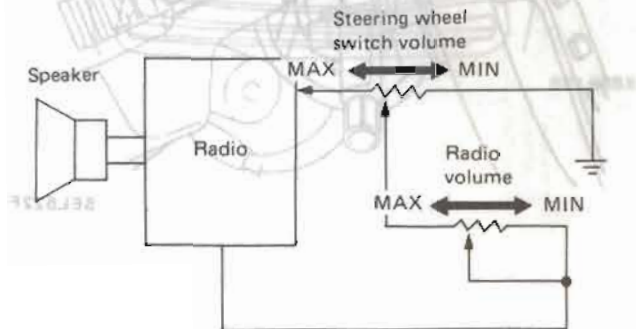


2+2 seater model



The receiver activates the radio or A.S.C.D. drive circuit corresponding to the steering wheel switch signal sent from the head amplifier.

AUDIO VOLUME CONTROL



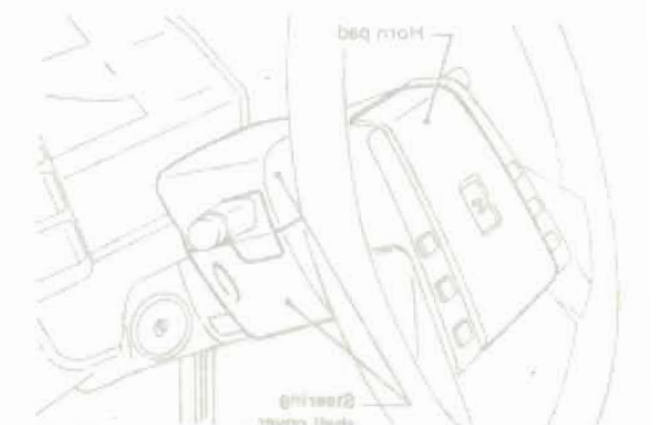
SEL652E

- The volume control on the steering wheel switch is connected in series with the volume control on the radio.
- When the volume control on the radio is set to a minimum, no sound will be heard from the loudspeaker even if the steering wheel switch volume control is adjusted.
- Sound level from the loudspeaker will be at the maximum when the steering wheel switch volume control is set to the maximum with the volume control on the radio also set to the maximum.



STEERING WHEEL SWITCH REMOVAL AND INSTALLATION

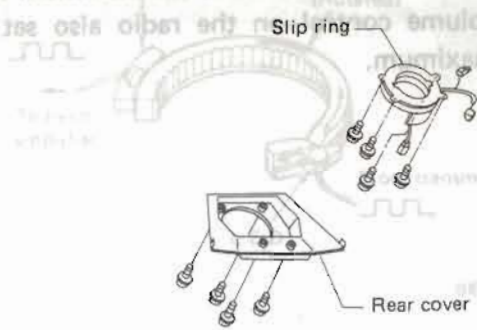
- To prevent the steering wheel switch from being damaged, be sure to observe the following procedure:
- When removing the steering wheel:



STEERING WHEEL SWITCH SYSTEM

Steering Wheel Switch Removal and Installation

The steering wheel switch system uses an optical ring as a sensor. The volume control on the steering wheel switch is connected in series with the volume control on the radio. When the volume control on the radio is set to a minimum, no sound will be heard from the loudspeaker even if the steering wheel switch volume control is adjusted. When the volume control on the radio is set to the maximum, the sound level from the loudspeaker will be at the maximum when the steering wheel switch volume control is set to the maximum with the volume control on the radio also set to the maximum.



As the L.E.D. embedded in the optical ring lights, its light moves forward while repeating reflection on the side wall of the ring. It eventually will reach the photo-transistor placed on the outer periphery of the ring.

STEERING WHEEL REMOVAL AND INSTALLATION

To prevent the steering wheel switch from being damaged, be sure to observe the following procedure:

- When removing the steering wheel:
1. Remove the horn pad and both sections of the steering shell cover.



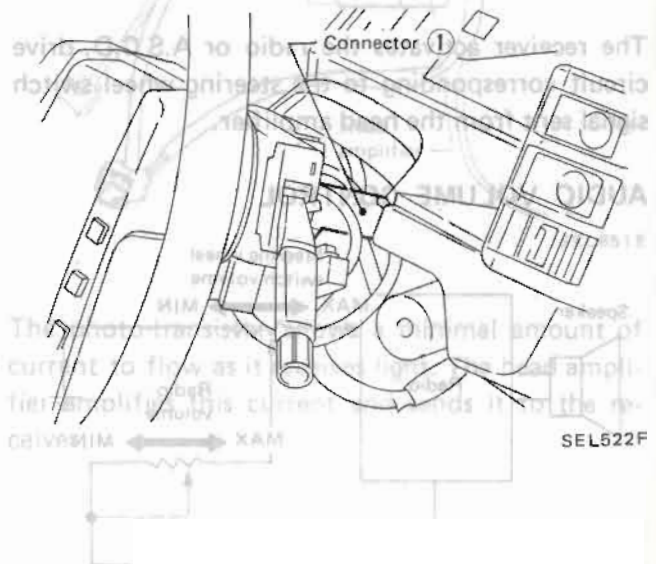
SEL521F



The slip ring must not be disassembled.

SEL653E

2. Disconnect the connector ① first and then loosen the steering nut and remove steering wheel.



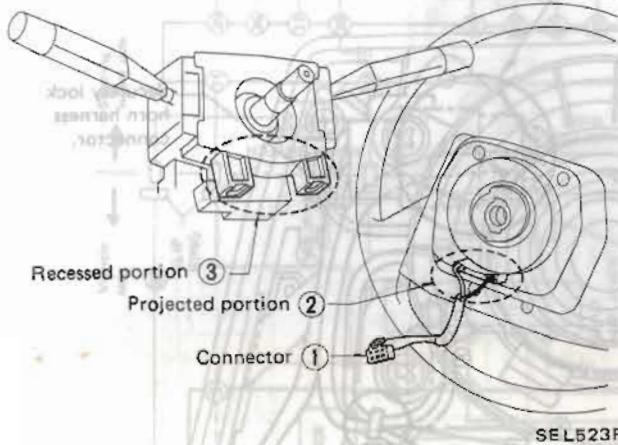
SEL522F

STEERING WHEEL SWITCH SYSTEM

Steering Wheel Switch Removal and Installation (Cont'd)

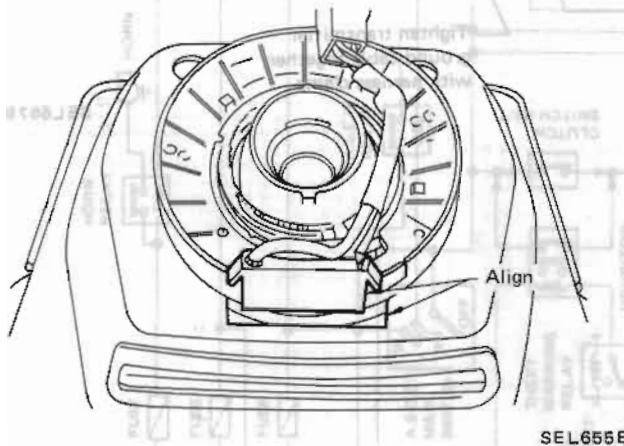
- When installing the steering wheel:

First determine the slip ring position so that the projected portion ② of the slip ring will fit in the recessed portion ③ of the combination switch. Then install the steering wheel.



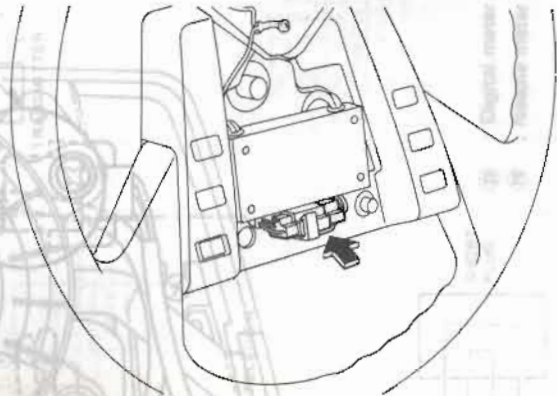
STEERING WHEEL REAR COVER REMOVAL

- Remove the rear cover with the projected portion of the slip ring fitted into the cutout portion of the rear cover.



SLIP RING REMOVAL

- Remove the connector joining the slip ring and transmitter after removing the transmitter mounting screws. Then remove the transmitter.

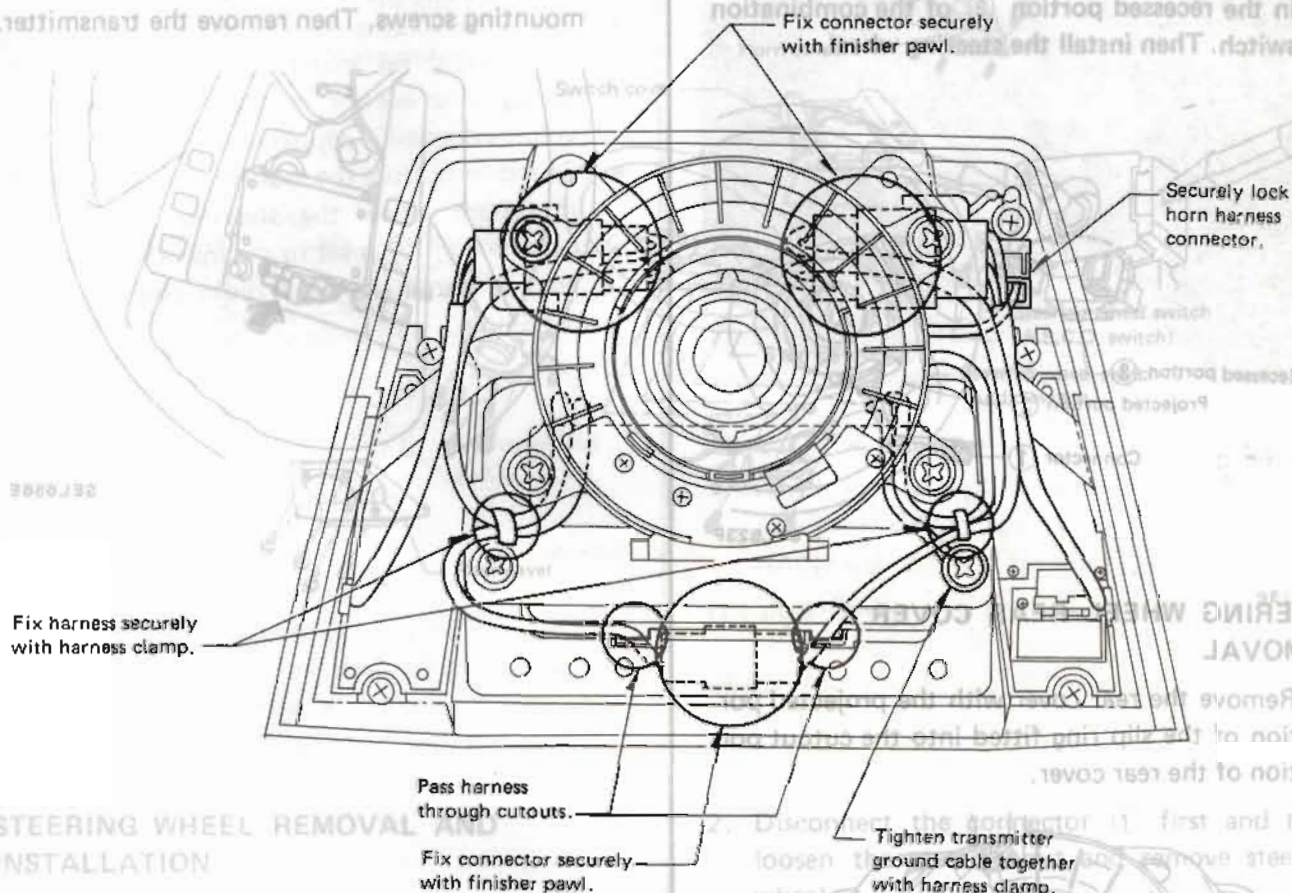


STEERING WHEEL SWITCH SYSTEM

Steering Wheel Switch Removal and Installation (Cont'd)

TRANSMITTER AND SLIP RING INSTALLATION

- When installing the transmitter and slip ring, arrange and secure the harnesses and connectors as shown in the following figure.



STEERING WHEEL REMOVAL AND INSTALLATION

To prevent the steering wheel switch from being damaged, be sure to observe the following procedure:

- When removing the steering wheel:

1. Remove the horn pad and both sections of the steering shell cover.

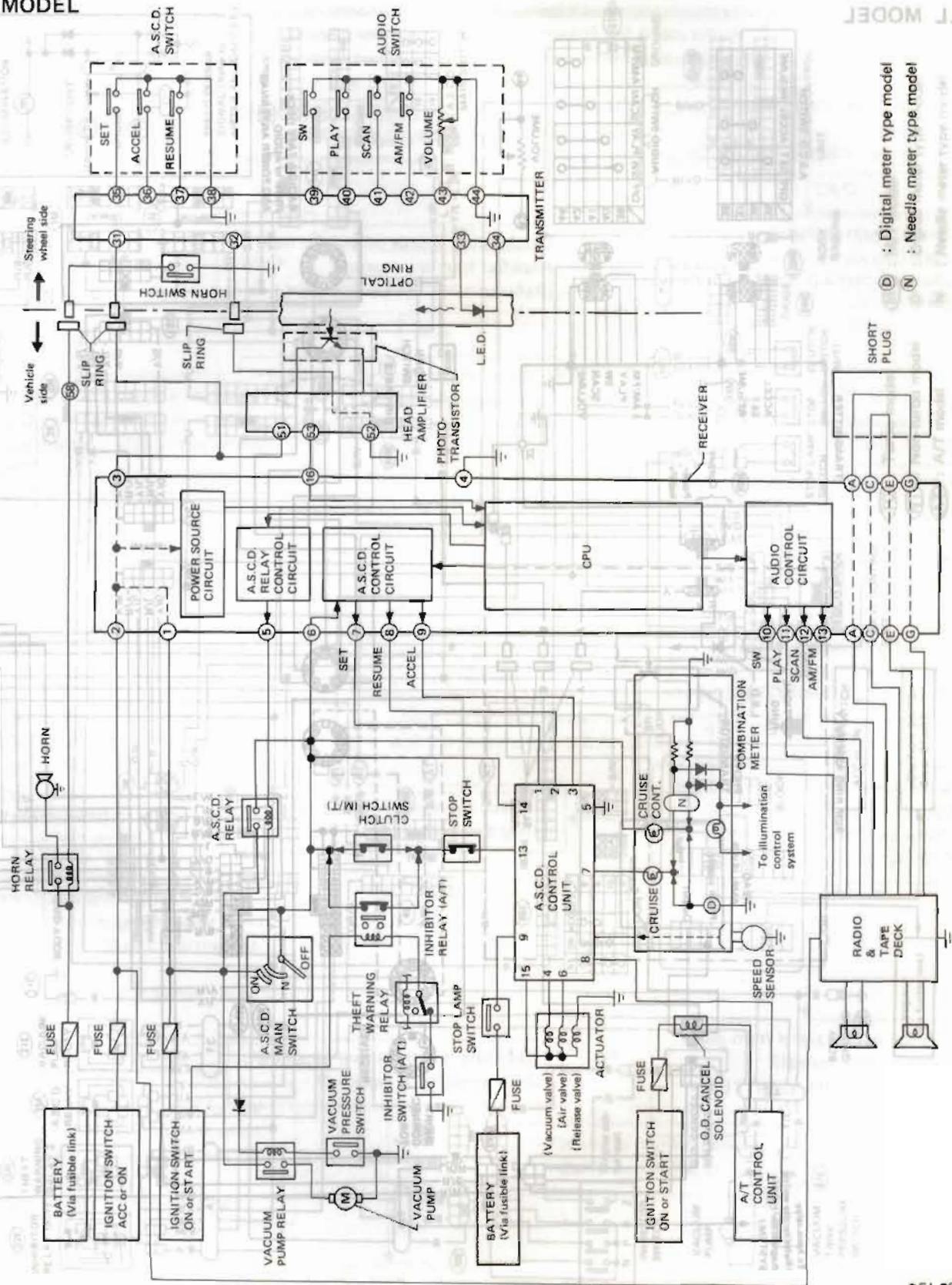


STEERING WHEEL SWITCH SYSTEM

Schematic

GLL MODEL

GFL MODEL

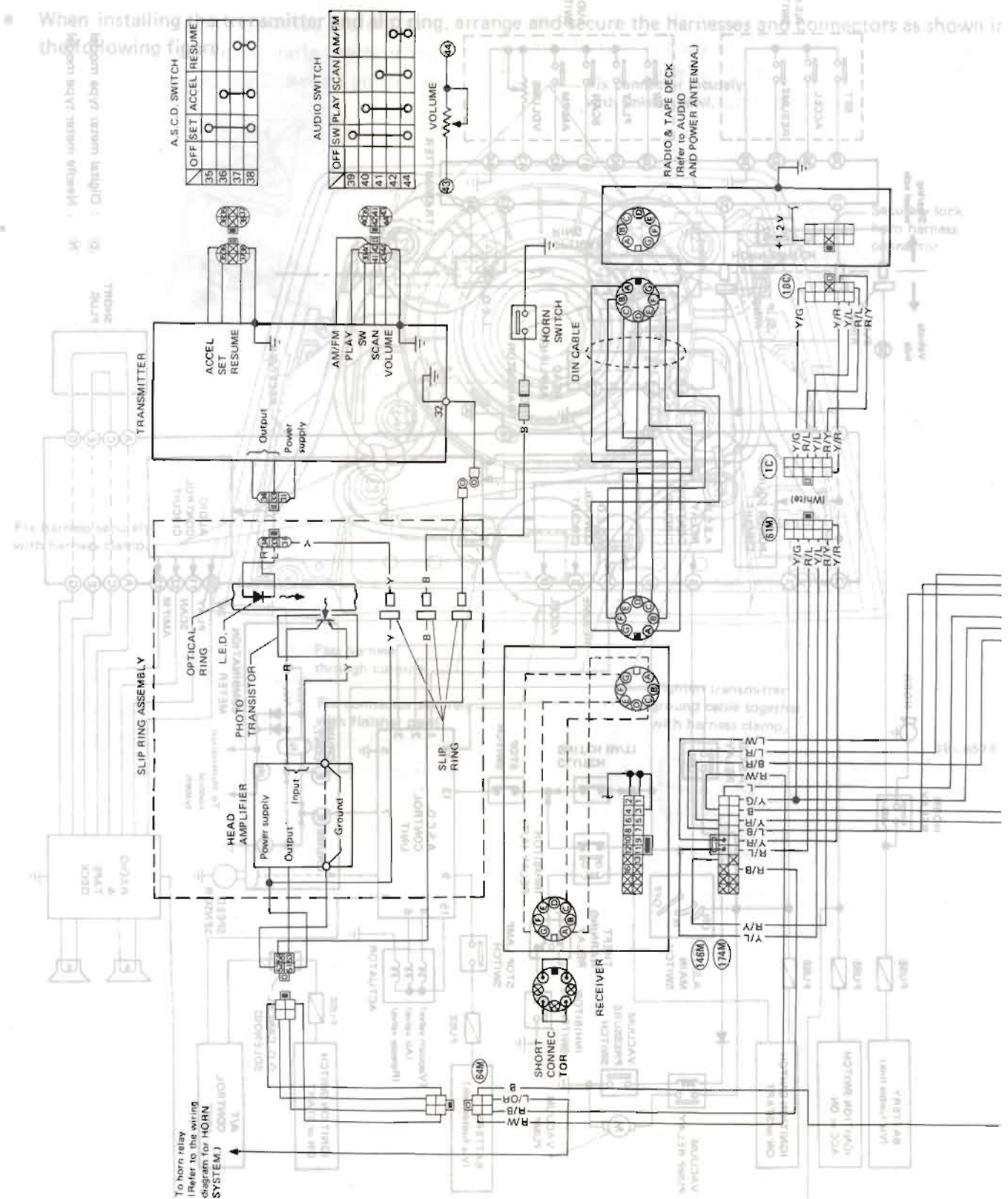


SEL327L

STEERING WHEEL SWITCH SYSTEM

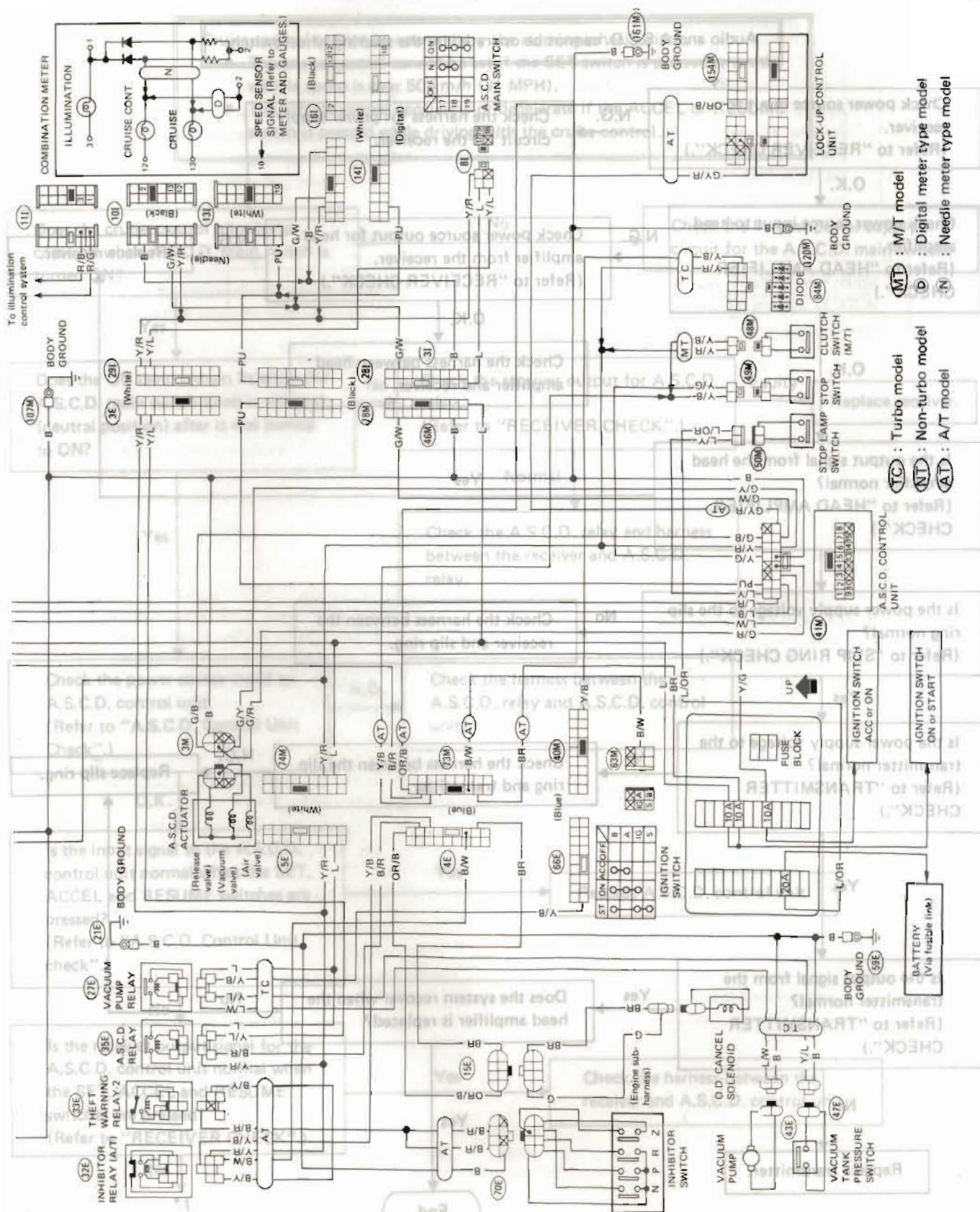
Wiring Diagram Installation (Cont'd)

GLL MODEL AND SLIP RING INSTALLATION



STEERING WHEEL SWITCH SYSTEM

Wiring Diagram (Cont'd)

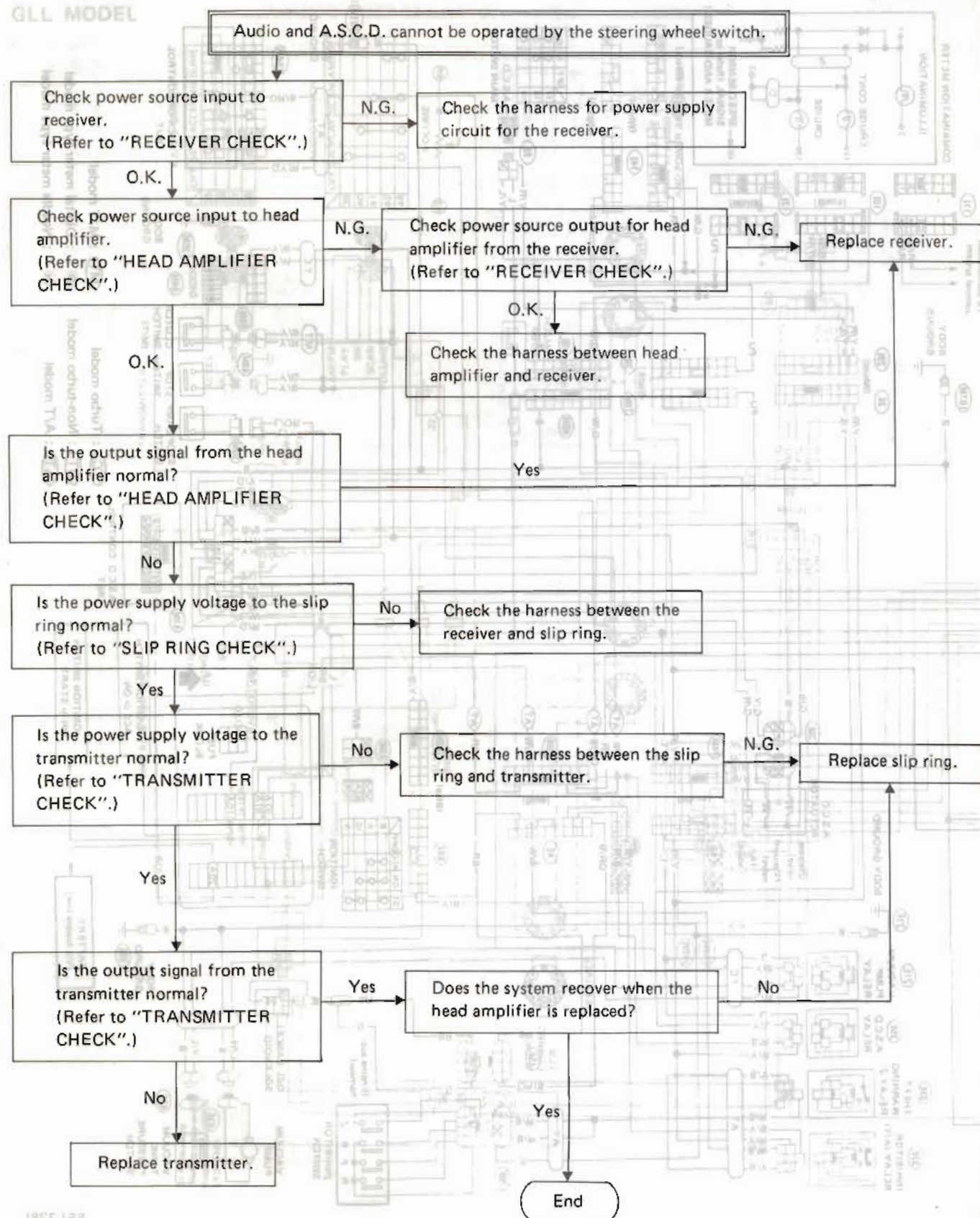


SEL328L

STEERING WHEEL SWITCH SYSTEM

Trouble-shooting

GLL MODEL



STEERING WHEEL SWITCH SYSTEM

Trouble-shooting (Cont'd)

Cruise control cannot be operated by the steering wheel switch.

- The cruise control cannot be set if the SET switch is pressed when the vehicle speed is over 50 km/h (31 MPH).
- The vehicle cannot accelerate or decelerate if the ACCEL or RESUME switch is pressed while driving with the cruise control.

