ELECTRICAL SYSTEM

SECTION EL

When you read wiring diagrams:
● Read GI section, ''HOW TO READ WIRING DIAGRAMS''.
When you perform trouble diagnoses, read GI section, ''HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES'' and ''HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT''.

CONTENTS

WIRING DIAGRAM REFERENCE CHART

Supplemental Restraint System (SRS) ''AIR BAG'' (4WD models)

The Supplemental Restraint System ''AIR BAG'', used along with a seat belt, helps to reduce the risk or severity of injury to the driver in a frontal collision. The Supplemental Restraint System consists of an air bag module (located in the center of the steering wheel), a diagnosis sensor unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **RS section** of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses are covered with yellow insulation either just before the harness connectors or for the complete harness, for easy identification.**

Supplemental Restraint System (SRS) ''AIR BAG'' (2WD models)

The Supplemental Restraint System ''AIR BAG'', used along with a seat belt, helps to reduce the risk or severity of injury to the driver in a frontal collision. The Supplemental Restraint System consists of an air bag module (located in the center of the steering wheel), a diagnosis sensor unit, warning lamp and spiral cable. Information necessary to service the system safely is included in the **RS section** of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.**
- **Do not use electrical test equipment on any circuit related to the SRS.**

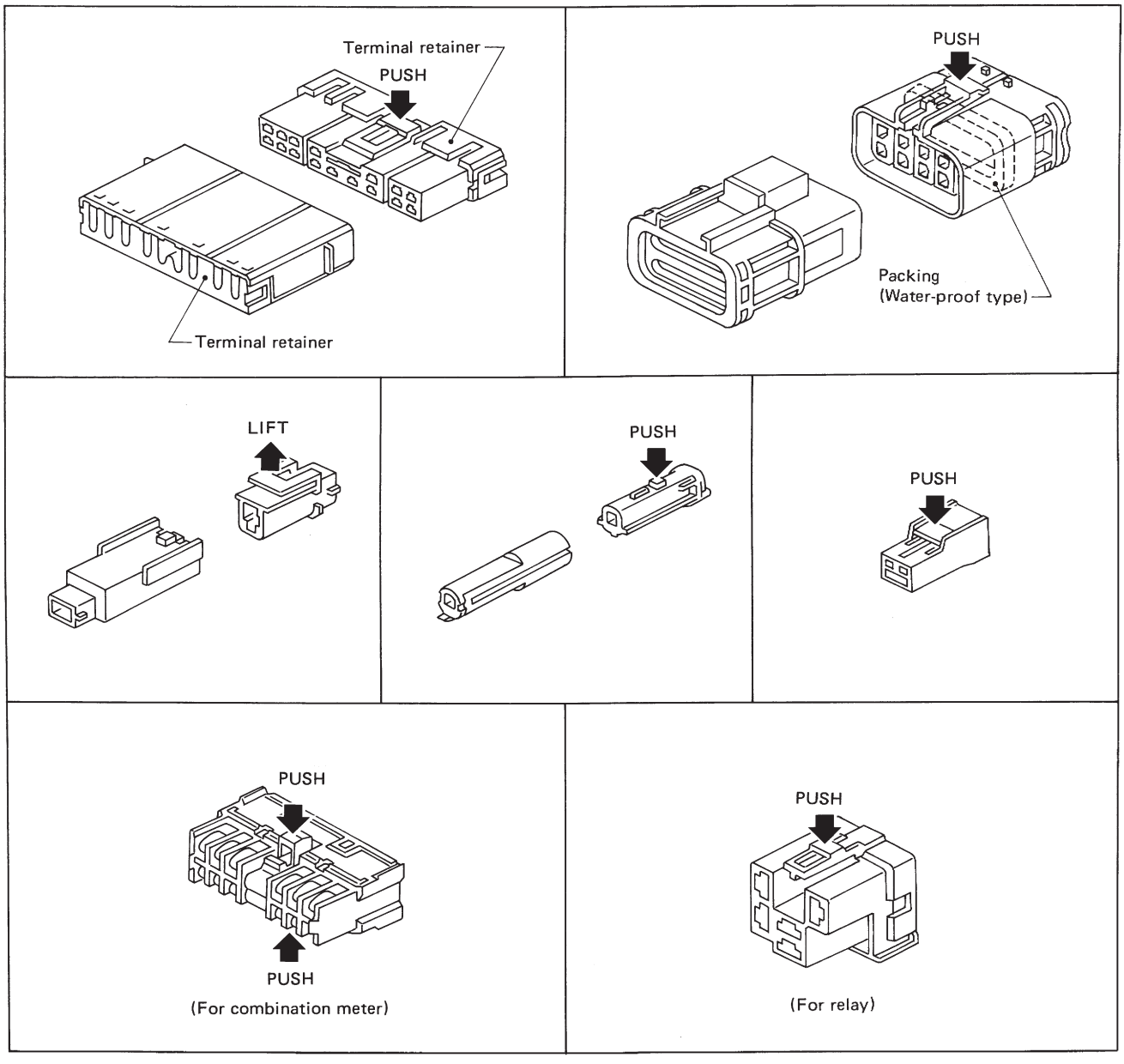
Description

HARNESS CONNECTOR

- All harness connectors have been modified to prevent accidental looseness or disconnection.
- The connector can be disconnected by pushing or lifting the locking section.

CAUTION:
Do not pull the harness when disconnecting the connector.

[Example]

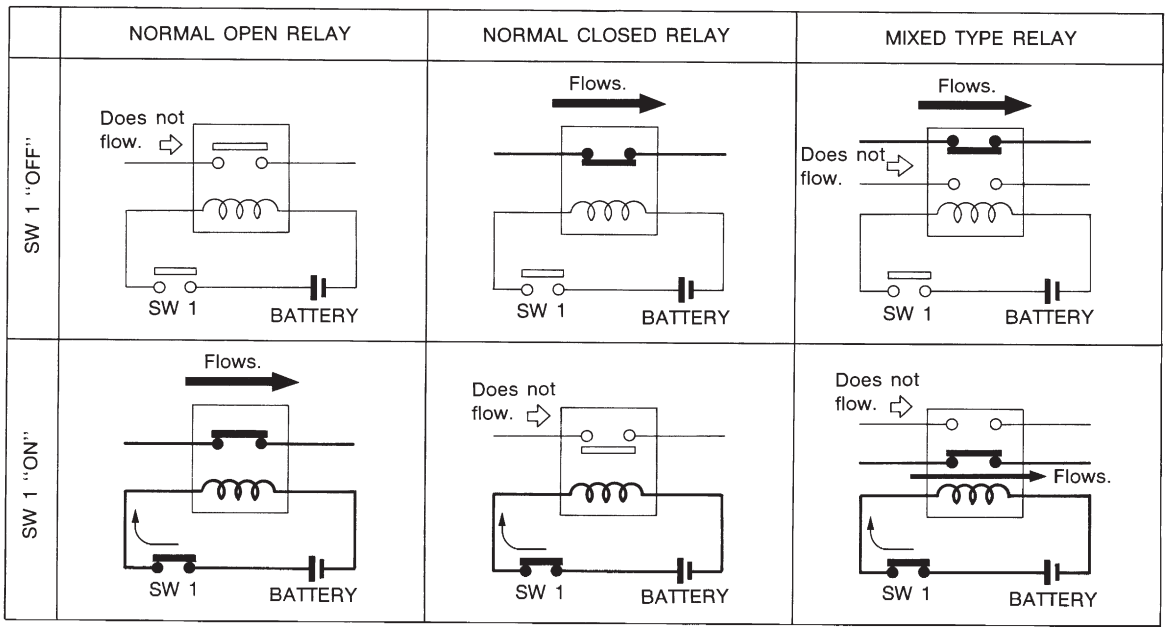


SEL769D

Description

NORMAL OPEN, NORMAL CLOSED AND MIXED TYPE RELAYS

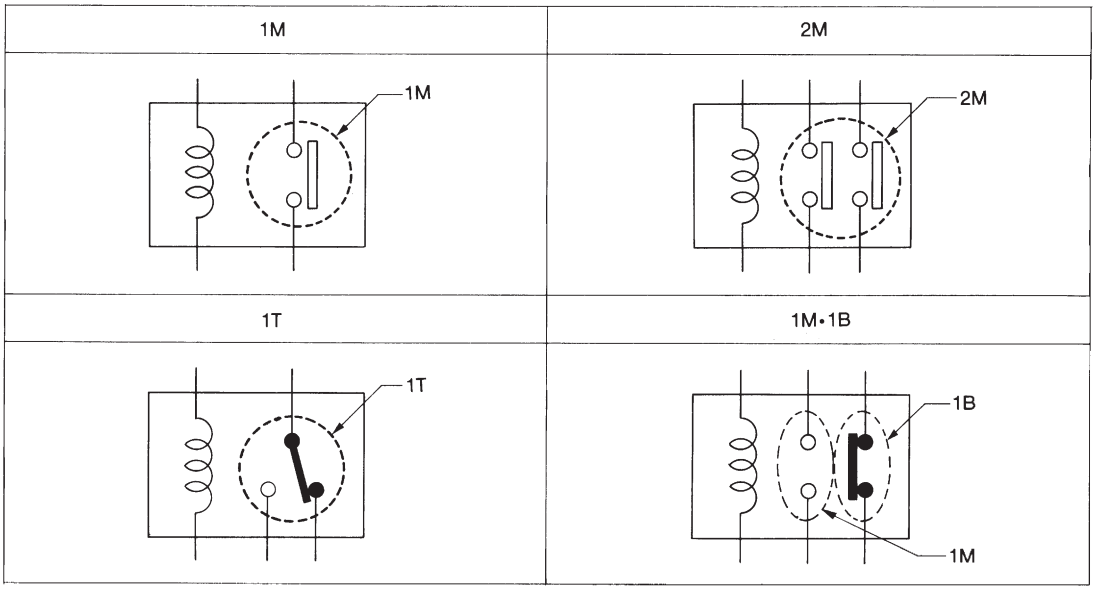
Relays can mainly be divided into three types: normal open, normal closed and mixed type relays.



SEL881H

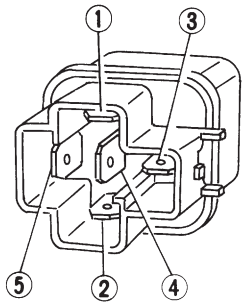
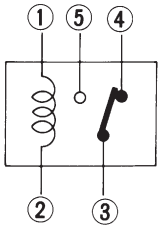
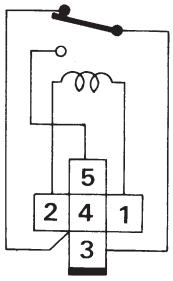
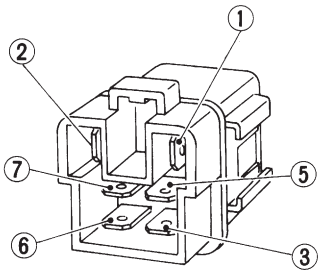
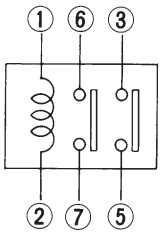
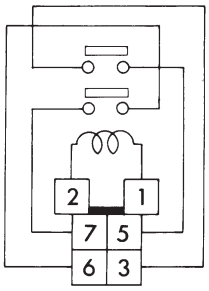
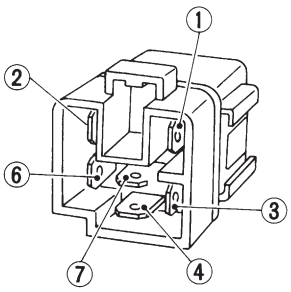
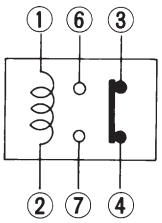
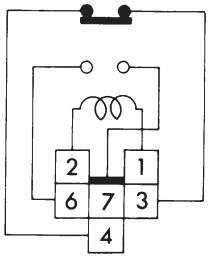
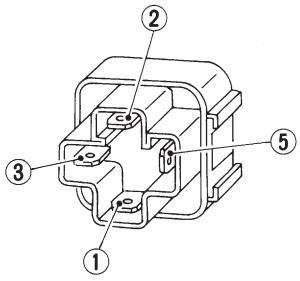
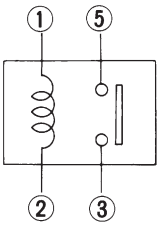
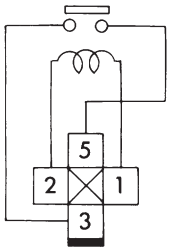
TYPE OF STANDARDIZED RELAYS

1M	.....	1 Make	2M	.....	2 Make
1T	.....	1 Transfer	1M·1B	.....	1 Make 1 Break



SEL882H

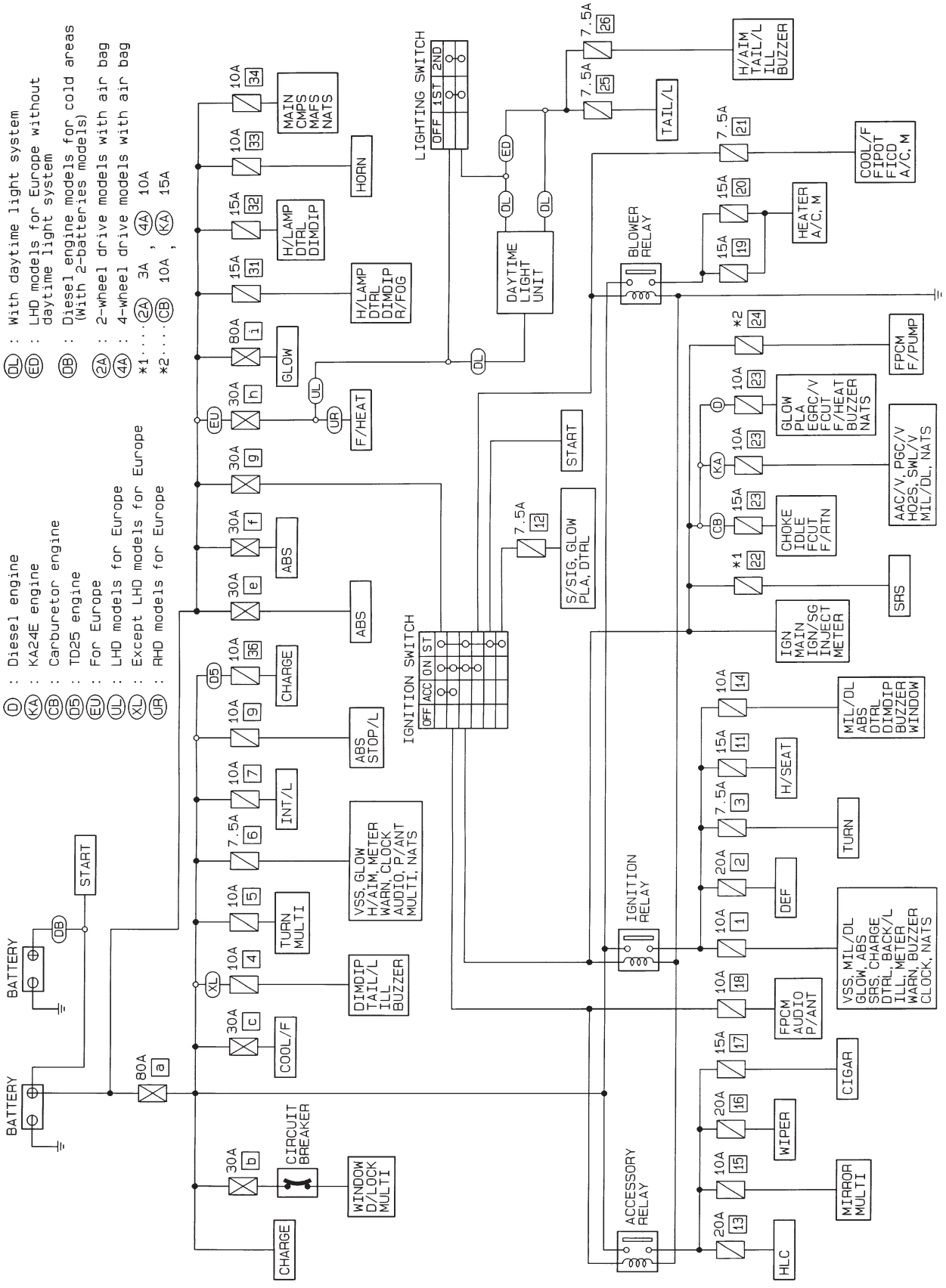
Description (Cont'd)

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

The arrangement of terminal numbers on the actual relays may differ from those shown above.

SEL661TA

Schematic

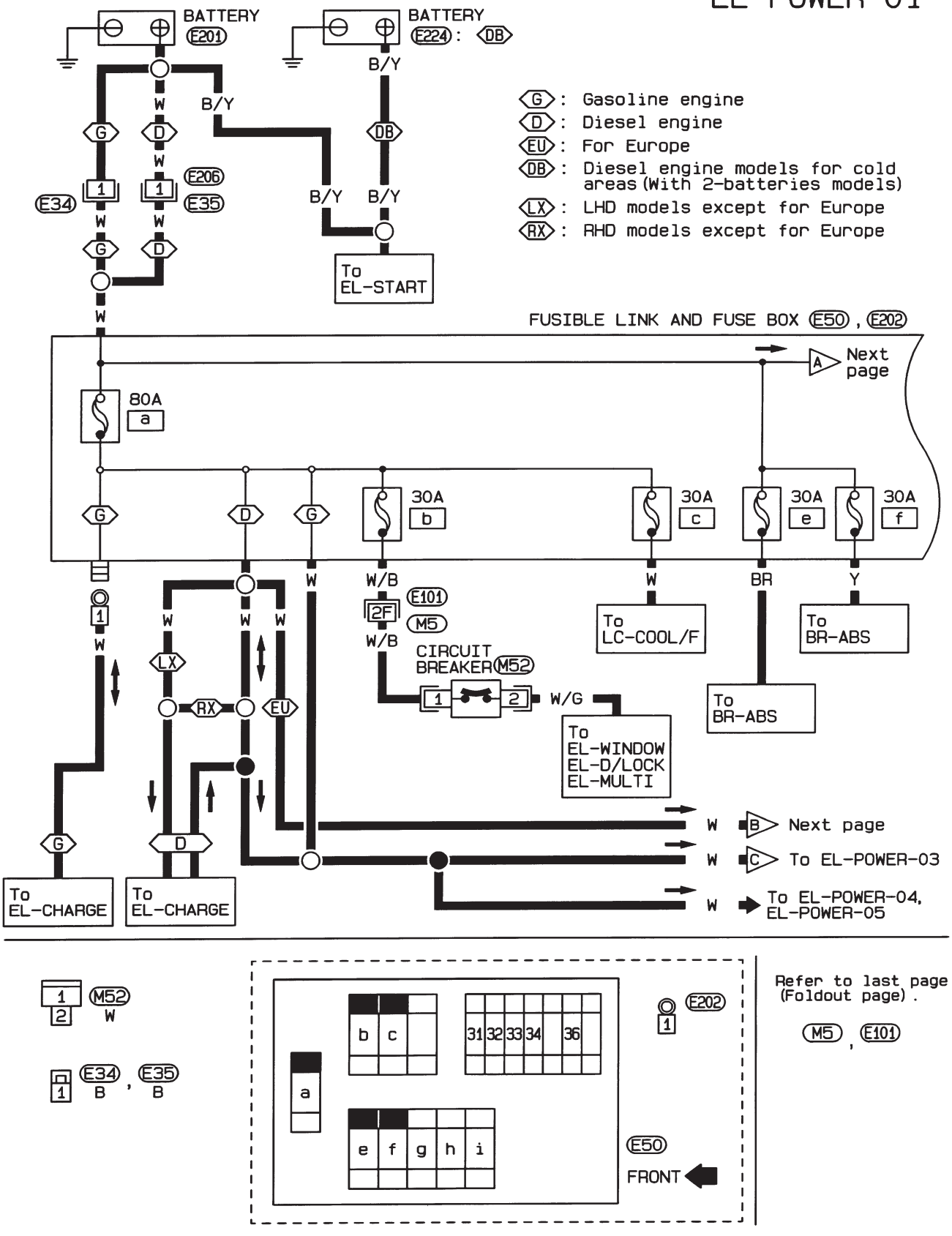


HEL309A

Wiring Diagram — POWER —

BATTERY POWER SUPPLY — IGNITION SWITCH IN ANY POSITION

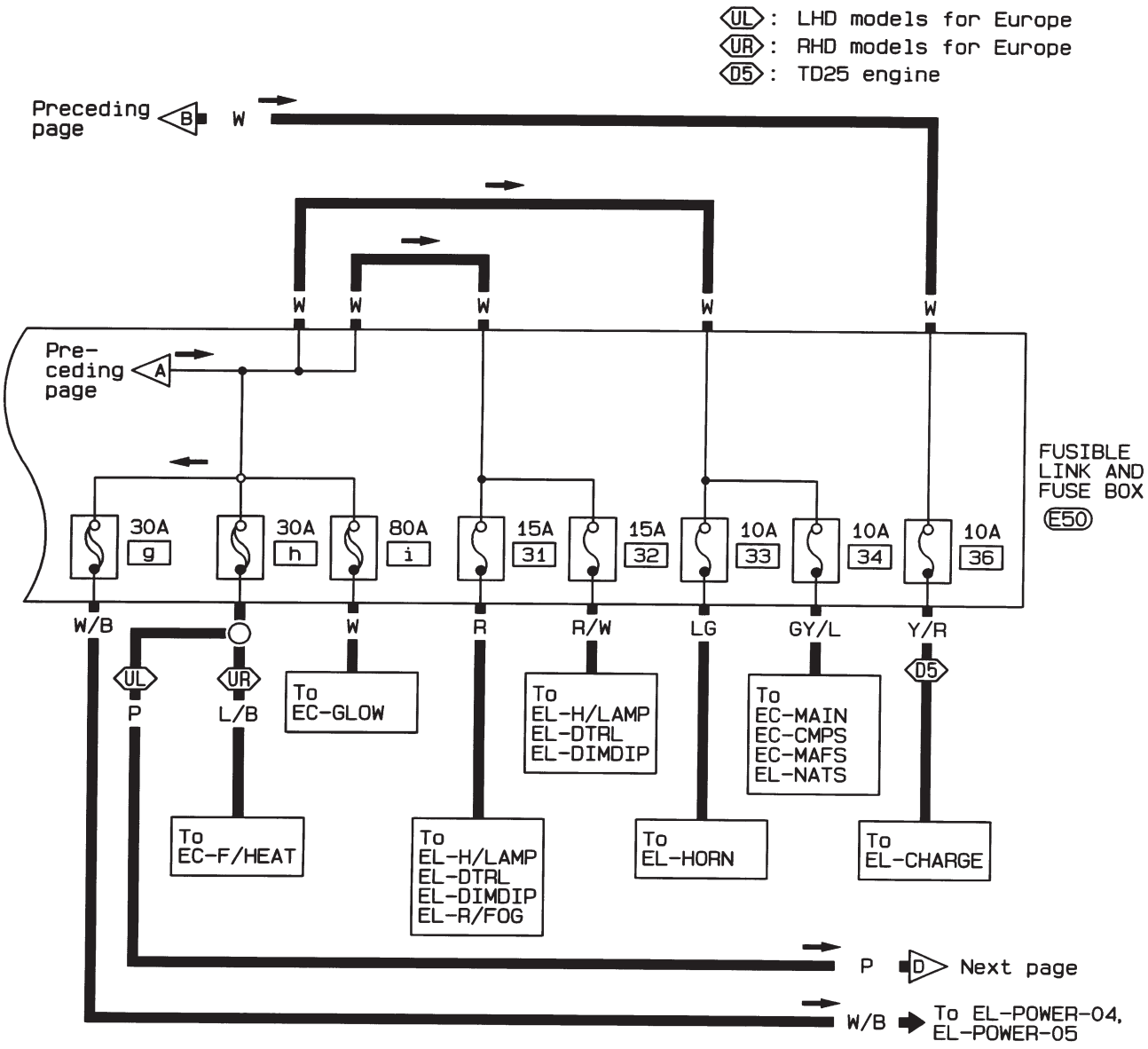
EL-POWER-01

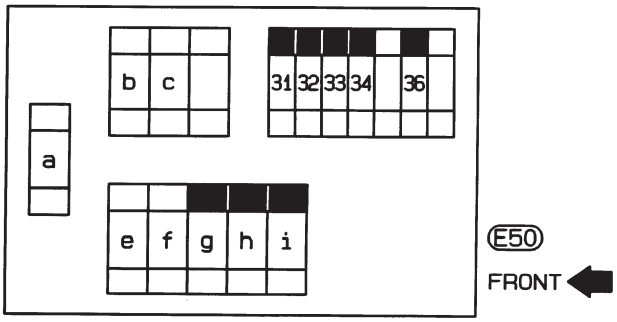


HEL310A

Wiring Diagram — POWER — (Cont'd)

EL-POWER-02



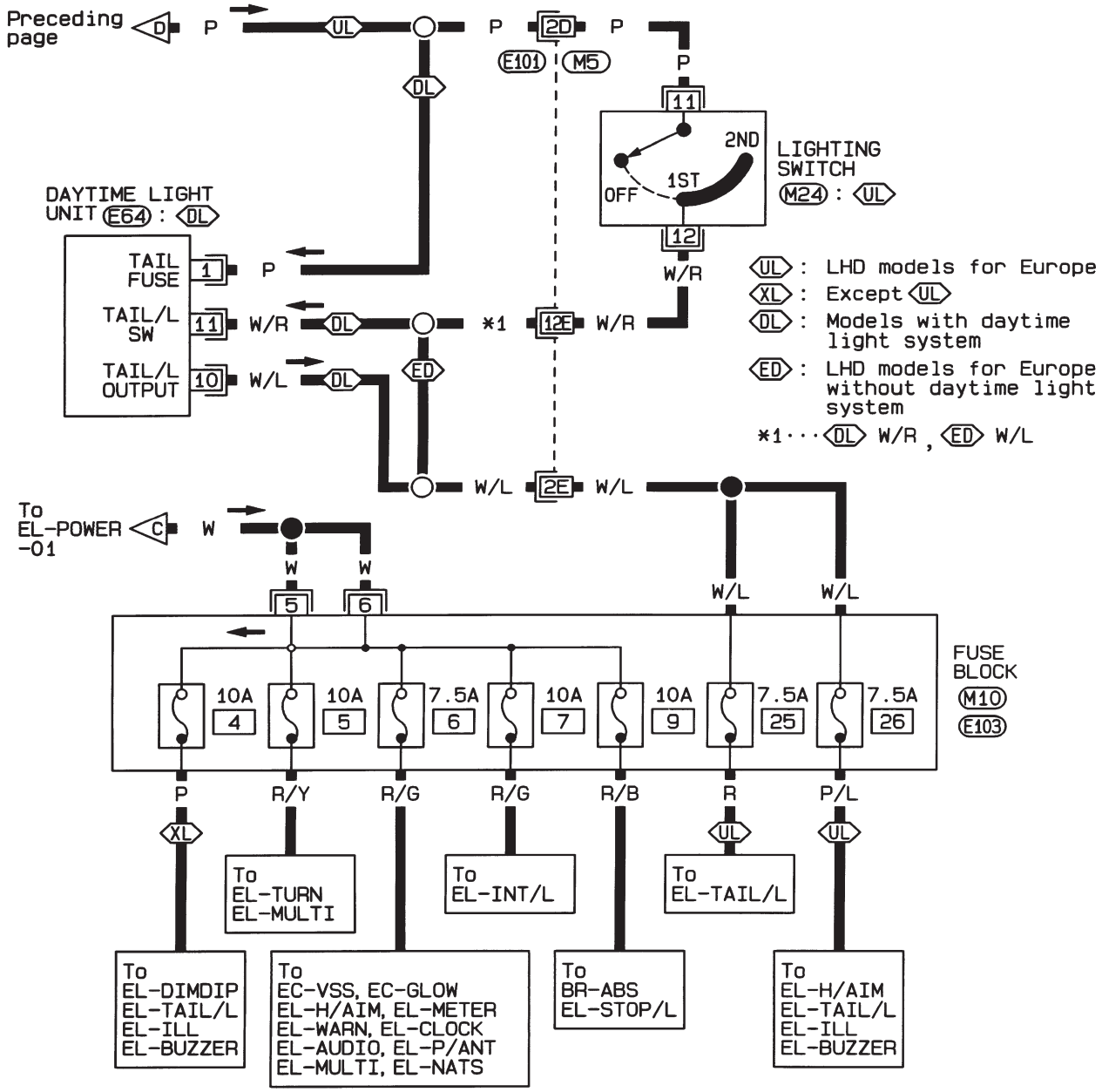


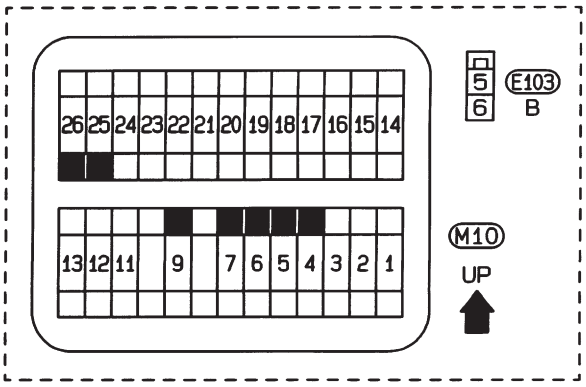
HEL311A

Wiring Diagram — POWER — (Cont'd)

BATTERY POWER SUPPLY — IGNITION SW. IN ANY POSITION

EL-POWER-03



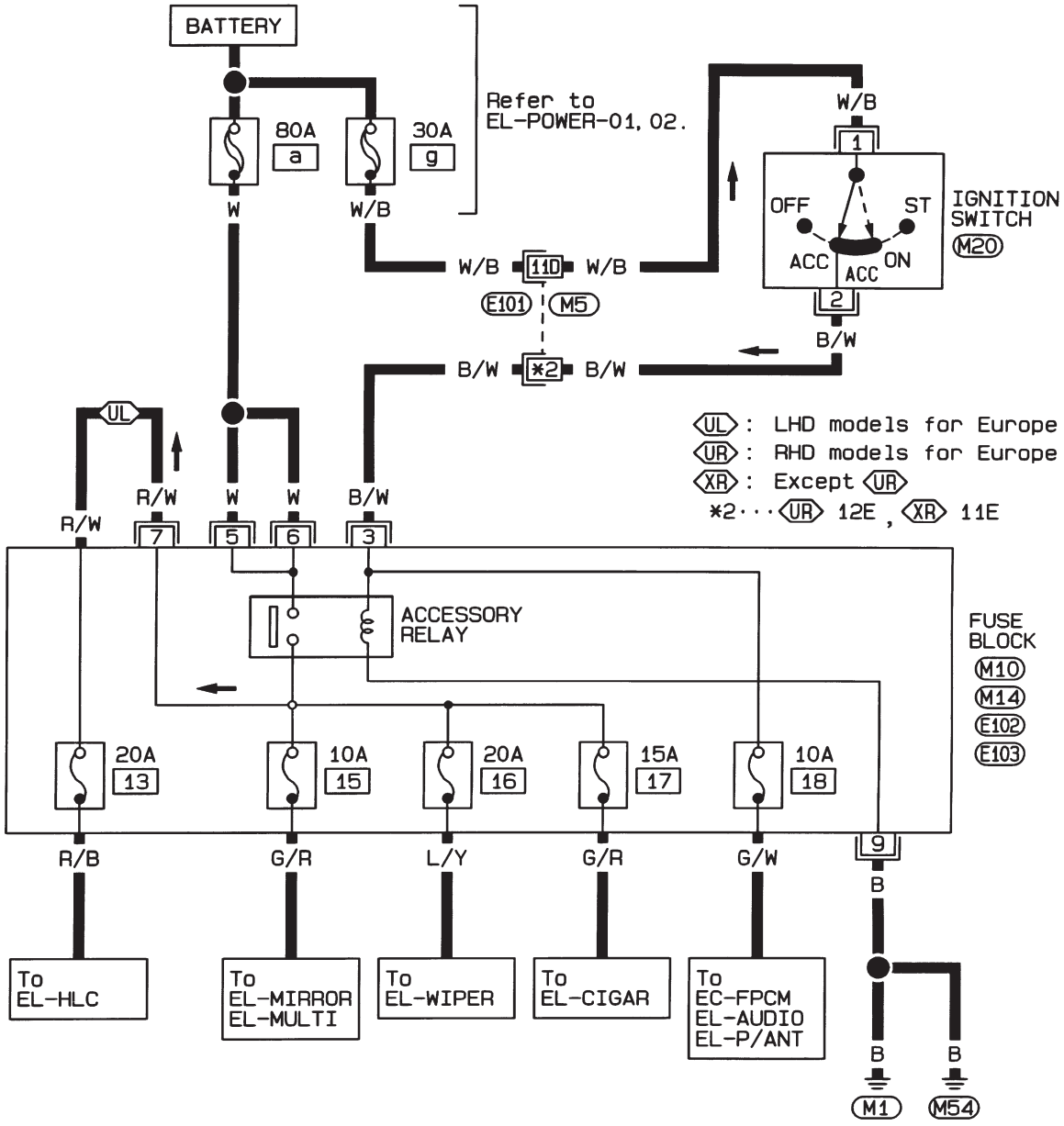


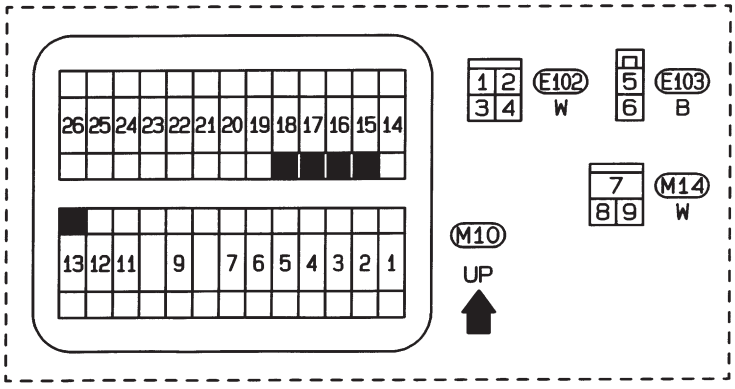
Refer to last page (Foldout page).
M5 , E101

HEL312A

Wiring Diagram — POWER — (Cont'd)

EL-POWER-04





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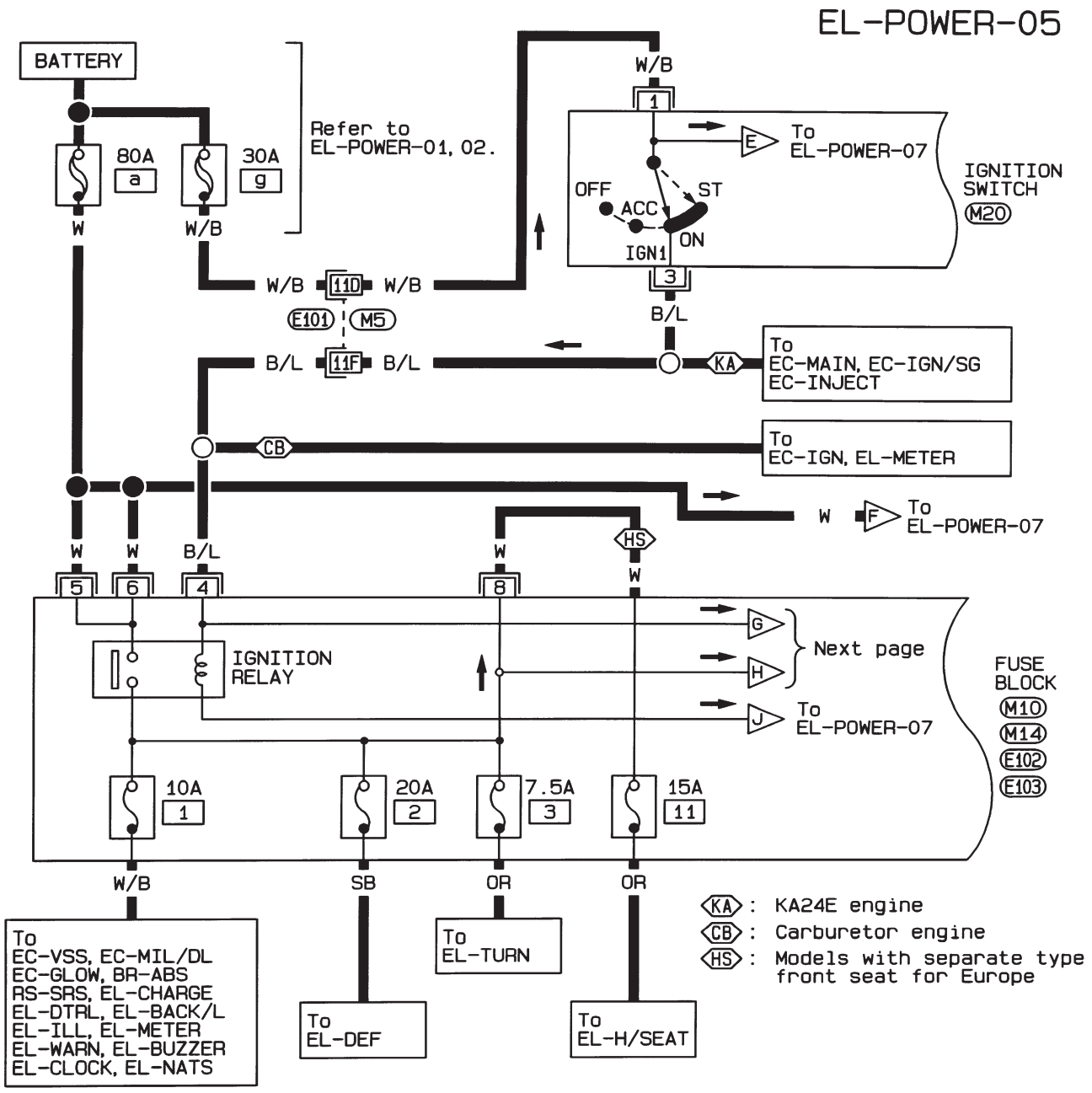
(Foldout page).

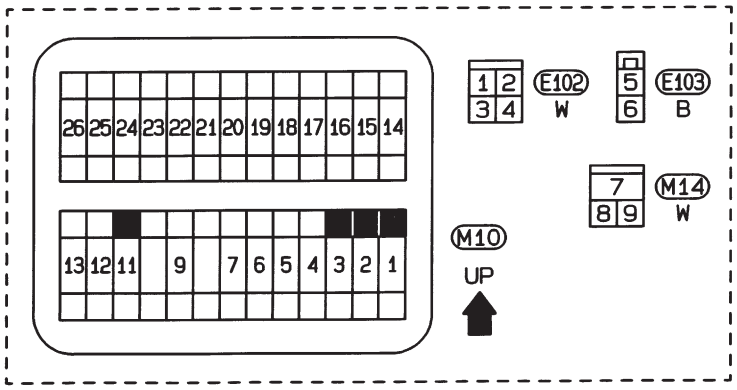
M5 , E101

HEL313A

Wiring Diagram — POWER — (Cont'd)

ACCESSORY POWER SUPPLY — IGNITION SW. IN "ACC" OR "ON"





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(Foldout page).
M5, E101

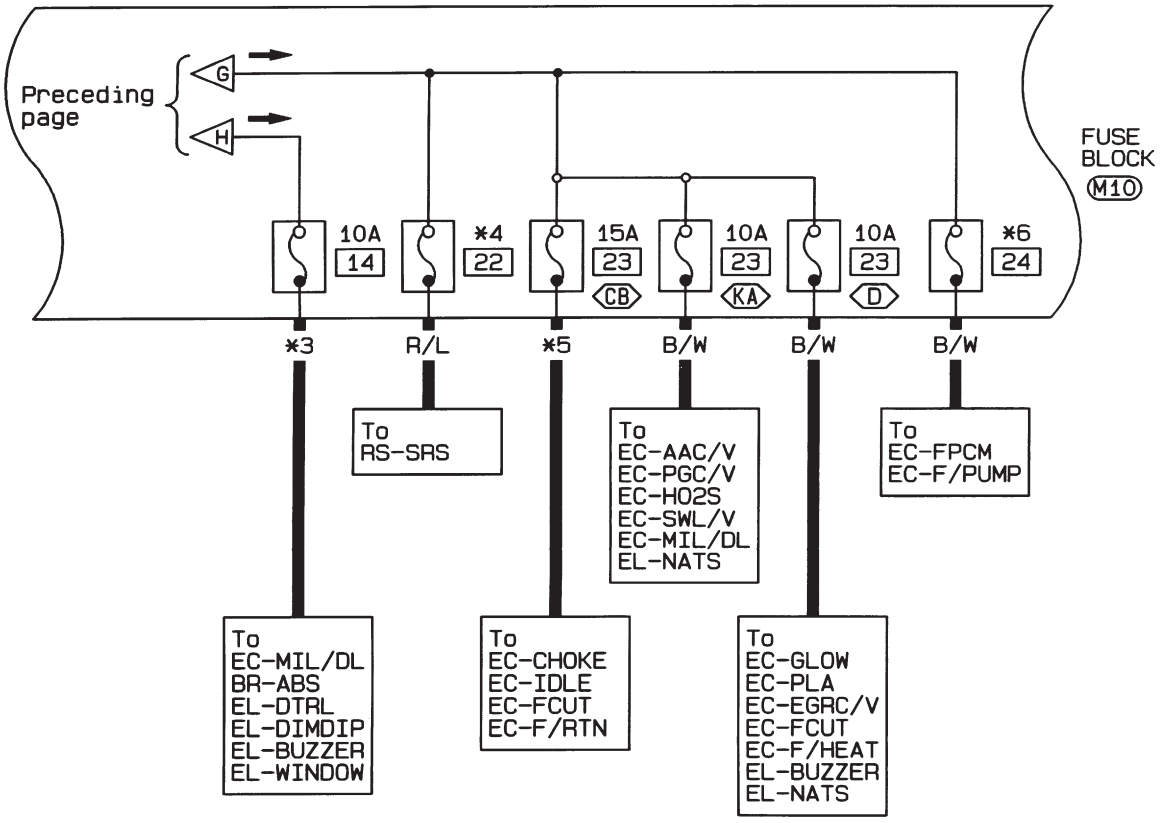
HEL314A

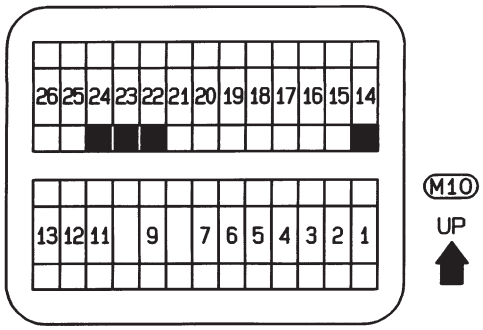
Wiring Diagram — POWER — (Cont'd)

IGNITION POWER SUPPLY — IGNITION SW. IN "ON" AND/OR "START"

EL-POWER-06

(D) : Diesel engine
(NA) : NA20S engine
(Z) : Z24S engine
(KA) : KA24E engine
(CB) : Carburetor engine
(AS) : Models with ABS
(PW) : Models with power window without ABS
(PN) : Models without ABS and power window
(2A) : 2-wheel drive models with air bag
(4A) : 4-wheel drive models with air bag
*3 : For Europe ····· OR
Except for Europe ··· (AS) OR , (PW) W/B , (PN) B/W
*4 ··· (2A) 3A , (4A) 10A
*5 ··· (NA) W/G , (Z) W/L
*6 ··· (CB) 10A , (KA) 15A

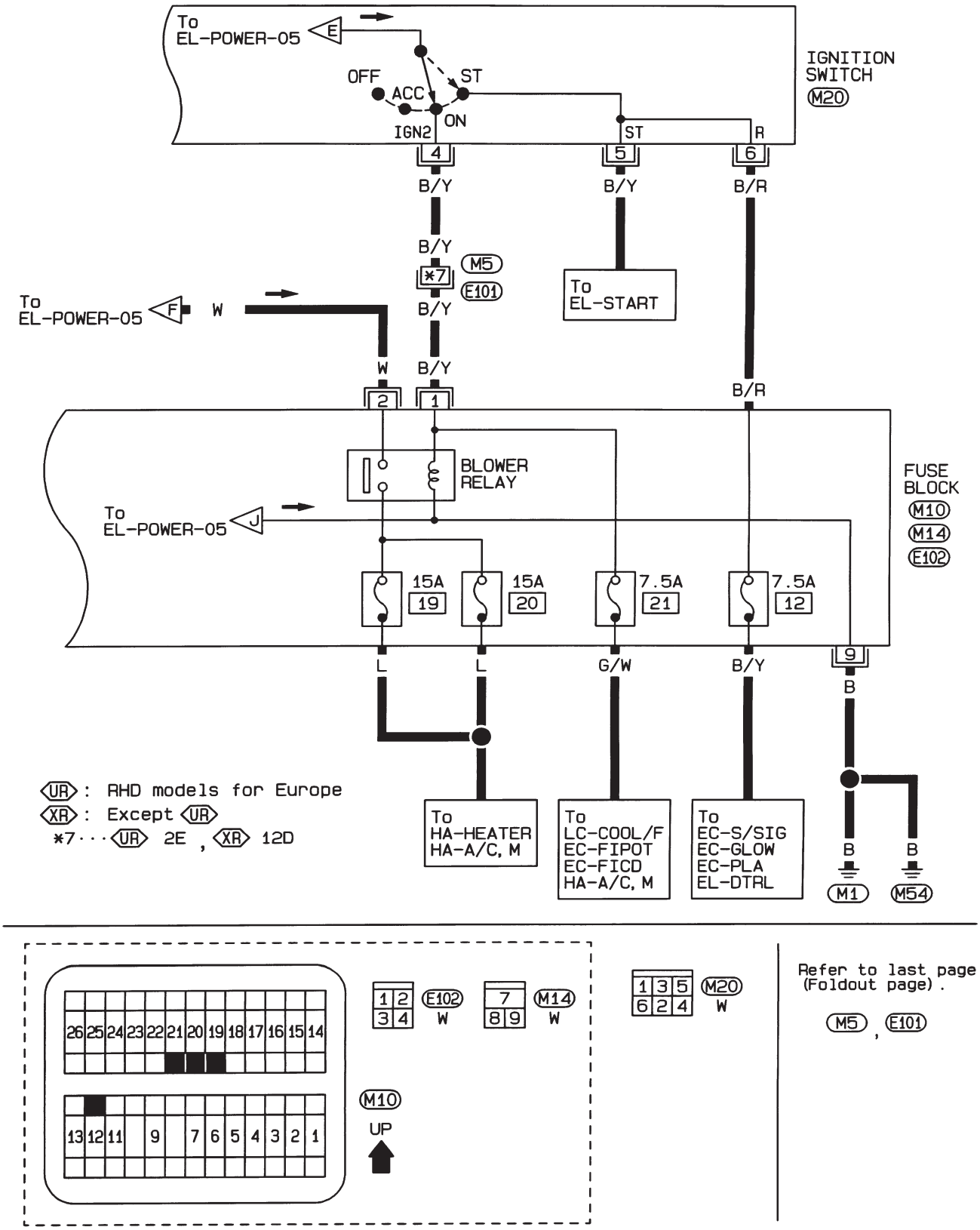




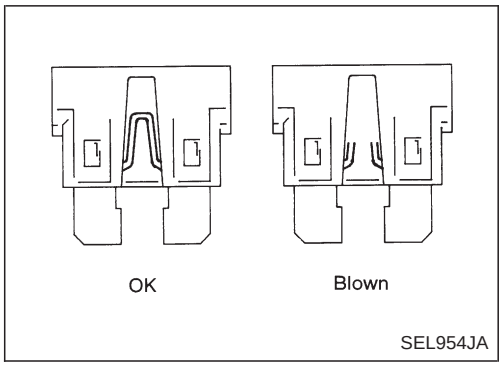
HEL315A

Wiring Diagram — POWER — (Cont'd)

EL-POWER-07

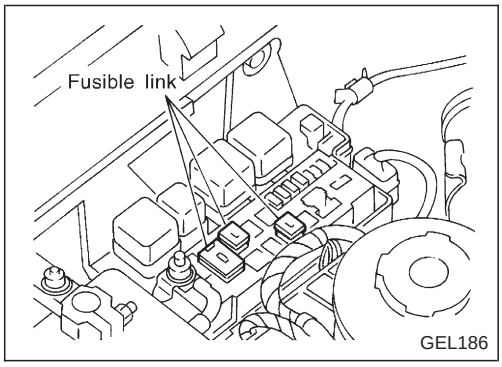


HEL316A



Fuse

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

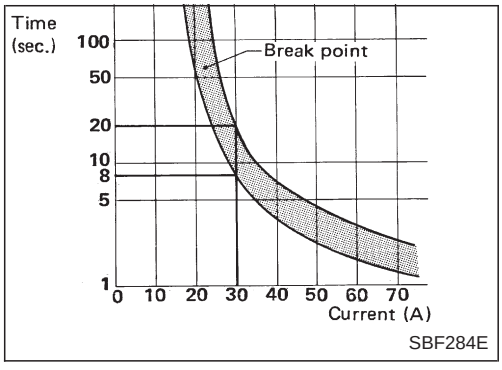


Fusible Link

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

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 outside of fusible link with vinyl tape. Important: Never let fusible link touch any other wiring harness, vinyl or rubber parts.**



Circuit Breaker Inspection

For example, when current is 30A, the circuit is broken within 8 to 20 seconds.

Circuit breakers are used in the following systems.

- Power window
- Power door lock
- Multi-remote control system

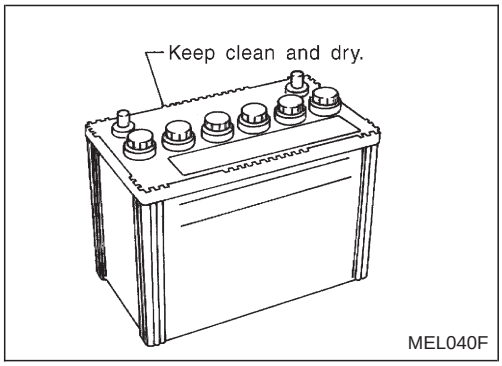
EARTH	CONNECT TO	CONN. NO.	CELL CODE
M1/M54	ACCESSORY RELAY (In fuse block)	M14	EL-POWER
	AIR BAG DIAGNOSIS SENSOR UNIT (4WD models)	M110	RS-SRS
	ASHTRAY ILLUMINATION	M34	EL-ILL
	BLOWER RELAY (In fuse block)	M14	EL-POWER
	CHECK CONNECTOR (NA engine)	M12	EC-CHOKE
	CHECK CONNECTOR (Z engine)	M13	EC-CHOKE
	CIGARETTE LIGHTER SOCKET	M37	EL-CIGAR
	COMBINATION FLASHER UNIT	M15	EL-TURN
	DOOR LOCK TIMER	M51	EL-D/LOCK
	DOOR SWITCH DRIVER SIDE (For Europe)	M118	EL-BUZZER EL-MULTI
	ECM (ENGINE CONTROL MODULE)	M66	EC-GLOW EC-PLA EC-EGRC/V
	FAN SWITCH ILLUMINATION (Except for Europe and Australia)	M403	HA-HEATER HA-A/C,M EL-ILL
	FAN SWITCH ILLUMINATION (For Europe and Australia)	M40	HA-HEATER HA-A/C,M EL-ILL
	FAN SWITCH (Except for Europe and Australia)	M404	EC-FIPOT HA-HEATER HA-A/C,M
	FAN SWITCH (For Europe and Australia)	M39	HA-HEATER HA-A/C,M
	FRONT SEAT LH	M119	EL-H/SEAT
	FRONT SEAT RH	M122	EL-H/SEAT
	FRONT WIPER AMPLIFIER (RHD models without KA engine and LHD models)	M220	EL-WIPER
	FRONT WIPER AND WASHER SWITCH	M28	EL-WIPER
	FRONT WIPER MOTOR (RHD models without KA engine and LHD models)	M221	EL-WIPER
	FUEL FILTER SWITCH (LHD models with diesel engine)	M259	EL-WARN EL-BUZZER
	FUEL PUMP CONTROL MODULE	M22	EC-FPCM
	FUEL RETURN CONTROL SOLENOID VALVE (LHD models with NA engine)	M257	EC-F/RTN
	GLOW CONTROL UNIT (TD27 engine except for cold areas and QD engine)	M29	EC-GLOW EC-PLA
	GLOW CONTROL UNIT (TD27 engine for cold areas)	M30	EC-GLOW EC-PLA
	GLOW RELAY-1 (LHD models with diesel engine except for Europe)	M253	EC-GLOW
	GLOW RELAY-2 (TD27 engine for cold areas)	M256	EC-GLOW
	HAZARD SWITCH	M41	EL-TURN EL-ILL
	HEADLAMP WASHER SWITCH	M70	EL-ILL EL-HLC
	HEATED SEAT SWITCH LH	M602	EL-H/SEAT
	HEATED SEAT SWITCH RH	M603	EL-H/SEAT
	IACV-FICD SOLENOID VALVE (KA engine)	M203	EC-FICD HA-A/C,M
	IGNITION RELAY (In fuse block)	M14	EL-POWER
	MULTI-REMOTE CONTROL RELAY-3	M706	EL-MULTI
	MULTI-REMOTE CONTROL RELAY-4	M707	EL-MULTI
	MULTI-REMOTE CONTROL UNIT	M703	EL-MULTI
	POWER WINDOW RELAY	M9	EL-WINDOW
	REAR WINDOW DEFOGGER SWITCH	M42	EL-DEF
	SEAT BELT SWITCH	M109	EL-WARN
	SPIRAL CABLE (2WD models with air bag)	M26	RS-SRS
	COMBINATION METER (4WD WARNING LAMP)	N6	EL-WARN
	COMBINATION METER (ABS WARNING LAMP)	N6	BR-ABS EL-WARN

EARTH	CONNECT TO	CONN. NO.	CELL CODE
M1/M54	COMBINATION METER (AIR BAG WARNING LAMP)	N5	RS-SRS EL-WARN
	COMBINATION METER (CLOCK ILLUMINATION)	N6	EL-ILL EL-CLOCK
	COMBINATION METER (DIGITAL CLOCK)	N6	EL-CLOCK
	COMBINATION METER (FUEL GAUGE)	N5	EL-METER
	COMBINATION METER (HIGH BEAM INDICATOR)	N5	EL-H/LAMP EL-DTRL EL-DIMDIP
	COMBINATION METER (METER ILLUMINATION)	N6	EL-ILL
	COMBINATION METER (ODO/TRIP METER ILLUMINATION)	N6	EL-ILL
	COMBINATION METER (REAR FOG LAMP INDICATOR)	N6	EL-R/FOG
	COMBINATION METER (TURN LH INDICATOR)	N6	EL-TURN
	COMBINATION METER (TURN RH INDICATOR)	N6	EL-TURN
	COMBINATION METER (UNIFIED METER CONTROL UNIT)	N5	EC-VSS EC-GLOW EL-METER
	COMBINATION METER (WATER TEMP. GAUGE)	N5	EL-METER
	DOOR MIRROR REMOTE CONTROL SWITCH	N3	EL-MIRROR
	FRONT WIPER AMPLIFIER (RHD models with KA engine)	F20	EL-WIPER
	FRONT WIPER MOTOR (RHD models with KA engine)	F21	EL-WIPER
	HEADLAMP AIMING SWITCH	N7	EL-H/AIM
	INTERIOR LAMP (Single cab and King cab)	R4	EL-INT/L
	SPOT LAMP	R3	EL-INT/L
	FUEL TANK GAUGE UNIT (With electric fuel pump)	C3	EC-FPCM EC-F/PUMP EL-METER EL-WARN
	FUEL TANK GAUGE UNIT (With mechanical fuel pump)	C4	EL-METER EL-WARN
	LICENSE PLATE LAMP LH (With step bumper)	T7	EL-TAIL/L
	LICENSE PLATE LAMP LH (Without step bumper)	T6	EL-TAIL/L
	LICENSE PLATE LAMP RH (With step bumper)	T3	EL-TAIL/L
	LICENSE PLATE LAMP RH (Without step bumper)	T5	EL-TAIL/L
	REAR COMBINATION LAMP LH (BACK-UP) (A-chassis models, and except for Europe, Australia and China)	T8	EL-BACK/L
	REAR COMBINATION LAMP LH (BACK-UP) (For Europe, Australia and China except A-chassis models)	T9	EL-BACK/L
	REAR COMBINATION LAMP LH (REAR FOG) (LHD models except A-chassis)	T9	EL-R/FOG
	REAR COMBINATION LAMP LH (TAIL AND STOP) (A-chassis models, and except for Europe, Australia and China)	T8	EL-TAIL/L EL-STOP/L
	REAR COMBINATION LAMP LH (TAIL AND STOP) (For Europe, Australia and China except A-chassis models)	T9	EL-TAIL/L EL-STOP/L
	REAR COMBINATION LAMP LH (TURN SIGNAL) (A-chassis models, and except for Europe, Australia and China)	T8	EL-TURN
	REAR COMBINATION LAMP LH (TURN SIGNAL) (For Europe, Australia and China except A-chassis models)	T9	EL-TURN
	REAR COMBINATION LAMP RH (BACK-UP) (A-chassis models, and except for Europe, Australia and China)	T1	EL-BACK/L
	REAR COMBINATION LAMP RH (BACK-UP) (For Europe, Australia and China except A-chassis models)	T2	EL-BACK/L

EARTH	CONNECT TO	CONN. NO.	CELL CODE
M1/M54	REAR COMBINATION LAMP RH (REAR FOG) (RHD models except A-chassis)	T2	EL-R/FOG
	REAR COMBINATION LAMP RH (TAIL AND STOP) (A-chassis models, and except for Europe, Australia and China)	T1	EL-TAIL/L EL-STOP/L
	REAR COMBINATION LAMP RH (TAIL AND STOP) (For Europe, Australia and China except A-chassis models)	T2	EL-TAIL/L EL-STOP/L
	REAR COMBINATION LAMP RH (TURN SIGNAL) (A-chassis models, and except for Europe, Australia and China)	T1	EL-TURN
	REAR COMBINATION LAMP RH (TURN SIGNAL) (For Europe, Australia and China except A-chassis models)	T2	EL-TURN
	REAR FOG LAMP LH (LHD A-chassis models)	T12	EL-R/FOG
	REAR FOG LAMP RH (RHD A-chassis models)	T10	EL-R/FOG
	DOOR LOCK ACTUATOR DRIVER SIDE (Unlock sensor)	D10	EL-MULTI
	LOCK KNOB SWITCH	D8	EL-D/LOCK
	POWER WINDOW MAIN SWITCH (Double cab)	D5	EL-WINDOW EL-D/LOCK
	POWER WINDOW MAIN SWITCH (Single cab and King cab)	D6	EL-WINDOW EL-D/LOCK
M33/M207 (LHD models with KA engine)	CONDENSER	M210	EC-IGN/SG
	DISTRIBUTOR (POWER TRANSISTOR)	M214	EC-IGN/SG
	ECM (ECCS CONTROL MODULE)	M32	EC-MAIN
M208 (LHD models with KA engine)	DATA LINK CONNECTOR FOR CONSULT	M11	EC-MIL/DL
	DISTRIBUTOR (CAMSHAFT POSITION SENSOR)	M214	EC-CMPS
	ECM (ECCS CONTROL MODULE)	M32	EC-MAIN
	NATS IMMU	M68	EL-NATS
	SHIELD WIRE (CAMSHAFT POSITION SENSOR)	M214	EC-CMPS
	SHIELD WIRE (MASS AIR FLOW SENSOR)	M204	EC-MAFS
	SHIELD WIRE (THROTTLE POSITION SENSOR)	M302	EC-TPS
	SHIELD WIRE (HEATED OXYGEN SENSOR)	E3	EC-HO2S
E6/E39	NATS IMMU (Diesel engine)	M69	EL-NATS
	ABS ACTUATOR AND ELECTRIC UNIT	E4	BR-ABS
	BRAKE FLUID LEVEL SWITCH	E2	EL-WARN
	COOLING FAN MOTOR	E24	LC-COOL/F
	DAYTIME LIGHT UNIT	E64	EL-DTRL
	DIM-DIP LAMP UNIT	E67	EL-DIMDIP
	FRONT COMBINATION LAMP LH (PARKING) (Except for Europe, Australia and China)	E11	EL-TAIL/L
	FRONT COMBINATION LAMP LH (PARKING) (For Europe, Australia and China)	E12	EL-TAIL/L
	FRONT COMBINATION LAMP LH (TURN SIGNAL) (Except for Europe, Australia and China)	E11	EL-TURN
	FRONT COMBINATION LAMP LH (TURN SIGNAL) (For Europe, Australia and China)	E12	EL-TURN
	FRONT COMBINATION LAMP RH (PARKING) (Except for Europe, Australia and China)	E27	EL-TAIL/L
	FRONT COMBINATION LAMP RH (PARKING) (For Europe, Australia and China)	E28	EL-TAIL/L
	FRONT COMBINATION LAMP RH (TURN SIGNAL) (Except for Europe, Australia and China)	E27	EL-TURN
	FRONT COMBINATION LAMP RH (TURN SIGNAL) (For Europe, Australia and China)	E28	EL-TURN
	FUEL FILTER (FUEL HEATER)	E56	EC-F/HEAT
	FUEL FILTER SWITCH (RHD models with diesel engine)	E5	EL-WARN EL-BUZZER
	FUEL RETURN CONTROL SOLENOID VALVE (RHD models with NA engine)	E40	EC-F/RTN

EARTH	CONNECT TO	CONN. NO.	CELL CODE
E6/E39	GLOW RELAY (RHD models with diesel engine except for Europe)	E44	EC-GLOW
	HEADLAMP AIMING MOTOR LH	E57	EL-H/AIM
	HEADLAMP AIMING MOTOR RH	E60	EL-H/AIM
	HEADLAMP LH	E13	EL-H/LAMP EL-DTRL
	HEADLAMP RH	E26	EL-H/LAMP EL-DTRL EL-DIMDIP
	HEADLAMP WASHER AMPLIFIER	E65	EL-HLC
	IACV-FICD SOLENOID VALVE (Diesel engine)	E37	HA-A/C,M
	ISC-FI POT CONTROL SOLENOID VALVE	E37	EC-FIPOT HA-A/C,M
	POWER ANTENNA	E46	EL-P/ANT
	SHIELD WIRE (FRONT WHEEL SENSOR LH)	E15	BR-ABS
	SHIELD WIRE (FRONT WHEEL SENSOR RH)	E31	BR-ABS
	SIDE TURN SIGNAL LAMP LH	E1	EL-TURN
	SIDE TURN SIGNAL LAMP RH	E45	EL-TURN
	THERMOSWITCH	E18	LC-COOL/F
	TRIPLE-PRESSURE SWITCH	E25	LC-COOL/F
	VACUUM CONTROL SOLENOID VALVE	E20	EC-IDLE
	ALTERNATOR (Gasoline engine)	E211	EC-CHOKE EC-FPCM EL-CHARGE EL-WARN
	NEUTRAL POSITION SWITCH	E220	EC-PNP/SW
	POWER STEERING OIL PRESSURE SWITCH (RHD 2WD models with KA engine and LHD models)	E208	EC-PST/SW
	POWER STEERING OIL PRESSURE SWITCH (RHD 4WD models with KA engine)	E207	EC-PST/SW
	SHIELD WIRE (REAR WHEEL SENSOR LH) (4WD models)	C5	BR-ABS
	SHIELD WIRE (REAR WHEEL SENSOR RH) (4WD models)	C5	BR-ABS
	SHIELD WIRE (REAR WHEEL SENSOR) (2WD models)	C6	BR-ABS
F7/F52 (RHD models with KA engine)	CONDENSER	F10	EC-IGN/SG
	DISTRIBUTOR (POWER TRANSISTOR)	F14	EC-IGN/SG
	ECM (ECCS CONTROL MODULE)	F51	EC-MAIN
F8 (RHD models with KA engine)	DATA LINK CONNECTOR FOR CONSULT	M11	EC-MIL/DL
	DISTRIBUTOR (CAMSHAFT POSITION SENSOR)	F14	EC-CMPS
	ECM (ECCS CONTROL MODULE)	F51	EC-MAIN
	SHIELD WIRE (CAMSHAFT POSITION SENSOR)	F14	EC-CMPS
	SHIELD WIRE (MASS AIR FLOW SENSOR)	F4	EC-MAFS
	SHIELD WIRE (THROTTLE POSITION SENSOR)	F102	EC-TPS
A1 (Diesel engine)	ALTERNATOR	A7	EC-GLOW EL-CHARGE EL-WARN
	ENGINE COOLANT TEMPERATURE SENSOR (Except for Europe)	A11	EC-GLOW
R54	REAR WINDOW DEFOGGER	R53	EL-DEF

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

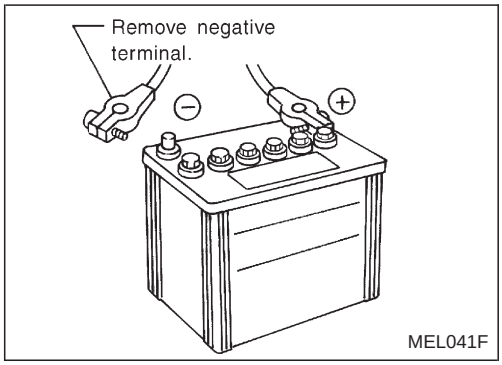


How to Handle Battery

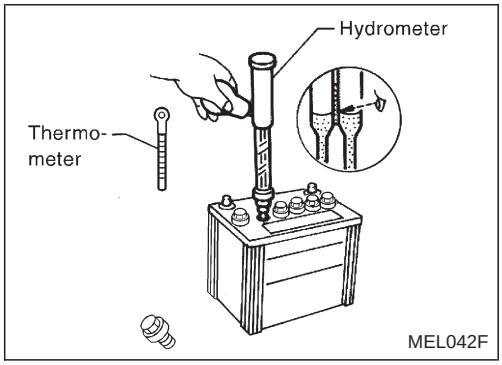
METHODS OF PREVENTING OVER-DISCHARGE

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.
- The terminal connections should be clean and tight.
- At every routine maintenance, check the electrolyte level. This also applies to batteries designated as ‘‘low maintenance’’ and ‘‘maintenance-free’’.



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

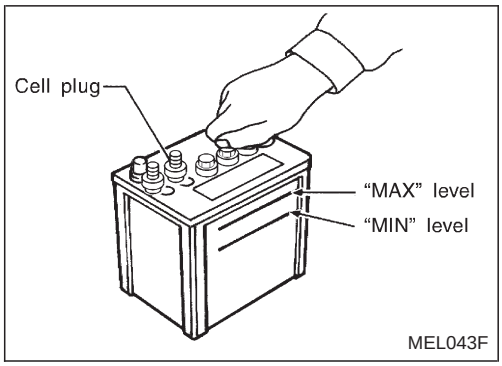


- Check the charge condition of the battery.
  Periodically check the specific gravity of the electrolyte. Keep a close check on charge condition to prevent over-discharge.

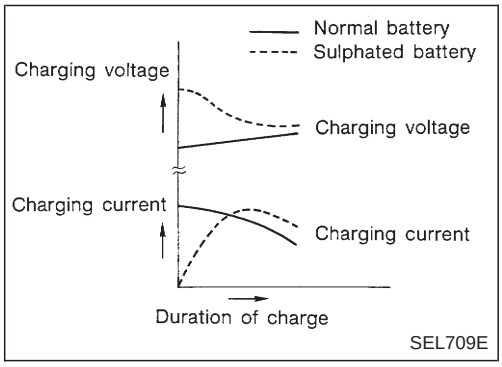
CHECKING ELECTROLYTE LEVEL

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 acid contacts eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention.

How to Handle Battery (Cont'd)



- Remove the cell plug using a suitable tool.
- Add distilled water up to the MAX level.

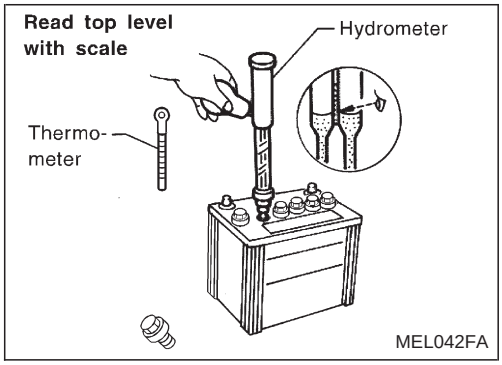


SULPHATION

A battery will be completely discharged if it is left unattended for a long time and the specific gravity will become less than 1.100. This may result in sulphation on the cell plates.

To determine if a battery has been ''sulphated'', note its voltage and current when charging it. As shown in the figure, less current and higher voltage are observed in the initial stage of charging sulphated batteries.

A sulphated battery may sometimes be brought back into service by means of a long, slow charge, 12 hours or more, followed by a battery capacity test.



SPECIFIC GRAVITY CHECK

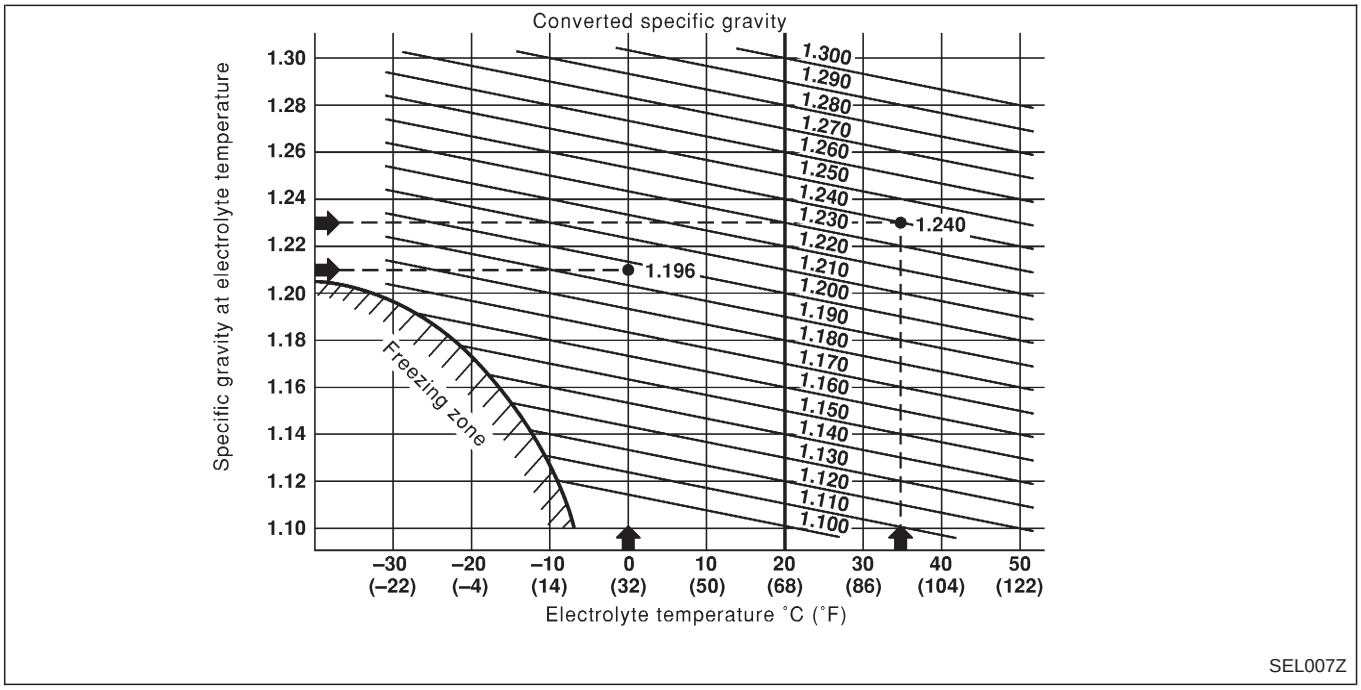
1. Read hydrometer and thermometer indications at eye level.

How to Handle Battery (Cont'd)

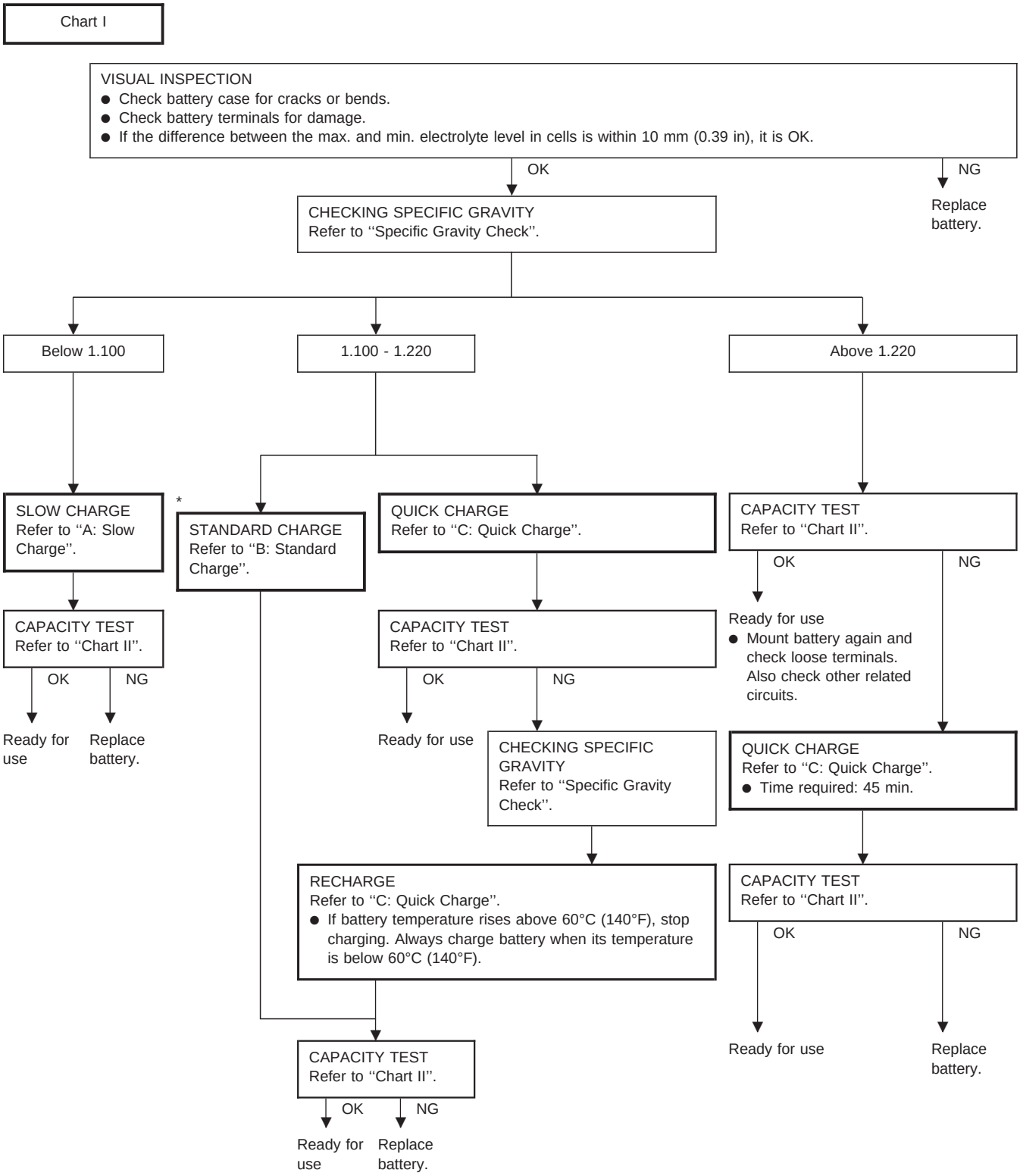
2. Convert into specific gravity at 20°C (68°F).

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.



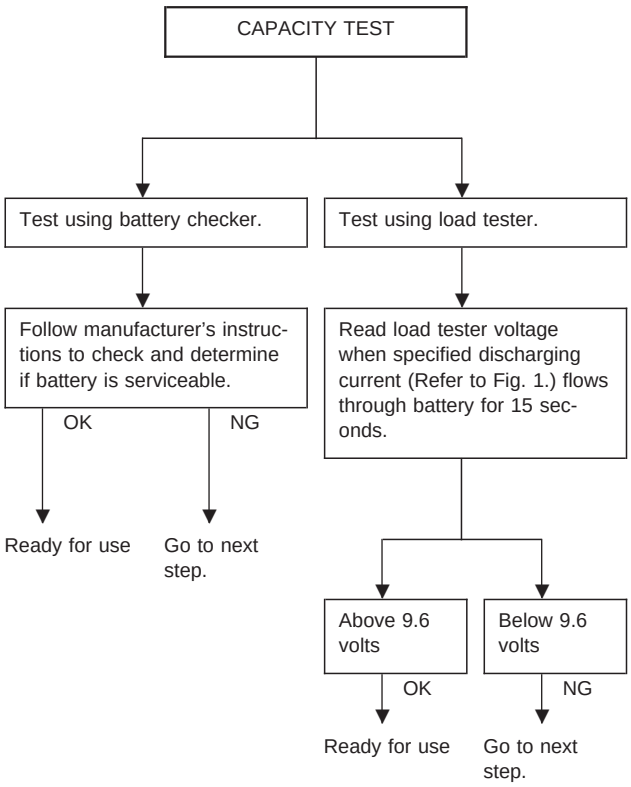
Battery Test and Charging Chart



*** ''STANDARD CHARGE'' is recommended if the vehicle is in storage after charging.**

Battery Test and Charging Chart (Cont'd)

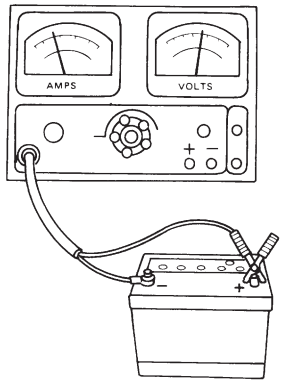
Chart II



- 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
115D31R(L)	240
95E41R(L)	300
130E41R(L)	330



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Battery Test and Charging Chart (Cont'd)

A: SLOW CHARGE

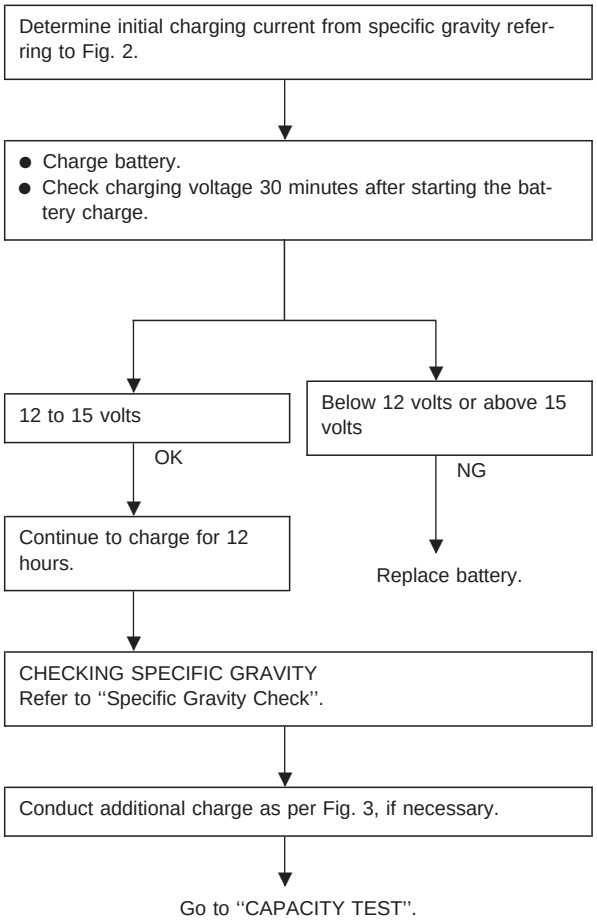
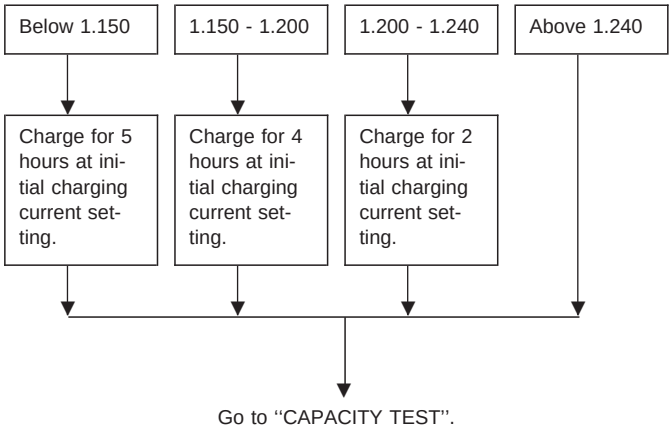


Fig. 2 INITIAL CHARGING CURRENT SETTING (Slow charge)

CONVERTED SPECIFIC GRAVITY	BATTERY TYPE												
	28B19R(L)	34B19R(L)	46B24R(L)	55B24R(L)	50D23R(L)	55D23R(L)	65D26R(L)	80D26R(L)	75D31R(L)	95D31R(L)	115D31R(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

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.