Does the cruise control pilot lamp come on when A.S.C.D. main switch is turned ON?

No

Check the harness power supply circuit for the A.S.C.D. main switch.

Yes

Does the ON lamp remain lit when the A.S.C.D. main switch knob is released (neutral position) after it was turned to ON?

No

Check the receiver output for A.S.C.D. relay. (Refer to "RECEIVER CHECK".)

Faulty

Replace receiver.

Normal

Check the A.S.C.D. relay and harness between the receiver and A.S.C.D. relay.

Yes

Check the power source input to A.S.C.D. control unit. (Refer to "A.S.C.D. Control Unit Check".)

N.G.

Check the harness between the A.S.C.D. relay and A.S.C.D. control unit.

O.K.

Is the input signal to the A.S.C.D. control unit normal when the SET, ACCEL and RESUME switches are pressed? (Refer to "A.S.C.D. Control Unit check".)

Yes

Replace A.S.C.D. control unit.

No

Is the receiver output signal for the A.S.C.D. control unit normal when the SET, ACCEL and RESUME switches are pressed? (Refer to "RECEIVER CHECK".)

Yes

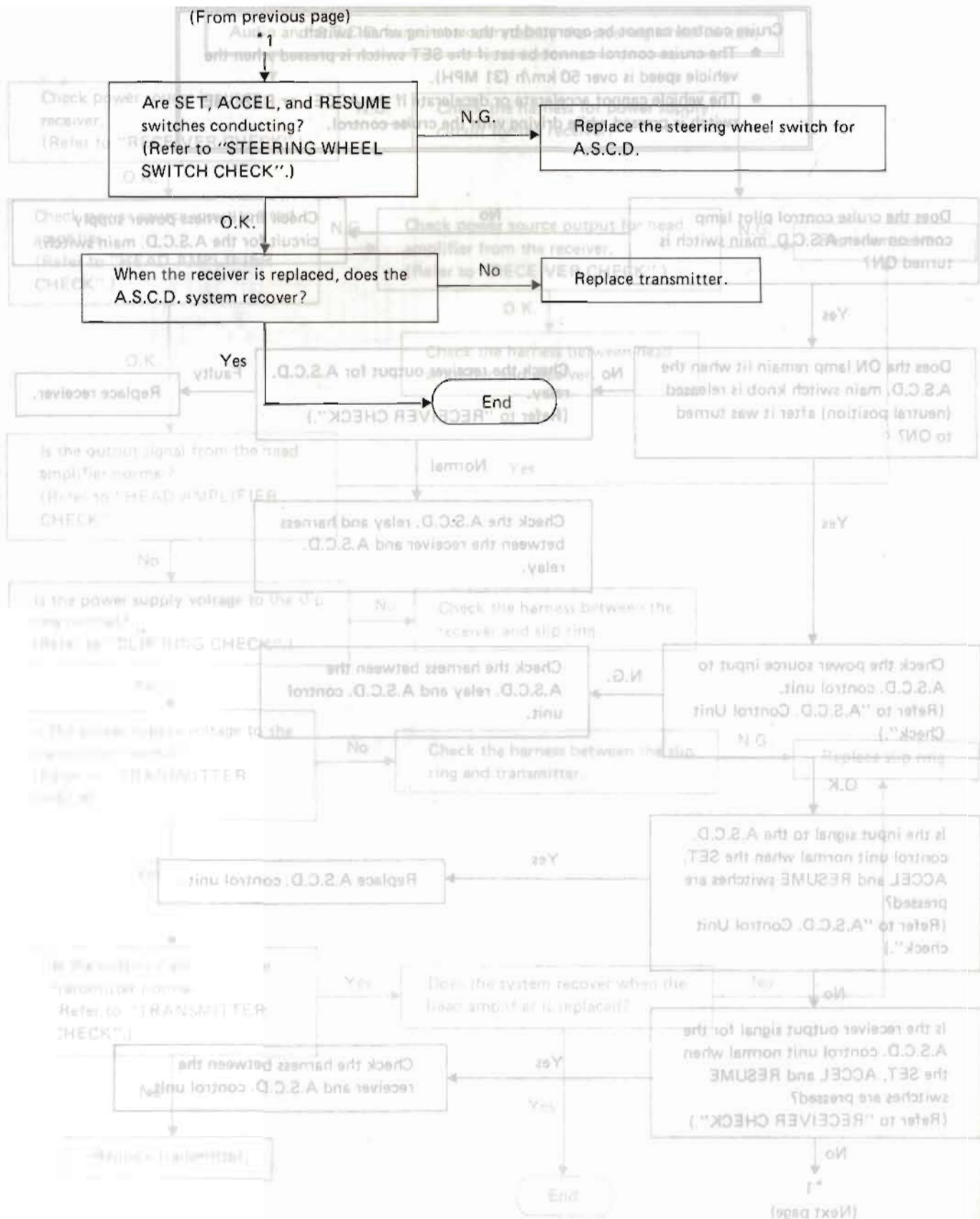
Check the harness between the receiver and A.S.C.D. control unit.

No

(Next page)

STEERING WHEEL SWITCH SYSTEM

Trouble-shooting (Cont'd)



STEERING WHEEL SWITCH SYSTEM

Trouble-shooting (Cont'd)

Audio cannot be operated by the steering wheel switch when the ignition switch is set to ACC or ON position.

- The radio does not operate when the SW switch of the steering wheel switch is pressed with the ignition switch set to ACC or ON.
- Operation of the tape deck, changeover between AM and FM modes, or SCAN tuning fails when the PLAY, AM/FM, or SCAN switch of the steering wheel switch is pressed with the radio ON.

When the power switch on the radio is turned ON, does the audio system operate?

No

Check harness for power supply circuit for radio.

O.K.

Are the switches (PLAY, AM/FM, SCAN, etc.) on the radio operative?

No

Check fuse on the radio or replace radio if necessary.

Receiver Check

When pressing the SW, PLAY, AM/FM or SCAN switch on the steering wheel switch, check output voltage of the receiver.
(Refer to "RECEIVER CHECK".)

O.K.

Check harness between radio and receiver.

N.G.

Are the SW, PLAY, SCAN, and AM/FM switches conducting?
(Refer to "STEERING WHEEL SWITCH CHECK".)

N.G.

Replace steering wheel switch for audio.

O.K.

When the receiver is replaced, does the audio system recover?

No

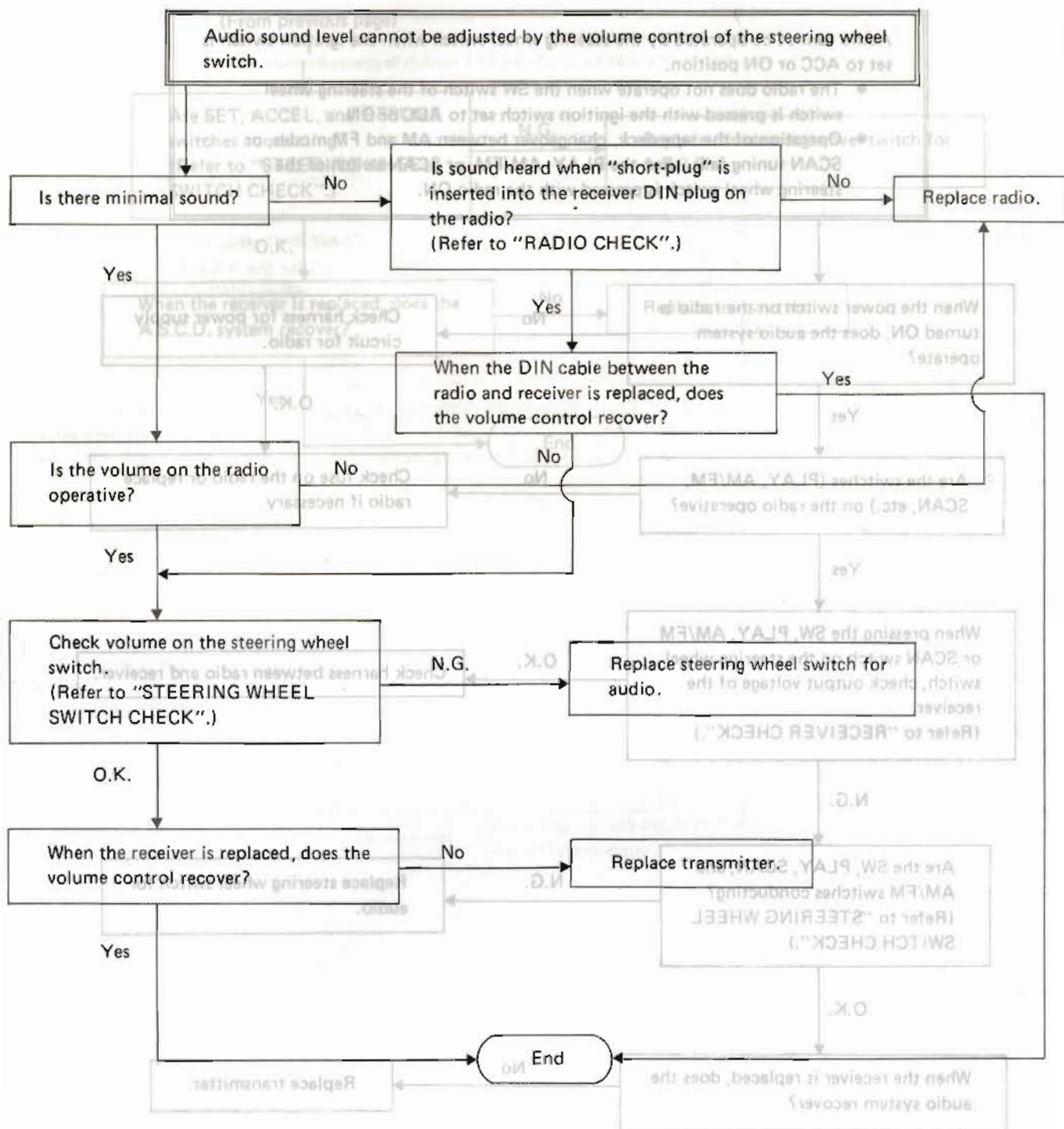
Replace transmitter.

Yes

End

STEERING WHEEL SWITCH SYSTEM

Trouble-shooting (Cont'd)



STEERING WHEEL SWITCH SYSTEM

Trouble-shooting (Cont'd)

Radio volume decrease when the steering is turned rapidly under extremely low temperature conditions.

This results from a poor ground connection inside the steering column bearing. To correct the incident, apply low temperature grease to the steering column bearing as follows:

TROUBLE-SHOOTING PROCEDURE

1. Disconnect the battery ground cable.
2. Remove the horn pad, horn cover, and both sections of the steering shell cover.
3. Disconnect the steering switch transmitter harness connector from the rear of the combination switch.
4. Remove the steering wheel, using the tool and procedure described in the ST section.
5. Apply the low temperature grease to the steering column shaft bearing as follows:
 - 1) Place the turn signal switch in neutral position to prevent grease from getting on the turn signal cancel cam.
 - 2) Carefully apply approximately 1 mL (0.03 US fl oz, 0.04 Imp fl oz) of grease to the steering column bearing.

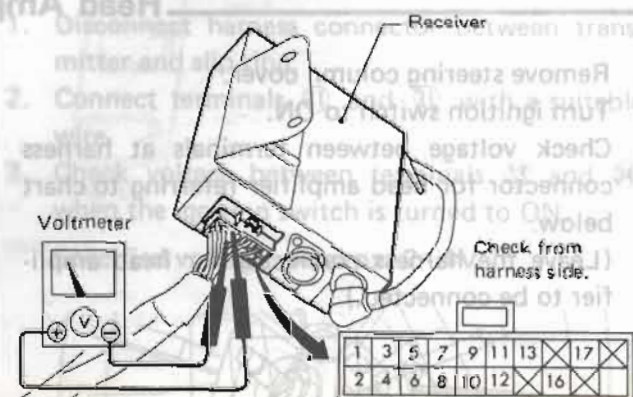
To facilitate application of the grease, a cone of paper or vinyl film is suggested.

- 3) Temporarily install the steering wheel. Insure that the projected portion of the slip ring fits in the recessed portion of the combination switch. Turn the steering wheel fully to the left and right a couple of times, taking care to prevent damage to the projected portion of the slip ring.
- 4) Remove the steering wheel.
- 5) Repeat steps b, c, and d.
- 6) Make sure that grease is applied to the entire bearing.
6. Install the steering wheel on the shaft in a straight ahead position. Be sure that the projected portion of the slip ring fits in the recessed portion of the combination switch.

7. Connect steering switch transmitter harness connector to combination switch.
8. Install horn cover, horn pad and both sections of the combination switch housing.
9. Connect battery ground cable.

Receiver Check

1. Remove luggage box.
2. Remove receiver with harness connected.
3. Turn ignition switch to ON.
4. Check voltage between terminals referring to the chart below.



SEL660E

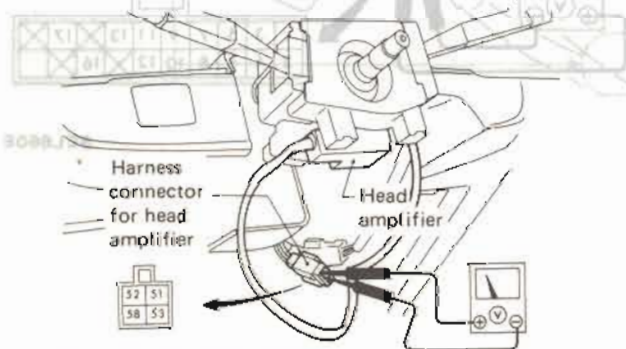
STEERING WHEEL SWITCH SYSTEM

Receiver Check (Cont'd)

Check item		Voltmeter terminal		Switch condition	Specified voltage [V]
		(+)	(-)		
Power source input	IG	①	④	—	Approx. 12
	ACC	②	④		
Power source output for head amplifier and slip ring		③	④	—	Approx. 12
Output for A.S.C.D. relay		⑤	④	A.S.C.D. main switch ON	0
				OFF	Approx. 5
Output for A.S.C.D. control unit		⑦	④	SET switch ON	Approx. 12
		⑧	④	RESUME switch ON	Approx. 12
		⑨	④	ACCEL switch ON	Approx. 12
		⑩	④	SW switch ON	0
Output for audio system (Check voltage while operating the SW, PLAY, SCAN or FM/AM on the steering wheel switch.)		⑪	④	PLAY switch ON	0
				OFF	Approx. 5
		⑫	④	SCAN switch ON	0
				OFF	Approx. 5
		⑬	④	AM/FM switch ON	0
				OFF	Approx. 5

Head Amplifier Check

1. Remove steering column cover.
2. Turn ignition switch to ON.
3. Check voltage between terminals at harness connector for head amplifier referring to chart below.
(Leave the harness connector for head amplifier to be connected.)



Check from head amplifier side.

SEL344L

Check item	Voltmeter terminals		Specified voltage [V]
	(+)	(-)	
Power supply input	⑤①	⑤②	Approx. 12
Output for receiver	⑤③	⑤②	Approx. 2-4

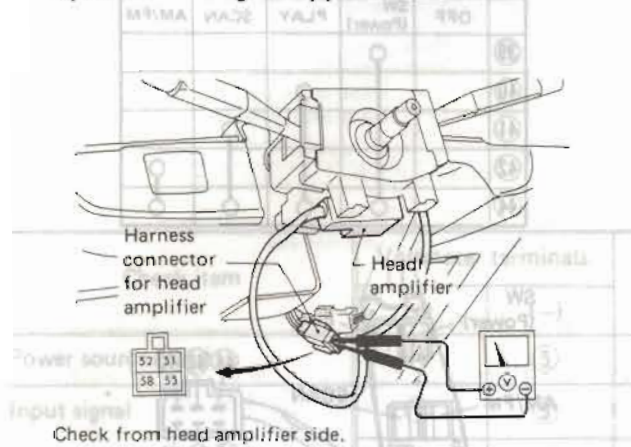
STEERING WHEEL SWITCH SYSTEM

Slip Ring Check

POWER SUPPLY VOLTAGE CHECK

1. Remove steering column cover.
2. Check voltage between terminals ⑤① and ⑤② when the ignition switch is turned to ON.

Specified voltage: Approx. 12V

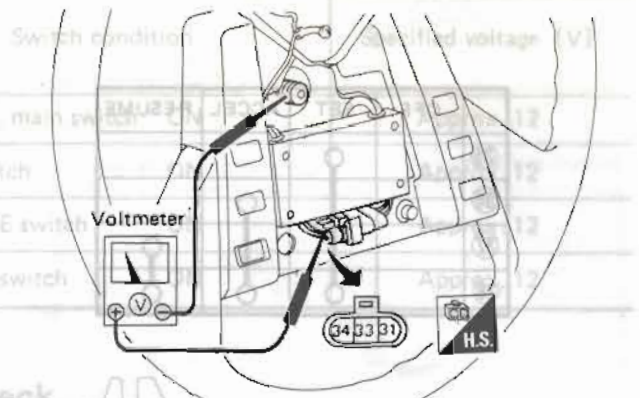


Transmitter Check

POWER SUPPLY VOLTAGE CHECK

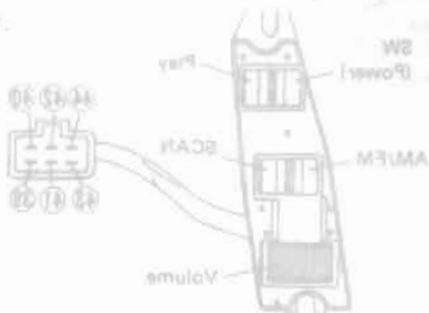
1. Connect the harness connector for slip ring at the back of combination switch.
2. Install steering wheel on the column shaft.
3. Connect the voltmeter probe to:
 - (+) terminal ... ③①
 - (-) terminal ... Steering column shaft
4. Check voltage when the ignition switch is turned to ON.

Specified voltage: Approx. 12V



OUTPUT SIGNAL CHECK

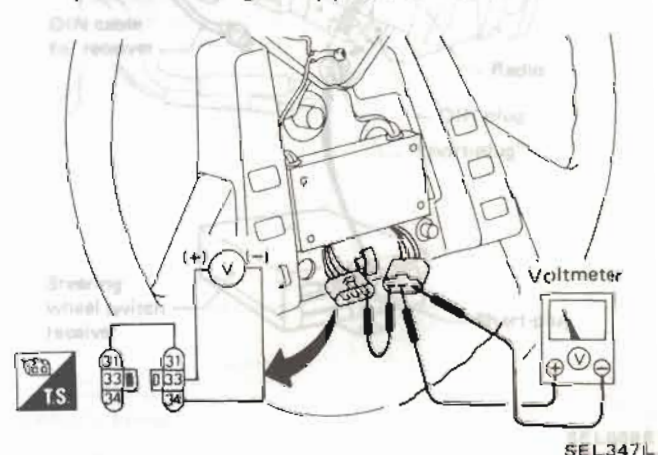
1. Disconnect harness connector between transmitter and slip ring.
 2. Connect terminals ③① and ③② with a suitable wire.
 3. Check voltage between terminals ③③ and ③④ when the ignition switch is turned to ON.
- The radio is normal if there is sound.
- After finishing the check, be sure to re-install the "short-plug" on the steering wheel switch receiver.



OUTPUT SIGNAL CHECK

1. Disconnect harness connector between transmitter and slip ring.
2. Connect terminals ③① and ③② with a suitable wire.
3. Check voltage between terminals ③③ and ③④ when the ignition switch is turned to ON.

Specified voltage: Approx. 2 - 4V



STEERING WHEEL SWITCH SYSTEM

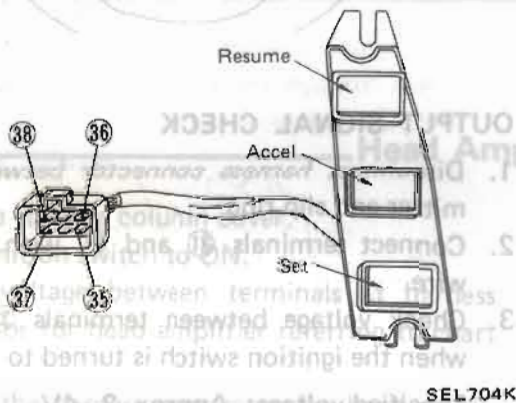
Steering Wheel Switch Check

1. Disconnect harness connector for slip ring at the back of combination switch.
2. Remove steering wheel.
3. Remove steering wheel rear cover.
4. Disconnect harness connector between steering wheel switch and transmitter.
5. Remove steering wheel switches.

A.S.C.D. SWITCH CHECK

- Check continuity while pressing each switch.
Below 300Ω ... O.K.

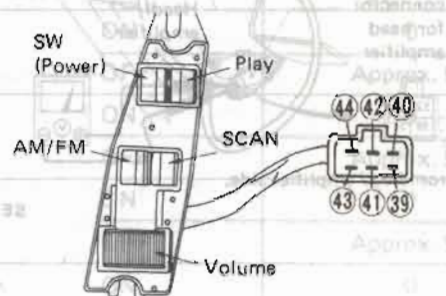
	OFF	SET	ACCEL	RESUME
(35)		○		
(36)		○	○	
(37)		○		○
(38)		○	○	○



AUDIO SWITCH CHECK

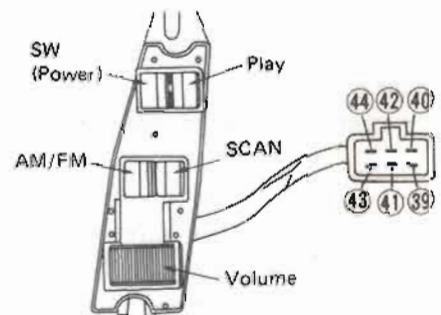
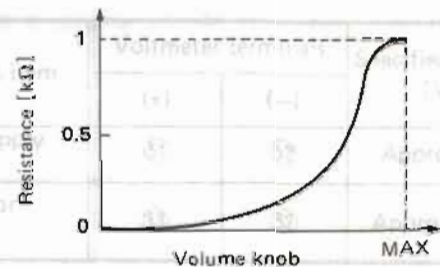
- Check continuity while pressing each switch.
Below 300Ω ... O.K.

	OFF	SW (Power)	PLAY	SCAN	AM/FM
(39)		○			
(40)		○	○		
(41)		○	○	○	
(42)		○	○	○	○
(44)		○	○	○	○



VOLUME CHECK

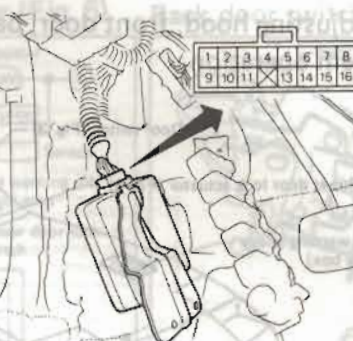
- Measure resistance between terminals 43 and 44 while operating the volume.



STEERING WHEEL SWITCH SYSTEM

A.S.C.D. Control Unit Check

1. Remove A.S.C.D. control unit with harness connected.
2. Check terminal voltage referring to chart below.



SEL736D

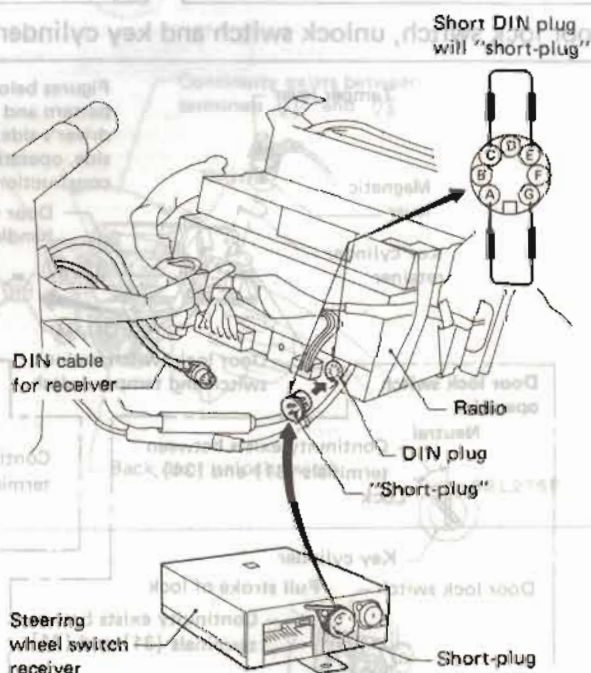
Check item	Voltmeter terminals		Switch condition		Specified voltage [V]
	(+)	(-)			
Power source input	⑭	⑤	A.S.C.D. main switch	ON	Approx. 12
Input signal	①	⑤	SET switch	ON	Approx. 12
	②	⑤	RESUME switch	ON	Approx. 12
	③	⑤	ACCEL switch	ON	Approx. 12

Radio Check

1. Remove radio with harness connected.
2. Disconnect DIN cable for steering wheel switch receiver from radio.
3. Remove luggage box.
4. Remove "short-plug" from steering wheel switch receiver.
5. Connect the "short-plug" to radio.
6. Check the sound when the radio is turned on.

The radio is normal if there is sound.

7. After finishing this check, be sure to re-install the "short-plug" on the steering wheel switch receiver.

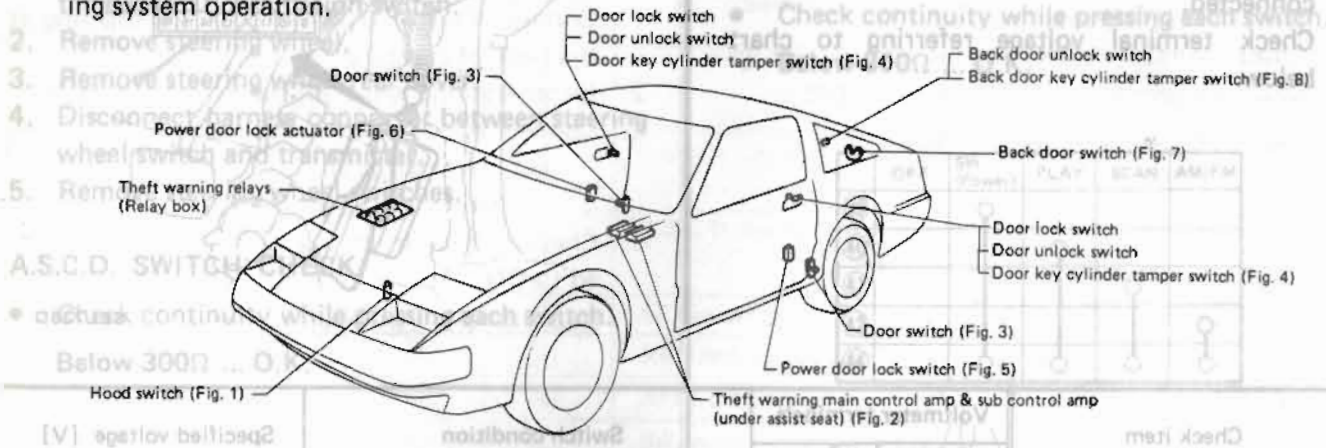


SEL669E

THEFT WARNING SYSTEM

Location of Electrical Units

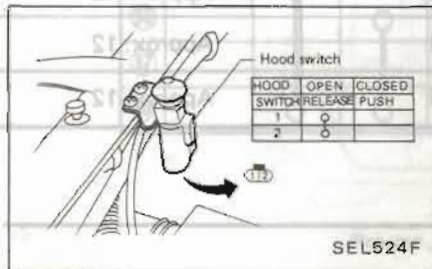
- When adjusting hood, front door, back door or removing & installing them or switches, check theft warning system operation.



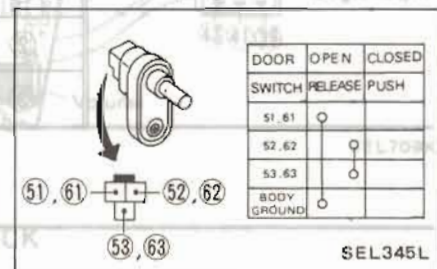
Operation of Switches and Sensors

Theft warning main control unit & sub control unit (Fig. 2)

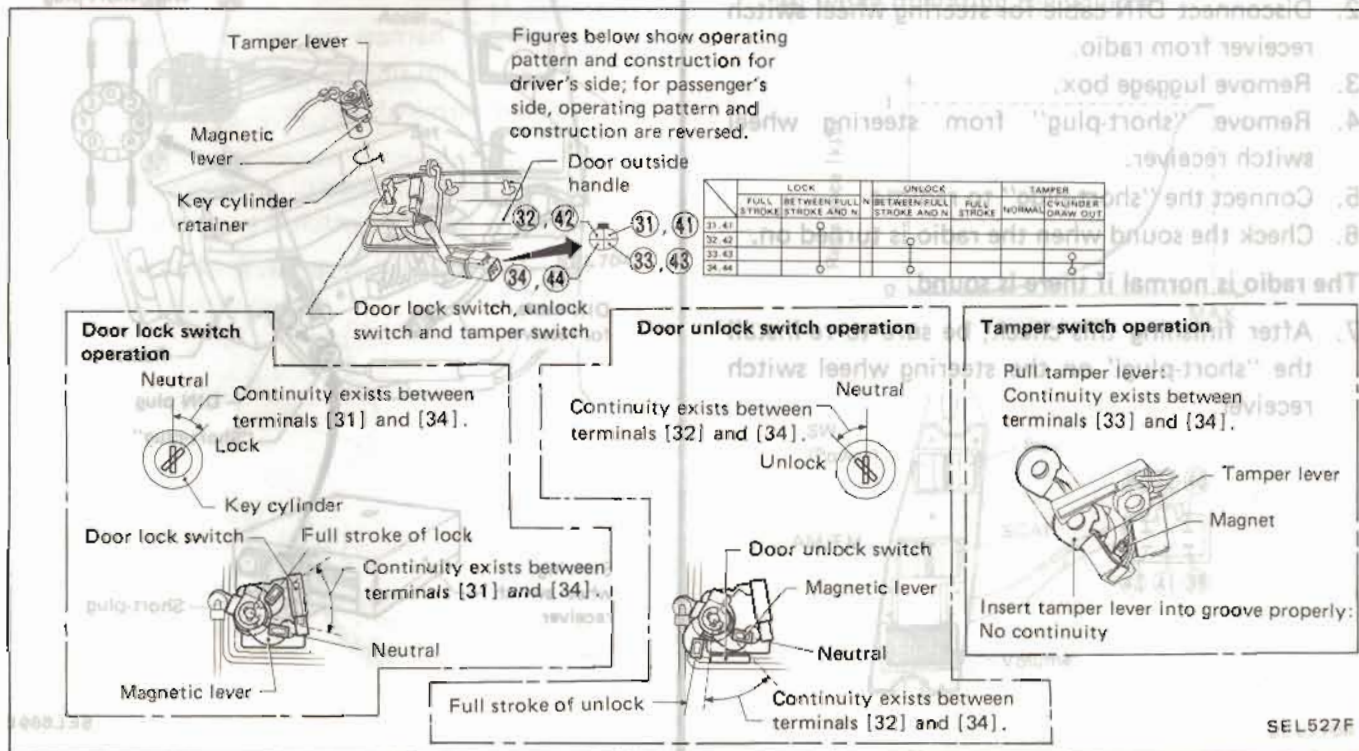
Hood switch (Fig. 1)



Door switch (Fig. 3)



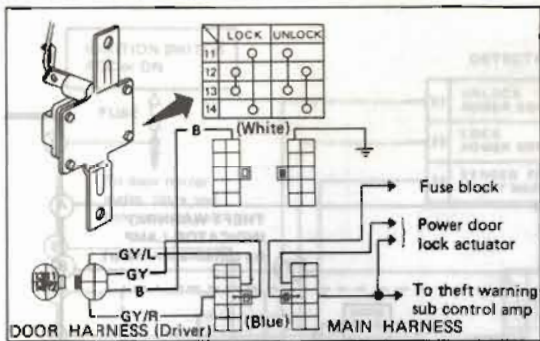
Door lock switch, unlock switch and key cylinder tamper switch (Fig. 4)



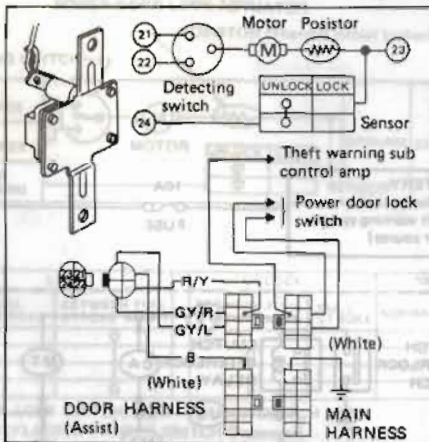
THEFT WARNING SYSTEM

Operation of Switches and Sensors (Cont'd)

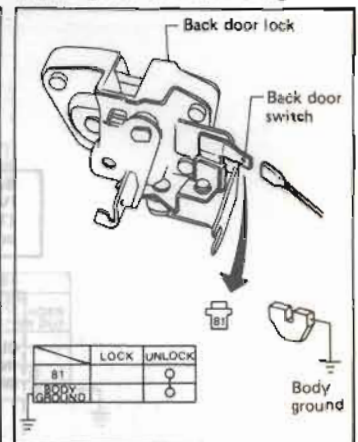
Power door lock switch (Fig. 5)



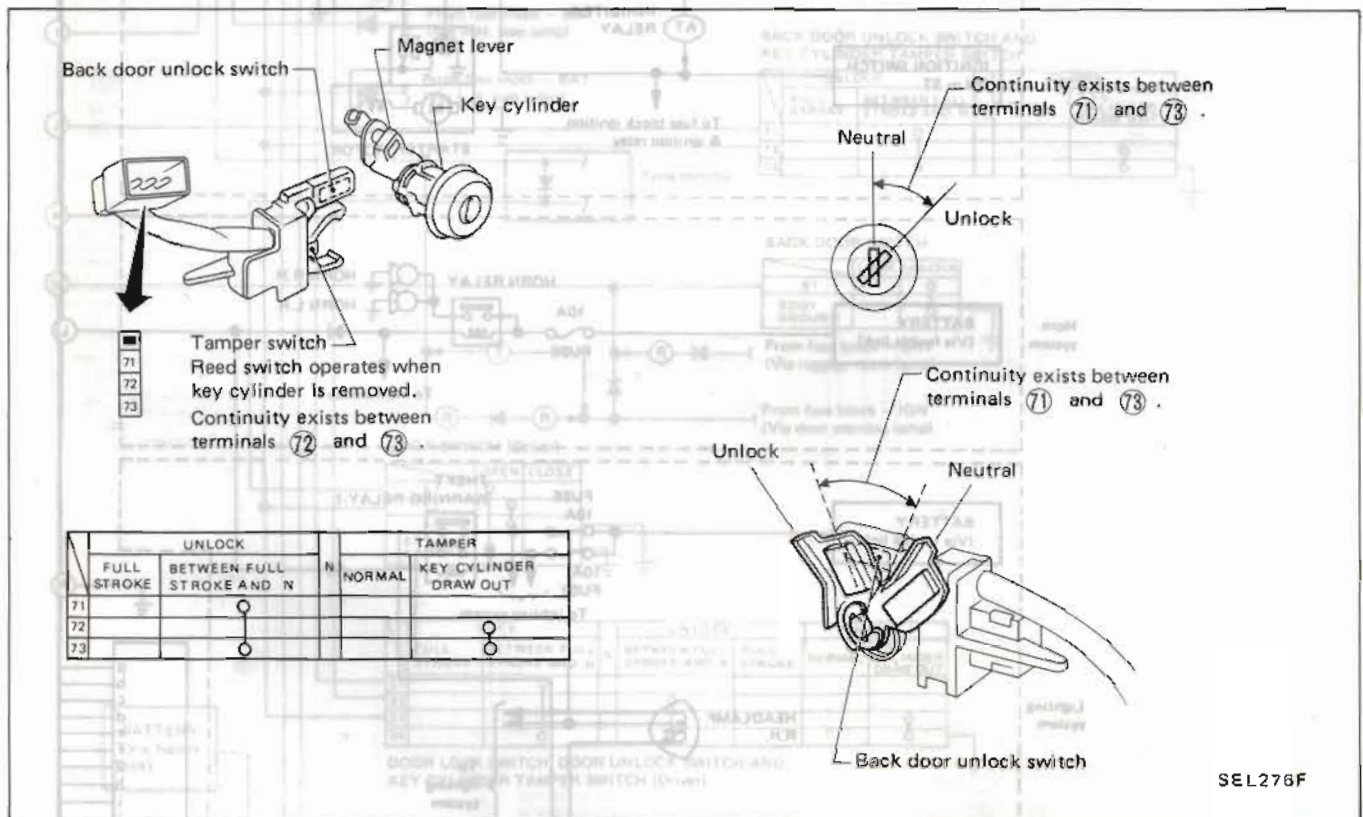
Power door lock actuator (Fig. 6)



Back door switch (Fig. 7)



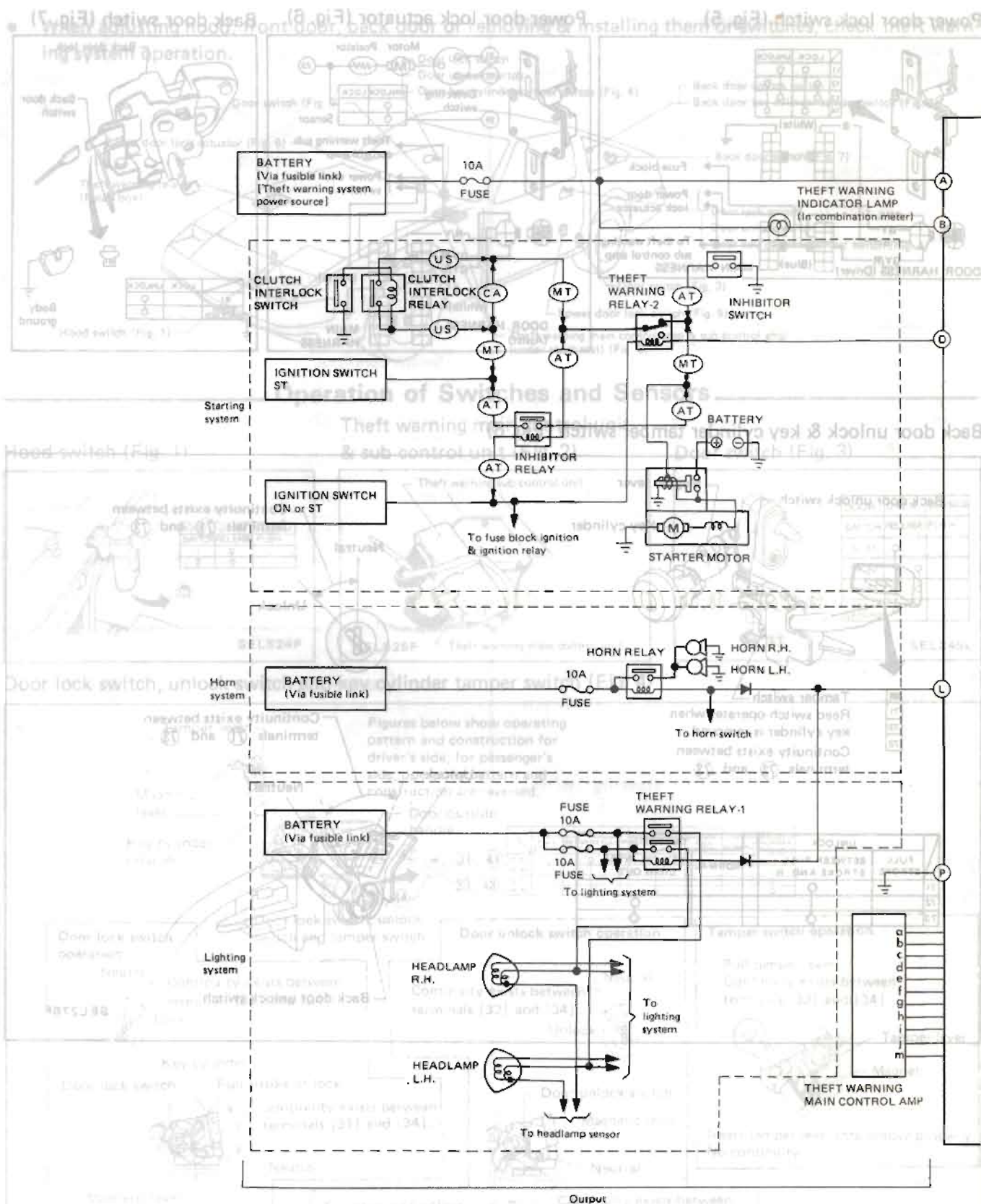
Back door unlock & key cylinder tamper switch (Fig. 8)



SEL276F

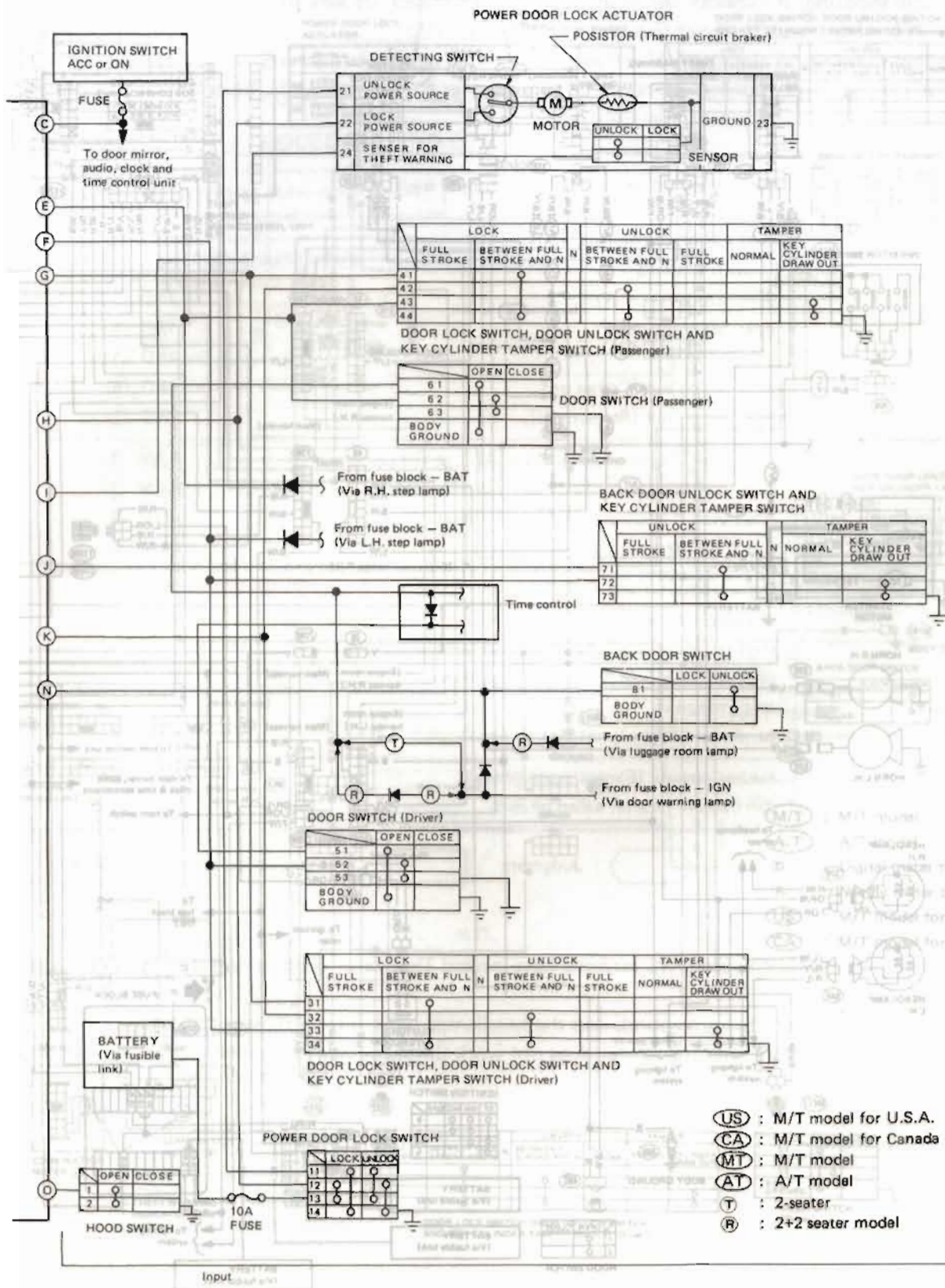
THEFT WARNING SYSTEM

Schematic



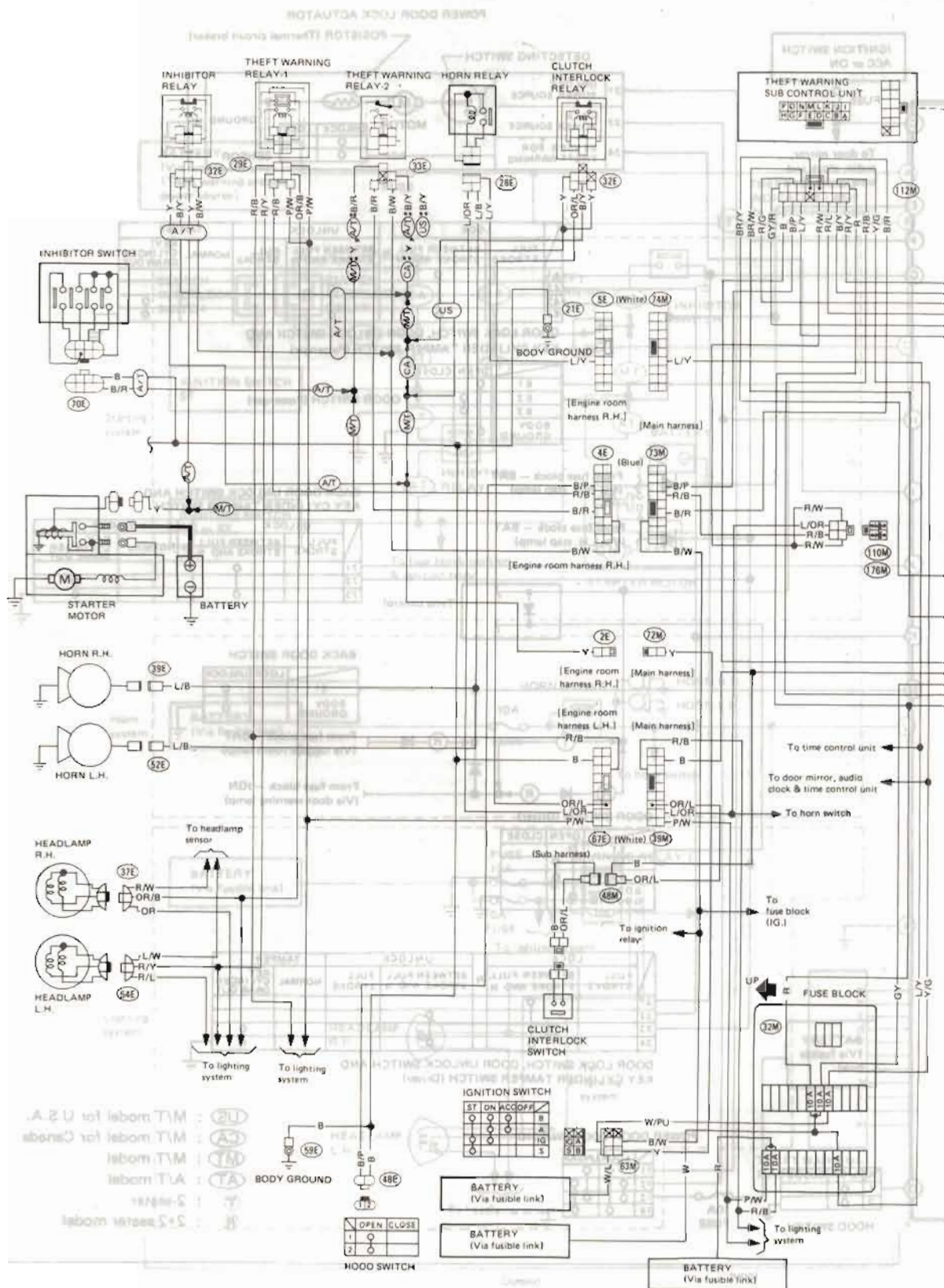
THEFT WARNING SYSTEM

Schematic (Cont'd)



SEL527K

Wiring Diagram



Wiring Diagram (Cont'd)



THEFT WARNING SYSTEM

Trouble-shooting

- During trouble-shooting, if "checks ① – ④, ⑥" are indicated, be sure to refer to "checks ① – ④, ⑥" in the "Terminal check". (Refer to pages EL-168 - EL-170.)
- During trouble-shooting, if the cause of trouble is found to be due to "Faulty sub-control unit, Faulty main control unit or Faulty adapter harness", be sure to refer to "Control Unit Inspection".

Contents

No.	INCIDENT: The theft warning system responds in one of these ways.		Refer to TROUBLE-SHOOTING PROCEDURE:
1	Indicator lamp	does not blink (Remains out).	IND ①
2		remains blinking.	IND ②
3		does not come on (1).	IND ③
4		does not come on (2).	IND ④
5		remains lit.	IND ⑤
6		does not go out (Comes on).	IND ⑥
7		does not go out (Remains lit).	IND ⑦
8	Armed	is set even if ignition switch is in ACC or ON position.	ARM ①
9		is set even if at least one of doors is unlocked.	ARM ②
10		is set even if at least one of doors is open.	ARM ③
11		is not set (Armed phase).	ARM ④
12	Alarm	is given without any cause.	ALR ①
13		does not operate (Alarm phase).	ALR ②
14		does not stop (Alarm continues for over 4 minutes).	ALR ③
15		does not stop even if stop signal is given.	ALR ④
16		stops too soon.	ALR ⑤
17		continues (Alarm is not intermittent).	ALR ⑥
18	Starter motor	cannot operate (Except alarm phase).	ST ①
19		can operate (Starter killed phase).	ST ②

● Symbol:  : Action  : Judgment  : Probable cause

- "Armed phase" means that approx. 30 seconds have passed (Indicator lamp goes out) since locking and closing all doors.
- "Alarm phase" means that the horn sounds and the headlamps blink intermittently.
- "Starter killed phase" means that the starter does not work until one door is unlocked with the key after the alarm has sounded.

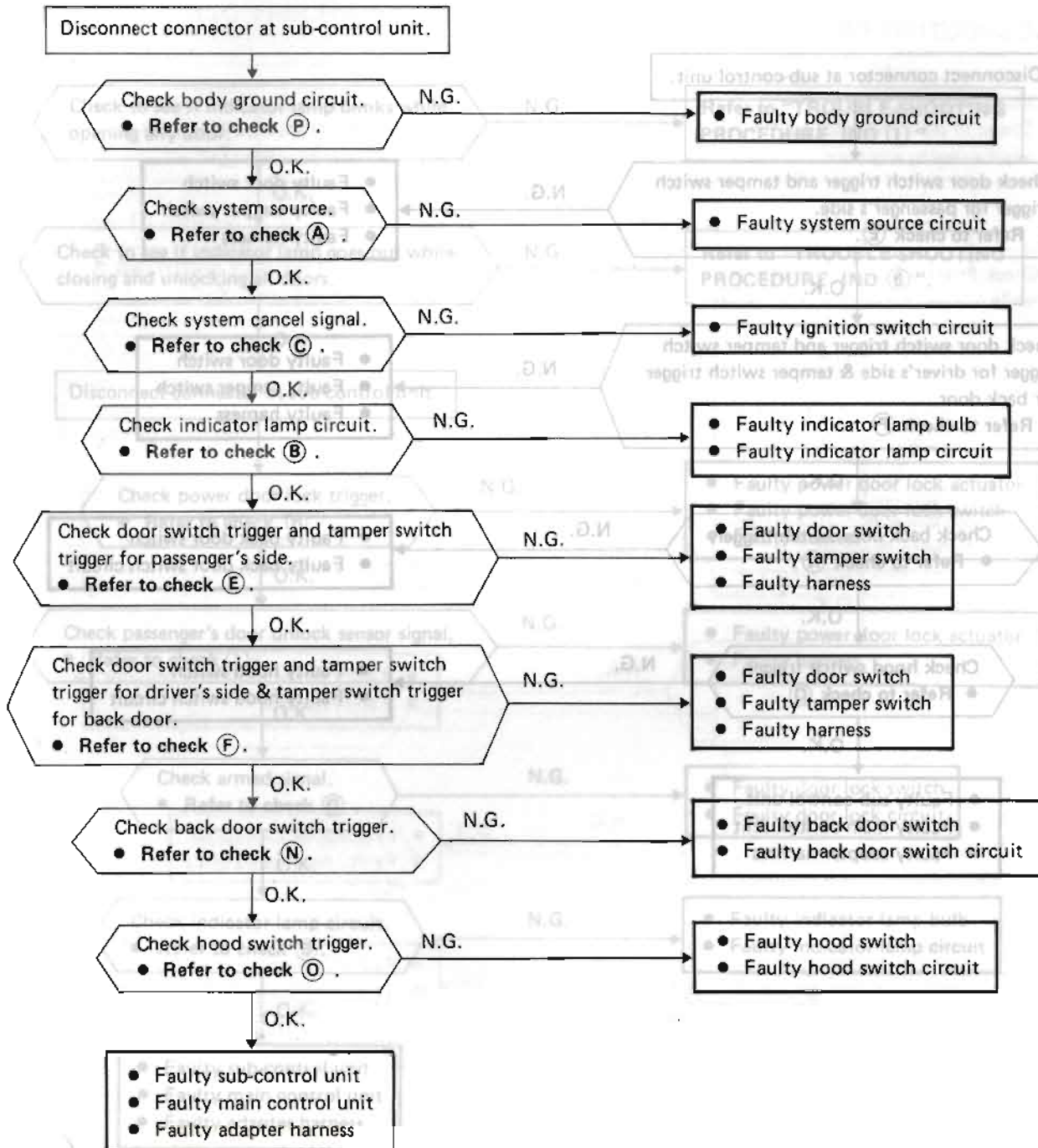
THEFT WARNING SYSTEM

Trouble-shooting (Cont'd)

CUSTOMER COMPLAINT

- Indicator lamp does not blink (Remains out).
 - Ignition switch OFF
 - At least one of the doors, hood, or back door is open.