↓

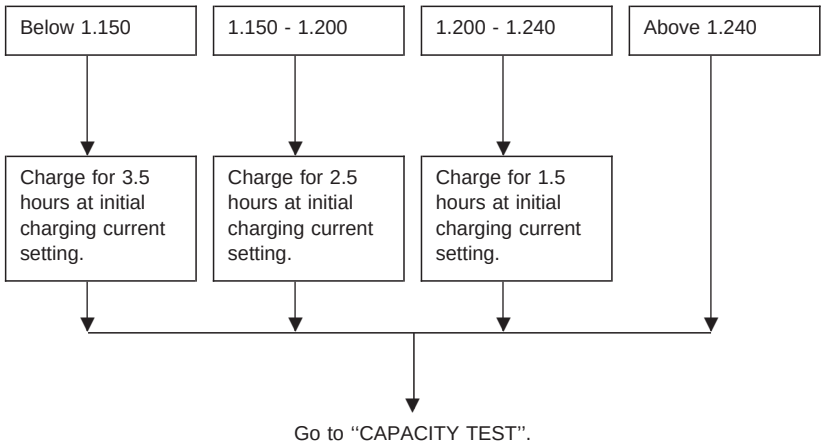
Go to ''CAPACITY TEST''.

Fig. 4 INITIAL CHARGING CURRENT SETTING (Standard charge)

CONVERTED SPECIFIC GRAVITY	BATTERY TYPE									
	28B19R(L) 34B19R(L)	46B24R(L) 55B24R(L)	50D23R(L) 55D23R(L)	65D26R(L) 80D26R(L)	75D31R(L)	95D31R(L) 115D31R(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.

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 Test and Charging Chart (Cont'd)

C: QUICK CHARGE

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

Charge battery.

Go to ''CAPACITY TEST''.

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

BATTERY TYPE		28B19R(L) 34B19R(L)	46B24R(L) 55B24R(L) 50D23R(L)	55D23R(L) 65D26R(L) 80D26R(L)	75D31R(L) 95D31R(L) 115D31R(L) 95E41R(L)	130E41R(L)
CURRENT [A]		10 (A)	15 (A)	20 (A)	30 (A)	40 (A)
CONVERTED SPECIFIC GRAVITY	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:

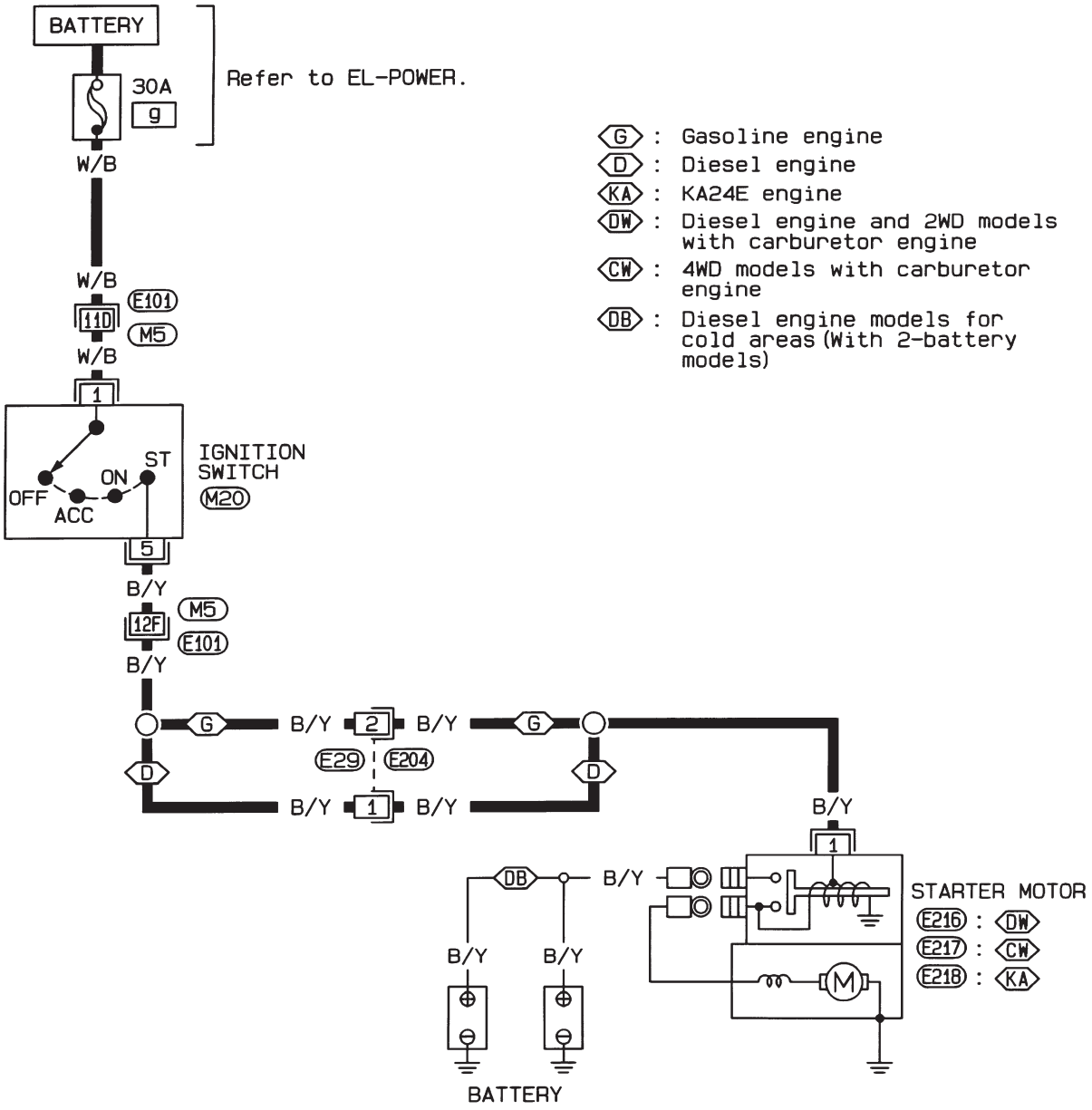
- **Do not use quick charge method on a battery whose specific gravity is less than 1.100.**
- **Set initial charging current to value specified in Fig. 6. If charger is not capable of producing specified current value, set its charging current as close to that value as possible.**
- **Keep battery away 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 charging battery over the charging time can cause deterioration of the battery.**

Service Data and Specifications (SDS)

Applied model		Europe		
		KA24	TD25	
		Standard		Option
Type		55D23R	95D31R	80D26L, 80D26R
Capacity	V-AH	12-48	12-64	12-55

Wiring Diagram — START —

EL-START-01



M20 W

E204 GY

E216 B

E217 GY

E218 GY

Refer to last page (Foldout page).

M5, E101

HEL317A

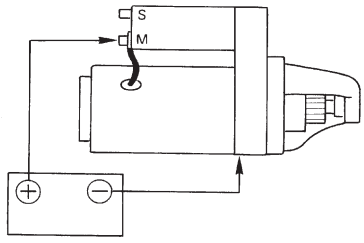
Trouble Diagnoses

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

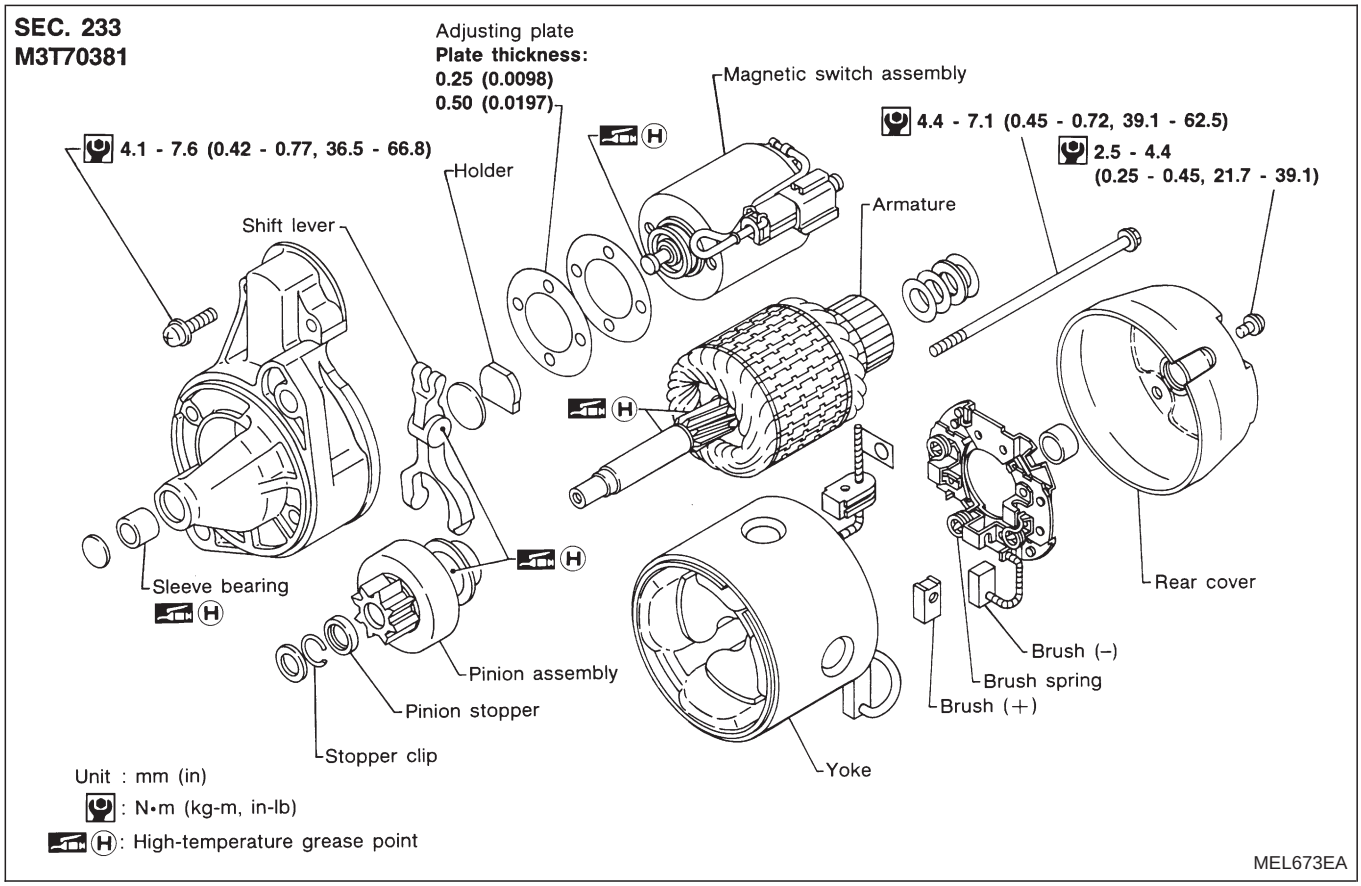
Starter does not stop. → Replace magnetic switch.

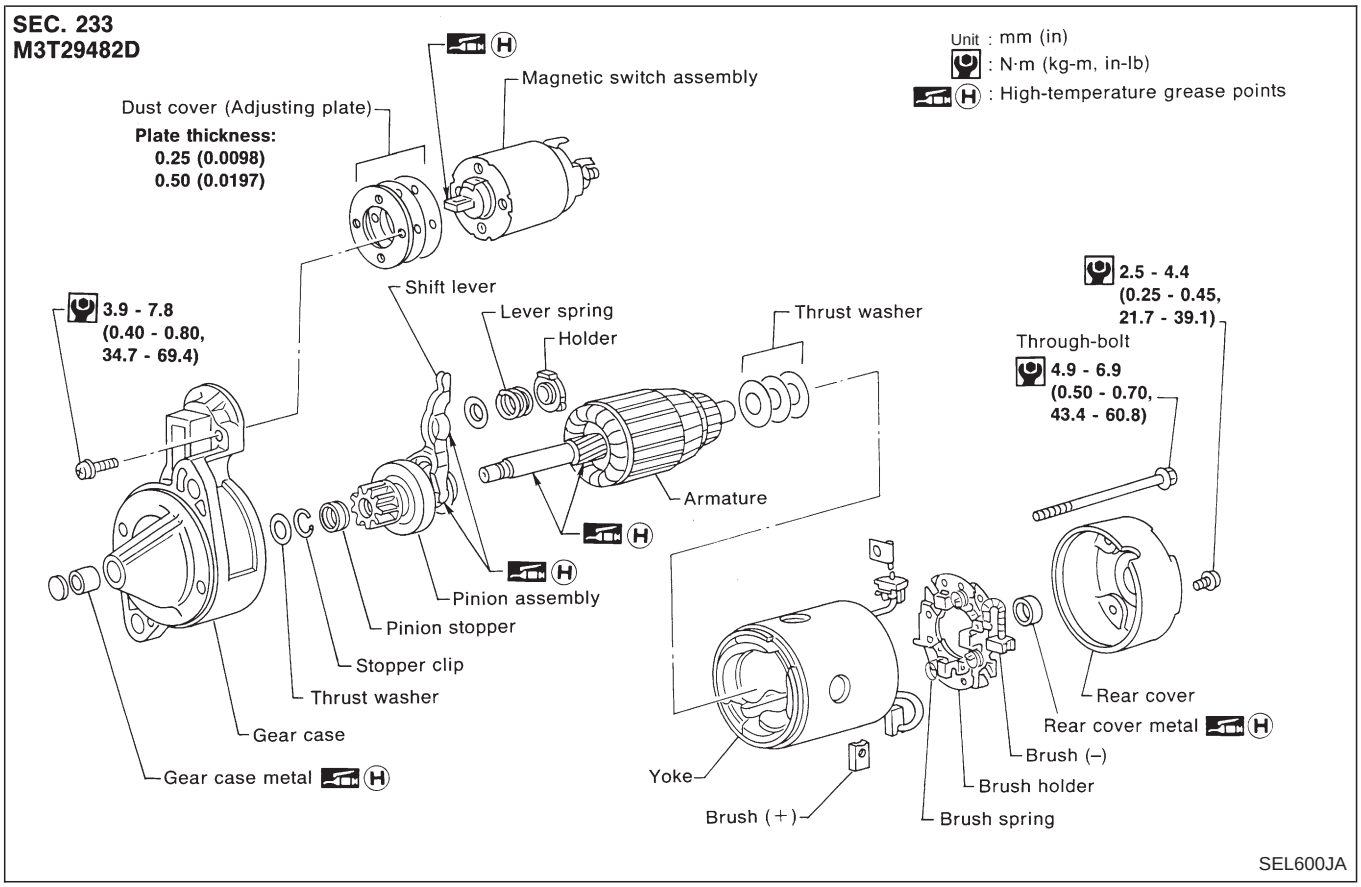
Engine does not start.

Does engine turn by cranking?
- Yes → Does engine turn normally?
  - Yes → Check ignition/fuel system.
  - No (Turns slowly.) → Check battery as follows:
    - Charging condition
    - Terminal connections
    - Terminal corrosion
    - OK → Repair starter motor.
    - NG → Ⓐ
- No → Does starter motor turn?
  - Yes → Does gear shaft turn?
    - Yes → Check pinion clutch.
    - No → Check reduction gear, armature and gear shaft.
  - No → Check fuse and fusible link.
    - NG → Replace.
    - OK → Check battery as follows:
      - Charging condition
      - Terminal connections
      - Terminal corrosion
      - NG → Ⓐ
        - Charge battery.
        - Repair connections and corrosion of battery terminals.
      - OK → Check starting system wiring.
        - NG → Repair.
        - OK → Does magnetic switch operation sound occur?
          - No → Replace magnetic switch.
          - Yes → Check condition of pinion and ring gear mesh.
            - OK → Does starter turn under no load by connecting wires as follows?
              - Yes → Replace magnetic switch.
              - No → Repair starter motor.
            - NG →
              - Adjust pinion movement.
              - Check pinion moving mechanism.
              - Check ring gear.



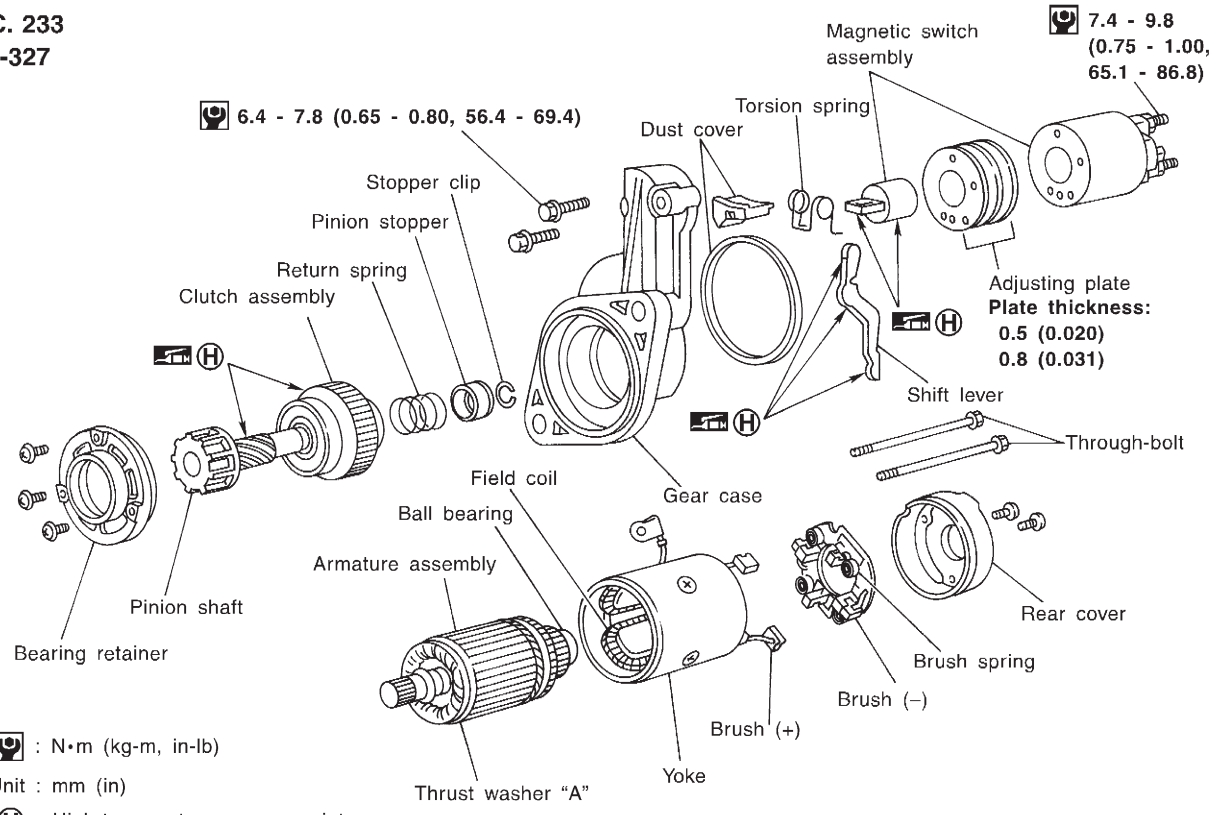
Construction

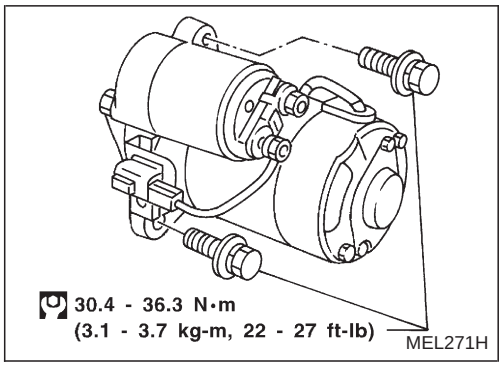




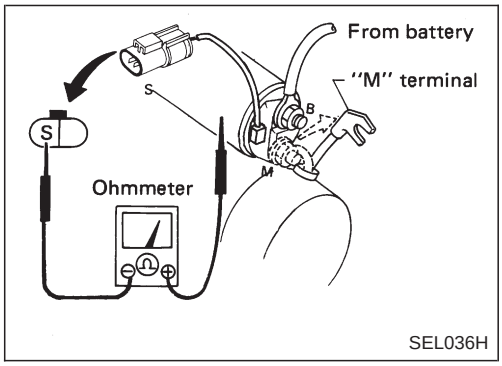
Construction (Cont'd)

SEC. 233
S13-327





Removal and Installation

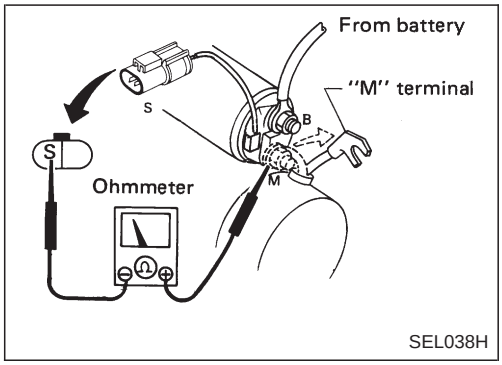


Inspection

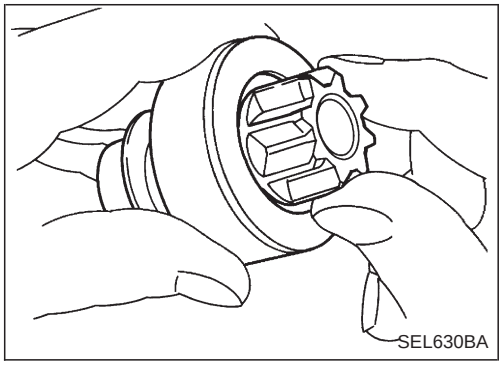
MAGNETIC SWITCH CHECK

- 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.

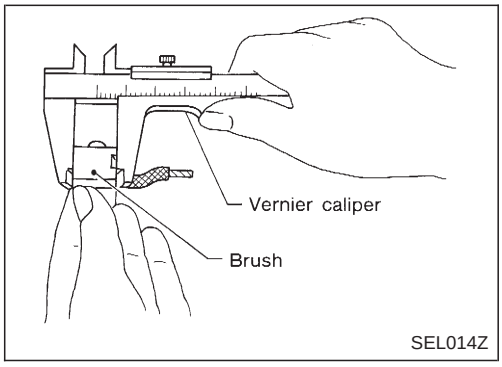


2. Continuity test (between "S" terminal and "M" terminal).
- No continuity ... Replace.



PINION/CLUTCH CHECK

1. Inspect pinion teeth.
- Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
2. Inspect reduction gear teeth (If equipped).
- Replace reduction gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)
3. Check to see if pinion locks in one direction and rotates smoothly in the opposite direction.
- If it locks or rotates in both directions, or unusual resistance is evident. ... Replace.



BRUSH CHECK

Brush

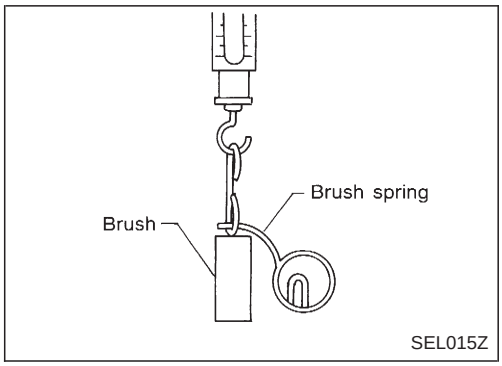
Check wear of brush.

Wear limit length:
Refer to SDS, EL-33.

- Excessive wear ... Replace.

Inspection (Cont'd)

Brush spring pressure



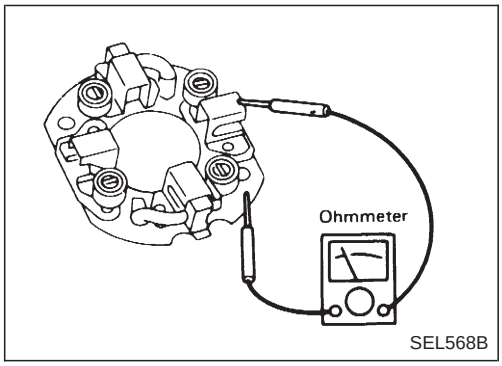
SEL015Z

Check brush spring pressure with brush spring detached from brush.

Spring pressure (with new brush):
Refer to SDS, EL-33.

- Not within the specified values ... Replace.

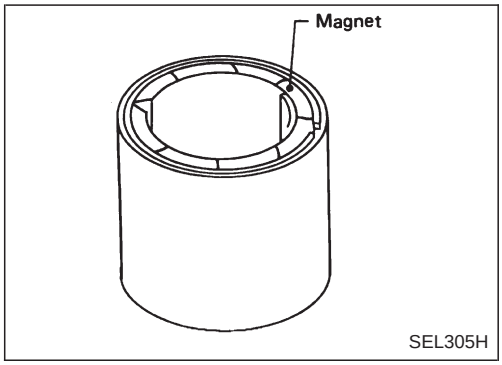
Brush holder



SEL568B

1. Perform insulation test between brush holder (positive side) and its base (negative side).
- Continuity exists. ... Replace.
2. Check brush to see if it moves smoothly.
- If brush holder is bent, replace it; if sliding surface is dirty, clean.

YOKE CHECK

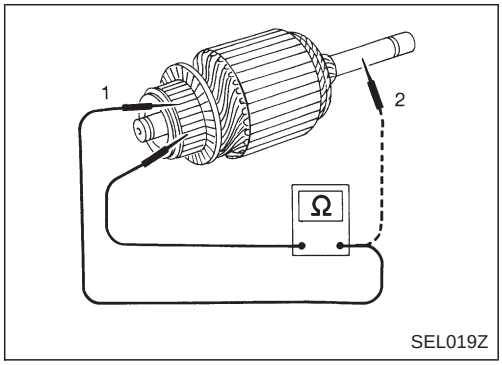


SEL305H

Magnet is secured to yoke by bonding agent. Check magnet to see that it is secured to yoke and for any cracks. Replace malfunctioning parts as an assembly.

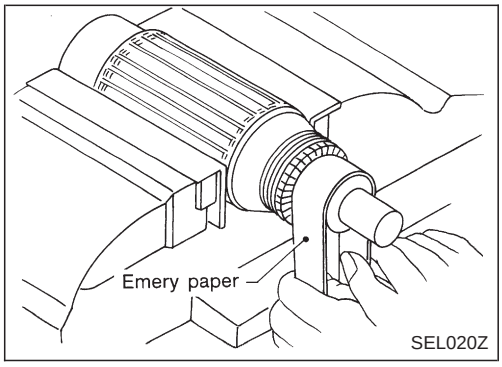
CAUTION:
Do not clamp yoke in a vice or strike it with a hammer.

ARMATURE CHECK



SEL019Z

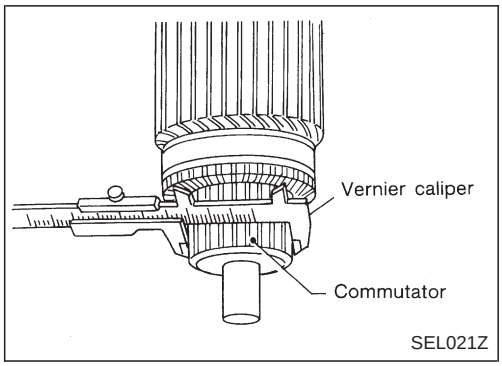
1. Continuity test (between two segments side by side).
- No continuity ... Replace.
2. Insulation test (between each commutator bar and shaft).
- Continuity exists. ... Replace.



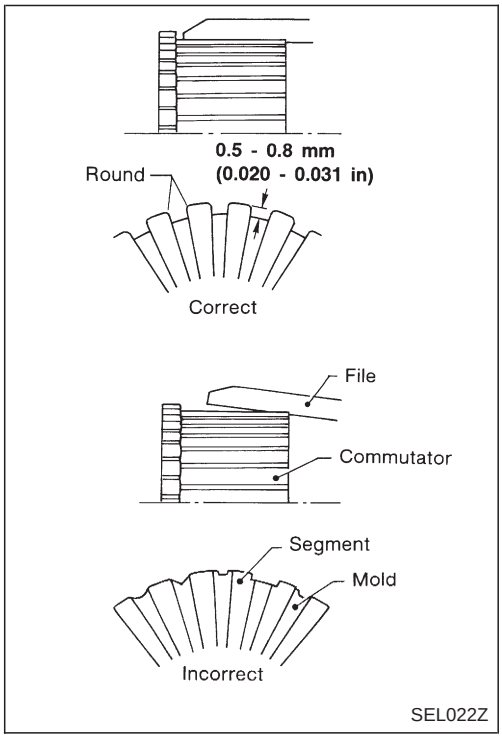
SEL020Z

3. Check commutator surface.
- Rough ... Sand lightly with No. 500 - 600 emery paper.

Inspection (Cont'd)



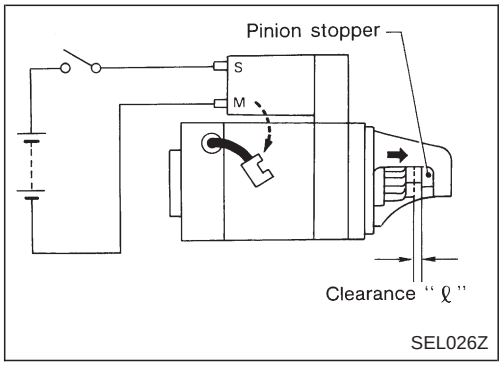
4. Check diameter of commutator.
   Commutator minimum diameter:
   Refer to SDS, EL-33.
- Less than specified value ... Replace.



5. Check depth of insulating mold from commutator surface.
- Less than 0.2 mm (0.008 in) ... Undercut to 0.5 to 0.8 mm (0.020 to 0.031 in)

Assembly

Apply high-temperature grease to lubricate the bearing, gears and frictional surface when assembling the starter.
Carefully observe the following instructions.



PINION PROTRUSION LENGTH ADJUSTMENT

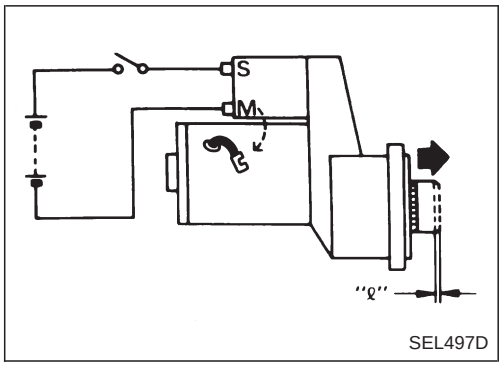
Clearance "ℓ"

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

Clearance "ℓ":
Refer to SDS, EL-33.

Assembly (Cont'd)

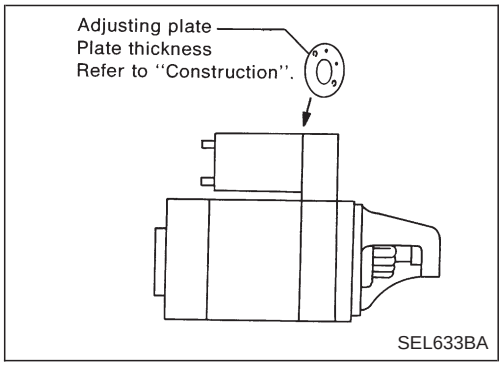
Movement "ℓ"



SEL497D

Compare movement "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.

Movement "ℓ":
Refer to SDS, EL-33.



SEL633BA

- Not in the specified value ... Adjust by adjusting plate.

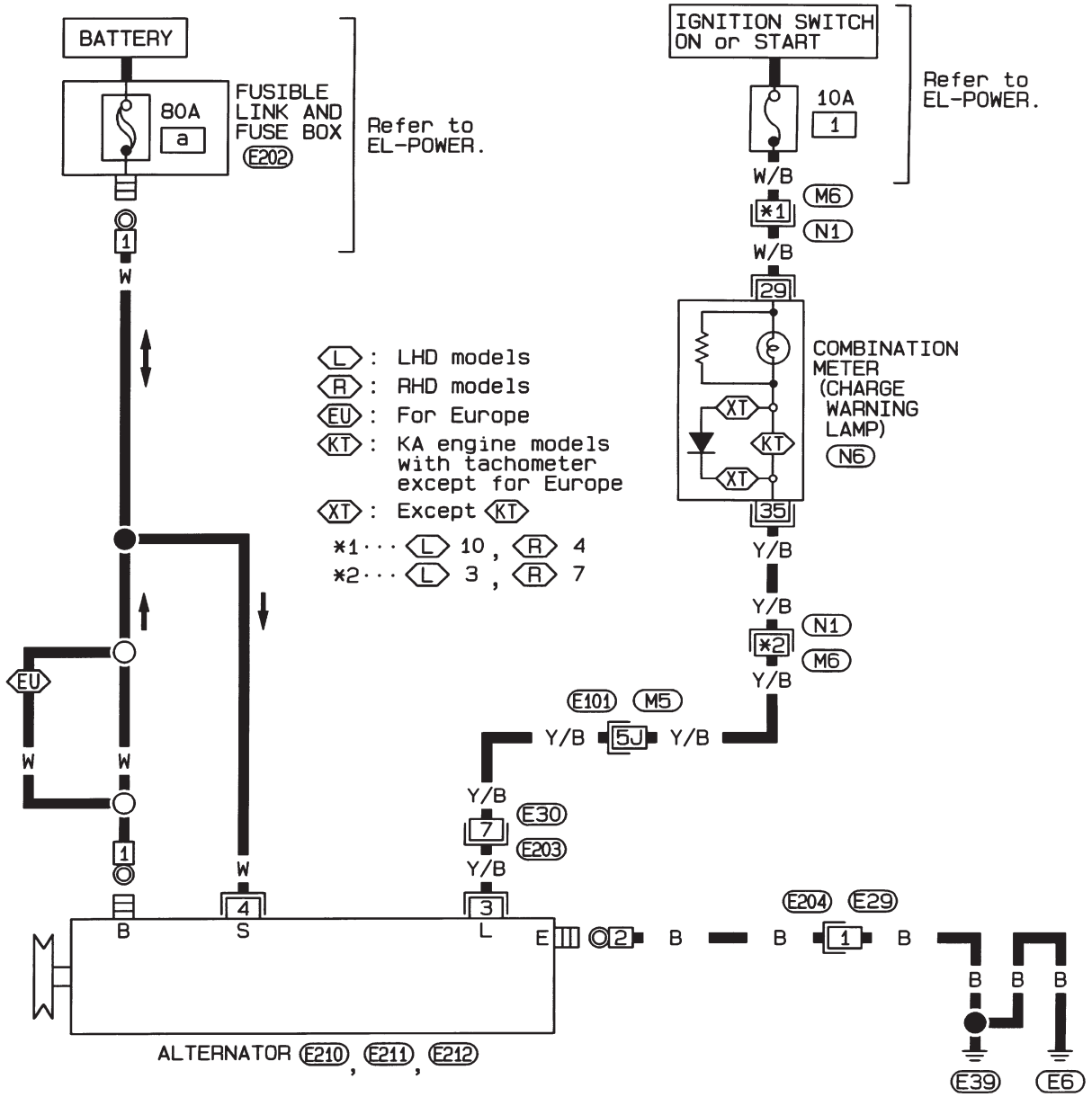
Service Data and Specifications (SDS)

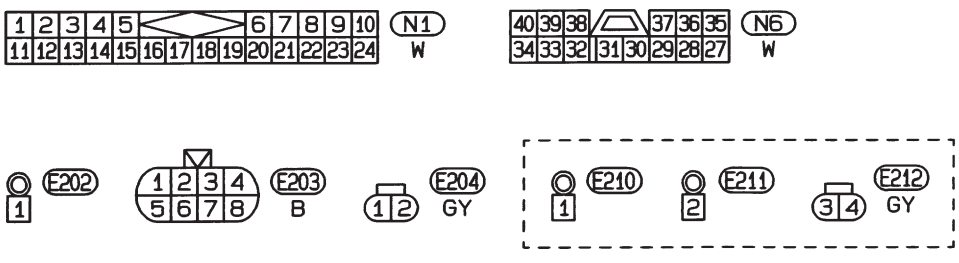
STARTER

Type		M3T70381	M3T29482D	S13-327
		MITSUBISHI		HITACHI
		Non-reduction		Reduction
Applied model		2WD	4WD	2WD
		KA24		TD25
		Standard		Standard
System voltage	V	12		
No-load				
Terminal voltage	V	11.5		11.0
Current	A	Less than 60		Less than 160
Revolution	rpm	More than 6,500		More than 4,000
Minimum diameter of commutator	mm (in)	31.4 (1.236)		35.5 (1.398)
Minimum length of brush	mm (in)	11.5 (0.453)		9.0 (0.354)
Brush spring tension	N (kg, lb)	13.7 - 25.5 (1.4 - 2.6, 3.1 - 5.7)		—
Clearance between bearing metal and armature shaft	mm (in)	—	Less than 0.2 (0.008)	—
Clearance "ℓ" between pinion front edge and pinion stopper	mm (in)	0.5 - 2.0 (0.020 - 0.079)		—
Movement "ℓ" in height of pinion assembly	mm (in)	—		0.3 - 1.5 (0.012 - 0.059)

Wiring Diagram — CHARGE —/Gasoline Engine

EL-CHARGE-01



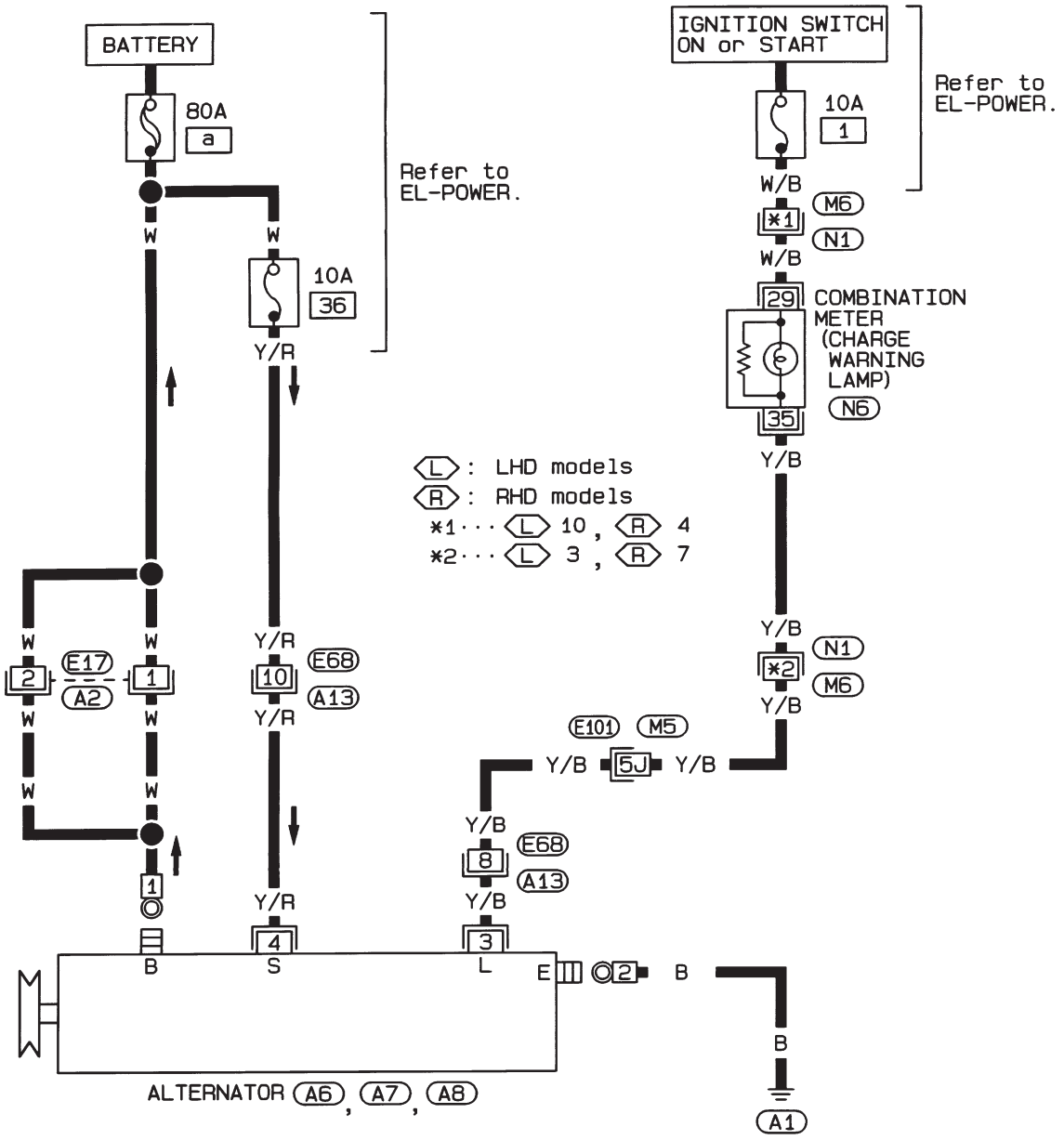


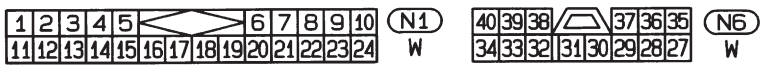
Refer to last page (Foldout page).
M5, E101

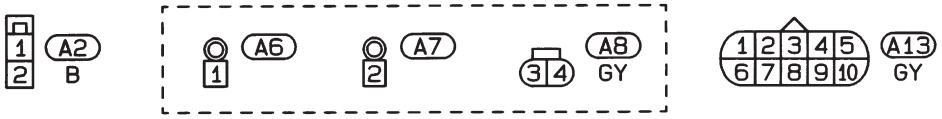
HEL318A

Wiring Diagram — CHARGE —/Diesel Engine

EL-CHARGE-03







Refer to last page (Foldout page).

M5 , E101

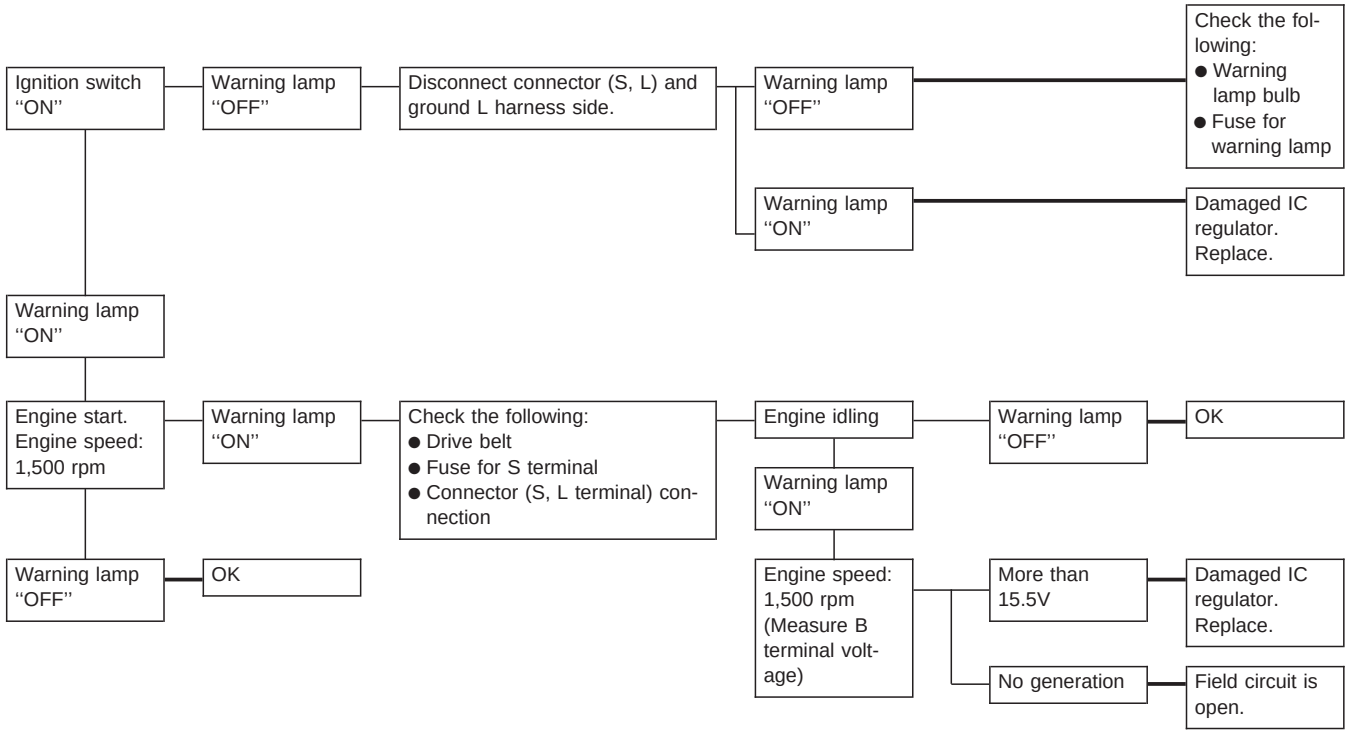
HEL319A

Trouble Diagnoses

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, inspect the fusible link.**
- **Use fully charged battery.**

GASOLINE ENGINE MODELS



Warning lamp: "CHARGE" warning lamp in combination meter

Note:

- **If the inspection result is OK even though the charging system is malfunctioning, check the B terminal connection. (Check the tightening torque.)**
- **When field circuit is open, check condition of rotor coil, rotor slip ring and brush. If necessary, replace faulty parts with new ones.**

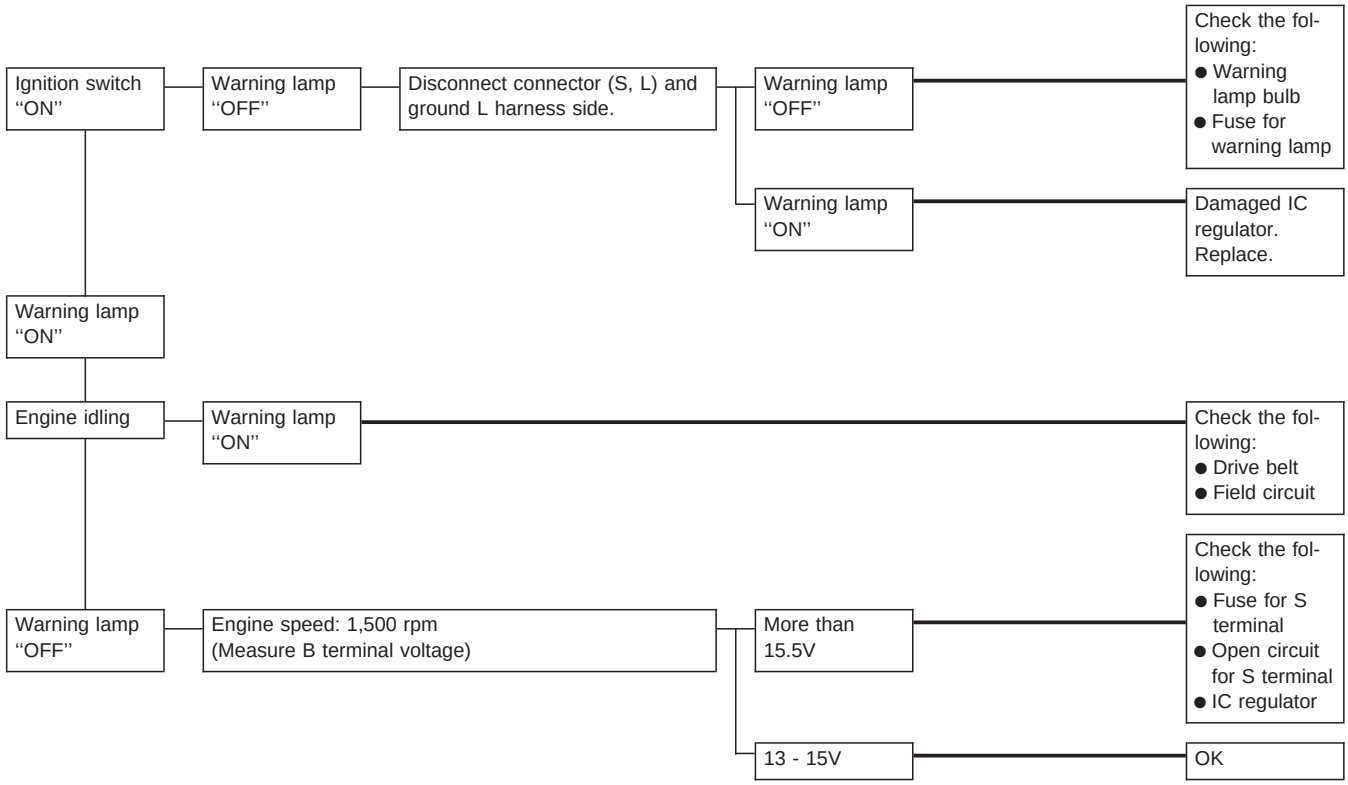
Malfunction indicator

The IC regulator warning function activates to illuminate "CHARGE" warning lamp, if any of the following symptoms occur while alternator is operating:

- Field circuit is open.
- Excessive voltage is produced.

Trouble Diagnoses (Cont'd)

DIESEL ENGINE MODELS



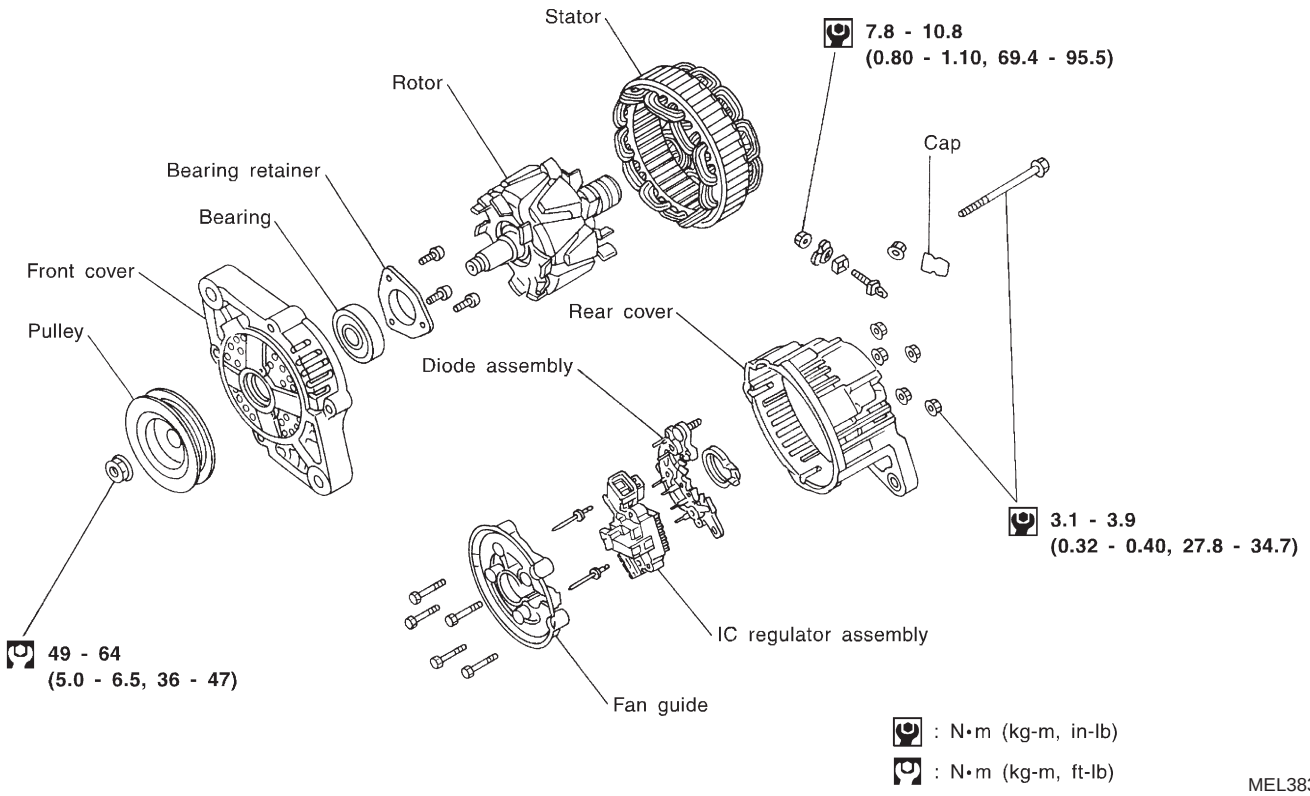
Warning lamp: "CHARGE" warning lamp in combination meter

Note:

- **If the inspection result is OK even though the charging system is malfunctioning, check the B terminal connection (check the tightening torque).**
- **When field circuit is open, check condition of rotor coil, rotor slip ring and brush. If necessary, replace faulty parts with new ones.**

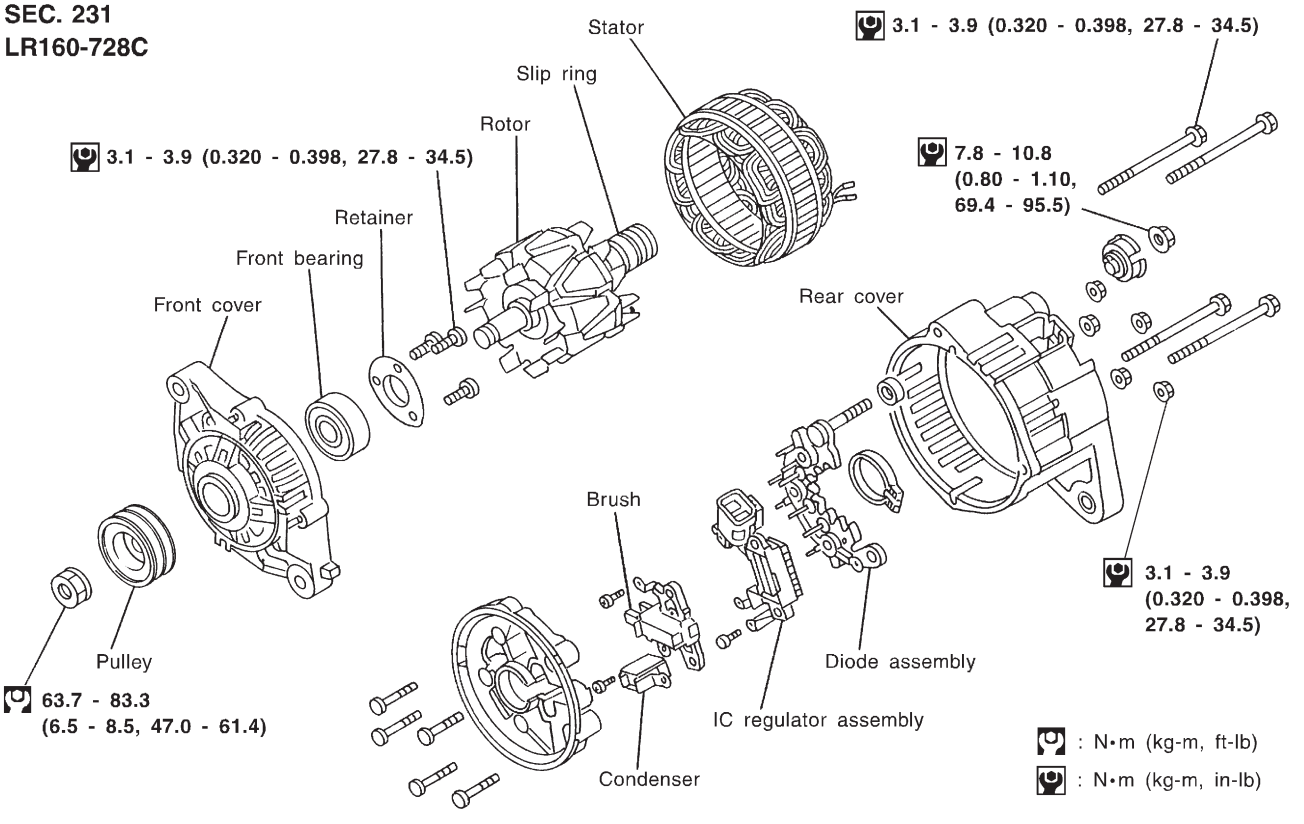
Construction

SEC. 231
LR160-727C

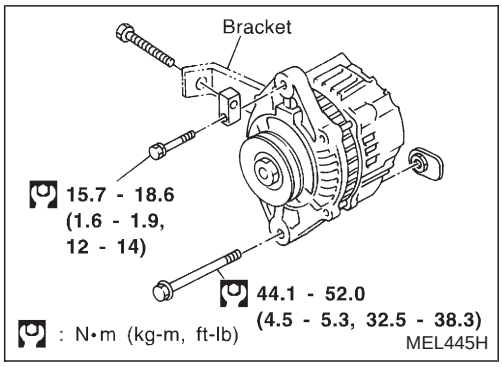


MEL383I

SEC. 231
LR160-728C



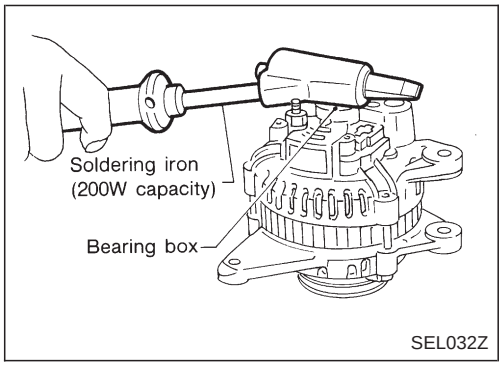
MEL443HA



Removal and Installation

CAUTION:

- **Start service operation after removing the negative terminal from the battery.**
- **Also remove the undercover, if equipped, before servicing.**



Disassembly

REAR COVER

CAUTION:

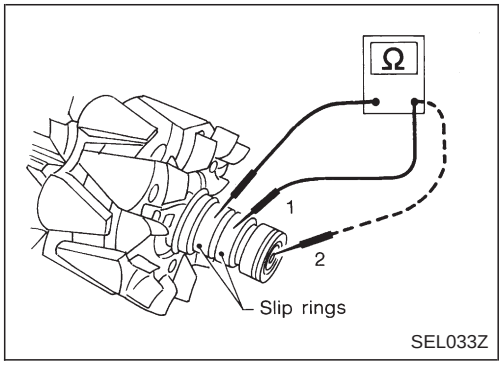
Rear cover may be hard to remove because a ring is used to lock outer race of rear bearing. To facilitate removal of rear cover, heat just bearing box section with a 200W soldering iron.

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

REAR BEARING

CAUTION:

- **Do not reuse rear bearing after removal. Replace with a new one.**
- **Do not lubricate rear bearing outer race.**



Inspection

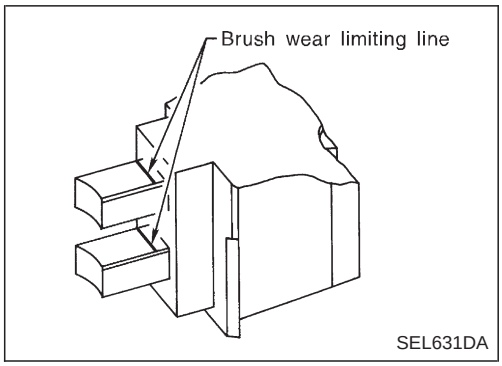
ROTOR CHECK

1. Resistance test
   Resistance: Refer to SDS, EL-41.
- Not within the specified values ... Replace rotor.

2. Insulator test
- Continuity exists. ... Replace rotor.

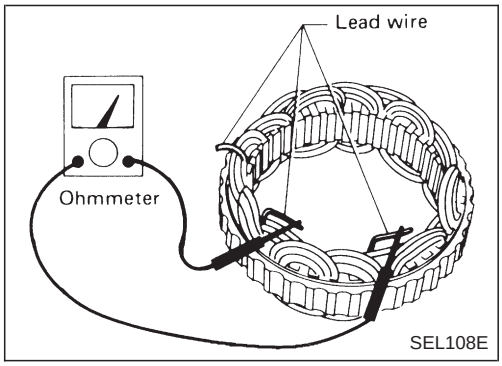
3. Check slip ring for wear.
   Slip ring minimum outer diameter:
   Refer to SDS, EL-41.
- Not within the specified values ... Replace rotor.

Inspection (Cont'd)



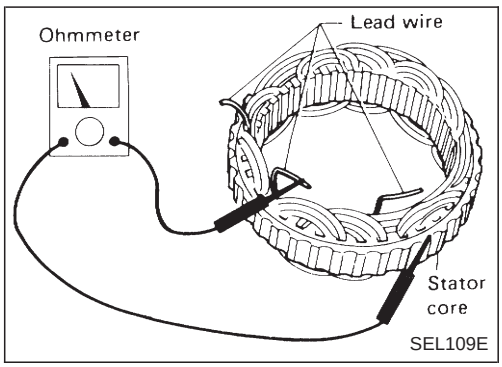
BRUSH CHECK

1. Check smooth movement of brush.
- Not smooth ... Check brush holder and clean.
2. Check brush for wear.
- Replace brush if it is worn down to the limit line.



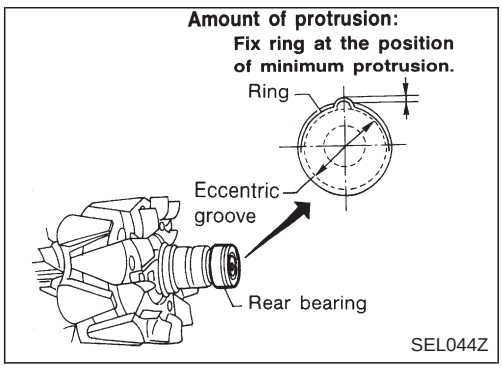
STATOR CHECK

1. Continuity test
- No continuity ... Replace stator.



2. Ground test
- Continuity exists. ... Replace stator.

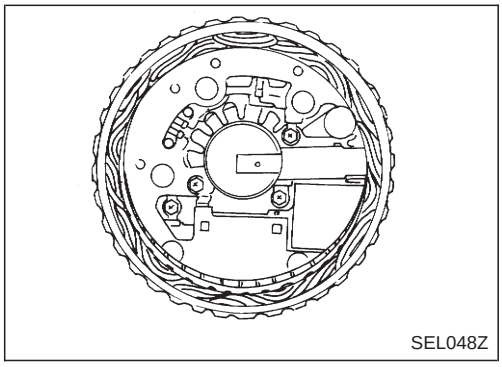
Assembly



RING FITTING IN REAR BEARING

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

CAUTION:
Do not reuse rear bearing after removal.

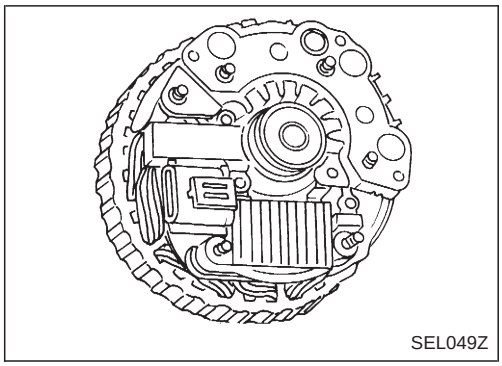


REAR COVER INSTALLATION

1. Fit brush assembly, diode assembly, regulator assembly and stator.
2. Push brushes up with fingers and install them to rotor.

Take care not to damage slip ring sliding surface.

Assembly (Cont'd)


SEL049Z

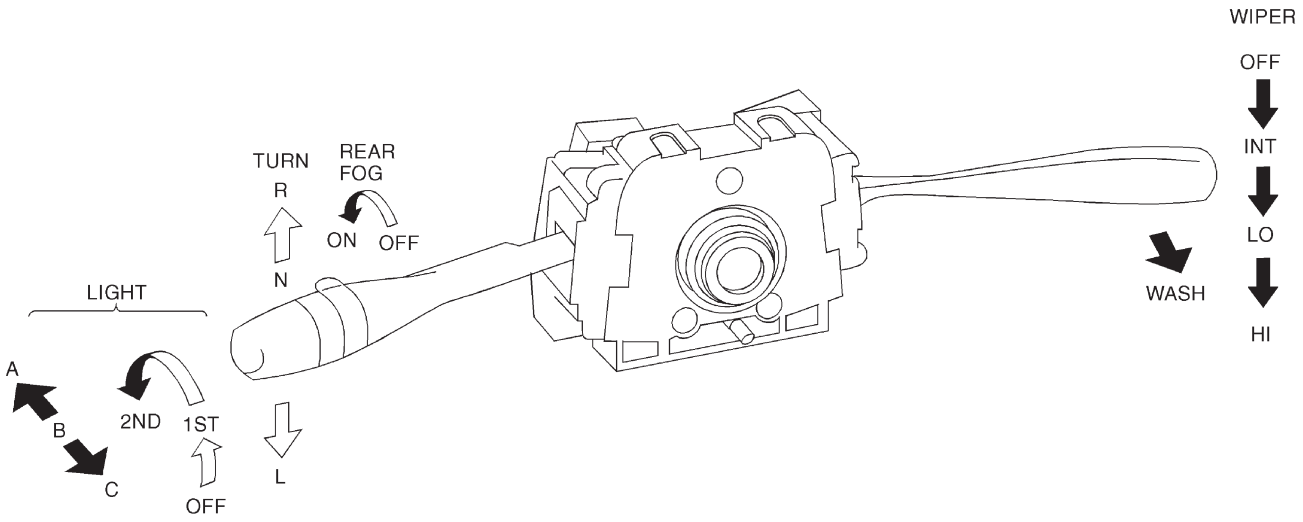
Service Data and Specifications (SDS)

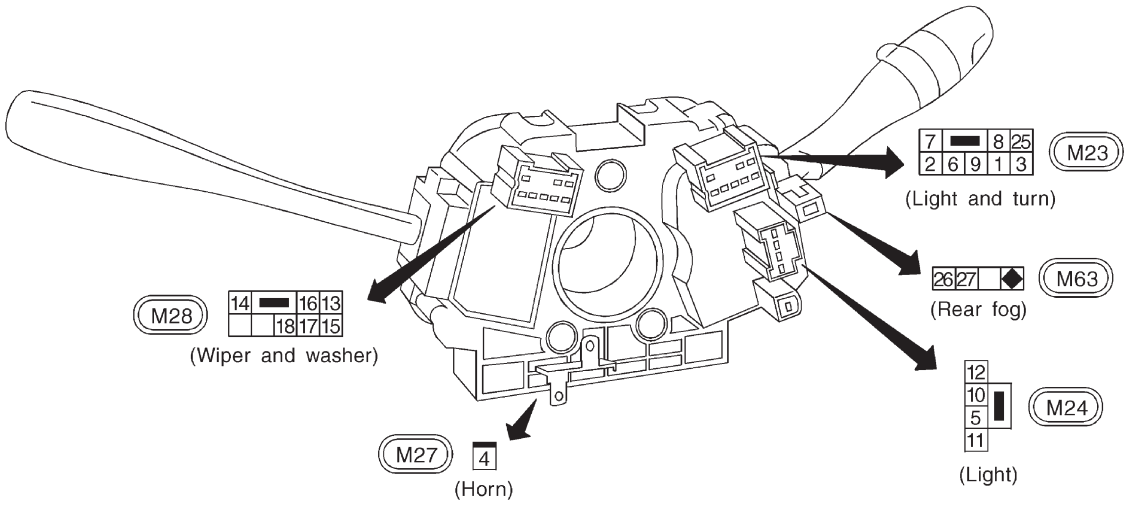
ALTERNATOR

Type		LR160-727C	LR160-728C
		HITACHI	
Applied model		KA24	TD25
Nominal rating	V-A	12-60	
Ground polarity		Negative	
Minimum revolution under no-load (When 13.5V is applied)	rpm	Less than 1,000	
Hot output current	A/rpm	More than 17/1,300 More than 48/2,500 More than 57/5,000 (When 13.5V is applied)	
Regulated output voltage	V	14.1 - 14.7	
Minimum length of brush	mm (in)	6.0 (0.236)	
Brush spring pressure	N (g, oz)	1.0 - 3.4 (102 - 350, 3.60 - 12.34)	
Slip ring minimum outer diameter	mm (in)	26.0 (1.024)	
Rotor (Field coil) resistance	Ω	2.58	

Check

FOR EUROPE AND LHD MODELS





LIGHTING SWITCH

	OFF			1ST			2ND		
	A	B	C	A	B	C	A	B	C
5			○			○	○	○	○
6			○			○	○		○
7								○	
8			○			○	○	○	○
9			○			○	○		
10								○	
11				○	○	○	○	○	○
12				○	○	○	○	○	○
25							○	○	○

WIPER AND WASHER SWITCH (With intermittent)

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

WIPER AND WASHER SWITCH (Without intermittent)

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

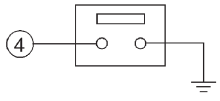
TURN SIGNAL LAMP SWITCH

	L	N	R
1	○		○
2			○
3	○		

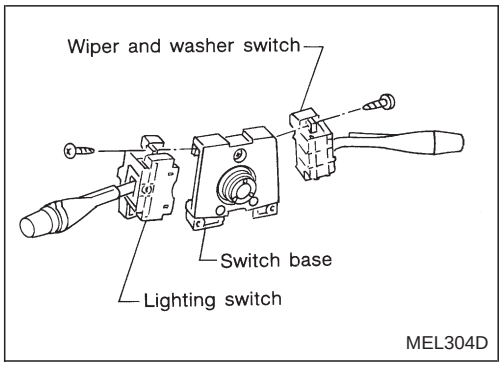
REAR FOG LAMP SWITCH

	OFF	ON
26		○
27		○

HORN SWITCH (Without air bag)



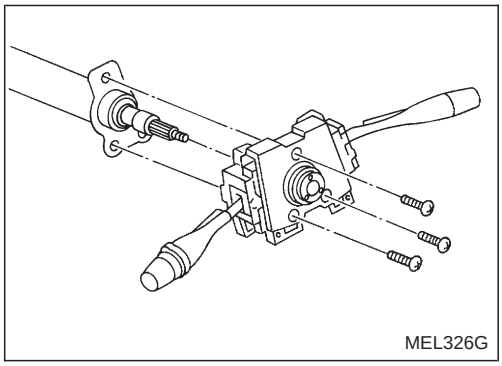
HEL320A



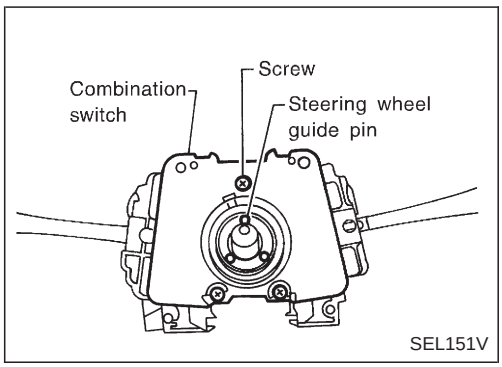
Replacement

For removal and installation of spiral cable, refer to RS section [''Installation — Air Bag Module and Spiral Cable'', ''SUPPLEMENTAL RESTRAINT SYSTEM (SRS)''].

- Each switch can be replaced without removing combination switch base.



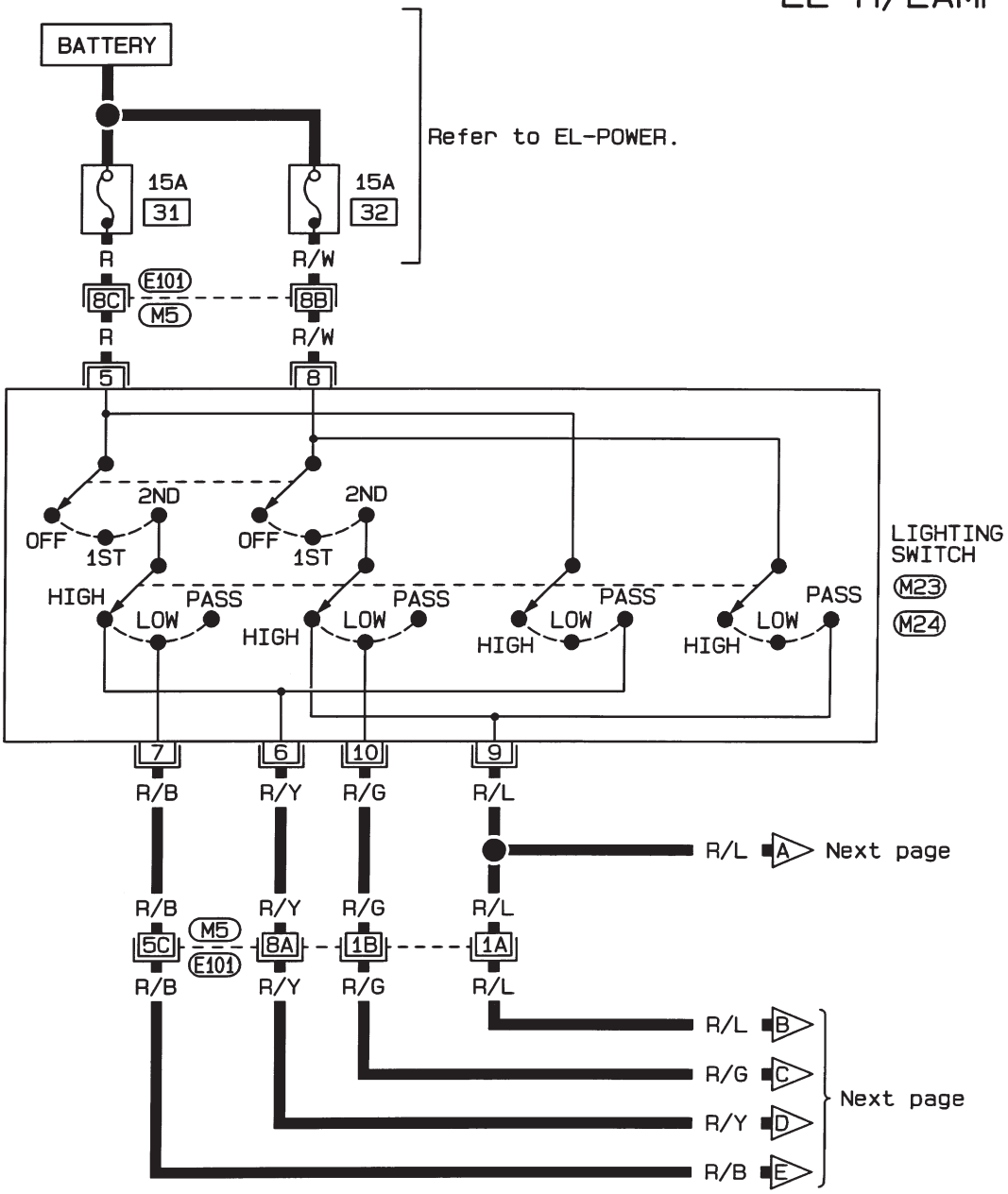
- To remove combination switch base, remove base attaching screw.



- Before installing the steering wheel, align the steering wheel guide pins with the screws which secure the combination switch as shown in the left figure.

Wiring Diagram — H/LAMP —/LHD Models

EL-H/LAMP-01



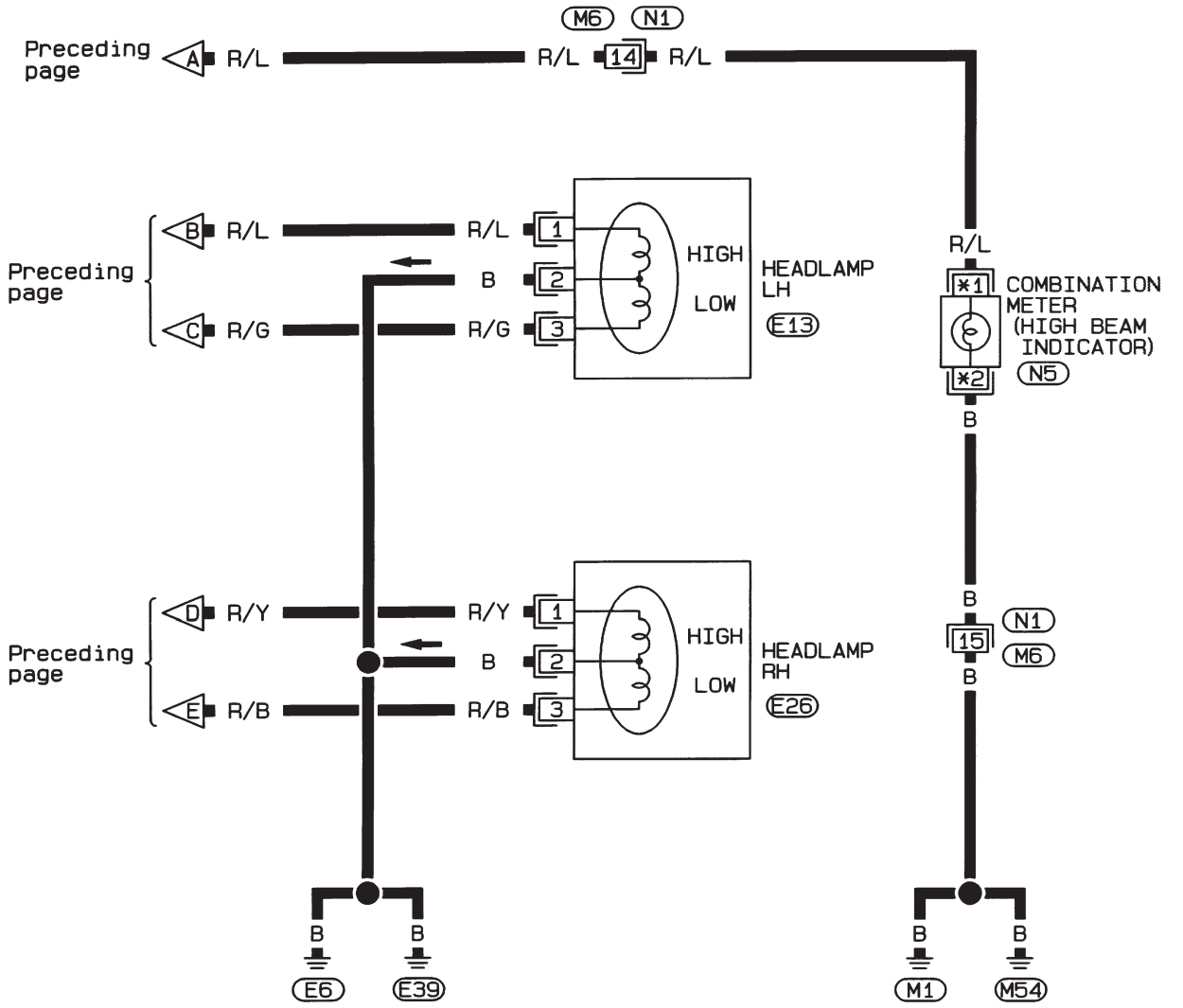
Refer to last page (Foldout page).

M5, E101

Wiring Diagram — H/LAMP —/LHD Models (Cont'd)

EL-H/LAMP-02

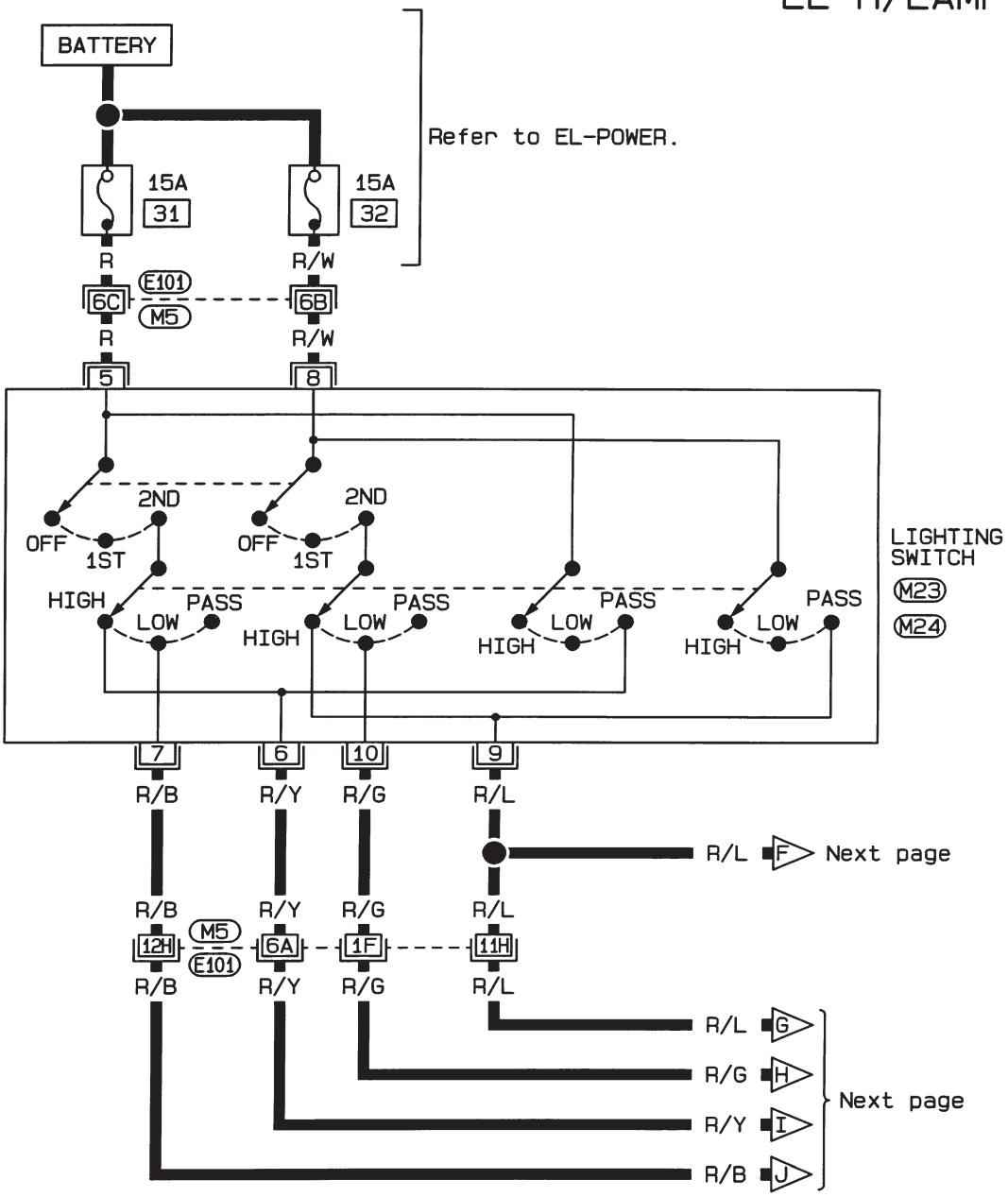
UM : For the Middle East and Europe
XU : Except UM
*1 ··· UM 18, XU 17
*2 ··· UM 17, XU 16



HEL321A

Wiring Diagram — H/LAMP —/RHD Models

EL-H/LAMP-03



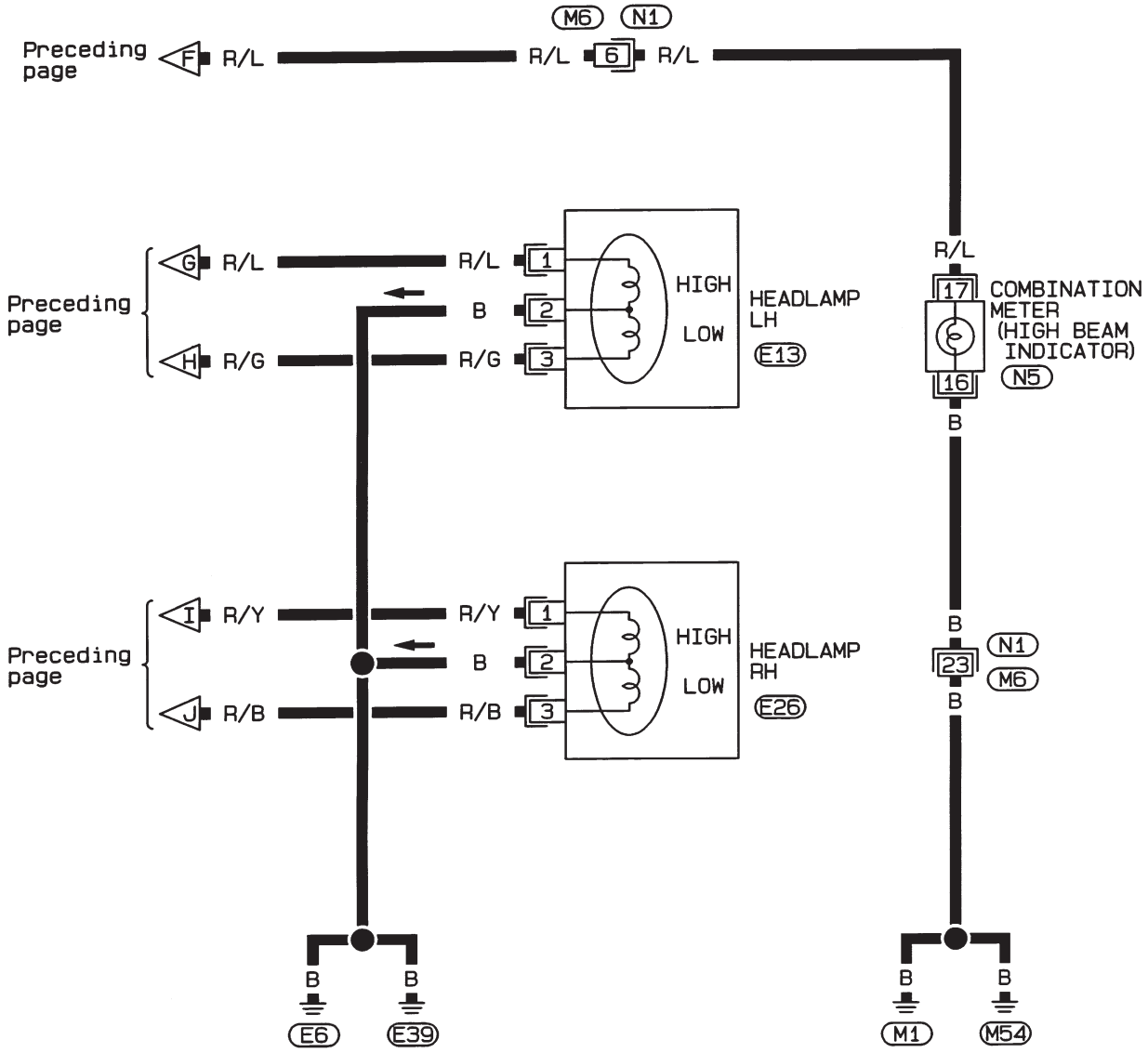
Refer to last page (Foldout page).

M5, E101

HEL900

Wiring Diagram — H/LAMP —/RHD Models (Cont'd)

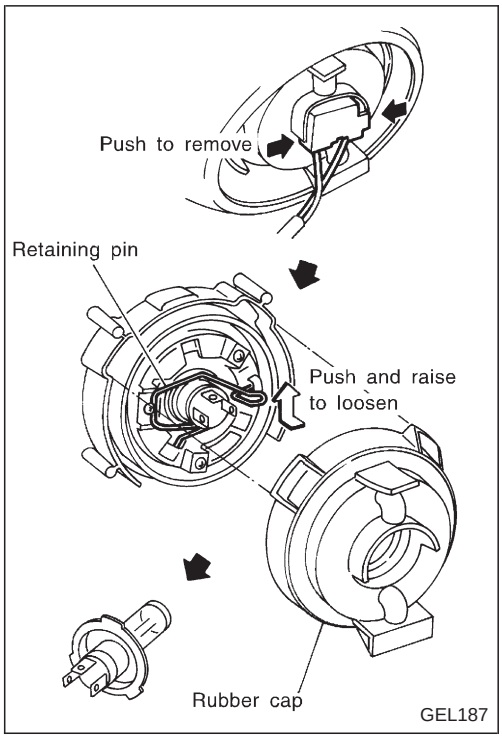
EL-H/LAMP-04



HEL901

Trouble Diagnoses

Symptom	Possible cause	Repair order
LH headlamps do not operate.	1. Bulb 2. Grounds (E6) and (E39) 3. 15A fuse 4. Lighting switch	1. Check bulb. 2. Check grounds (E6) and (E39). 3. Check 15A fuse (No. 32, located in fusible link and fuse box). Verify battery positive voltage is present at terminal (8) of lighting switch. 4. Check lighting switch.
RH headlamps do not operate.	1. Bulb 2. Grounds (E6) and (E39) 3. 15A fuse 4. Lighting switch	1. Check bulb. 2. Check grounds (E6) and (E39). 3. Check 15A fuse (No. 31, located in fusible link and fuse box). Verify battery positive voltage is present at terminal (5) of lighting switch. 4. Check lighting switch.
LH high beams do not operate, but LH low beam operates.	1. Bulbs 2. Open in LH high beams circuit 3. Lighting switch	1. Check bulbs. 2. Check R/L wire between lighting switch and LH headlamps for an open circuit. 3. Check lighting switch.
LH low beam does not operate, but LH high beam operates.	1. Bulb 2. Open in LH low beam circuit 3. Lighting switch	1. Check bulb. 2. Check R/G wire between lighting switch and LH headlamp for an open circuit. 3. Check lighting switch.
RH high beams do not operate, but RH low beam operates.	1. Bulbs 2. Open in RH high beams circuit 3. Lighting switch	1. Check bulbs. 2. Check R/Y wire between lighting switch and RH headlamps for an open circuit. 3. Check lighting switch.
RH low beam does not operate, but RH high beam operates.	1. Bulb 2. Open in RH low beam circuit 3. Lighting switch	1. Check bulb. 2. Check R/B wire between lighting switch and RH headlamp for an open circuit. 3. Check lighting switch.
High beam indicator does not work.	1. Bulb 2. Grounds (M1) and (M54) 3. Open in high beam circuit	1. Check bulb in combination meter. 2. Check grounds (M1) and (M54). 3. Check R/L wire between lighting switch and combination meter for an open circuit.



Bulb Replacement

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

- **Grasp only the plastic base when handling the bulb. Never touch the glass envelope.**

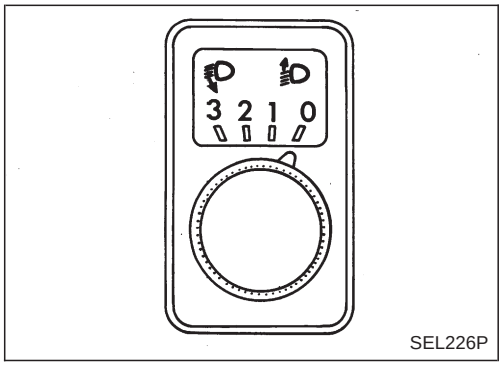
1. Disconnect the battery cable.
2. Disconnect the harness connector from the back side of the bulb.
3. Pull off the rubber cap.
4. Push and raise retaining pin to loosen it.
5. Remove the headlamp bulb carefully. Do not shake or rotate the bulb when removing it.
6. Install in the reverse order of removal.

CAUTION:
Do not leave headlamp reflector without bulb for a long period of time. Dust, moisture, smoke, etc. entering headlamp body may affect the performance of the headlamp. Remove headlamp bulb from the headlamp reflector just before a replacement bulb is installed.

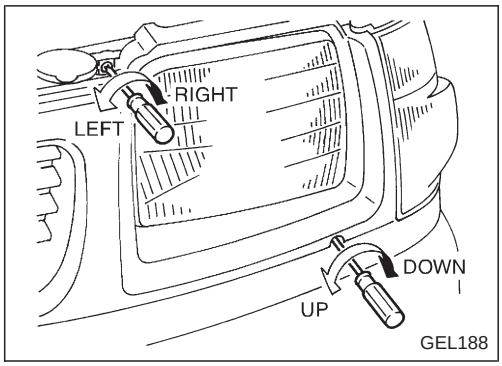
Aiming Adjustment

When performing headlamp aiming adjustment, use an aiming machine, aiming wall screen or headlamp tester. Aimers should be in good repair, calibrated and operated in accordance with respective operation manuals.
If any aimer is not available, aiming adjustment can be done as follows:
For details, refer to the regulations in your own country.

a. Keep all tires inflated to correct pressures.
b. Place vehicle and tester on one and same flat surface.
c. See that there is no-load in vehicle (coolant, engine oil filled up to correct level and full fuel tank) other than the driver (or equivalent weight placed in driver's position).



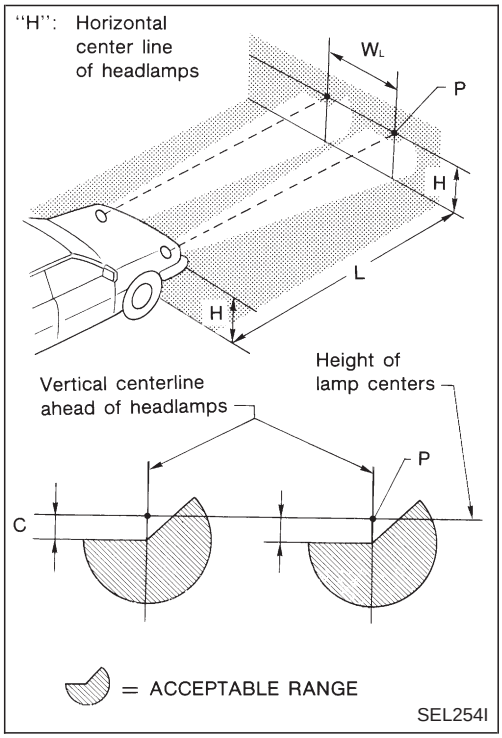
CAUTION:
Be sure aiming switch is set to ''0'' when performing aiming adjustment on vehicles equipped with headlamp aiming control.



Low Beam

1. Turn headlamp low beam on.
2. Use adjusting screws to perform aiming adjustment.

- **First tighten the adjusting screw all the way and then make adjustment by loosening the screw.**



- **Adjust headlamps so that main axis of light is parallel to center line of body and is aligned with point P shown in illustration.**
- **Figure to the left shows headlamp aiming pattern for driving on right side of road; for driving on left side of road, aiming pattern is reversed.**
- **Dotted lines in illustration show center of headlamp.**

"H": Horizontal center line of headlamps
"W_L": Distance between each headlamp center
"L": 5,000 mm (196.85 in)
"C": 65 mm (2.56 in)

System Description

OPERATION

Headlamp system on vehicles for North Europe contains a daytime light system. The unit operates to illuminate headlamps low beam, parking, tail, license lamps and illuminations automatically in the following conditions.

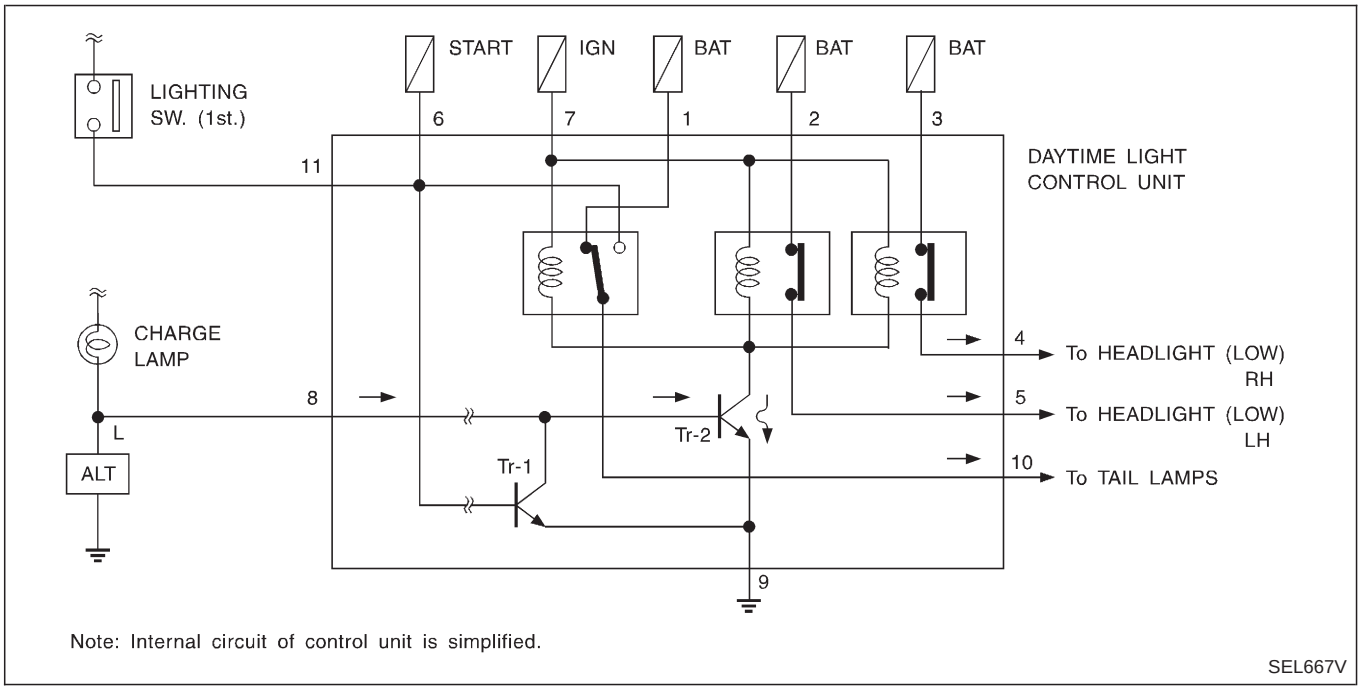
- The engine is running with lighting switch in OFF position.

When the any of following conditions exists, the daytime light operation will be canceled.

- Ignition switch is in any position other than ON
- Engine is stopped
- Lighting switch is turned to 1st or 2nd position.

If the daytime light system is canceled, lighting switch operations are the same as for conventional light system.

DAYTIME LIGHT IS OPERATING
(With engine running and lighting switch in OFF position)



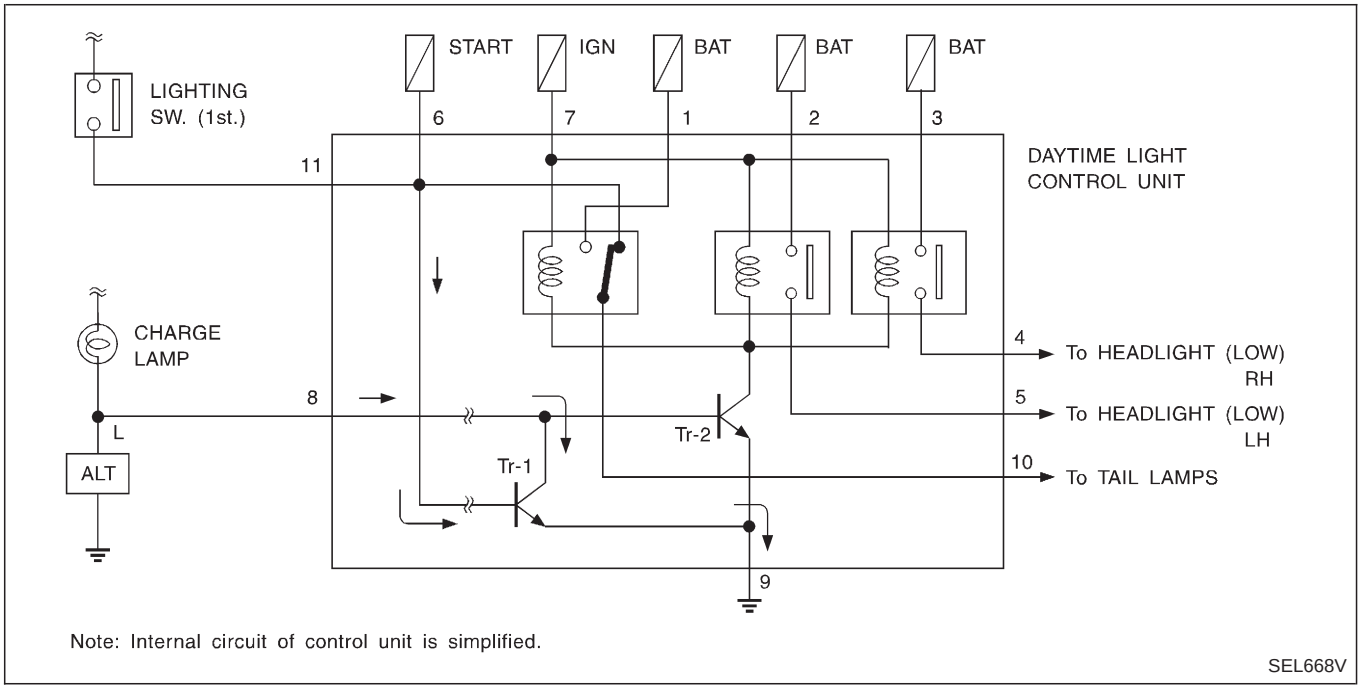
With engine running, power is supplied

- from alternator terminal L
- through daytime light control unit terminal ⑧
- to base of transistor-2 in the daytime light control unit.

The transistor-2 supplies ground path to all relays. Then the relays energize to illuminate lamps.

System Description (Cont'd)

DAYTIME LIGHT IS CANCELED
(Lighting switch in 1st or 2nd position or ignition switch in START position)



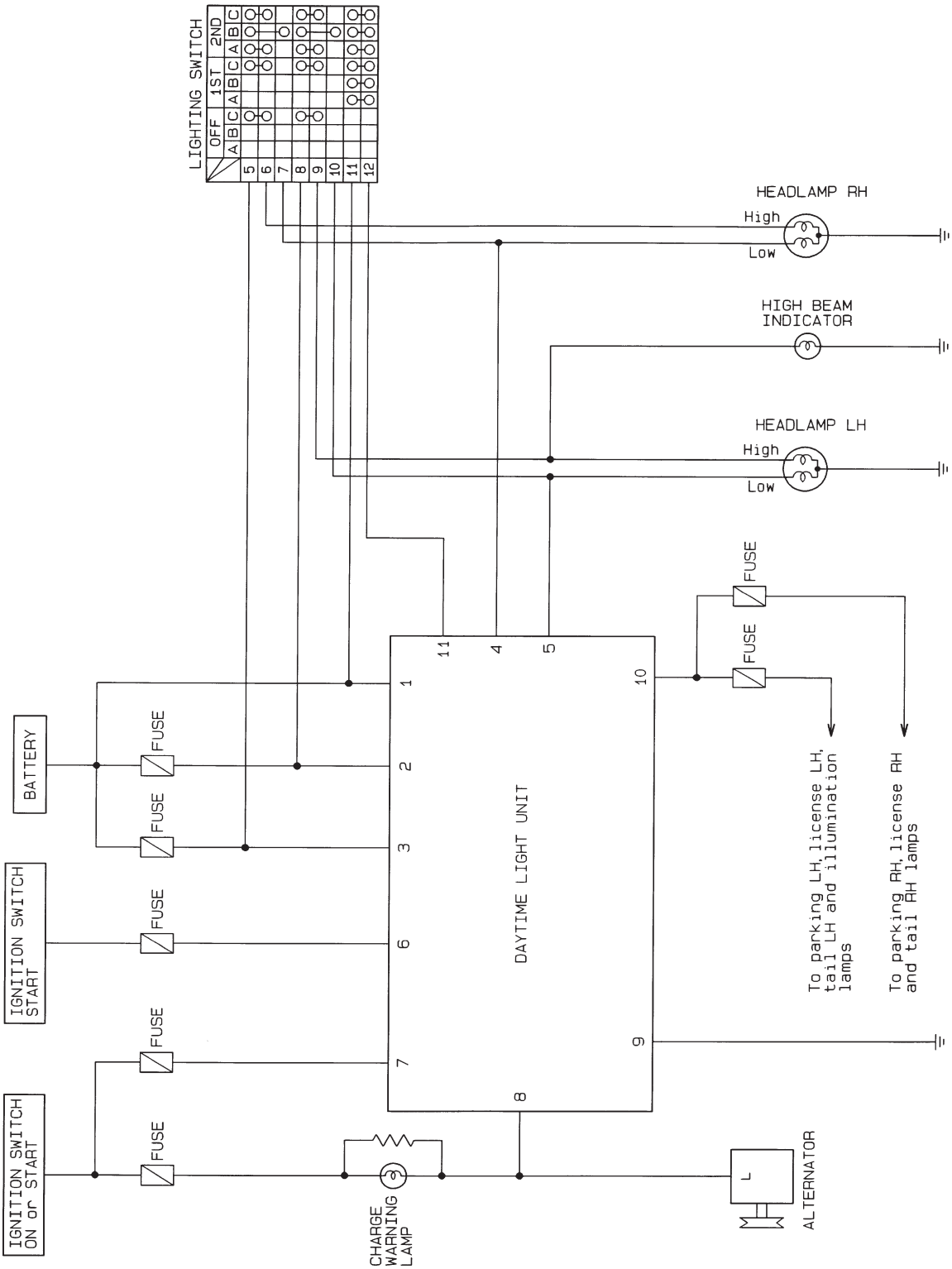
- Ignition switch is in START position
- Lighting switch is in 1st or 2nd position.

When one of the above conditions exists, power is supplied

- to base of the transistor-1 in daytime light control unit
- through daytime light control unit terminal ⑪ or ⑥.

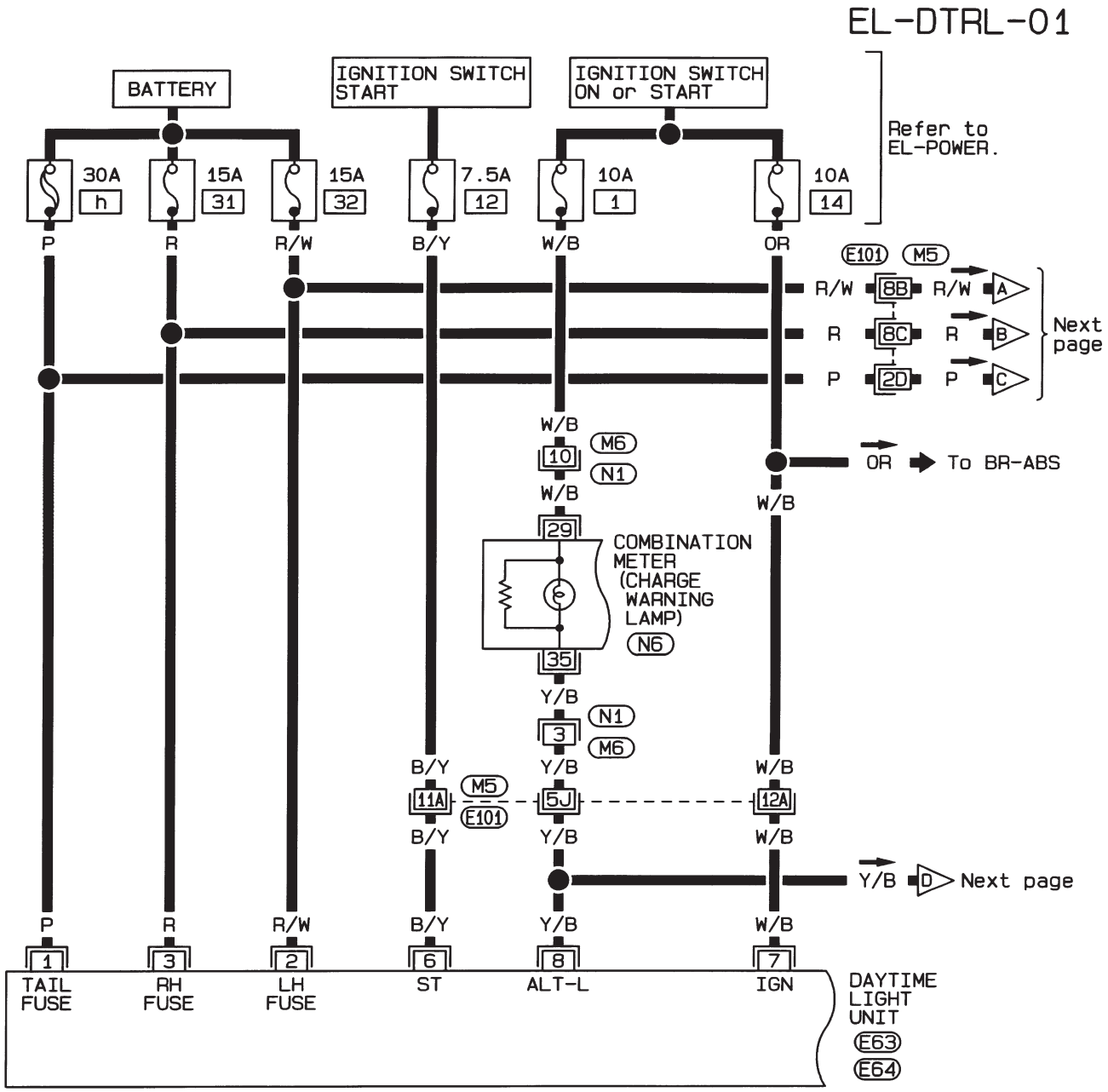
And then, power supply path to the base transistor-2 is interrupted to cancel daytime light operation.

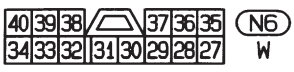
Schematic

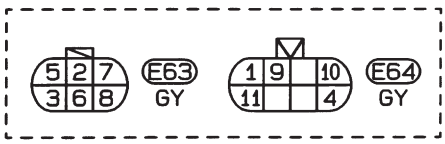


HEL322A

Wiring Diagram — DTRL —







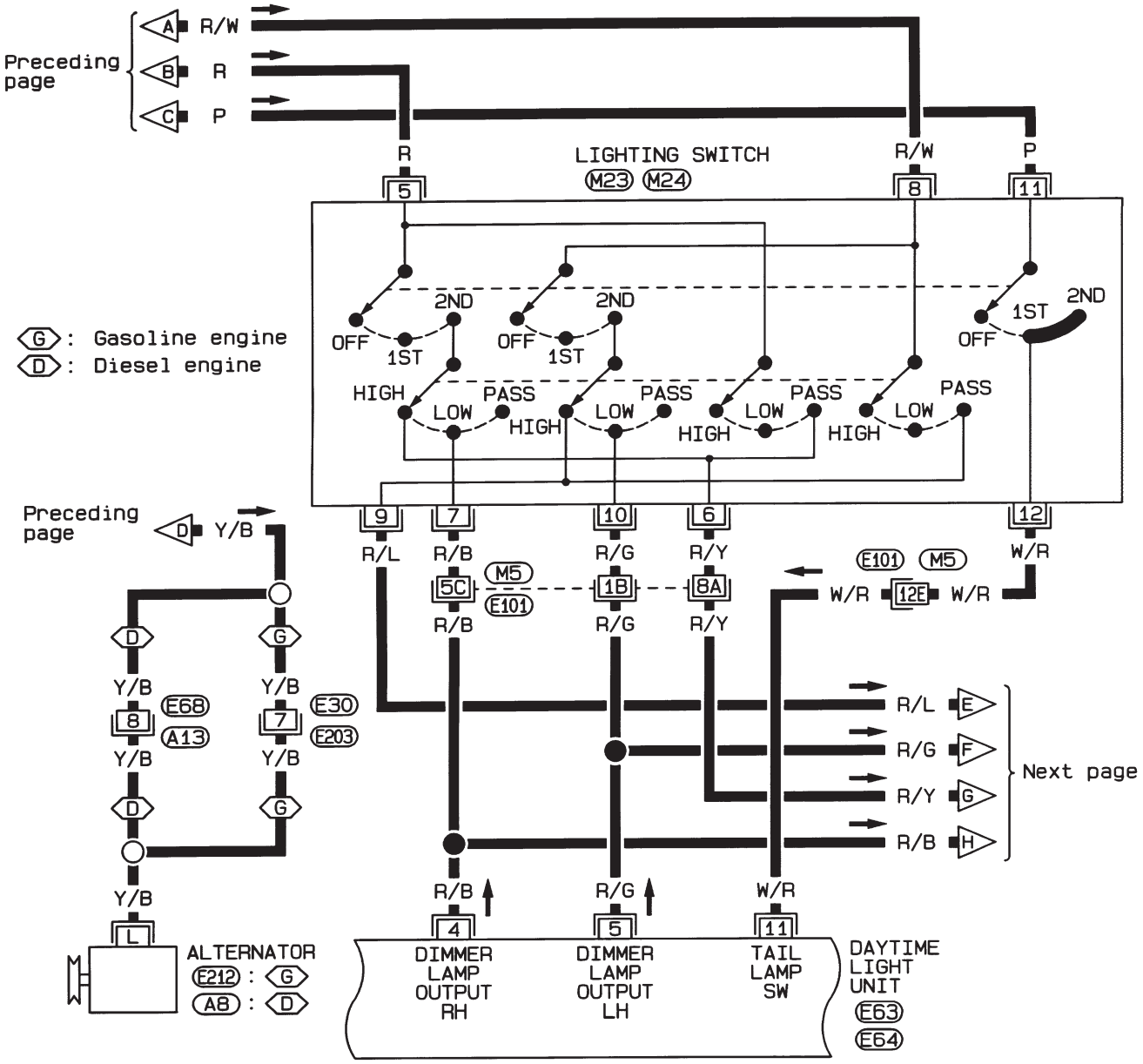
Refer to last page (Foldout page).

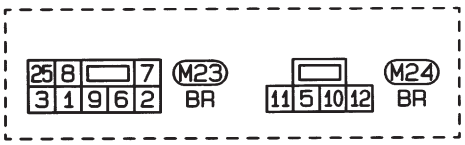
M5, E101

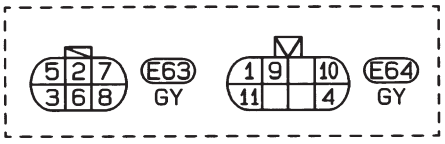
HEL323A

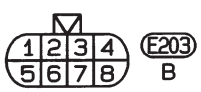
Wiring Diagram — DTRL — (Cont'd)

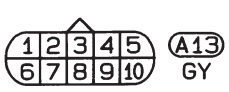
EL-DTRL-02











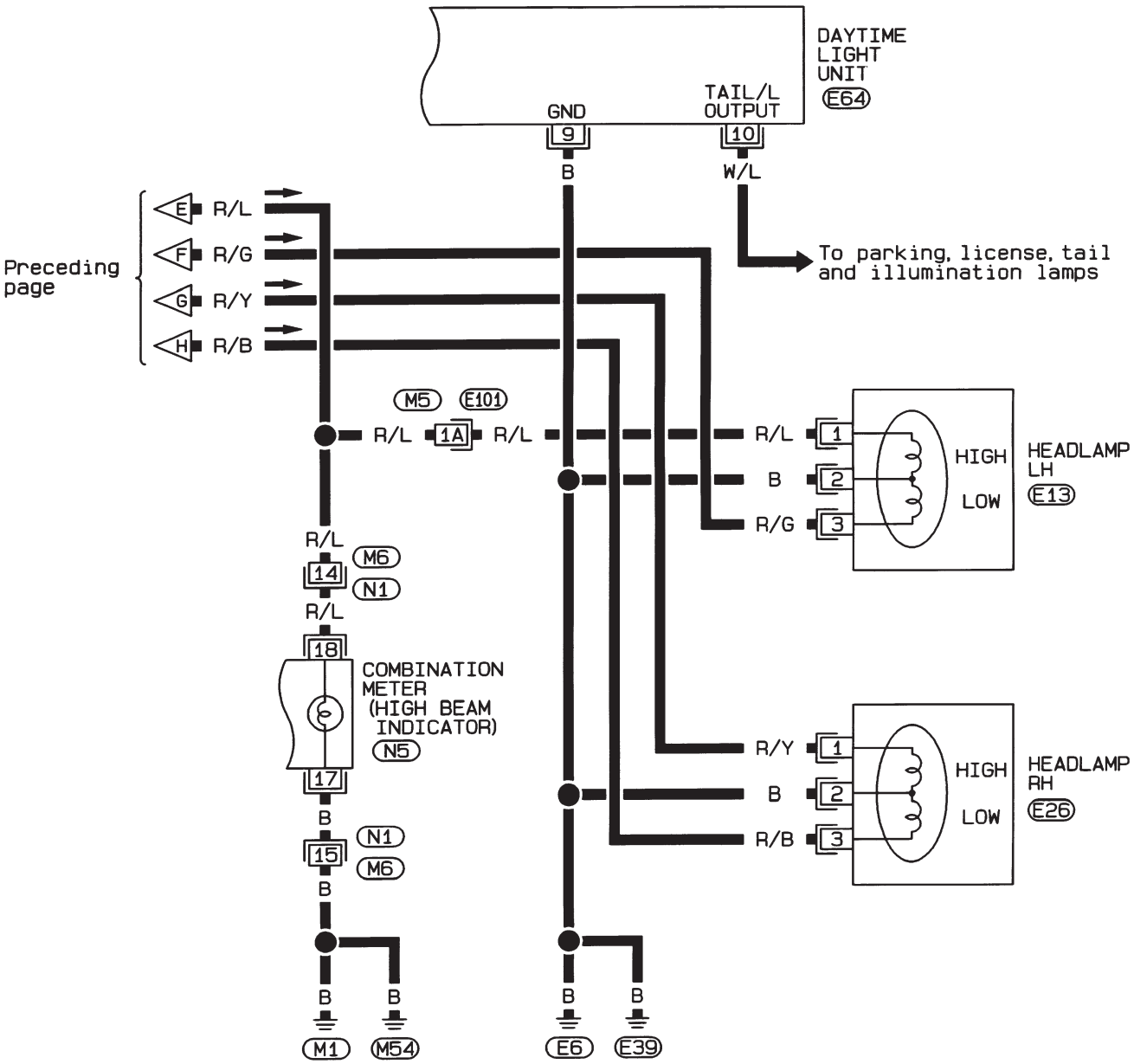
Refer to last page (Foldout page).

M5, E101

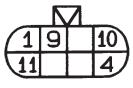
HEL324A

Wiring Diagram — DTRL — (Cont'd)

EL-DTRL-03



E13 B , E26 B



E64 GY

Refer to last page (Foldout page).

M5, E101

HEL325A

Trouble Diagnoses

DAYTIME LIGHT CONTROL UNIT INSPECTION TABLE

Terminal No.	Connections	INPUT (I)/ OUTPUT (O)	Operated condition		Voltage (V) (Approximate values)
1	Power source for illumination & tail lamp	—	—		12
2	Power source for headlamp LH	—	—		12
3	Power source for headlamp RH	—	—		12
4	Headlamp RH	O	ON (daytime light operating*)		12
			OFF		0
5	Headlamp LH	O	ON (daytime light operating*)		12
			OFF		0
6	Start signal	I	Ignition switch	START	12
				ON, ACC or OFF	0
7	Power source	—	Ignition switch	ON or START	12
				ACC or OFF	0
8	Alternator ‘‘L’’ terminal	I	Engine	Running	12
				Stopped	0
9	Ground	—	—		—
10	Illumination & tail lamp	O	ON (daytime light operating*)		12
			OFF		0
11	Lighting switch	I	1ST·2ND position		12
			OFF		0

*: Daytime light operating: Lighting switch in ‘‘OFF’’ position with engine running.

Bulb Replacement

Refer to ‘‘HEADLAMP’’ (EL-49).

Aiming Adjustment

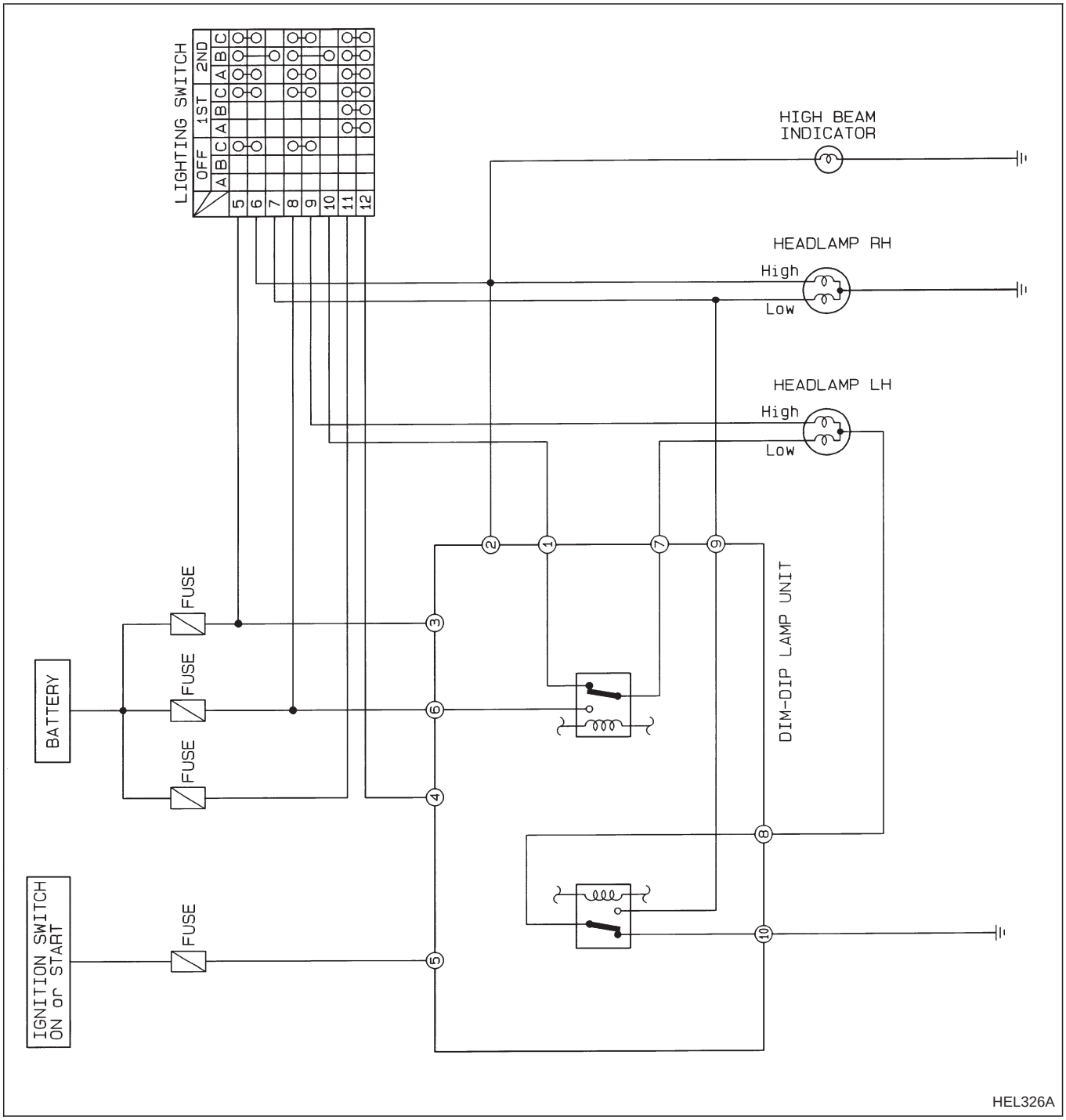
Refer to ‘‘HEADLAMP’’ (EL-49).

System Description

Headlamp system on RHD vehicles for Europe contains a dim-dip lamp system. The unit operates both headlamp low beams at half illumination in the following conditions.

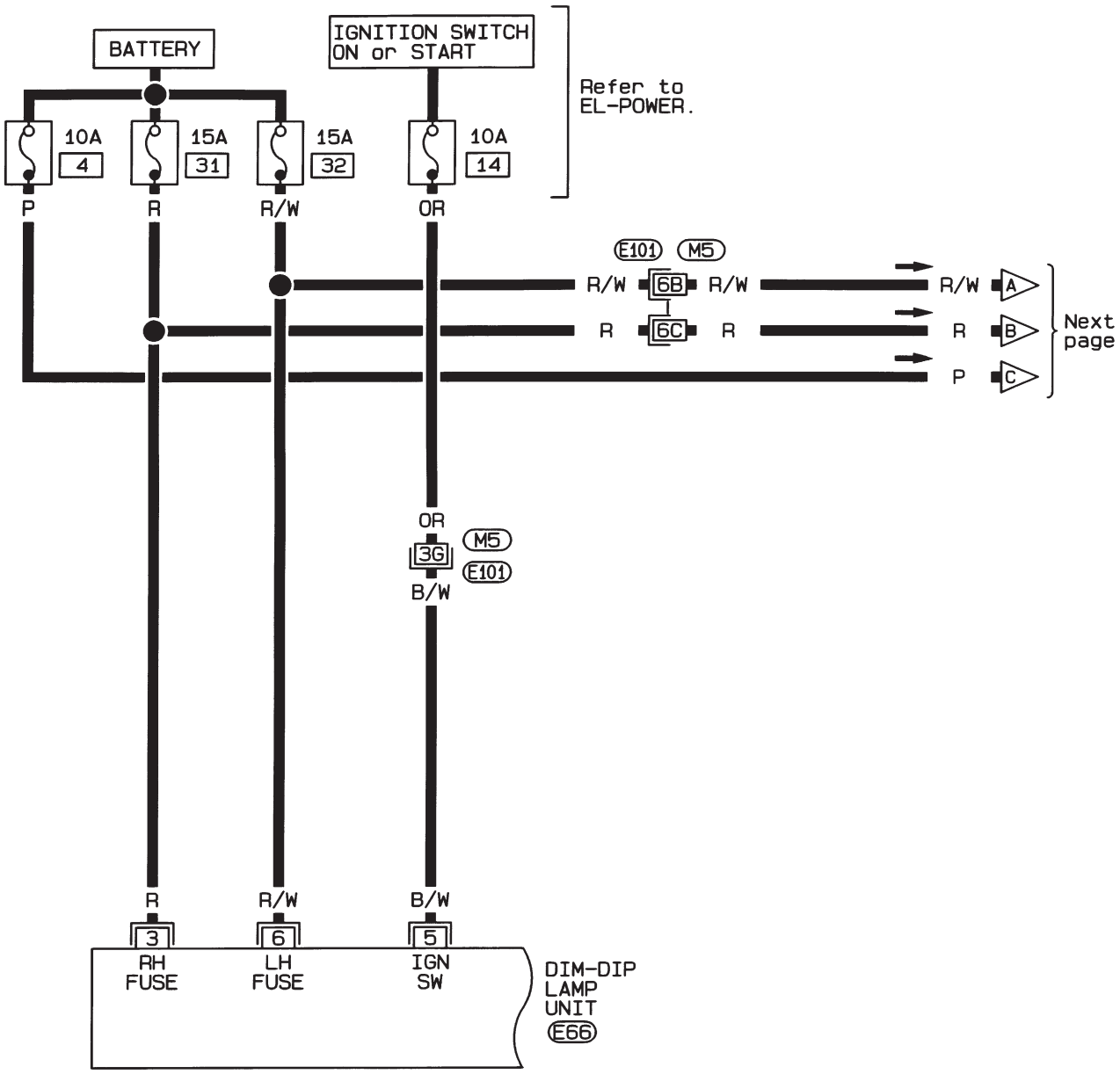
- Lighting switch is turned to 1st, with ignition switch in ON position. In other conditions, the dim-dip lamp is canceled and lighting switch operations are the same as in conventional light systems.

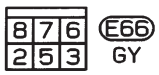
Schematic



Wiring Diagram — DIMDIP —

EL-DIMDIP-01





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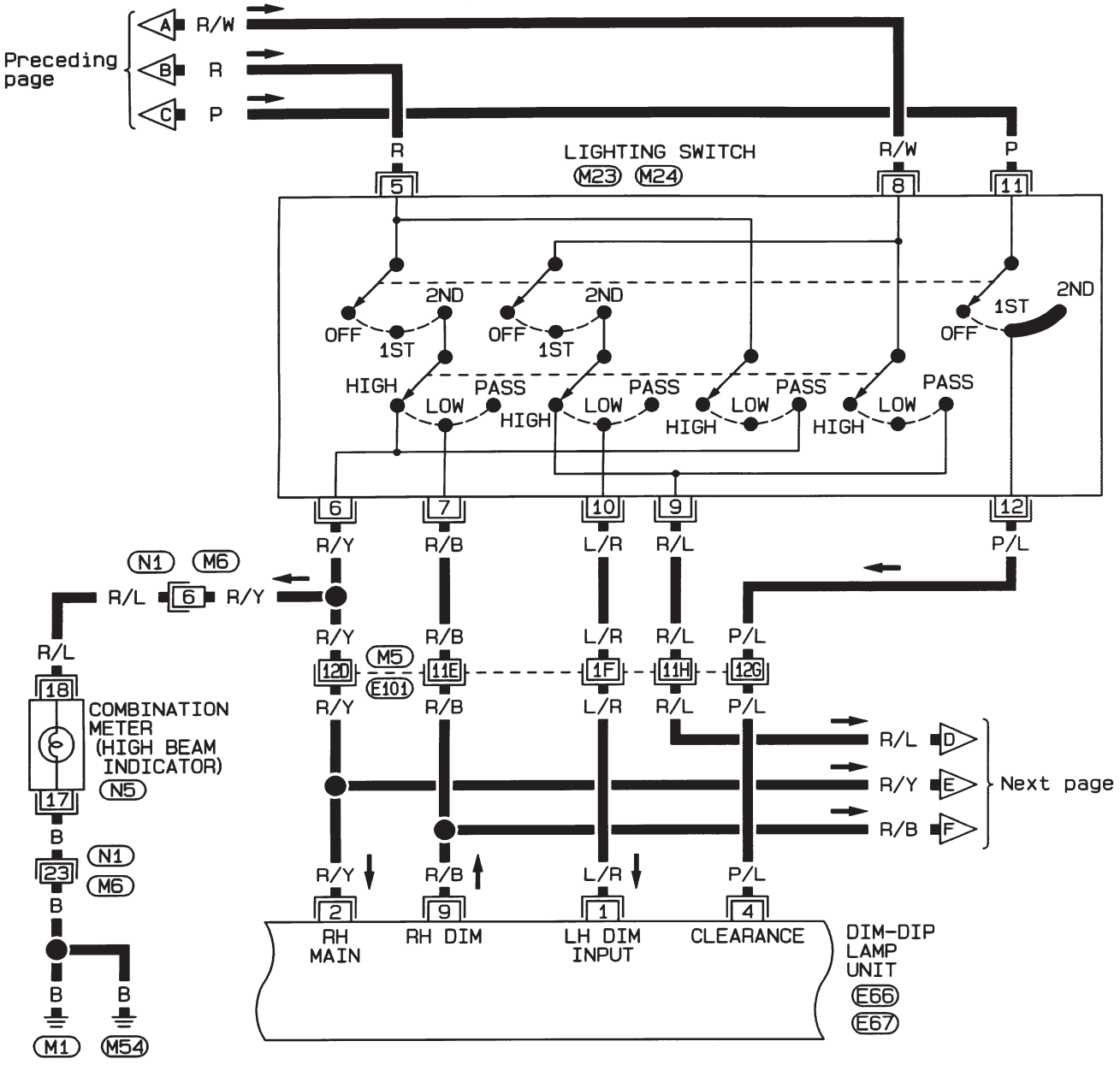
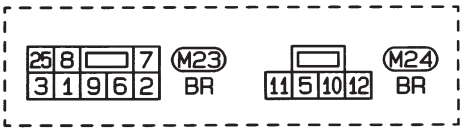
M5, E101

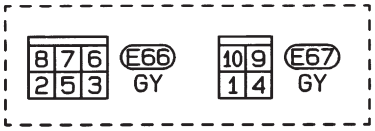
HEL327A

Wiring Diagram — DIMDIP — (Cont'd)

EL-DIMDIP-02







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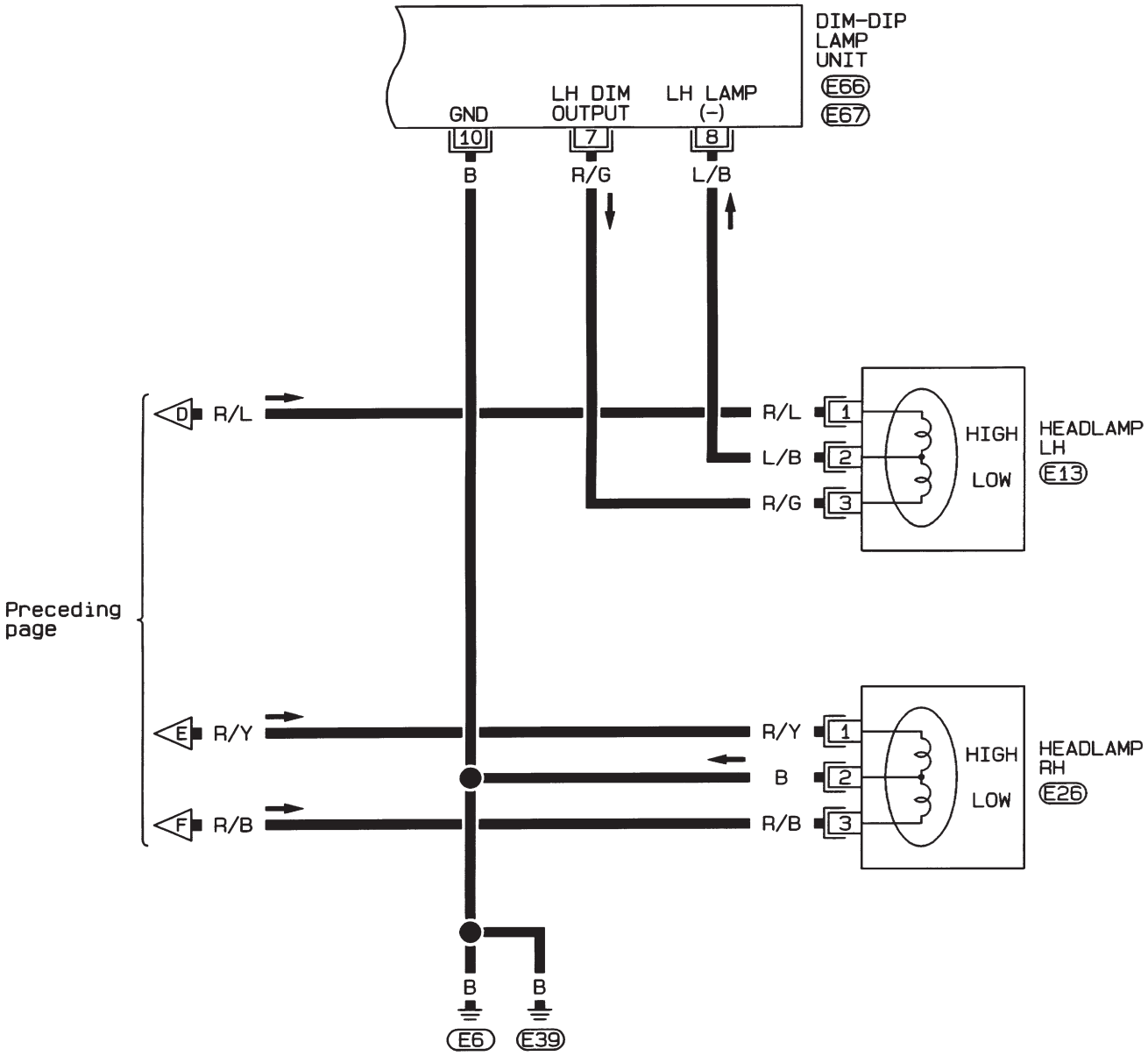
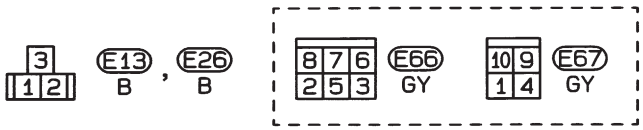
M5, E101

HEL328A

Wiring Diagram — DIMDIP — (Cont'd)

EL-DIMDIP-03





HEL329A

Trouble Diagnoses

DIM-DIP LAMP CONTROL UNIT INSPECTION TABLE

Terminal No.	Connections	INPUT (I)/ OUTPUT (O)	Operated condition			Voltage (V) (Approximate values)
1	Lighting switch (Low beam)	I	Lighting switch	Low beam ON		12
				Other		0
2	Lighting switch (High beam)	I	Lighting switch	High beam ON		12
				Other		0
3	Power source	—	—			12
4	Lighting switch	I	1ST·2ND position			12
			OFF			0
5	Ignition on signal	I	Ignition switch	ON or START		12
				ACC or OFF		0
6	Power source for head-lamp LH	—	—			12
7	Headlamp LH	O	Lighting switch	Low beam ON		12
				Other	Dim-dip lamp operating	12
					Dim-dip lamp off	0
8	LH headlamp ground	—	ON (dim-dip lamp operating*)			6
			OFF			0
9	Headlamp RH	O	Lighting switch	High beam ON		12
				Other	Dim-dip lamp operating	6
					Dim-dip lamp off	0
10	Ground	—	—			—

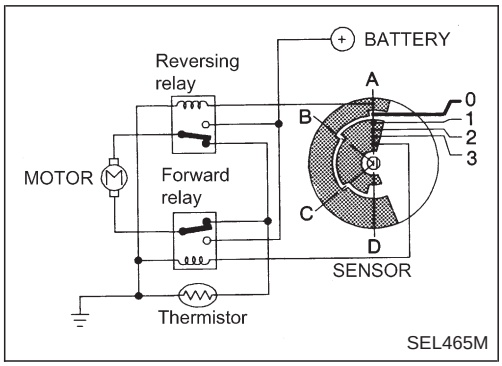
*: Dim-dip lamp operating: Lighting switch in ‘‘1st.’’ position with ignition switch ON.

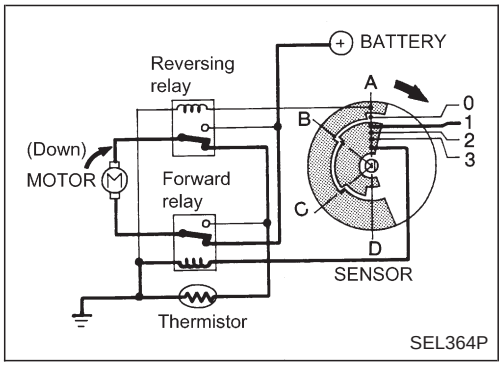
Bulb Replacement

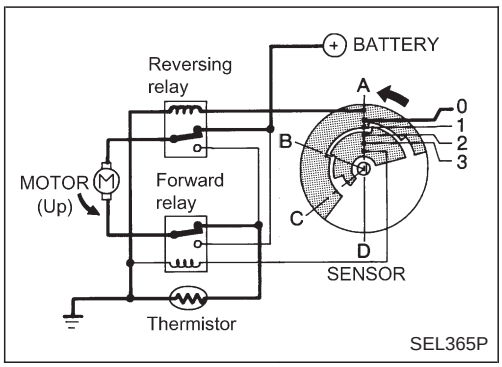
Refer to ‘‘HEADLAMP’’ (EL-49).

Aiming Adjustment

Refer to ‘‘HEADLAMP’’ (EL-49).







System Description

CIRCUIT OPERATION

[Example]

Aiming switch ''0''

- When the aiming switch is set to ''0'', the motor will not start. This is because the power terminals are positioned at the nonconductive section of the sensor's rotary unit.

Aiming switch ''0'' → ''1''

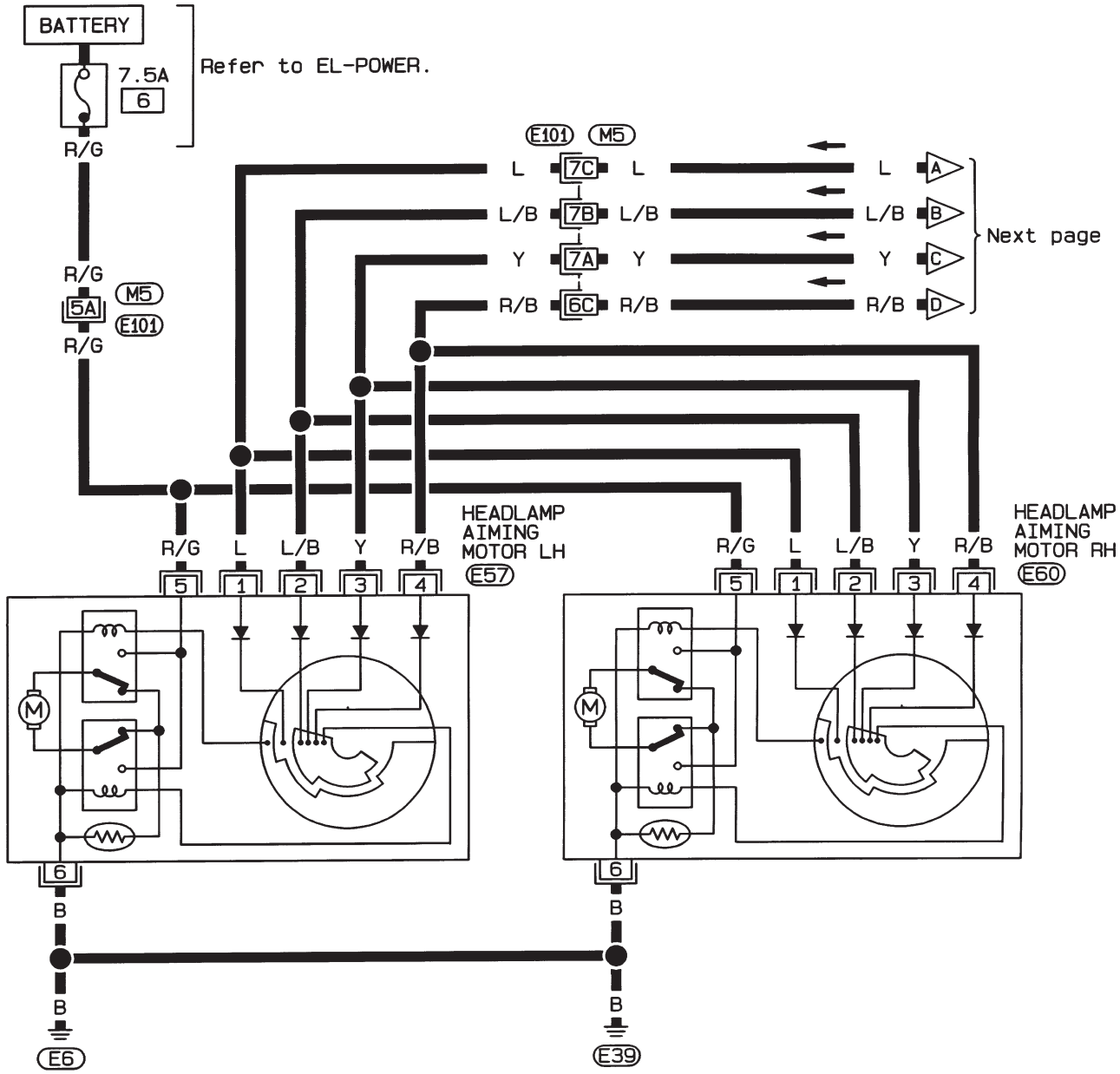
- When the aiming switch is moved from ''0'' to ''1'', the sensor's conductive section activates the relay. Power is supplied through the relay to the motor. The headlamps will then move in the ''DOWN'' direction.
- The motor continues to rotate while the rotary unit of the sensor moves from point A to point B.
- The power terminals will then be positioned at the nonconductive section, disconnecting the power to the motor. The motor will then stop.

Aiming switch ''1'' → ''0''

- When the aiming switch is moved from ''1'' to ''0'', the sensor's conductive section activates the relay. Power is supplied through the relay to the motor. The motor will rotate to move the headlamps in the ''UP'' direction.
- When the rotary unit of the sensor moves from point B to point A, the motor will stop.

Wiring Diagram — H/AIM —

EL-H/AIM-01



1 2 3 4 5 6 E57 GY , E60 GY

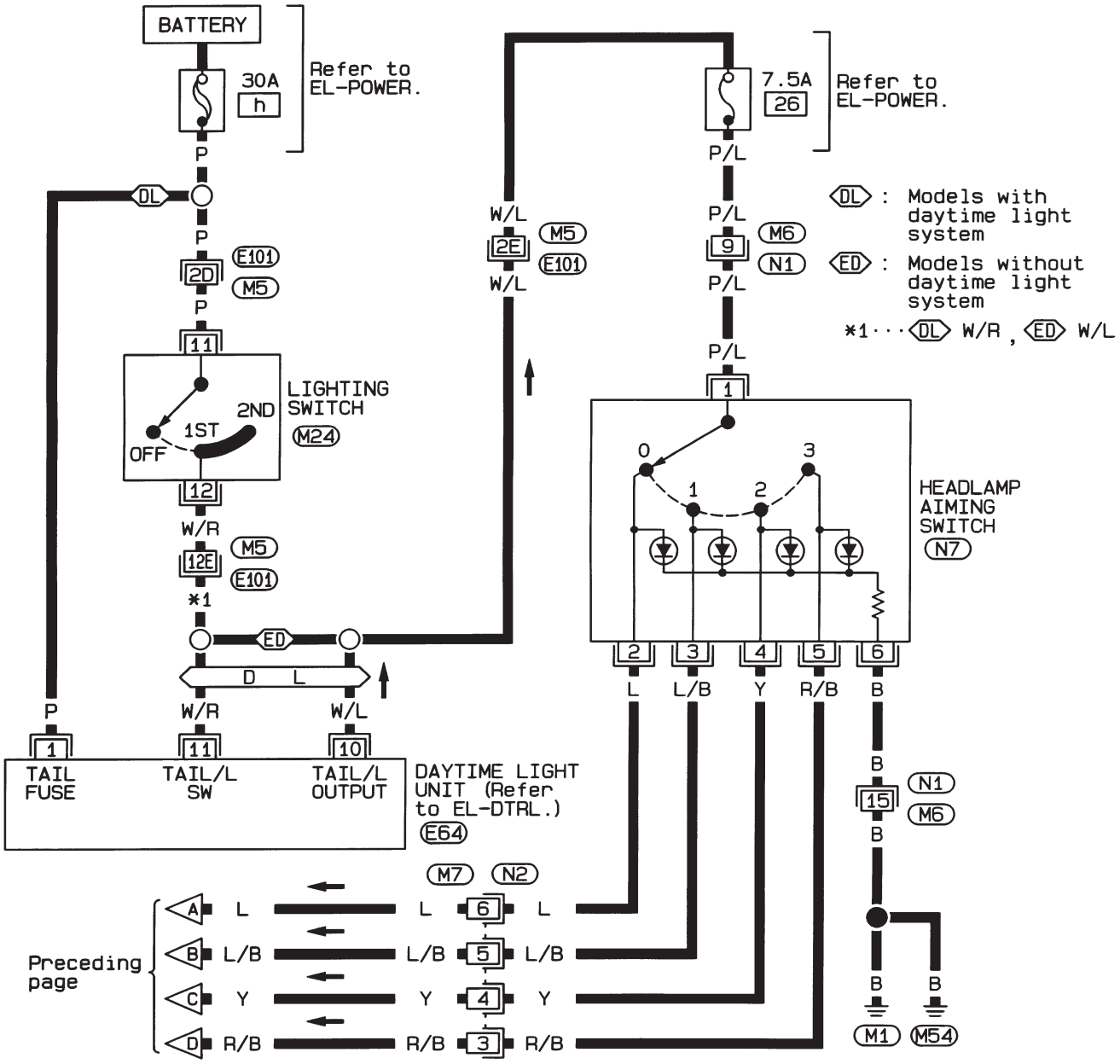
Refer to last page (Foldout page).

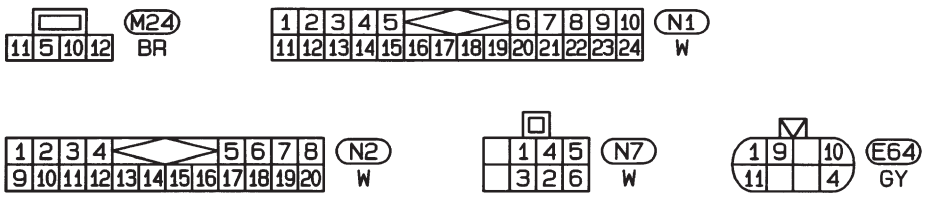
M5 , E101

HEL330A

Wiring Diagram — H/AIM — (Cont'd)

EL-H/AIM-02



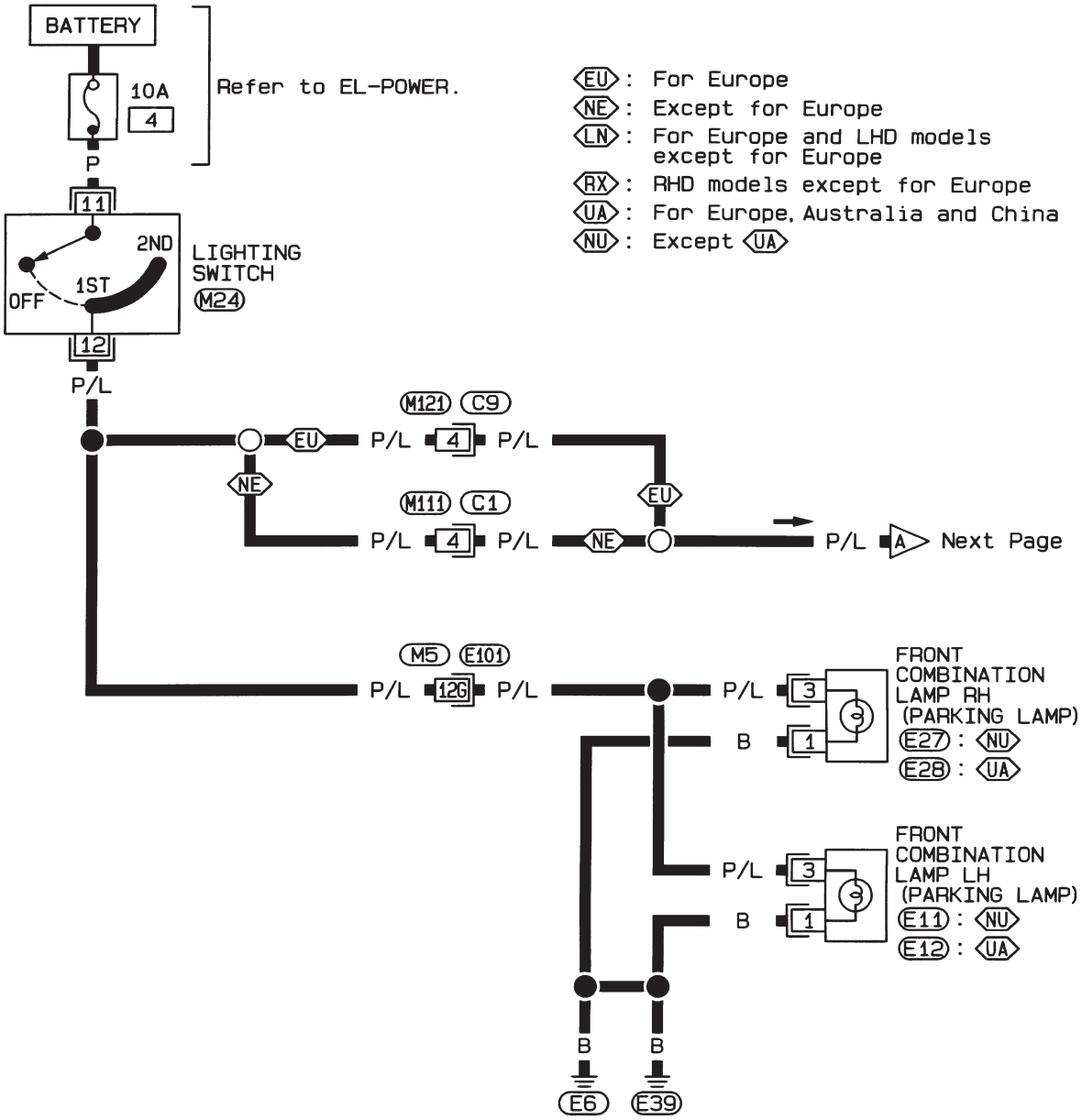


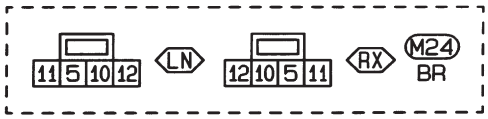
Refer to last page (Foldout page).

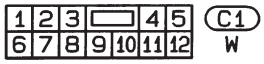
M5, E101

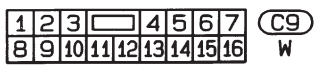
Wiring Diagram — TAIL/L —/Except for LHD Models for Europe

EL-TAIL/L-01









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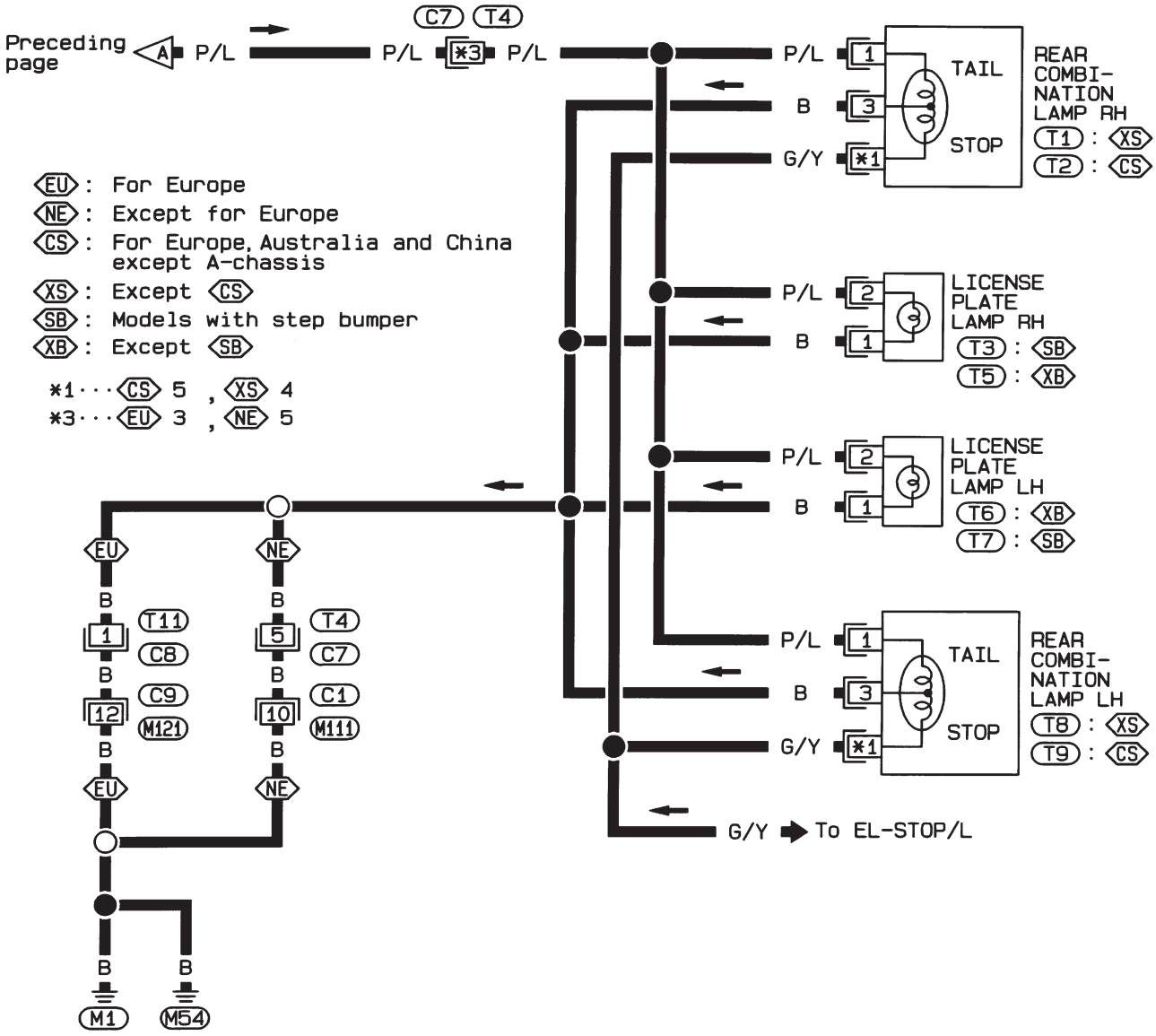
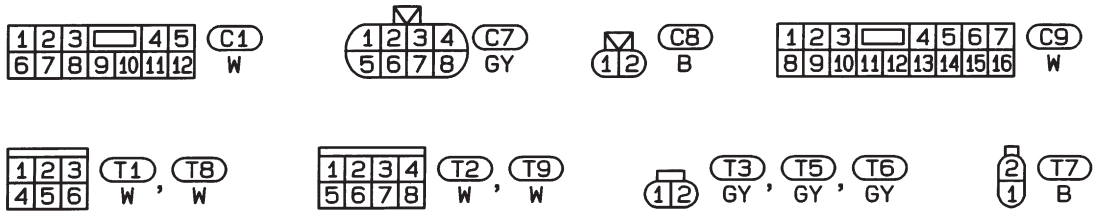
M5, E101

HEL332A

Wiring Diagram — TAIL/L —/Except for LHD Models for Europe (Cont'd)

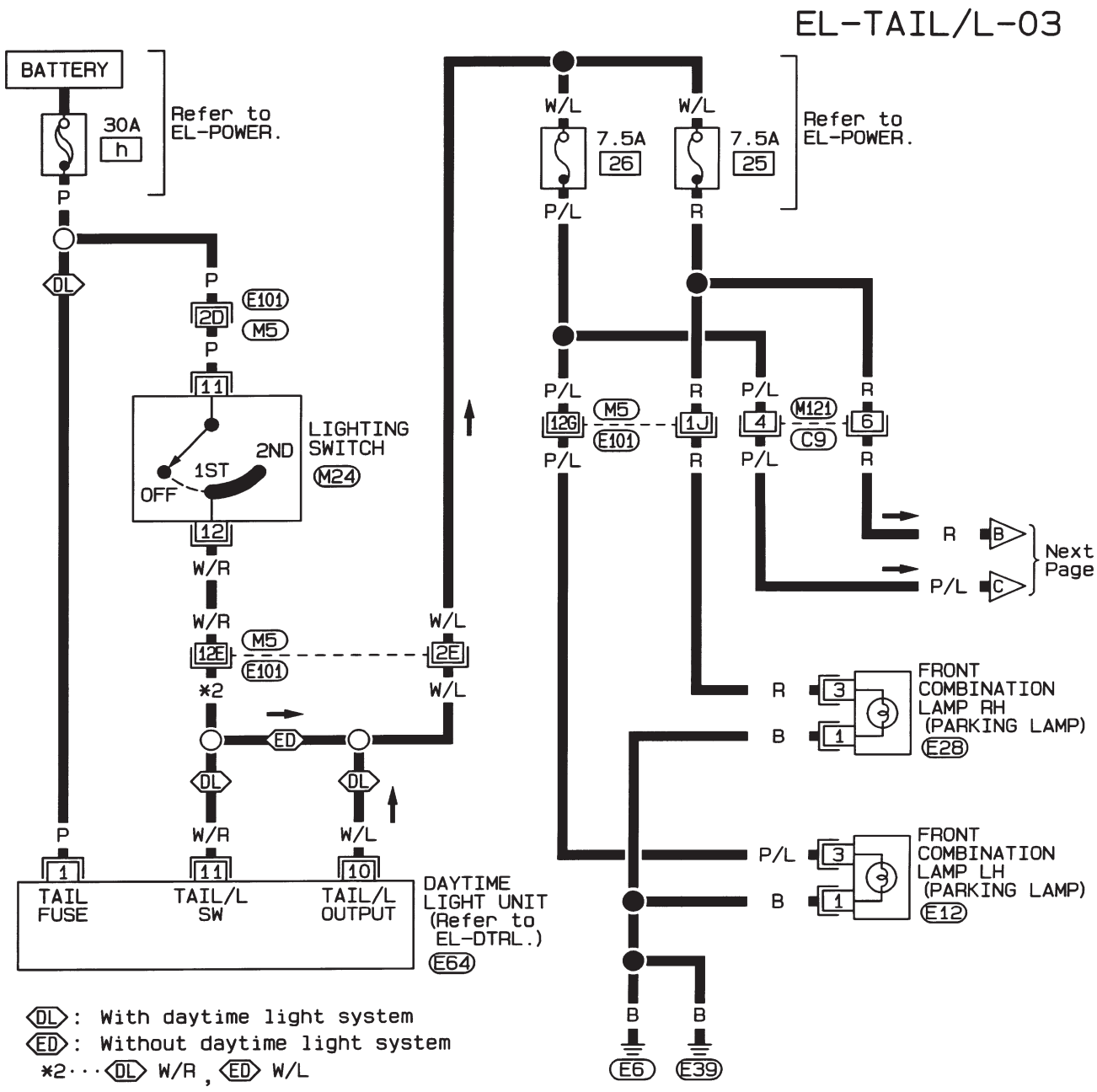
EL-TAIL/L-02





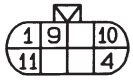
HEL333A

Wiring Diagram — TAIL/L —/LHD Models for Europe

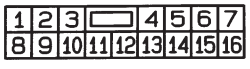


M24
BR

E12
BR
,
E28
BR



E64
GY



C9
W

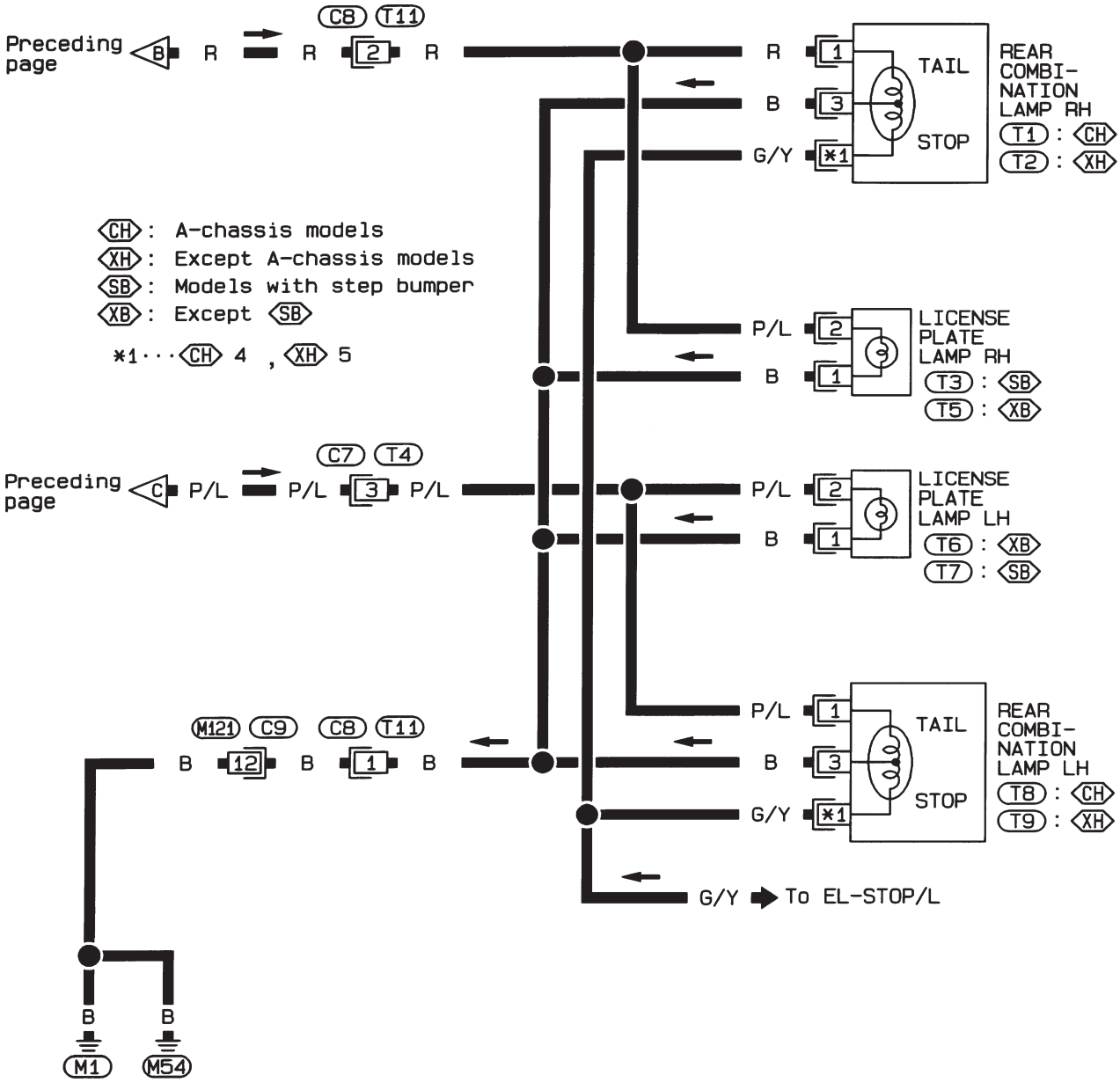
Refer to last page (Foldout page).