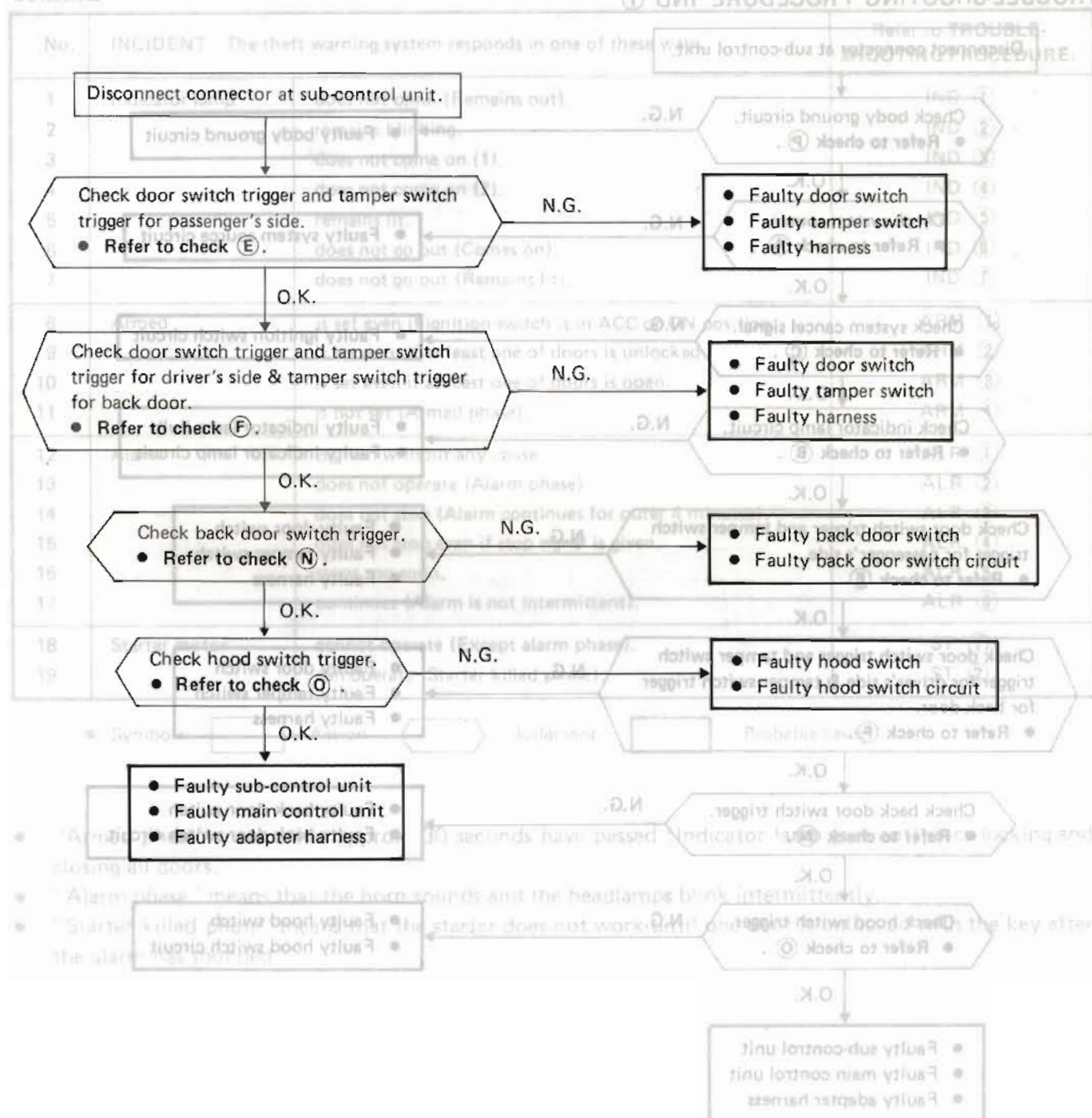
TROUBLE-SHOOTING PROCEDURE IND ①



Trouble-shooting (Cont'd)

- Ignition switch OFF
- Doors, hood and back door are closed

Contents



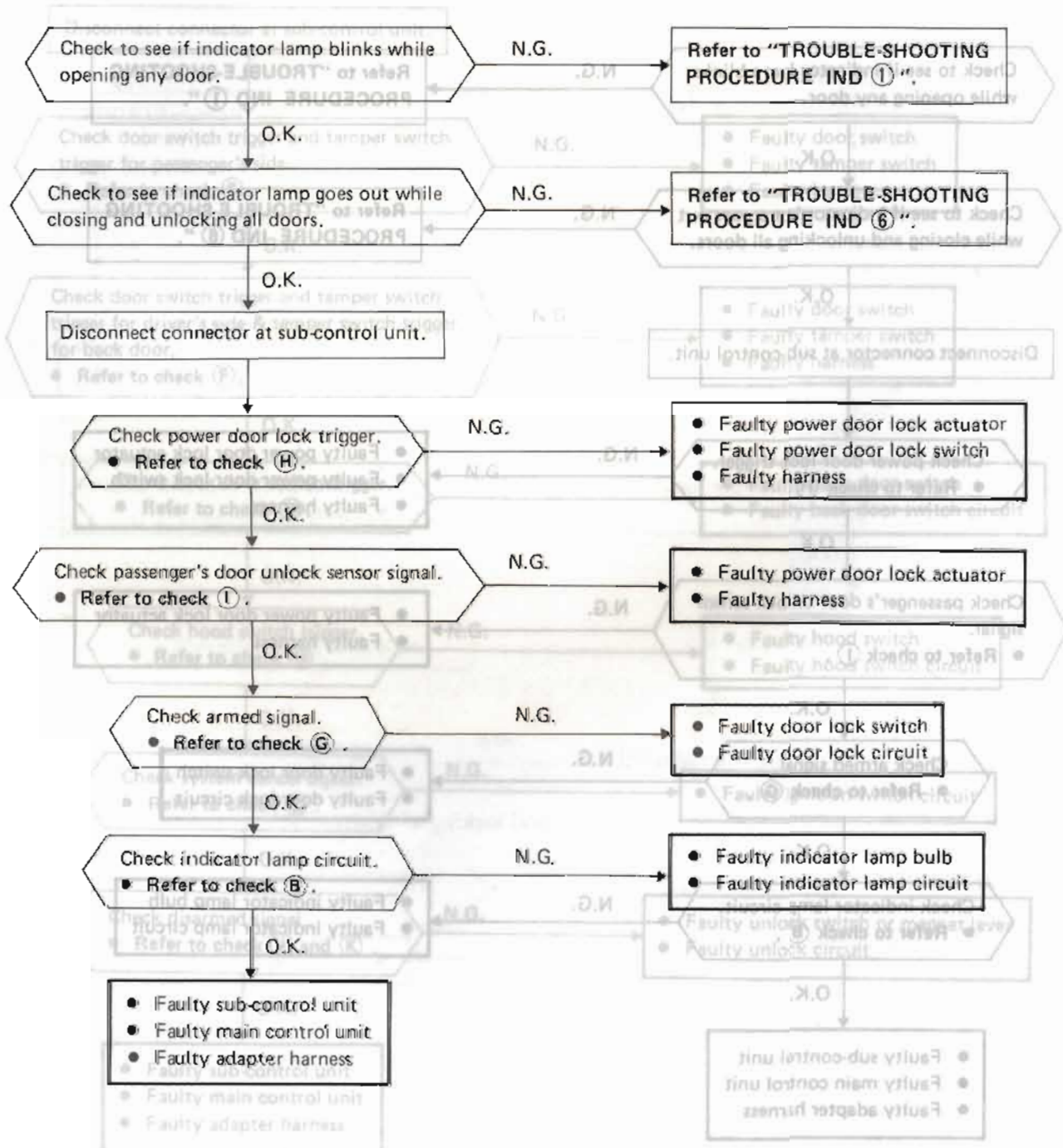
THEFT WARNING SYSTEM

Trouble-shooting (Cont'd)

3. Indicator lamp does not come on (1).

- Ignition switch OFF
- Doors, hood and back door are closed.
- After closing all doors, doors are locked with key.

TROUBLE-SHOOTING PROCEDURE IND ③



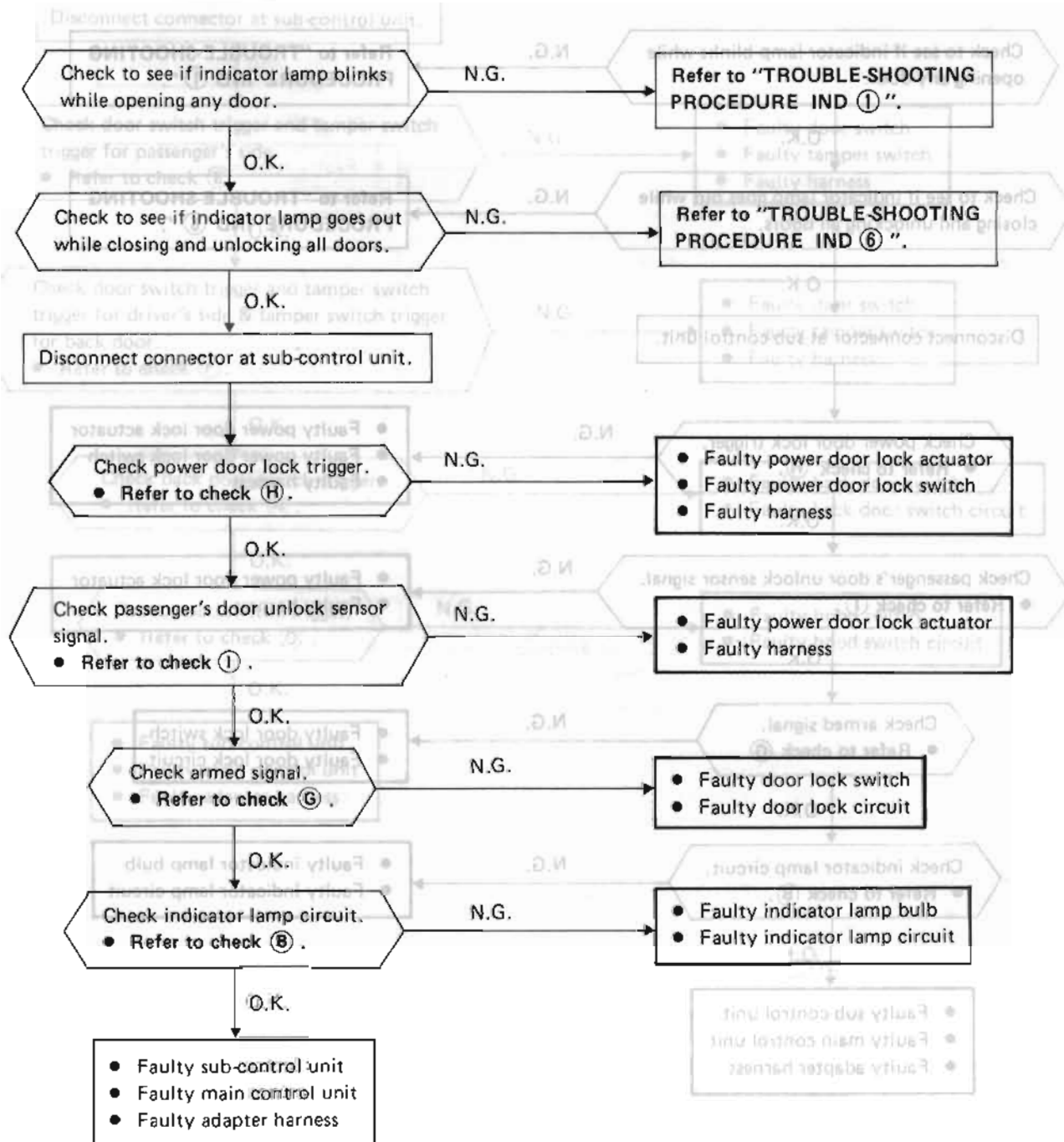
THEFT WARNING SYSTEM

Trouble-shooting (Cont'd)

4. Indicator lamp does not come on (2).

- Ignition switch OFF
- After closing hood and back door, lock and close all doors without key. Or after locking and closing all doors, close hood and back door.

TROUBLE-SHOOTING PROCEDURE IND ④



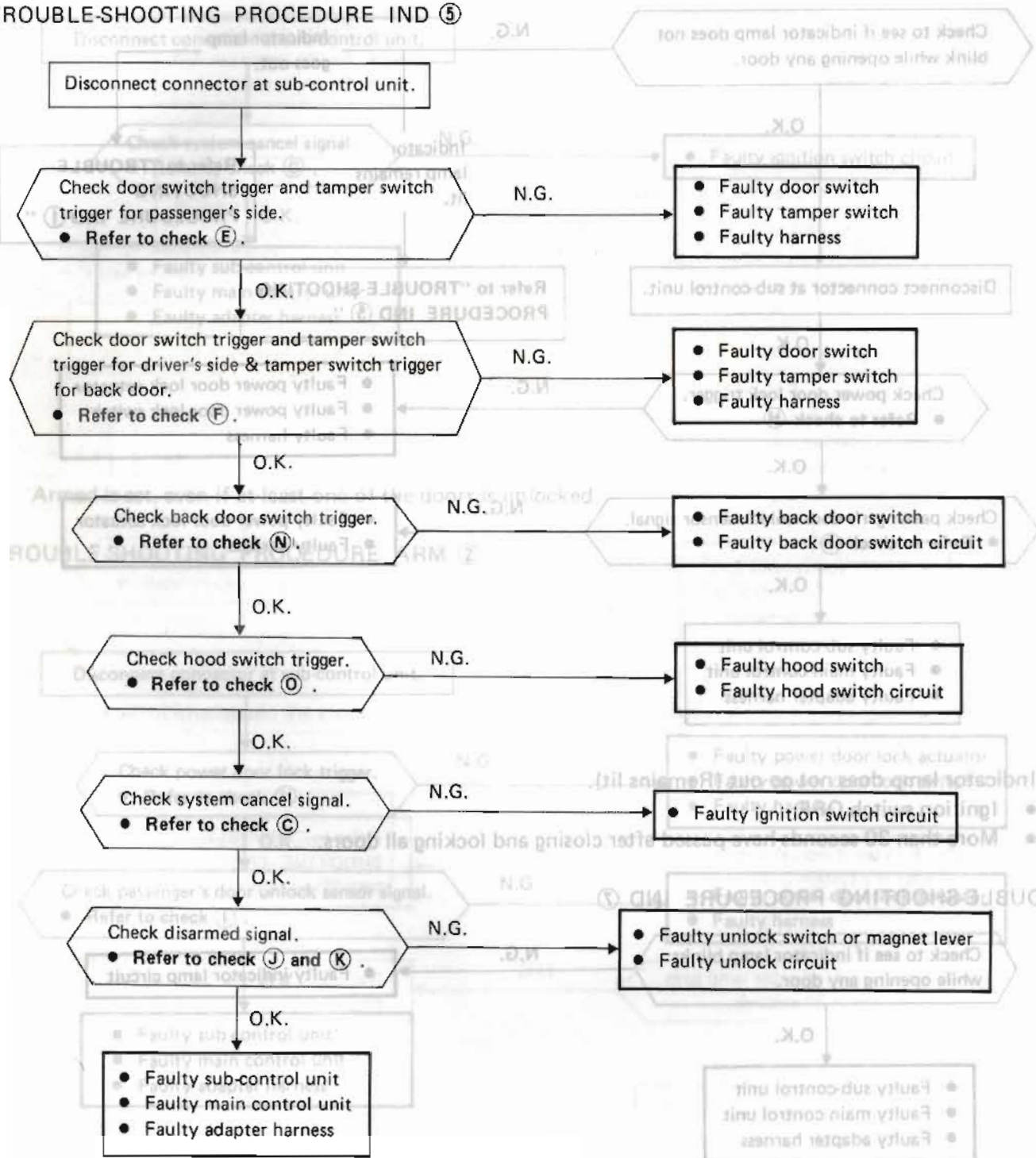
THEFT WARNING SYSTEM

Trouble-shooting (Cont'd)

5. Indicator lamp remains lit.

- Ignition switch OFF
 - At least one of the door is open or unlocked.
- or
- Reset the armed phase.

TROUBLE-SHOOTING PROCEDURE IND ⑤



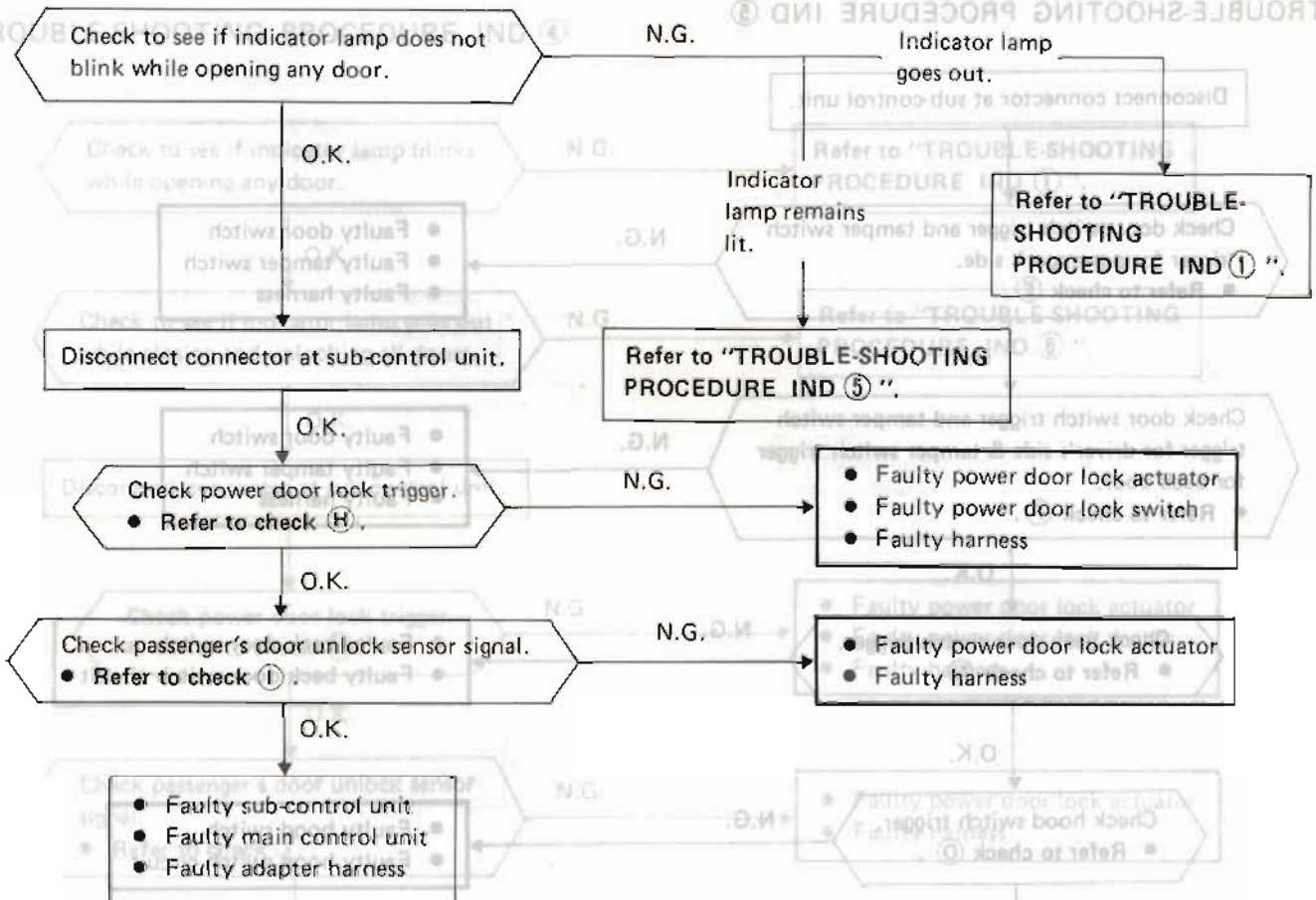
THEFT WARNING SYSTEM

Trouble-shooting (Cont'd)

6. Indicator lamp does not go out (Comes on).

- Ignition switch OFF
- Doors close and at least one of the doors unlocks.

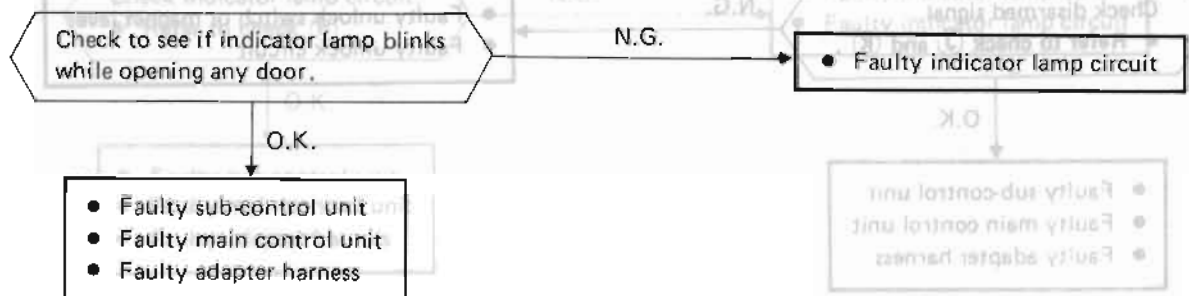
TROUBLE-SHOOTING PROCEDURE IND ⑥



7. Indicator lamp does not go out (Remains lit).

- Ignition switch OFF.
- More than 30 seconds have passed after closing and locking all doors.

TROUBLE-SHOOTING PROCEDURE IND ⑦

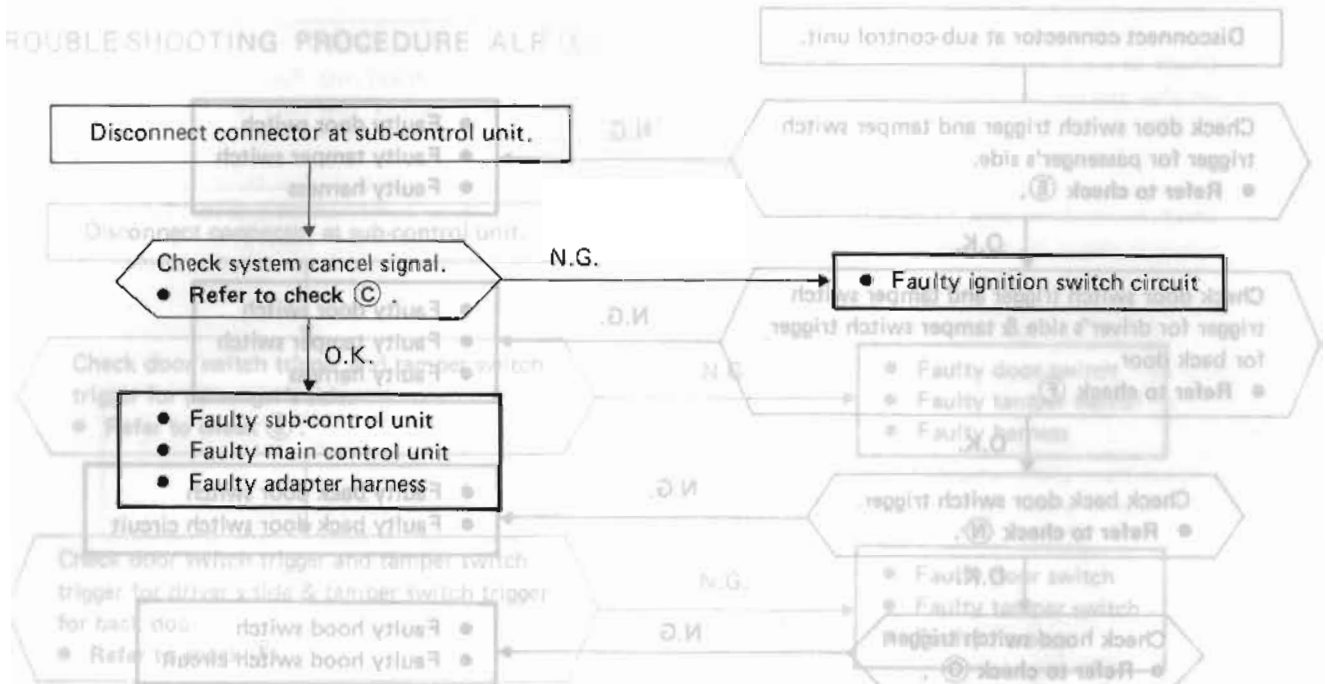


THEFT WARNING SYSTEM

Trouble-shooting (Cont'd)

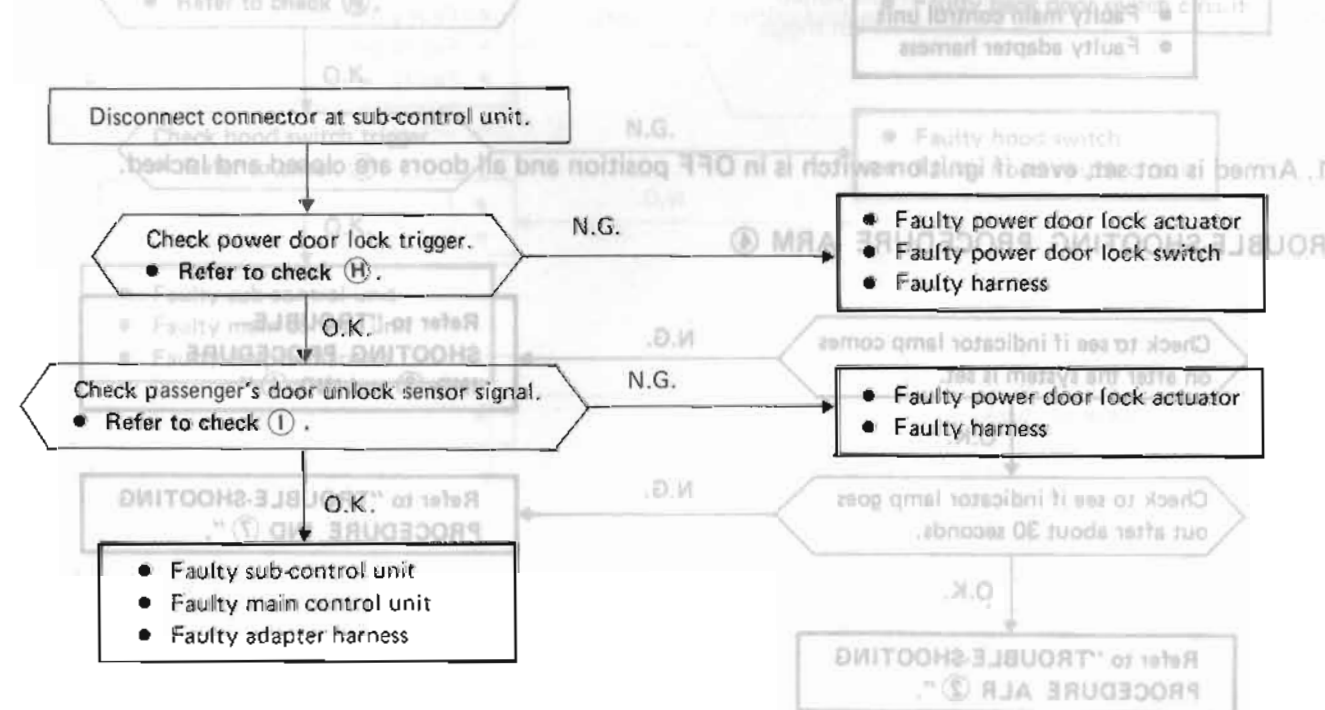
8. Armed is set, even if ignition switch is in ACC or ON position.

TROUBLE-SHOOTING PROCEDURE ARM ①



9. Armed is set, even if at least one of the doors is unlocked.

TROUBLE-SHOOTING PROCEDURE ARM ②

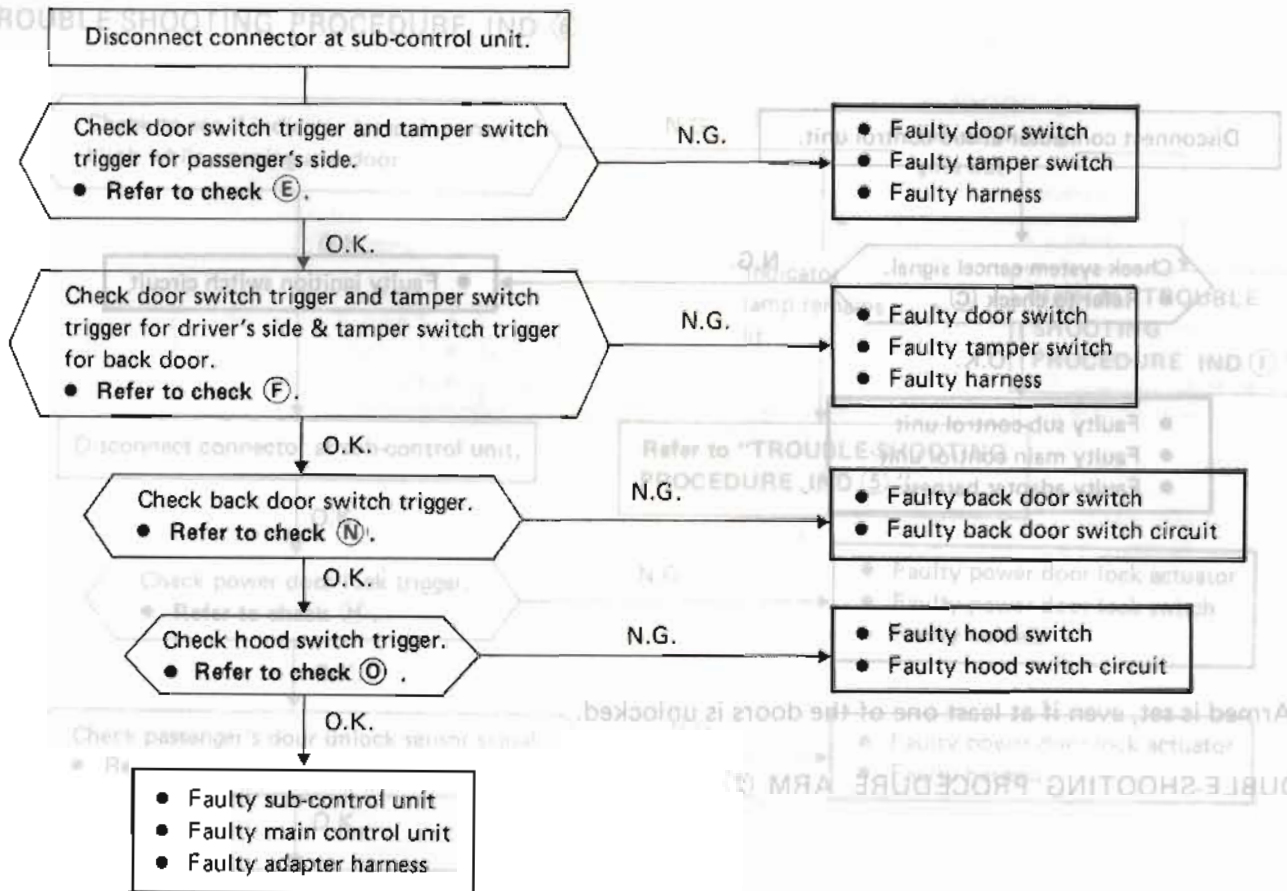


THEFT WARNING SYSTEM

Trouble-shooting (Cont'd)

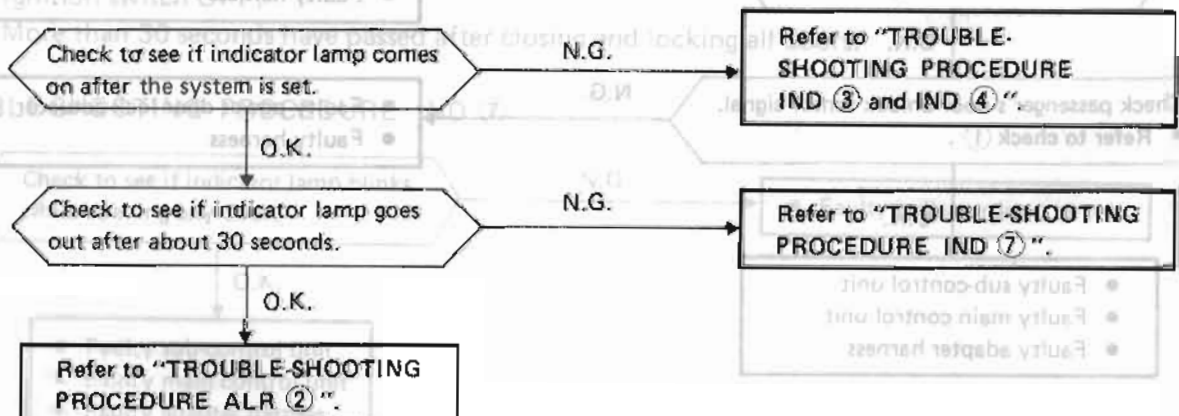
10. Armed is set, even if at least one of the doors is open.

TROUBLE-SHOOTING PROCEDURE ARM ③



11. Armed is not set, even if ignition switch is in OFF position and all doors are closed and locked.

TROUBLE-SHOOTING PROCEDURE ARM ④



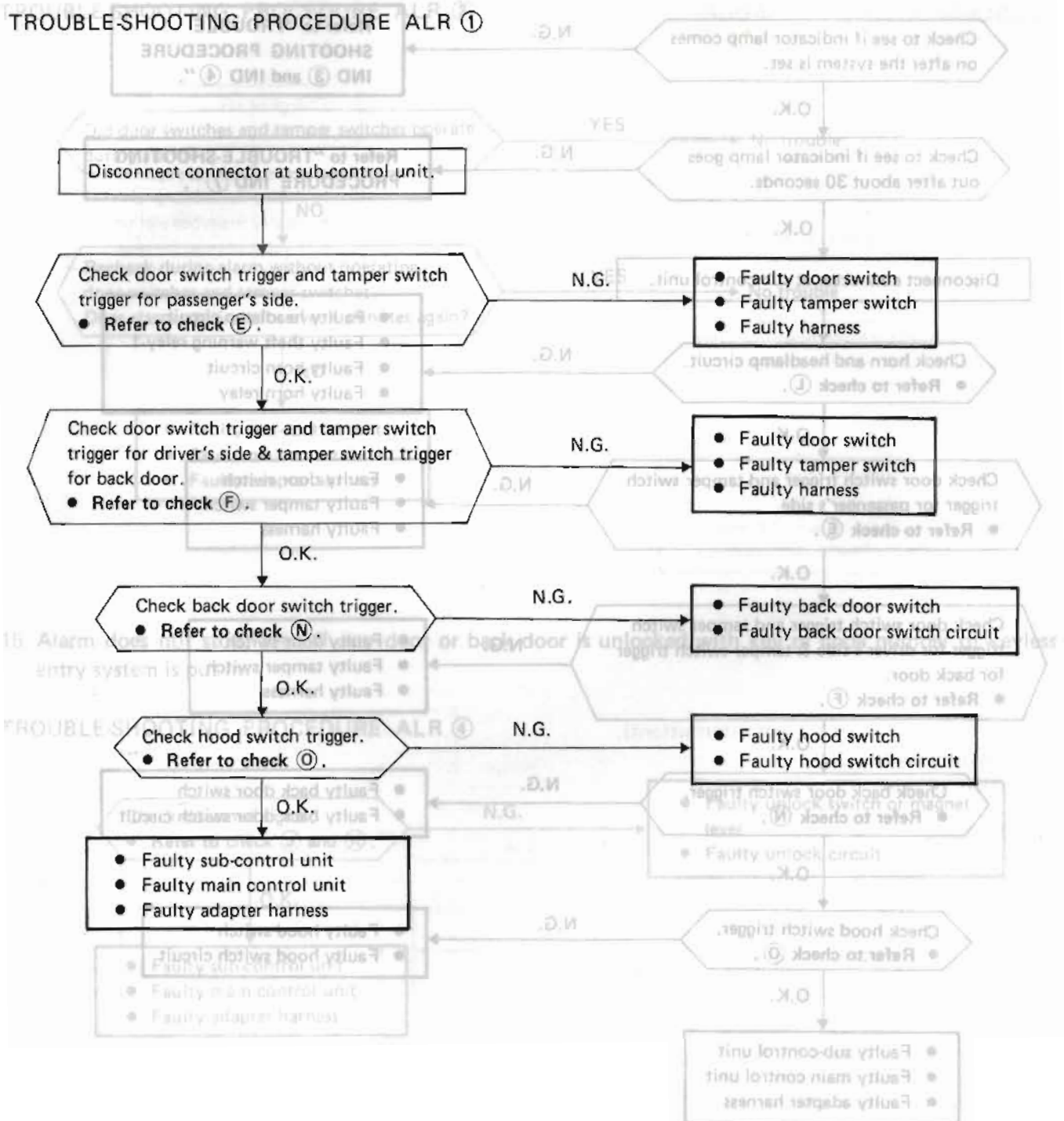
THEFT WARNING SYSTEM

Trouble-shooting (Cont'd)

12. Alarm is given without any cause.

- Ignition switch OFF
- Doors locked and closed

TROUBLE-SHOOTING PROCEDURE ALR ①

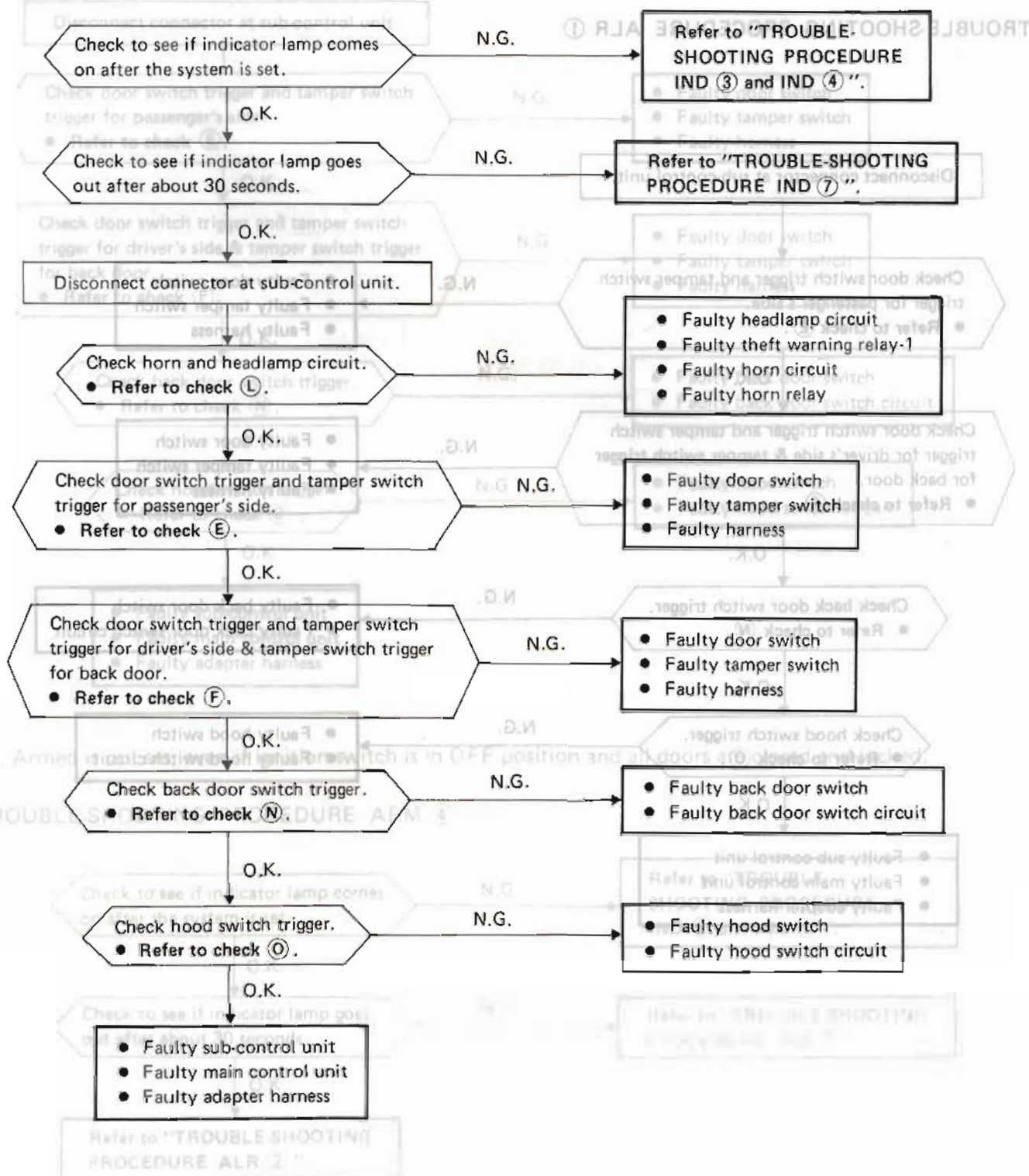


THEFT WARNING SYSTEM

Trouble-shooting (Cont'd)

13. Alarm does not operate, even if any door is opened without key or any key cylinder is drawn out.

TROUBLE-SHOOTING PROCEDURE ALR ②



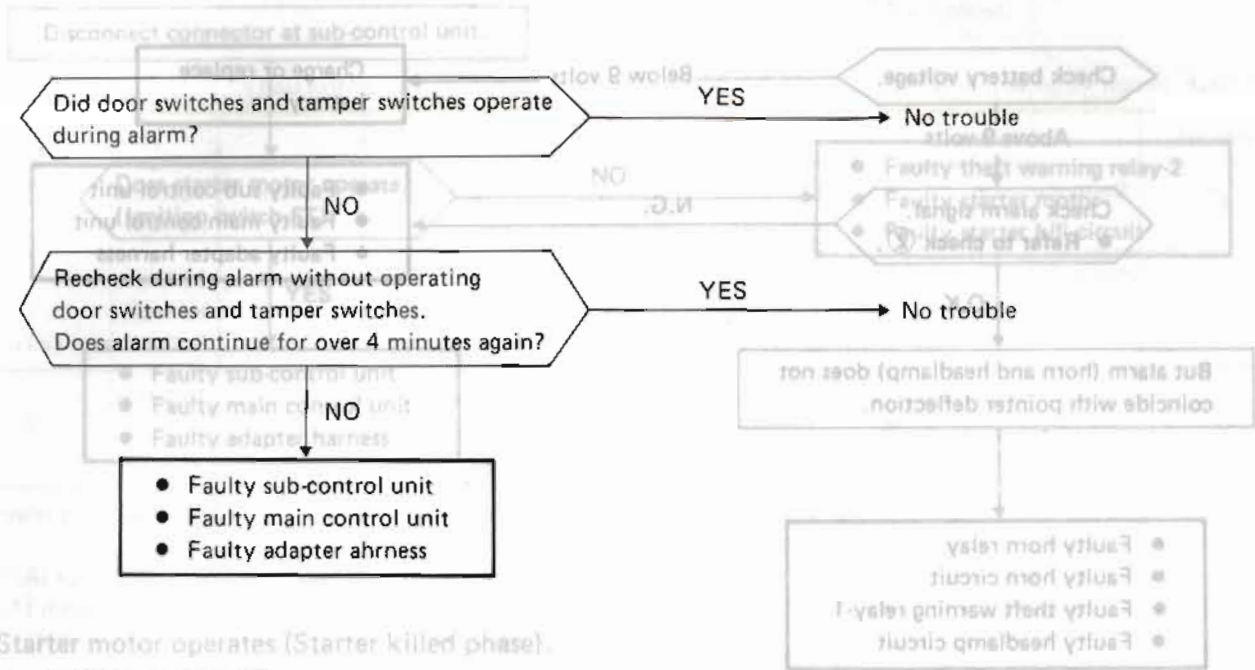
THEFT WARNING SYSTEM

Trouble-shooting (Cont'd)

14. Alarm does not stop (Alarm continues for over 4 minutes).

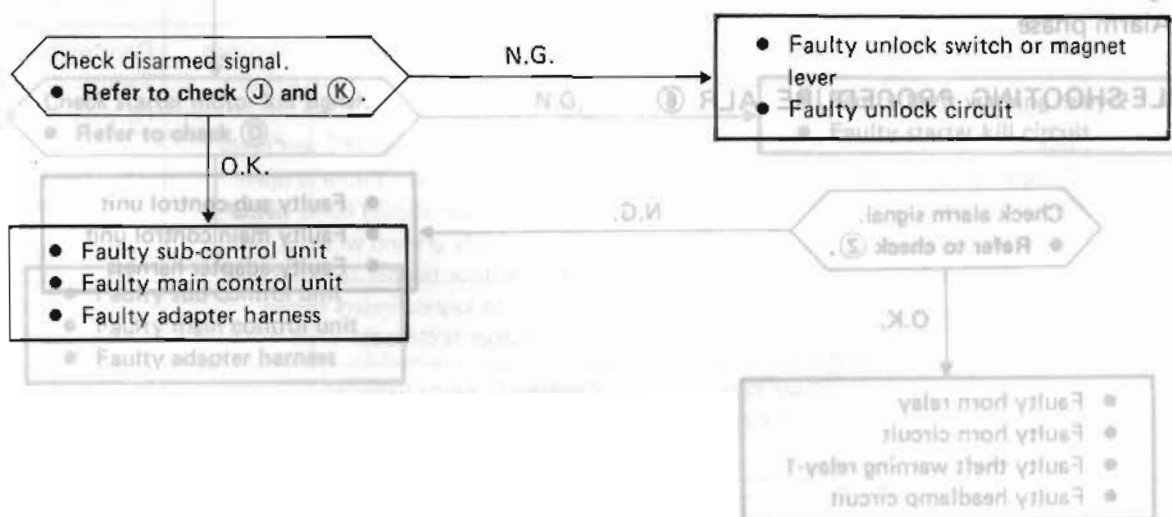
- Ignition switch OFF
- Alarm phase

TROUBLE-SHOOTING PROCEDURE ALR ③



15. Alarm does not stop, even if any door or back door is unlocked with key or code number of keyless entry system is put in.

TROUBLE-SHOOTING PROCEDURE ALR ④



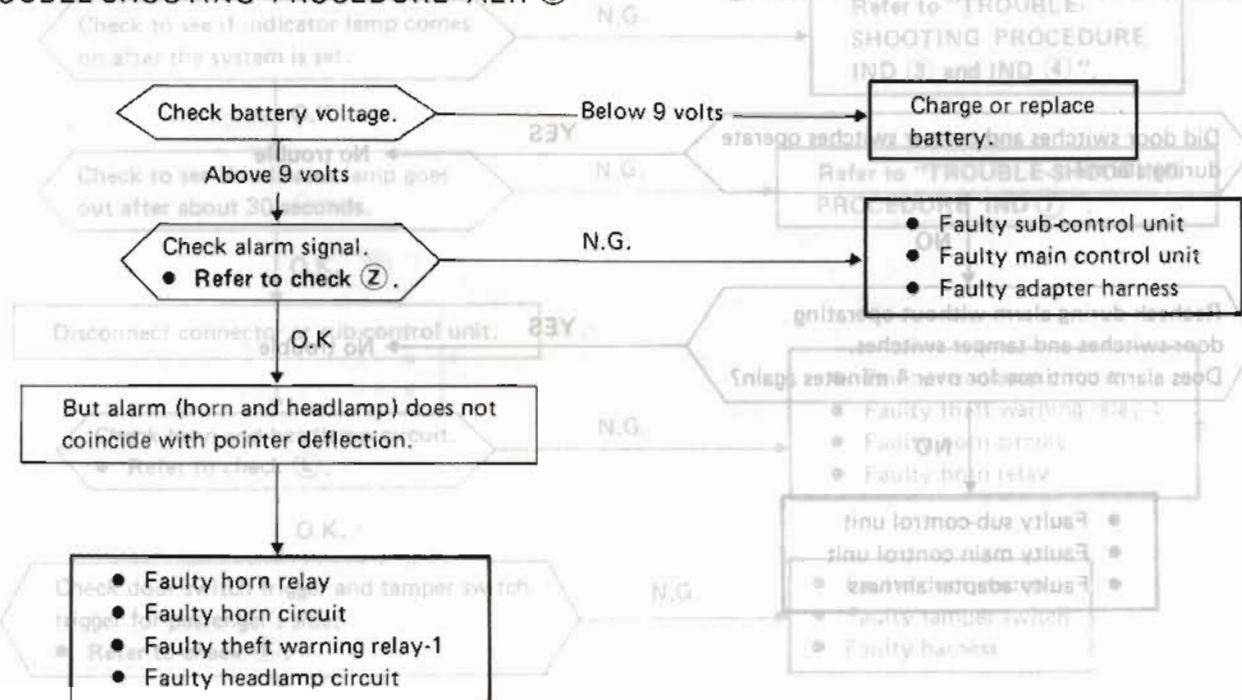
THEFT WARNING SYSTEM

Trouble-shooting (Cont'd)

16. Alarm stops too soon (Alarm does not continue for 2 to 4 minutes).

- Ignition switch OFF
- Alarm phase

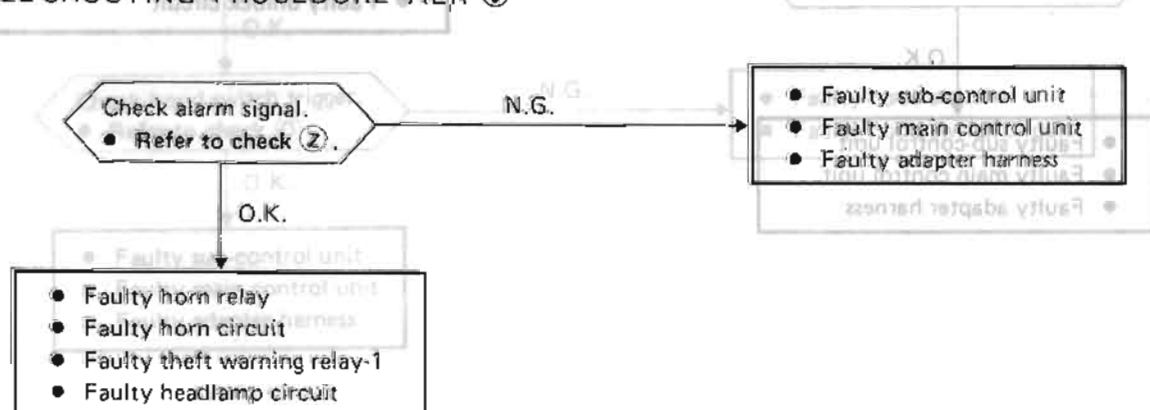
TROUBLE-SHOOTING PROCEDURE ALR ⑤



17. Alarm continues (Alarm is not intermittent).

- Ignition switch OFF
- Alarm phase

TROUBLE-SHOOTING PROCEDURE ALR ⑥



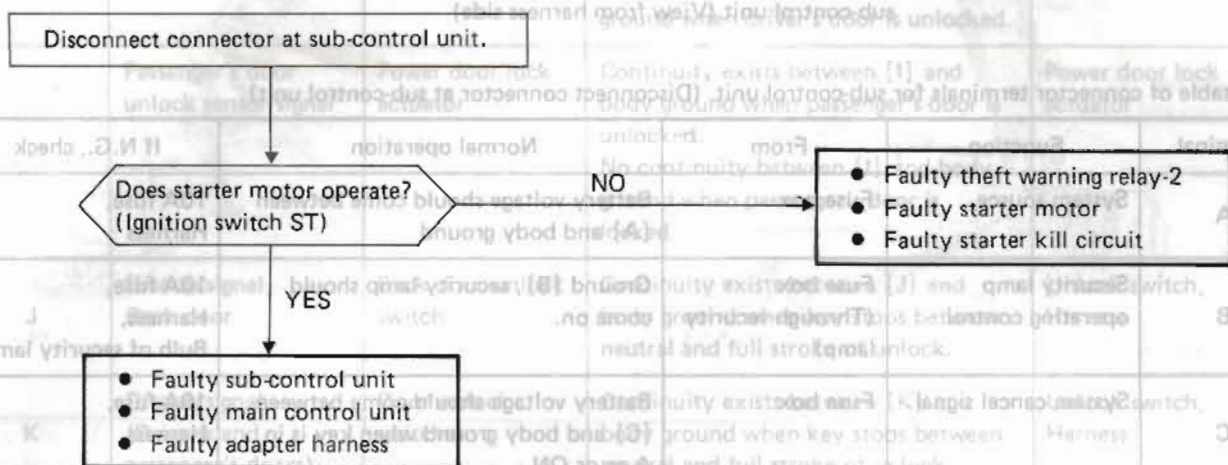
THEFT WARNING SYSTEM

Trouble-shooting (Cont'd)

18. Starter motor does not operate (Except alarm phase).

- Ignition switch ST

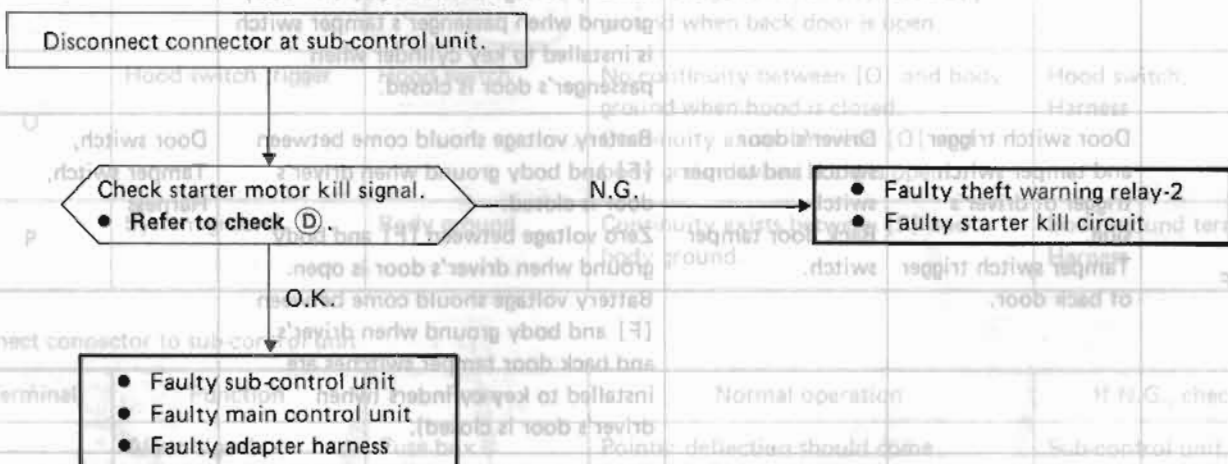
TROUBLE-SHOOTING PROCEDURE ST ①



19. Starter motor operates (Starter killed phase).

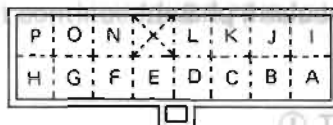
- Ignition switch ST

TROUBLE-SHOOTING PROCEDURE ST ②



THEFT WARNING SYSTEM

Terminal Check



Terminal arrangement of connector for theft warning sub-control unit (View from harness side)

Check table of connector terminals for sub-control unit. (Disconnect connector at sub-control unit)

Terminal	Function	From	Normal operation	If N.G., check
A	System source	Fuse box	Battery voltage should come between [A] and body ground	10A fuse, Harness
B	Security lamp operating control	Fuse box (Through security lamp)	Ground [B], security lamp should come on.	10A fuse, Harness, Bulb of security lamp
C	System cancel signal	Fuse box	Battery voltage should come between [C] and body ground when key is in A cc or ON.	10A fuse, Harness
D	Starter kill	Fuse box (Through theft warning relay-2)	Ground [D] starter should not operate.	Theft warning relay-2, Harness, Inhibitor relay (A/T), Inhibitor switch (A/T)
E	Door switch trigger and tamper switch trigger for passenger's side	Passenger's door switch and tamper switch	Battery voltage should come between [E] and body ground when passenger's door is closed. Zero voltage between [E] and body ground when passenger's door is open. Battery voltage between [E] and body ground when passenger's tamper switch is installed to key cylinder when passenger's door is closed.	Door switch, Tamper switch, Harness
F	Door switch trigger and tamper switch trigger of driver's side. Tamper switch trigger of back door.	Driver's door switch and tamper switch. Back door tamper switch.	Battery voltage should come between [F] and body ground when driver's door is closed. Zero voltage between [F] and body ground when driver's door is open. Battery voltage should come between [F] and body ground when driver's and back door tamper switches are installed to key cylinders (when driver's door is closed).	Door switch, Tamper switch, Harness
G	Arm signal	Door lock switches.	Continuity exists between [G] and body ground when key stops between neutral and full stroke of lock.	Door lock switch, Harness

THEFT WARNING SYSTEM

Terminal Check (Cont'd)

Terminal	Function	From	Normal operation	If N.G., check
H	Power door lock trigger	Power door lock switch	Battery voltage should come between [H] and body ground when driver's door is locked. Zero voltage between [H] and body ground when driver's door is unlocked.	Power door lock actuator, Power door lock switch
I	Passenger's door unlock sensor signal	Power door lock actuator	Continuity exists between [I] and body ground when passenger's door is unlocked. No continuity between [I] and body ground when passenger's door is locked.	Power door lock actuator
J	Disarm signal Back door	Back door unlock switch	Continuity exists between [J] and body ground when key stops between neutral and full stroke of unlock.	Unlock switch, Harness
K	Disarm signal (Driver's and passenger's doors)	Door unlock switches	Continuity exists between [K] and body ground when key stops between neutral and full stroke of unlock.	Unlock switch, Harness
L	Alarm signal	Fuse box (Through horn relay) Fuse box (Through theft warning relay-1)	Ground [L], horn should sound and headlamp should come on.	Horn relay, Theft warning relay-1, 15A, 10A fuse, Harness
N	Back door switch trigger	Back door switch	Battery voltage should come between [N] and body ground when back door is closed. Zero voltage between [N] and body ground when back door is open.	Back door switch, Harness
O	Hood switch trigger	Hood switch	No continuity between [O] and body ground when hood is closed. Continuity exists between [O] and body ground when hood is open.	Hood switch, Harness
P	System ground	Body ground	Continuity exists between [P] and body ground.	Body ground terminal, Harness

Connect connector to sub-control unit

Terminal	Function	From	Normal operation	If N.G., check
L (Check ②)	Alarm signal	Fuse box (Through horn relay) Fuse box (Through theft warning relay-1)	Pointer deflection should come intermittently under alarm phase.	Sub-control unit, Main control unit, Adapter harness

THEFT WARNING SYSTEM

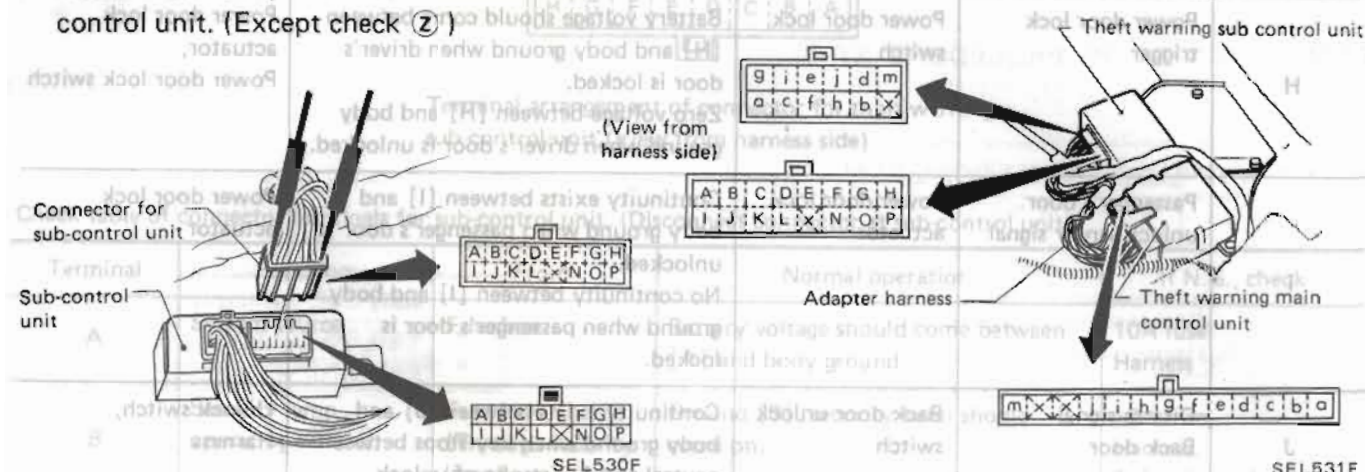
Terminal Check (Cont'd)

Preparation for check

- Disconnect body harness connector at sub-control unit. (Except check ②)

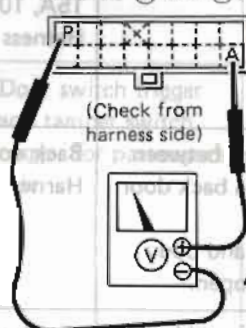
Terminal arrangement for check

(View from harness side)



CHECK ① ... System source check

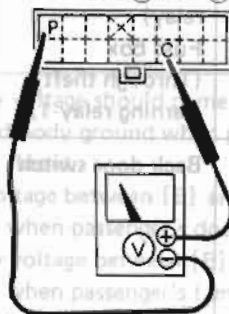
Measure voltage across terminals (A) and (P).