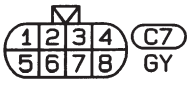
M5
,
E101

HEL334A

Wiring Diagram — TAIL/L —/LHD Models for Europe (Cont'd)

EL-TAIL/L-04

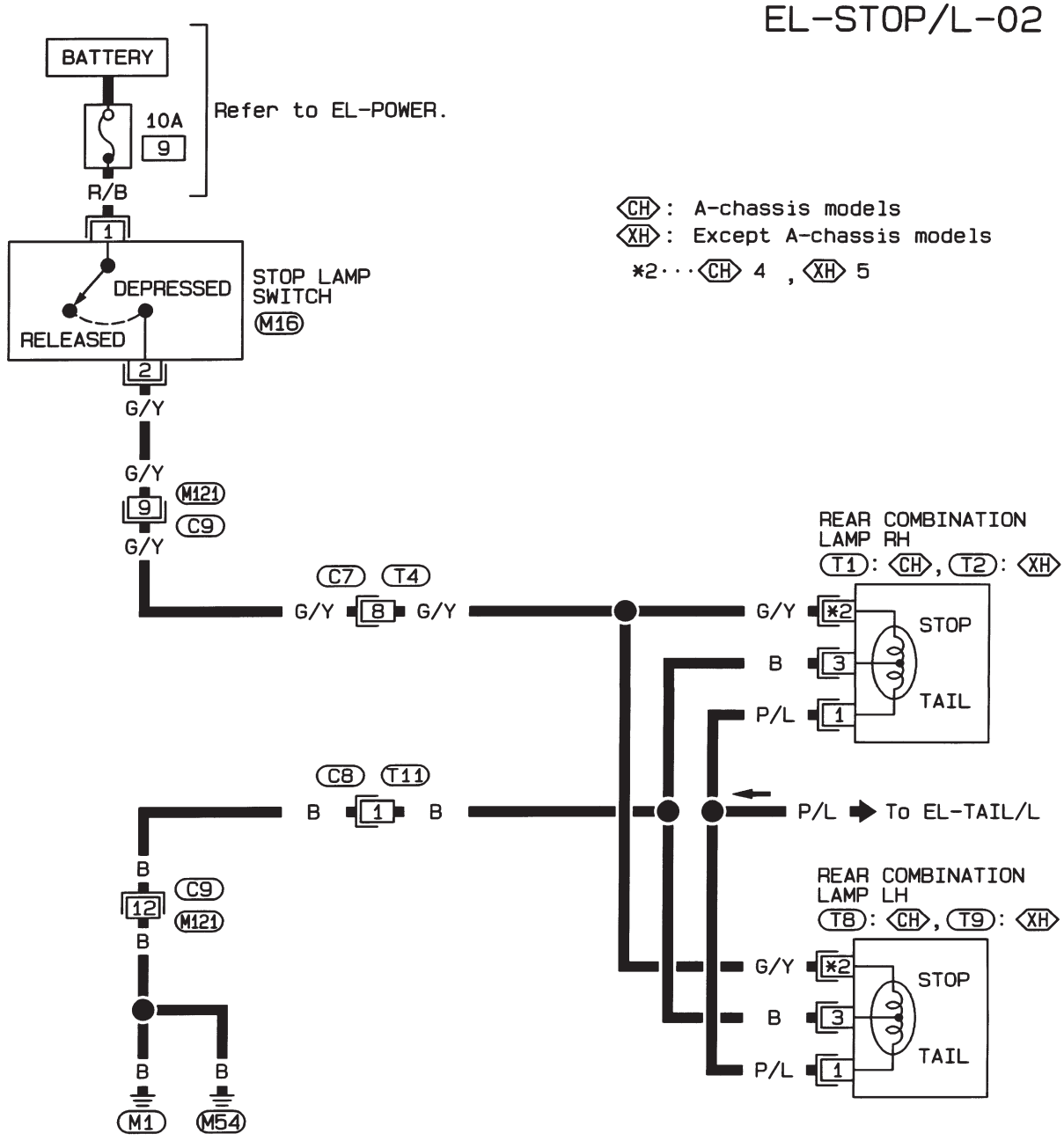


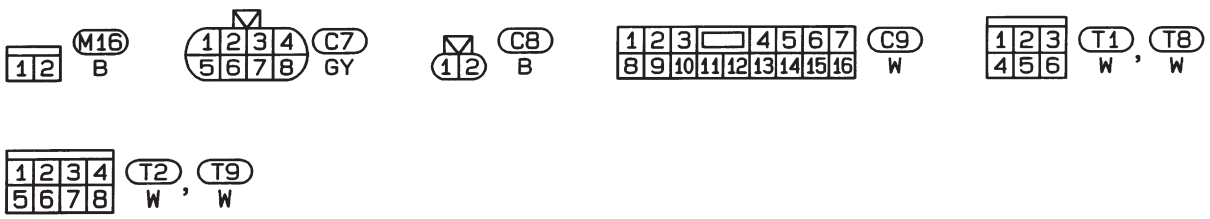


HEL335A

Wiring Diagram — STOP/L —

EL-STOP/L-02

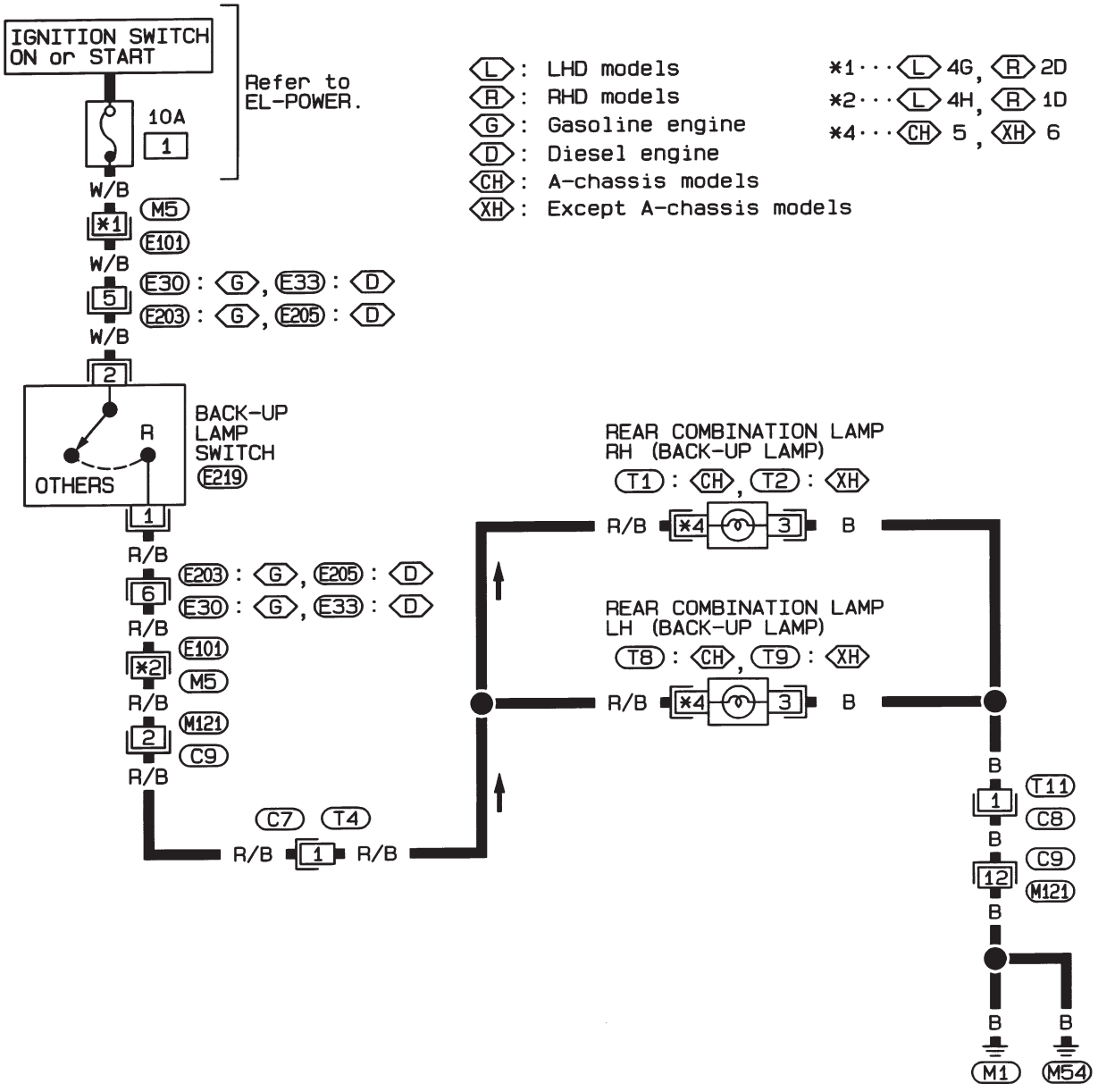


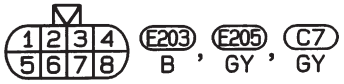


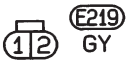
HEL336A

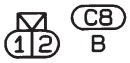
Wiring Diagram — BACK/L —

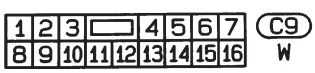
EL-BACK/L-02











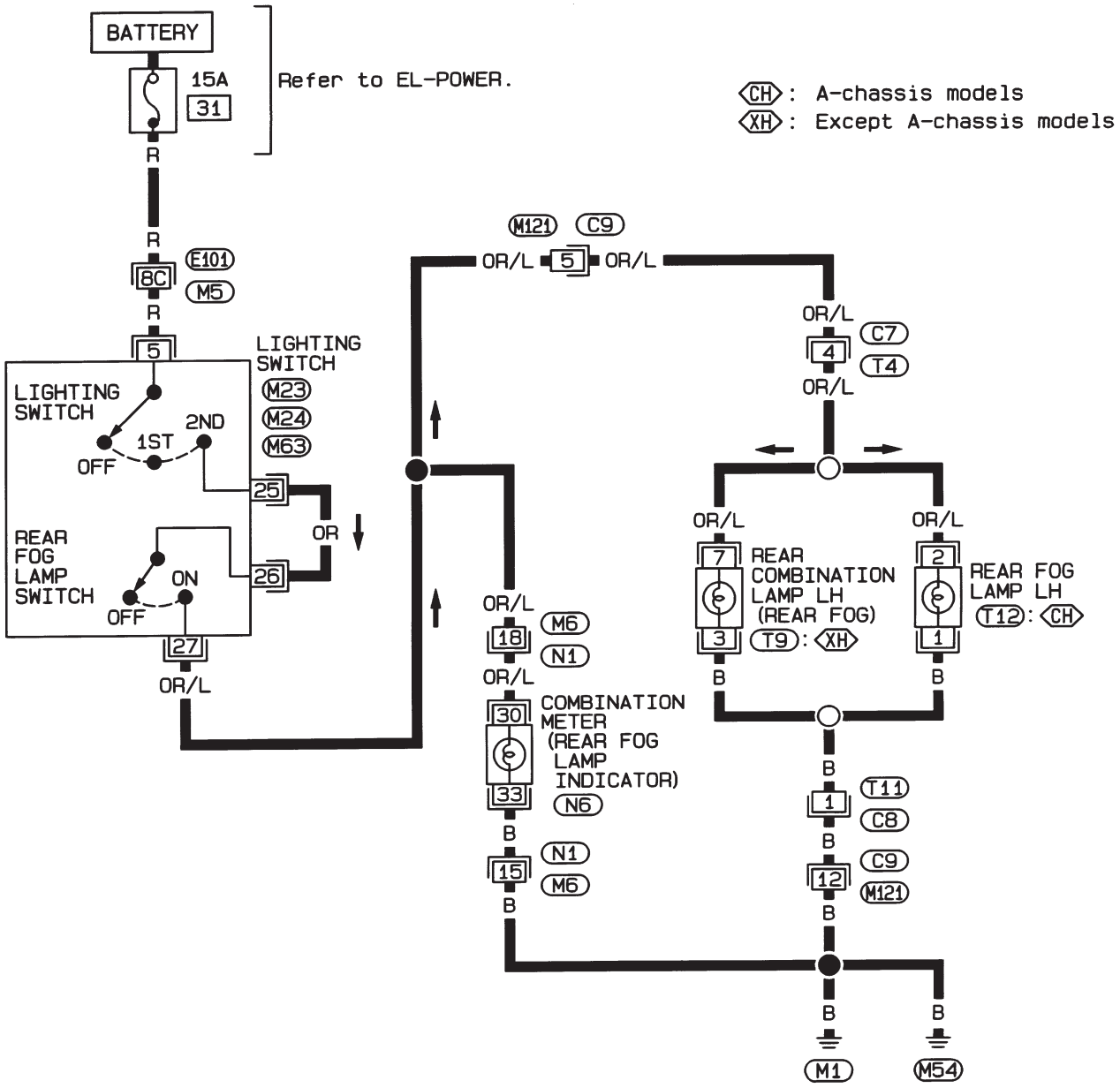
Refer to last page (Foldout page).

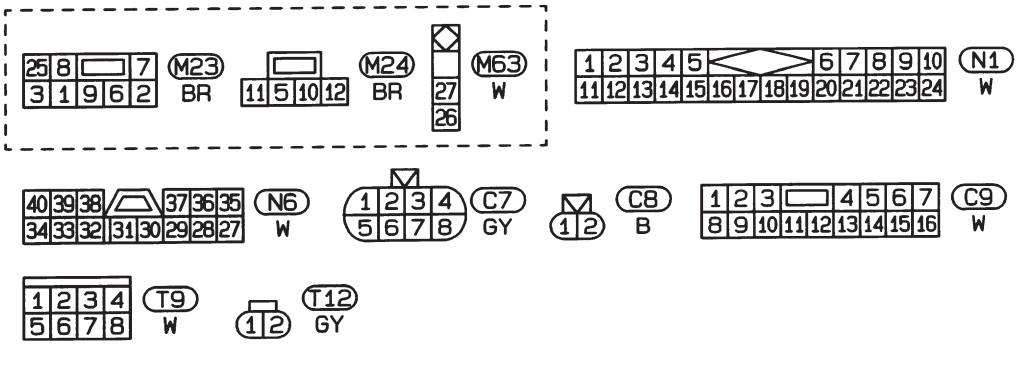
M5, E101

HEL337A

Wiring Diagram — R/FOG —/LHD Models

EL-R/FOG-01





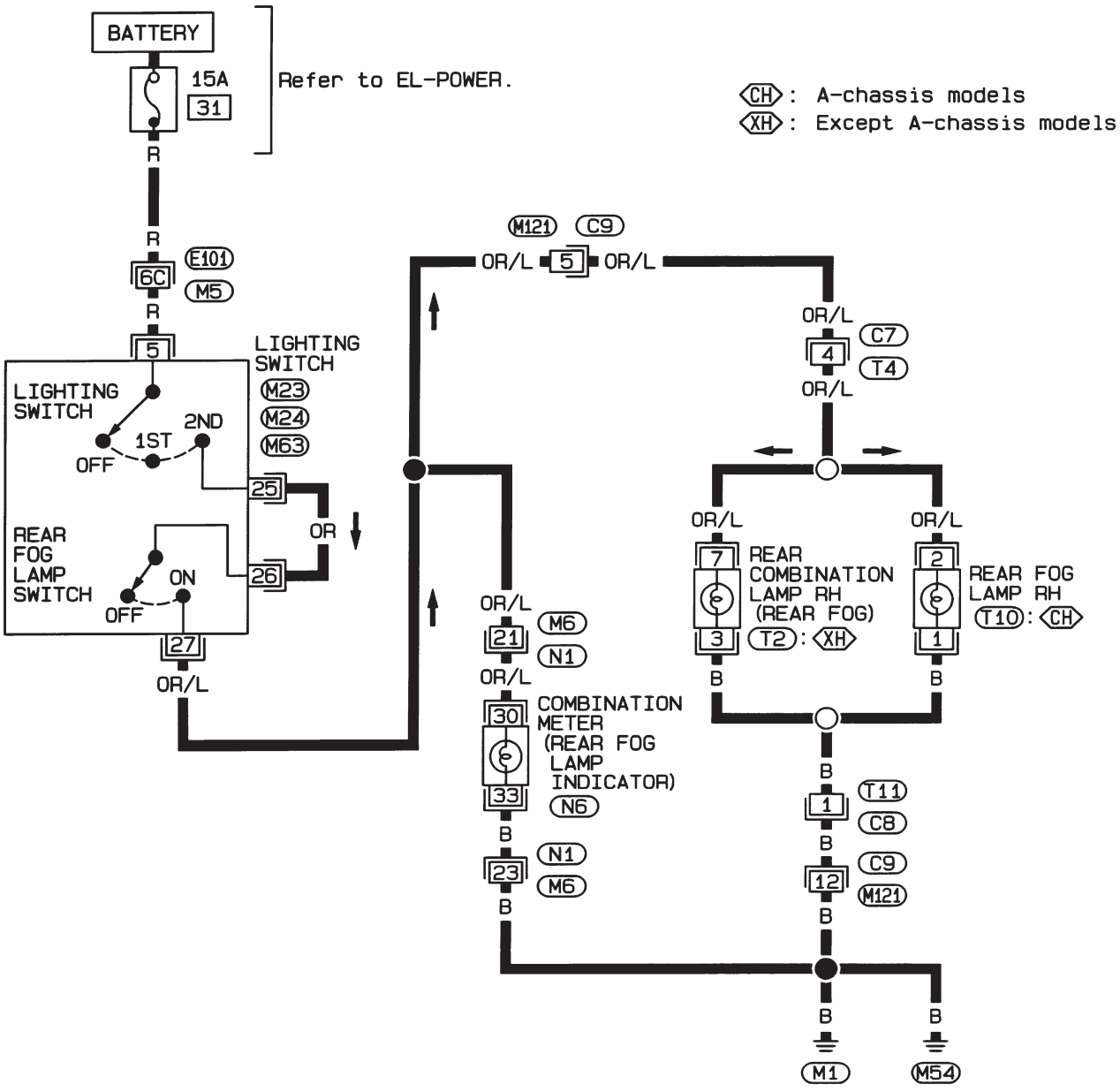
Refer to last page (Foldout page).

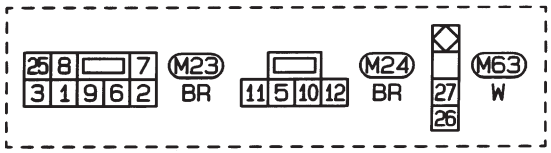
M5, E101

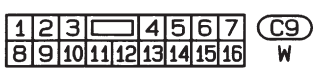
HEL338A

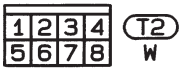
Wiring Diagram — R/FOG —/RHD Models

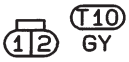
EL-R/FOG-02









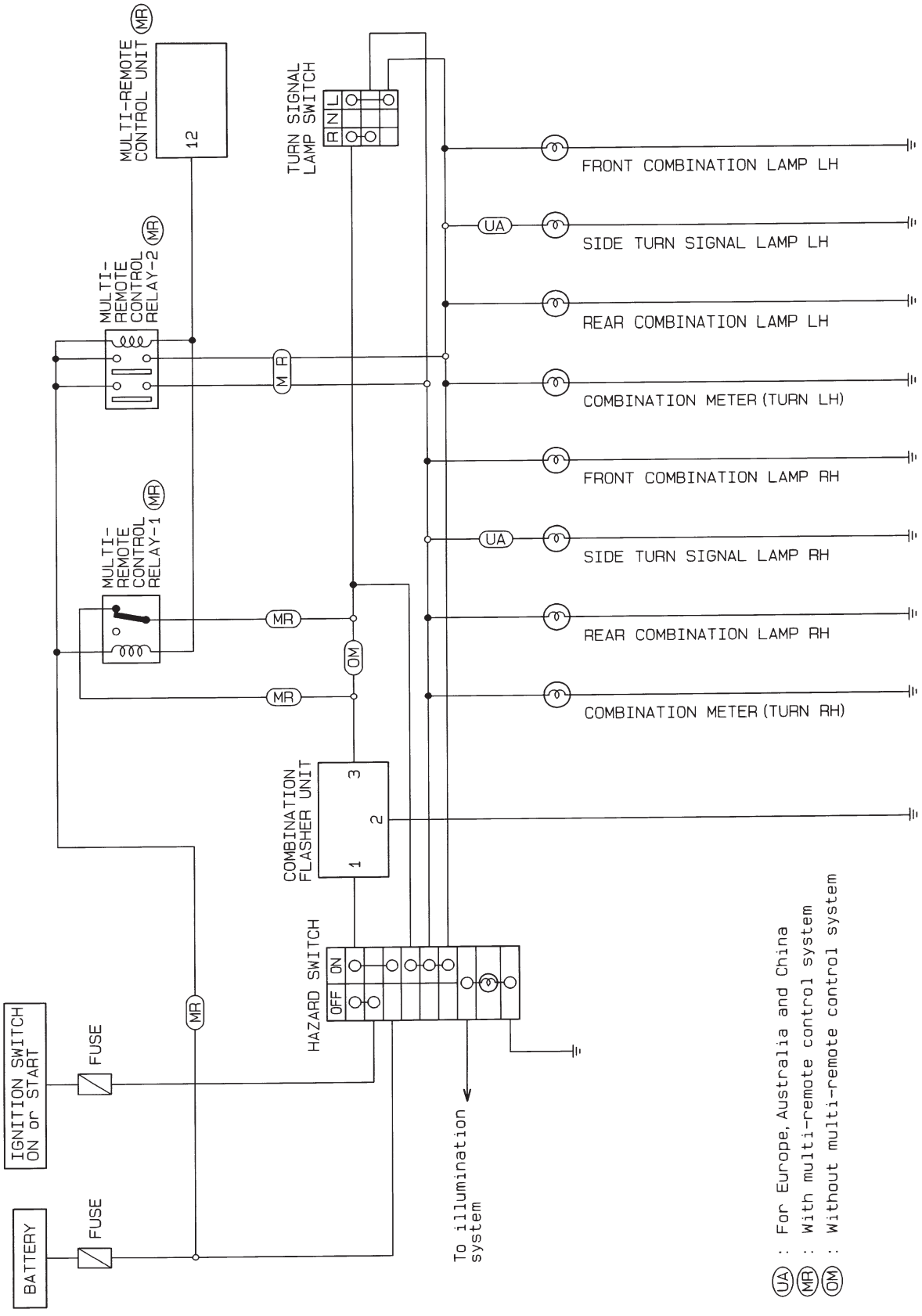


Refer to last page (Foldout page).

M5, E101

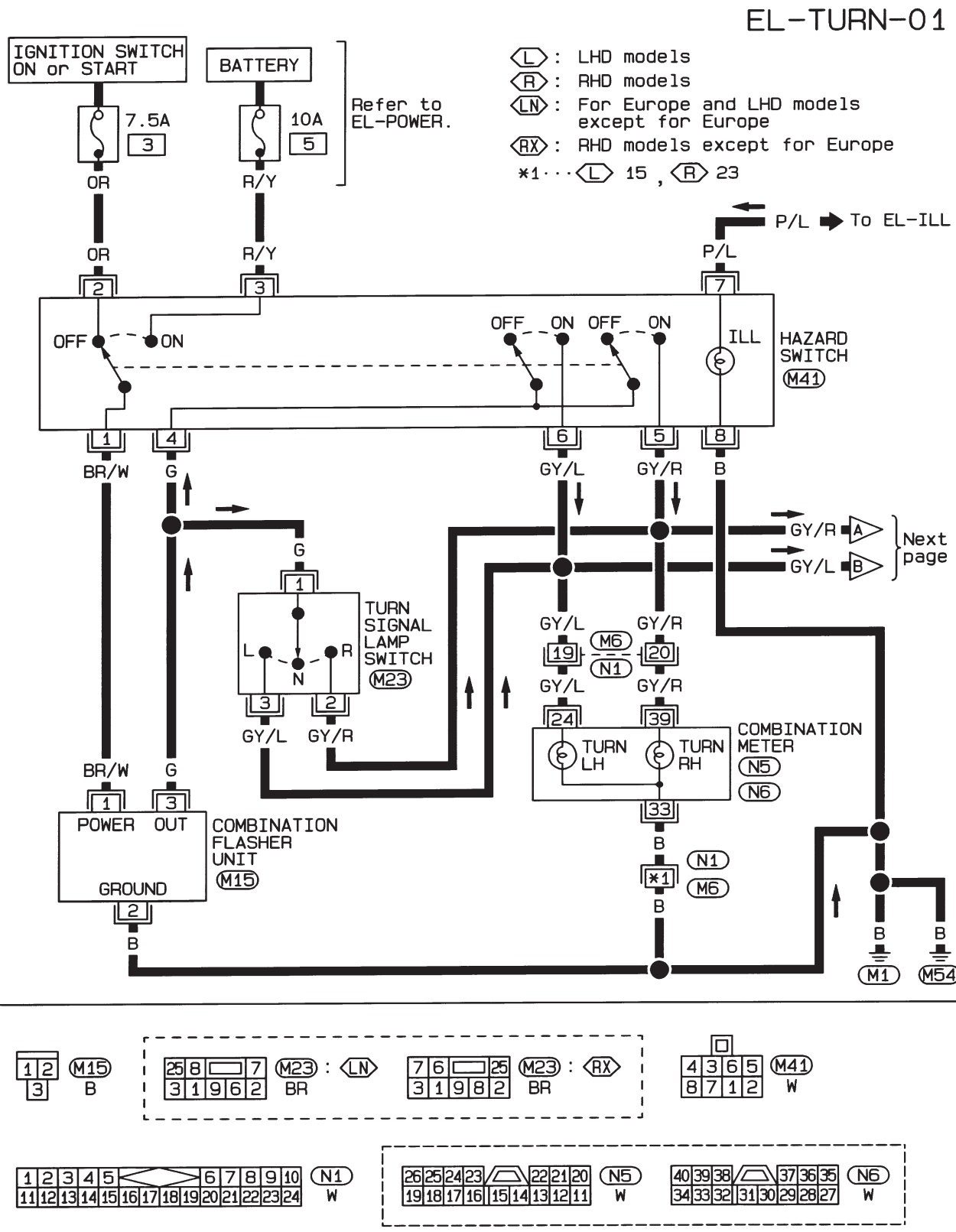
HEL339A

Schematic



HEL340A

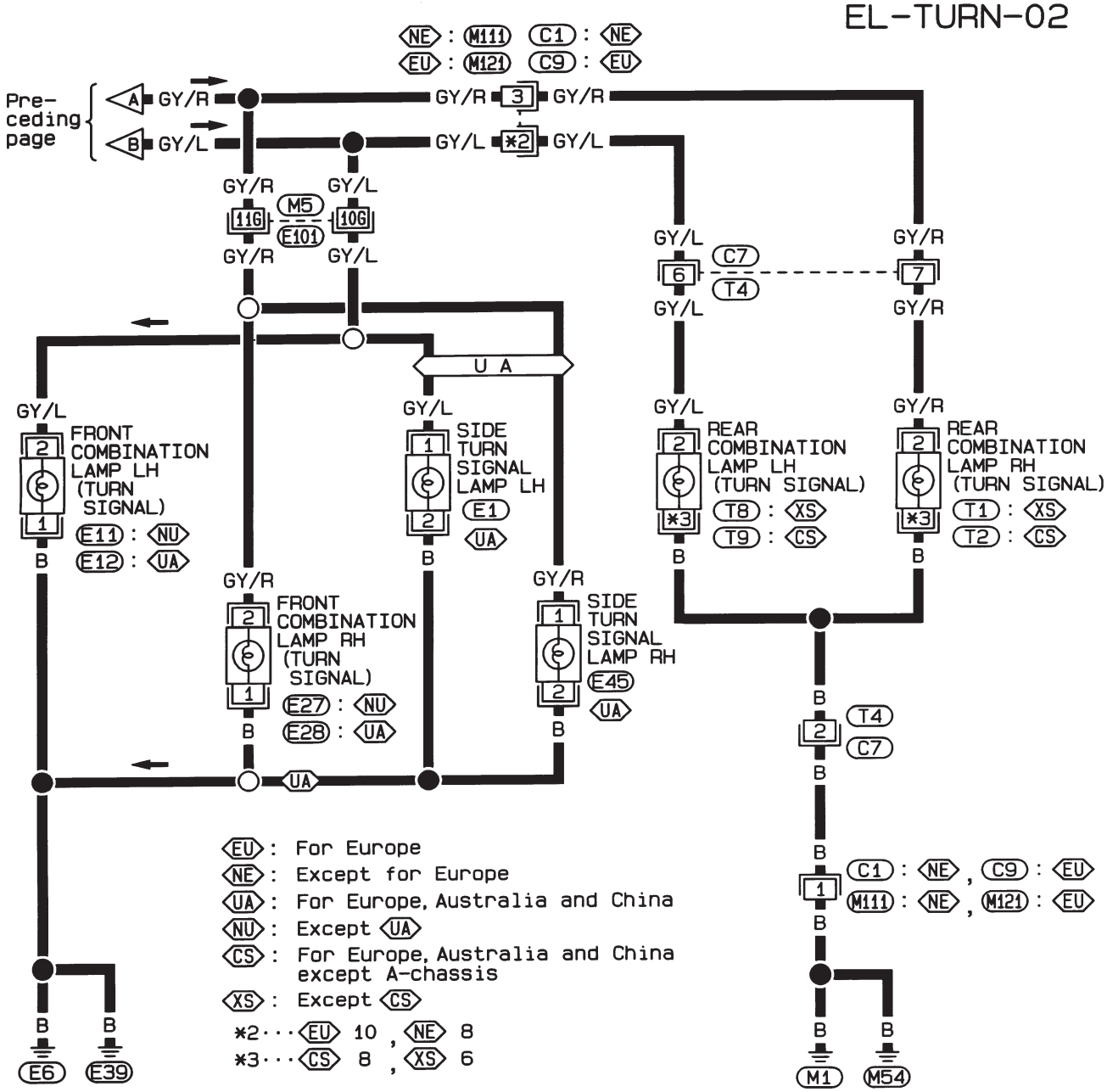
Wiring Diagram — TURN —/Except 4WD Models for Europe

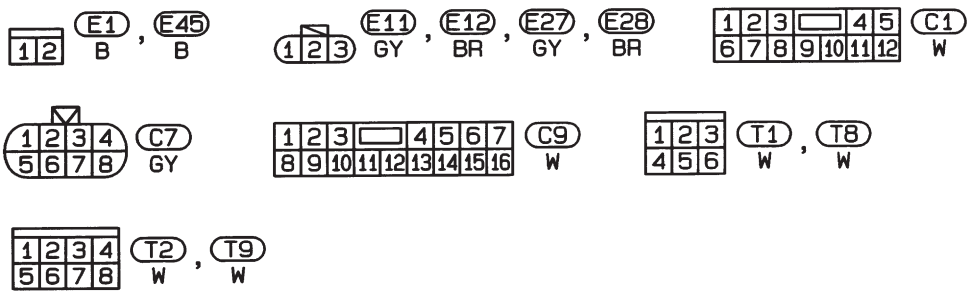


HEL426A

Wiring Diagram — TURN —/Except 4WD Models for Europe (Cont'd)

EL-TURN-02





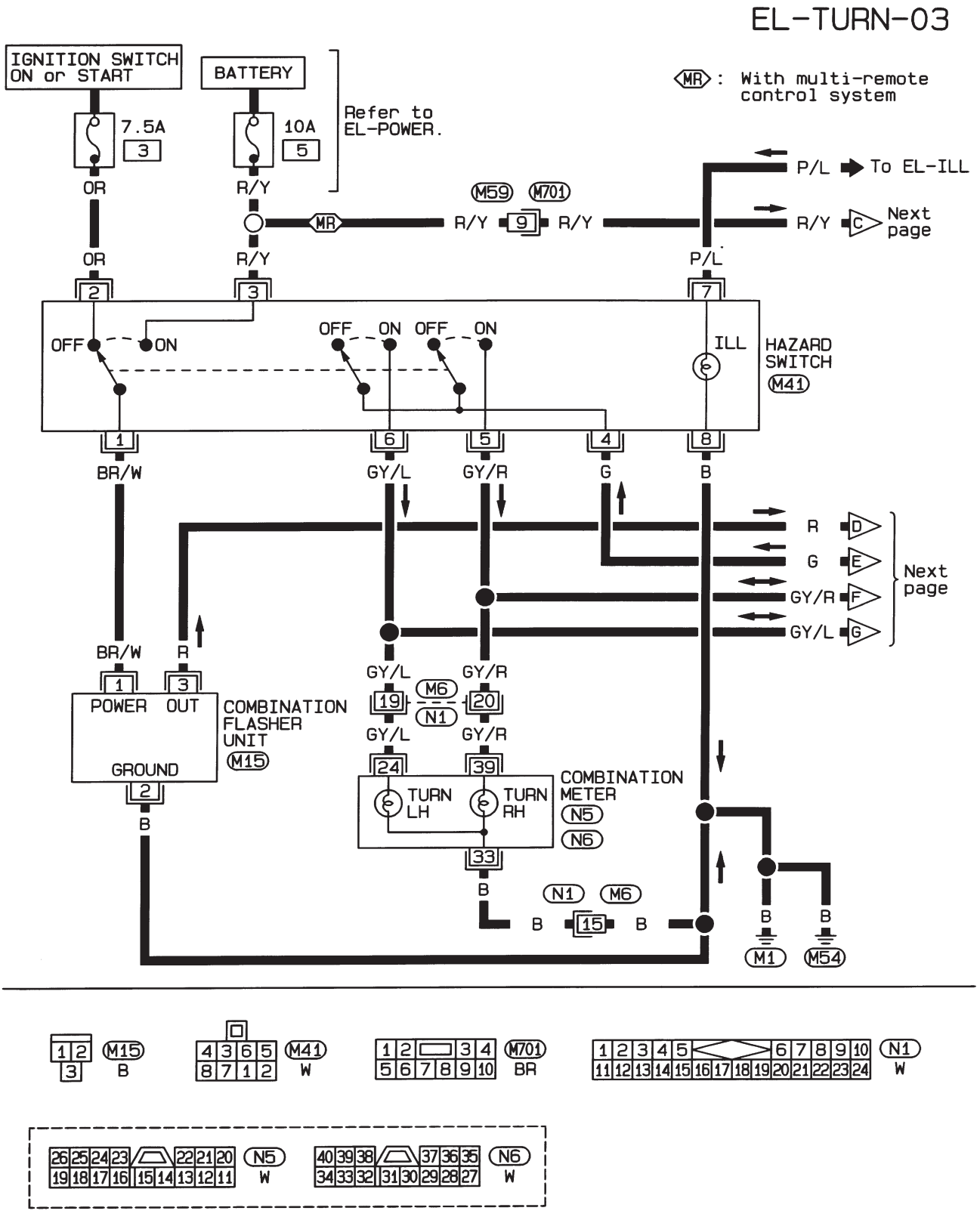
Refer to last page (Foldout page).

M5 , E101

HEL427A

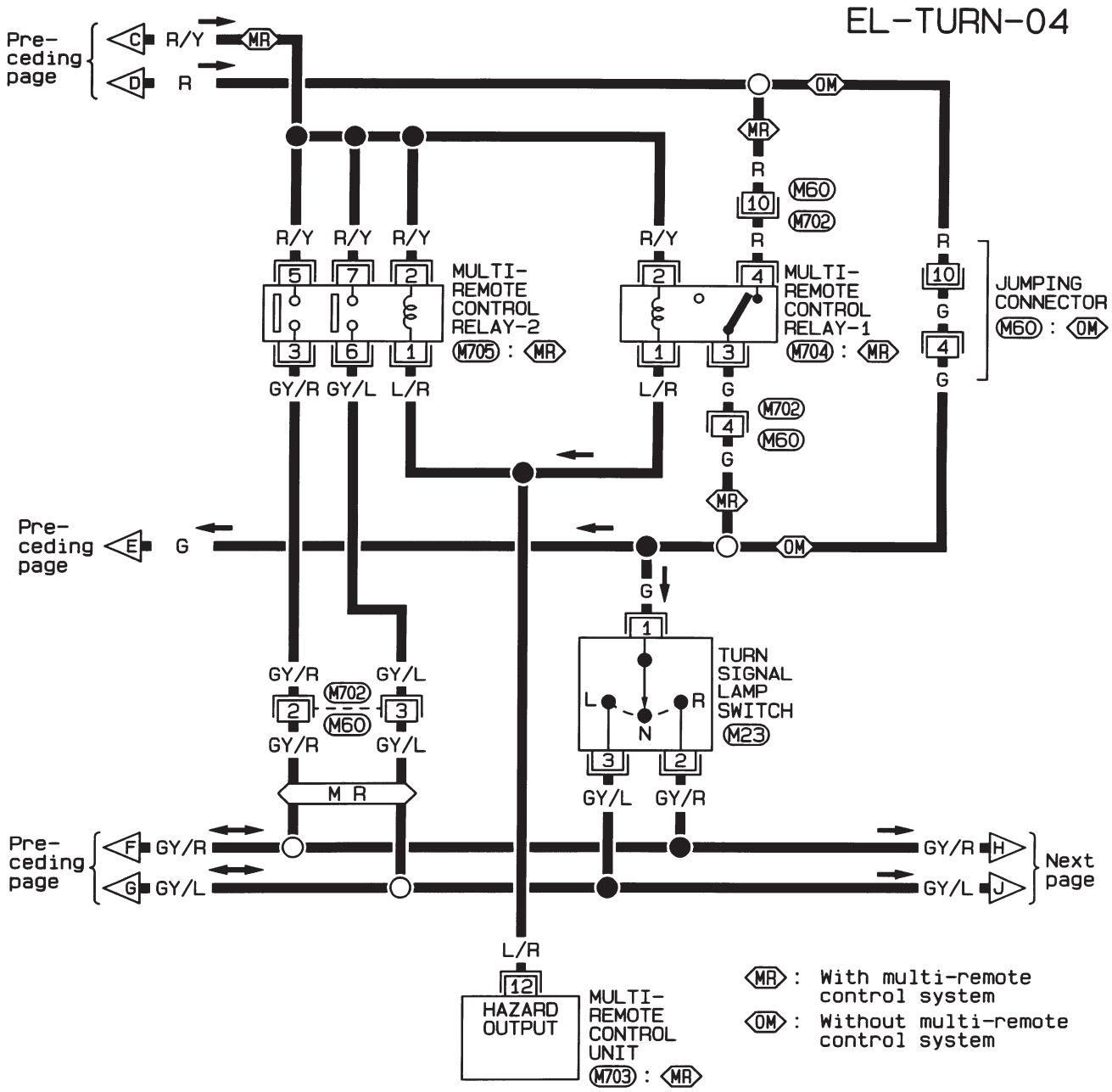
Wiring Diagram — TURN —/4WD Models for Europe

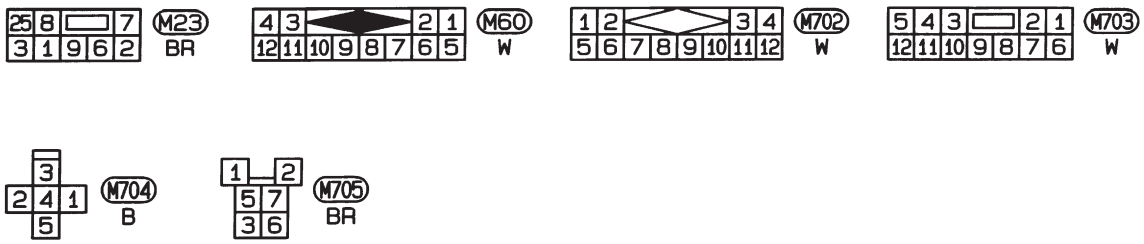
NOTE: For Single cab models with air bag, refer to ''Wiring Diagram — TURN —/Except 4WD Models for Europe''.



HEL341A

Wiring Diagram — TURN —/4WD Models for Europe (Cont'd)

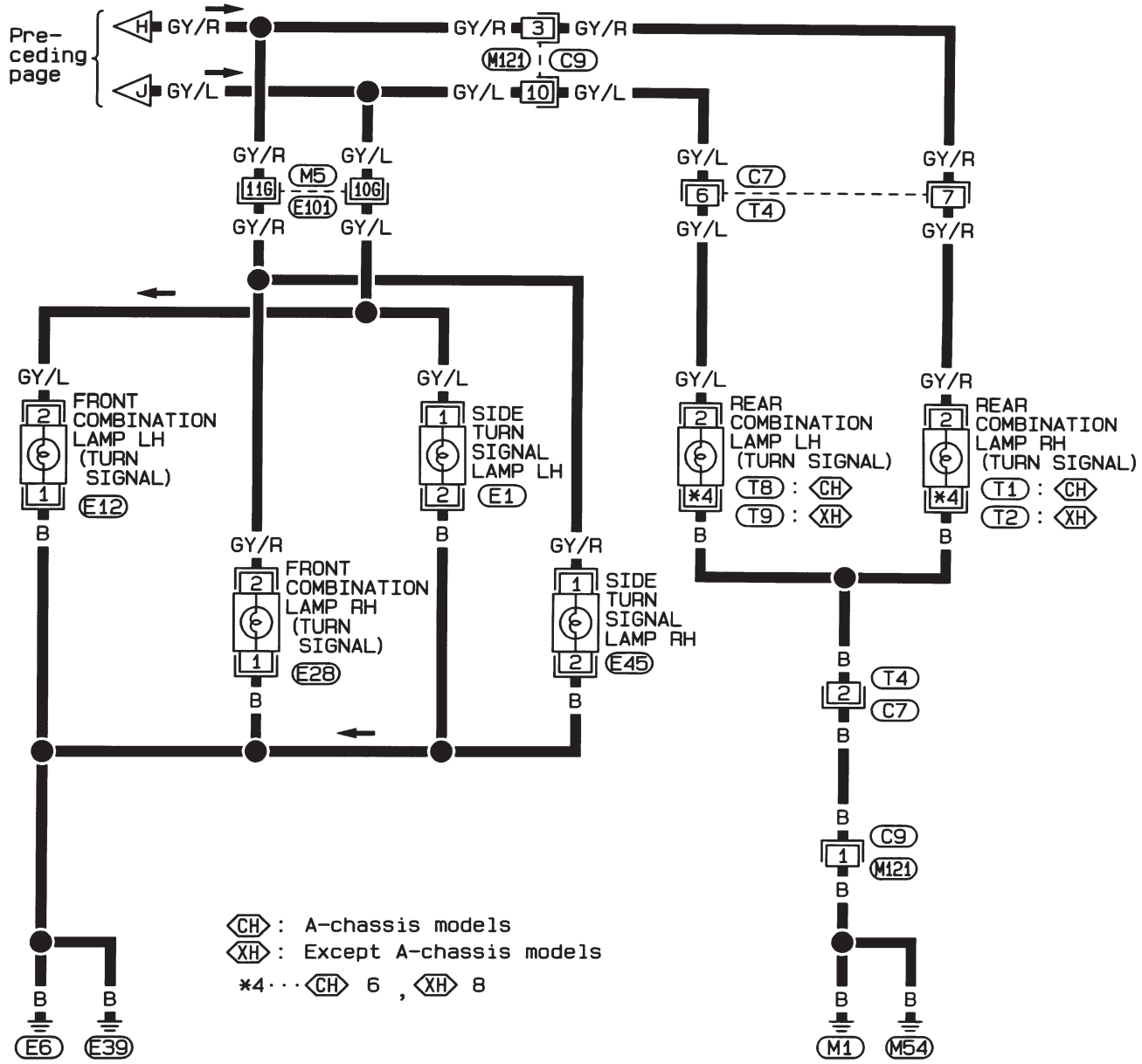


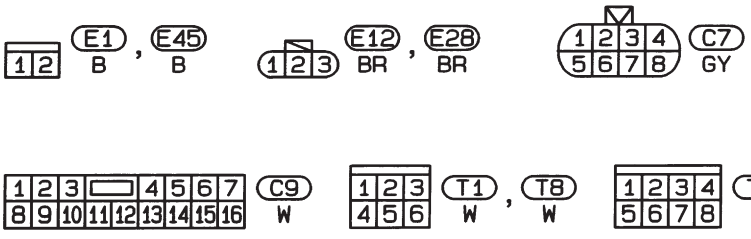


HEL342A

Wiring Diagram — TURN —/4WD Models for Europe (Cont'd)

EL-TURN-05





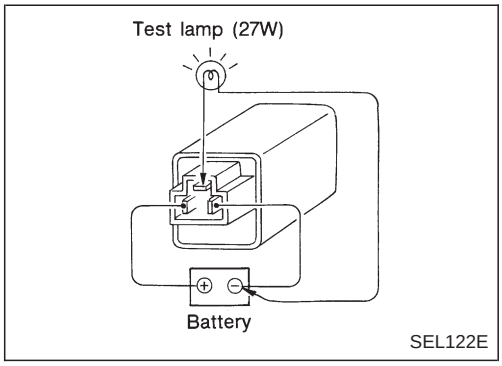
Refer to last page (Foldout page).

M5, E101

HEL343A

Trouble Diagnoses

Symptom	Possible cause	Repair order
Turn signal and hazard warning lamps do not operate.	1. Hazard switch 2. Combination flasher unit 3. Open in combination flasher unit circuit	1. Check hazard switch. 2. Refer to combination flasher unit check. 3. Check wiring to combination flasher unit for open circuit.
Turn signal lamps do not operate but hazard warning lamps operate.	1. 7.5A fuse 2. Hazard switch 3. Turn signal switch 4. Open in turn signal switch circuit	1. Check 7.5A fuse (No. 3, located in fuse block). Turn ignition switch ON and verify battery positive voltage is present at terminal ② of hazard switch. 2. Check hazard switch. 3. Check turn signal switch. 4. Check G wire between combination flasher unit and turn signal switch for open circuit.
Hazard warning lamps do not operate but turn signal lamps operate.	1. 10A fuse 2. Hazard switch 3. Open in hazard switch circuit	1. Check 10A fuse (No. 5, located in fuse block). Verify battery positive voltage is present at terminal ③ of hazard switch. 2. Check hazard switch. 3. Check G wire between combination flasher unit and hazard switch for open circuit.
Front or side turn signal lamp LH or RH does not operate.	1. Bulb 2. Grounds E6 and E39	1. Check bulb. 2. Check grounds E6 and E39.
Rear turn signal lamp LH or RH does not operate.	1. Bulb 2. Grounds M1 and M54	1. Check bulb. 2. Check grounds M1 and M54.
LH and RH turn indicators do not operate.	1. Ground	1. Check grounds M1 and M54.
LH or RH turn indicator does not operate.	1. Bulb	1. Check bulb in combination meter.



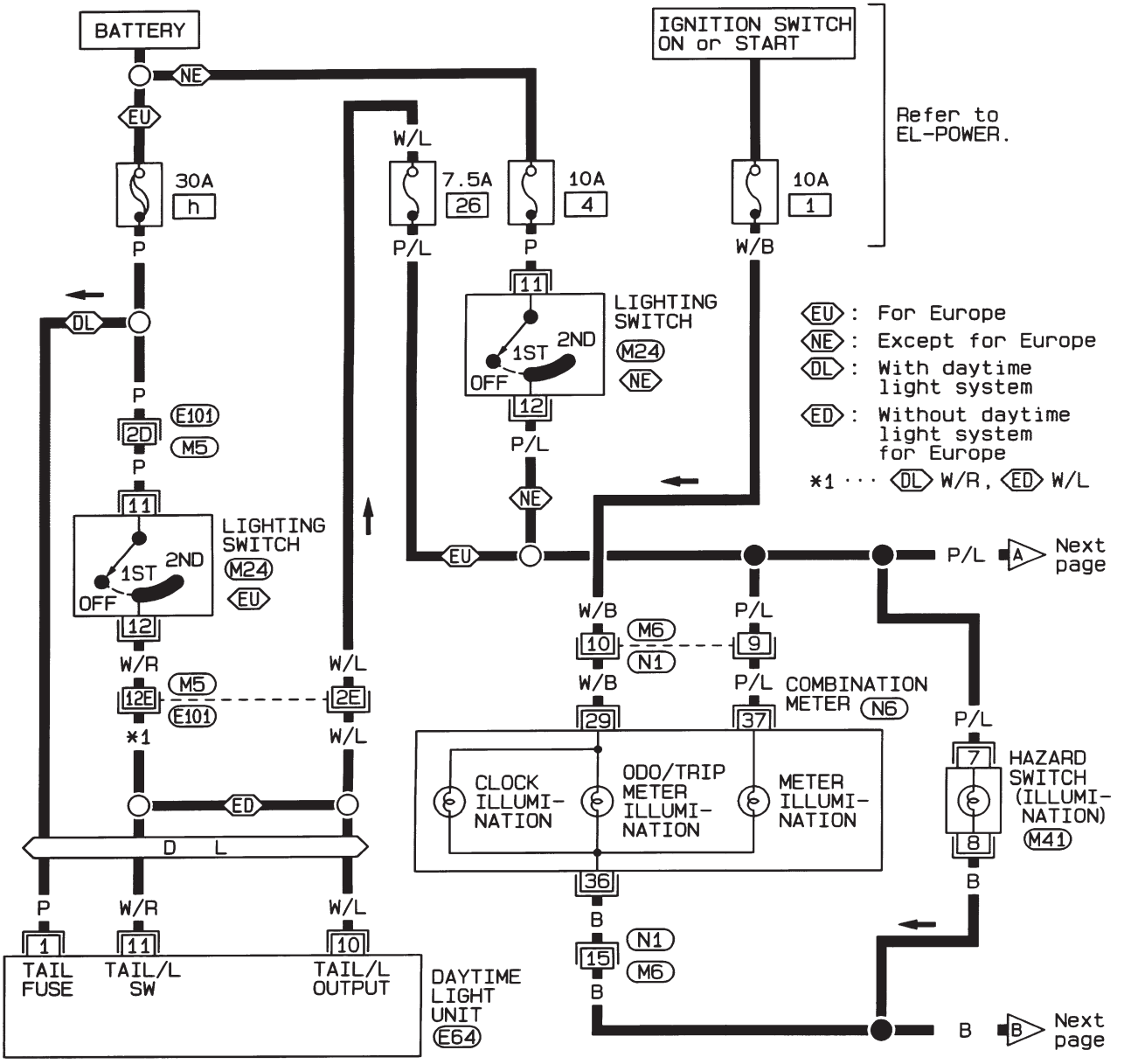
SEL122E

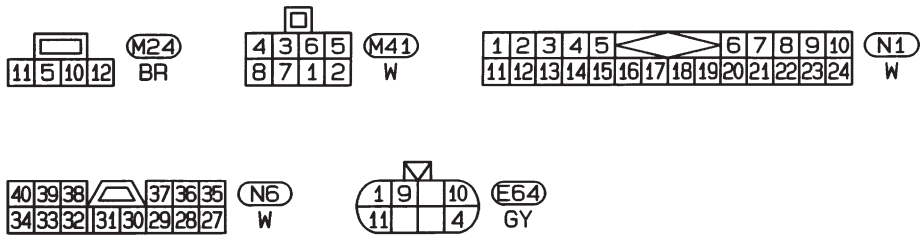
Combination Flasher Unit Check

- Before checking, ensure that bulbs meet specifications.
- Connect a battery and test lamp to the combination flasher unit, as shown. Combination flasher unit is properly functioning if it blinks when power is supplied to the circuit.

Wiring Diagram — ILL —/LHD Models

EL-ILL-01





Refer to last page (Foldout page).

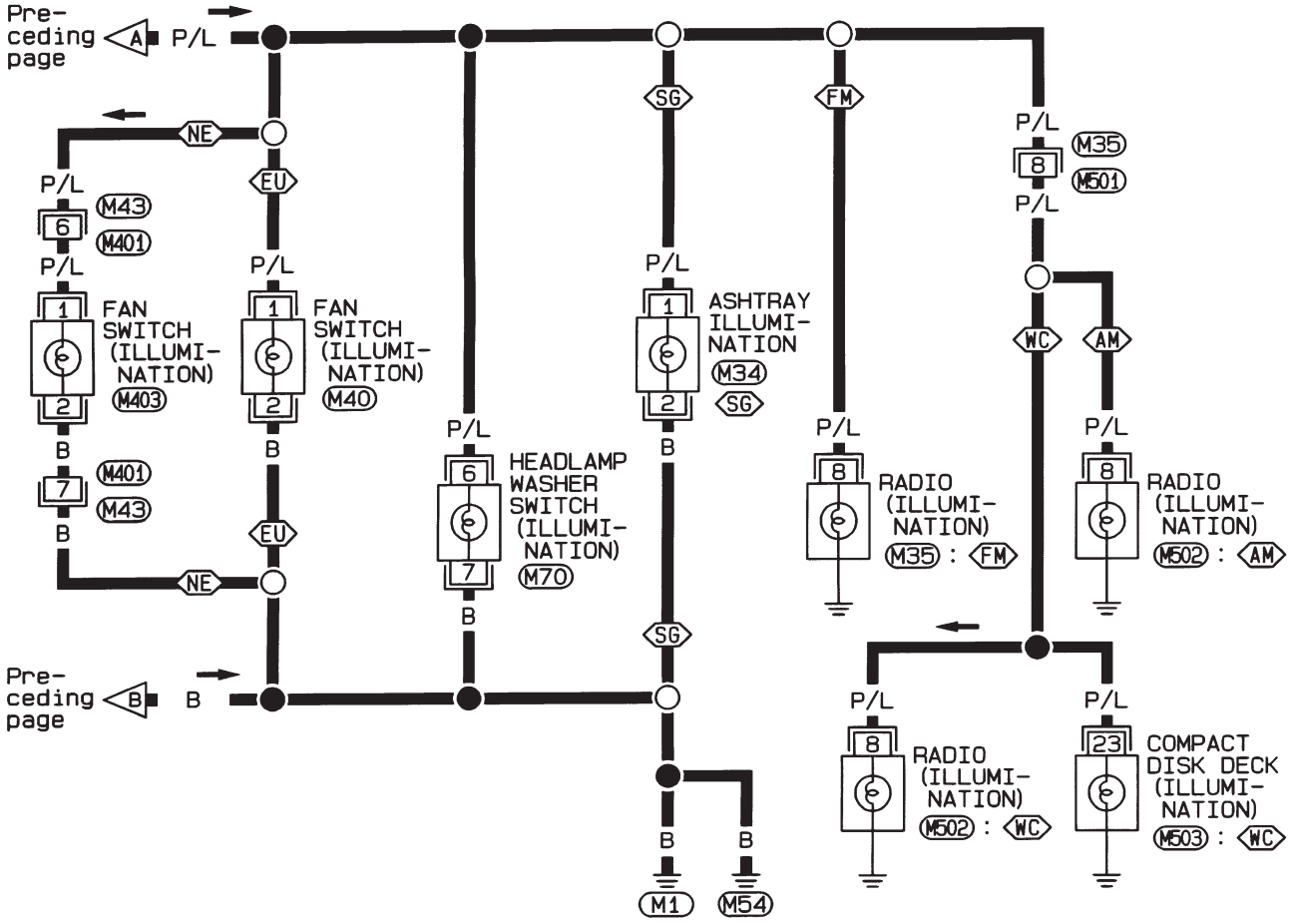
M5, E101

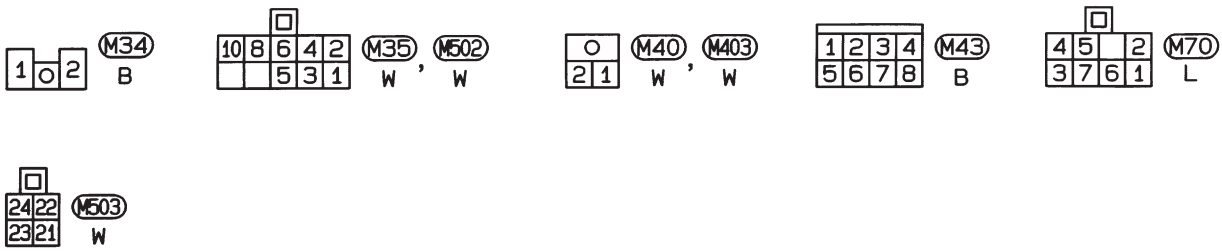
HEL344A

Wiring Diagram — ILL —/LHD Models (Cont'd)

EL-ILL-02

EU : For Europe
NE : Except for Europe
WC : Models with CD deck
AM : Models without CD deck (1-speaker radio except for Europe)
FM : Models without CD deck (For Europe and with 2 or 4-speakers radio except for Europe)
SG : GL and S-GL grade for the Middle East

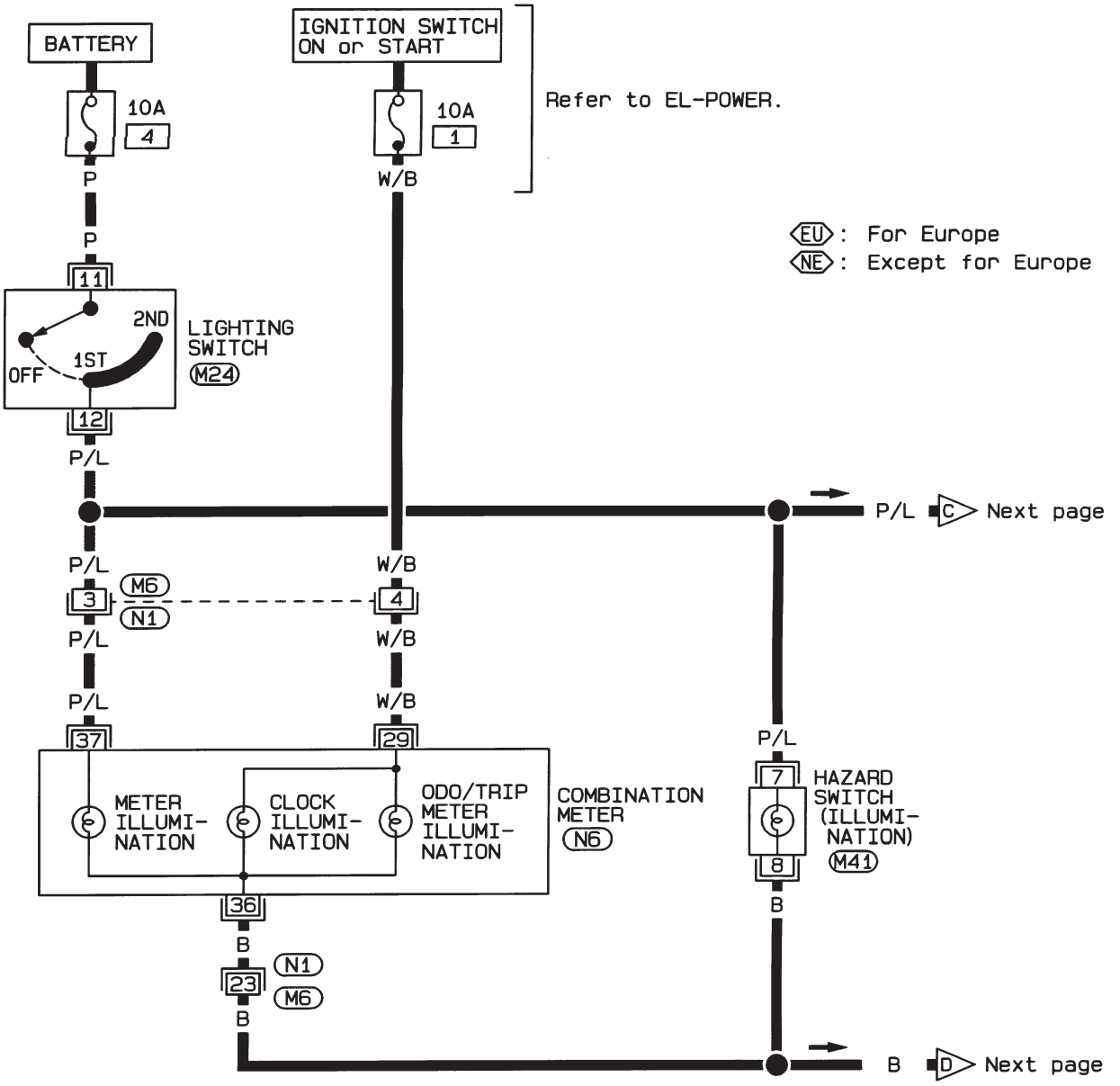


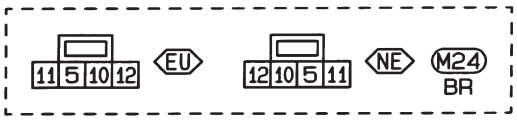


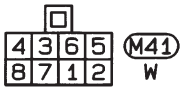
HEL345A

Wiring Diagram — ILL —/RHD Models

EL-ILL-03



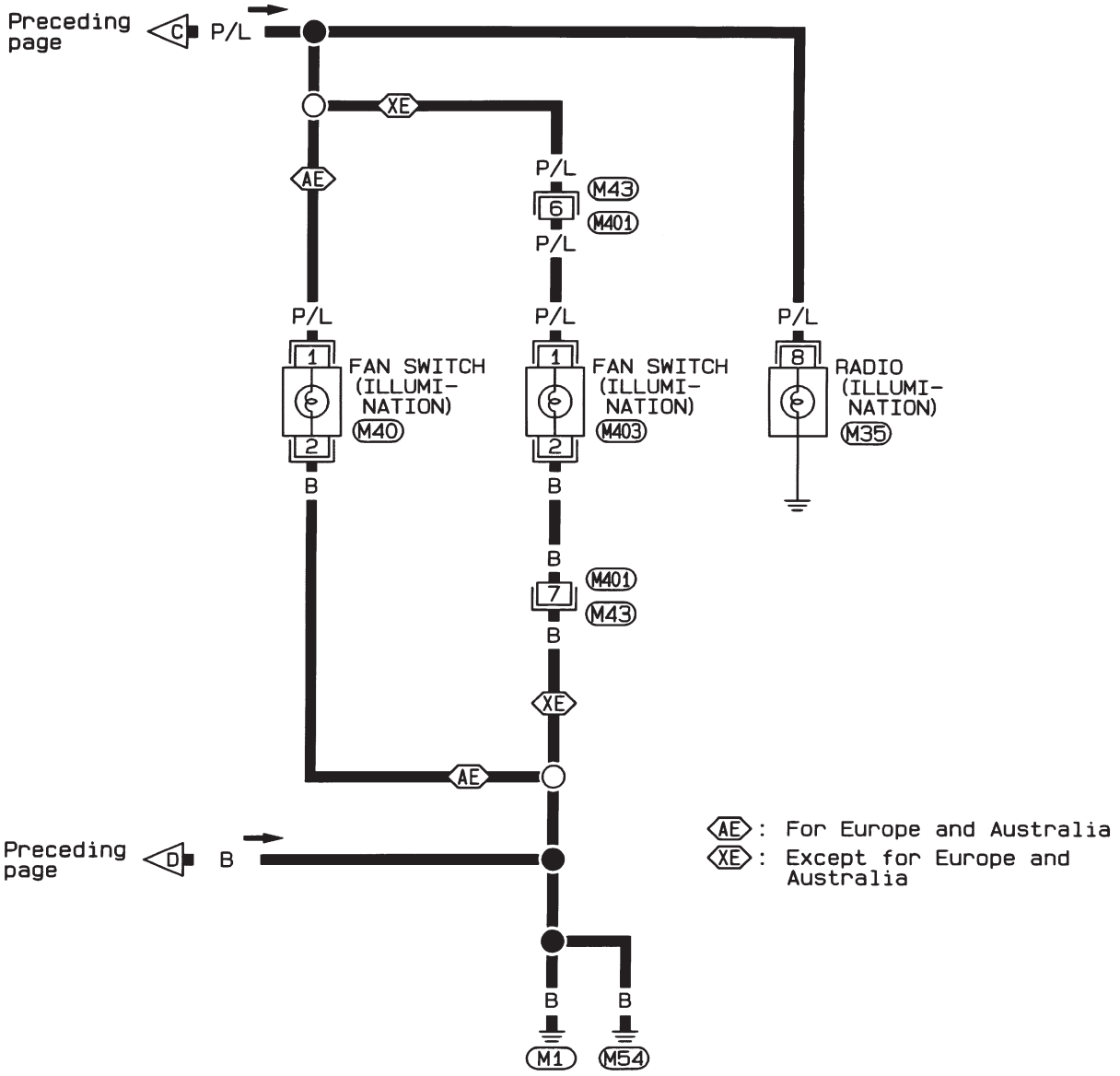


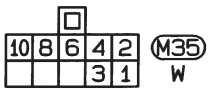


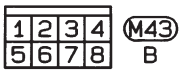
HEL346A

Wiring Diagram — ILL —/RHD Models (Cont'd)

EL-ILL-04



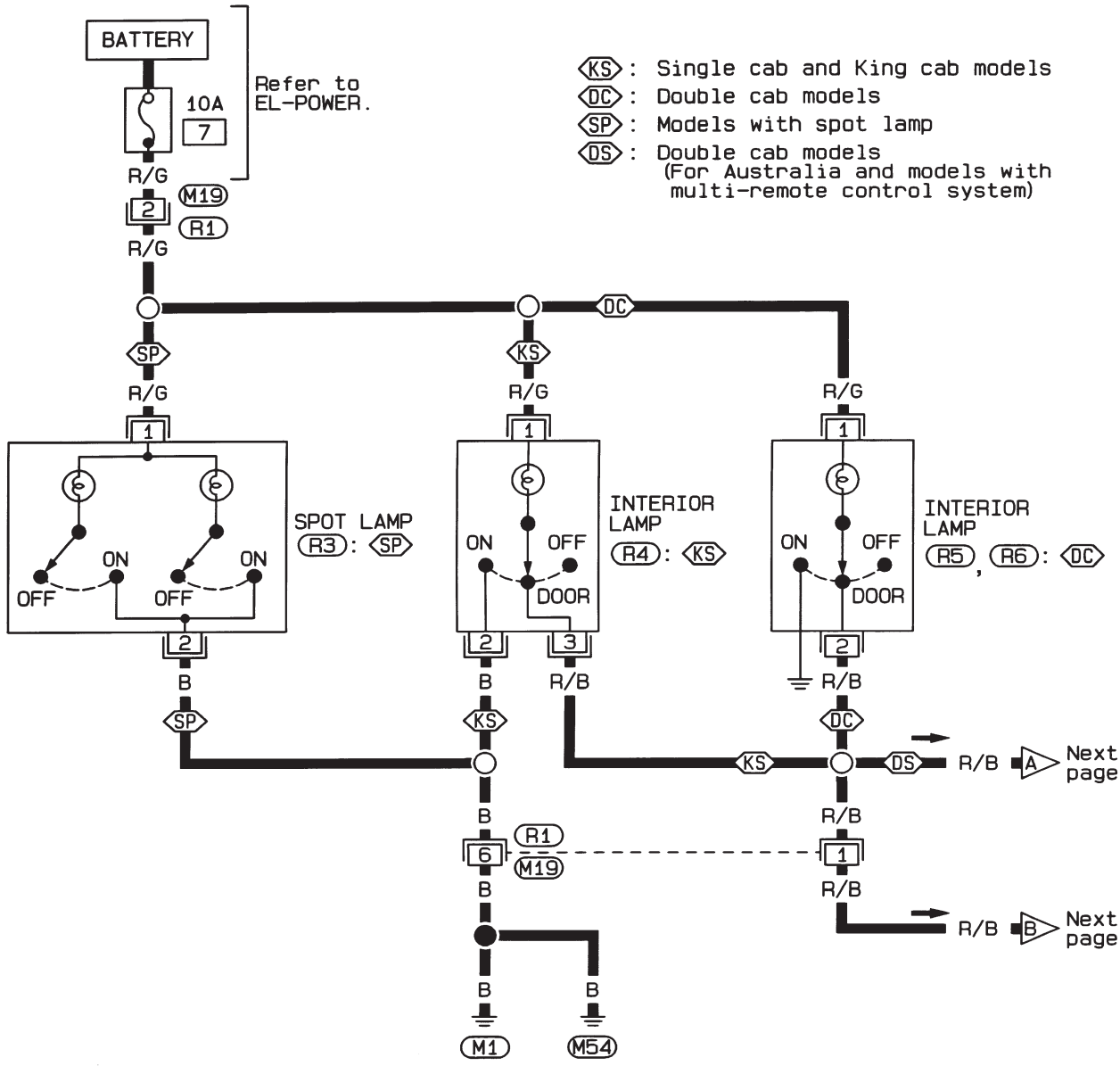


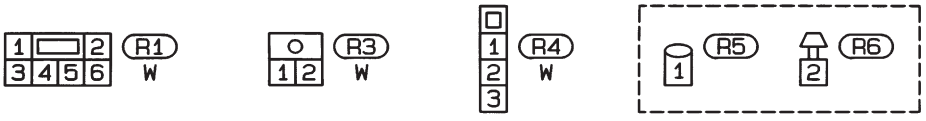


HEL347A

Wiring Diagram — INT/L —

EL-INT/L-01



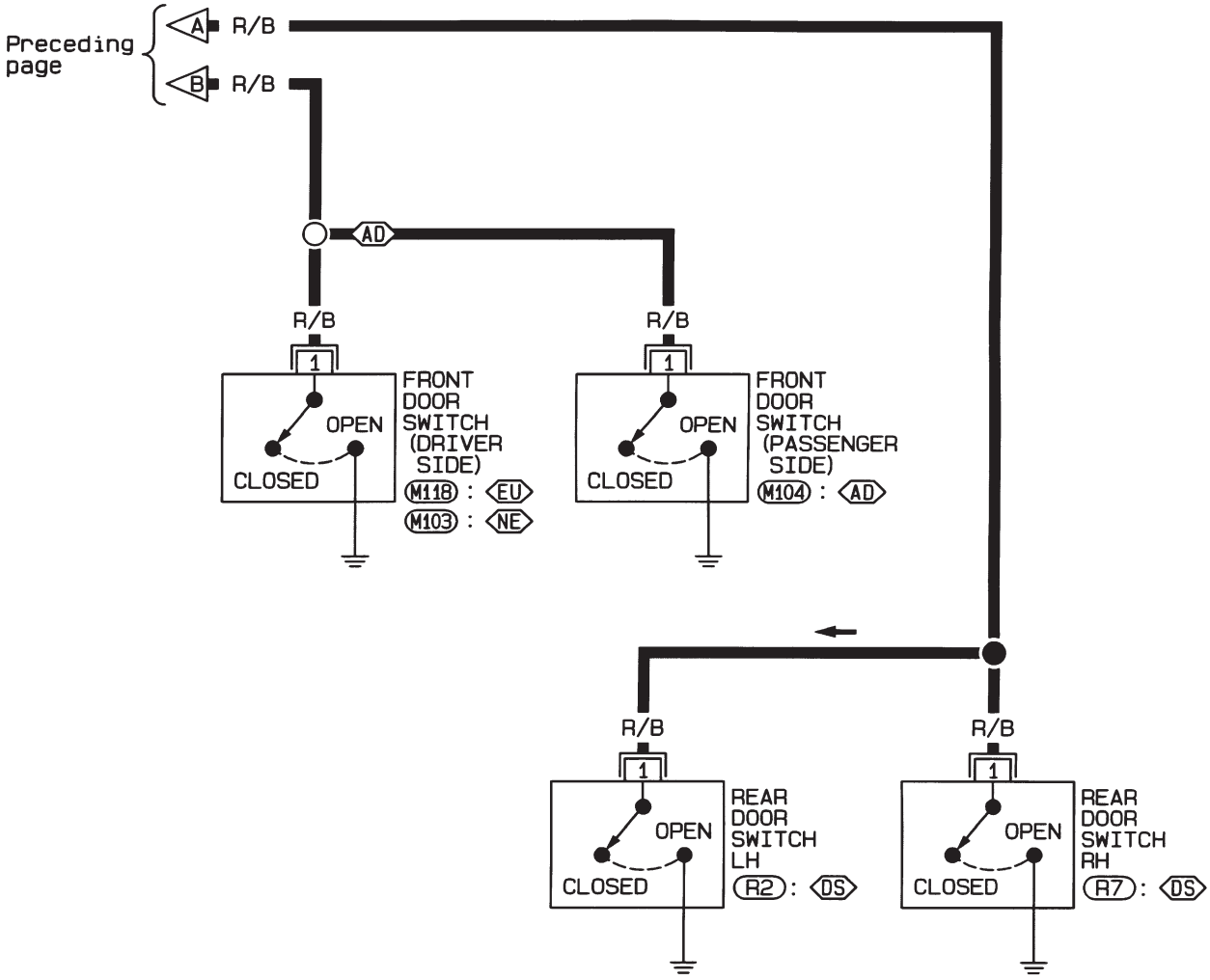


HEL348A

Wiring Diagram — INT/L — (Cont'd)

EL-INT/L-02

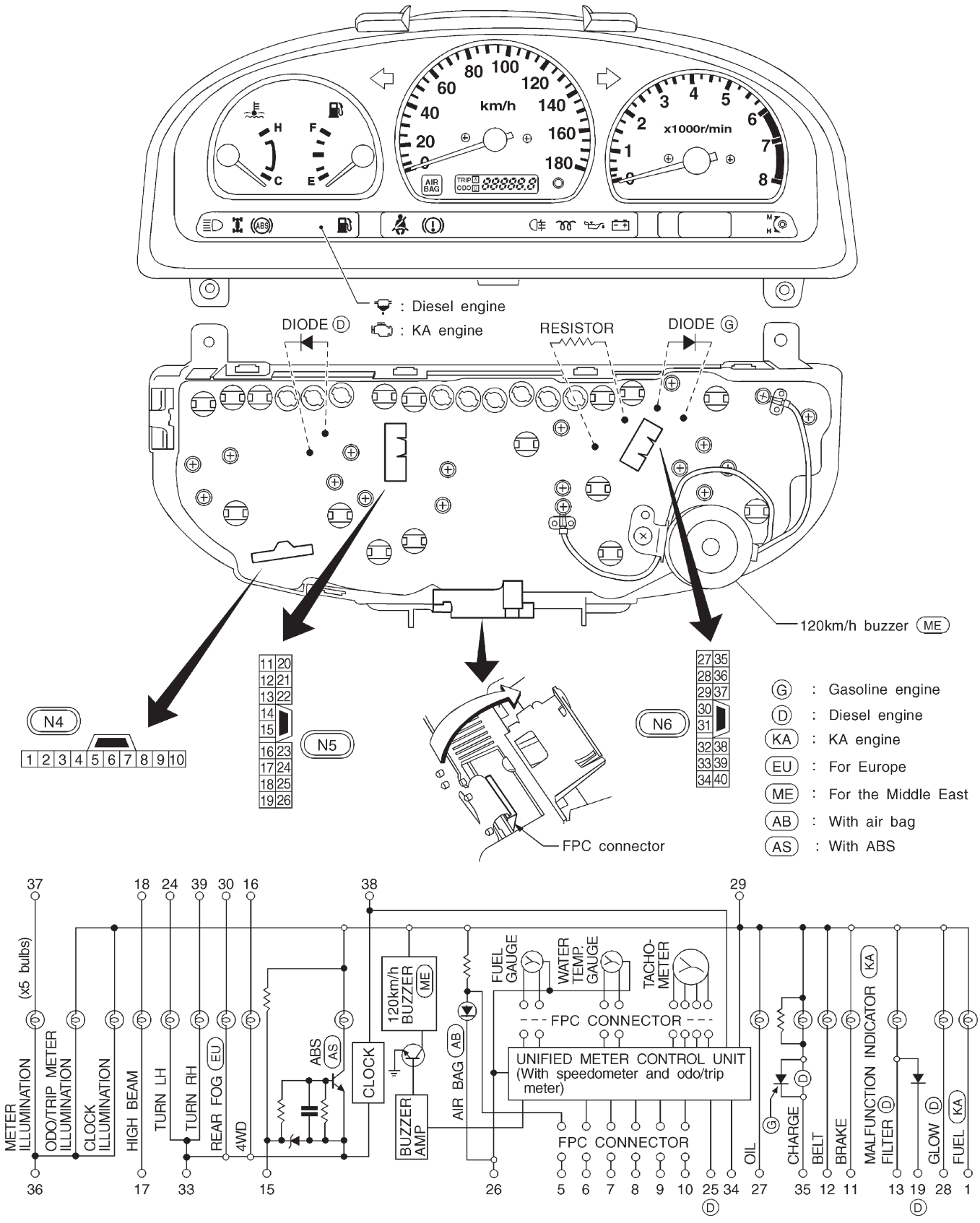
EU : For Europe
NE : Except for Europe
AD : For Australia and models with multi-remote control system
DS : Double cab models (For Australia and models with multi-remote control system)