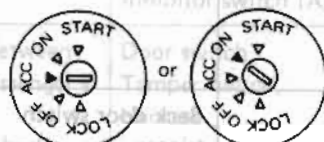
Approx. 12 V ... O.K.

CHECK ③ ... System cancel signal check

Measure voltage across terminals (C) and (P).



Ignition switch ACC or ON



Approx. 12 V ... O.K.

CHECK ② ... Security lamp circuit check

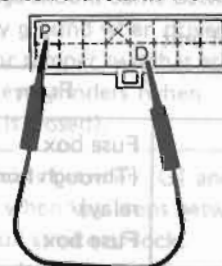
Connect terminals (B) and (P) with jumper cable.



Security lamp comes on ... O.K.

CHECK ④ ... Starter kill signal check

Connect terminals (D) and (P) with jumper cable. Check that starter motor cannot operate.



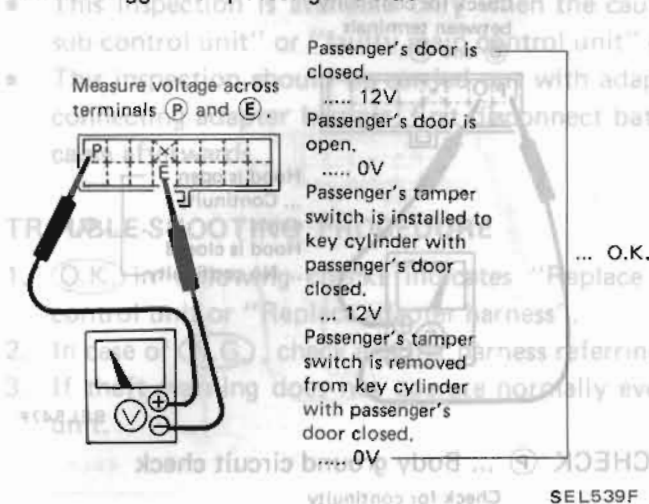
If key turns to "Start", starter does not operate. ... O.K.



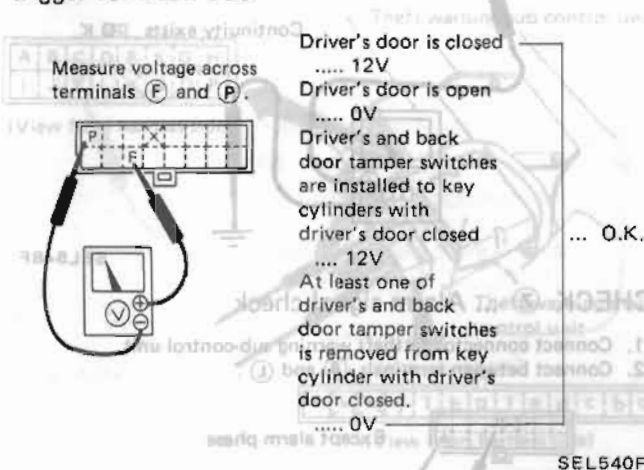
THEFT WARNING SYSTEM

Terminal Check (Cont'd)

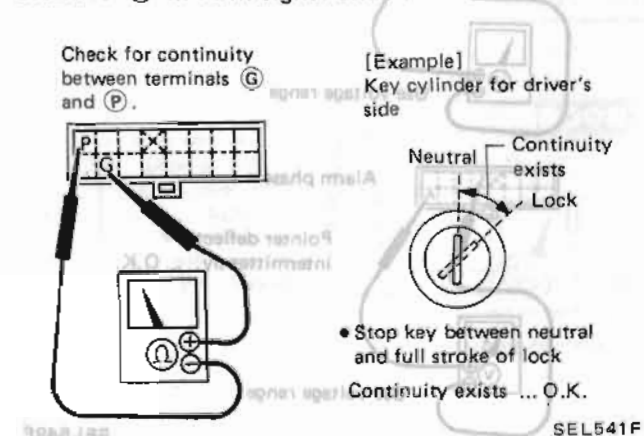
CHECK (E) ... Door switch trigger and tamper switch trigger for passenger's side



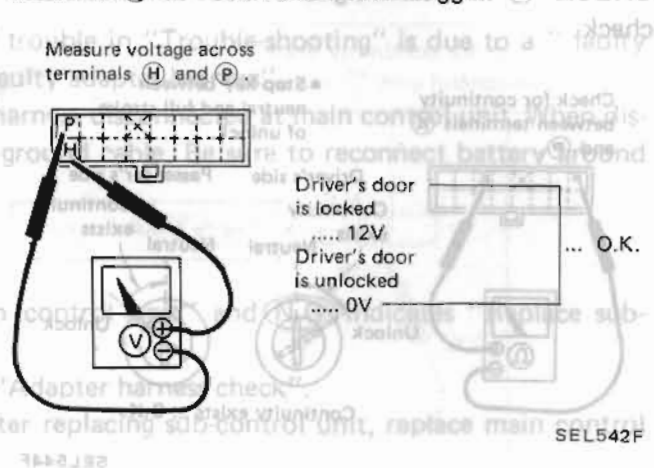
CHECK (F) ... Door switch trigger and tamper switch trigger for driver's side & tamper switch trigger for back door



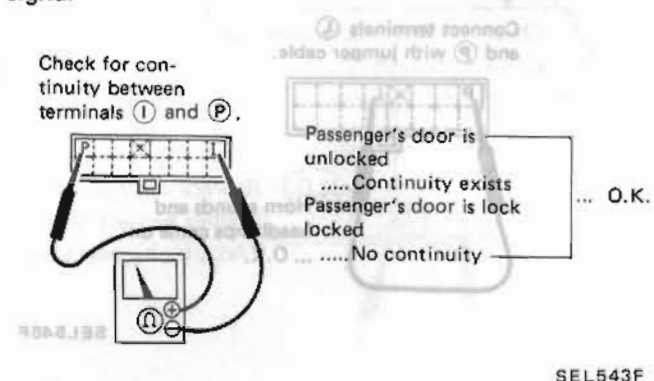
CHECK (G) ... Arm signal check



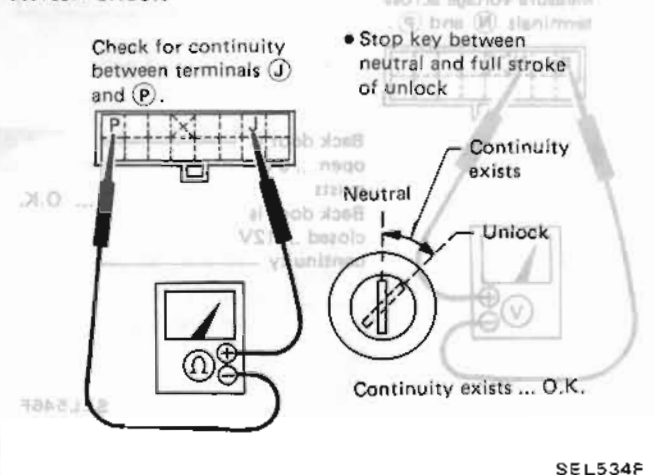
CHECK (H) ... Power door lock trigger



CHECK (I) ... Passenger's door unlock sensor signal



CHECK (J) ... Disarm signal of back door unlock switch check



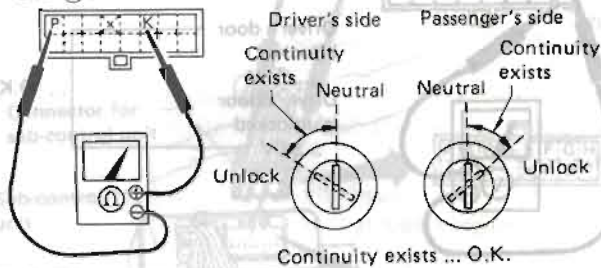
THEFT WARNING SYSTEM

Terminal Check (Cont'd)

CHECK (K) ... Disarm signal of door unlock switch check

Check for continuity between terminals (K) and (P).

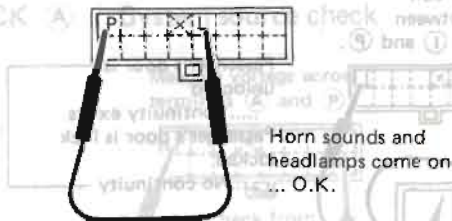
- Stop key between neutral and full stroke of unlock.



SEL544F

CHECK (L) ... Alarm check

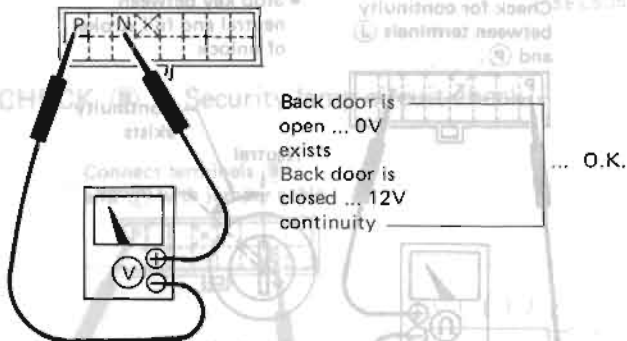
Connect terminals (L) and (P) with jumper cable.



SEL545F

CHECK (N) ... Back door switch trigger check

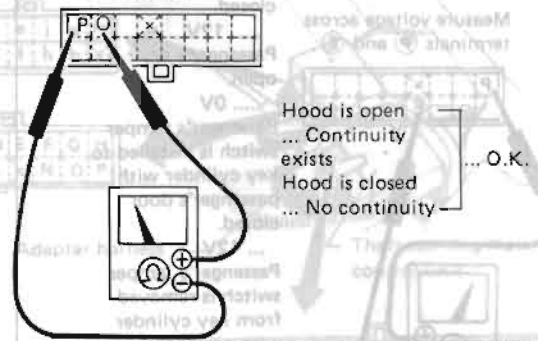
Measure voltage across terminals (N) and (P).



SEL546F

CHECK (O) ... Hood switch trigger check

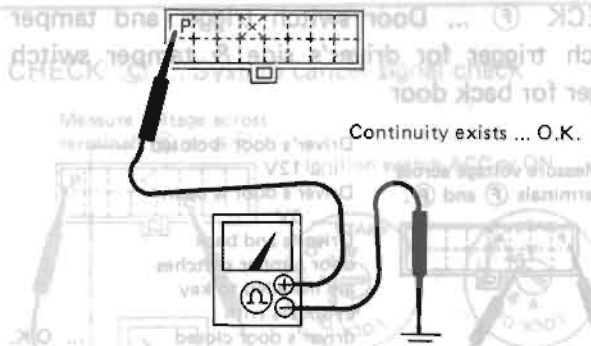
Check for continuity between terminals (O) and (P).



SEL547F

CHECK (P) ... Body ground circuit check

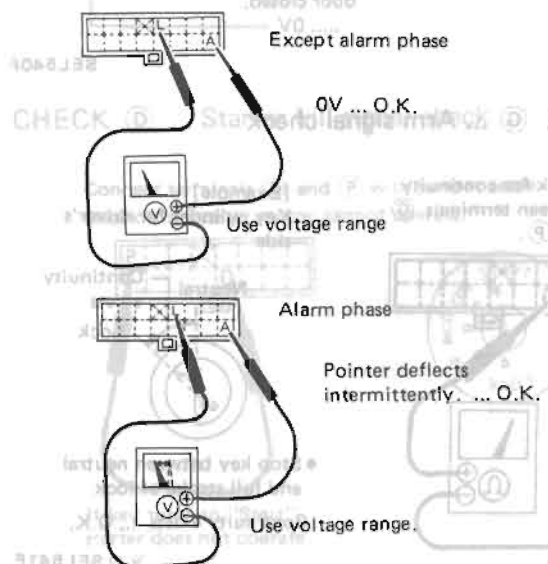
Check for continuity between terminals (P) and body.



SEL548F

CHECK (Z) ... Alarm signal check

1. Connect connector to theft warning sub-control unit.
2. Connect between terminals (A) and (L).



SEL549F

THEFT WARNING SYSTEM

Control Unit Check

CONTROL UNIT INSPECTION

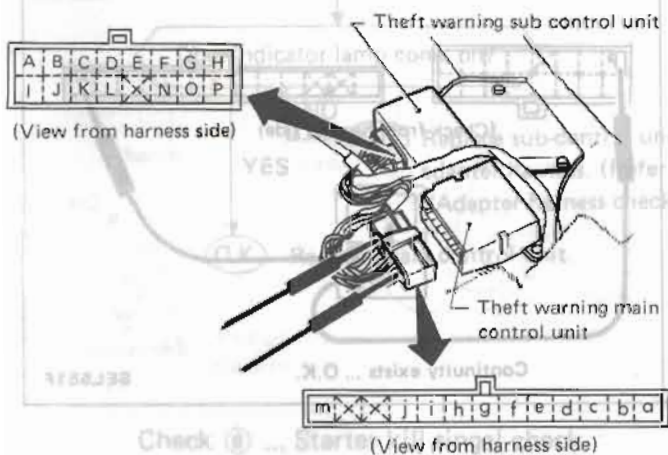
- This inspection is available only when the cause of trouble in "Trouble-shooting" is due to a "faulty sub-control unit" or "faulty main control unit" or "faulty adapter harness".
- This inspection should be carried out with adapter harness disconnected at main control unit. When disconnecting adapter harness, first disconnect battery ground cable. Be sure to reconnect battery ground cable afterwards.

TROUBLE-SHOOTING PROCEDURE

1. **O.K.** in following checks indicates "Replace main control unit" and **N.G.** indicates "Replace sub-control unit or "Replace adapter harness".
2. In case of **N.G.**, check adapter harness referring to "Adapter harness check".
3. If theft warning does not operate normally even after replacing sub-control unit, replace main control unit.

Preparation for check

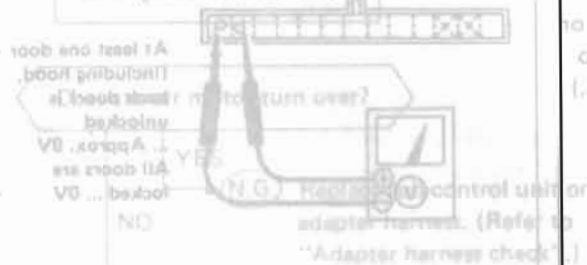
Disconnect adapter harness at main control unit.



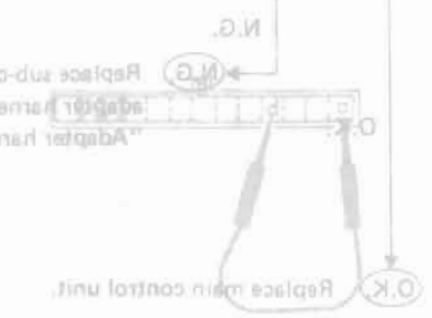
Check (a) ... Starter

Connect (a) and (b) with jumper cable

Turn ignition switch to ST



Check for continuity terminals (a) and (b) sub-control unit



Check (b) ... Door unlock signal check

Measure voltage across terminals (b) and (c).



THEFT WARNING SYSTEM

Control Unit Check (Cont'd)

Check (a) ... Ground circuit check

Check for continuity between terminals sub-control unit (P) and body.

N.G.

Faulty ground circuit

O.K.

Check for continuity terminals (a) and sub-control unit (P).

N.G.

(N.G.) Replace sub-control unit or adapter harness. (Refer to "Adapter harness check".)

O.K.

(O.K.) Replace main control unit.

Check (b) ... Door unlock signal check

Measure voltage across terminals (b) and (a).

N.G.

(N.G.) Replace sub-control unit or adapter harness. (Refer to "Adapter harness check".)

O.K.

(O.K.) Replace main control unit.

(Check from harness side)

Continuity exists ... O.K.

SEL550F

(Check from harness side)

Continuity exists ... O.K.

SEL551F

At least one door (including hood, back door) is unlocked ... Approx. 9V
All doors are locked ... 0V ... O.K.

SEL311F

THEFT WARNING SYSTEM

Control Unit Check (Cont'd)

Check ③ ... Hood signal check

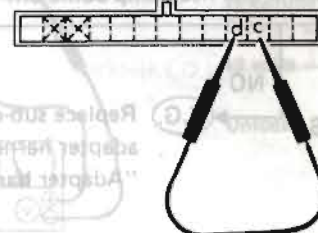
Connect ③ and ④ with jumper cable.

Open hood.

Does indicator lamp come on?

NO → (N.G.) Replace sub-control unit or adapter harness. (Refer to "Adapter harness check".)
YES → (O.K.) Replace main control unit.

Connect ① and ② with jumper cable.



SEL312F

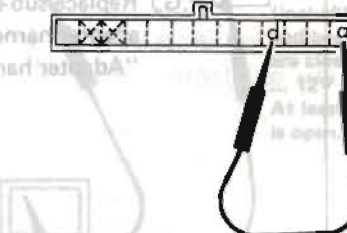
Check ④ ... Indicator lamp circuit check

Connect ④ and ⑤ with jumper cable.

Does indicator lamp come on?

NO → (N.G.) Replace sub-control unit or adapter harness. (Refer to "Adapter harness check".)
YES → (O.K.) Replace main control unit.

Connect between terminals ④ and ⑤.



SEL313F

Check ⑤ ... Starter kill signal check

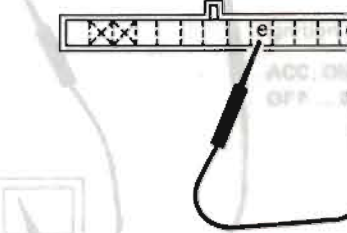
Connect ⑤ and ⑥ with jumper cable.

Turn ignition switch to ST.

Does starter motor turn over?

YES → (N.G.) Replace sub-control unit or adapter harness. (Refer to "Adapter harness check".)
NO → (O.K.) Replace main control unit.

Connect between terminals ⑤ and ⑥.



SEL314F

THEFT WARNING SYSTEM

Control Unit Check (Cont'd)

Check ① ... Alarm check

Connect ① and ② with jumper cable.

Does horn sound and headlamp come on?

YES

O.K.

Replace main control unit.

NO

N.G.

Replace sub-control unit or adapter harness. (Refer to "Adapter harness check".)

Check ② ... Hood signal check

Connect ② and ③ with jumper cable.



SEL315F

Check ③ ... Arm signal check

Connect between terminals ③ and ④.

O.K.

O.K.

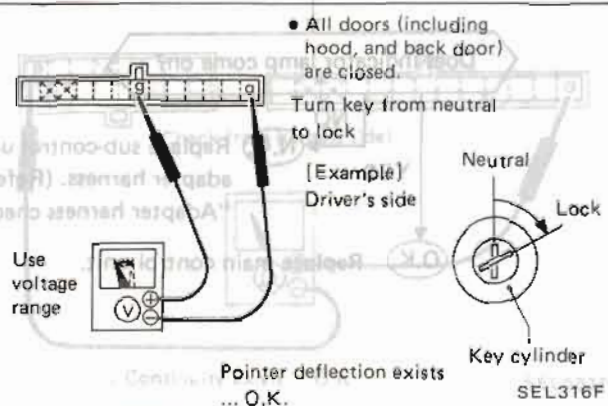
Replace main control unit.

N.G.

Replace sub-control unit or adapter harness. (Refer to "Adapter harness check".)

Check ④ ... Indicator lamp circuit check

Connect ④ and ⑤ with jumper cable.



SEL316F

Check ⑤ ... Starter kill signal check

Connect ⑤ and ⑥ with jumper cable.

Turn ignition switch to ST.

Does starter motor turn over?

YES

N.G. Replace sub-control unit or adapter harness. (Refer to "Adapter harness check".)

O.K. Replace main control unit.

THEFT WARNING SYSTEM

Control Unit Check (Cont'd)

Check (h) ... Unlock signal check

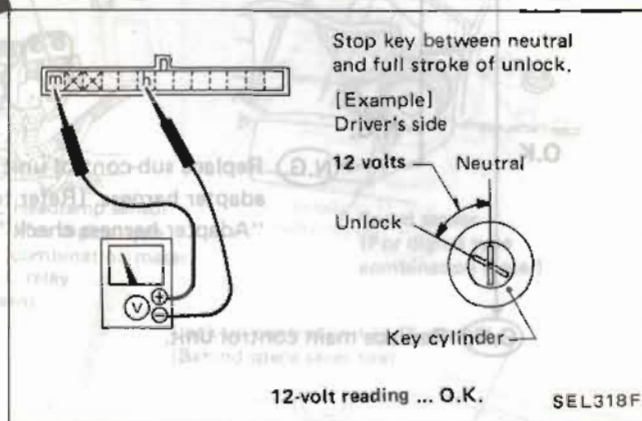
Measure voltage across terminals (h) and (m).

O.K.

O.K. Replace main control unit.

N.G.

N.G. Replace sub-control unit or adapter harness. (Refer to "Adapter harness check".)



Check (i) ... Door switch signal check

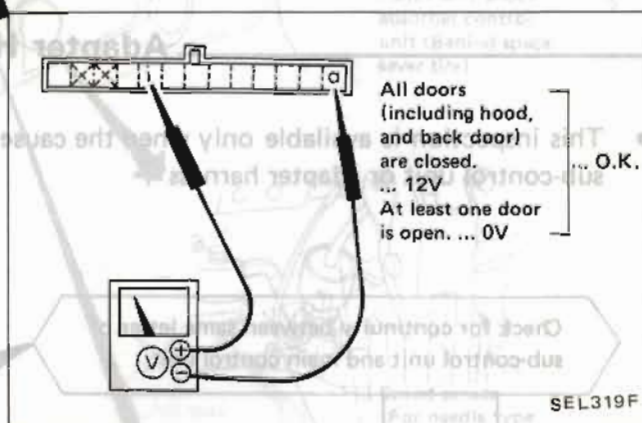
Measure voltage across terminals (i) and (a).

O.K.

O.K. Replace main control unit.

N.G.

N.G. Replace sub-control unit or adapter harness. (Refer to "Adapter harness check".)



Check (j) ... System cancel signal check

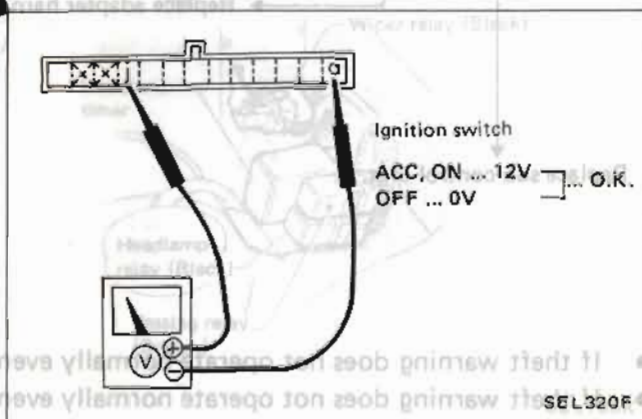
Measure voltage across terminals (j) and (a).

O.K.

O.K. Replace main control unit.

N.G.

N.G. Replace sub-control unit or adapter harness. (Refer to "Adapter harness check".)



THEFT WARNING SYSTEM

Control Unit Check (Cont'd)

Check ③ ... System source check

Measure voltage across terminals ③ and ④.

O.K.

N.G.

N.G. Replace sub-control unit or adapter harness. (Refer to "Adapter harness check".)

O.K. Replace main control unit.

Check ④ ... Unlock signal check

Measure voltage across terminals ④ and ⑤.

12V ... O.K.

SEL321F

Adapter Harness Check

- This inspection is available only when the cause of trouble in "Control Unit Check" is due to a "Replace sub-control unit or adapter harness".

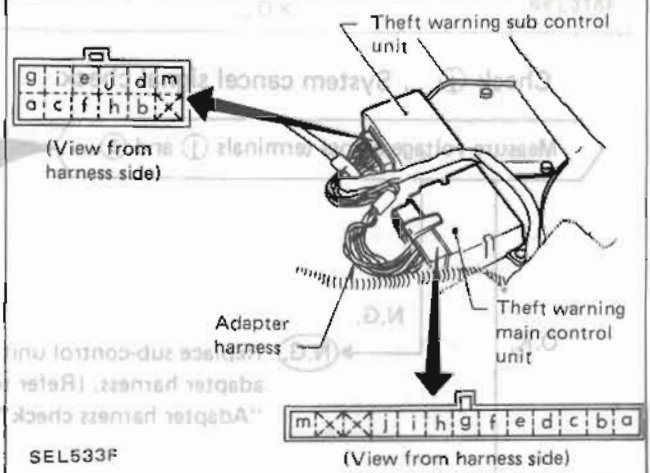
Check for continuity between same letter of sub-control unit and main control unit.

O.K.

N.G.

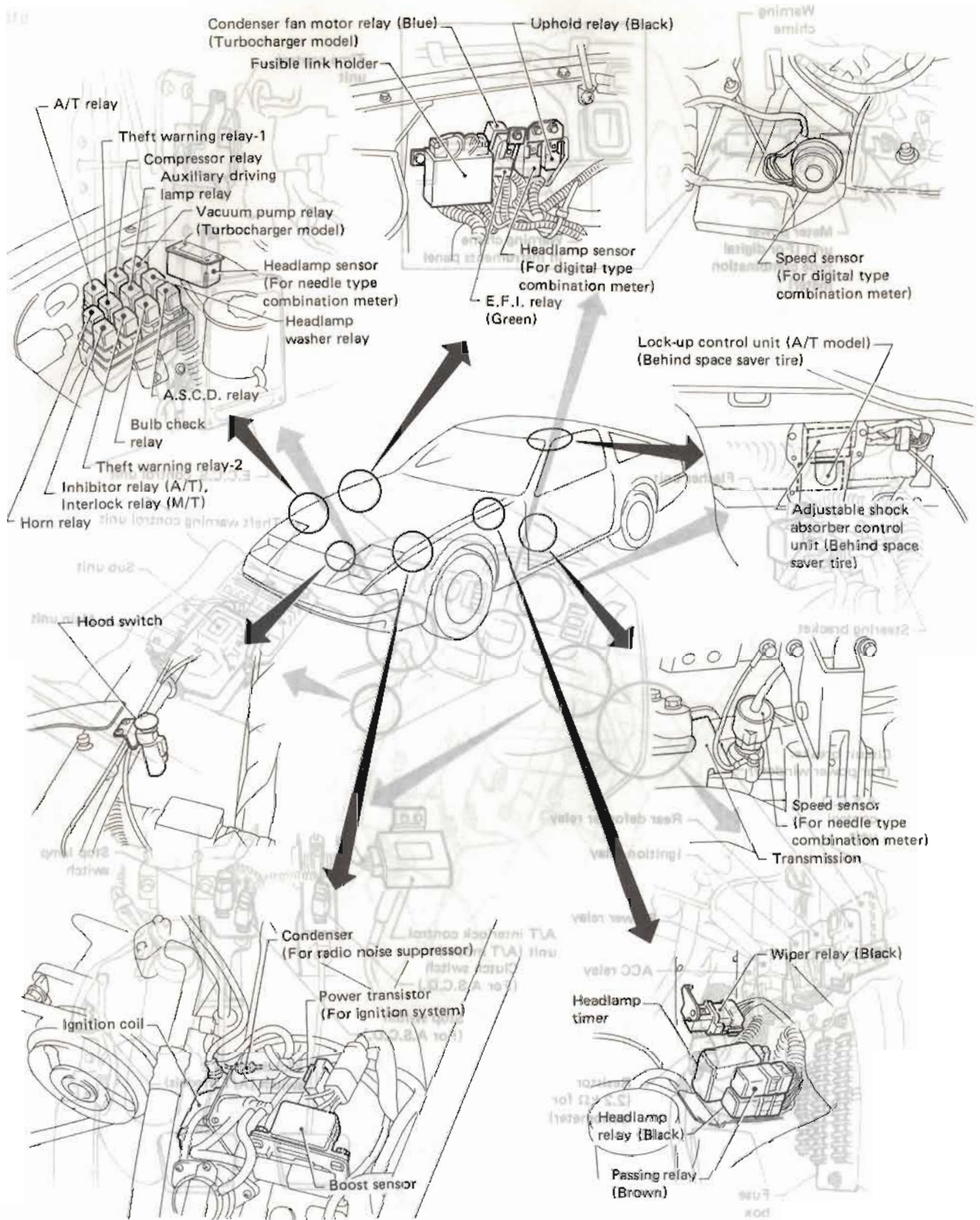
Replace adapter harness.

Replace sub-control unit.



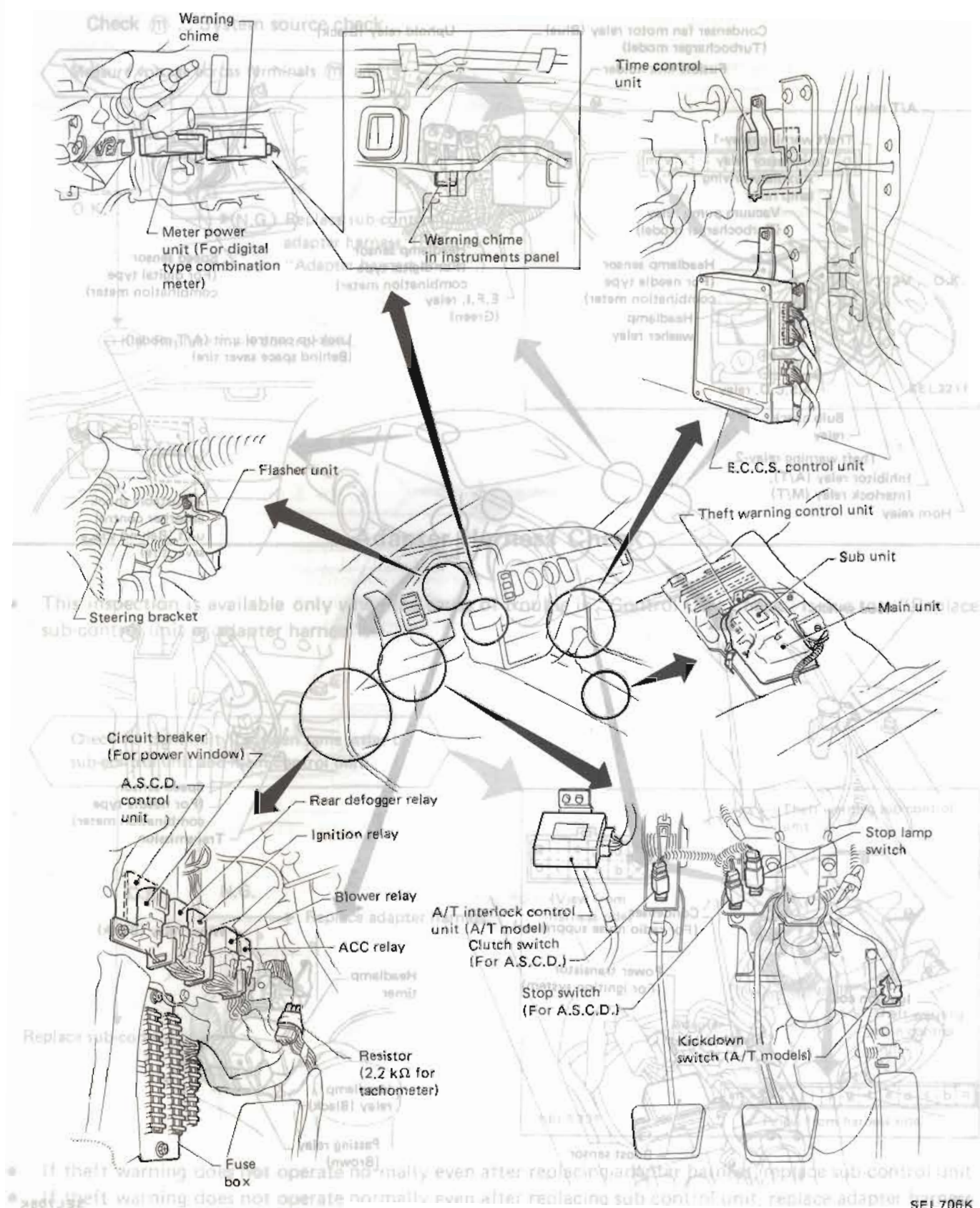
- If theft warning does not operate normally even after replacing adapter harness, replace sub-control unit.
- If theft warning does not operate normally even after replacing sub-control unit, replace adapter harness.

LOCATION OF ELECTRICAL UNITS



SEL705K

LOCATION OF ELECTRICAL UNITS



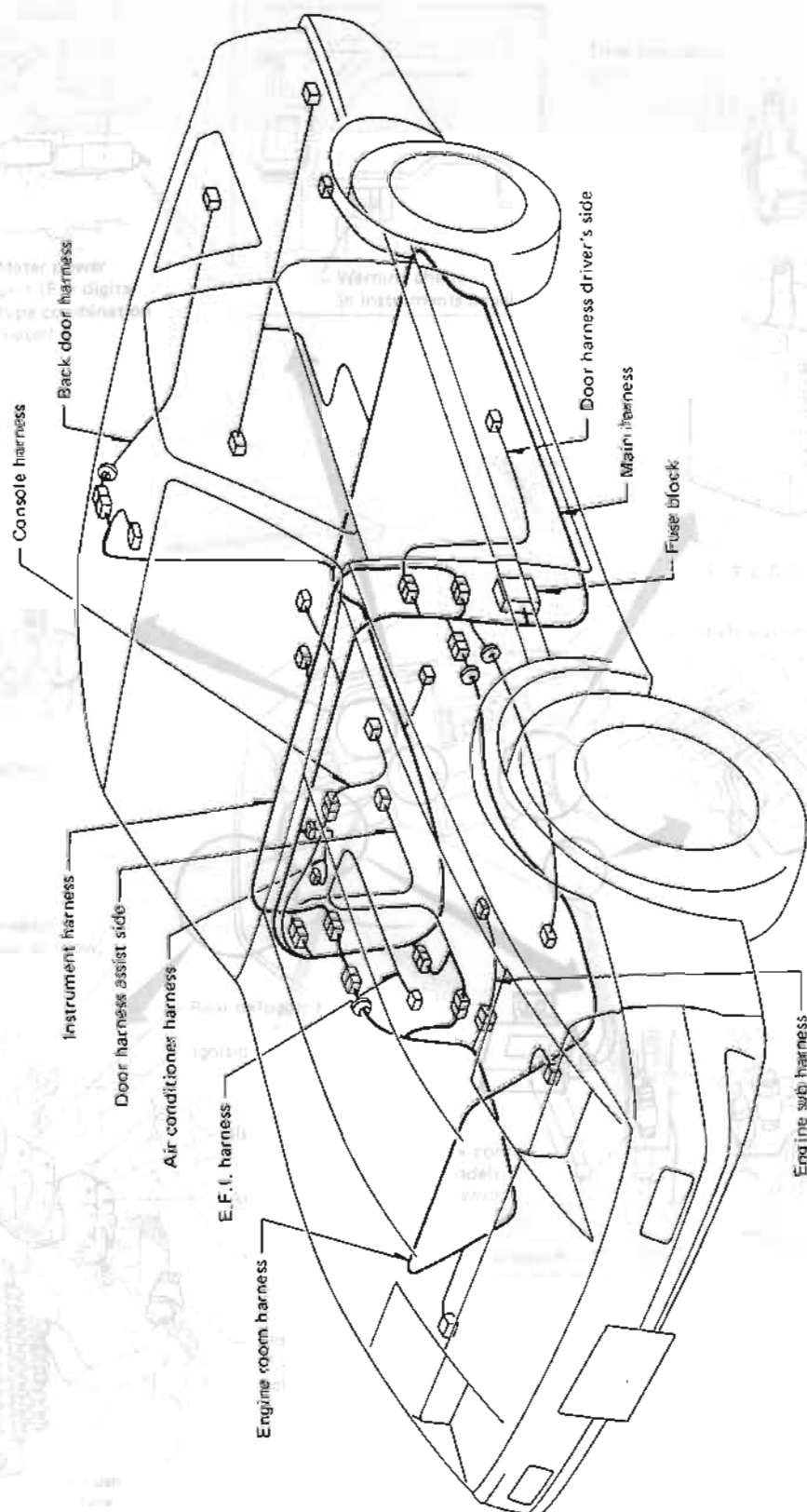
SEL706K

LOCATION OF ELECTRICAL UNITS

Note:

Outline

Note



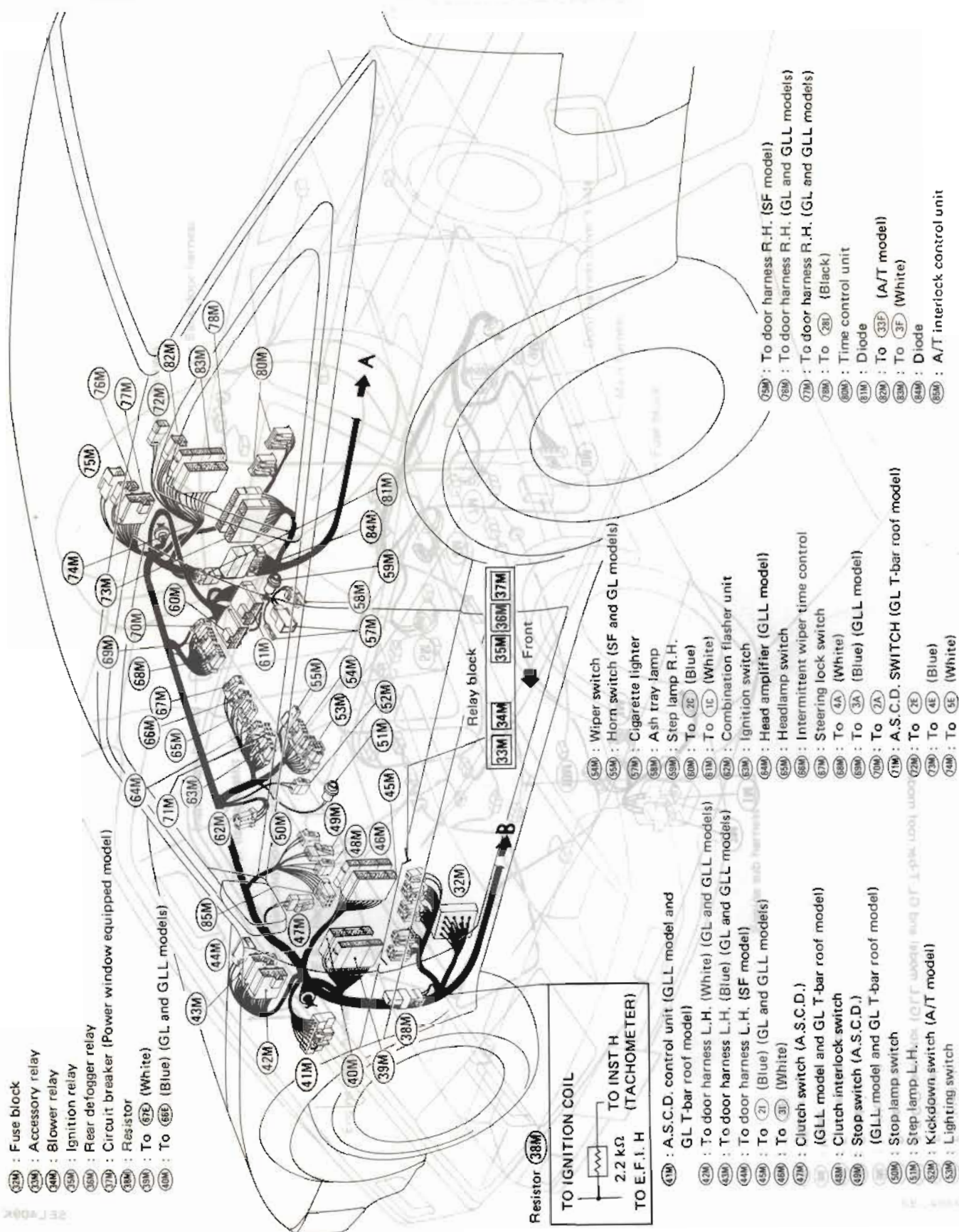
SEL486F

____ Main Harness



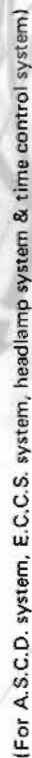
HARNESS LAYOUT

Main Harness (Cont'd)



Main Harness (Cont'd)

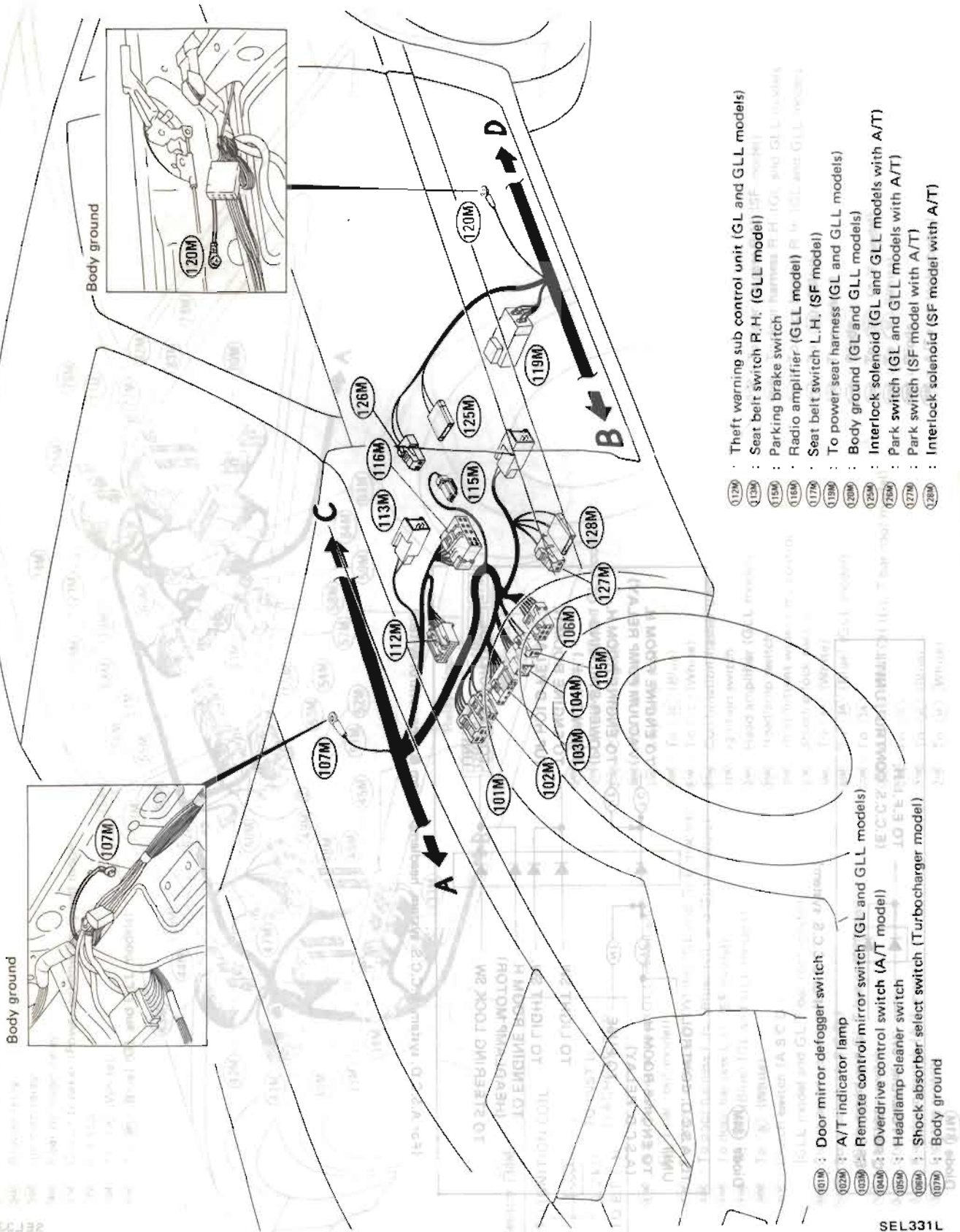
libcom JLD bms JD	signa l'eterna dei gromu t'et	321
libcom JLD	H-P r'etive t'ud t'ad	321
	rt'os no ext'at g'ol'as	321
libcom JLD	willigua ab'as	321
libcom J21	H-L r'etive t'ud t'ad	321
libcom JLD bms JD	ap'at'at t'ud t'ad	321
libcom JLD bms JD	br'ug'at y'ab	321
(TVA d'itw libcom JLD bms JD)	bl'og'at t'ad t'ad	321
(TVA d'itw libcom JLD bms JD)	bl'og'at t'ad t'ad	321
(TVA d'itw libcom J21)	bl'og'at t'ad t'ad	321
(TVA d'itw libcom J21)	bl'og'at t'ad t'ad	321



EL-183

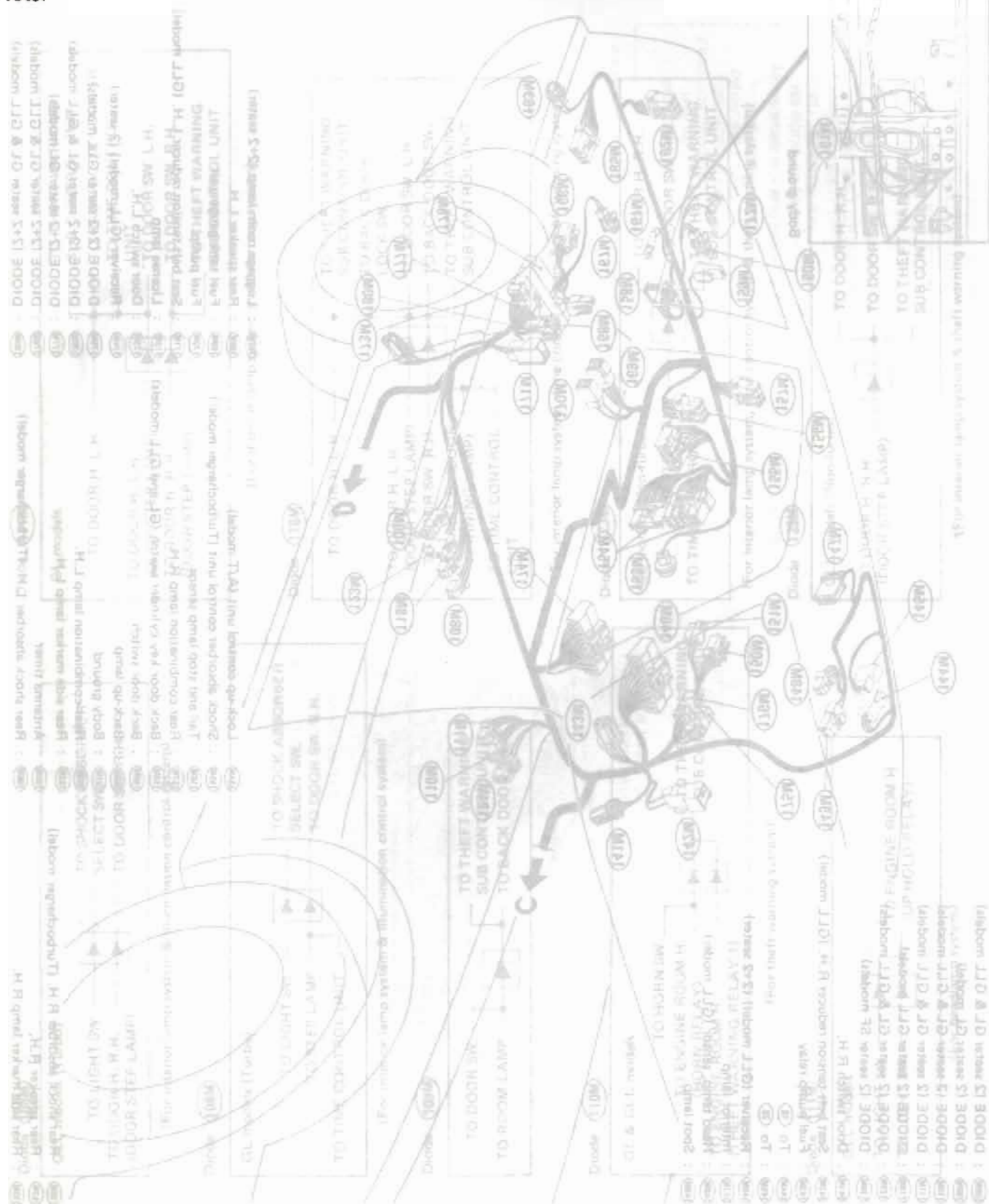
HARNESS LAYOUT

Main Harness (Cont'd)



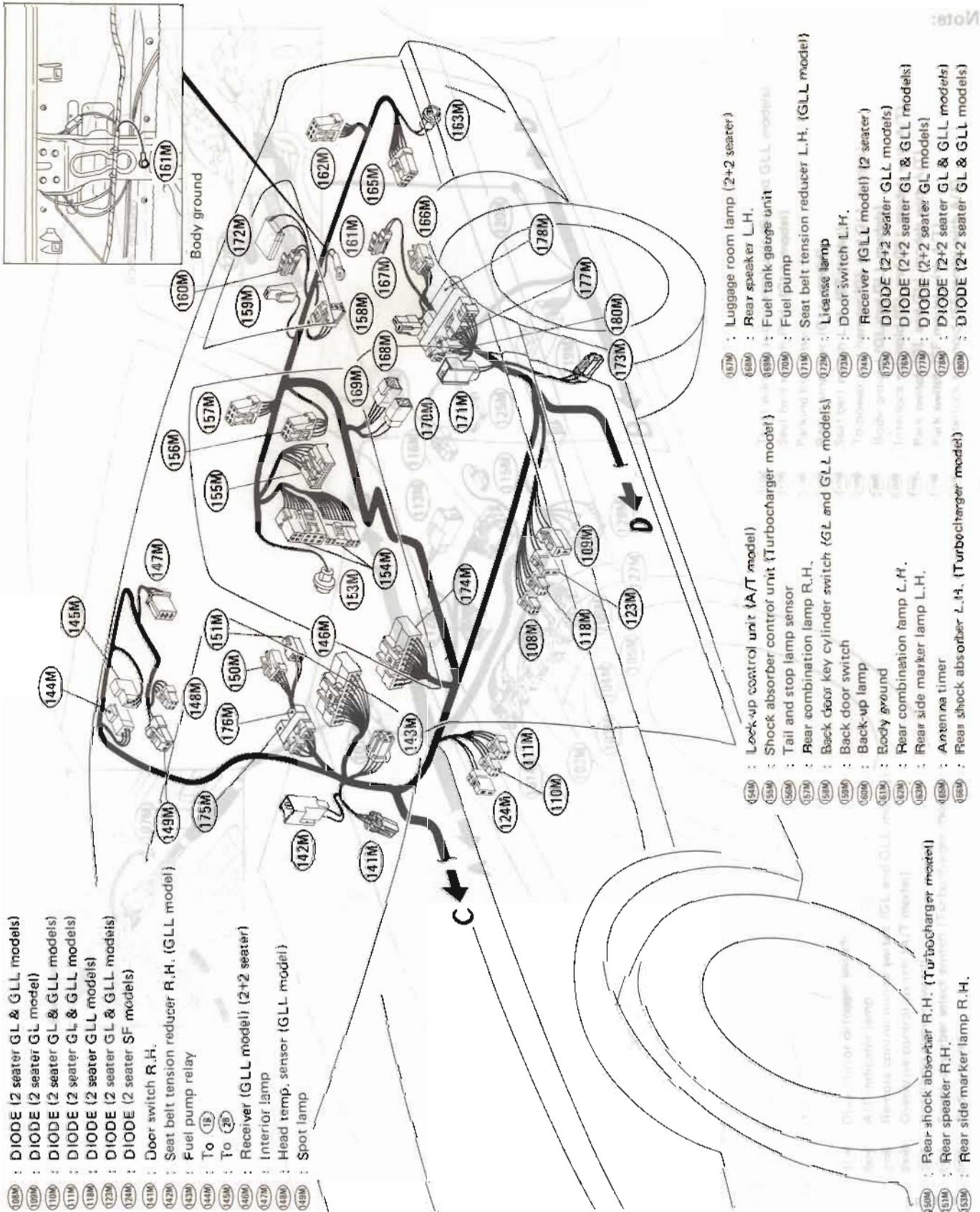
[Main Page](#)

Note:



HARNESS LAYOUT

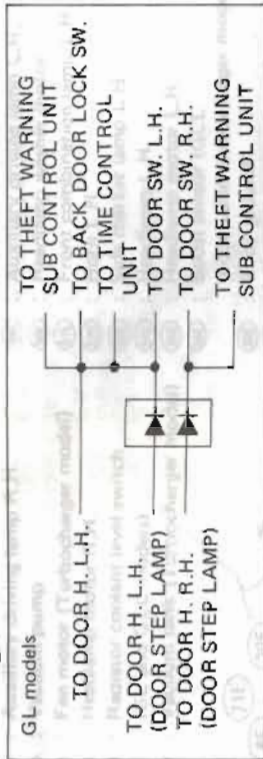
Main Harness (Cont'd)