HEL349A

Combination Meter

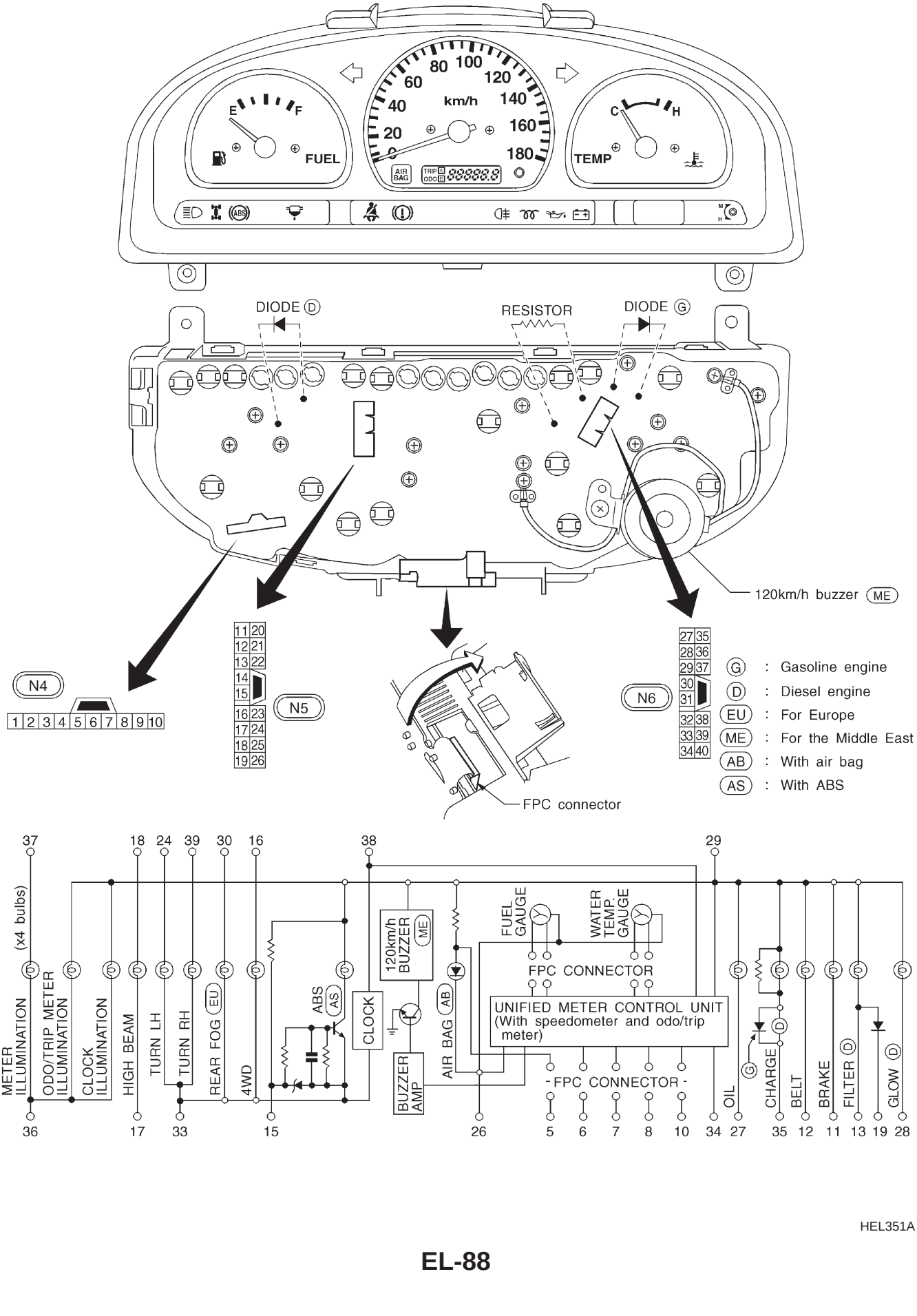
FOR EUROPE AND THE MIDDLE EAST (With tachometer)



HEL350A

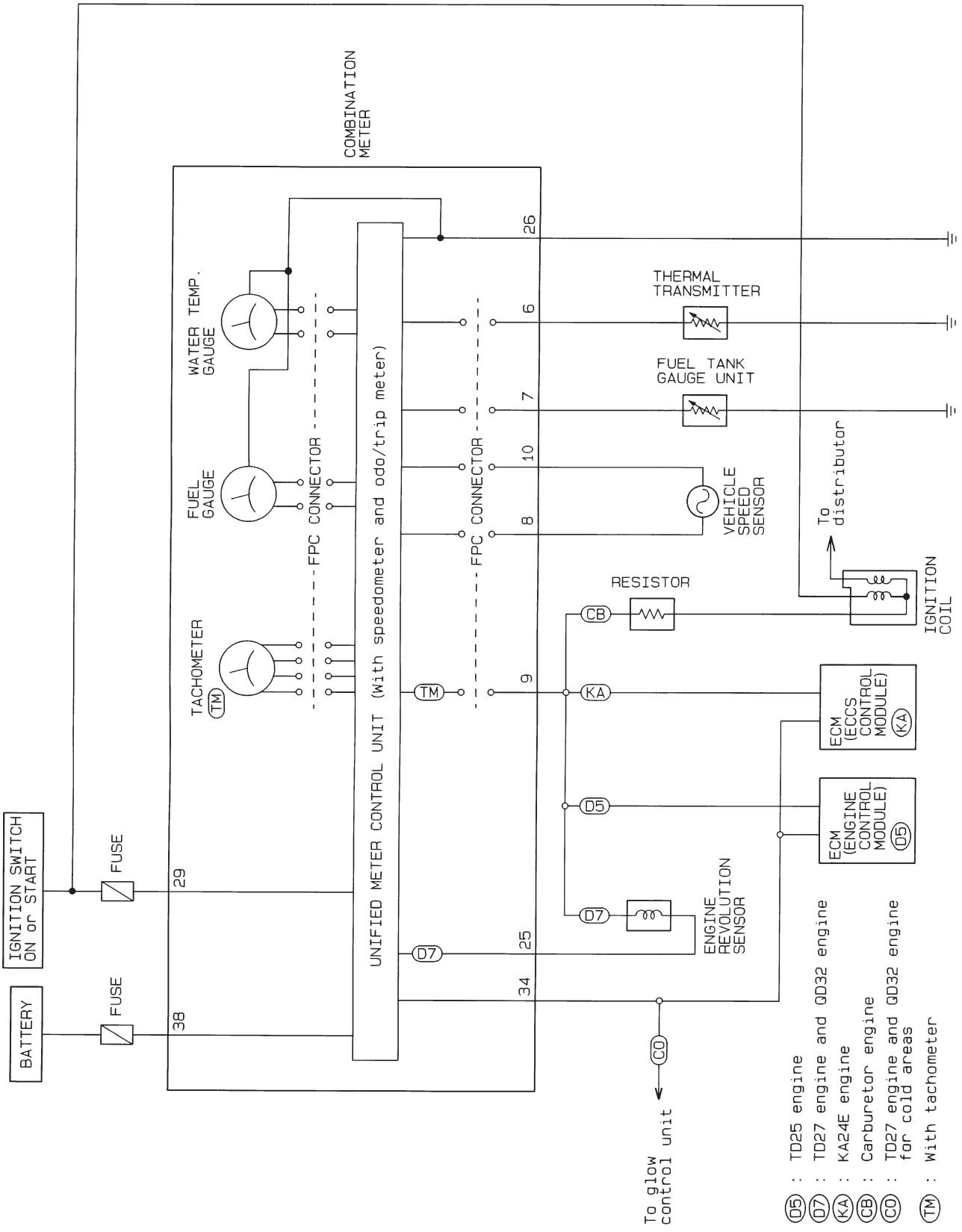
Combination Meter (Cont'd)

FOR EUROPE AND THE MIDDLE EAST (Without tachometer)



HEL351A

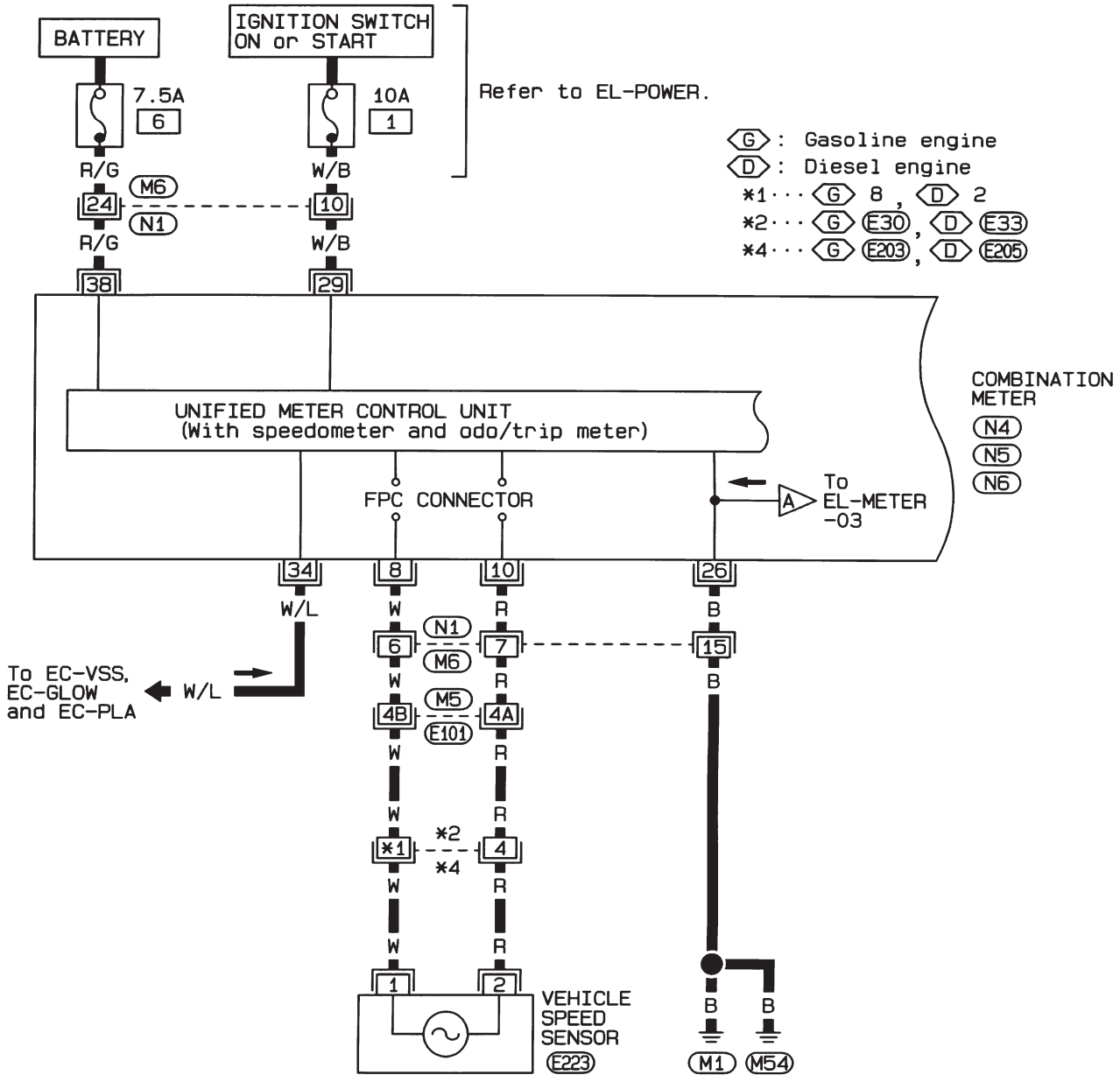
Schematic



HEL352A

Wiring Diagram — METER —/LHD Models

EL-METER-01



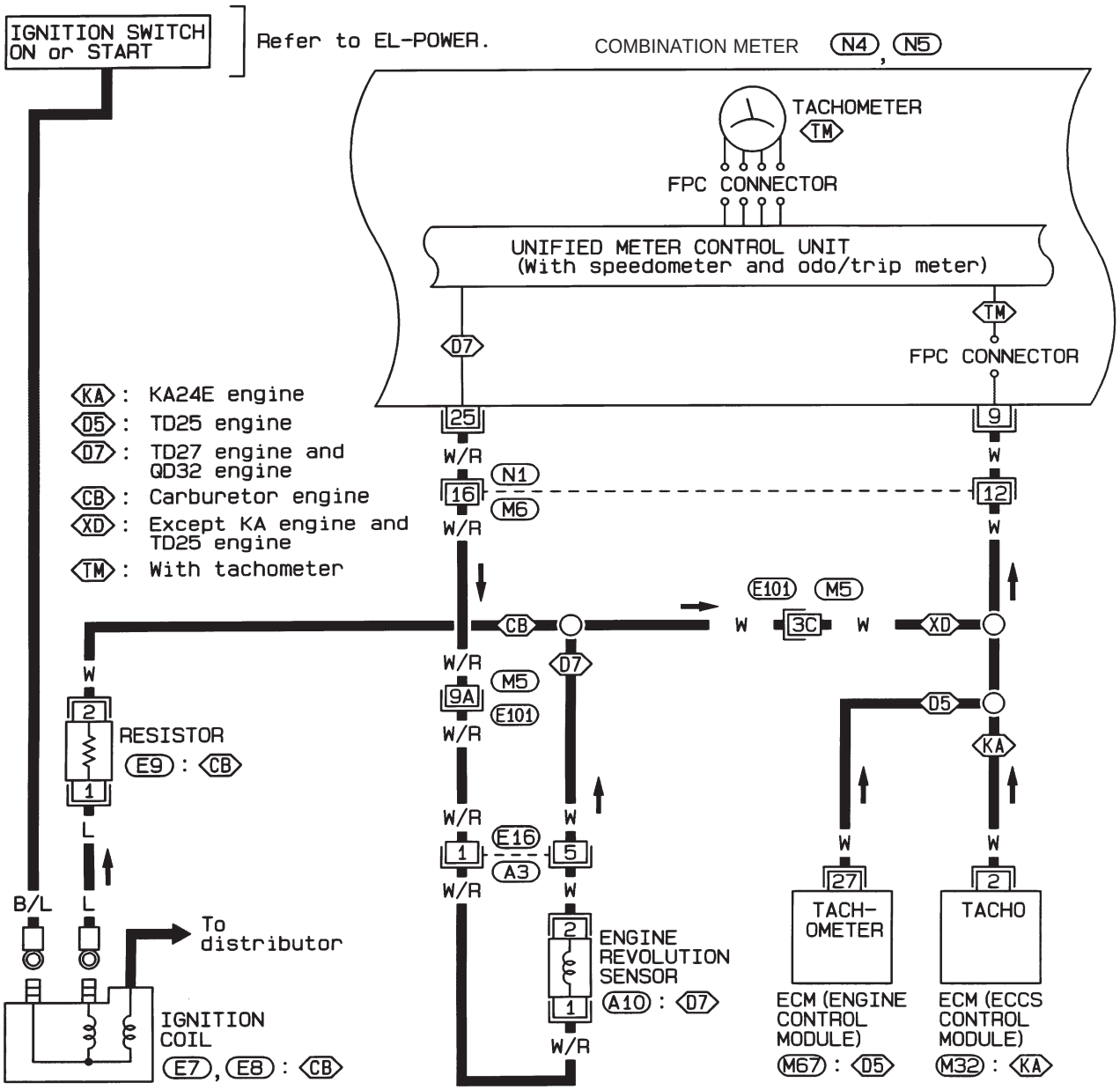
Refer to last page (Foldout page).

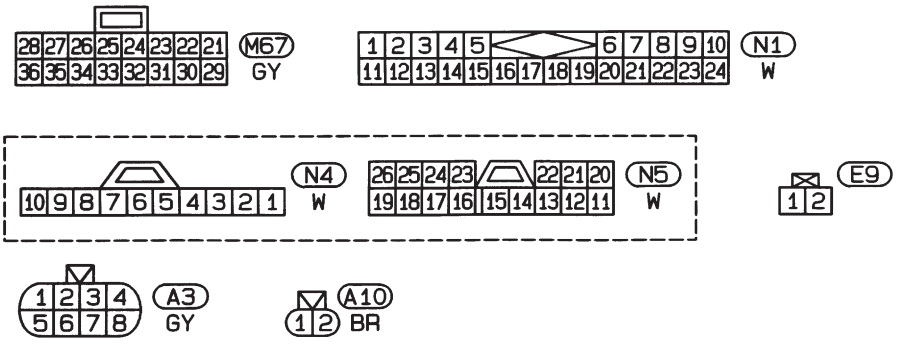
M5 , E101

HEL353A

Wiring Diagram — METER —/LHD Models (Cont'd)

EL-METER-02





Refer to last page (Foldout page).

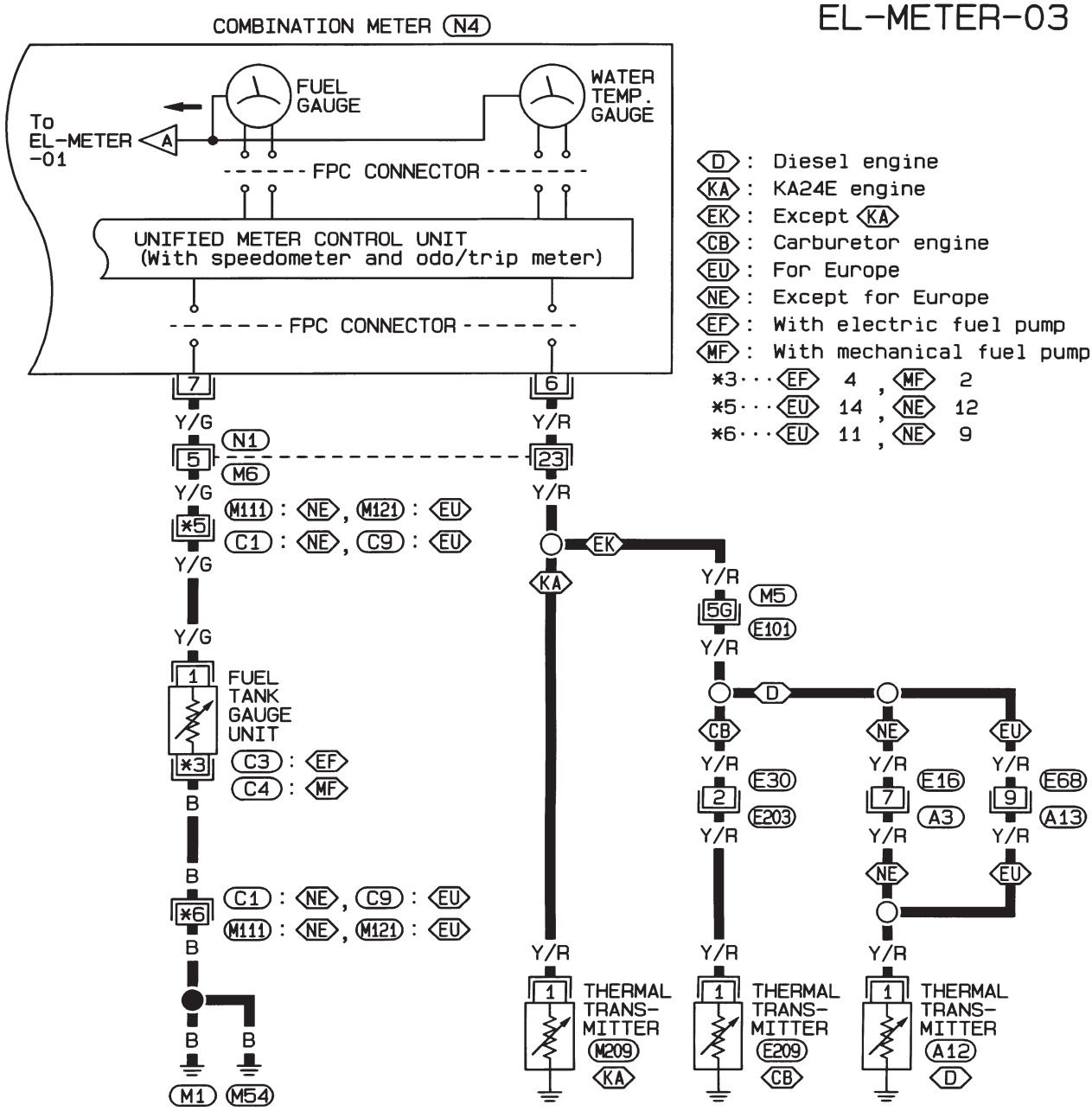
(M5), (E101)

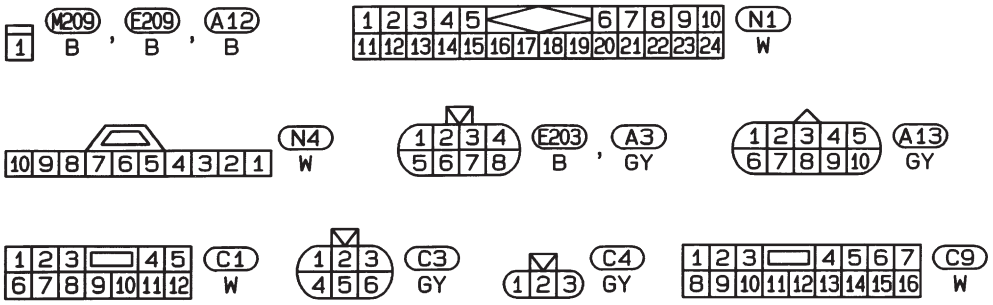
(M32)

HEL354A

Wiring Diagram — METER —/LHD Models (Cont'd)

EL-METER-03





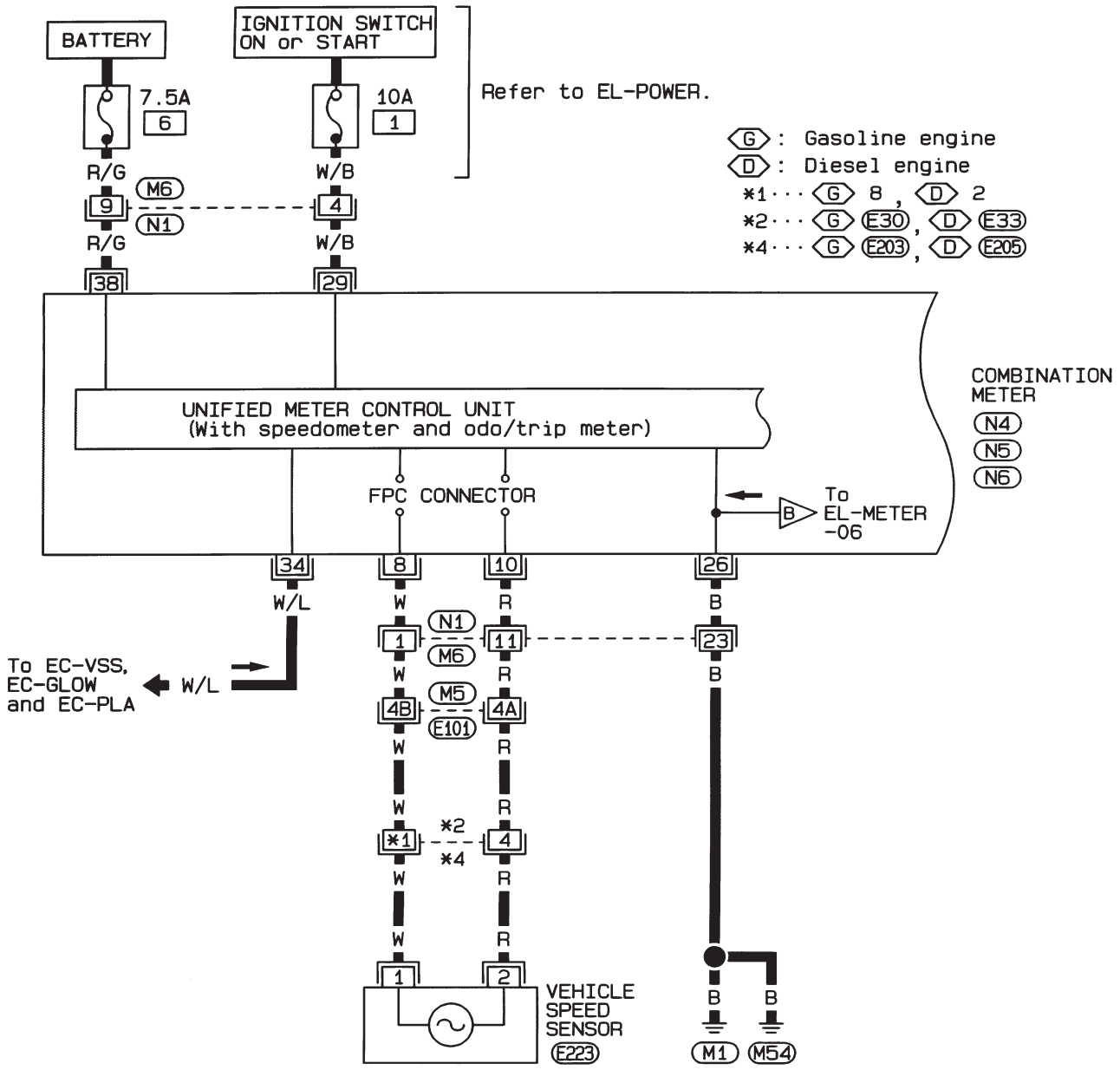
Refer to last page (Foldout page).

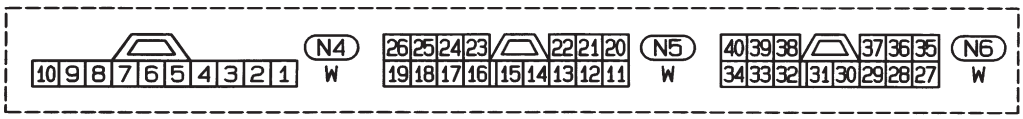
M5 , E101

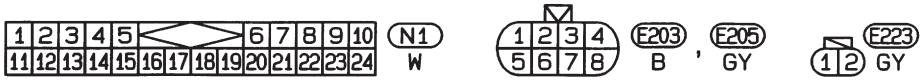
HEL355A

Wiring Diagram — METER —/RHD Models

EL-METER-04







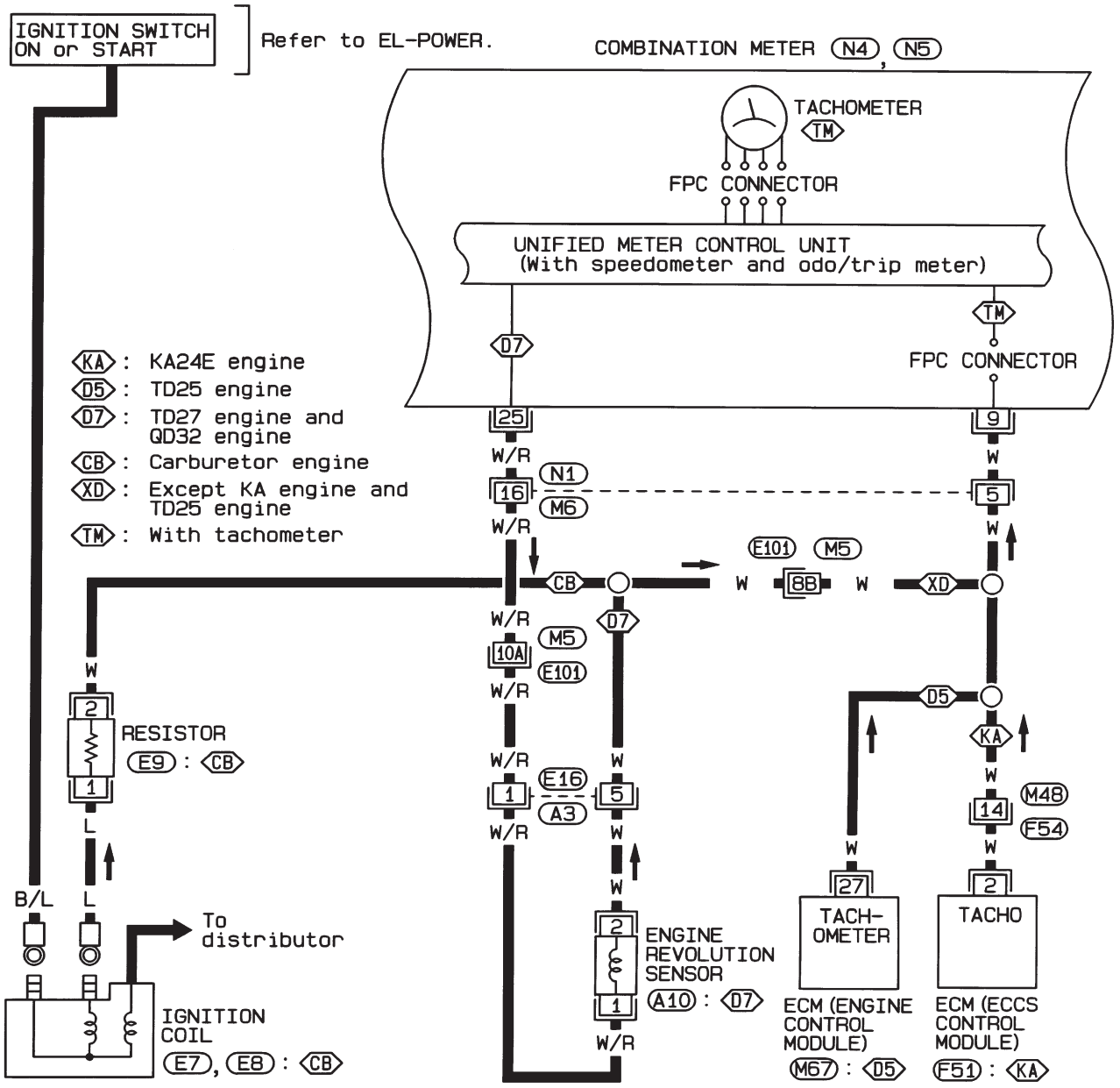
Refer to last page (Foldout page).

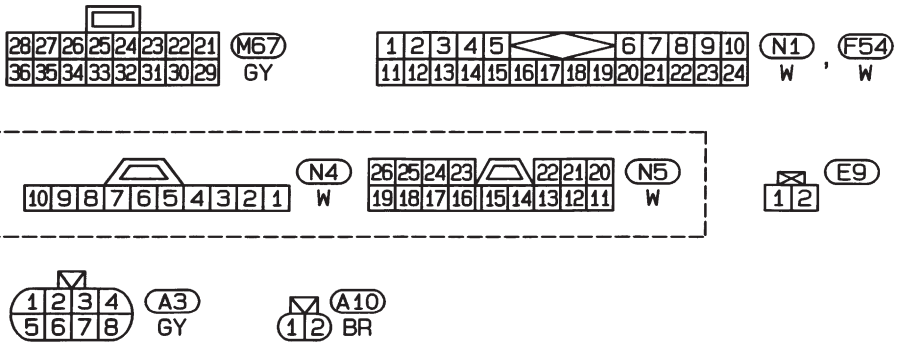
M5 , E101

HEL356A

Wiring Diagram — METER —/RHD Models (Cont'd)

EL-METER-05





Refer to last page (Foldout page).

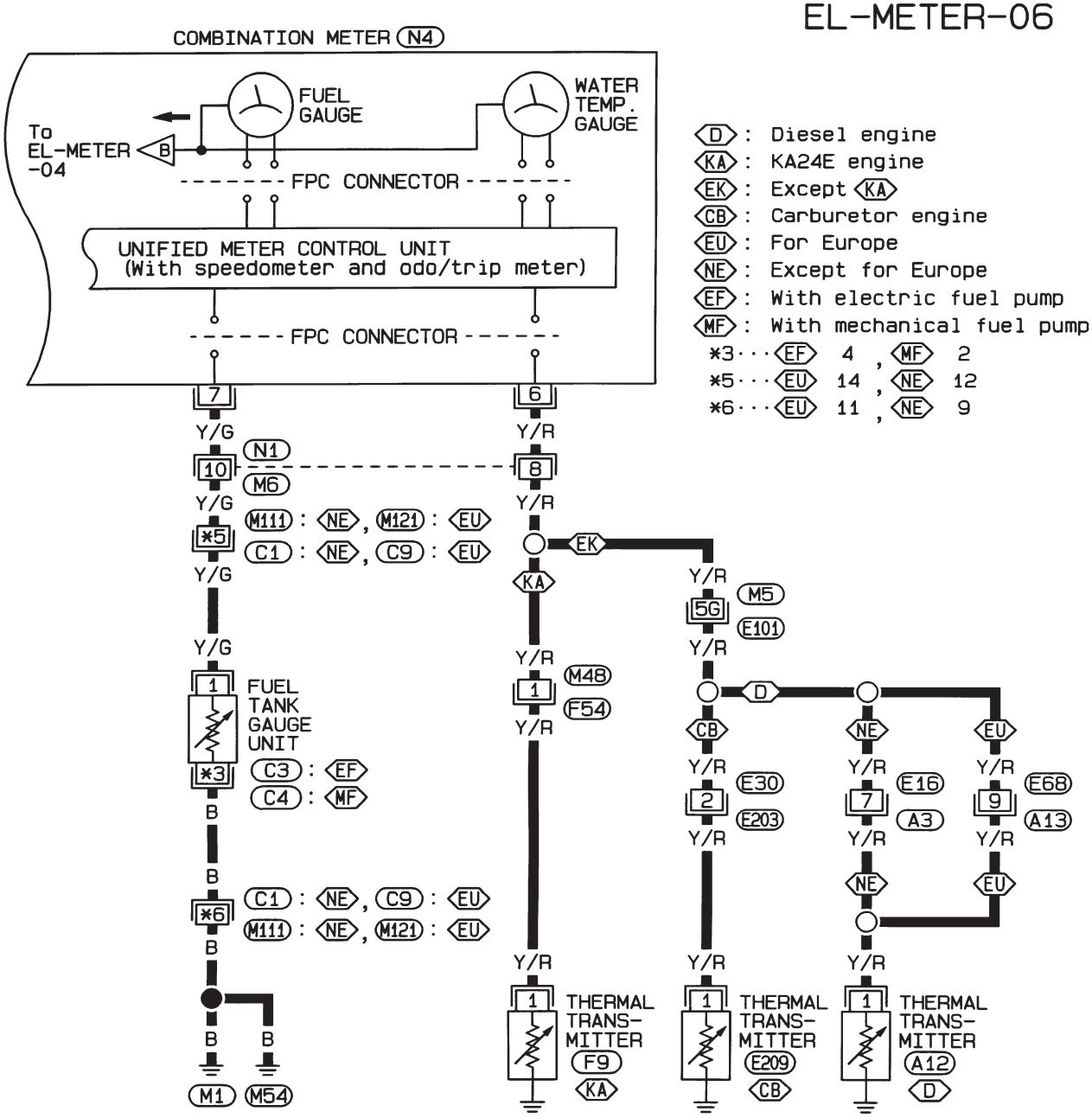
(M5), (E101)

(F51)

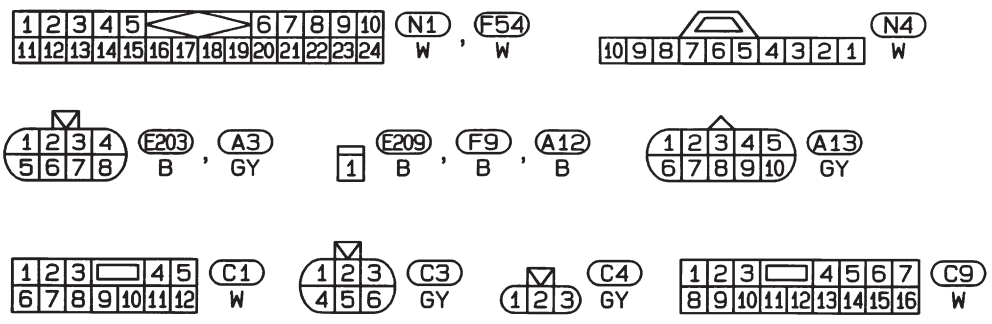
HEL357A

Wiring Diagram — METER —/RHD Models (Cont'd)

EL-METER-06



(D) : Diesel engine
(KA) : KA24E engine
(EK) : Except (KA)
(CB) : Carburetor engine
(EU) : For Europe
(NE) : Except for Europe
(EF) : With electric fuel pump
(MF) : With mechanical fuel pump
*3 ··· (EF) 4 , (MF) 2
*5 ··· (EU) 14 , (NE) 12
*6 ··· (EU) 11 , (NE) 9



Refer to last page (Foldout page).

(M5) , (E101)

HEL358A

Unified Control Meter System Description

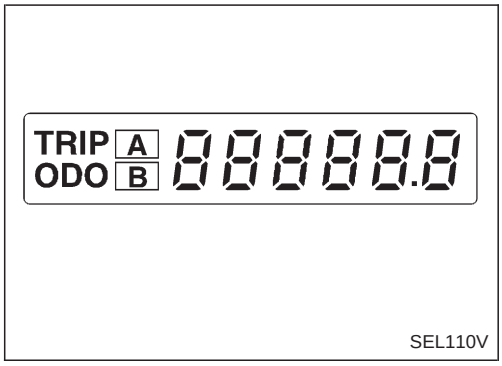
UNIFIED CONTROL METER

Speedometer, odo/trip meter, tachometer, fuel gauge and water temperature gauge are controlled totally by control unit combined with speedometer.

Meter/gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode

DIAGNOSIS FUNCTION

- Odo/trip meter segment can be checked in diagnosis mode.
- Meters/gauges can be checked in diagnosis mode.

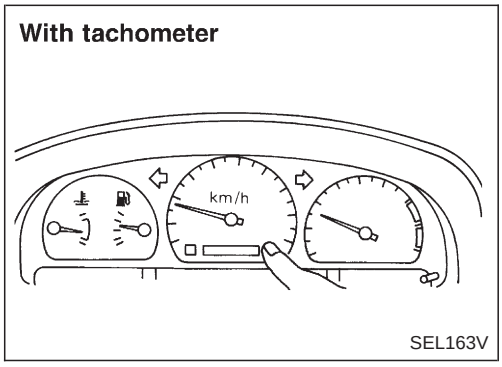


HOW TO ALTERNATE DIAGNOSIS MODE

1. Turn ignition switch to ON and change odo/trip meter to ''TRIP A'' or ''TRIP B''.
2. Turn ignition switch to OFF.
3. Turn ignition switch to ON when pushing odo/trip meter switch.
4. Confirm that trip meter indicates ''000.0''.
5. Push odo/trip meter switch more than three times within 5 seconds.
6. All odo/trip meter segments should be turned on.

NOTE: If some segments are not turned on, speedometer (unified meter control unit) with odo/trip meter should be replaced.

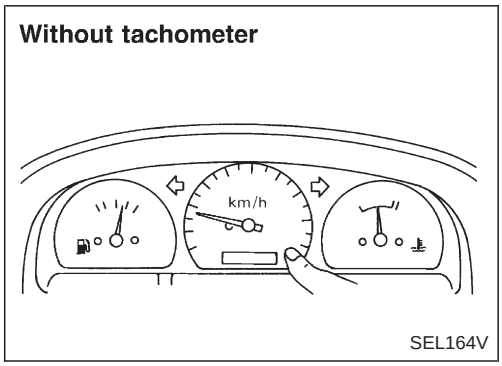
At this point, the unified control meter is turned to diagnosis mode.



7. Push odo/trip meter switch. Indication of each meter/gauge should be as shown left during pushing odo/trip meter switch if it is no malfunctioning.

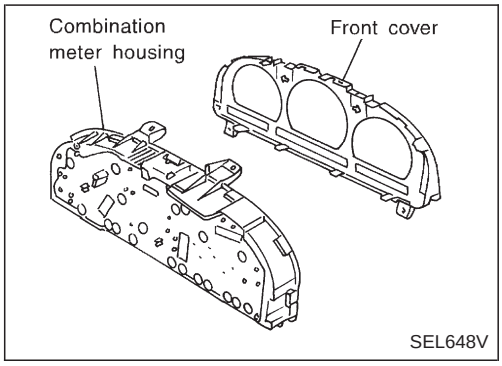
NOTE: It takes about 1 minute for indication of fuel gauge to become stable.

Meter/gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode (Cont'd)



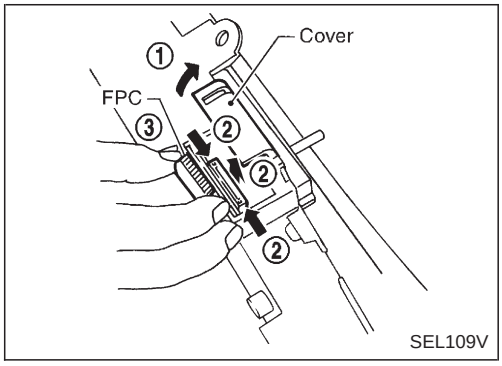
Flexible Print Circuit (FPC)

Tachometer, fuel gauge and water temperature gauge are connected with unified meter control unit (speedometer) by Flexible Print Circuit (FPC) connector. When replace or remove and install unified control unit (speedometer), disconnect and connect FPC connector according to the following steps.

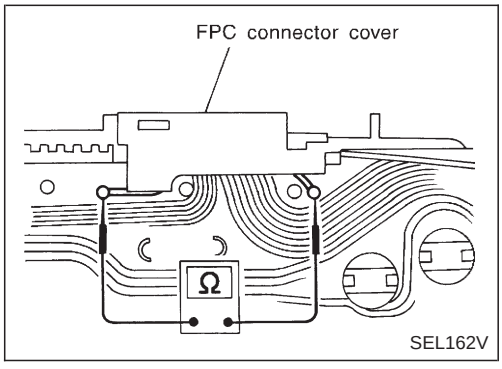


DISCONNECT

1. Remove front cover from combination meter housing.



2. Open connector cover.
3. Release connector lock by holding both ends of it and pulling it up.
4. Disconnect FPC by pulling it up.

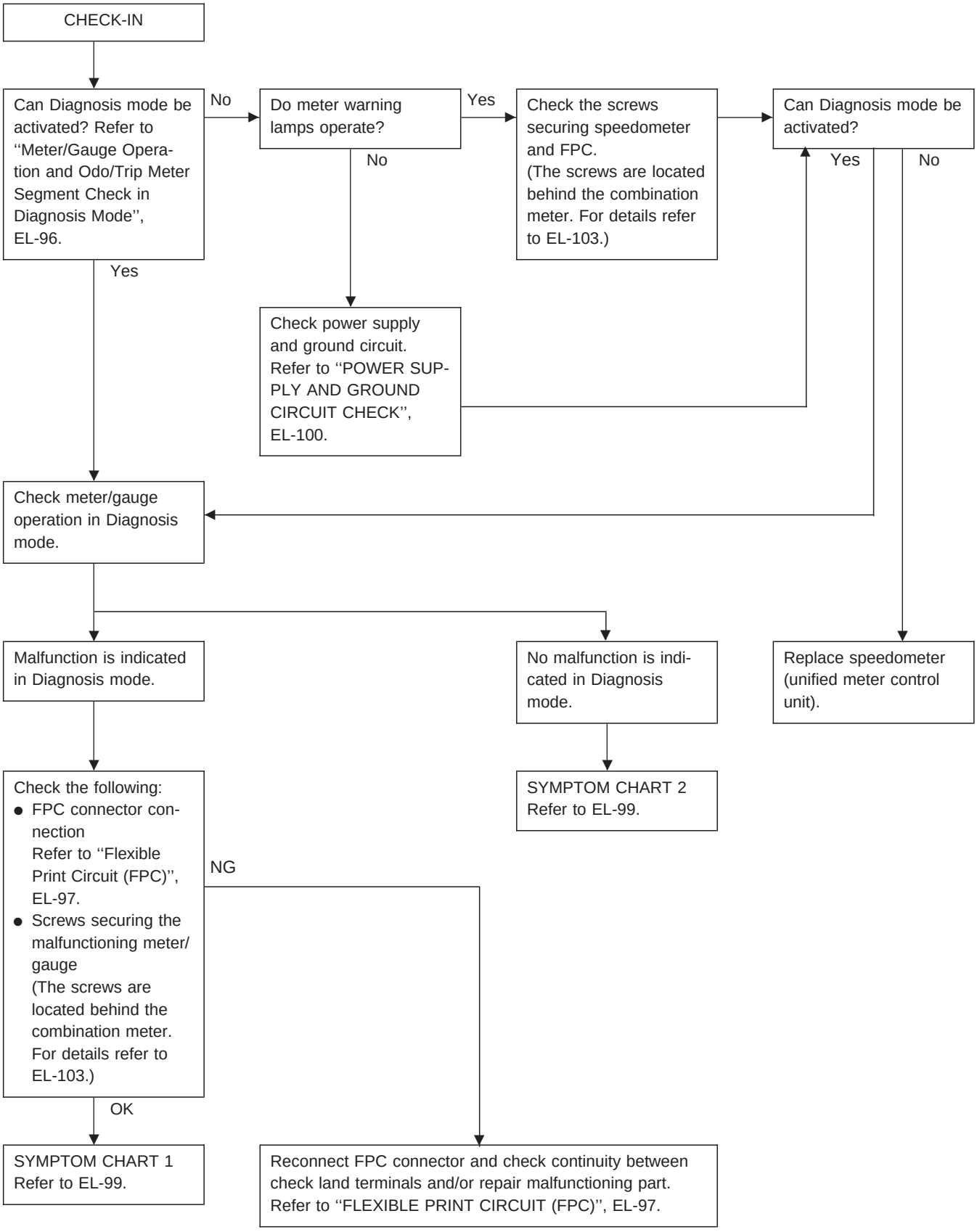


CONNECT

1. Insert FPC into connector and lock connector pushing FPC downward.
2. Check secure connection of FPC.
3. Check continuity of check land terminals for secure connection of FPC.
   Resistance: 0Ω
4. Close connector cover.

Trouble Diagnoses

PRELIMINARY CHECK



Trouble Diagnoses (Cont'd)

Before starting trouble diagnoses below, perform PRELIMINARY CHECK, EL-98.

SYMPTOM CHART 1 (MALFUNCTION IS INDICATED IN DIAGNOSIS MODE)

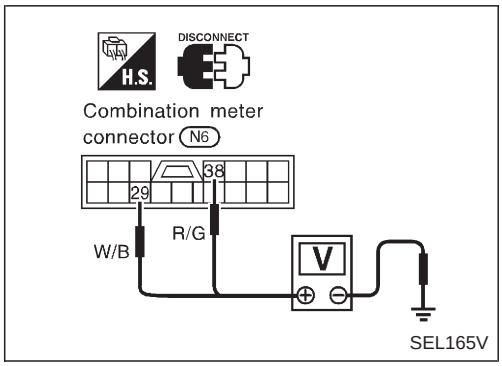
Symptom	Possible causes	Repair order
Speedometer and/or odo/trip meter indicate(s) malfunction in Diagnosis mode.	● Speedometer (Unified meter control unit)	● Replace speedometer (unified meter control unit).
Multiple meter/gauge indicate malfunction in Diagnosis mode.		
One of tachometer/fuel gauge/ water temp. gauge indicates malfunction in Diagnosis mode.	● Meter/Gauge ● Speedometer (Unified meter control unit)	1. Check resistance of meter/gauge indicating malfunction. If the resistance is NG, replace the meter/gauge. Refer to ''METER/GAUGE RESISTANCE CHECK'', EL-103. 2. If the resistance is OK, replace speedometer (unified meter control unit).

SYMPTOM CHART 2 (NO MALFUNCTION IS INDICATED IN DIAGNOSIS MODE)

Symptom	Possible causes	Repair order
Speedometer and odo/trip meter are malfunctioning.	1. Sensor - Speedometer, Odo/Trip meter 2. FPC connector 3. Speedometer (Unified meter control unit)	1. Check vehicle speed sensor. INSPECTION/VEHICLE SPEED SENSOR (Refer to EL-101.) 2. Check FPC connector. Refer to ''FLEXIBLE PRINT CIRCUIT (FPC)'', EL-97. 3. Replace speedometer (unified meter control unit).
Multiple meter/gauge are malfunctioning. (except speedometer, odo/trip meter)	1. FPC connector 2. Speedometer (Unified meter control unit)	1. Check FPC connector. Refer to ''FLEXIBLE PRINT CIRCUIT (FPC)'', EL-97. 2. Replace speedometer (unified meter control unit).
One of tachometer/fuel gauge/ water temp. gauge is malfunctioning.	1. Sensor/Engine revolution signal - Tachometer - Fuel gauge - Water temp. gauge 2. FPC connector 3. Speedometer (Unified meter control unit)	1. Check the sensor for malfunctioning meter/gauge. INSPECTION/ENGINE REVOLUTION SIGNAL (Refer to EL-101.) INSPECTION/FUEL TANK GAUGE (Refer to EL-102.) INSPECTION/THERMAL TRANSMITTER (Refer to EL-102.) 2. Check FPC connector. Refer to ''FLEXIBLE PRINT CIRCUIT (FPC)'', EL-97. 3. Replace speedometer (unified meter control unit).

Trouble Diagnoses (Cont'd)

POWER SUPPLY AND GROUND CIRCUIT CHECK

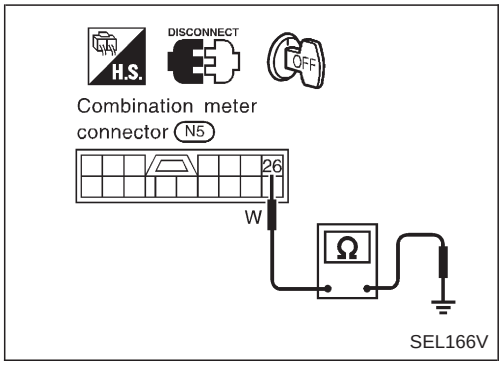


Power supply circuit check

Terminals		Ignition switch position		
⊕	⊖	OFF	ACC	ON
㊳	Ground	Battery voltage	Battery voltage	Battery voltage
㉙	Ground	0V	0V	Battery voltage

If NG, check the following.

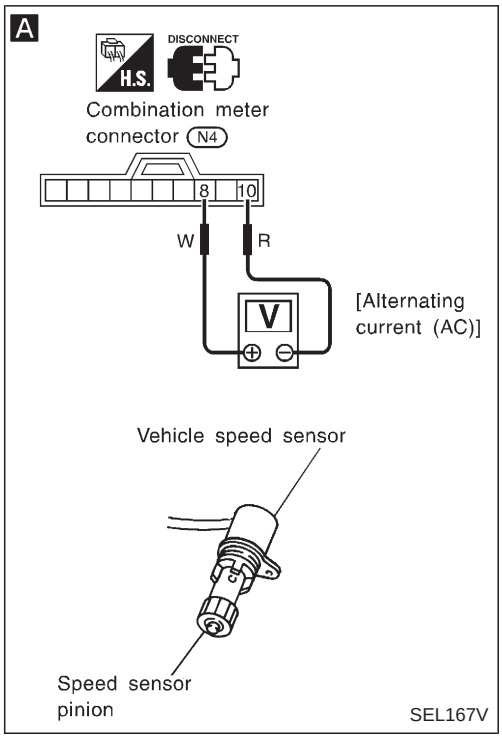
- 7.5A fuse [No. 6, located in fuse block (J/B)]
- 10A fuse [No. 1, located in fuse block (J/B)]
- Harness for open or short between fuse and combination meter



Ground circuit check

Terminals	Continuity
㉖ - Ground	Yes

Trouble Diagnoses (Cont'd)



INSPECTION/VEHICLE SPEED SENSOR

A

CHECK VEHICLE SPEED SENSOR OUTPUT.
1. Remove vehicle speed sensor from transmission.
2. Check voltage between combination meter terminals ⑧ and ⑩ while quickly turning speed sensor pinion.
   Voltage: Approx. 0.5V

OK → Vehicle speed sensor is OK.

NG ↓

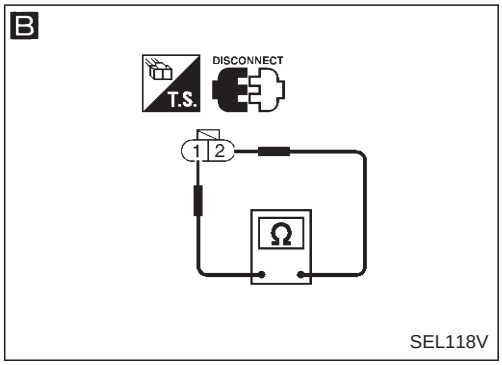
B

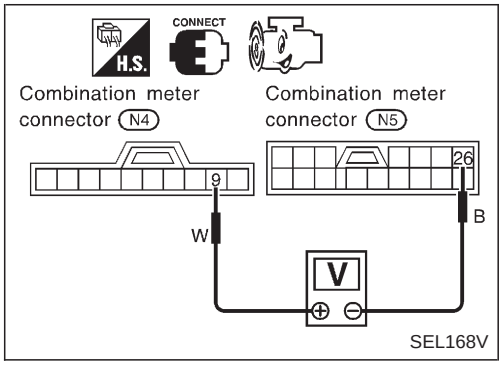
CHECK VEHICLE SPEED SENSOR.
Check resistance between vehicle speed sensor terminals ① and ② .
Resistance: Approx. 250Ω

NG → Replace vehicle speed sensor.

OK ↓

Check harness or connector between speedometer and vehicle speed sensor.





INSPECTION/ENGINE REVOLUTION SIGNAL (Models with tachometer)

Engine	Check item	Terminals ⊕	Terminals ⊖	Explanation
Injection	DC voltage	⑨	㉖	Higher rpm = Higher voltage Lower rpm = Lower voltage Voltage should change with rpm.
Diesel (TD25)				
Carburetor	AC voltage			

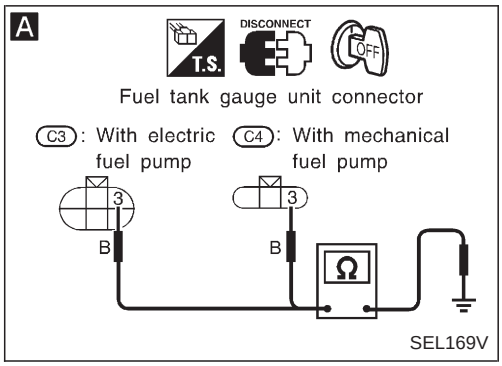
If NG, check the following.

Engine	Check item
Injection	● Harness for open or short and connection
Carburetor	● Harness for open or short and connection ● Resistor etc.
Diesel	● Harness for open or short and connection ● Engine revolution sensor etc.

Trouble Diagnoses (Cont'd)

INSPECTION/FUEL TANK GAUGE

A



CHECK GROUND CIRCUIT FOR FUEL TANK GAUGE UNIT.
Check harness continuity between fuel tank gauge unit terminal ③ and ground.
Continuity should exist.

NG → Repair harness or connector.

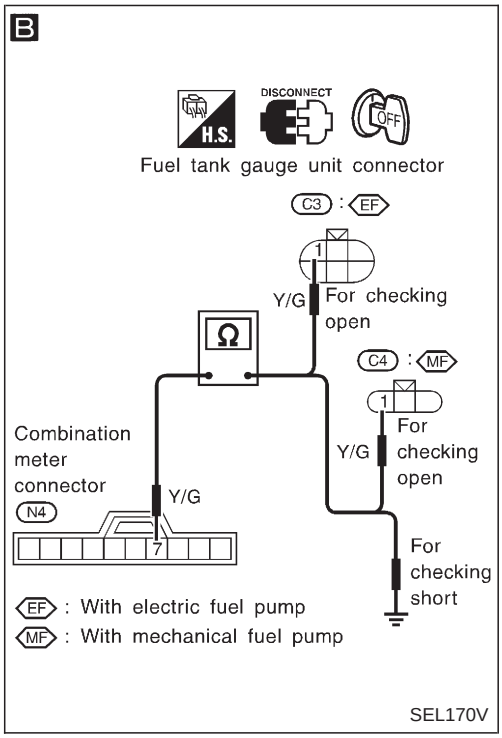
OK ↓

CHECK GAUGE UNITS.
Refer to "FUEL TANK GAUGE UNIT CHECK" (EL-103).

NG → Repair or replace. Refer to FE section.

OK ↓

B



CHECK HARNESS.
1. Disconnect combination meter connector N4 and fuel tank gauge unit connector.
2. Check harness continuity between combination meter terminal ⑦ and fuel tank gauge unit terminal ①.

Continuity should exist.

3. Check continuity between combination meter terminal ⑦ and ground.

Continuity should not exist.

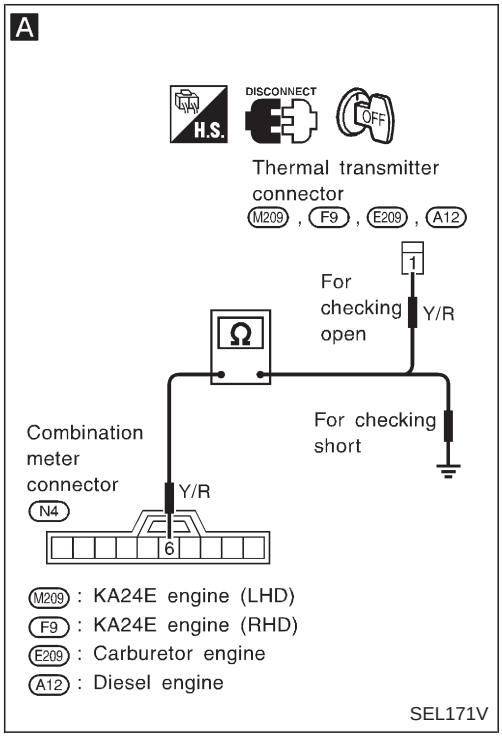
NG → Repair harness or connector.

OK ↓

Fuel tank gauge is OK.

INSPECTION/THERMAL TRANSMITTER

A



CHECK THERMAL TRANSMITTER.
Refer to "THERMAL TRANSMITTER CHECK" (EL-104).

NG → Repair or replace.

OK ↓

A

CHECK HARNESS.
1. Disconnect combination meter connector N4 and thermal transmitter connector.
2. Check harness for open or short between combination meter terminal ⑥ and thermal transmitter terminal ①.
3. Check continuity between combination meter terminal ⑥ and ground.

Continuity should not exist.

NG → Repair harness or connector.

OK ↓

Thermal transmitter is OK.

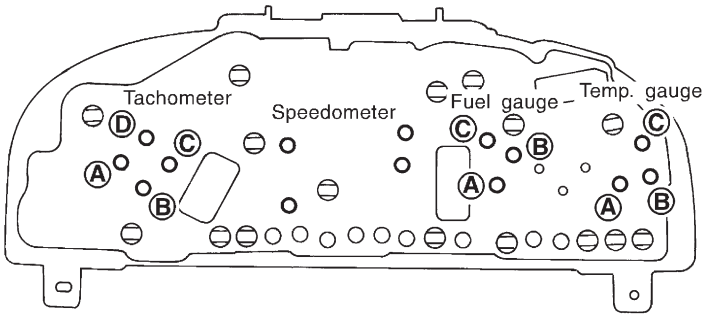
Electrical Components Inspection

METER/GAUGE RESISTANCE CHECK

1. Disconnect FPC connector. Refer to EL-97.
2. Check resistance between installation screws of meter/gauge.

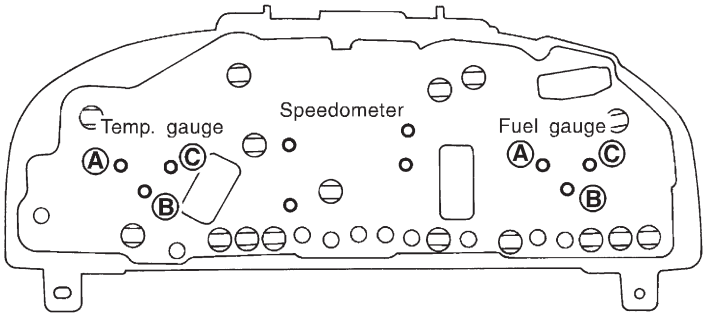
Screws		Resistance Ω
Tachometer	Fuel/Temp. gauge	
A - C	A - C	Approx. 70 - Approx. 140
B - D	B - C	Approx. 90 - Approx. 170

With tachometer

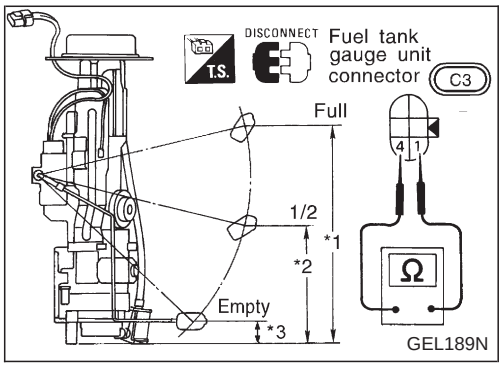


SEL172V

Without tachometer



SEL173V



GEL189N

FUEL TANK GAUGE UNIT CHECK (With electric fuel pump)

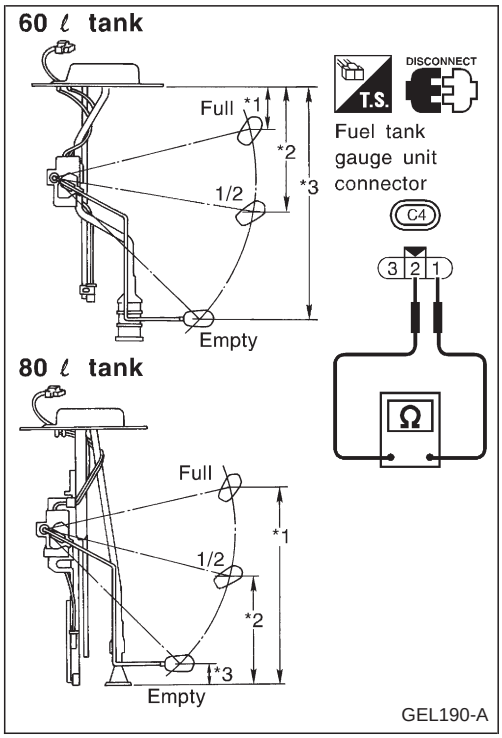
● For removal, refer to FE section.

Check the resistance between terminals ① and ④.

Ohmmeter		Float position mm (in)				Resistance value (Ω)
(+)	(−)			60ℓ (13-1/4 Imp gal) tank	80ℓ (17-5/8 Imp gal) tank	
①	④	*1	Full	253 (9.96)	247 (9.72)	Approx. 4 - 6
		*2	1/2	130 (5.12)	130 (5.12)	27 - 35
		*3	Empty	27 (1.06)	26 (1.02)	78 - 85

*1 and *3: When float rod is in contact with stopper.

Electrical Components Inspection (Cont'd)



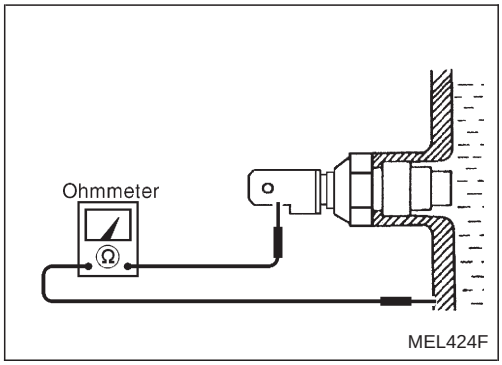
GEL190-A

FUEL TANK GAUGE UNIT CHECK (With mechanical fuel pump)

- For removal, refer to FE section.

Check the resistance between terminals ① and ②.

Ohmmeter		Float position mm (in)				Resistance value (Ω)
(+)	(−)			60ℓ (13-1/4 Imp gal) tank	80ℓ (17-5/8 Imp gal) tank	
①	②	*1	Full	50 (1.97)	247 (9.72)	Approx. 4 - 6
		*2	1/2	174 (6.85)	130 (5.12)	27 - 35
		*3	Empty	277 (10.91)	26 (1.02)	78 - 85

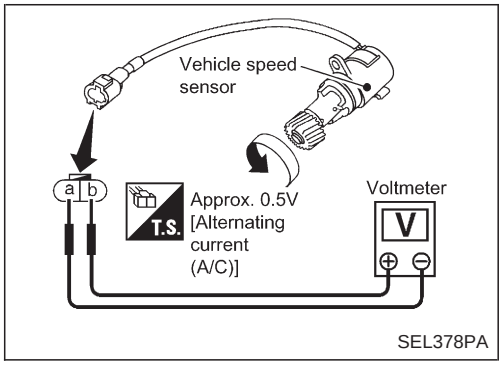


MEL424F

THERMAL TRANSMITTER CHECK

Check the resistance between the terminals of thermal transmitter and body ground.

Water temperature	Resistance
60°C (140°F)	Approx. 167 - 211Ω
100°C (212°F)	Approx. 47 - 53Ω

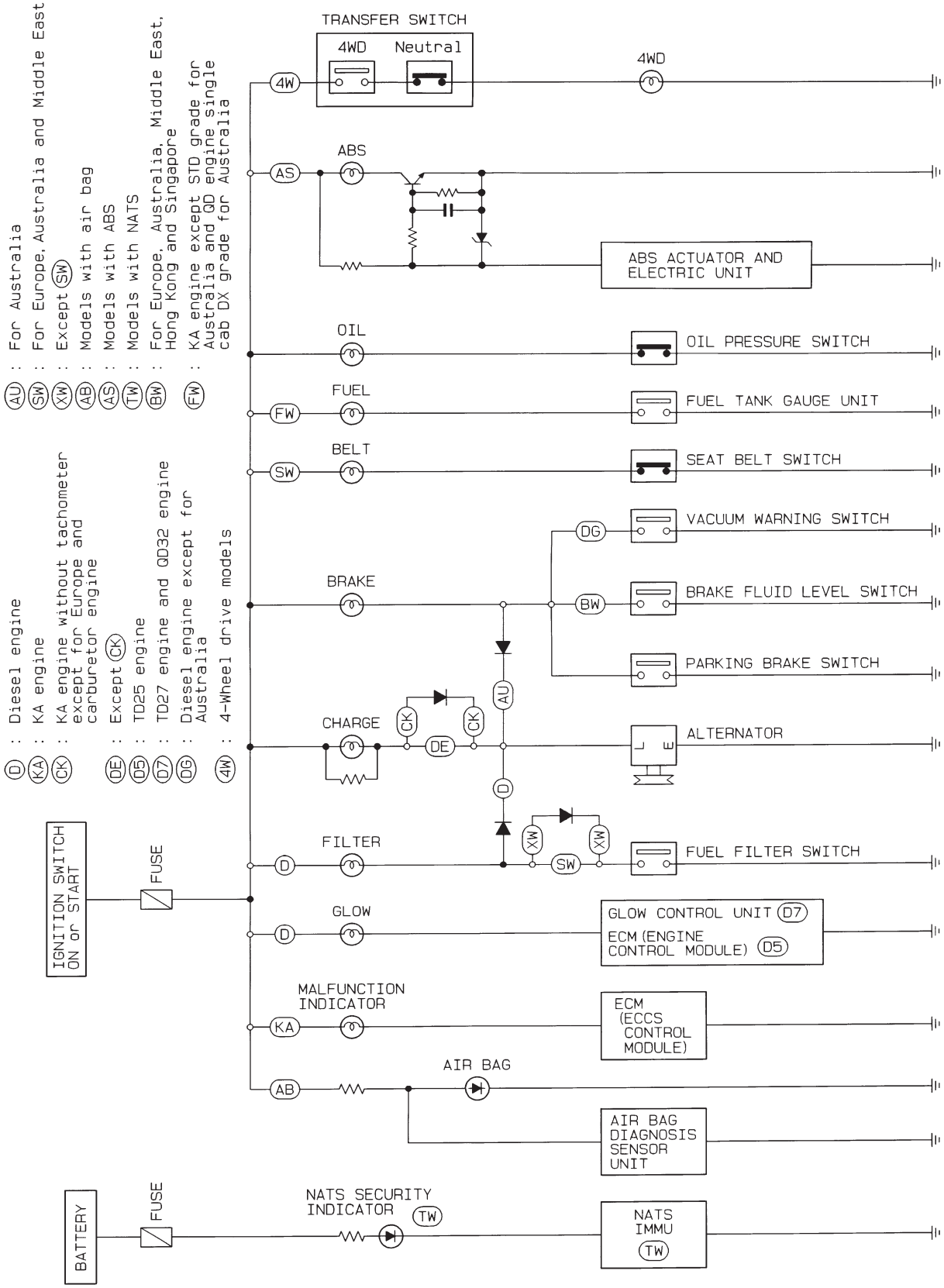


SEL378PA

VEHICLE SPEED SENSOR SIGNAL CHECK

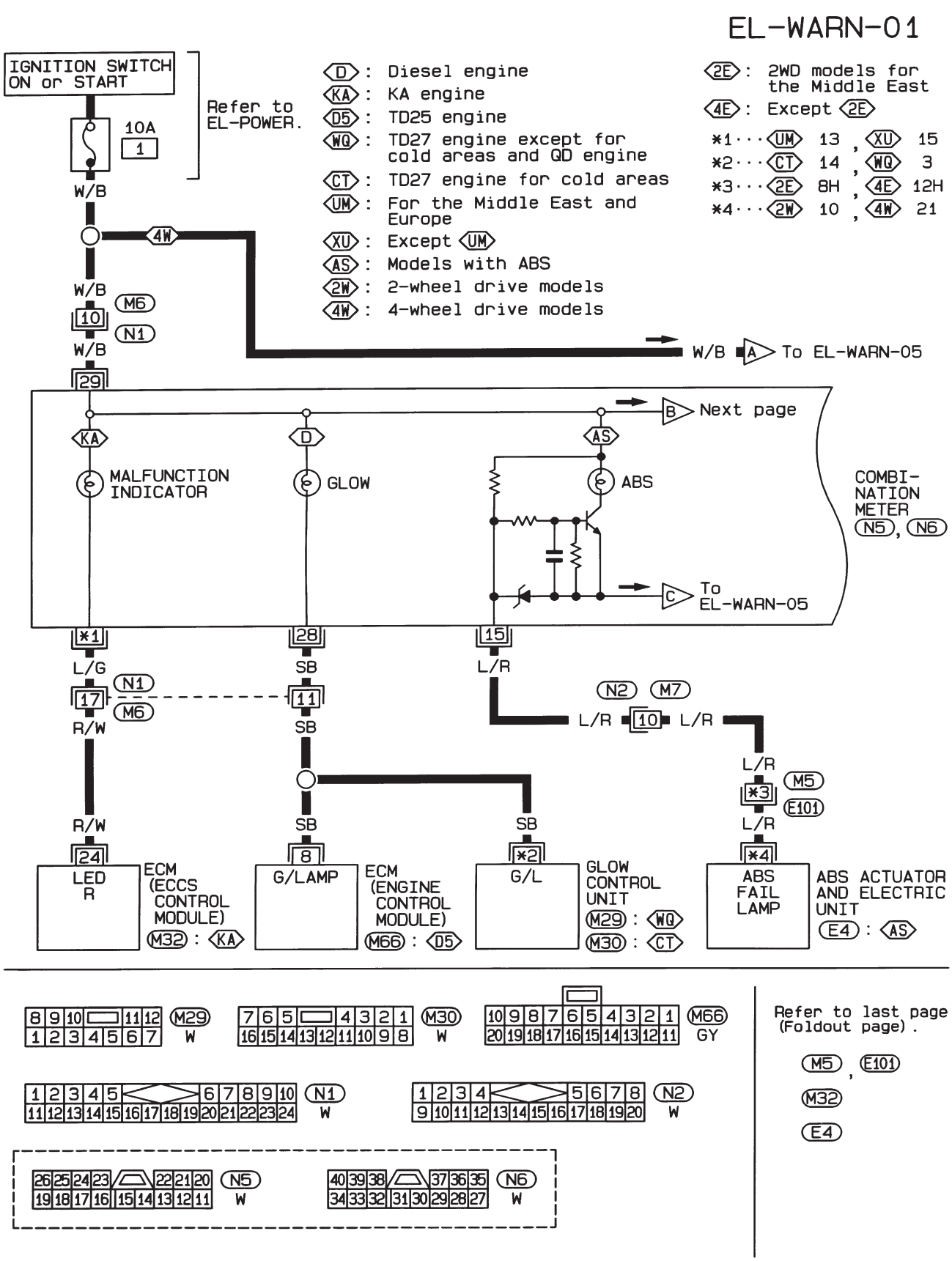
1. Remove vehicle speed sensor from transmission.
2. Turn vehicle speed sensor pinion quickly and measure voltage between terminals ⓐ and ⓑ.

Schematic



HEL359A

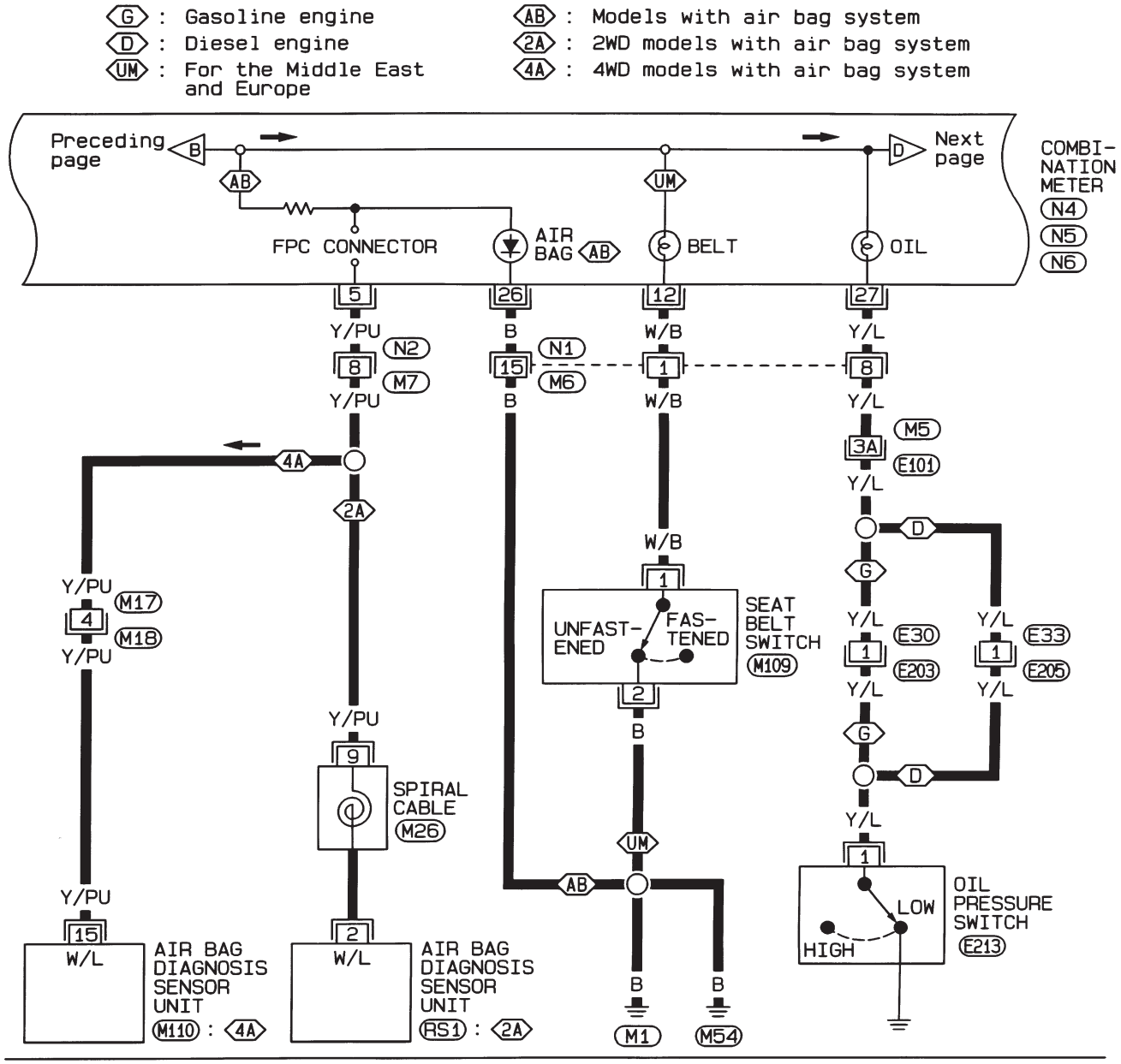
Wiring Diagram — WARN —/LHD Models

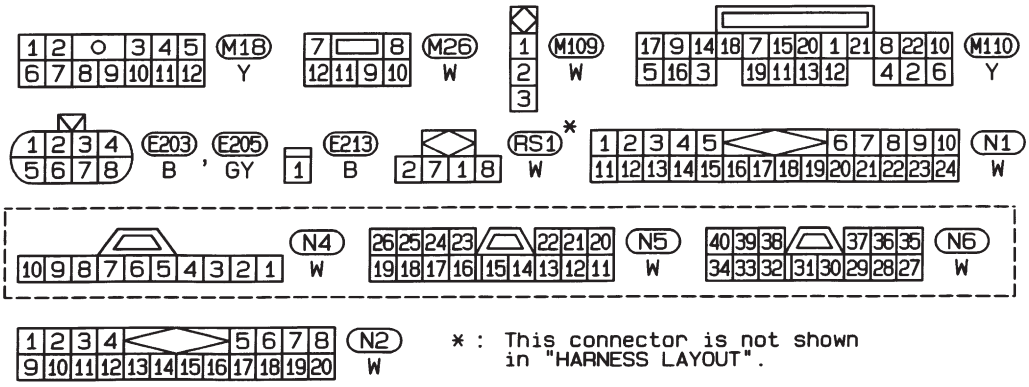


HEL360A

Wiring Diagram — WARN —/LHD Models (Cont'd)

EL-WARN-02





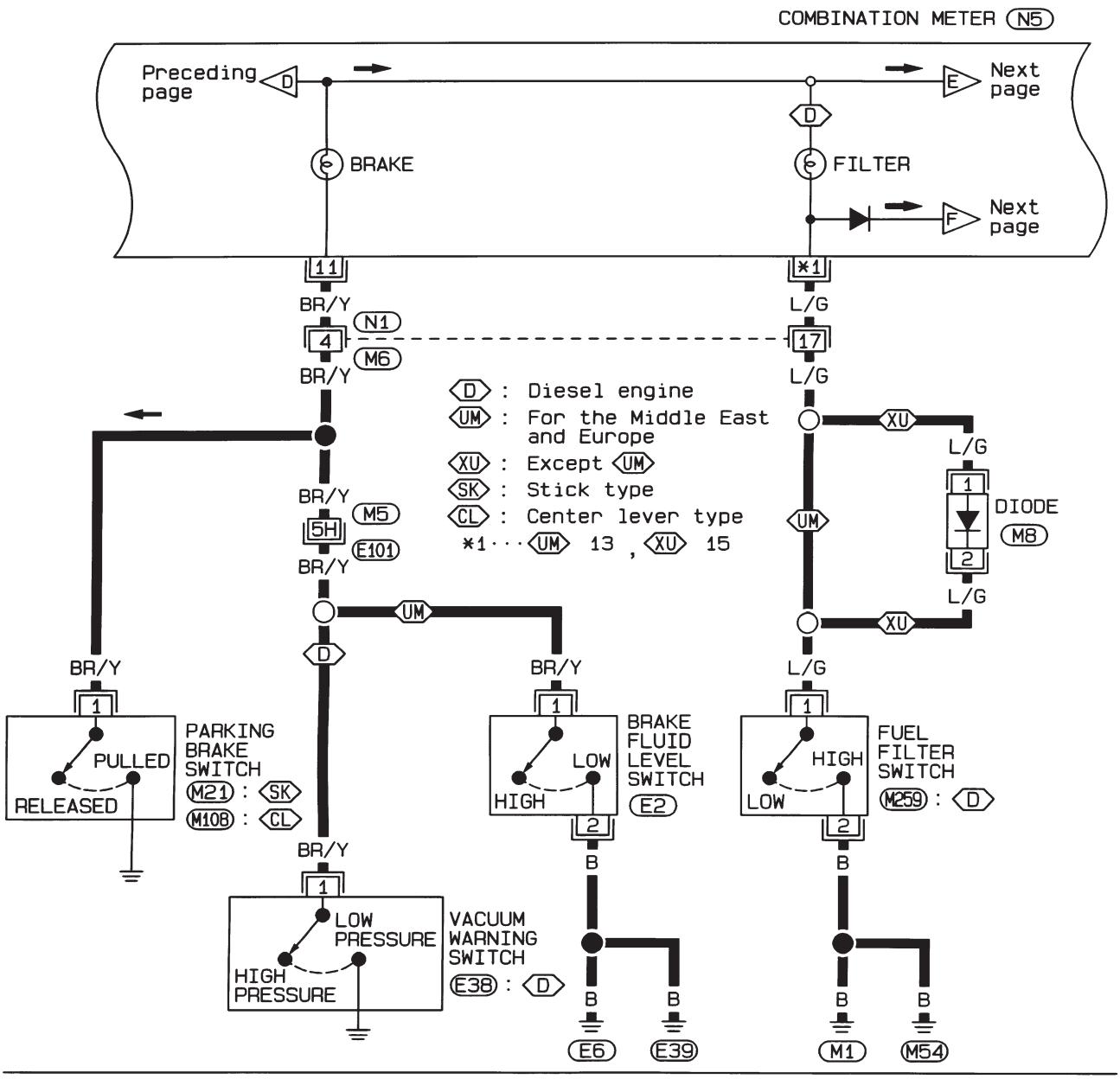
Refer to last page (Foldout page).

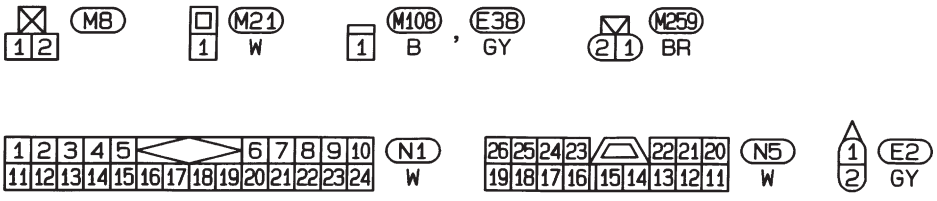
M5, E101

HEL361A

Wiring Diagram — WARN —/LHD Models (Cont'd)

EL-WARN-03



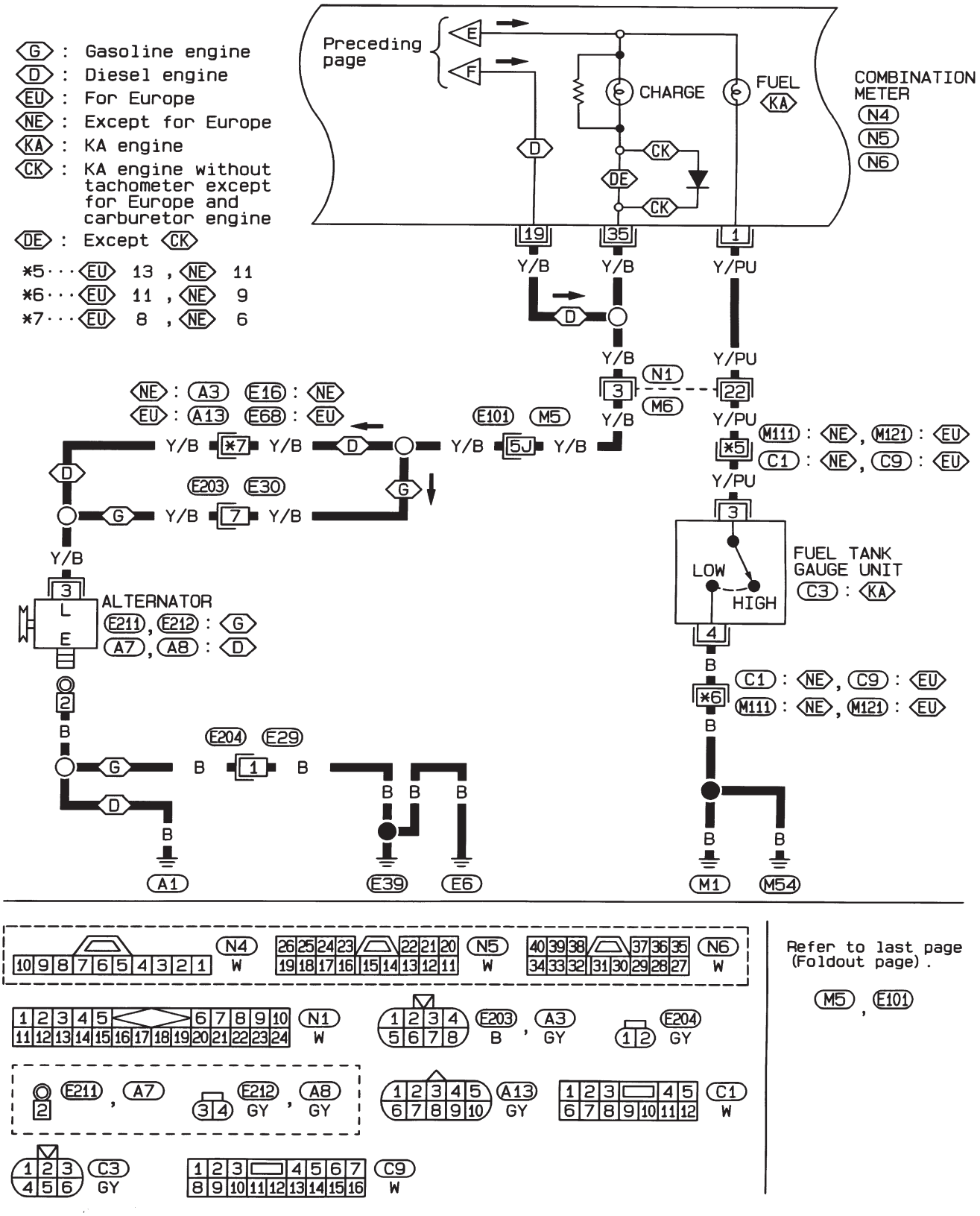


Refer to last page (Foldout page).
M5 , E101

HEL362A

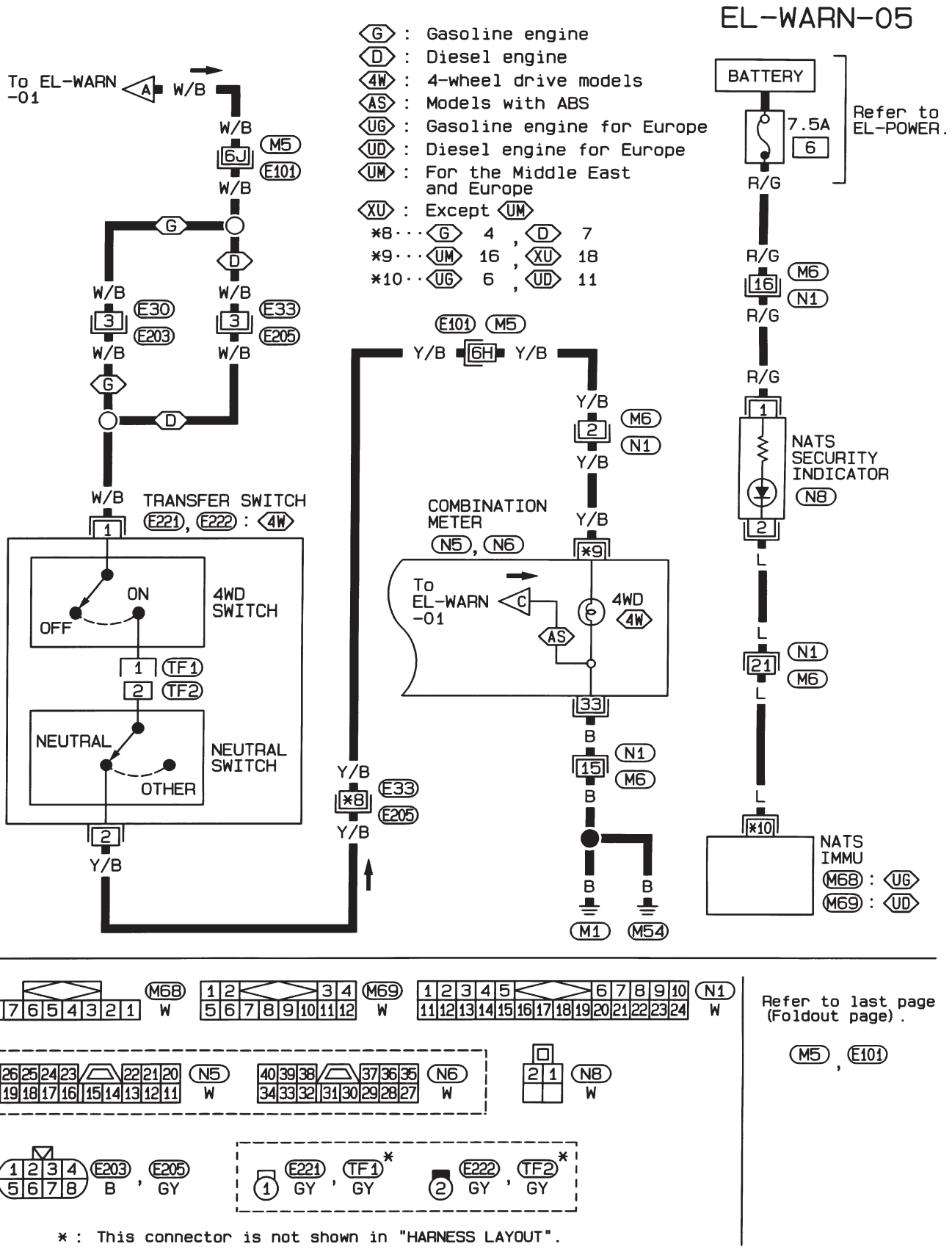
Wiring Diagram — WARN —/LHD Models (Cont'd)

EL-WARN-04



HEL363A

Wiring Diagram — WARN —/LHD Models (Cont'd)

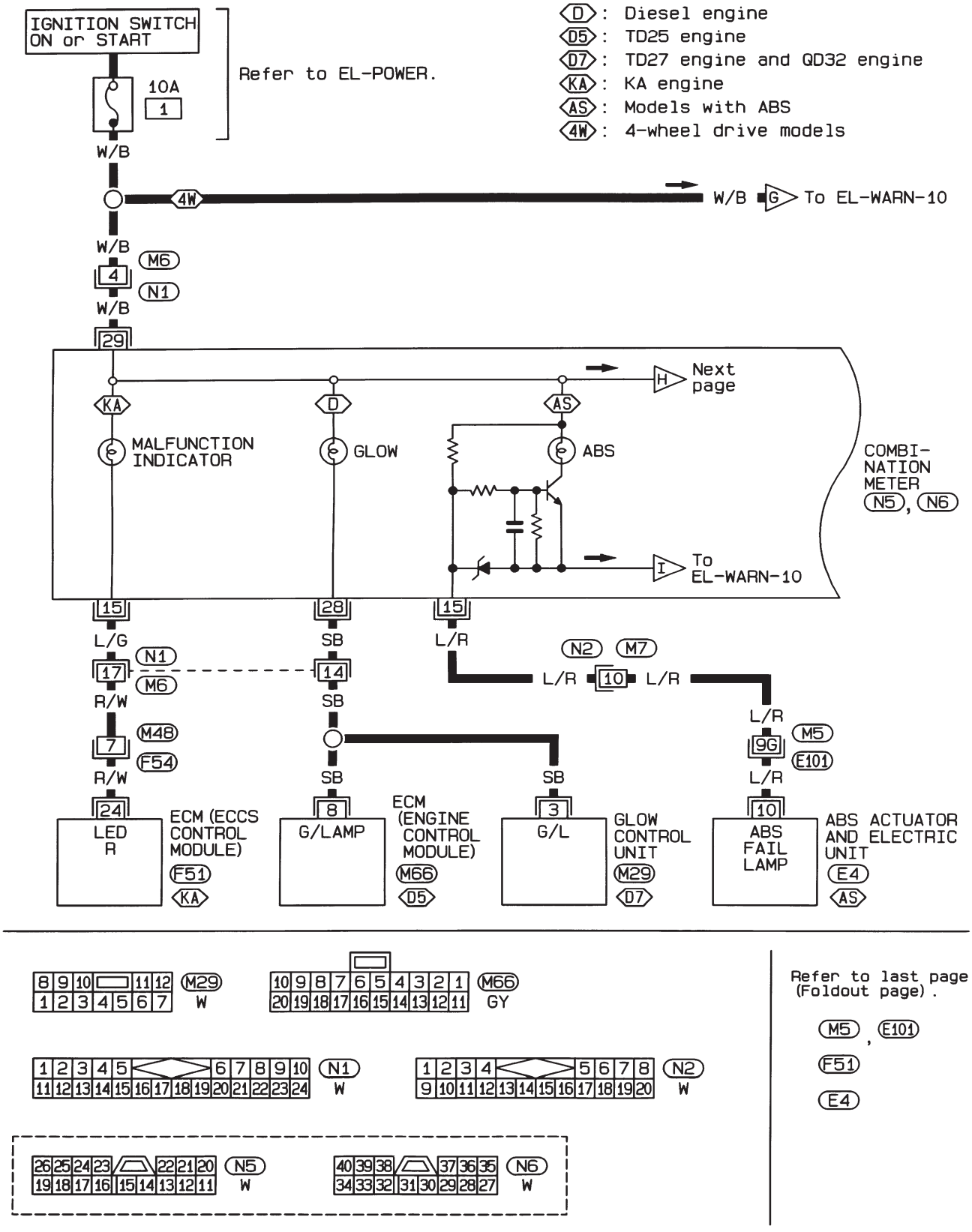


* : This connector is not shown in "HARNESS LAYOUT".

HEL364A

Wiring Diagram — WARN —/RHD Models

EL-WARN-06

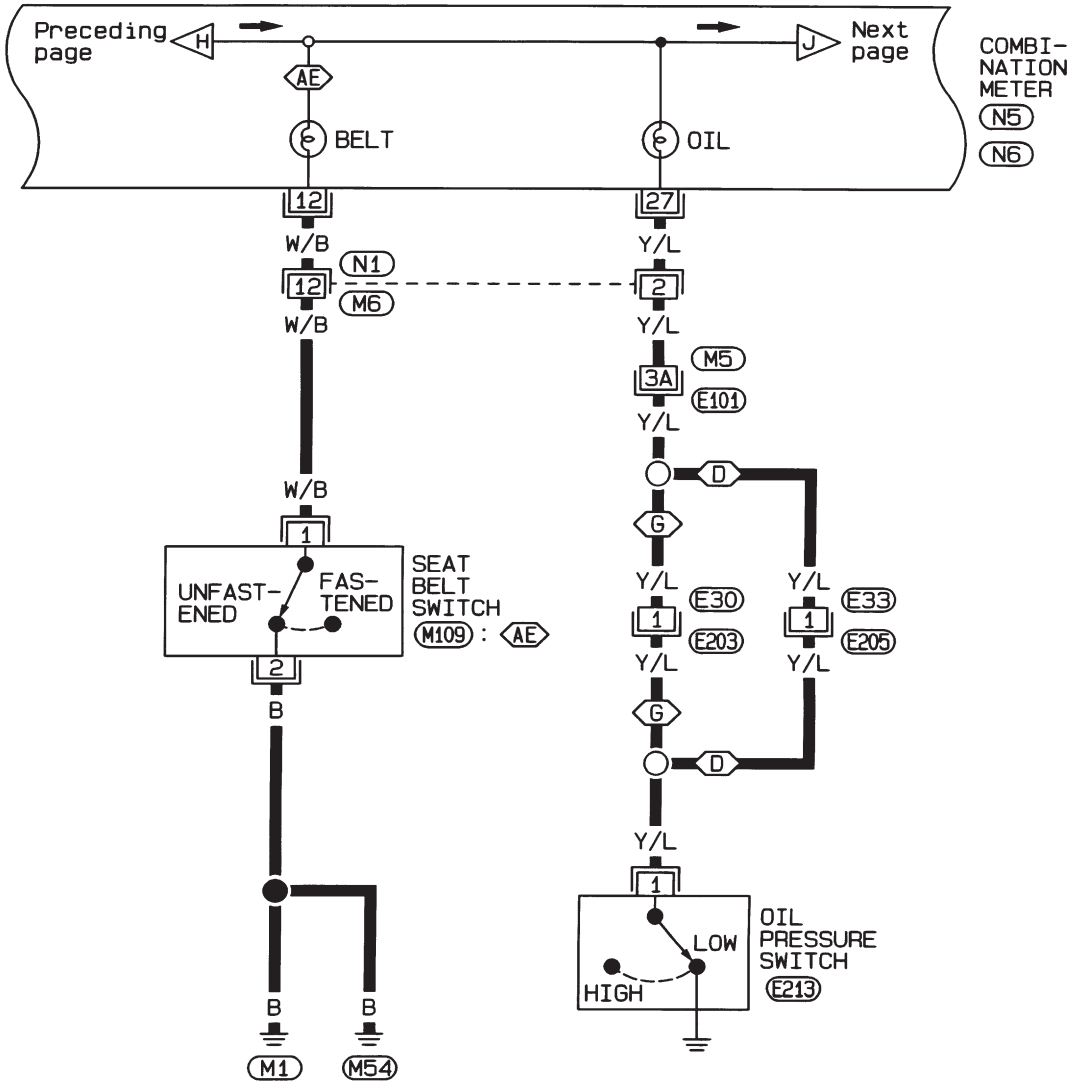


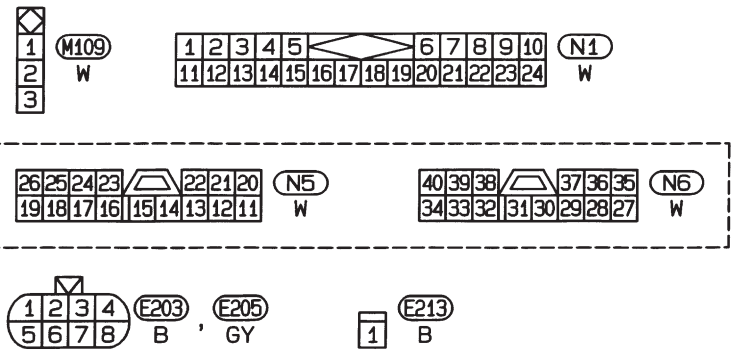
HEL365A

Wiring Diagram — WARN —/RHD Models (Cont'd)

EL-WARN-07

G : Gasoline engine
D : Diesel engine
AE : For Europe and Australia





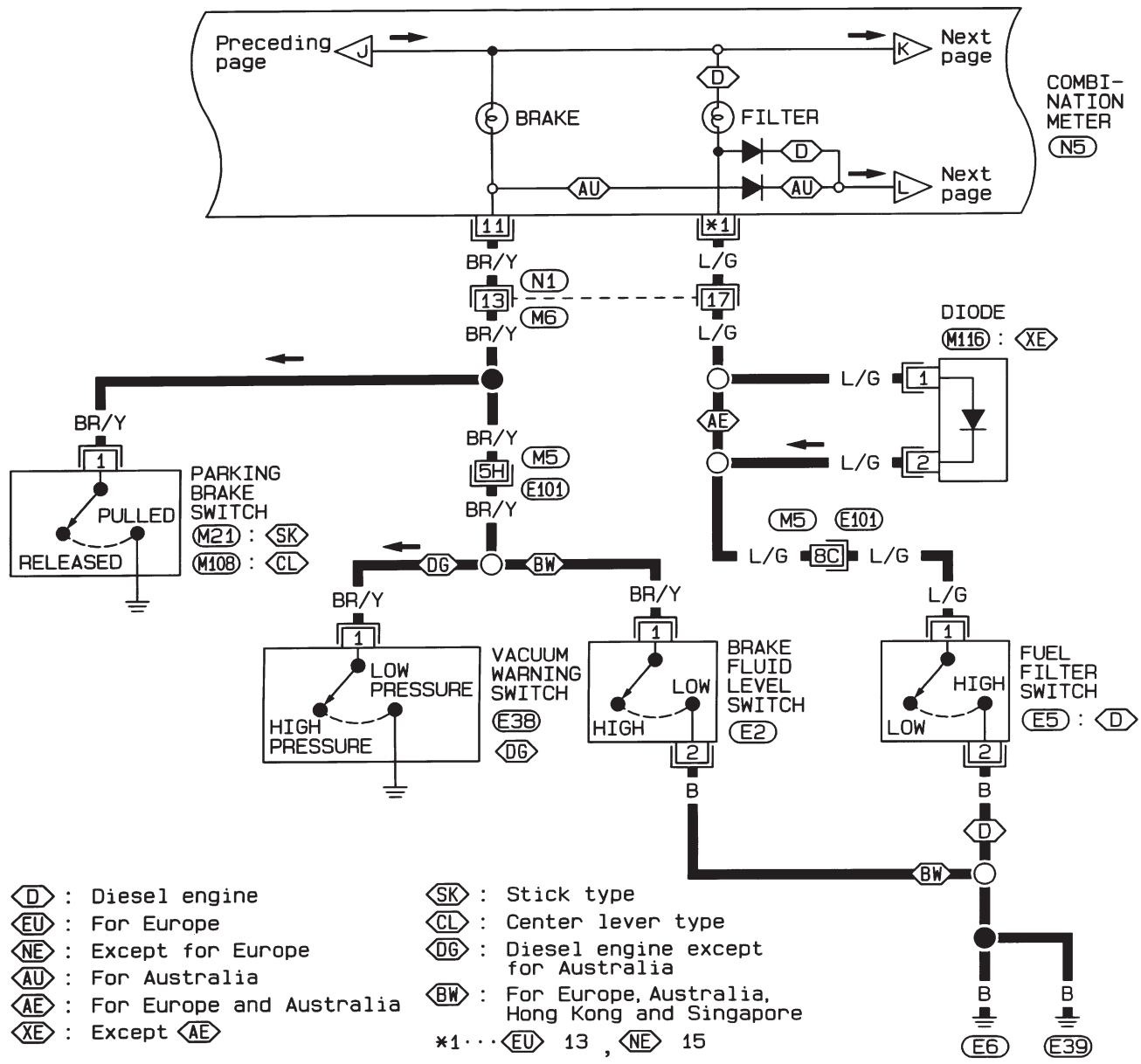
Refer to last page (Foldout page).

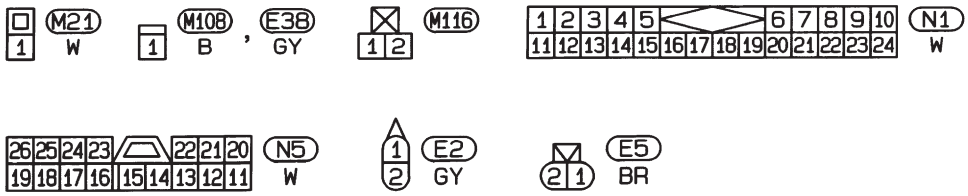
M5, E101

HEL366A

Wiring Diagram — WARN —/RHD Models (Cont'd)

EL-WARN-08



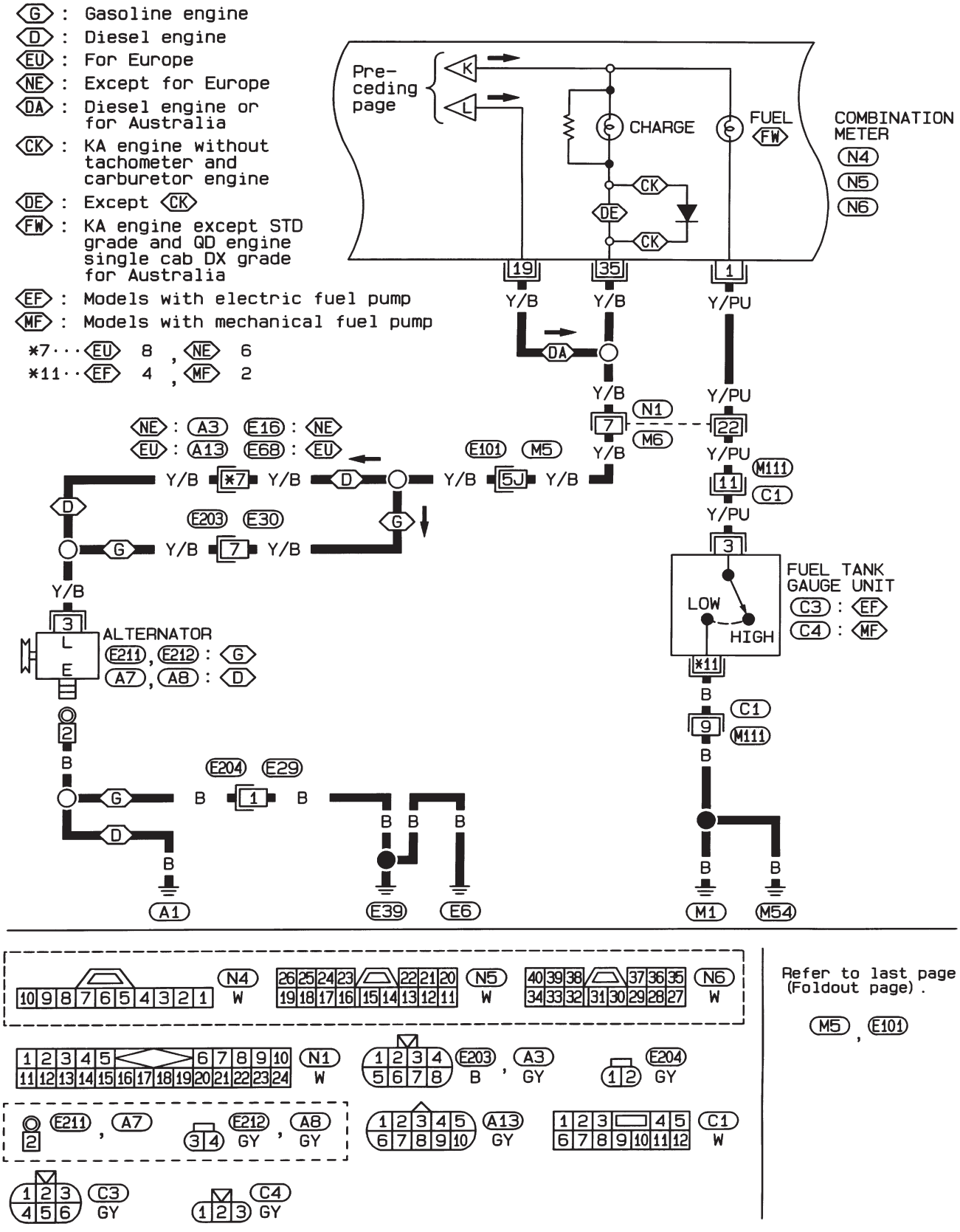


Refer to last page (Foldout page).
M5 , E101

HEL367A

Wiring Diagram — WARN —/RHD Models (Cont'd)

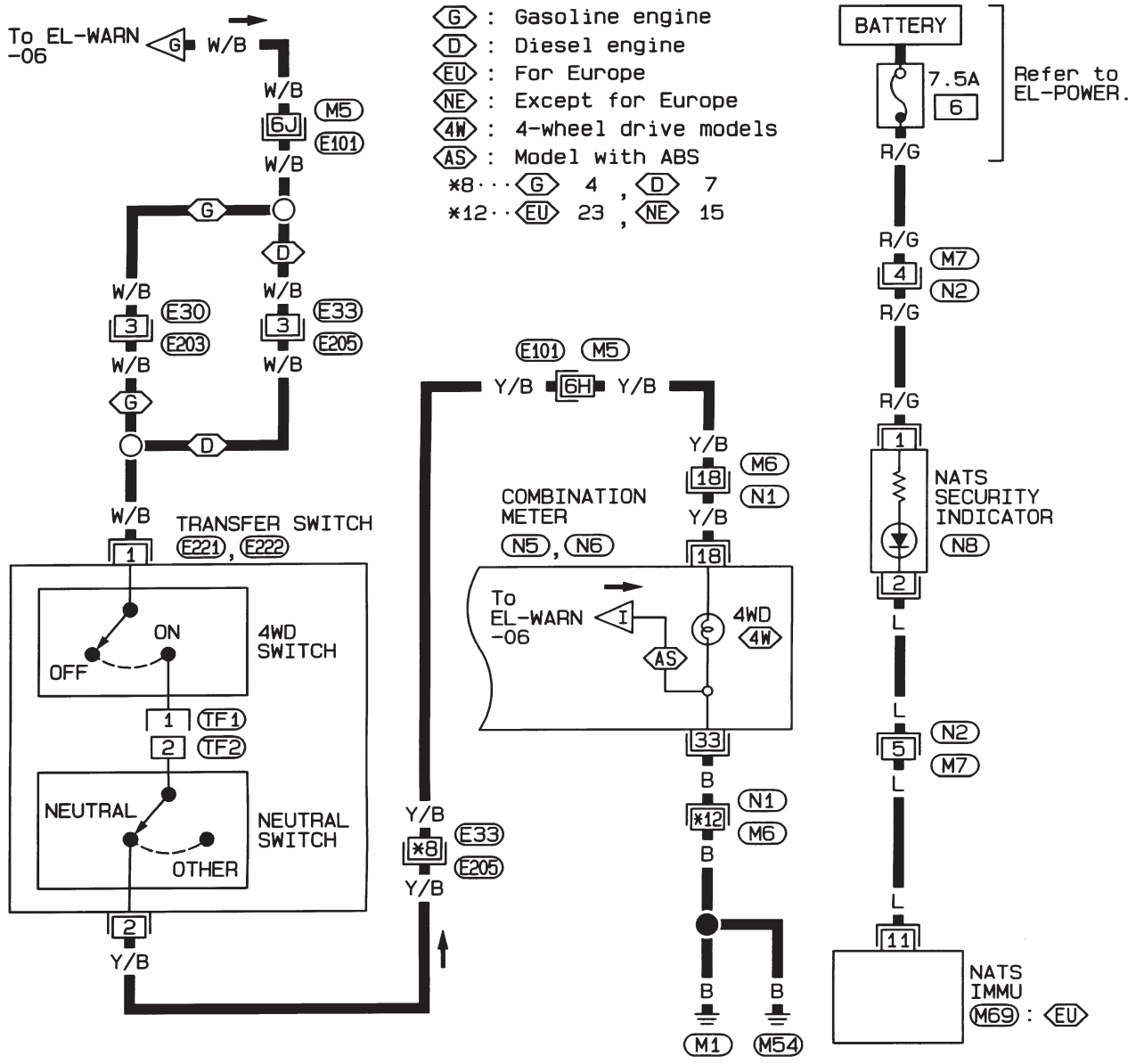
EL-WARN-09

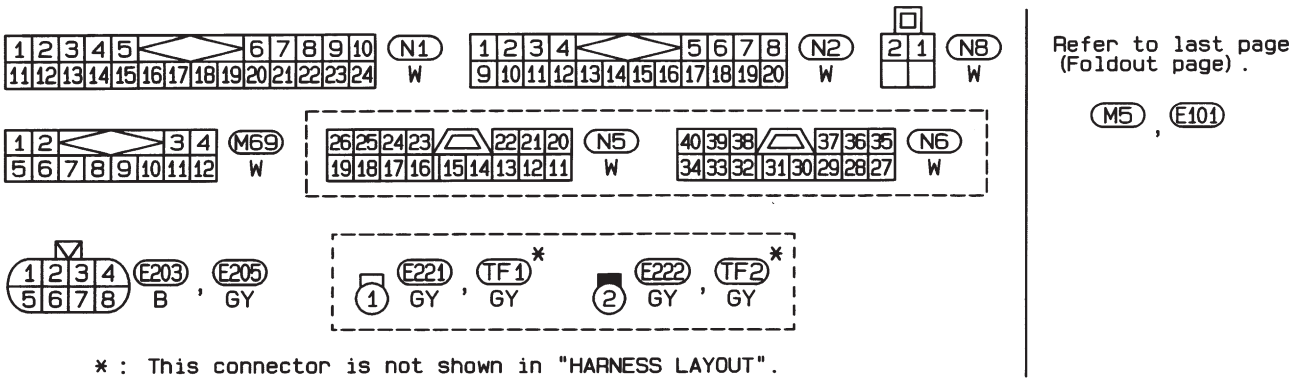


HEL368A

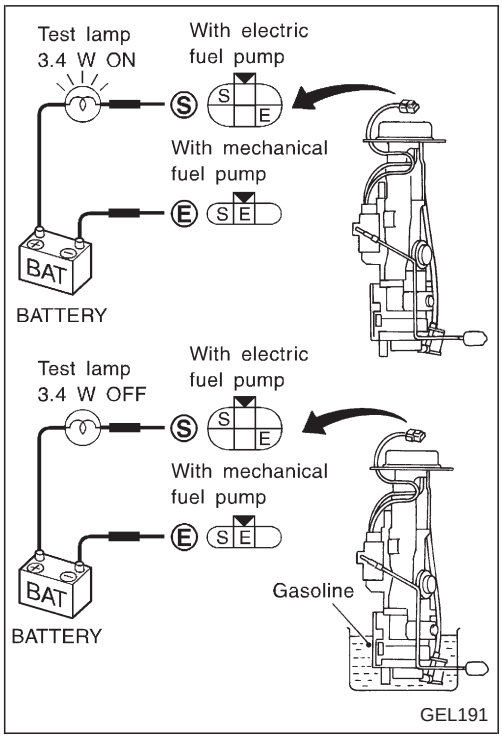
Wiring Diagram — WARN —/RHD Models (Cont'd)

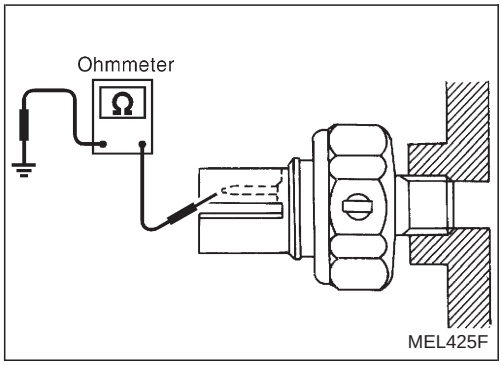
EL-WARN-10

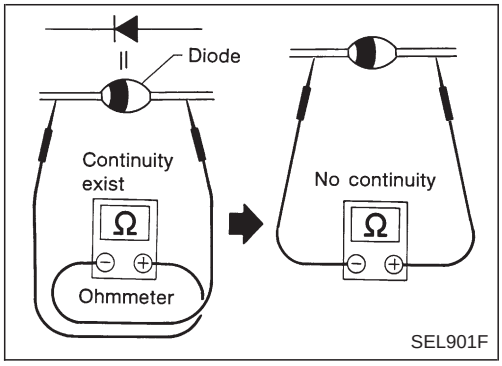


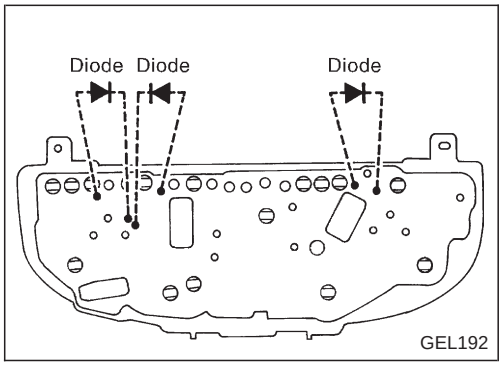


HEL369A









Electrical Components Inspection

FUEL WARNING LAMP SENSOR CHECK

- It will take a short time for the bulb to light.

OIL PRESSURE SWITCH CHECK

	Oil pressure kPa (bar, kg/cm^2, psi)	Continuity
Engine start	More than 10 - 20 (0.10 - 0.20, 0.1 - 0.2, 1 - 3)	NO
Engine stop	Less than 10 - 20 (0.10 - 0.20, 0.1 - 0.2, 1 - 3)	YES

Check the continuity between the terminals of oil pressure switch and body ground.

DIODE CHECK

- Check continuity using an ohmmeter.
- Diode is functioning properly if test results are as shown in the figure at left.

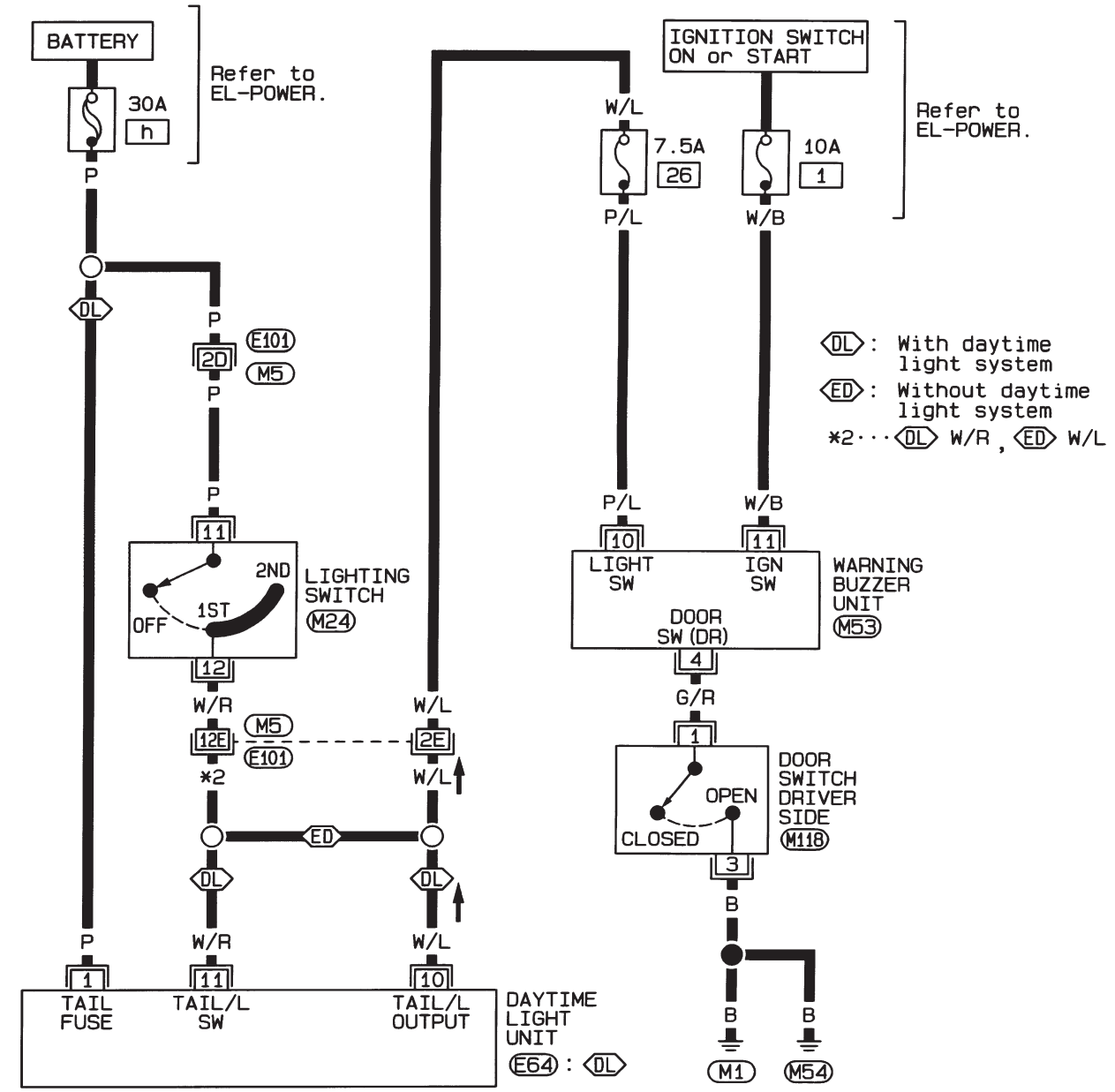
NOTE: Specification may vary depending on the type of tester. Before performing this inspection, be sure to refer to the instruction manual for the tester to be used.

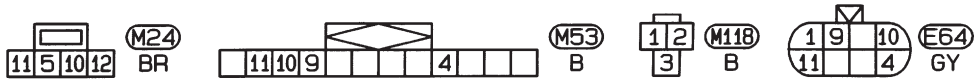
- Diodes for warning lamps are built into the combination meter printed circuit.

Wiring diagram — BUZZER —/LHD Models for Europe

LIGHT WARNING BUZZER

EL-BUZZER-02





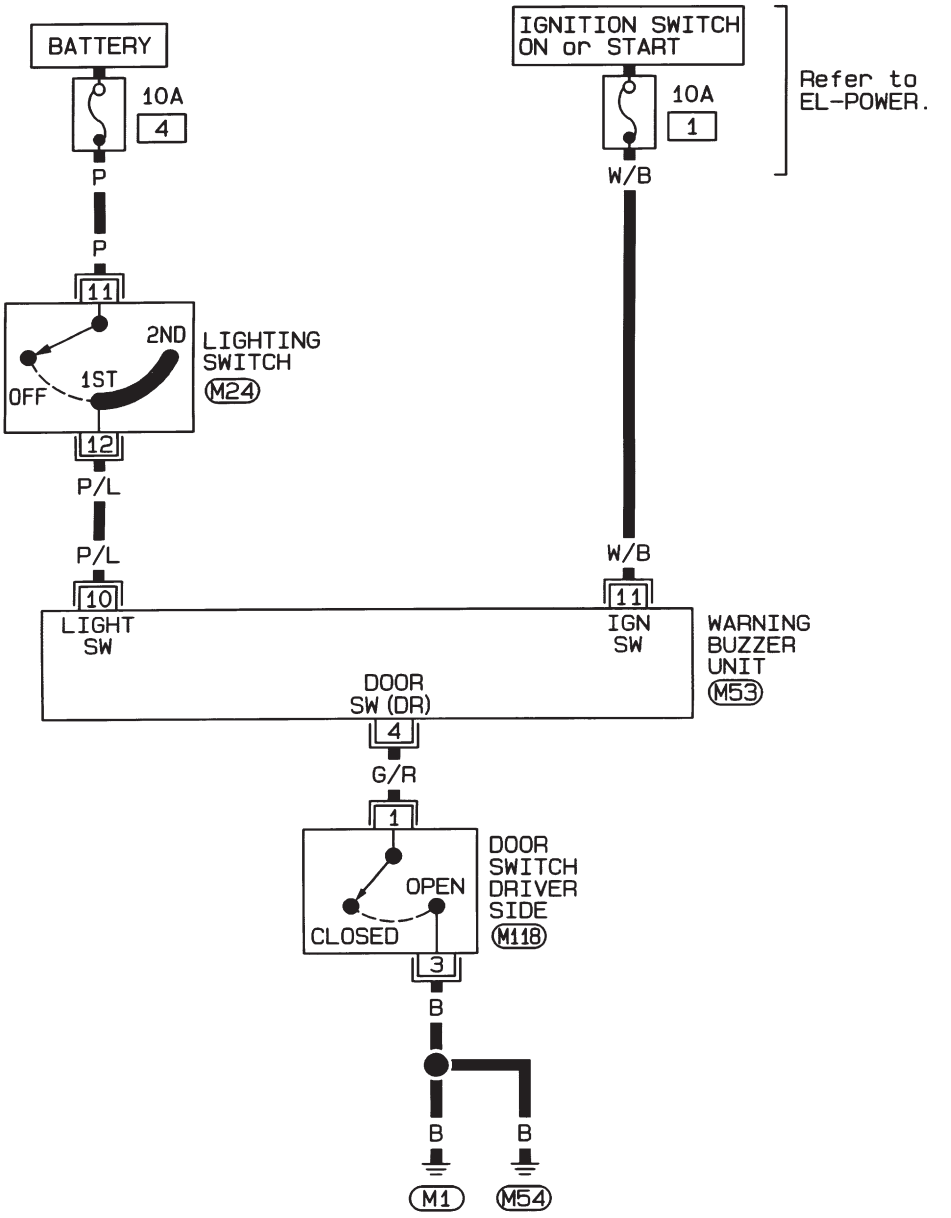
Refer to last page (Foldout page).
M5 , E101

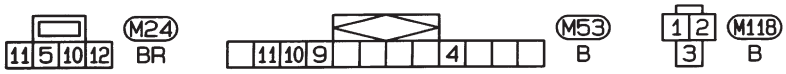
HEL370A

Wiring diagram — BUZZER —/RHD Models for Europe

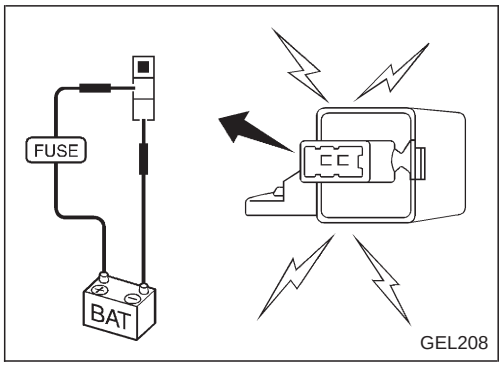
LIGHT WARNING BUZZER

EL-BUZZER-03



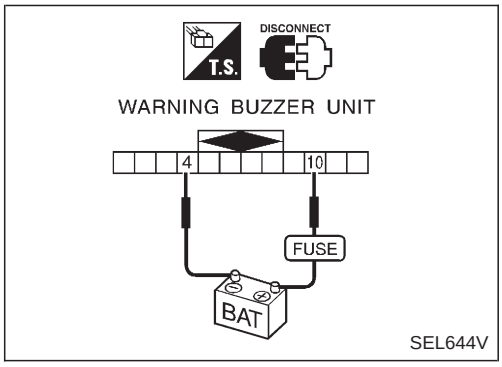


HEL371A



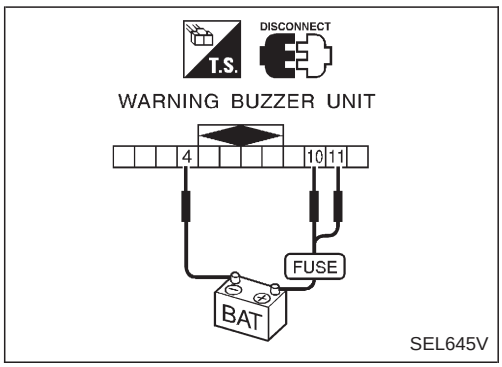
Electrical Components Inspection

FUEL FILTER WARNING BUZZER CHECK



LIGHT WARNING BUZZER

1. Apply 12V direct current to warning buzzer unit terminals ⑩ and ④.
   Warning buzzer should sound.



2. Apply 12V direct current to warning buzzer unit terminals ⑩, ⑪ and ④.
   Warning buzzer should not sound.

System Description

WIPER OPERATION

The wiper switch is controlled by a lever built into the combination switch.
There are two or three wiper switch positions:

- LO speed
- HI speed
- INT (Intermittent wiper models only)

With the ignition switch in the ACC or ON position, power is supplied

- through 20A fuse (No. 16, located in the fuse block)
- to wiper motor terminal ④.

Low and high speed wiper operation

Ground is supplied to wiper switch terminal ⑰ through body grounds M1 and M54.
When the wiper switch is placed in the LO position, ground is supplied

- through terminal ⑭ of the wiper switch
- to wiper motor terminal ②.

With power and ground supplied, the wiper motor operates at low speed.
When the wiper switch is placed in the HI position, ground is supplied

- through terminal ⑯ of the wiper switch
- to wiper motor terminal ③.

With power and ground supplied, the wiper motor operates at high speed.

Auto stop operation

With wiper switch turned OFF, wiper motor will continue to operate until wiper arms reach windshield base.
When wiper arms are not located at base of windshield with wiper switch OFF, ground is provided

- from terminal ⑭ of the wiper switch
- to wiper motor terminal ②, in order to continue wiper motor operation at low speed.

Ground is also supplied

- through terminal ⑬ of the wiper switch
- to wiper amplifier terminal ② (Intermittent wiper models only)
- through terminal ⑦ of the wiper amplifier (Intermittent wiper models only)
- to wiper motor terminal ⑤
- through terminal ⑥ of the wiper motor, and
- through body grounds M1 and M54.

When wiper arms reach base of windshield, wiper motor terminals ④ and ⑤ are connected instead of terminals ⑤ and ⑥. Wiper motor will then stop wiper arms at the PARK position.

Intermittent operation

The wiper motor operates the wiper arms one time at low speed at an interval of approximately 7 seconds. This feature is controlled by the wiper amplifier.
When the wiper switch is placed in the INT position, ground is supplied

- to wiper amplifier terminal ①
- from wiper switch terminal ⑮
- through body grounds M1 and M54.
- to wiper motor terminal ②
- through the wiper switch terminal ⑭
- to wiper switch terminal ⑬
- through wiper amplifier terminal ②
- to wiper amplifier terminal ③
- through body grounds M1 and M54.

With power and ground supplied, the wiper motor operates at low speed intermittently.

System Description (Cont'd)

WASHER OPERATION

With the ignition switch in the ACC or ON position, power is supplied
- through 20A fuse (No. 16, located in the fuse block)
- to washer motor terminal ①.

With intermittent wiper

When the lever is pulled to the WASH position, ground is supplied
- to washer motor terminal ②, and
- to wiper amplifier terminal ⑥
- from terminal ⑱ of the wiper switch
- through terminal ⑰ of the wiper switch, and
- through body grounds M1 and M54.

With power and ground supplied, the washer motor operates.
When the lever is pulled to the WASH position for one second or more, the wiper motor operates at low speed for approximately 3 times after the lever is released. This feature is controlled by the wiper amplifier in the same manner as the intermittent operation.

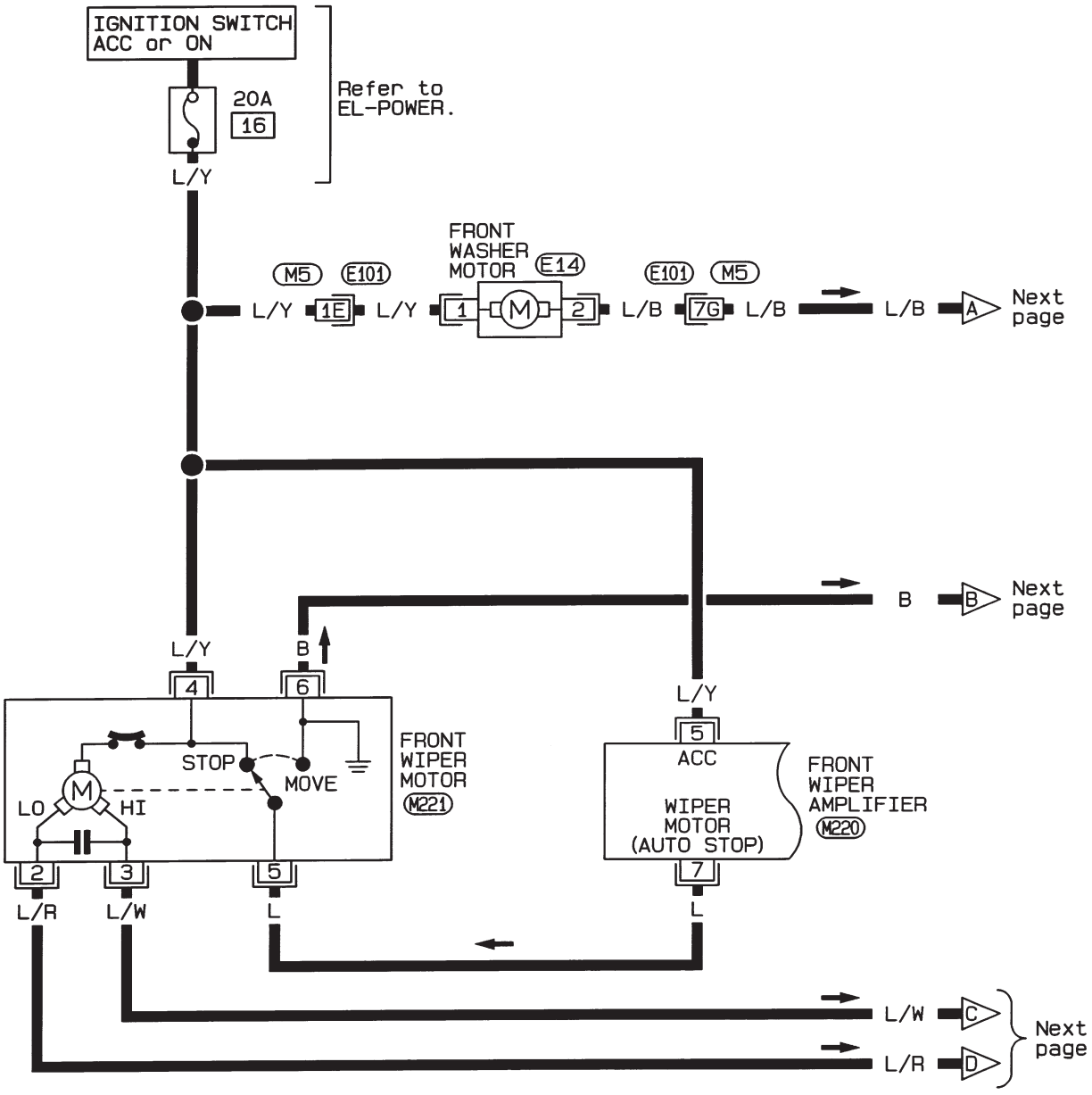
Without intermittent wiper

When the lever is pulled to the WASH position, ground is supplied
- to washer motor terminal ②
- from terminal ⑱ of the wiper switch
- through terminal ⑰ of the wiper switch, and
- through body grounds M1 and M54.

With power and ground supplied, the washer motor operates.

Wiring Diagram — WIPER —/LHD Models with Intermittent

EL-WIPER-01



M220 GY

M221 W

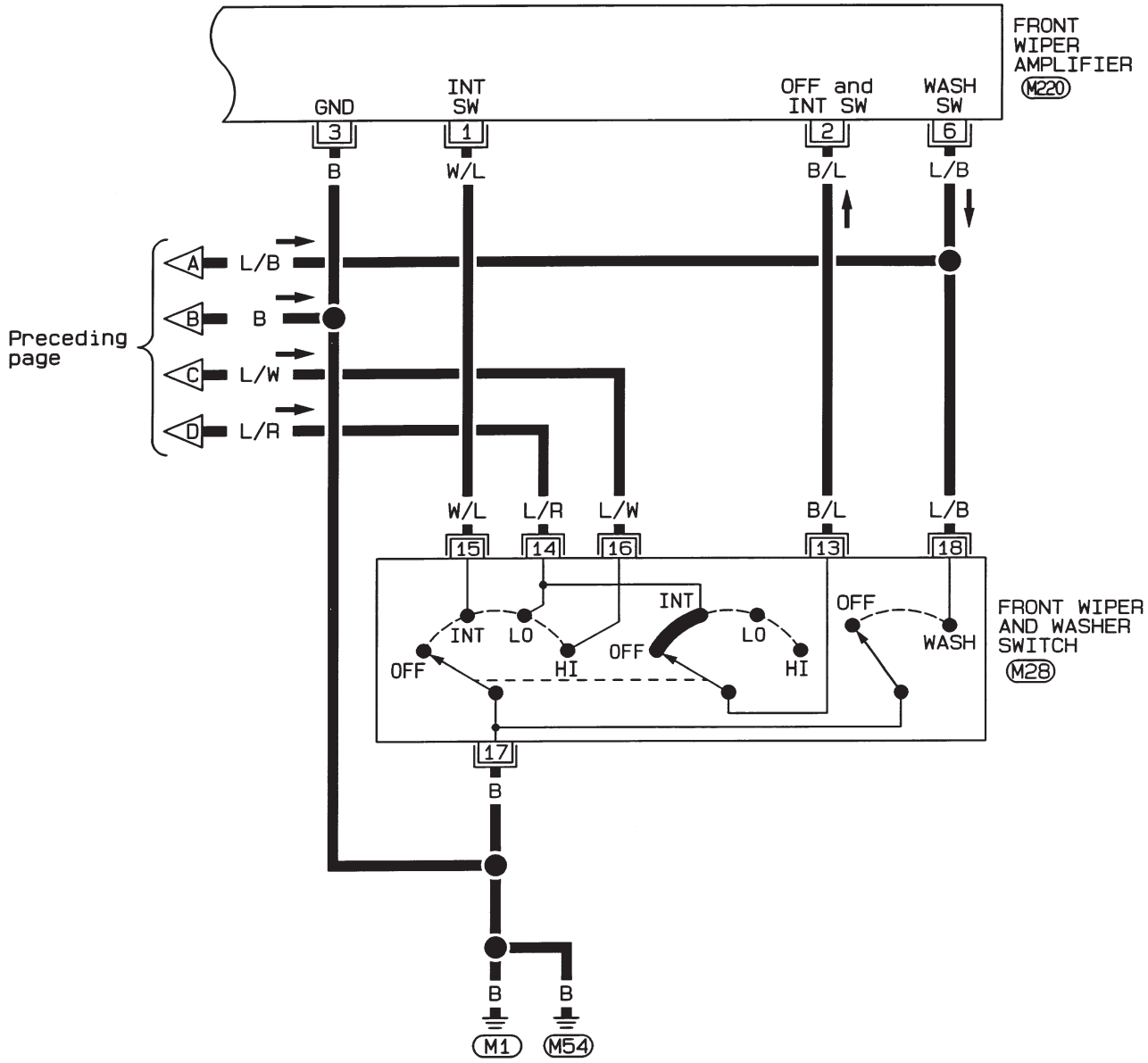
E14 GY

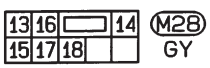
Refer to last page (Foldout page).

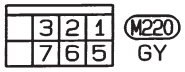
M5 , E101

Wiring Diagram — WIPER —/LHD Models with Intermittent (Cont'd)

EL-WIPER-02







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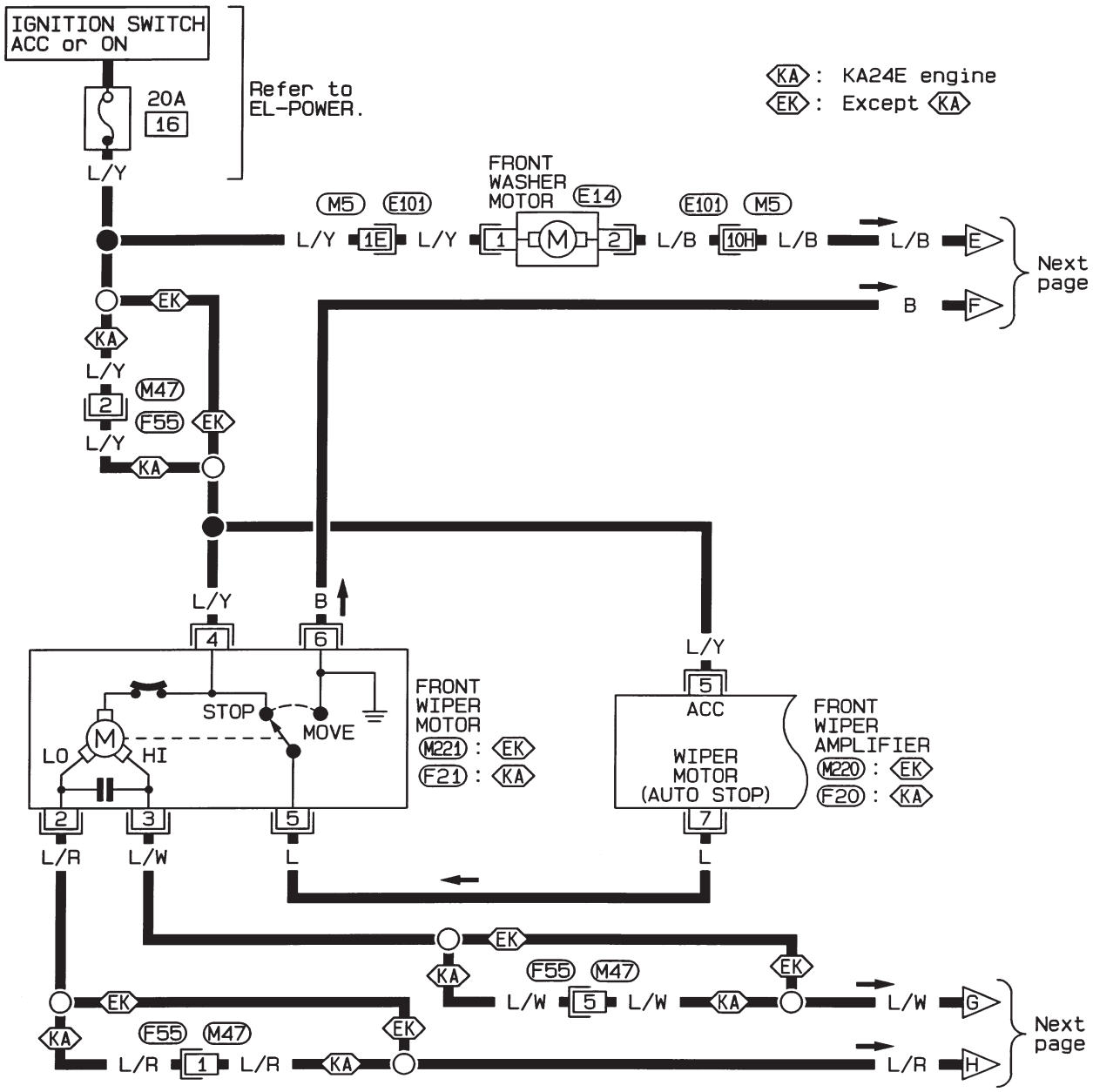
Wiring Diagram — WIPER —/RHD Models with Intermittent

EL-WIPER-04



M220 GY , F20 GY

M221 W , F21 W

E14 GY

F55 W

Refer to last page (Foldout page).

M5 , E101

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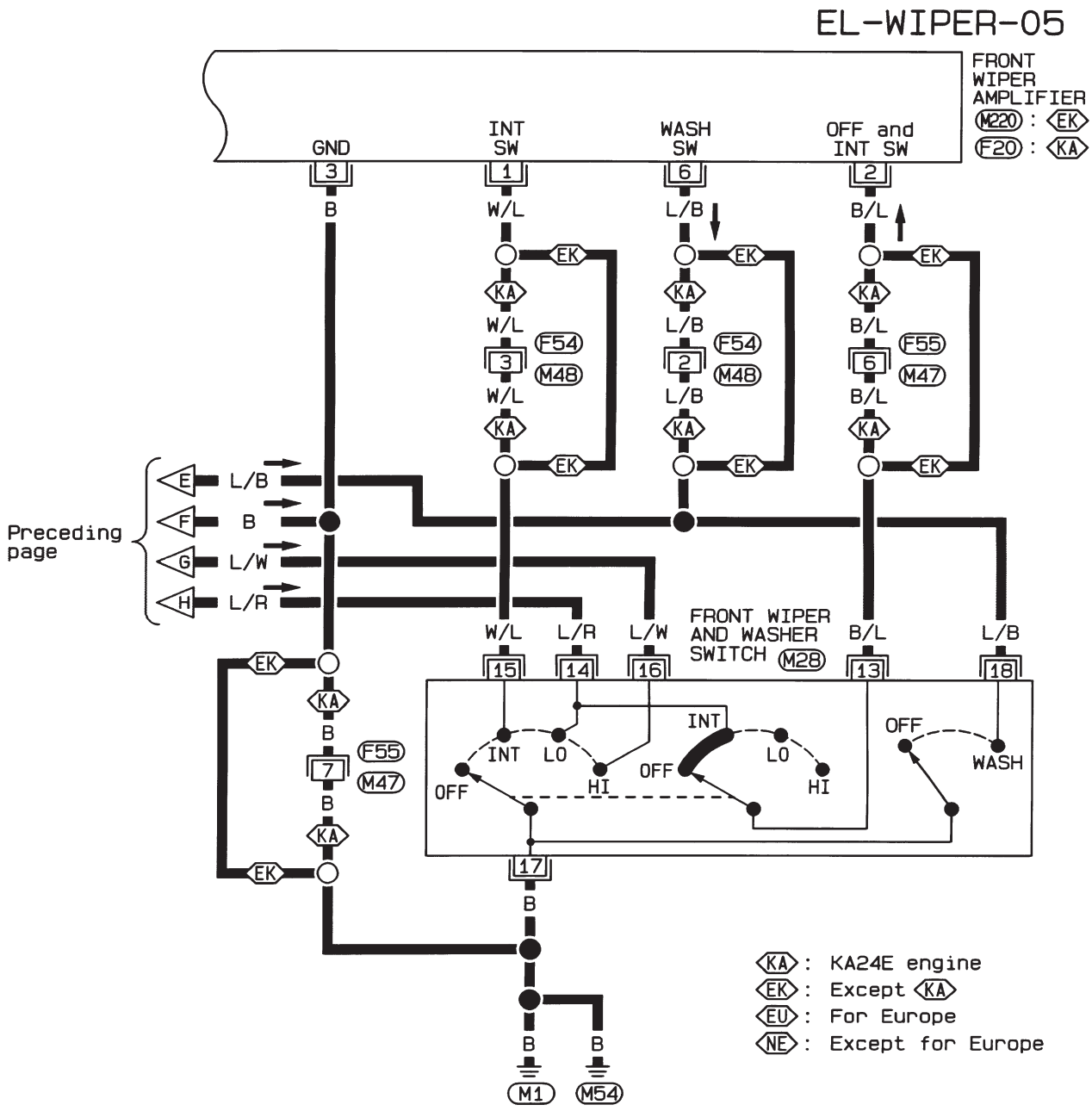
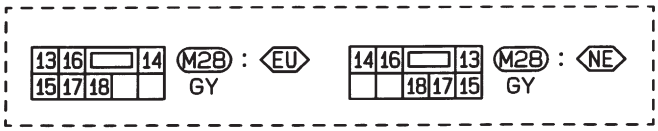
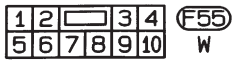
Wiring Diagram — WIPER —/RHD Models with Intermittent (Cont'd)

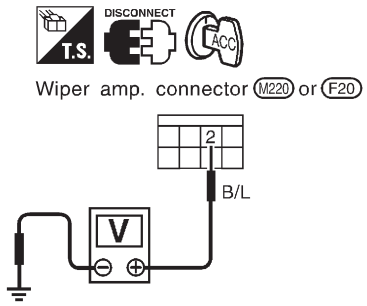




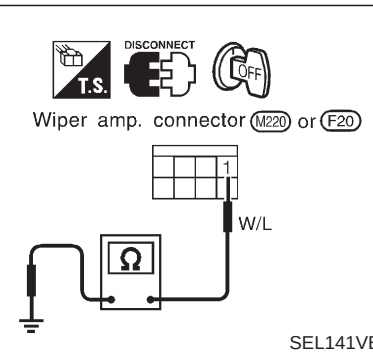


HEL372A

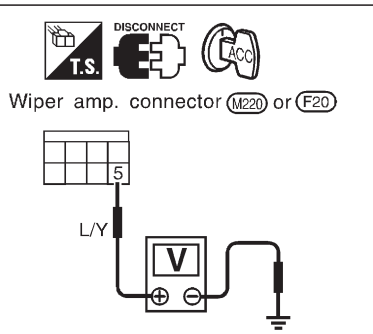
A



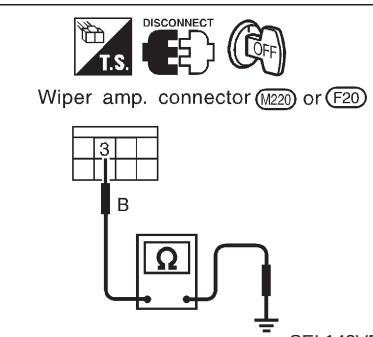
B



C



D



Trouble Diagnoses

DIAGNOSTIC PROCEDURE 1

SYMPTOM: Intermittent wiper does not operate.

Check whether wiper operates with the wiper switch at Lo position.

NG → Check the following.
- 20A fuse (No. 16, located in fuse block)
- Wiper motor
- Wiper switch
- Harness for open or short

OK ↓

A

1) Turn front wiper switch to OFF.
2) Disconnect wiper amp. connector.
3) Check voltage between wiper amp. terminal (2) and ground.
Battery voltage should exist.

NG → Check the following.
- Wiper switch
- Harness for open or short between wiper amp. terminal (2) and wiper switch terminal (13)

OK ↓

B

CHECK INTERMITTENT SWITCH INPUT SIGNAL.
Check harness continuity between wiper amp. terminal (1) and ground.

Condition of wiper switch	Continuity
OFF	No
INT	Yes

NG → Check the following.
- Wiper switch
- Harness for open or short between wiper amp. terminal (1) and wiper switch terminal (15)
- Ground circuit for front wiper switch terminal (17)

OK ↓

C

CHECK WIPER AMP. POWER SUPPLY CIRCUIT.
Check voltage between wiper amp. terminal (5) and ground while ignition switch is "ACC".
Battery voltage should exist.

NG → Check the following.
- 20A fuse (No. 16, located in fuse block)
- Harness for open or short between wiper amp. and fuse

OK ↓

D

CHECK WIPER AMP. GROUND CIRCUIT.
Check harness continuity between wiper amp. terminal (3) and body ground.
Continuity should exist.

NG → Repair harness or connector.

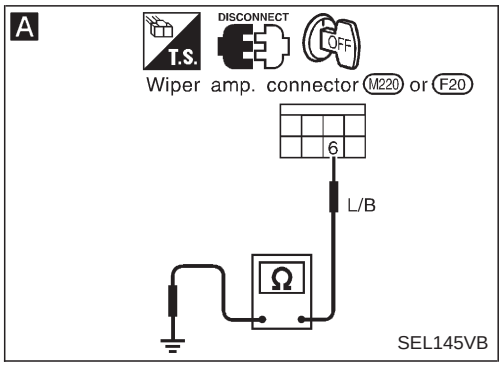
OK ↓

Replace wiper amp.

Trouble Diagnoses (Cont'd)

DIAGNOSTIC PROCEDURE 2

SYMPTOM: Wiper and washer activate individually but not in combination.



A

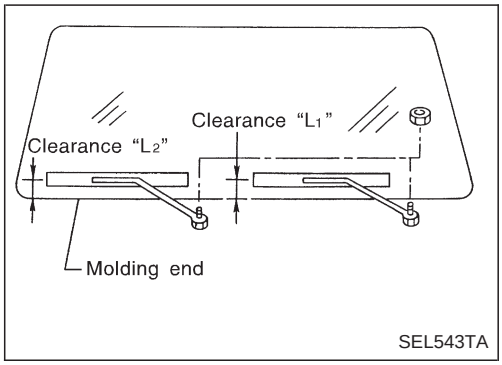
CHECK WASHER SWITCH INPUT SIGNAL.
1) Turn ignition switch to ''OFF''.
2) Disconnect wiper amp. connector.
3) Check harness continuity between wiper amp. terminal (6) and ground.

Condition of washer switch	Continuity
OFF	No
ON	Yes

NG → Check harness for open or short between wiper amp. terminal (6) and wiper switch terminal (18).

OK ↓

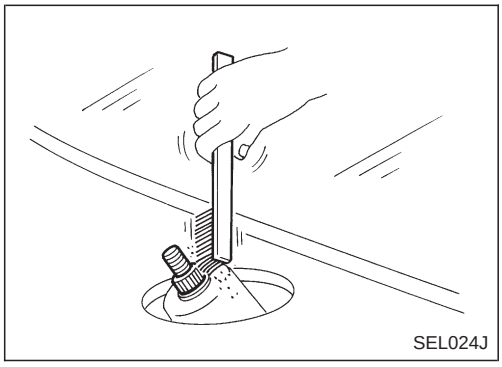
Go to DIAGNOSTIC PROCEDURE 1. → NG → Replace wiper amp.



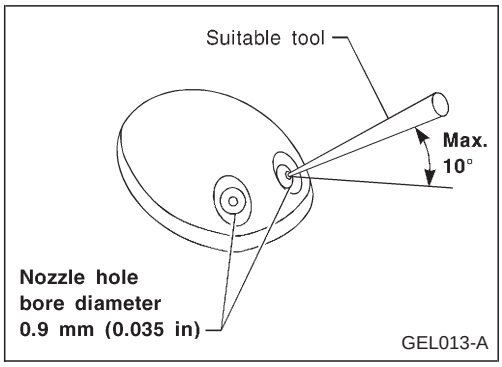
Wiper Installation and Adjustment

1. Prior to wiper arm installation, turn on wiper switch to operate wiper motor and then turn it ''OFF'' (Auto Stop).
2. Lift the blade up and then set it down onto glass surface to set the blade center to clearance ''L_1'' & ''L_2'' immediately before tightening nut.
3. Eject washer fluid. Turn on wiper switch to operate wiper motor and then turn it ''OFF''.
4. Ensure that wiper blades stop within clearance ''L_1'' & ''L_2''.
   Clearance ''L_1'': 20 - 30 mm (0.79 - 1.18 in)
   Clearance ''L_2'': 20 - 30 mm (0.79 - 1.18 in)

- Tighten wiper arm nuts to specified torque.
  Front wiper: 12.7 - 17.7 N·m (1.3 - 1.8 kg-m, 9 - 13 ft-lb)

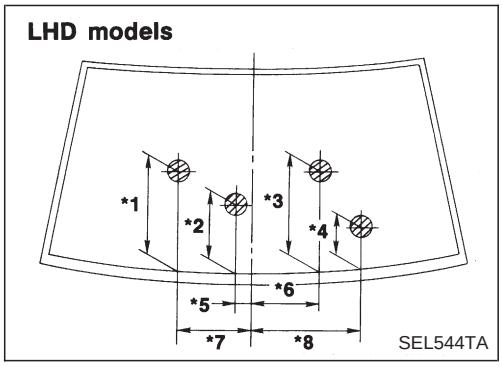


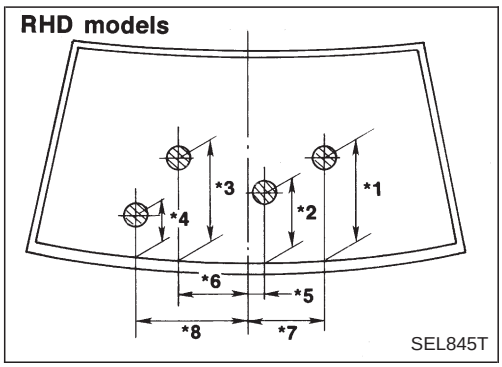
- **Before reinstalling wiper arm, clean up the pivot area as illustrated. This will reduce possibility of wiper arm looseness.**



Washer Nozzle Adjustment

- Adjust washer nozzle with suitable tool as shown in the figure at left.
  Adjustable range: ±10°



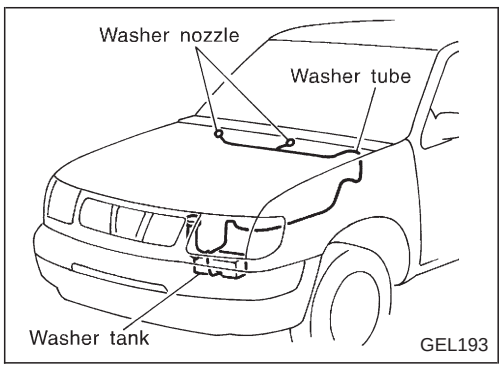


Unit: mm (in)

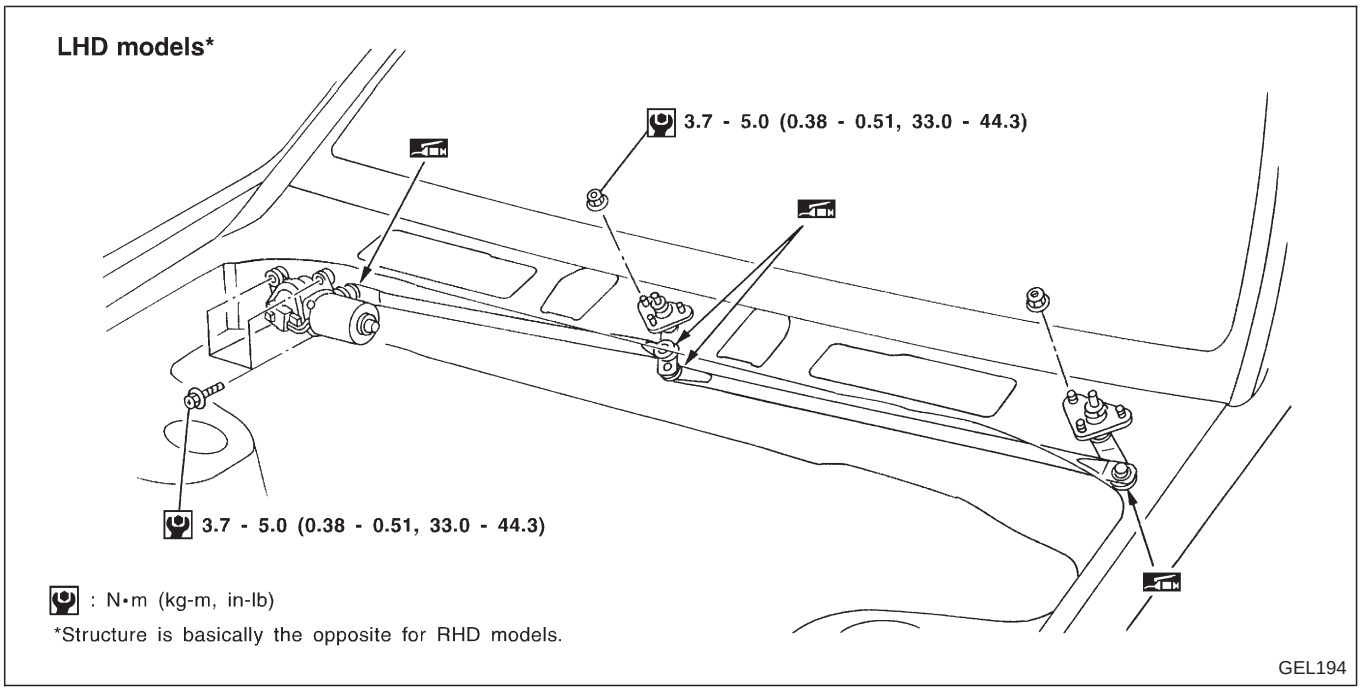
*1	470 (18.50)	*5	60 (2.36)
*2	215 (8.46)	*6	225 (8.86)
*3	380 (14.96)	*7	255 (10.04)
*4	180 (7.09)	*8	460 (18.11)

*: The diameters of these circles are less than 60 mm (2.36 in).

Washer Tube Layout



Wiper Linkage



REMOVAL

1. Remove 4 bolts that secure wiper motor.
2. Detach wiper motor from wiper linkage at ball joint.
3. Remove wiper linkage.

Be careful not to break ball joint rubber boot.

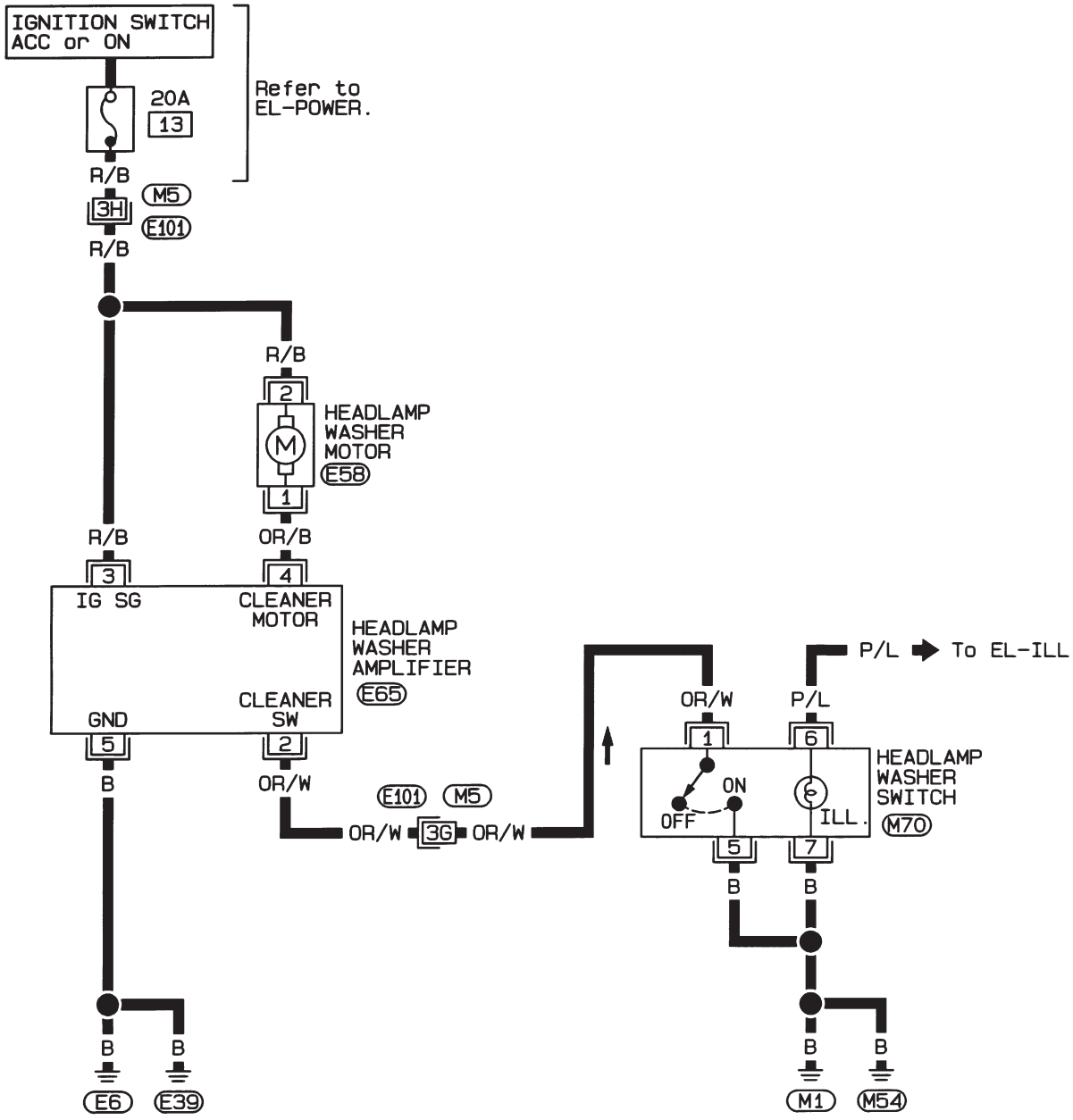
INSTALLATION

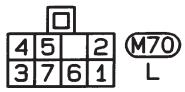
- Grease ball joint portion before installation.