HARNESS LAYOUT

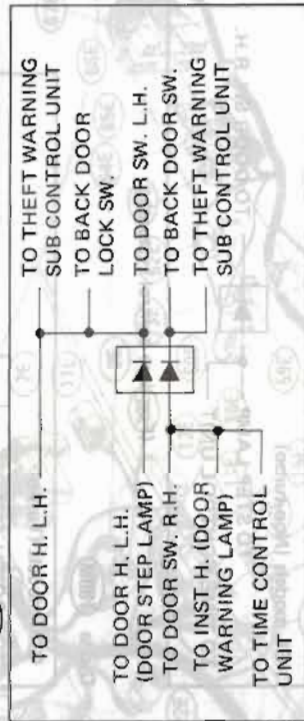
Main Harness (Cont'd)

Diode (111M)



(For interior lamp system theft warning system)

Diode (118M)



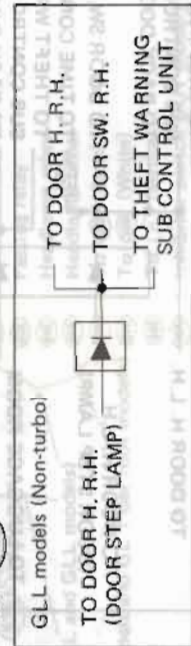
(For interior lamp system, time control system & theft warning system)

Diode (123M)



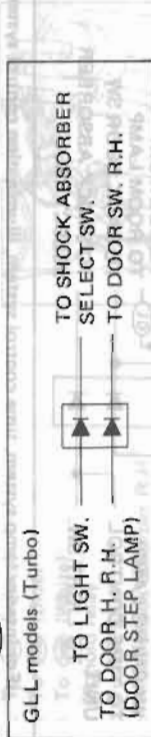
(For interior lamp system, time control system & theft warning system)

Diode (123M)



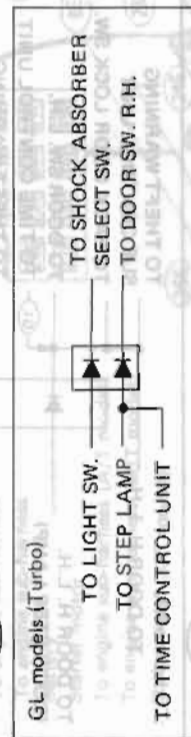
(For interior lamp system & theft warning system)

Diode (108M)



(For interior lamp system & illumination control system)

Diode (108M)

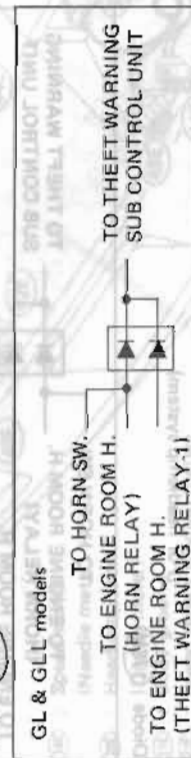


(For interior lamp system & illumination control system)

Diode (109M)

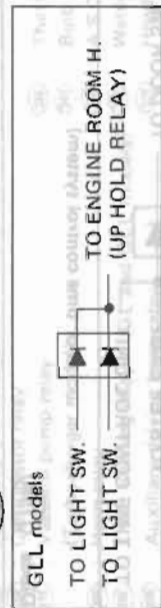


Diode (110M)



(For theft warning system)

Diode (111M)

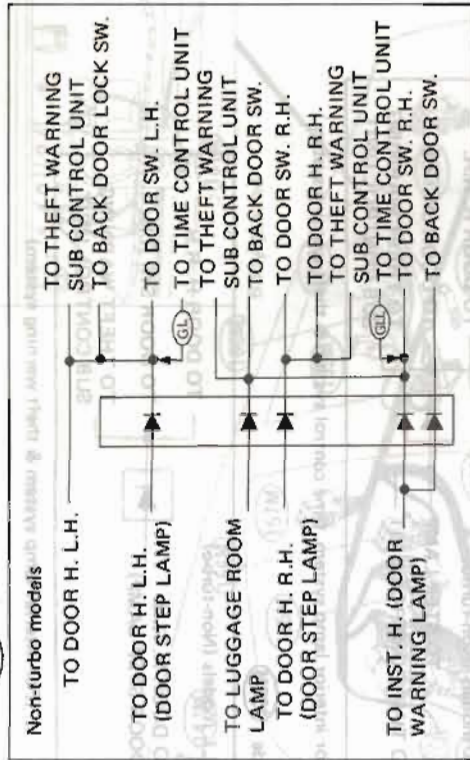


(For headlamp system)

HARNESS LAYOUT

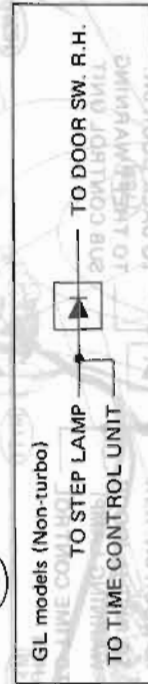
Main Harness (Cont'd)

Diode (178M)



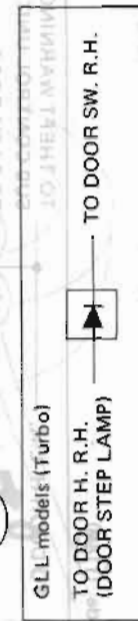
(For interior lamp system, time control system, illumination control system & theft warning system)

Diode (180M)



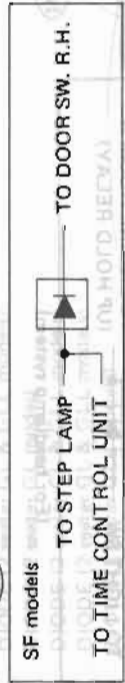
(For time control system)

Diode (180M)



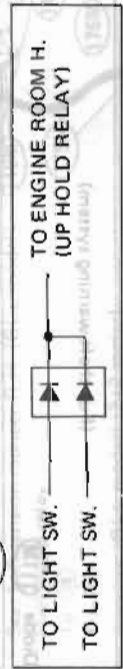
(For interior lamp system)

Diode (124M)



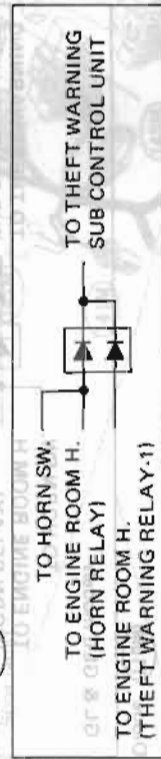
(For time control system)

Diode (175M)



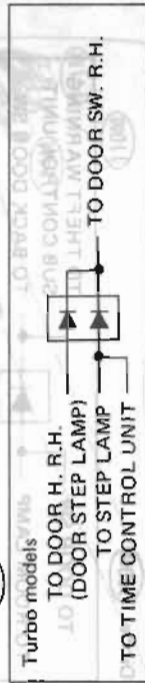
(For headlamp system)

Diode (176M)



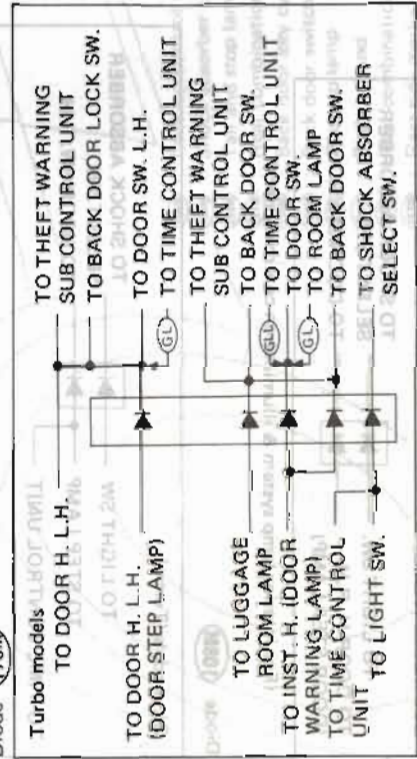
(For theft warning system)

Diode (177M)



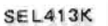
(For time control system)

Diode (178M)



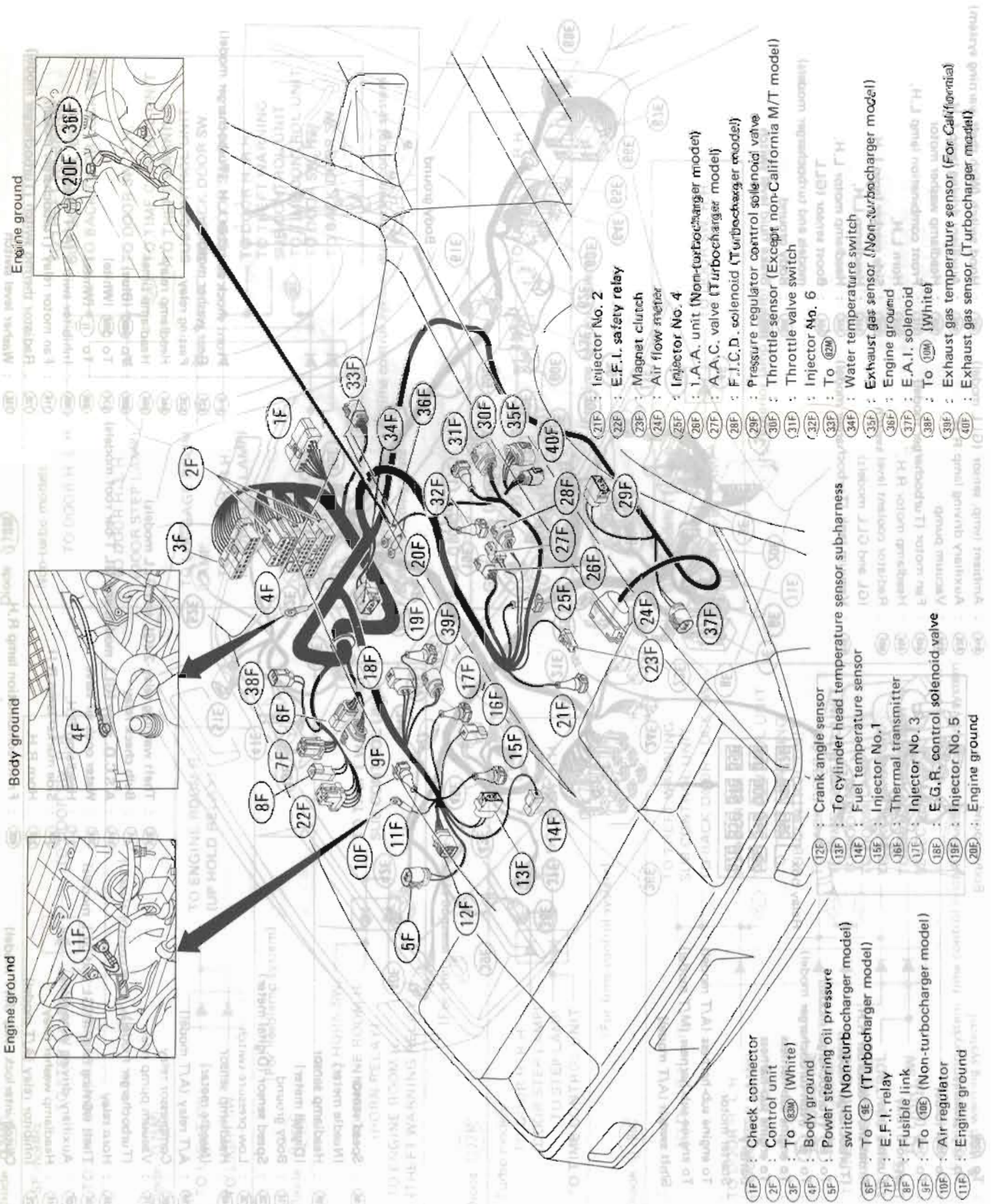
(For interior lamp system, time control system, illumination control system & theft warning system)

Engine Room Harness



HARNESS LAYOUT

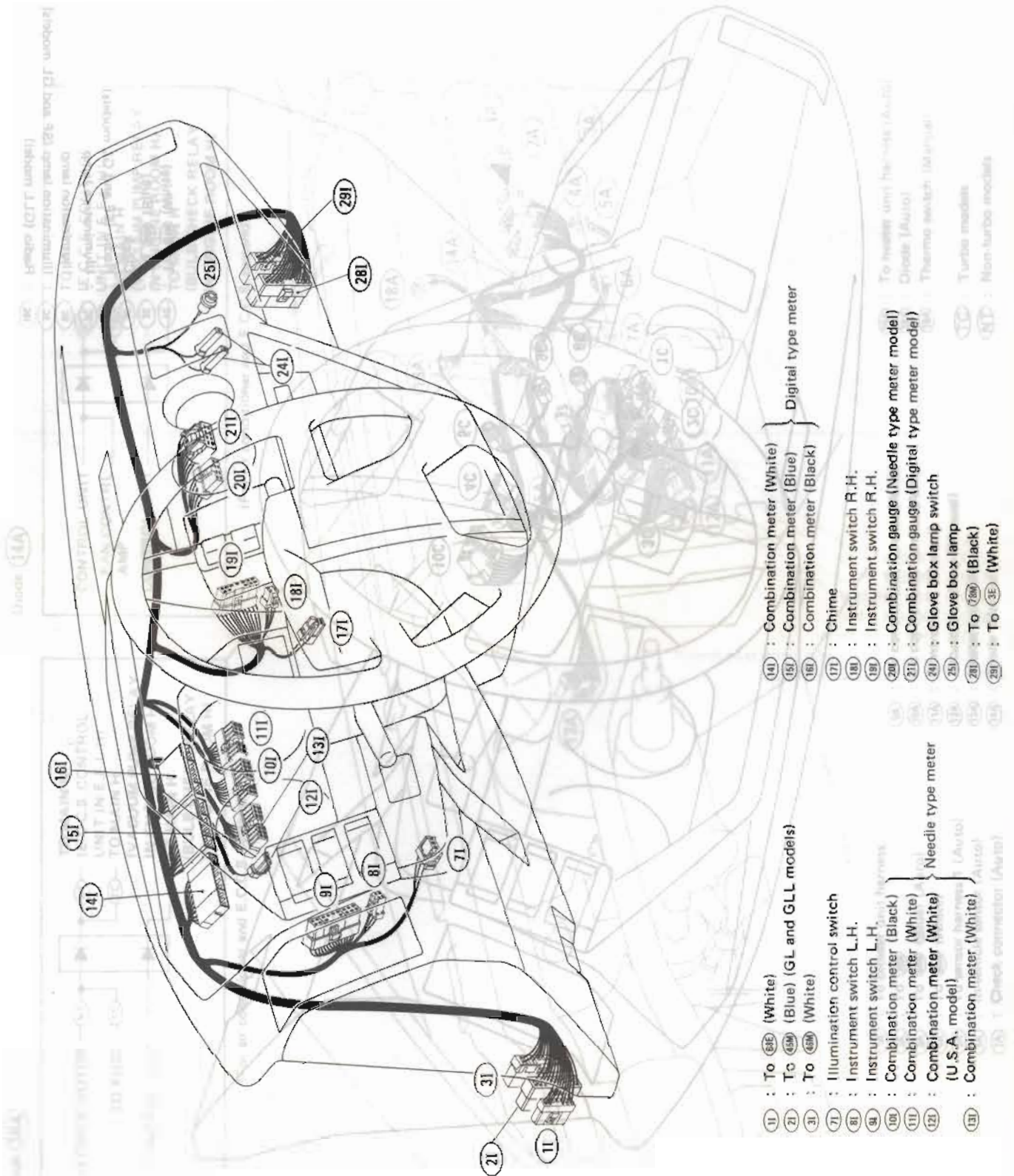
E.F.I. Harness



SEL450K

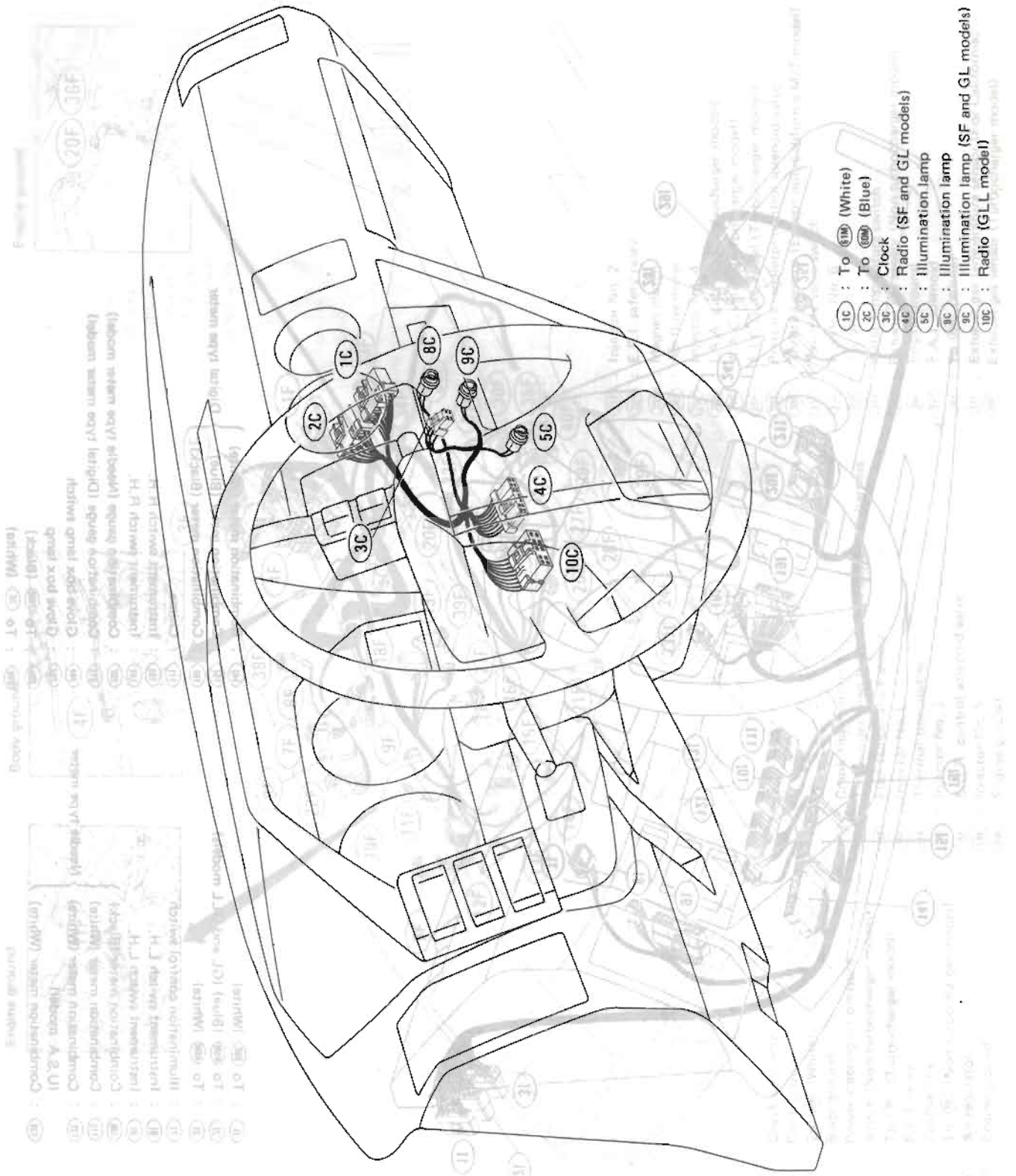
HARNESS LAYOUT

Instrument Harness



HARNESS LAYOUT

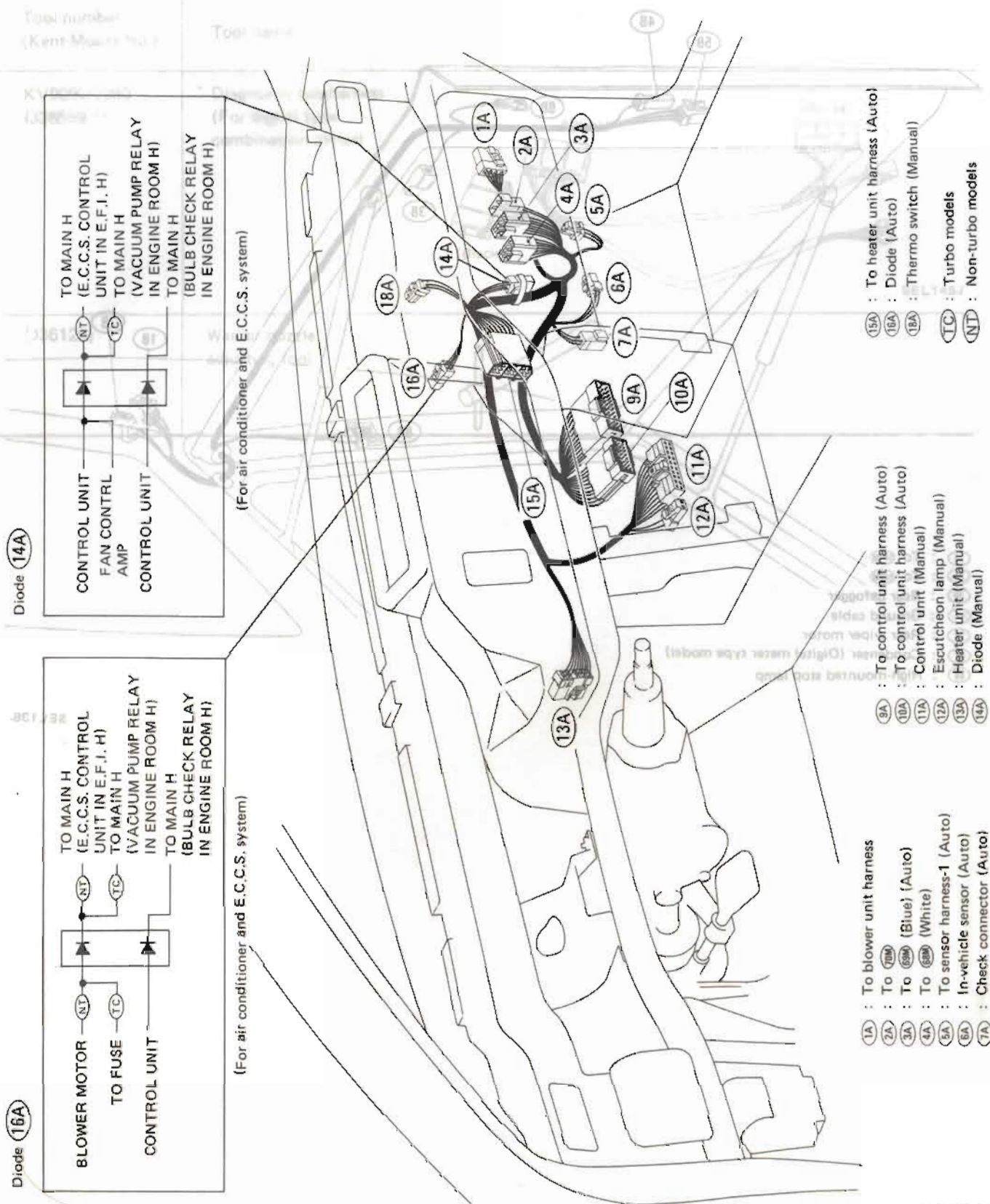
Console Harness



SPECIAL SERVICE TOOLS

HARNESS LAYOUT

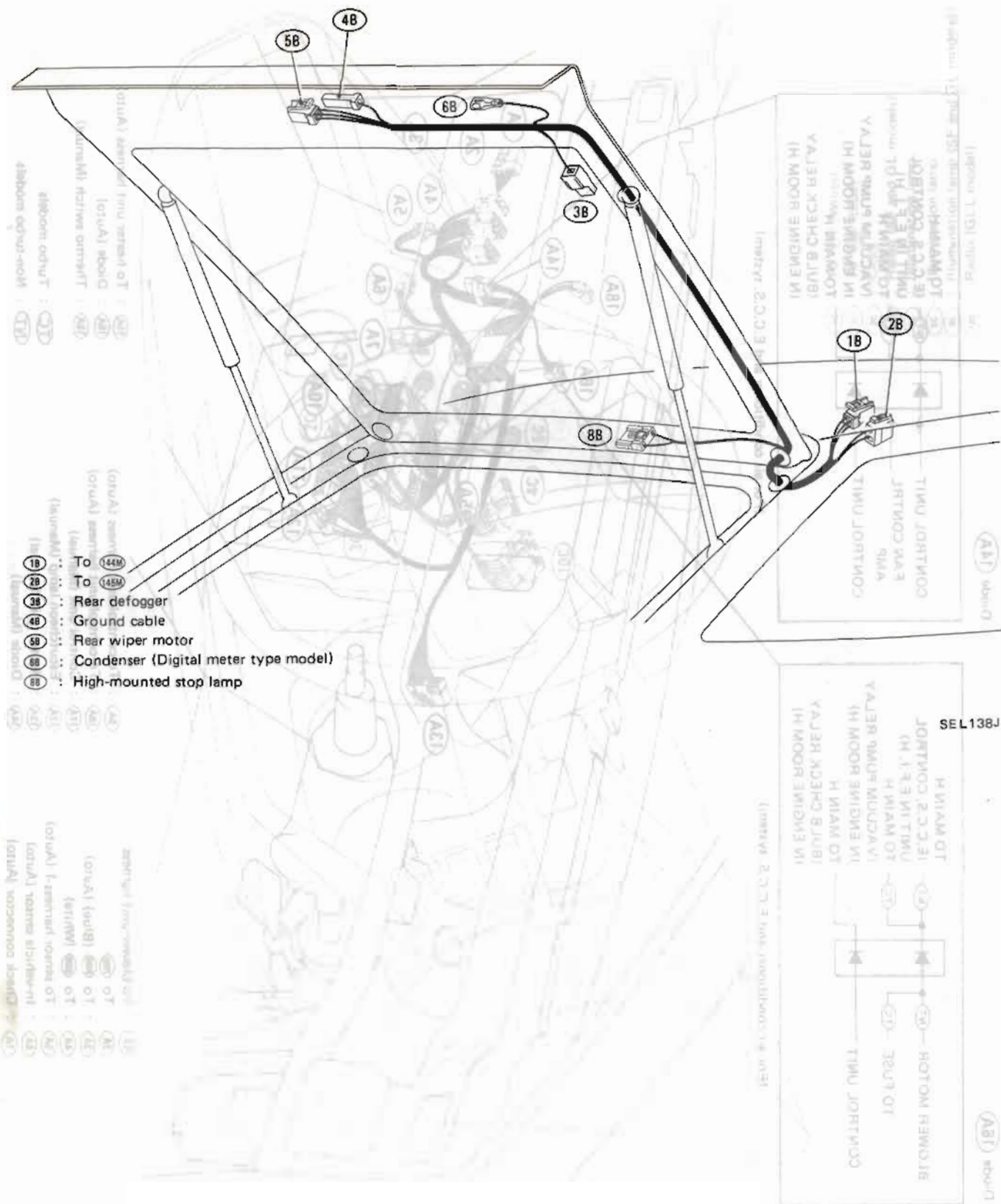
Air Conditioner Harness



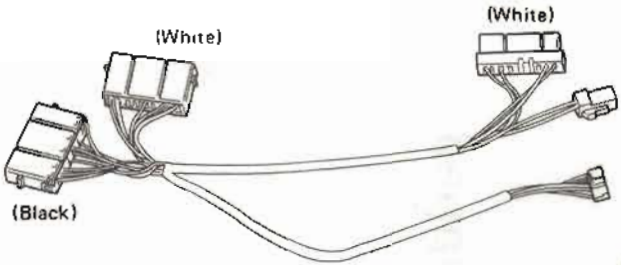
SEL416K

HARNESS LAYOUT

Back Door Harness



SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name
KV999U0060 (J36569-1)	<p data-bbox="340 365 586 457">Diagnostic sub-harness (For digital type combination meter)</p>  <p data-bbox="1292 640 1383 661">SEL145J</p>
(J36126)	<p data-bbox="340 697 491 756">Washer nozzle adjusting tool</p> 