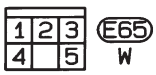
1. Installation is the reverse order of removal.

Wiring Diagram — HLC —

EL-HLC-01







Refer to last page
(Foldout page).

M5 , E101

HEL373A

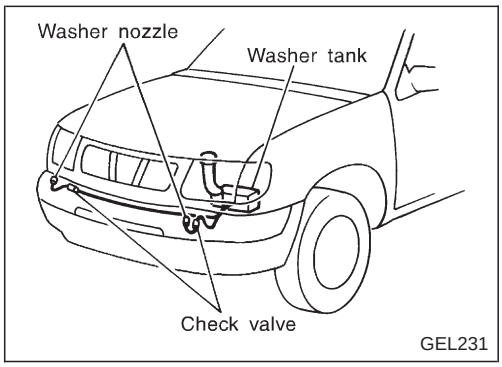
Trouble Diagnoses

HEADLAMP WASHER AMPLIFIER INSPECTION TABLE

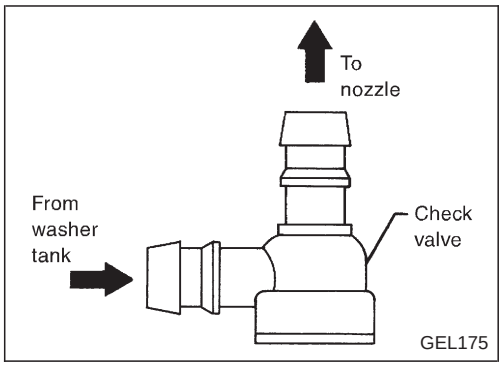
Voltage should be measured between each terminal of headlamp washer amplifier harness connector terminal and ground.

Terminal No.	Connections	Operated condition		Voltage (V) (Approximate value)
2	Headlamp washer switch	Headlamp washer switch	ON	0V
			OFF	12V
3	Power source for amplifier	Ignition switch ACC or ON		12V
4	Headlamp washer motor	Headlamp washer switch	ON	0V NOTE: Approx. 0.5 sec.
			OFF	12V
5	Ground	—		—

Washer Tube Layout

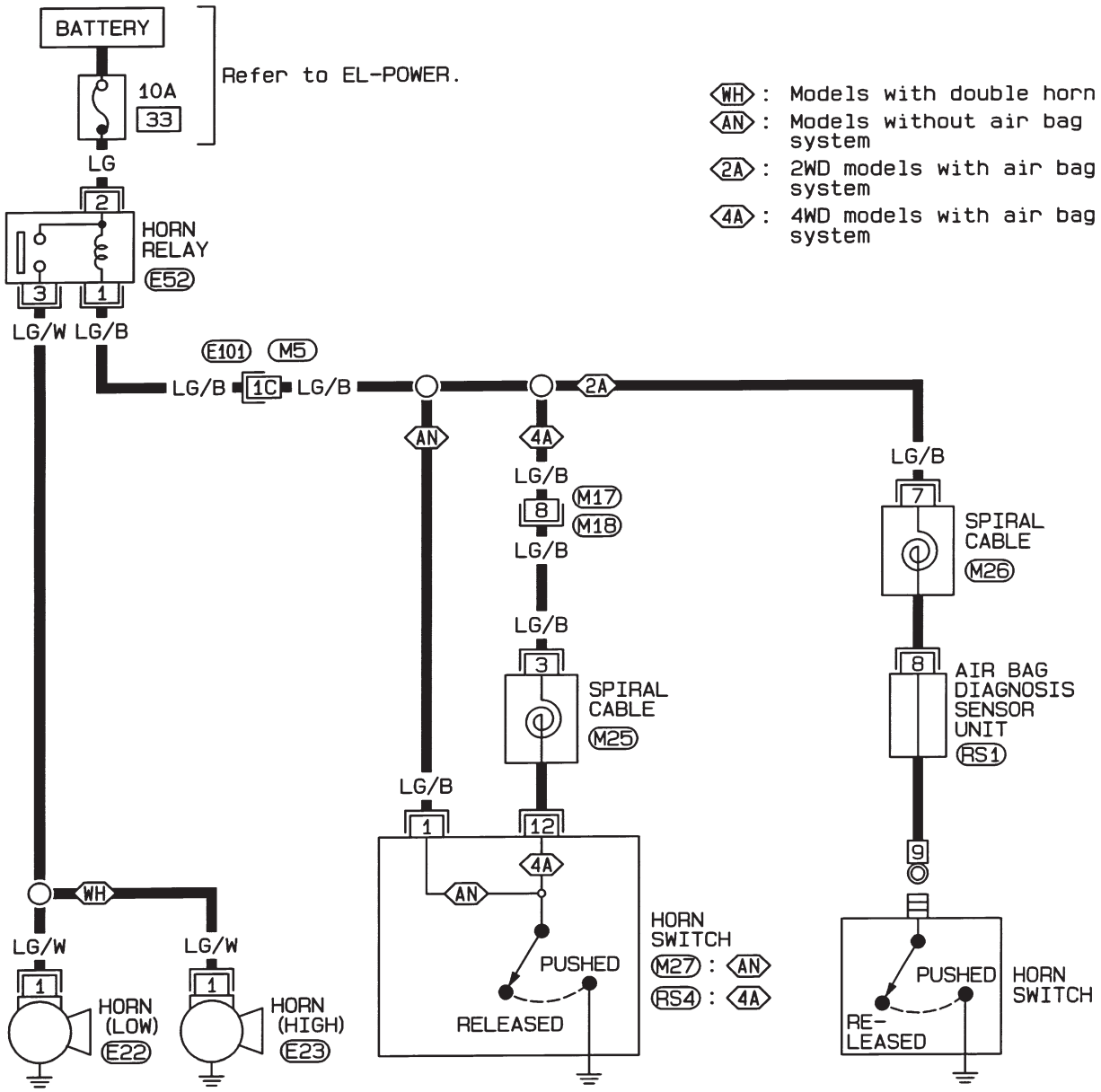


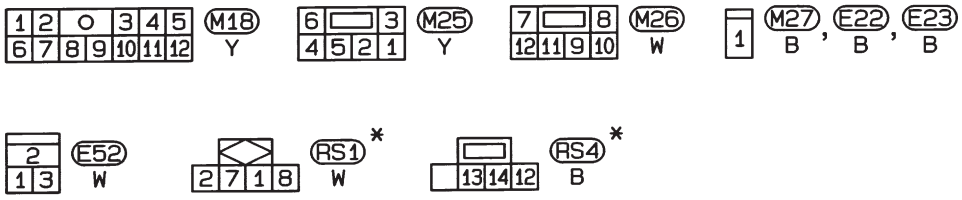
Check Valve



Wiring Diagram — HORN —

EL-HORN-01





* : This connector is not shown in "HARNESS LAYOUT".

Refer to last page (Foldout page).

M5 , E101

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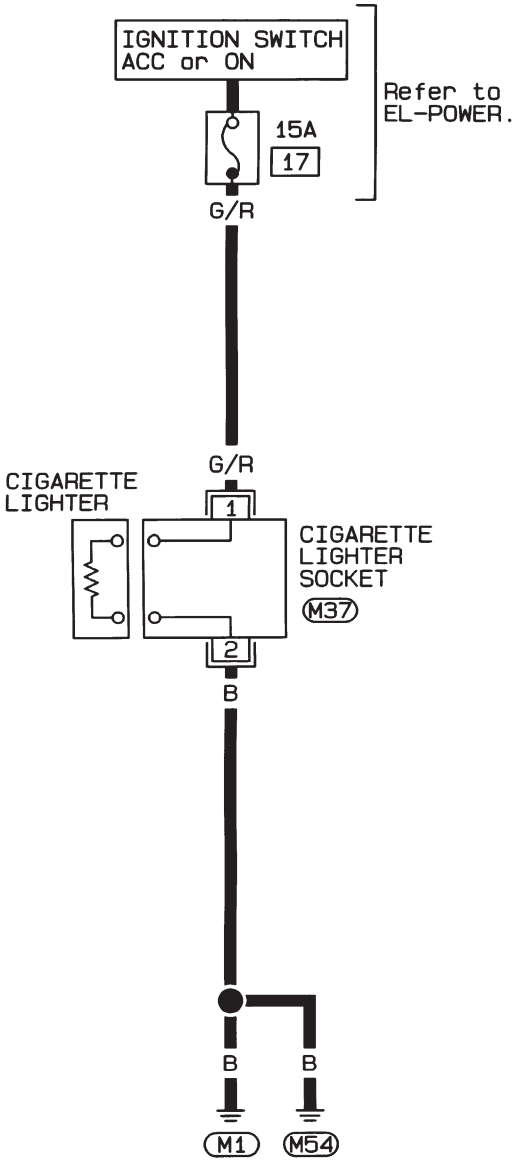
Wiring Diagram — CIGAR —

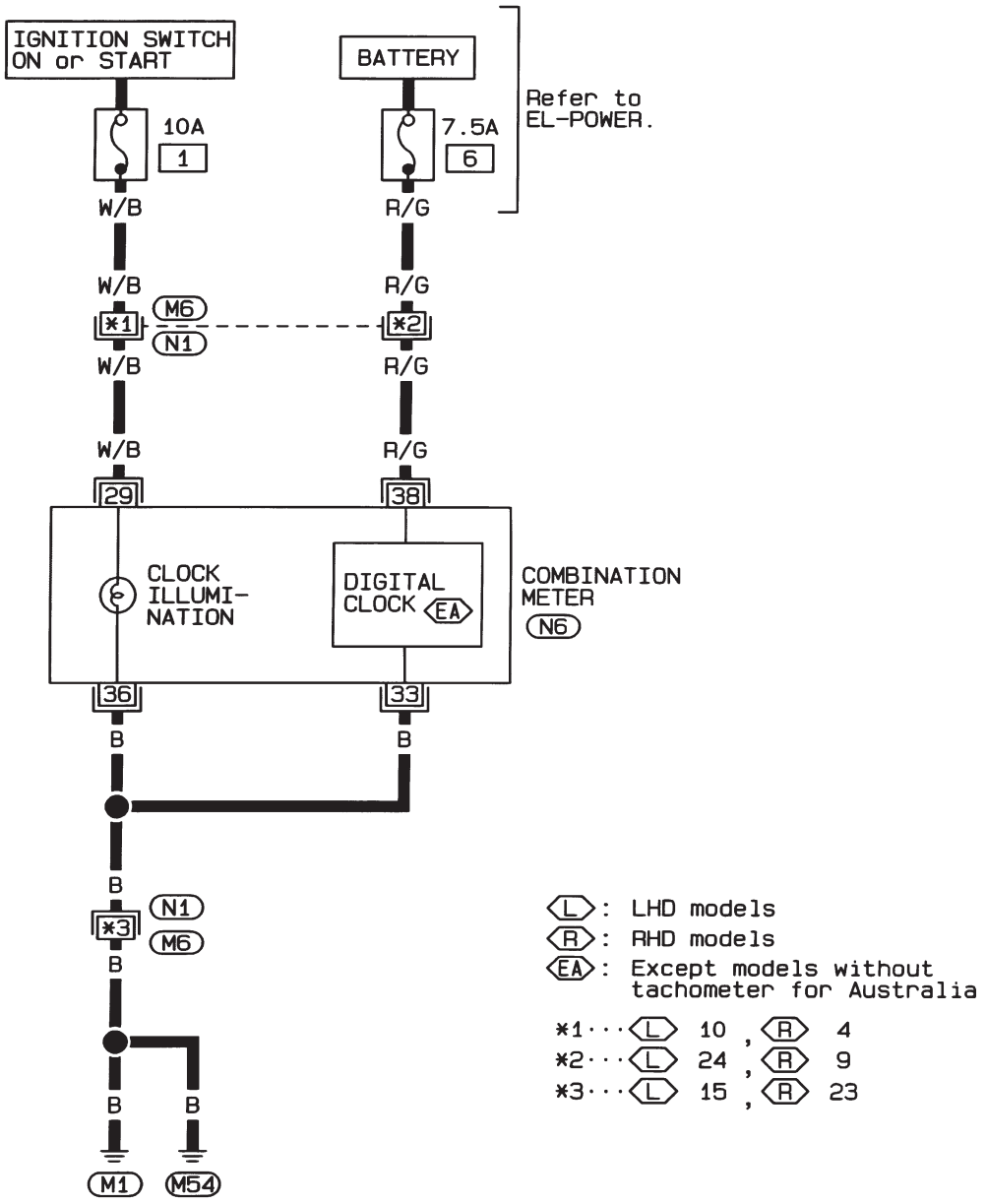
EL-CIGAR-01

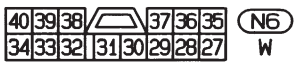


1 2 M37 B

Wiring Diagram — CLOCK —

EL-CLOCK-01

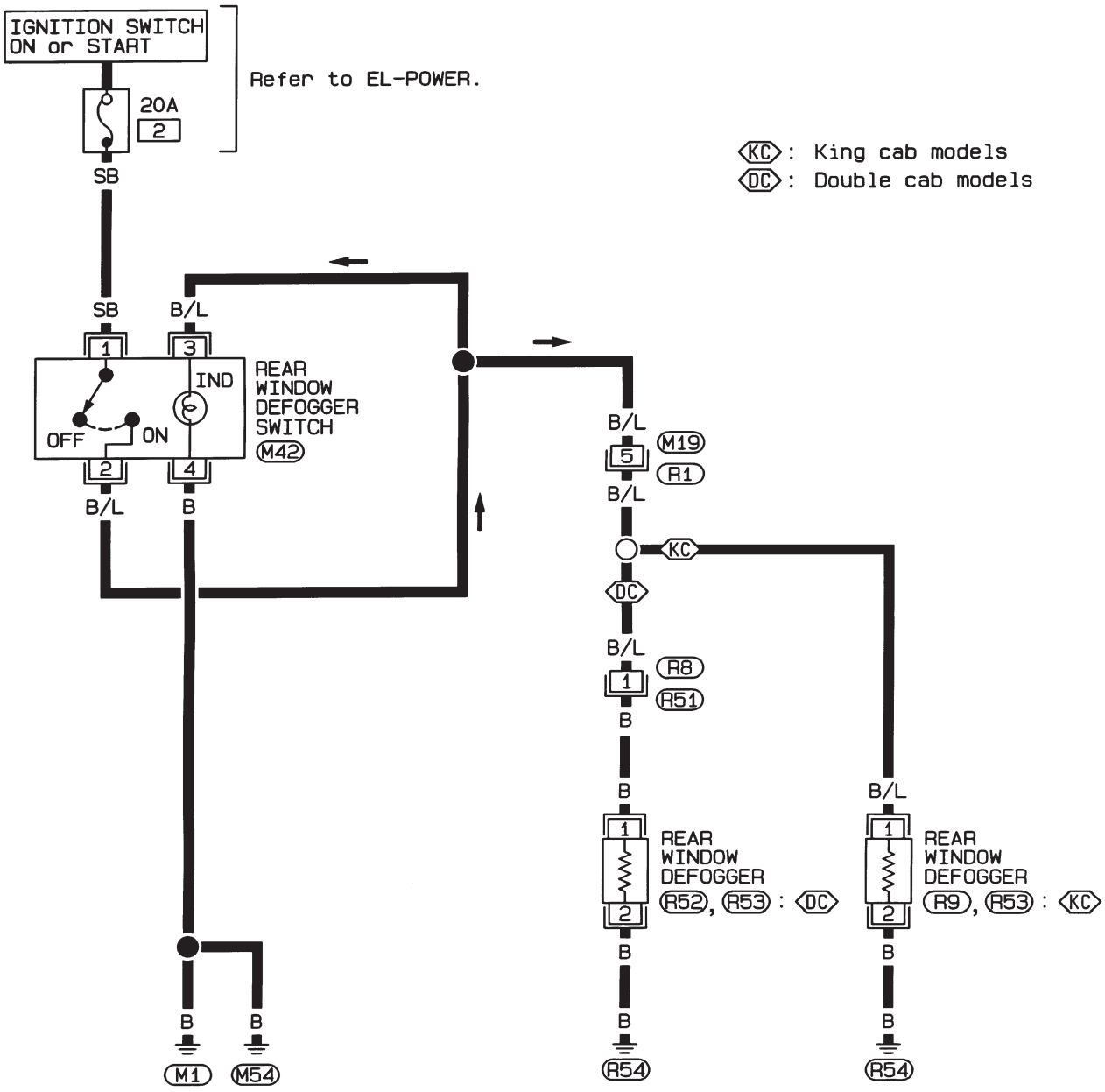




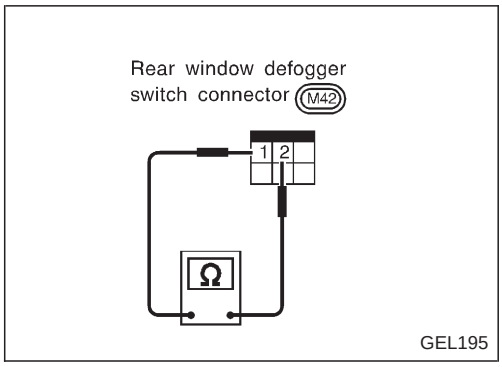
HEL375A

Wiring Diagram — DEF —

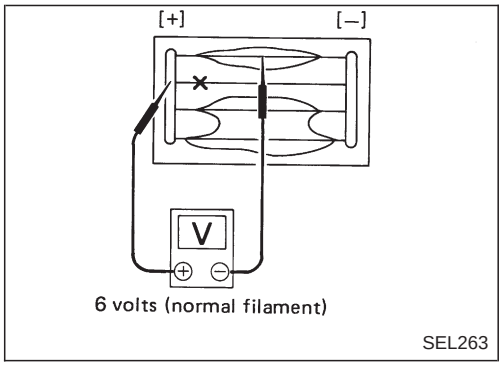
EL-DEF-01



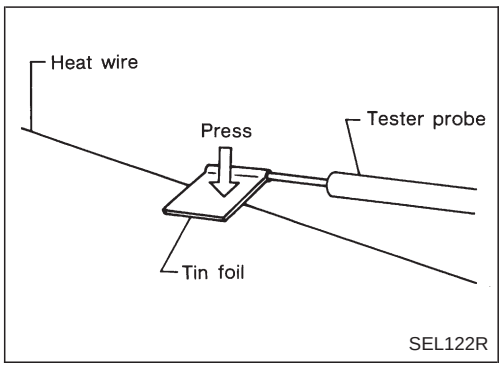
HEL376A



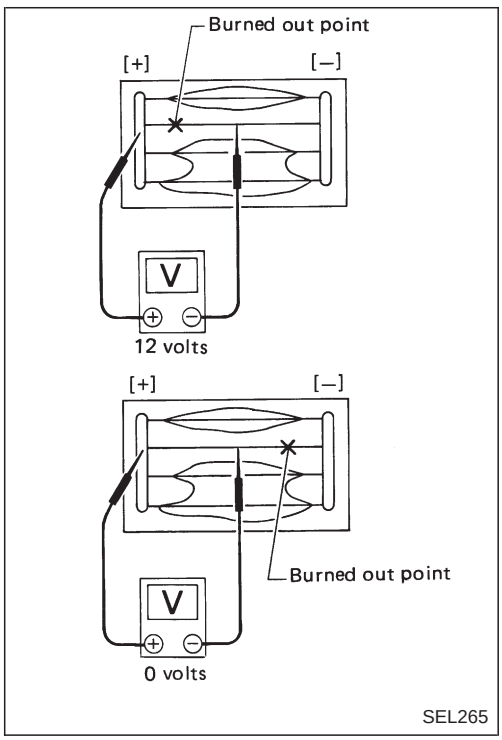
GEL195



SEL263



SEL122R



SEL265

Electrical Components Inspection

REAR WINDOW DEFOGGER SWITCH

Check continuity between terminals when rear window defogger switch is pushed and released.

Terminals	Condition	Continuity
① - ②	Rear window defogger switch is pushed	Yes
	Rear window defogger switch is released	No

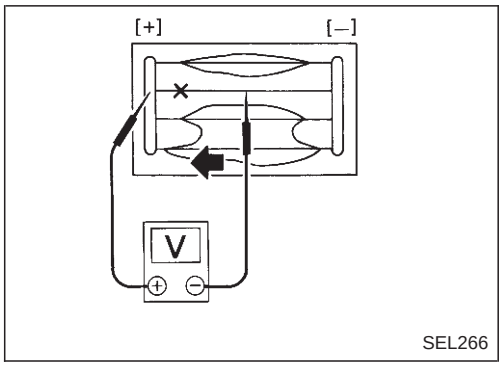
Filament Check

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

- **When measuring voltage, wrap tin foil around the top of the negative probe. Then press the foil against the wire with your finger.**

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

Filament Check (Cont'd)



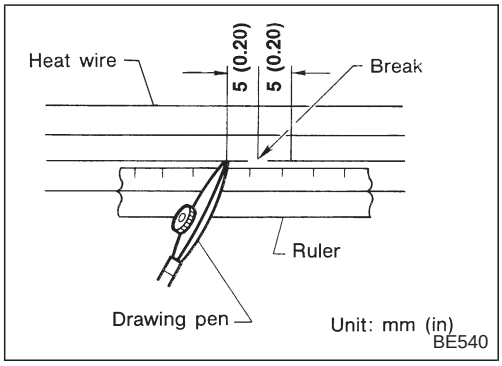
3. To locate burned out point, move probe to left and right along filament. Test needle will swing abruptly when probe passes the point.

Filament Repair

REPAIR EQUIPMENT

1. Conductive silver composition (Dupont No. 4817 or equivalent)
2. Ruler 30 cm (11.8 in) long
3. Drawing pen
4. Heat gun
5. Alcohol
6. Cloth

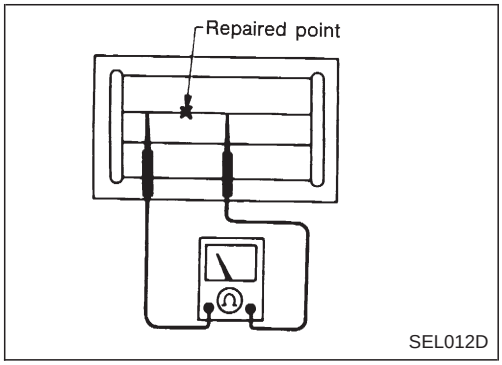
REPAIRING PROCEDURE



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

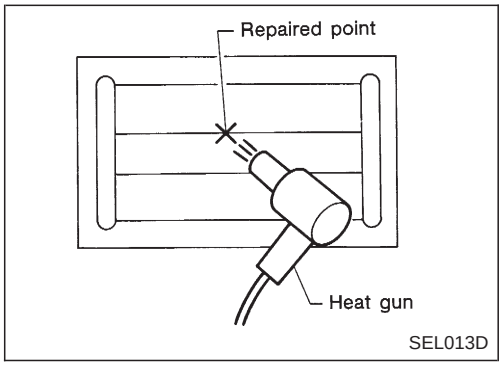
Shake silver composition container before use.

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



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

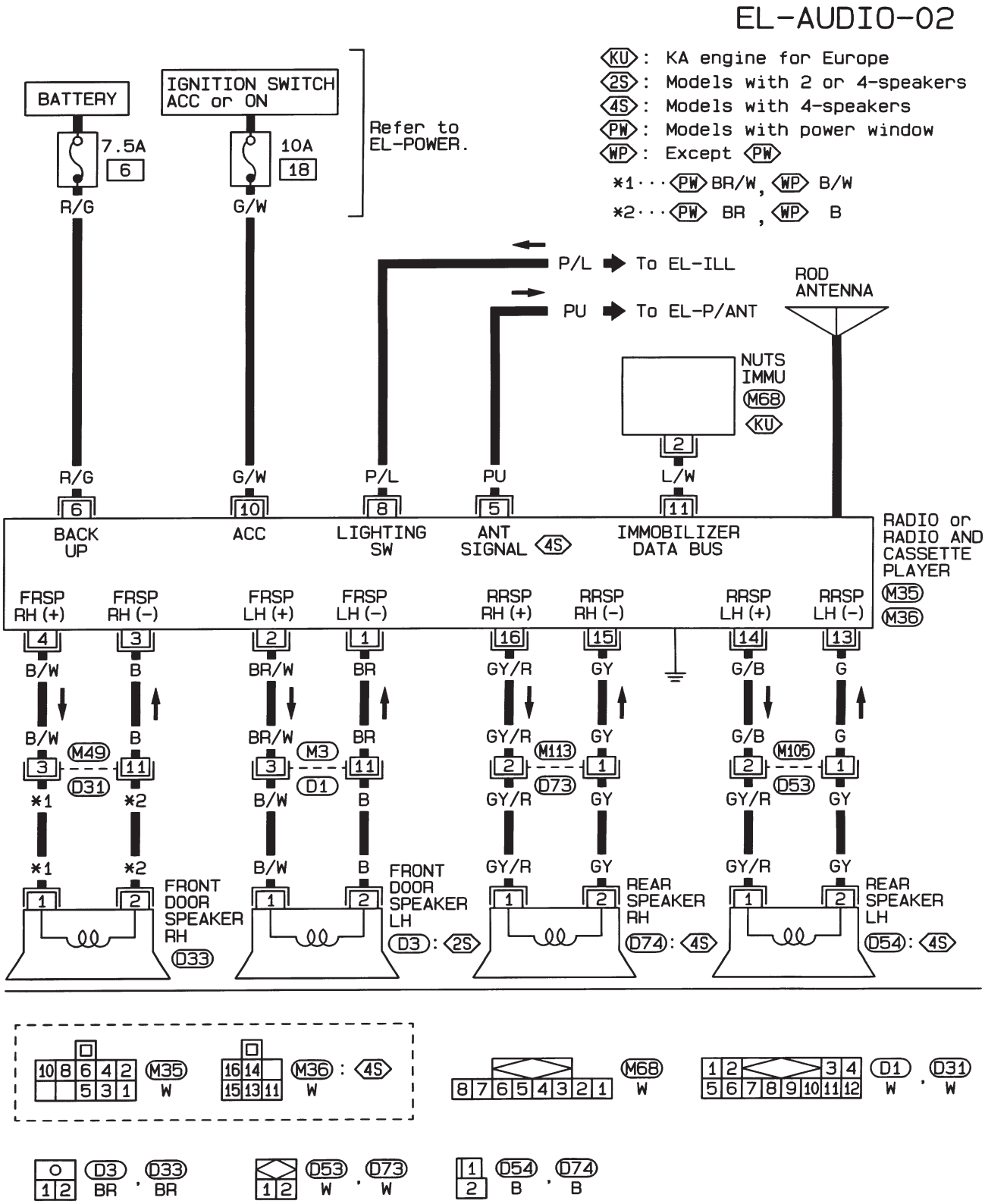
Do not touch repaired area while test is being conducted.



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 — AUDIO —/LHD Models Type-2

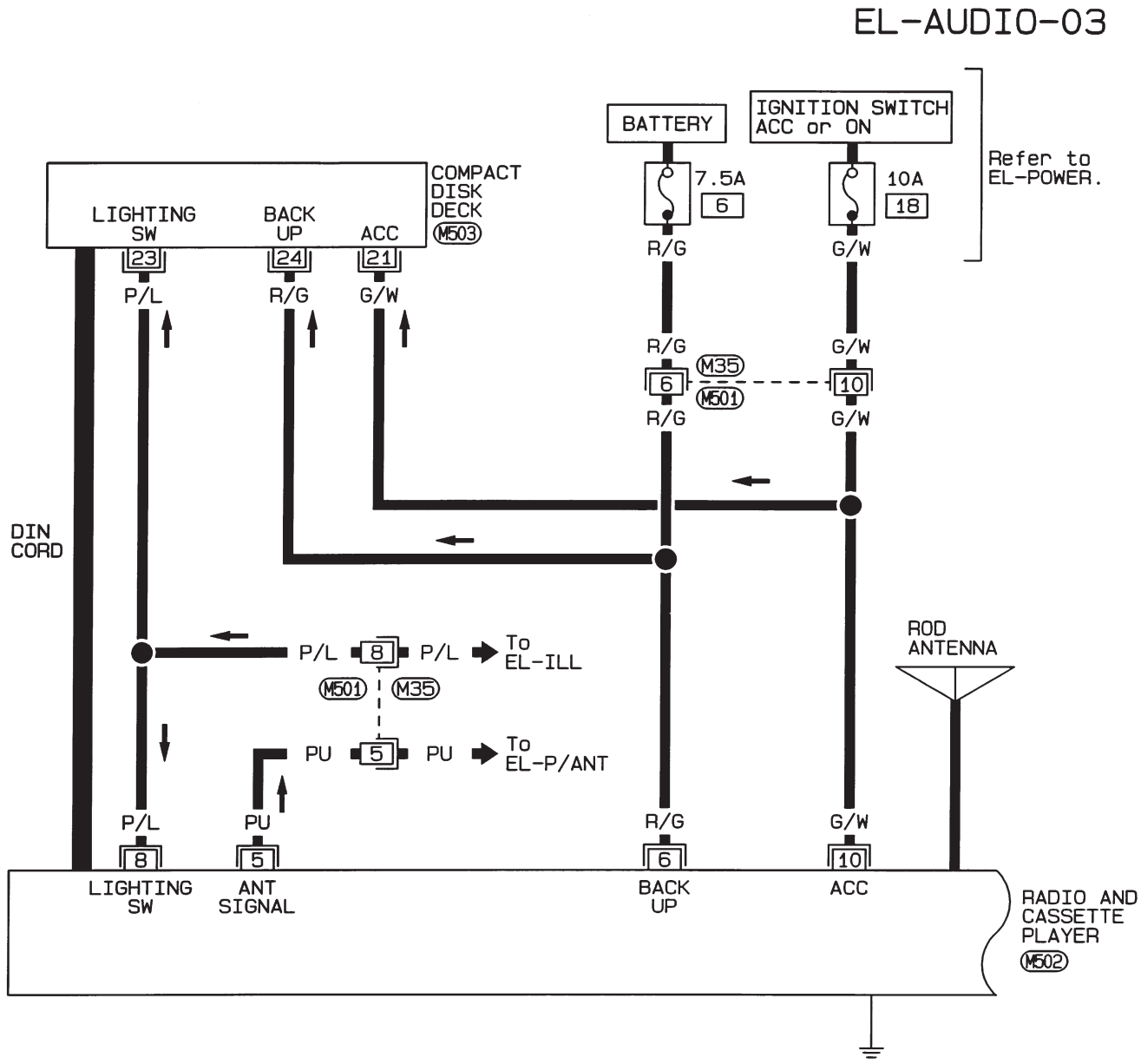
WITH 2 OR 4-SPEAKERS (Without CD deck) AND WITH 1-SPEAKER (For Europe)

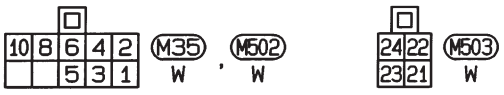


HEL377A

Wiring Diagram — AUDIO —/LHD Models Type-3

WITH 4-SPEAKERS (With CD deck)

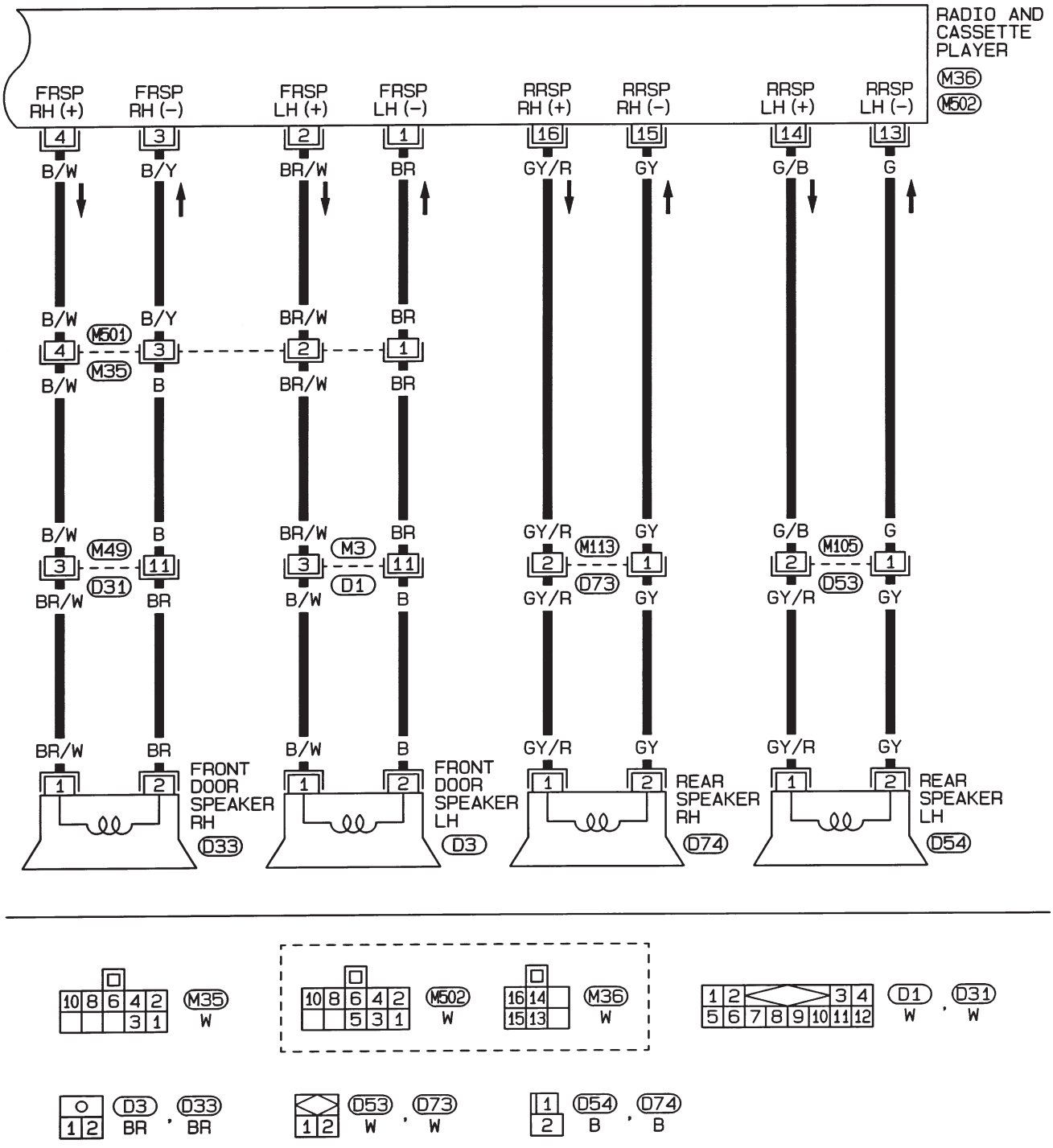




HEL946

Wiring Diagram — AUDIO —/LHD Models Type-3 (Cont'd)

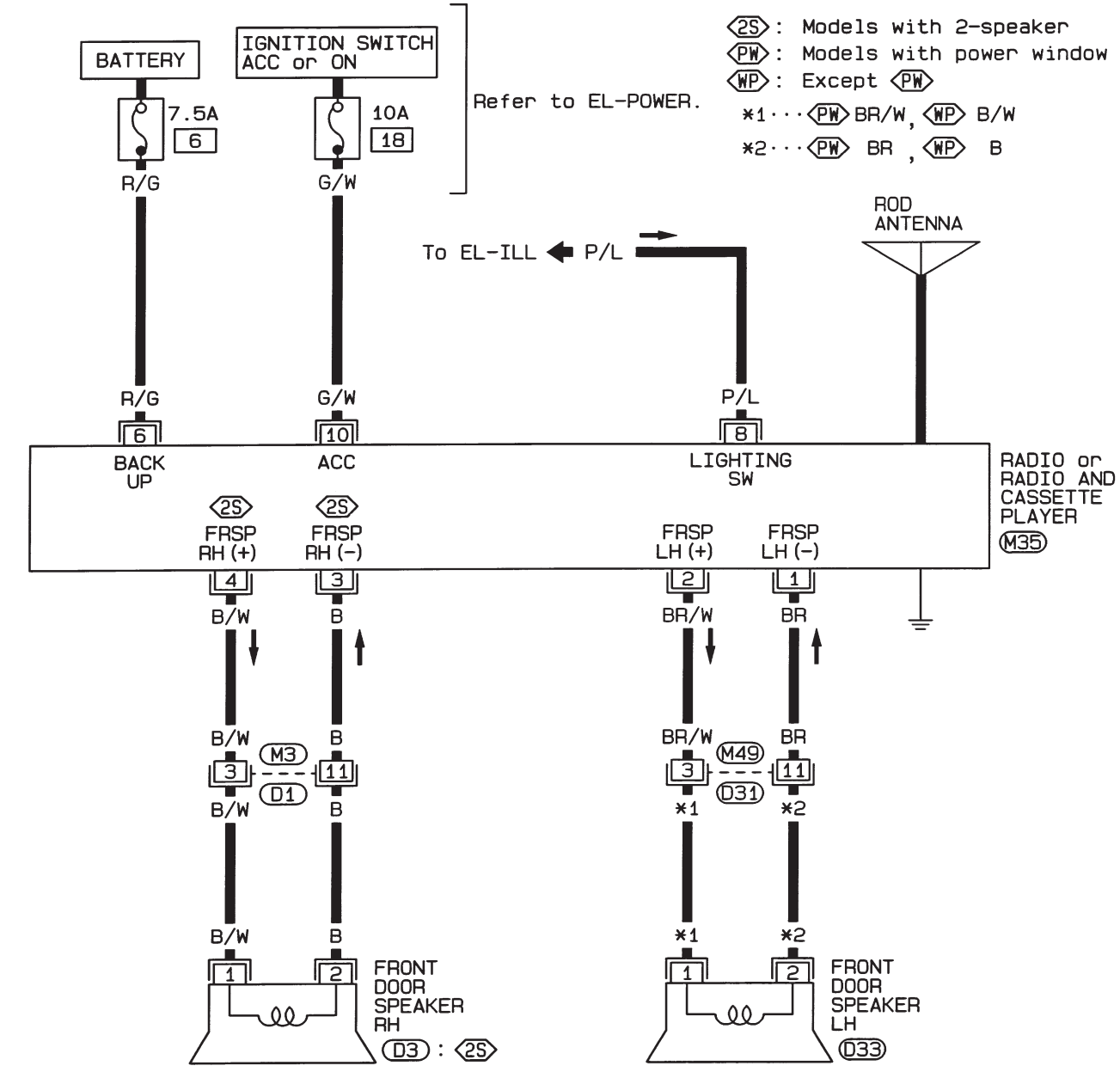
EL-AUDIO-04

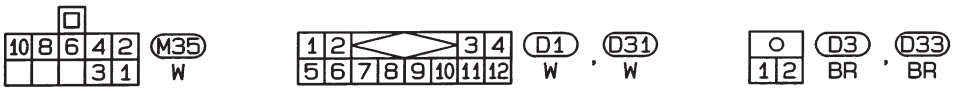


HEL947

Wiring Diagram — AUDIO —/RHD Models

EL-AUDIO-05





HEL948

Trouble Diagnoses

Symptom	Possible causes	Repair order
Radio inoperative (no digital display and no sound from speakers).	1. 10A fuse 2. Poor radio case ground 3. Radio	1. Check 10A fuse (No. 18, located in fuse block). Turn ignition switch ON and verify battery positive voltage is present at terminal ⑩ of radio. 2. Check radio case ground. 3. Remove radio for repair.
Radio controls are operational, but no sound is heard from any speaker.	1. Radio output 2. Radio	1. Check radio output voltages. 2. Remove radio for repair.
Radio presets are lost when ignition switch is turned OFF.	1. 7.5A fuse 2. Radio	1. Check 7.5A fuse (No. 6, located in fuse block) and verify battery positive voltage is present at terminal ⑥ of radio. 2. Remove radio for repair.
Individual speaker is noisy or inoperative.	1. Speaker 2. Radio output 3. Speaker circuit 4. Radio	1. Check speaker. 2. Check radio output voltages. 3. Check wires for open or short between radio and speaker. 4. Remove radio for repair.
Radio stations are weak or noisy.	1. Antenna 2. Poor radio ground 3. Radio	1. Check antenna. 2. Check radio ground. 3. Remove radio for repair.
Radio generates static noise with engine running.	1. Poor radio ground 2. Loose or missing ground bonding straps 3. Ignition condenser or rear window defogger noise suppressor condenser 4. Alternator 5. Ignition coil or secondary wiring 6. Radio	1. Check radio ground. 2. Check ground bonding straps. 3. Replace ignition condenser or rear window defogger noise suppressor condenser. 4. Check alternator. 5. Check ignition coil and secondary wiring. 6. Remove radio for repair.
Radio generates static noise with accessories on (switch pops and motor noise).	1. Poor radio ground 2. Antenna 3. Accessory ground 4. Faulty accessory	1. Check radio ground. 2. Check antenna. 3. Check accessory ground. 4. Replace accessory.

SPEAKER INSPECTION

1. Disconnect speaker harness connector.
2. Measure the resistance between speaker terminals ① and ②.

- The resistance should be 2 - 4Ω.

3. Using jumper wires, momentarily connect a 9V battery between speaker terminals ① and ②.

- A momentary hum or pop should be heard.

ANTENNA INSPECTION

Using a jumper wire, clip an auxiliary ground between antenna and body.

- If reception improves, check antenna ground (at body surface).
- If reception does not improve, check main feeder cable for short circuit or open circuit.

RADIO INSPECTION

All voltage inspections are made with:

- Ignition switch ON or ACC
- Radio ON
- Radio connected (If removed for inspection, supply a ground to the case using a jumper wire.)

CATS (Code) System/For Europe RHD

NOTE:
- **This system is used for code indicator-equipped radios on all models.**
- **The Europe LHD model with KA24E engine has a NATS-linked anti-theft function with radio as optional equipment that renders the code system inoperable.**

DESCRIPTION

By using a personal 4-digit code known only to the vehicle owner, the possibility of the audio unit being stolen is effectively reduced, because without the code the unit can not be activated. When in normal use, the unit is unlocked and accessible in the usual way.
If however, someone attempts to remove the unit or the battery cable is disconnected, the anti-theft system activates and the unit ''locks''. The only way it can be unlocked is by entering a personal code number known only by the owner.

UNLOCKING THE UNIT (How to enter a personal code number)

- If the battery supply to the vehicle is interrupted by accident for some reason, the unit will lock. To unlock the unit, proceed as follows:

1. Press the power/volume control knob to turn the unit on.
2. ''CODE IN'' is displayed.
3. Input your personal code by pressing the preset buttons (1 to 4).
4. Press the ∧ button.
5. If the entered code number is correct, the radio turns on.

When the code is incorrect

1. If the entered code is incorrect, the unit becomes inoperable for 10 seconds for the first three attempts, then the code input mode is automatically set (''CODE IN'' is displayed).
2. If the code is incorrect the fourth time, the unit becomes inoperable for 60 minutes and ''----'' is displayed. After 60 minutes, the code input mode is automatically set (''CODE IN'' is displayed).

NOTE:
If the above is repeated 17 times, the unit will lock and ''LOCKED'' is displayed.

3. After ''LOCKED'' is displayed, radio can be returned to the code input mode only within three attempts as follows. (Only three attempts are allowed to unlock the unit.)

a. Press the power/volume control knob while pushing both the MOD and TA switches.
b. The unit then returns to the code input mode.

CAUTION:
If the third attempt is unsuccessful, the unit will lock permanently.

NATS Audio Link/For Europe LHD (KA24E)

DESCRIPTION

The Europe LHD model with KA24E engine has a NATS-linked anti-theft function with radio as optional equipment.
The link with the NATS IMMU implies that the radio can basically only be operated if connected to the matching NATS IMMU to which the radio was initially fitted on the production line.
Since radio operation is impossible after the link with the NATS is disrupted theft of the radio unit is basically useless since special equipment is required to reset the radio.

Initialisation process for radios that are linked to the NATS IMMU

New radios will be delivered to the factories in the ''NEW'' state, i.e. ready to be linked with the vehicle's NATS.
When the radio in ''NEW'' state is first switched on at the factory, it will start up communication with the vehicle's immobiliser control unit (IMMU) and send a code (the ''Radio Code'') to the IMMU. The IMMU will then store this code, which is unique to each radio, in its (permanent) memory.
Upon receipt of the code by the IMMU, the NATS will confirm correct receipt of the radio code to the radio. Hereafter, the radio will operate as normal.
During the initialisation process, ''NEW'' is displayed on the radio display. Normally though, communication between Radio and IMMU takes such a short time (300 ms) that the radio seems to switch on directly without showing ''NEW'' on its display.

Normal operation

Each time the radio is switched on afterwards, the radio code will be verified between the radio unit and the NATS before the radio becomes operational. During the code verification process, ''WAIT'' is shown on the radio display. Again, the communication takes such a short time (300 ms) that the radio seems to switch on directly without showing ''WAIT'' on its display.

When the radio is locked

In case of a radio being linked with the vehicle's NATS (immobiliser system), disconnection of the link between the radio and the IMMU will cause the radio to switch into the lock (''SECURE'') mode in which the radio unit is fully inoperative. Hence, repair of the radio is basically impossible, unless the radio is reset to the ''NEW'' state for which special decoding equipment is required.
Both Blaupunkt and Clarion have provided their authorized service representatives with so called ''decoder boxes'' which can bring the radio unit back to the ''NEW'' state, enabling the radio to be switched on after which repair can be carried out. Subsequently, when the repaired radio is delivered to the final user again, it will be in the ''NEW'' state as to enable re-linking the radio to the vehicle's immobiliser system. As a result of the above, repair of the radio can only be done by an authorized Blaupunkt or Clarion representative.

Note:
Radio manufacturer of Nissan D22 models for Europe is ''Clarion''.

SERVICE PROCEDURE

Item	Service procedure	Description
Battery disconnection	No additional action required.	—
Radio needs repair	Repair needs to be done by authorized representative of radio manufacturer since radio cannot be operated unless it is reset to NEW state, using special decoding equipment.	—
Replacement of radio by new part	No additional action required.	Radio is delivered in NEW state.
Transferring radio to another vehicle/replacement of radio by an ''old'' part	Radio needs to be reset to NEW state by authorized representative of radio manufacturer.	—

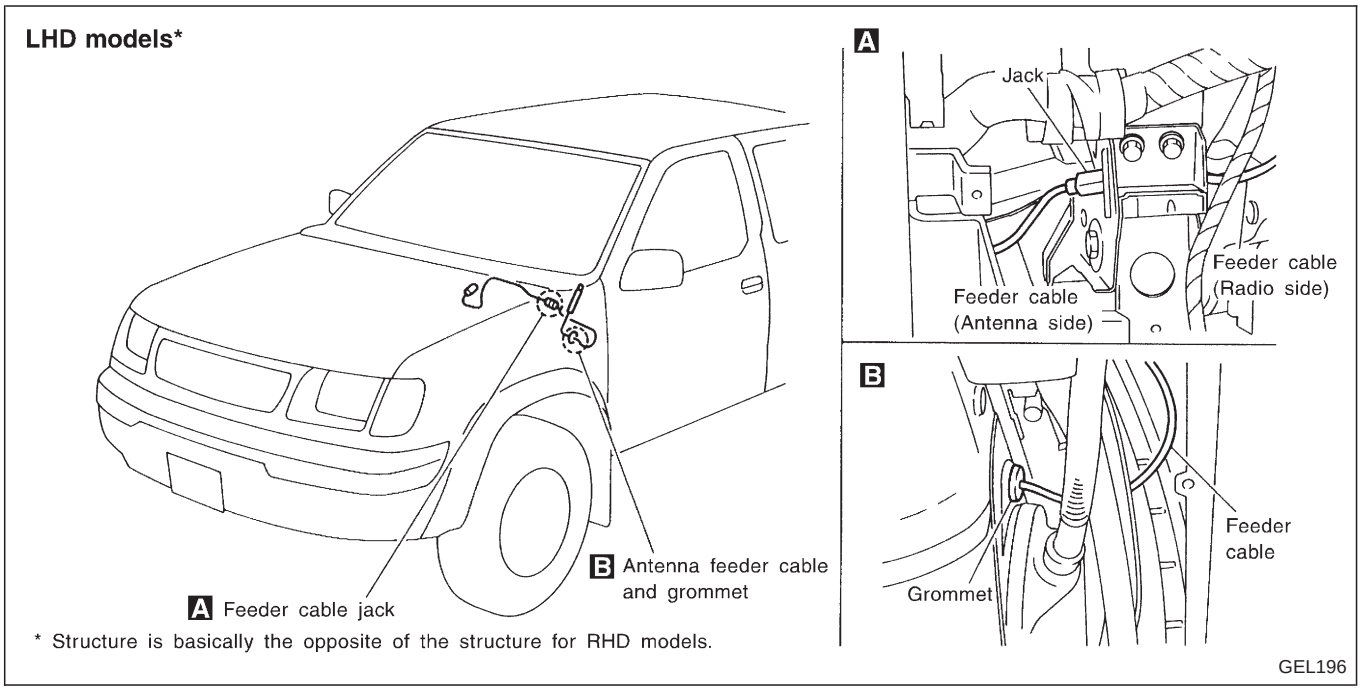
NATS Audio Link/For Europe LHD (KA24E) (Cont'd)

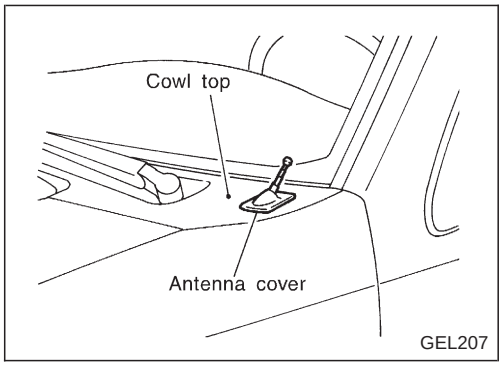
Item	Service procedure	Description
Replacement of IMMU by new part	No additional action required.	The new IMMU will be recognized by the radio since a ''blank'' code is stored in the memory of the IMMU. In case the radio recognizes this 'blank'' code, it will request for input of the correct CATS code after which the radio will switch back to the initialisation process.
Replacement of IMMU by old part	Radio needs to be reset to NEW state by authorized representative of radio manufacturer.	If a radio code has already been stored in memory of the IMMU, the radio cannot be linked to it. After switching on the radio, it will display ''SECURE'' after 1 minute.
No communication from IMMU to radio	1. If NATS is malfunctioning, check NATS system. 2. After NATS is repaired, reset radio to NEW state by authorized representative of radio manufacture.	After switching on the radio, the radio will display ''SECURE'' after 1 minute. Further use of radios impossible until communication is established again, or after radio is reset by authorized representative of (radio) manufacturer.

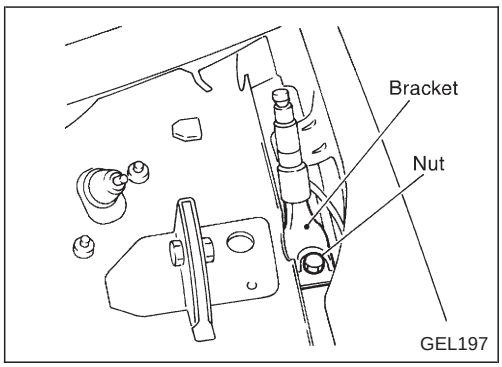
NOTE: Authorized radio manufacturer representatives in Europe are listed in the technical bulletin TB-EL 96-001 issued by Nissan Europe N.V.

Manual Antenna

LOCATION OF ANTENNA





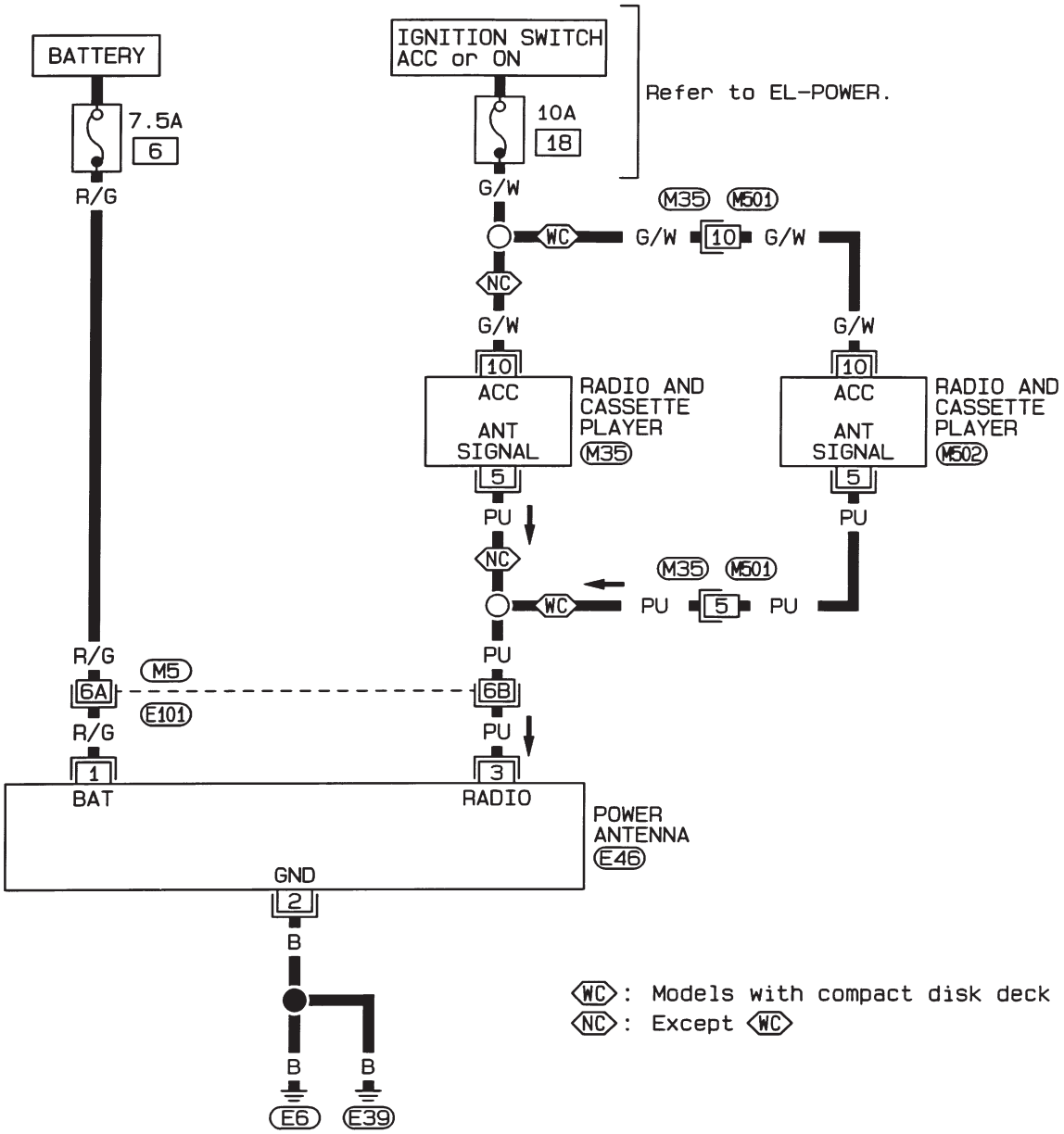


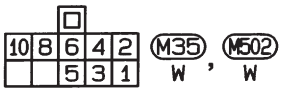
ANTENNA ASSEMBLY REPLACEMENT

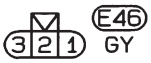
1. Remove antenna cover in cowl top.
2. Remove wiper arm and cowl top.
3. Loosen nut at antenna bracket.
4. Disconnect antenna feeder cable jack shown in the above illustration.
5. Remove fender protector.
6. Remove the grommet and pull the feeder cable out from fender inner.
7. Remove antenna assembly and replace with a new one.

Power Antenna/Wiring Diagram — P/ANT —

EL-P/ANT-01







Refer to last page
(Foldout page).

M5 , E101

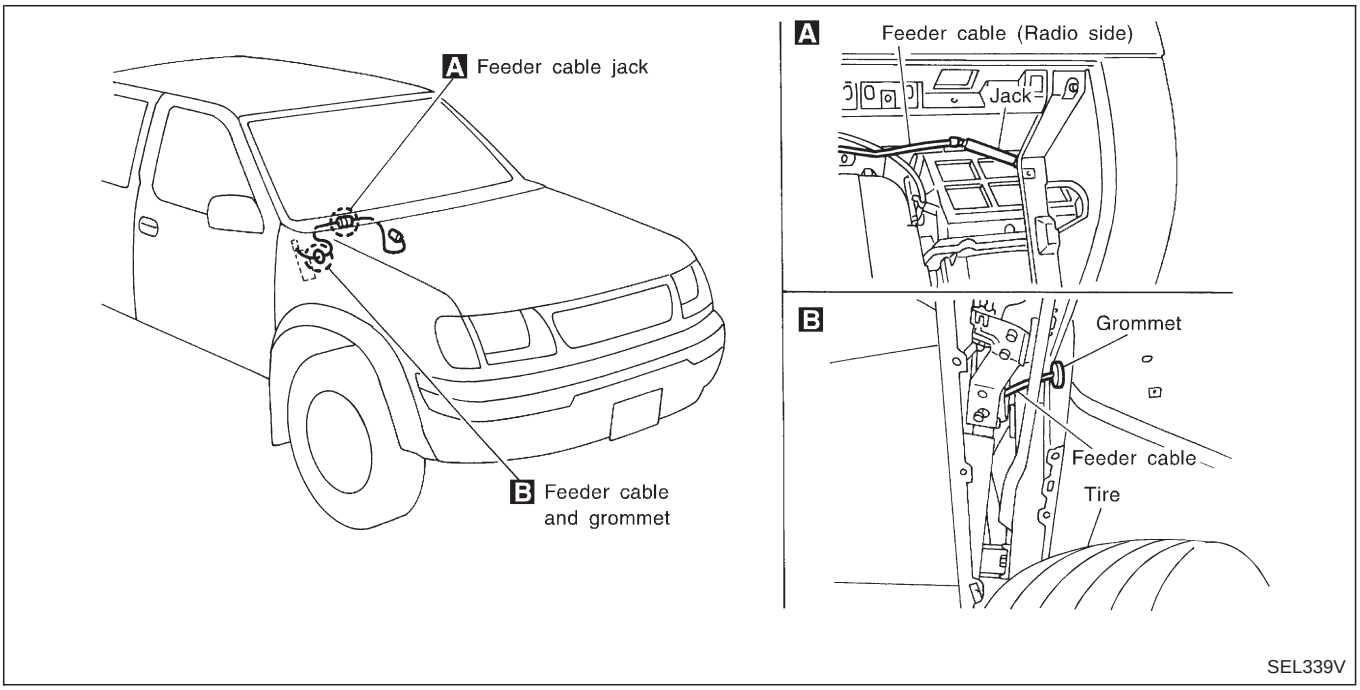
HEL949

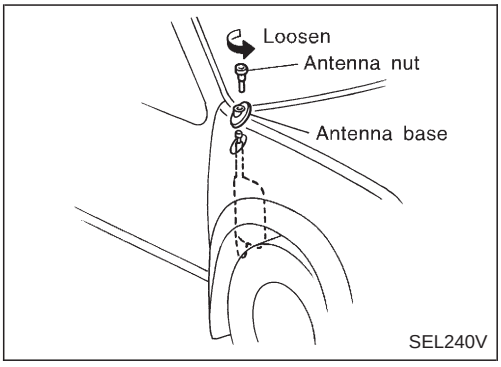
Power Antenna

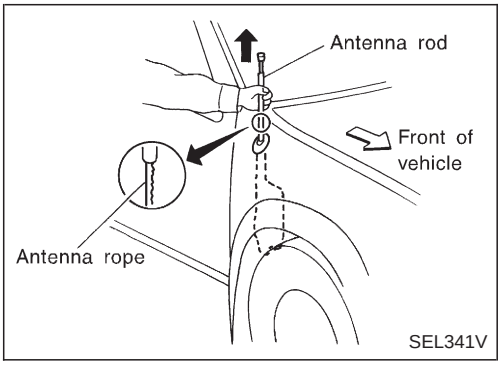
TROUBLE DIAGNOSES

Symptom	Possible causes	Repair order
Power antenna does not operate.	1. 7.5A fuse 2. Radio signal 3. Grounds E6 and E39	1. Check 7.5A fuse (No. 6, located in fuse block). Verify that battery positive voltage is present at terminal ① of power antenna. 2. Turn ignition switch and radio ON. Verify that battery positive voltage is present at terminal ③ of power antenna. 3. Check grounds E6 and E39.

LOCATION OF ANTENNA





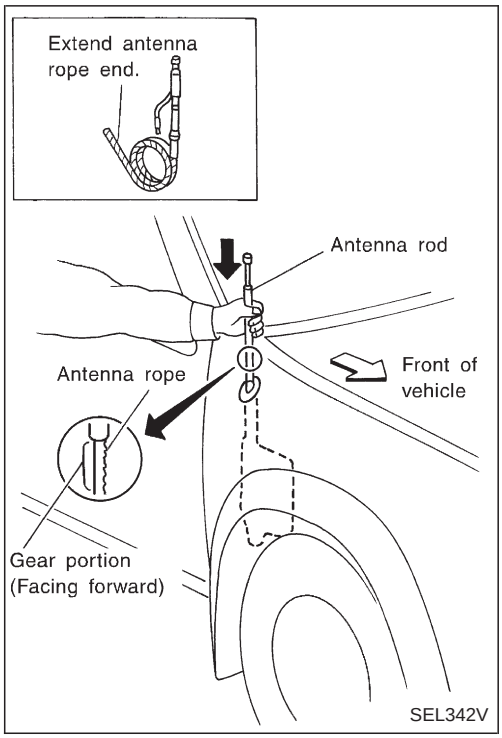


ANTENNA ROD REPLACEMENT

Removal

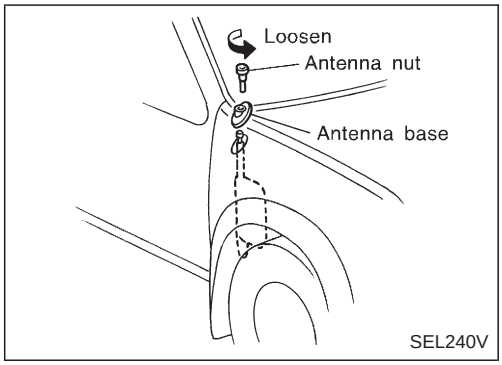
1. Remove antenna nut and antenna base.
2. Withdraw antenna rod while raising it by operating antenna motor.

Power Antenna (Cont'd)



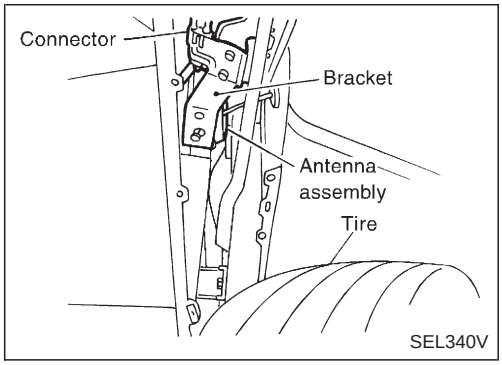
Installation

1. Lower antenna rod by operating antenna motor.
2. Insert gear section of antenna rope into place with it facing toward antenna motor.
3. As soon as antenna rope is wound on antenna motor, stop antenna motor. Insert antenna rod lower end into antenna motor pipe.
4. Retract antenna rod completely by operating antenna motor.
5. Install antenna nut and base.



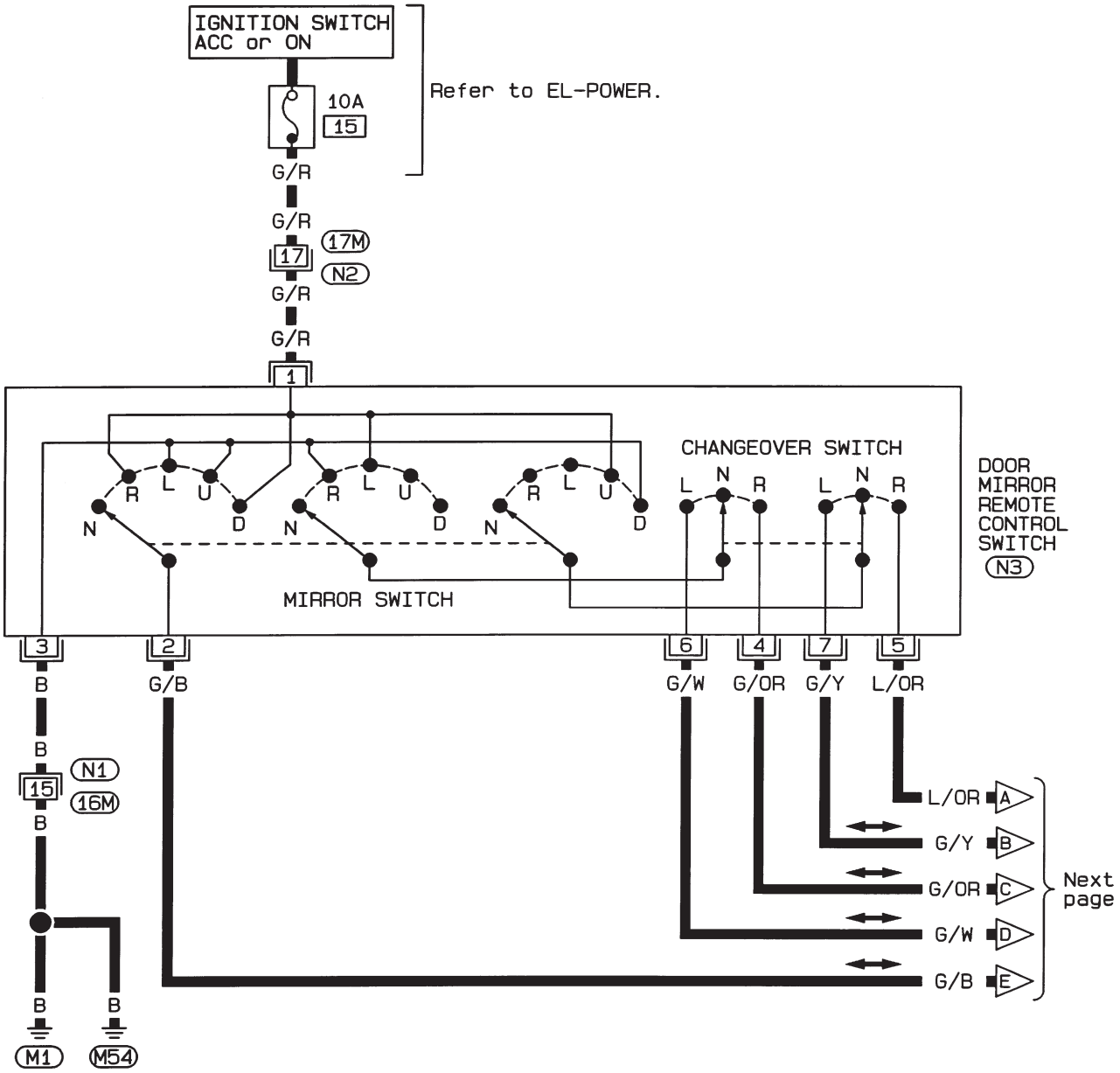
ANTENNA ASSEMBLY REPLACEMENT

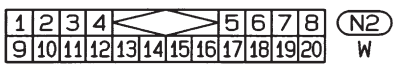
1. Remove antenna nut and antenna base.
2. Loosen bolts at antenna bracket and disconnect power antenna connector.
3. Disconnect antenna feeder cable jack shown in ''LOCATION OF ANTENNA''.
4. Remove fender protector.
5. Remove the grommet and pull the feeder cable out from fender inner.
6. Remove antenna assembly and replace with a new one.

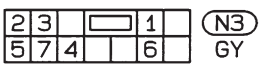


Wiring Diagram — MIRROR —

EL-MIRROR-01



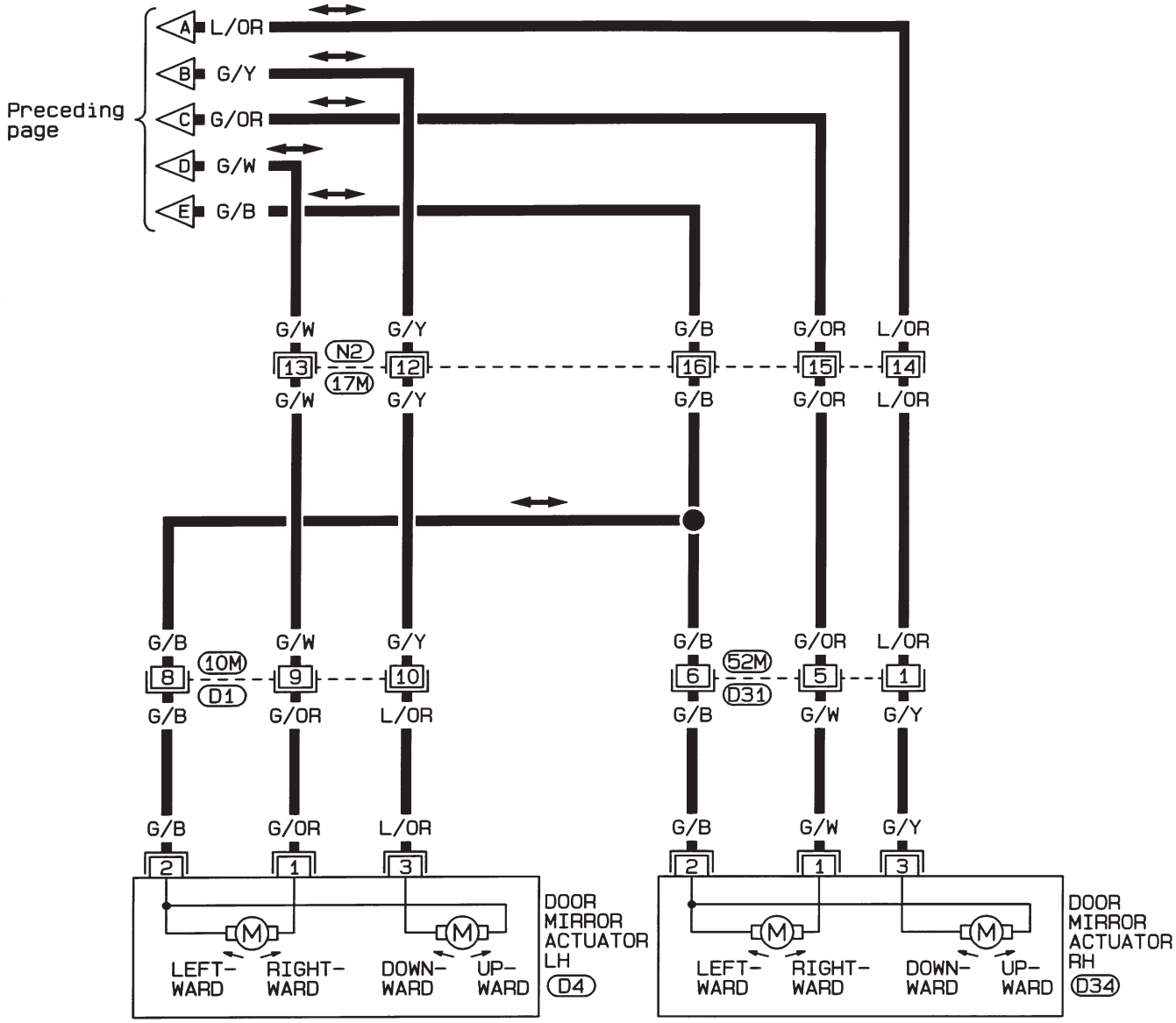


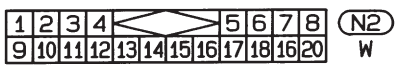


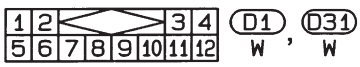
HEL950

Wiring Diagram — MIRROR — (Cont'd)

EL-MIRROR-02



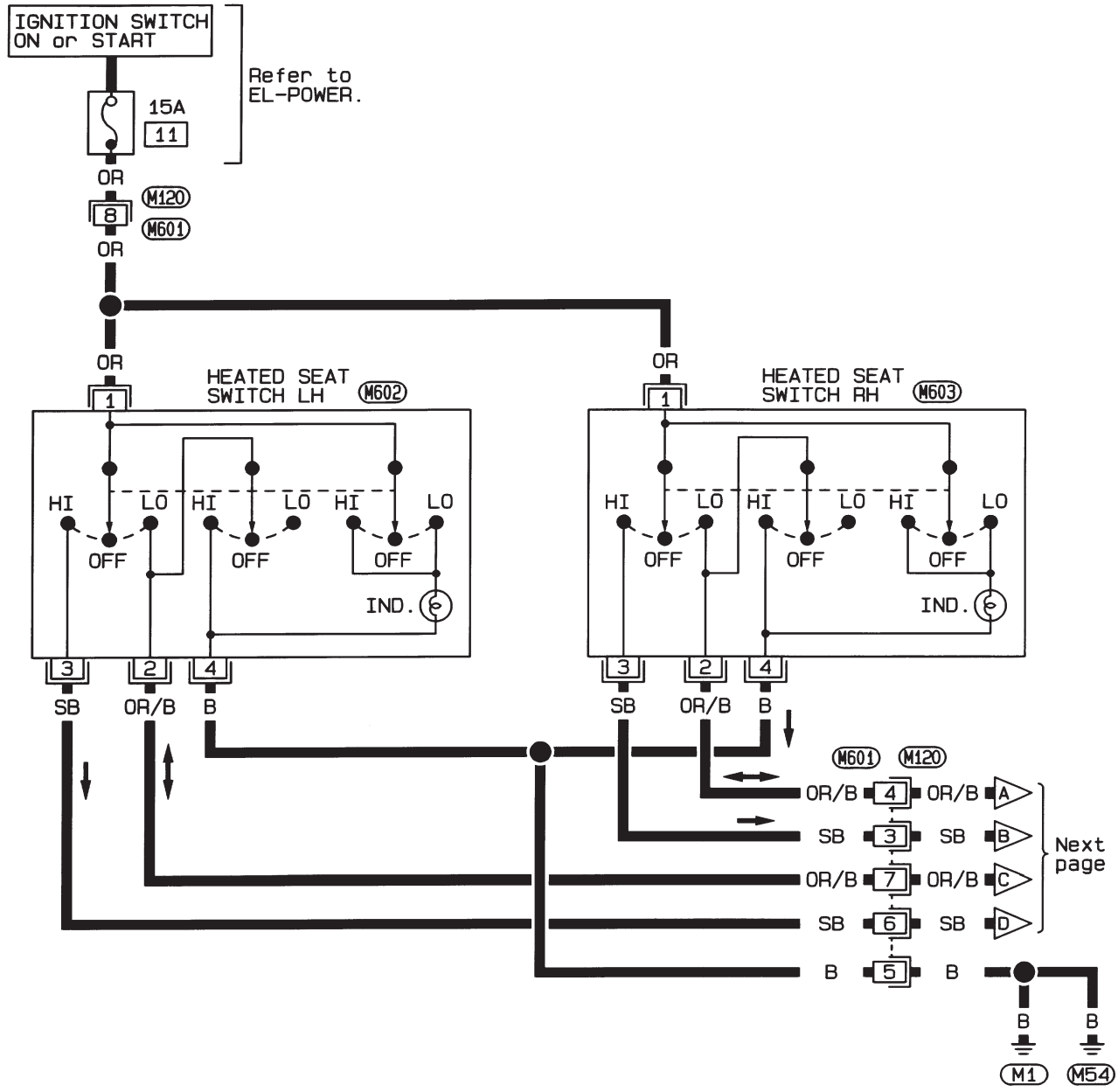




HEL951

Wiring Diagram — H/SEAT —

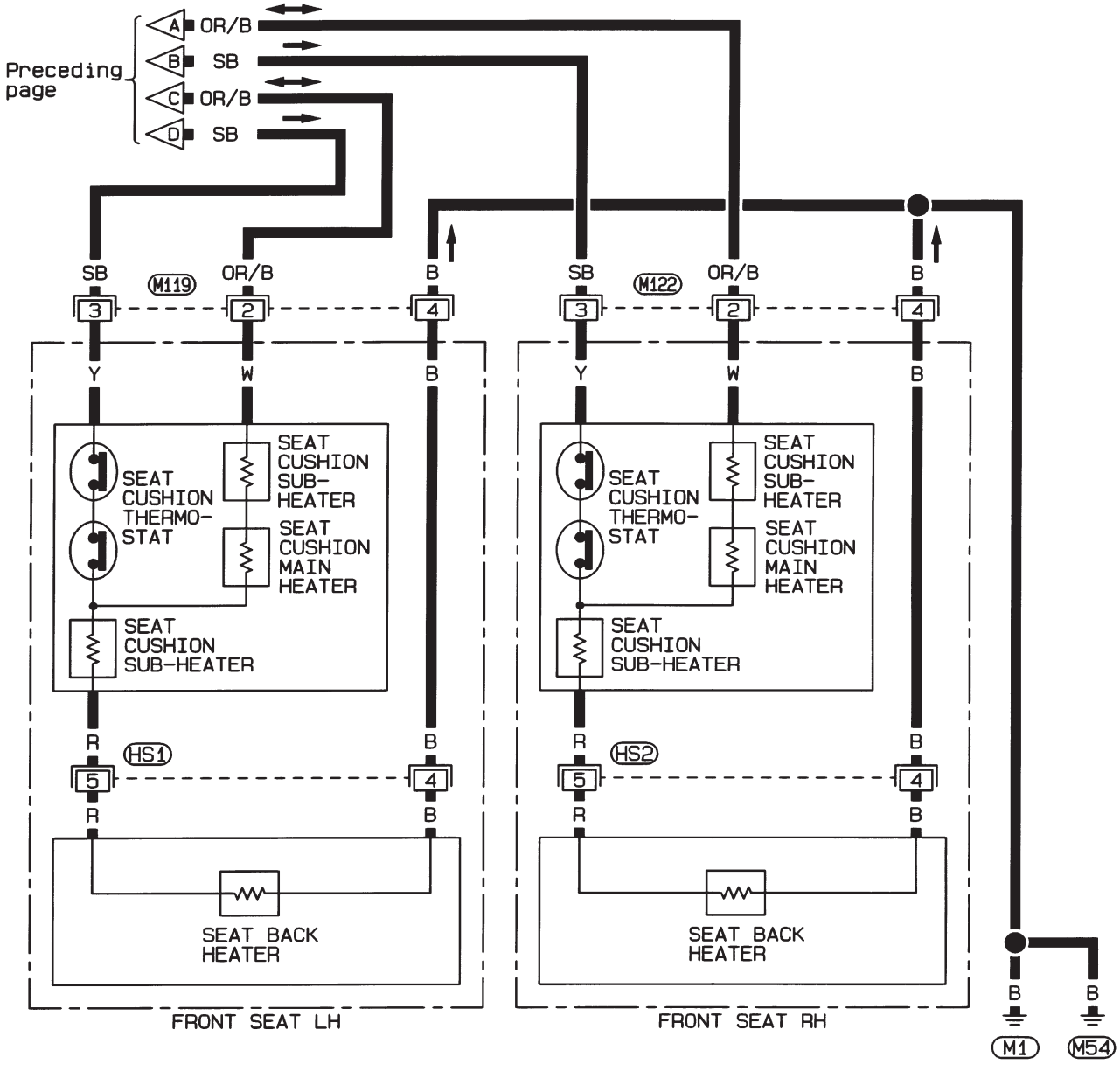
EL-H/SEAT-01



HEL378A

Wiring Diagram — H/SEAT — (Cont'd)

EL-H/SEAT-02



M119 W, M122 W

HS1* L, HS2* L

* : This connector is not shown in "HARNESS LAYOUT".

HEL379A

System Description

Power is supplied at all times
- from 30A fusible link (Letter [b], located in the fusible link and fuse box)
- to circuit breaker terminal (1)
- through circuit breaker terminal (2)
- to power window relay terminal (3).

With ignition switch in ON or START position, power is supplied
- through 10A fuse (No. [14], located in the fuse block)
- to power window relay terminal (2).

Ground is supplied to power window relay terminal (1)
- through body grounds (M1) and (M54).

The power window relay is energized and power is supplied
- through power window relay terminal (5)
- to power window main switch terminal (1),
- to power window sub-switch terminal (5).

MANUAL OPERATION

Driver side door

Ground is supplied
- to power window main switch terminal (3)
- through body grounds (M1) and (M54).

WINDOW UP
When the driver side switch in the power window main switch is pressed in the up position, power is supplied
- to driver side power window regulator terminal (2)
- through power window main switch terminal (9).

Ground is supplied
- to driver side power window regulator terminal (1)
- through power window main switch terminal (8).

Then, the motor raises the window until the switch is released.

WINDOW DOWN
When the driver side switch in the power window main switch is pressed in the down position, power is supplied
- to driver side power window regulator terminal (1)
- through power window main switch terminal (8).

Ground is supplied
- to driver side power window regulator terminal (2)
- through power window main switch terminal (9).

Then, the motor lowers the window until the switch is released.

Front passenger side door

Ground is supplied
- to power window main switch terminal (3)
- through body grounds (M1) and (M54).

NOTE:
Numbers in parentheses are terminal numbers, when power window switch is pressed in the up and down positions respectively.

MAIN SWITCH OPERATION
Power is supplied
- through power window main switch ((5), (6))
- to front power window sub-switch ((4), (3)).

The subsequent operation is the same as the sub-switch operation.

System Description (Cont'd)

SUB-SWITCH OPERATION
Power is supplied
- through front power window sub-switch (②, ①)
- to front passenger side power window regulator (②, ①).

Ground is supplied
- to front passenger side power window regulator (①, ②)
- through front power window sub-switch (①, ②)
- to front power window sub-switch (③, ④)
- through power window main switch (⑥, ⑤).

Then, the motor raises or lowers the window until the switch is released.

Rear door

Rear door windows will raise and lower in the same manner as front passenger side door window.

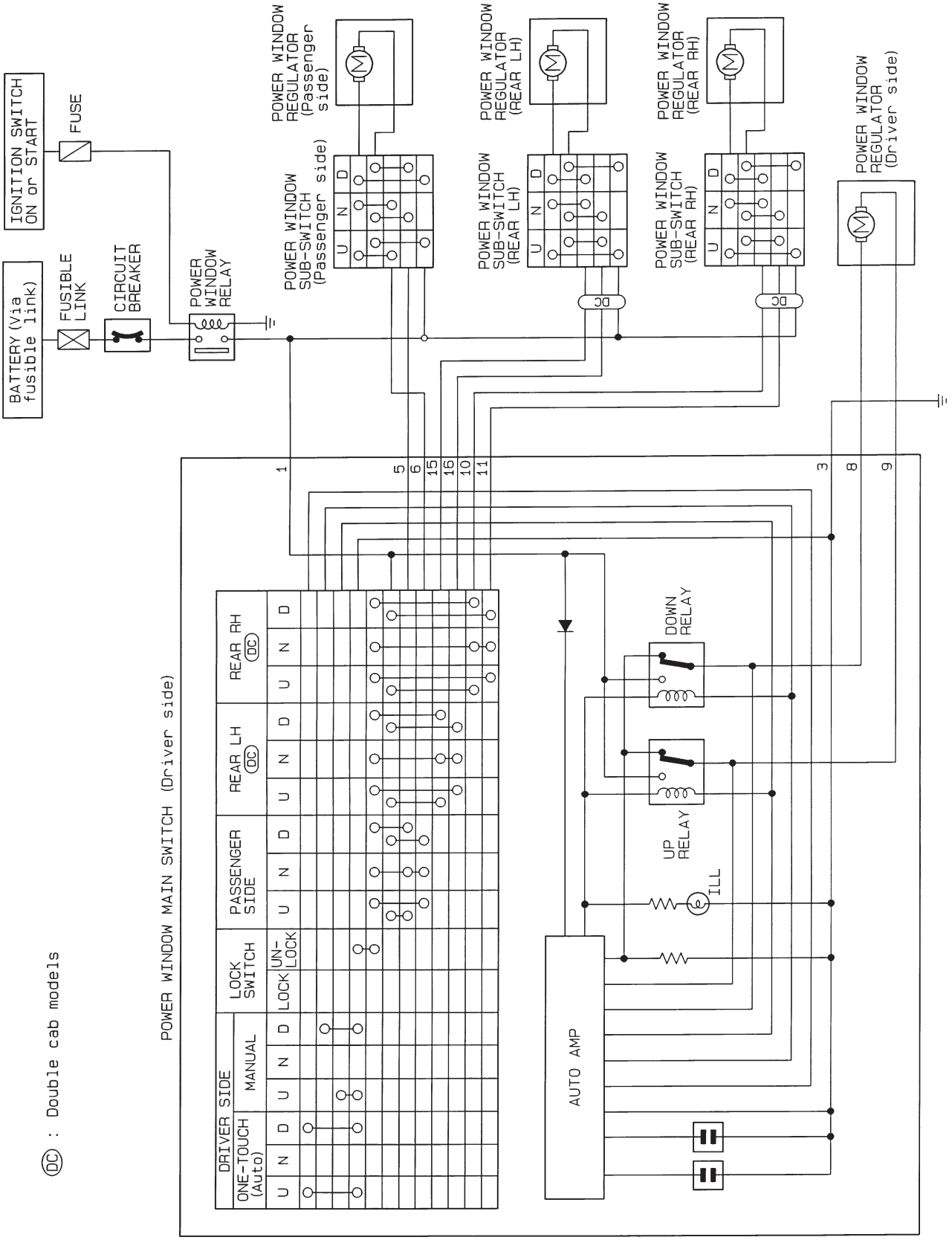
AUTO OPERATION

The power window AUTO feature enables the driver to open or close the driver's window without holding the window switch in the respective position.
When the AUTO switch in the main switch is pressed and released, the driver's window will travel to the fully open or closed position.

POWER WINDOW LOCK

The power window lock is designed to lock operation of all windows except for driver's door window.
When the lock switch is pressed to lock position, ground of the sub-switches in the power window main switch is disconnected. This prevents the power window motors from operating.

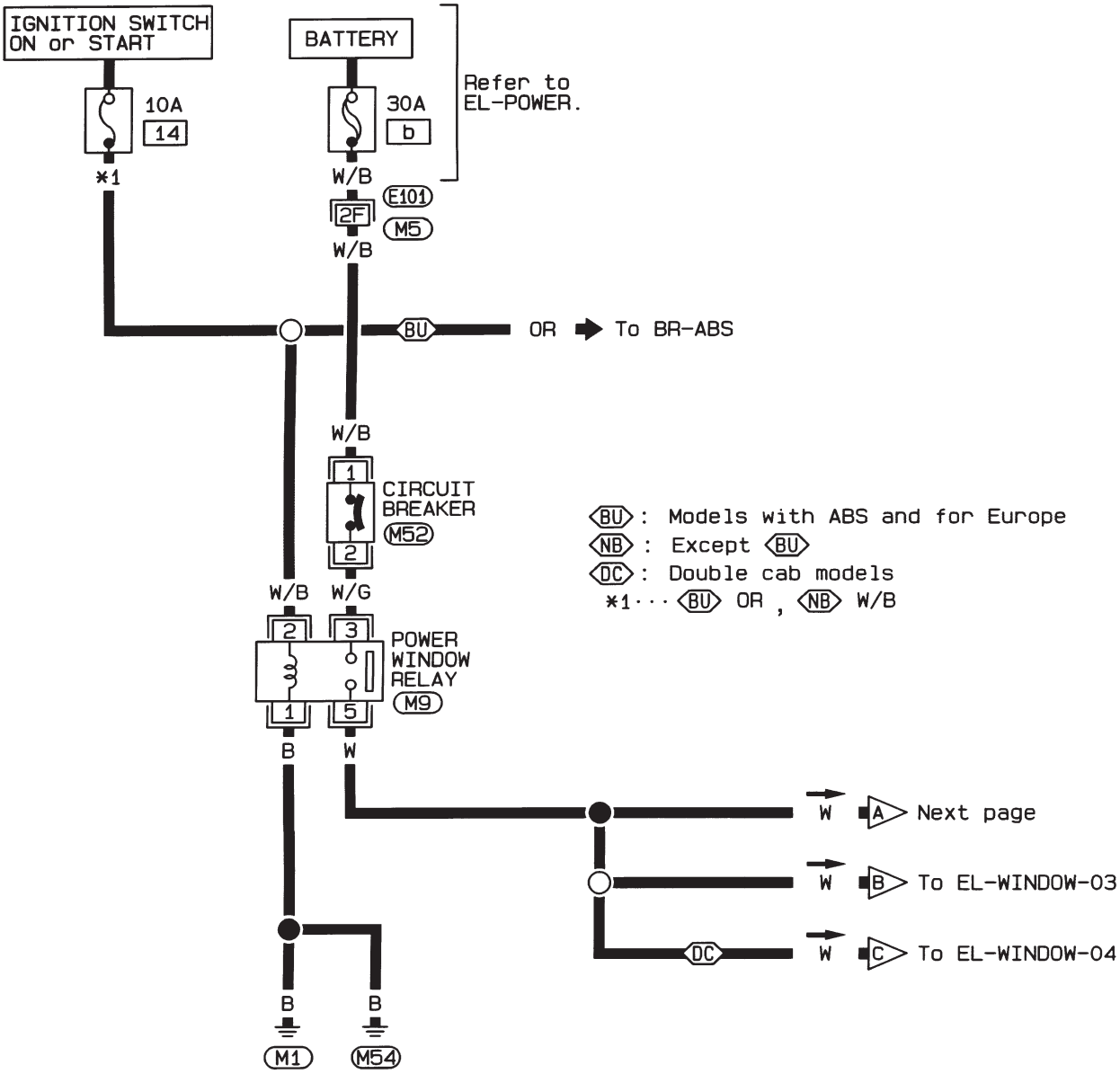
Schematic

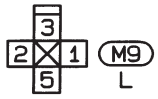


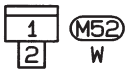
HEL952

Wiring Diagram — WINDOW —/LHD Models

EL-WINDOW-01







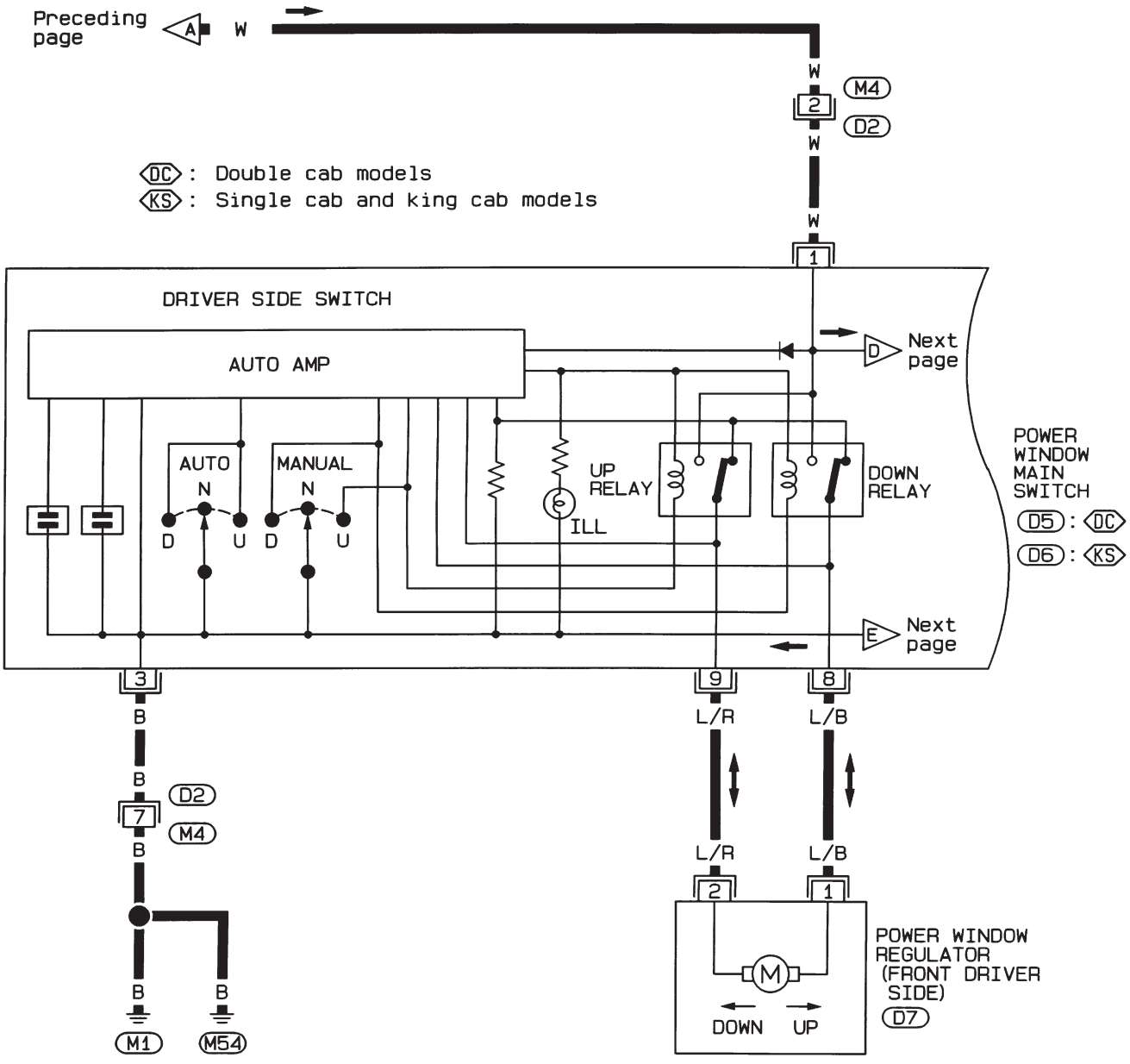
Refer to last page (Foldout page).

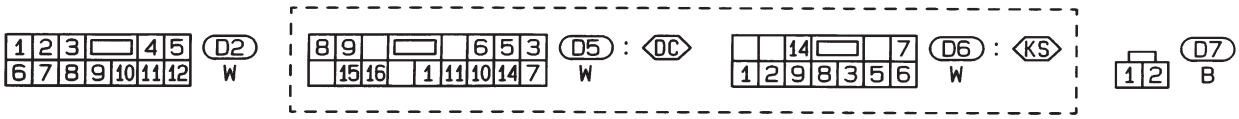
M5 , E101

HEL425A

Wiring Diagram — WINDOW —/LHD Models (Cont'd)

EL-WINDOW-02

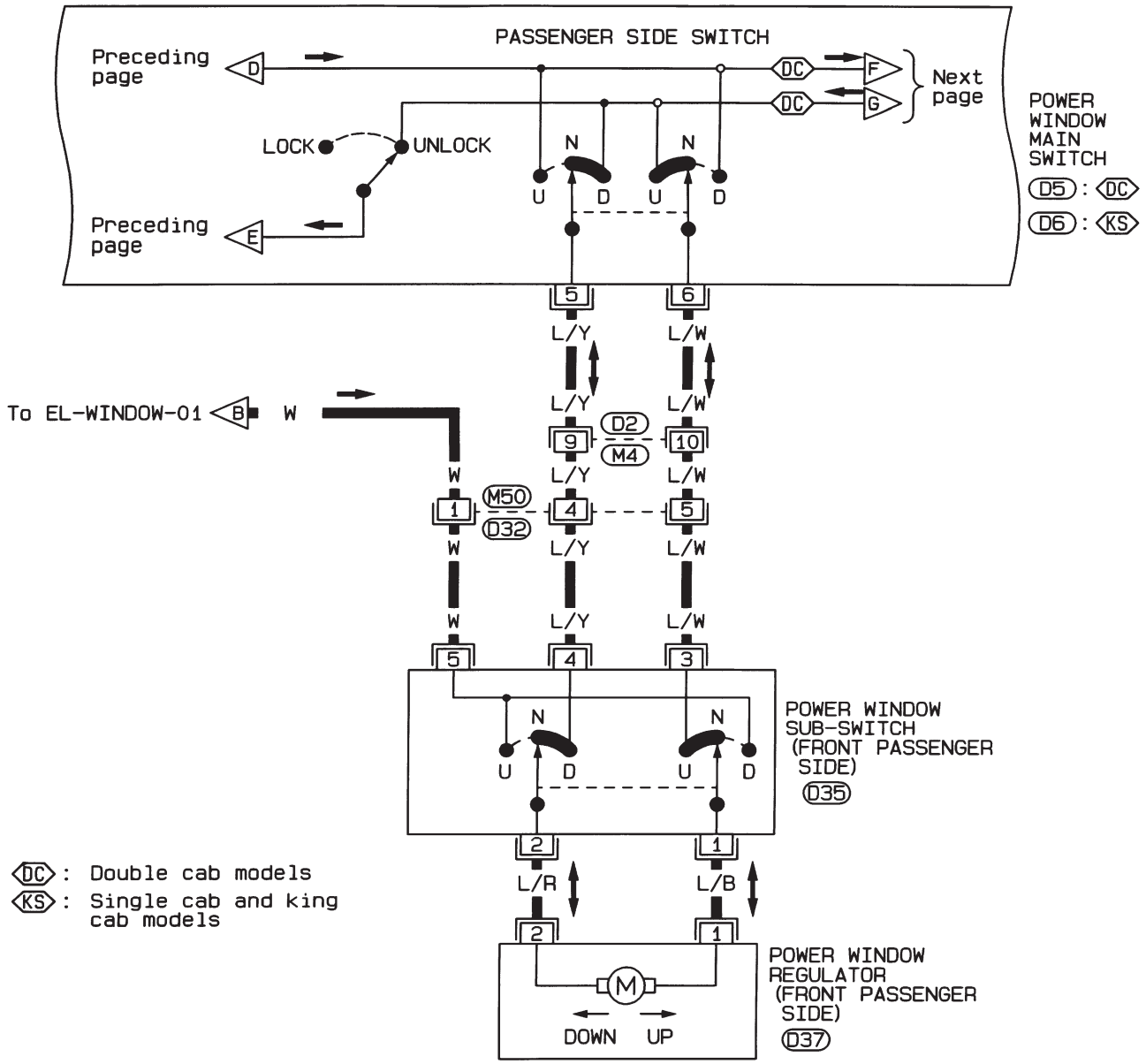


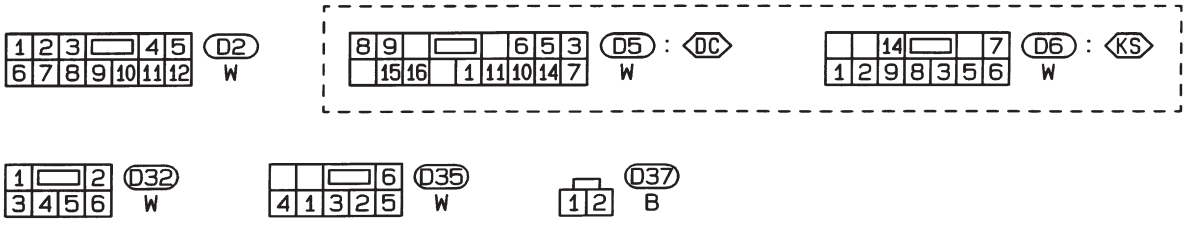


HEL380A

Wiring Diagram — WINDOW —/LHD Models (Cont'd)

EL-WINDOW-03

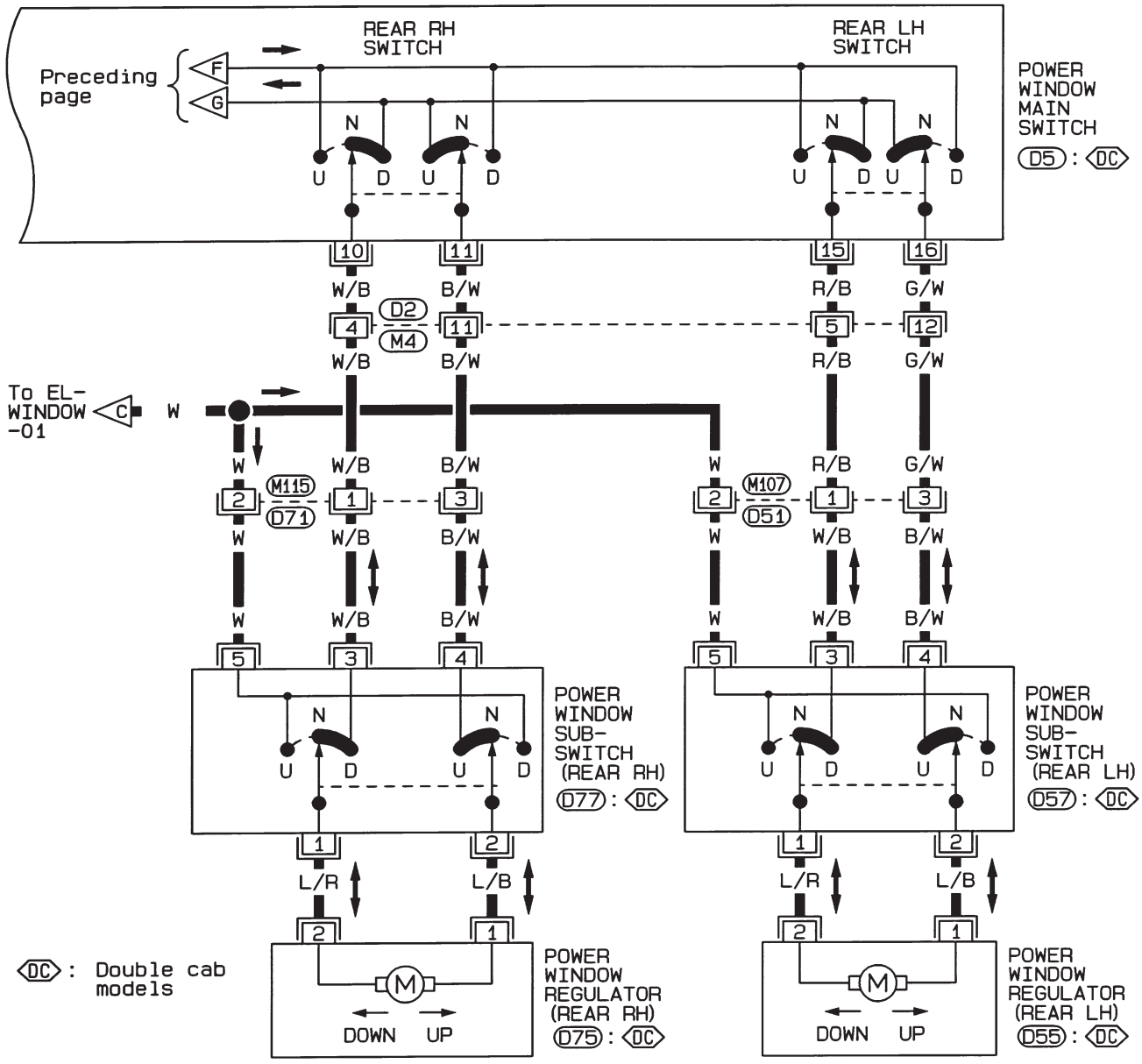


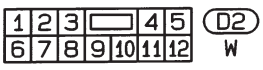


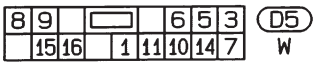
HEL381A

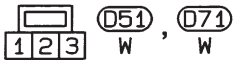
Wiring Diagram — WINDOW —/LHD Models (Cont'd)

EL-WINDOW-04





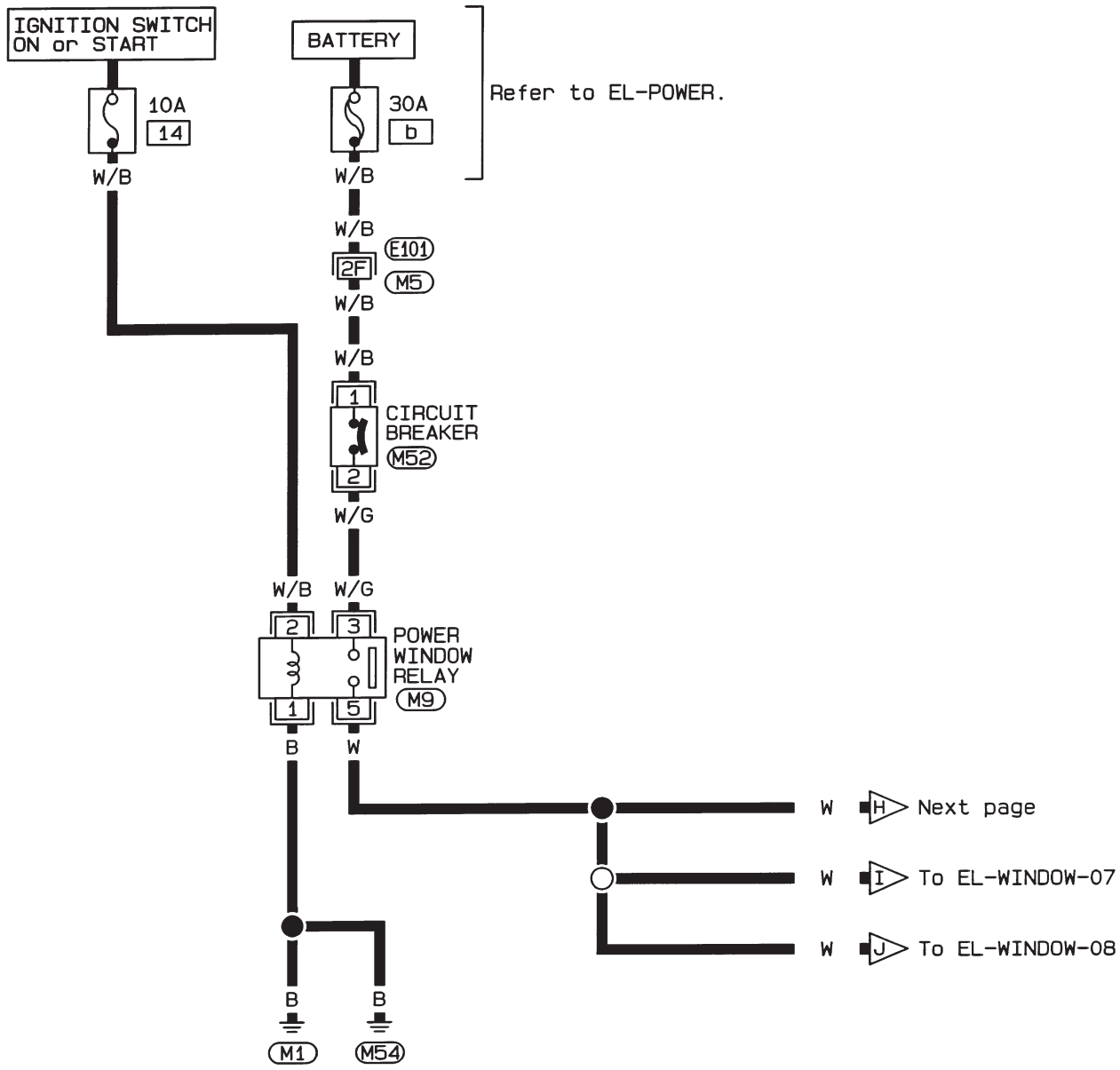


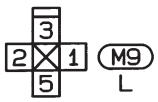


HEL956

Wiring Diagram — WINDOW —/RHD Models

EL-WINDOW-05



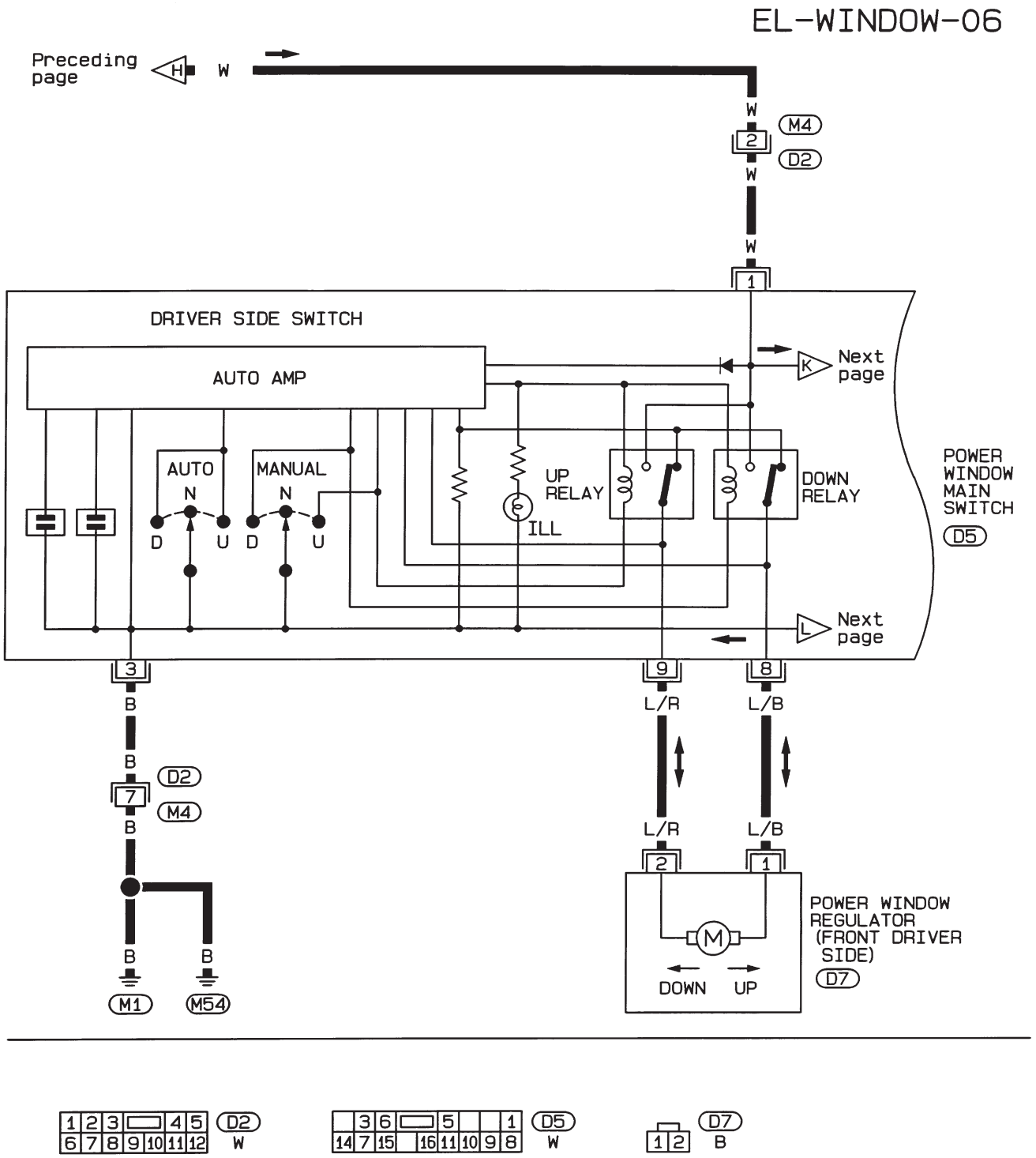


Refer to last page (Foldout page).

M5, E101

HEL957

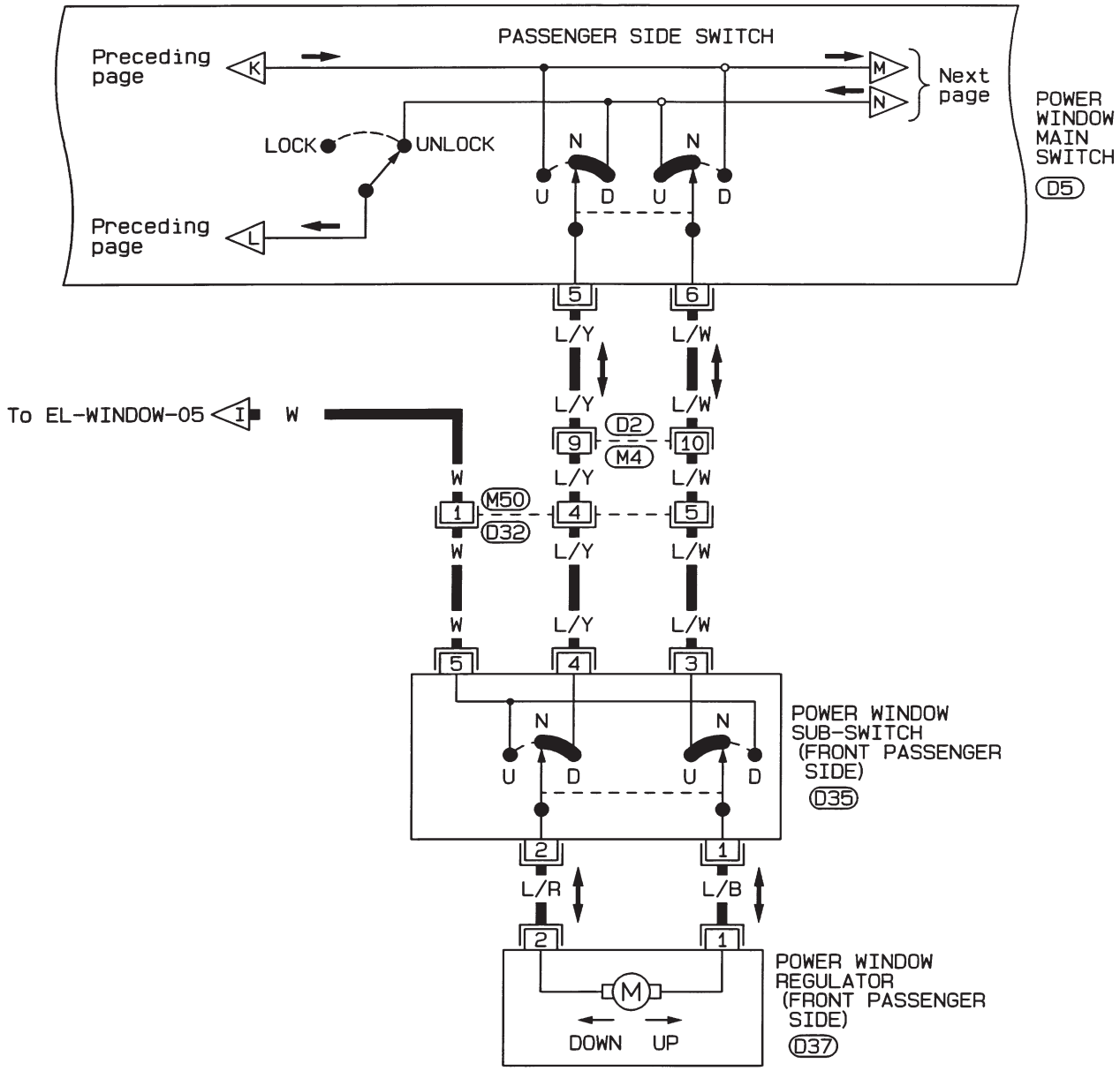
Wiring Diagram — WINDOW —/RHD Models (Cont'd)



HEL958

Wiring Diagram — WINDOW —/RHD Models (Cont'd)

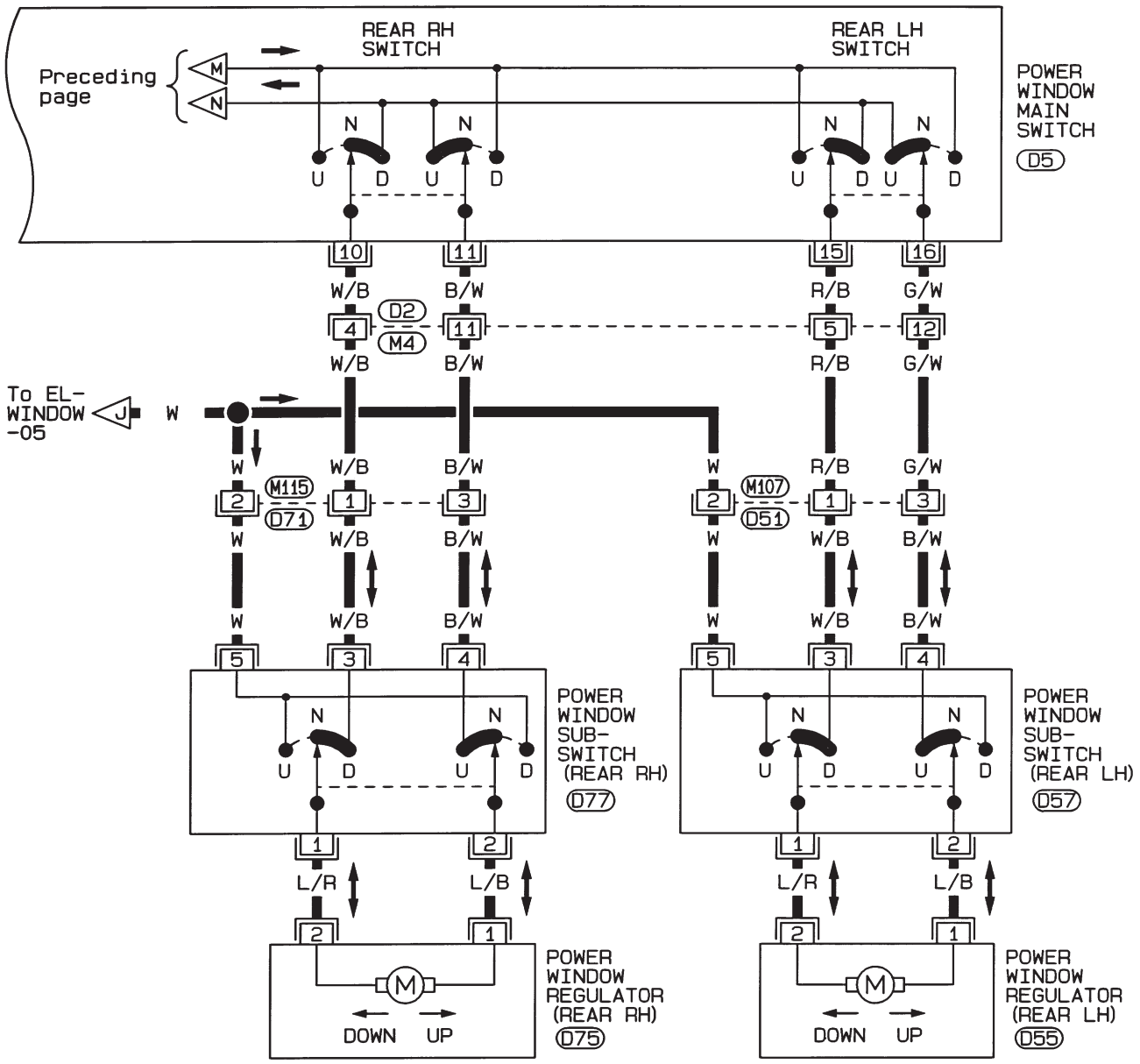
EL-WINDOW-07

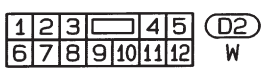


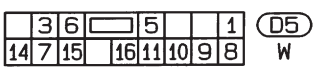
HEL959

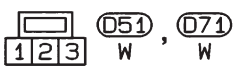
Wiring Diagram — WINDOW —/RHD Models (Cont'd)

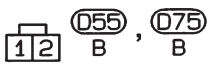
EL-WINDOW-08











HEL960

Trouble Diagnoses

Symptom	Possible cause	Repair order
None of the power windows can be operated using any switch.	1. 10A fuse, 30A fusible link and (M52) circuit breaker	1. Check 10A fuse (No. 14, located in fuse block), 30A fusible link (letter b, located in fusible link and fuse box) and (M52) circuit breaker. Turn ignition switch ''ON'' and verify battery positive voltage is present at terminal (1) of power window main switch and terminal (5) of sub-switch.
	2. Grounds (M1) and (M54)	2. Check grounds (M1) and (M54).
	3. Power window relay	3. Check power window relay.
	4. Open/short in power window main switch circuit	4. Check W wire between power window relay and power window main switch for open/short circuit.
Driver side power window cannot be operated but other windows can be operated.	1. Driver side power window regulator circuit	1. Check harness between power window main switch and power window regulator for open or short circuit.
	2. Driver side power window regulator	2. Check driver side power window regulator.
Passenger power window cannot be operated.	1. Power window sub-switches	1. Check power window sub-switch.
	2. Passenger side power window regulators	2. Check passenger side power window regulator.
	3. Power window main switch	3. Check power window main switch.
	4. Power window circuit	4-1. Check harnesses between power window main switch and power window sub-switch for open/short circuit. 4-2. Check harnesses between power window sub-switch and power window regulator for open/short circuit.
Passenger power window cannot be operated using power window main switch but can be operated by power window sub-switch.	1. Power window main switch	1. Check power window main switch.
Driver side power window auto function cannot be operated using power window main switch.	1. Power window main switch	1. Check power window main switch.

System Description

Power is supplied at all times
- through 30A fusible link (Letter (No. b, located in the fusible link and fuse box)
- to circuit breaker terminal ①
- through circuit breaker terminal ②
- to door lock timer terminal ③.

Ground is supplied to door lock timer terminal ① through body grounds M1 and M54.

INPUT

When the door lock & unlock switch (power window main switch) is in LOCKED position, ground signal is supplied
- to door lock timer terminal ⑤
- through door lock & unlock switch terminal ⑭
- to door lock & unlock switch terminal ③
- through body grounds M1 and M54.

When the door lock & unlock switch (power window main switch) is in UNLOCKED position, ground signal is supplied
- to door lock timer terminal ⑧
- through door lock & unlock switch terminal ⑦
- to door lock & unlock switch terminal ③
- through body grounds M1 and M54.

Driver side door key cylinder and driver side lock knob are connected to lock knob switch with a rod. When lock knob switch is in UNLOCKED position, ground signal is supplied
- to door lock timer terminal ⑥
- through lock knob switch terminal ②
- to driver side lock knob switch terminal ①
- through body grounds M1 and M54.

When lock knob switch is in LOCKED position, ground signal is interrupted.
Door lock operates according to the conditions of the door lock & unlock switch (power window main switch) and lock knob switch.

OUTPUT

Unlock

Ground is supplied
- to passenger side door lock actuator, rear door lock actuator LH and RH terminal ① (double cab models)
- through door lock timer terminal ②.

Power is supplied
- to passenger side door lock actuator, rear door lock actuator LH and RH terminal ② (double cab models)
- through door lock timer terminal ④.

Then, the doors are unlocked.

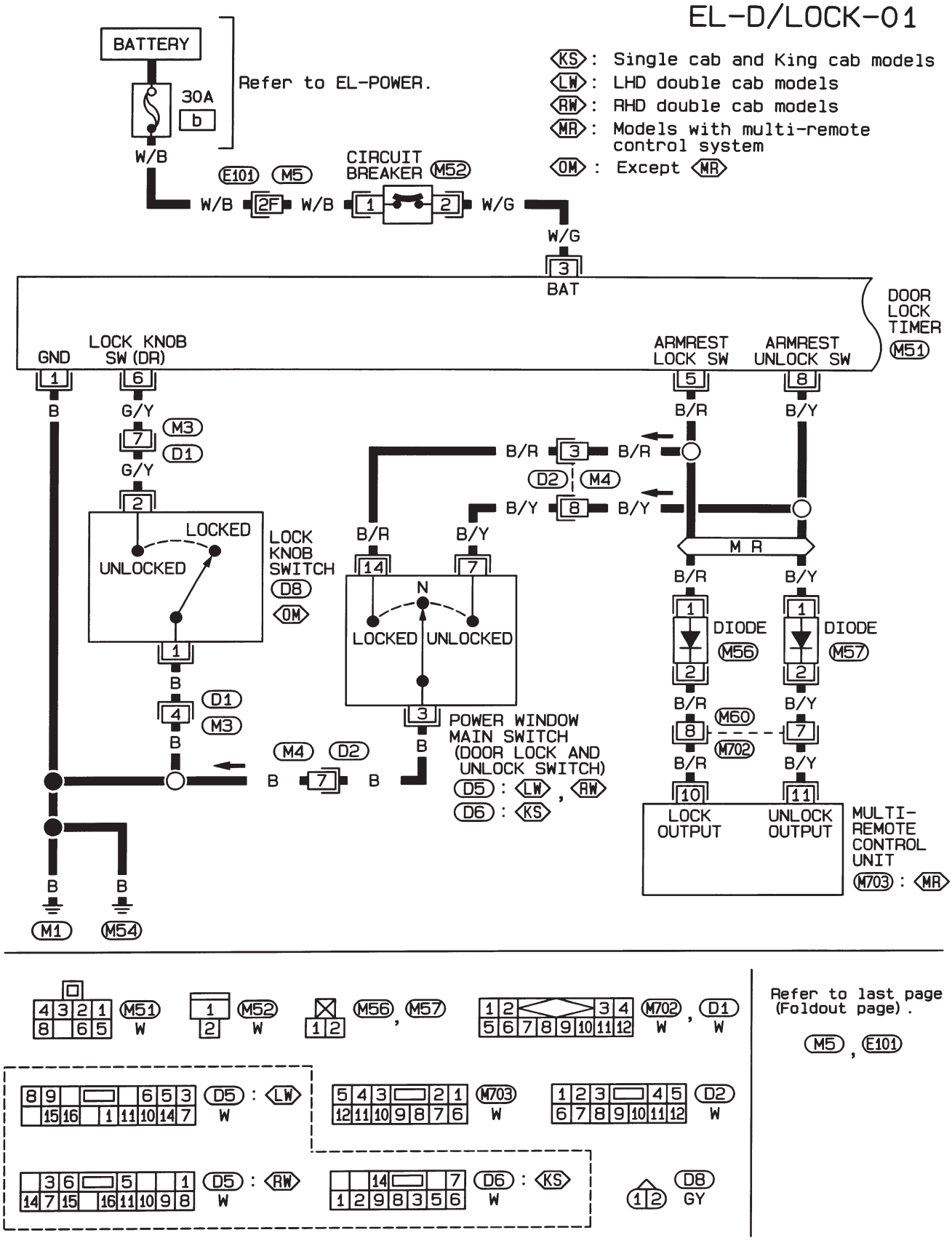
Lock

Ground is supplied
- to passenger side door lock actuator, rear door lock actuator LH and RH terminal ②
- through door lock timer terminal ④.

Power is supplied
- to passenger side door lock actuator, rear door lock actuator LH and RH terminal ①
- through door lock timer terminal ②.

Then, the doors are locked.

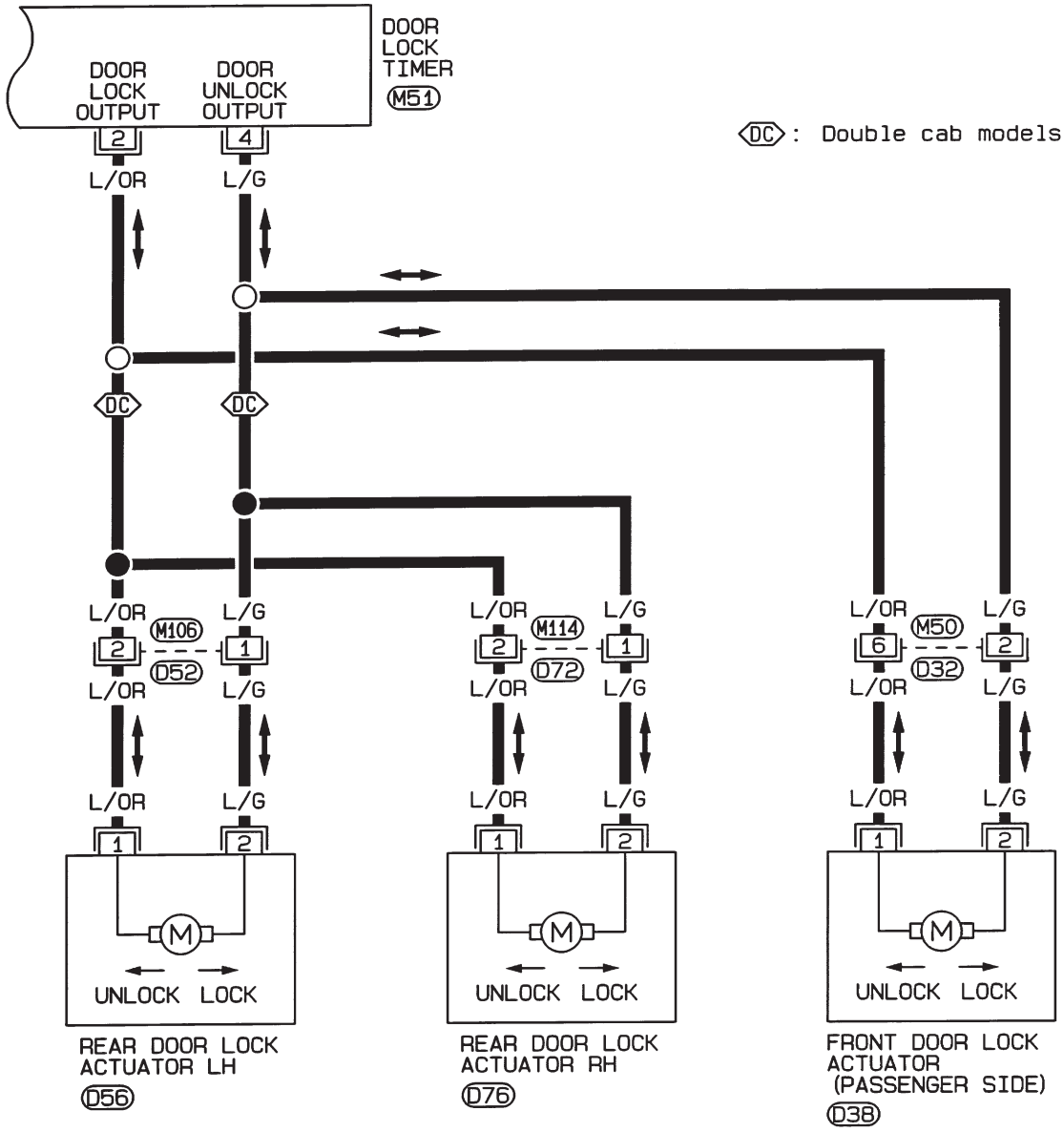
Wiring Diagram — D/LOCK —

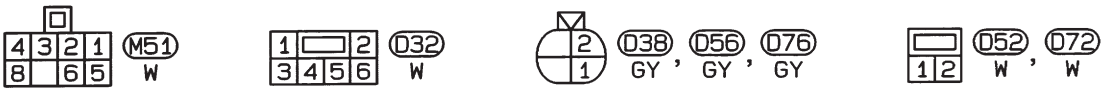


HEL382A

Wiring Diagram — D/LOCK — (Cont'd)

EL-D/LOCK-02



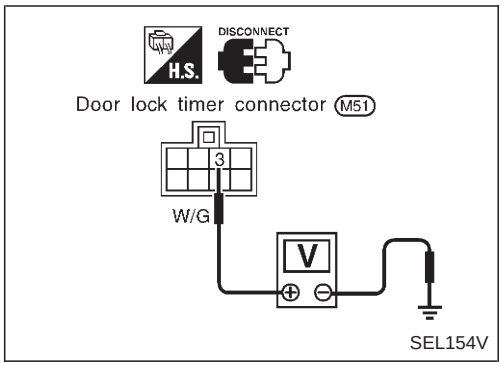


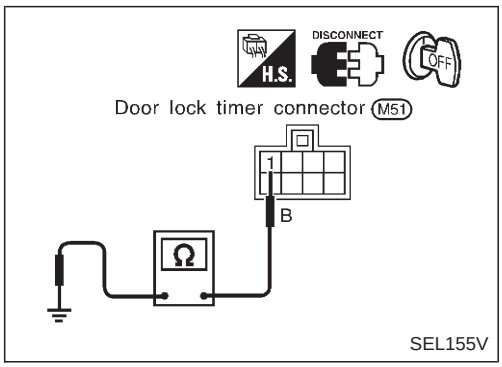
HEL962

Trouble Diagnosis

SYMPTOM CHART

REFERENCE PAGE	EL-169	EL-170	EL-171	EL-172
SYMPTOM	Main power supply and ground circuit check	Diagnostic procedure 1 (Door lock and unlock switch check)	Diagnostic procedure 2 (Door lock actuator check)	Diagnostic procedure 3 (Driver side lock knob switch check)
None of the doors lock/unlock when operating any switch.	X		X	
One or more doors are not locked and/or unlocked.			X	
Door lock and unlock switch does not operate.		X		
Lock knob switch on driver's door does not operate.				X





MAIN POWER SUPPLY AND GROUND CIRCUIT CHECK

Main power supply for door lock timer

Terminal		Ignition switch		
⊕	⊖	OFF	ACC	ON
③	Ground	Battery voltage	Battery voltage	Battery voltage

Ground circuit for door lock timer

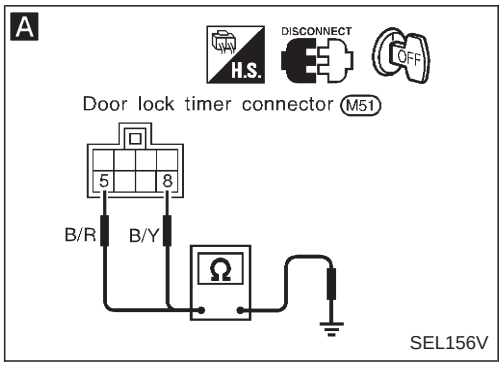
Terminals	Continuity
① - Ground	Yes

Trouble Diagnosis (Cont'd)

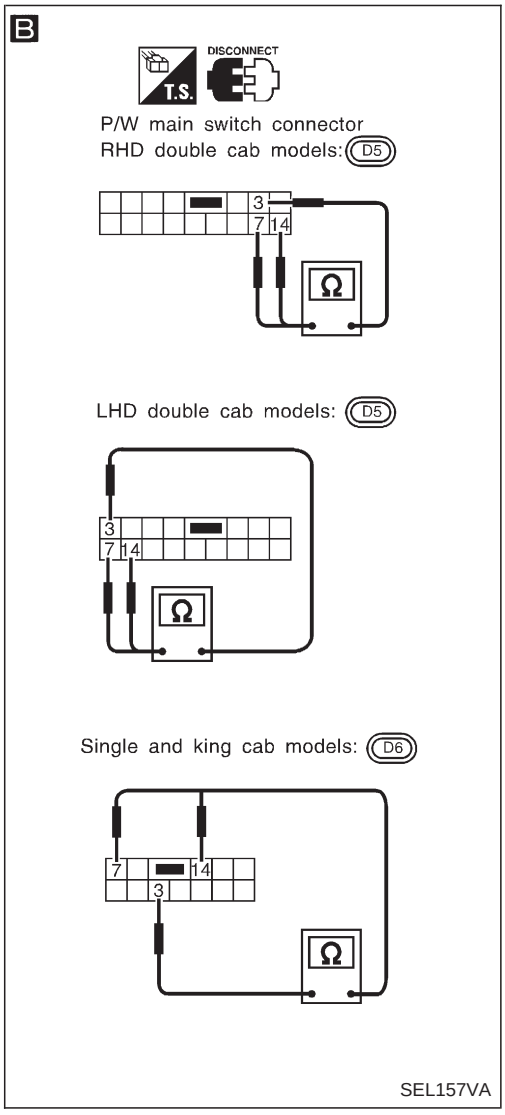
DIAGNOSTIC PROCEDURE 1

(Door lock and unlock switch check)

A



B



A

CHECK DOOR LOCK AND UNLOCK SWITCH INPUT SIGNAL.

1. Disconnect door lock timer connector.
2. Check continuity between control unit terminal ⑤ or ⑧ and ground.

Terminals	Door lock and unlock switch condition	Continuity
⑤ - Ground	Lock	Yes
	N and Unlock	No
⑧ - Ground	Unlock	Yes
	N and Lock	No

OK → Door lock and unlock switch is OK.

NG ↓

B

CHECK DOOR LOCK AND UNLOCK SWITCH.

1. Disconnect door lock and unlock switch connector.
2. Check continuity between power window main switch (Door lock and unlock switch) terminals.

Condition	Terminals		
	3	7	14
Lock	○		○
N	No continuity		
Unlock	○	○	

NG → Replace door lock and unlock switch.

OK ↓

Check the following.

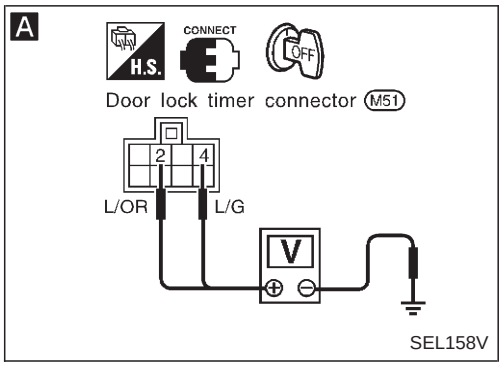
- Ground circuit for door lock and unlock switch
- Harness for open or short between door lock and unlock switch and door lock timer connector

Trouble Diagnosis (Cont'd)

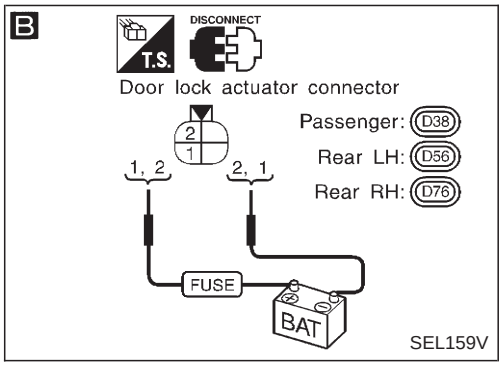
DIAGNOSTIC PROCEDURE 2

(Door lock actuator check)

A



B



A

CHECK DOOR LOCK ACTUATOR CIRCUIT.
Check voltage for door lock actuator.

Lock knob switch condition	Terminals ⊕	Terminals ⊖	Voltage (V)
Lock	②	ground	Battery voltage
Unlock	④	ground	

NG → Replace door lock timer. (Before replacing control unit, perform DIAGNOSTIC PROCEDURE 1.)

OK ↓

B

CHECK DOOR LOCK ACTUATOR.
1. Disconnect door lock actuator connector.
2. Apply 12V direct current to door lock actuator and check operation.

Door lock actuator operation	Terminals ⊕	Terminals ⊖
Unlocked → Locked	①	②
Locked → Unlocked	②	①

NG → Replace door lock actuator.

OK ↓

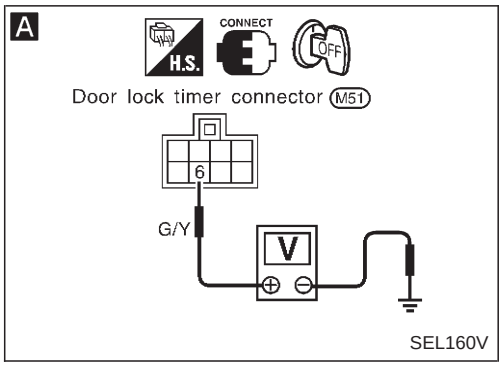
Repair harness between door lock timer connector and door lock actuator.

Trouble Diagnosis (Cont'd)

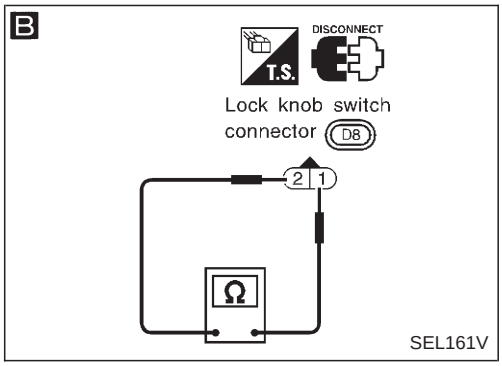
DIAGNOSTIC PROCEDURE 3

(Driver side lock knob switch check)

A



B



A

CHECK LOCK KNOB SWITCH INPUT SIGNAL.
Check voltage between door lock timer terminal ⑥ and ground.

Lock knob switch condition	Voltage (V)
Lock	Approx. 12
Unlock	0

OK → Driver side lock knob switch is OK.

NG ↓

B

CHECK LOCK KNOB SWITCH.
1. Disconnect driver side lock knob switch connector.
2. Check continuity between lock knob switch terminals.

Terminals	Condition	Continuity
① - ②	Locked	No
	Unlocked	Yes

NG → Replace lock knob switch.

OK ↓

Check the following.
- Ground circuit for lock knob switch
- Harness for open or short between lock knob switch and door lock timer

System Description

FUNCTION

Multi-remote control system has the following function.
- Door lock
- Door unlock
- Hazard reminder

LOCK OPERATION

To lock door by multi-remote controller, the following two signals must be received.
- Key switch OFF (when ignition key is not in ignition key cylinder.)
- All door switches CLOSED

When the LOCK signal is input to multi-remote control unit (the antenna of the system is combined with multi-remote control unit), ground is supplied
- through multi-remote control unit terminal ⑩
- to door lock timer terminal ⑤ and
- to multi-remote control relay-3 (LOCK) terminal ①.

Then door lock timer operates to lock doors (except for driver's door) and mutli-remote control relay-3 (LOCK) energized to lock driver's door.

UNLOCK OPERATION

To unlock door by multi-remote controller, the following signal must be received.
- Key switch OFF (when ignition key is not in ignition key cylinder)

When the UNLOCK signal is input to multi-remote control unit (the antenna of the system is combined with multi-remote control unit), ground is supplied
- through multi-remote control unit terminal ⑪
- to door lock timer terminal ⑧ and
- to multi-remote control relay-4 (UNLOCK) terminal ①.

Then door lock timer operates to unlock doors (except for driver's door) and mutli-remote control relay-4 (UNLOCK) is energized to unlock driver's door.

HAZARD REMINDER

When the doors and locked or unlocked by multi-remote controller, ground is supplied
- to terminal ① of multi-remote control relay-1 and 2
- through multi-remote control unit terminal ⑫.

Then the relays are energized and hazard warning lamp flashes as follows
- Lock operation: Flash once
- Unlock operation: Flash twice

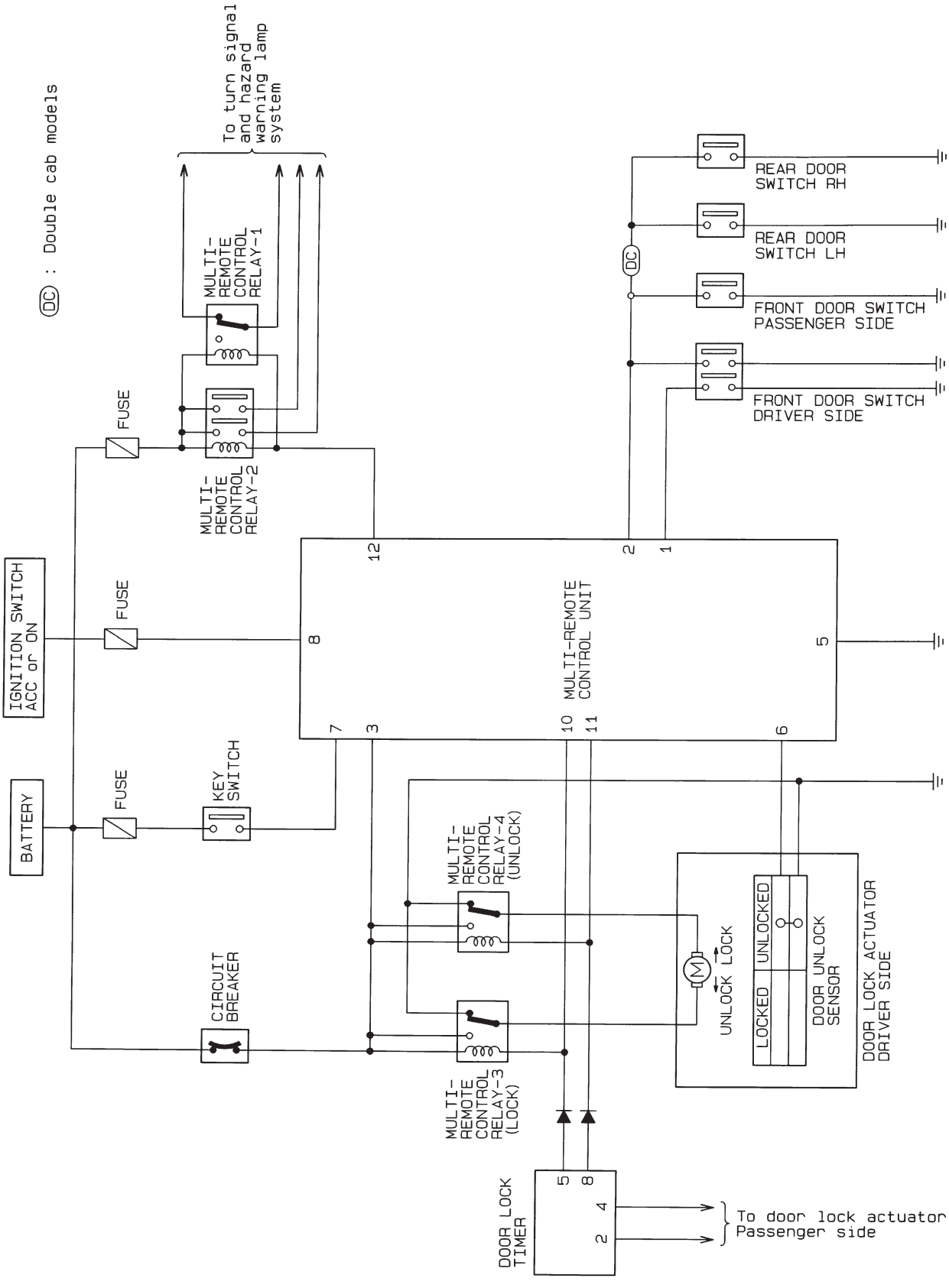
MULTI-REMOTE CONTROLLER ID CODE ENTRY

A maximum of four remote controllers can be entered. Any attempt to enter a remote controller will erase all ID codes previously entered. Therefore, be sure to receive all remote controllers from the vehicle owner when any ID code entry is performed.

To enter ID code entry, the following signals must be input to the multi-remote control unit.
- Driver side LOCKED signal (from driver side door unlock sensor)
- Door switch CLOSED signal
- Key switch signal (INSERTED/WITHDRAWN)
- Accessory power supply
- Signal from remote controller

For detailed procedure, refer to ''ID Code Entry Procedure'' in EL-182.

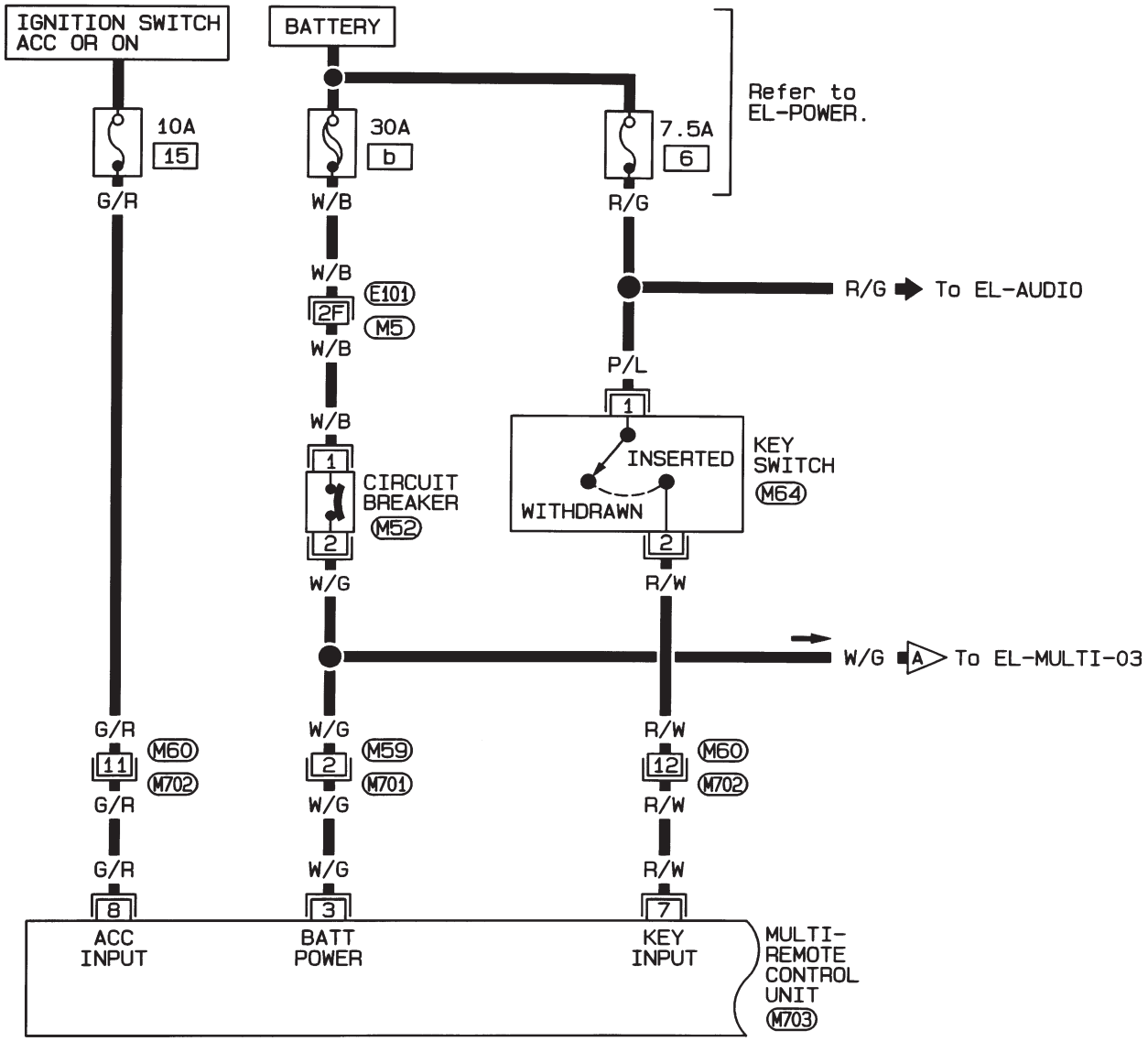
Schematic

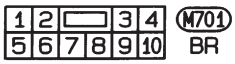


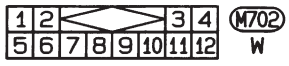
HEL383A

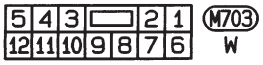
Wiring Diagram — MULTI —/LHD Models

EL-MULTI-01









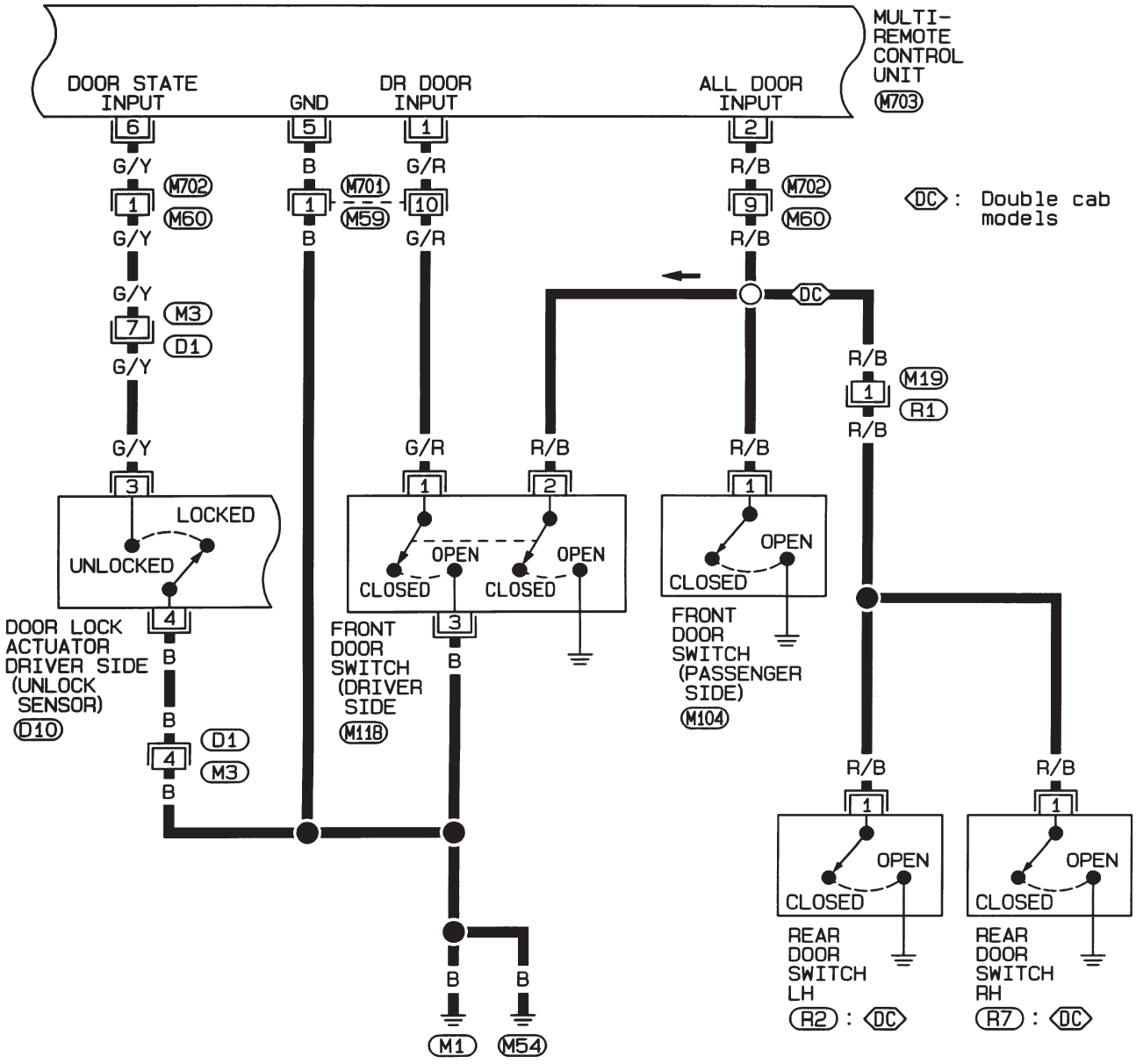
Refer to last page (Foldout page).

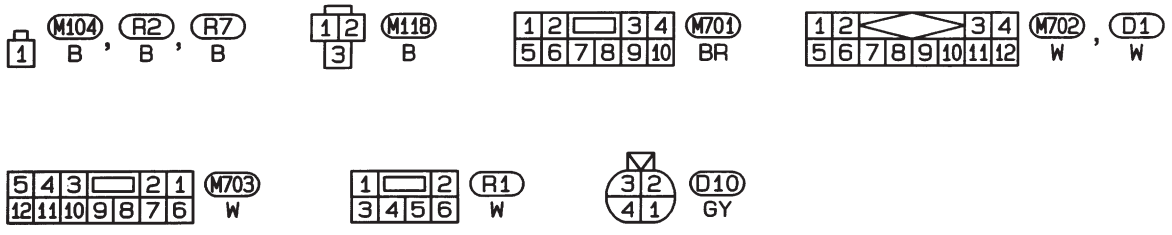
M5, E101

HEL384A

Wiring Diagram — MULTI —/LHD Models (Cont'd)

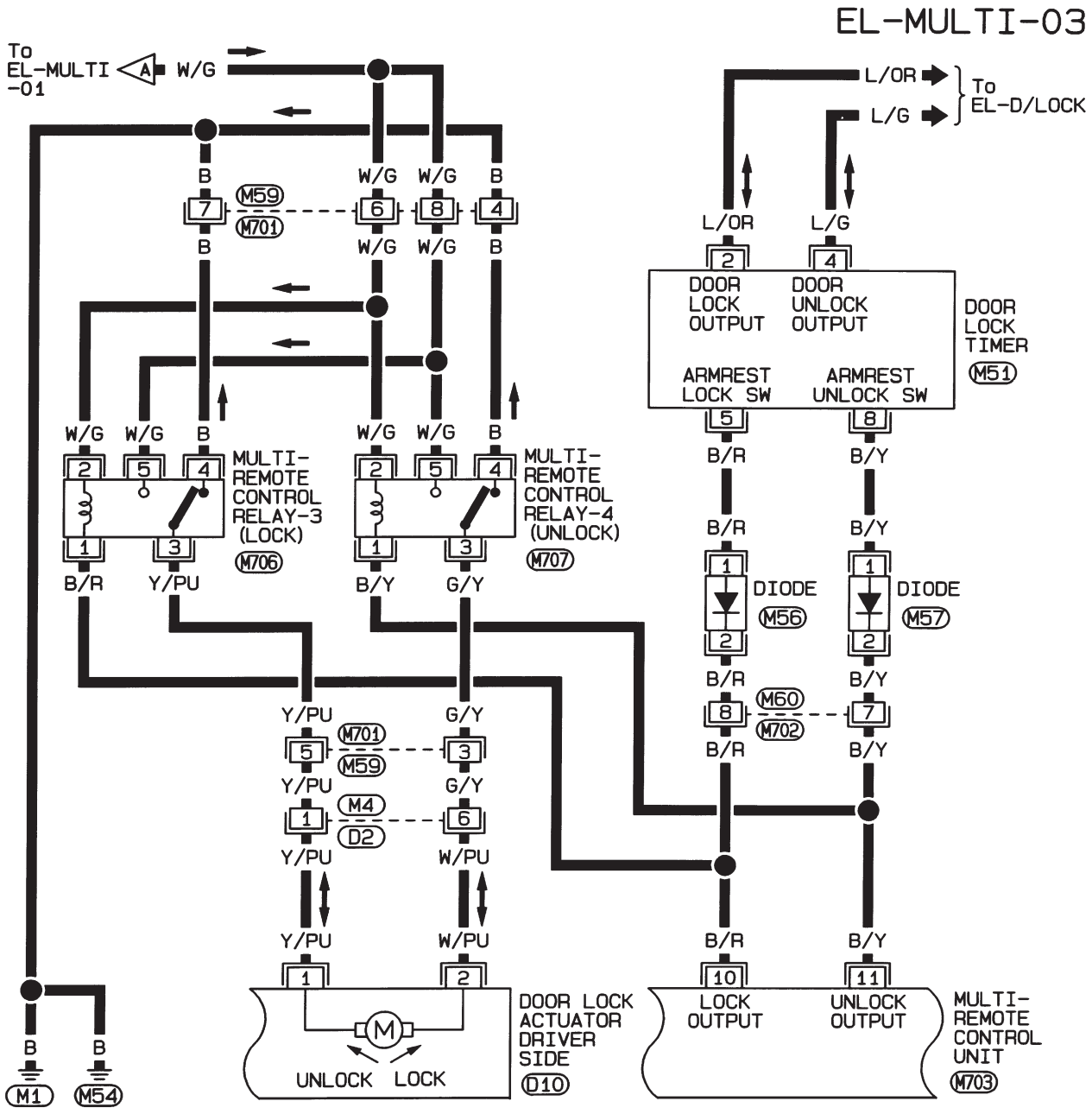
EL-MULTI-02

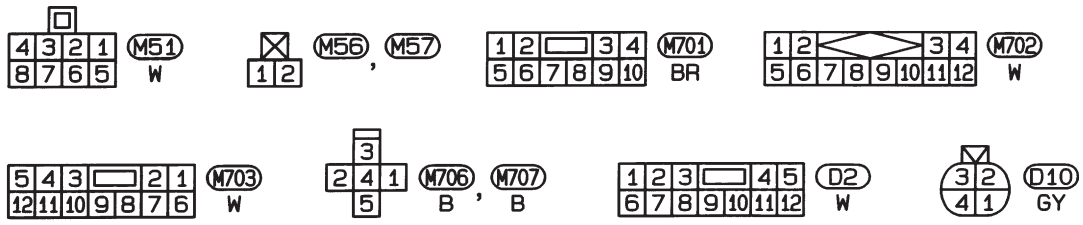




HEL385A

Wiring Diagram — MULTI —/LHD Models (Cont'd)

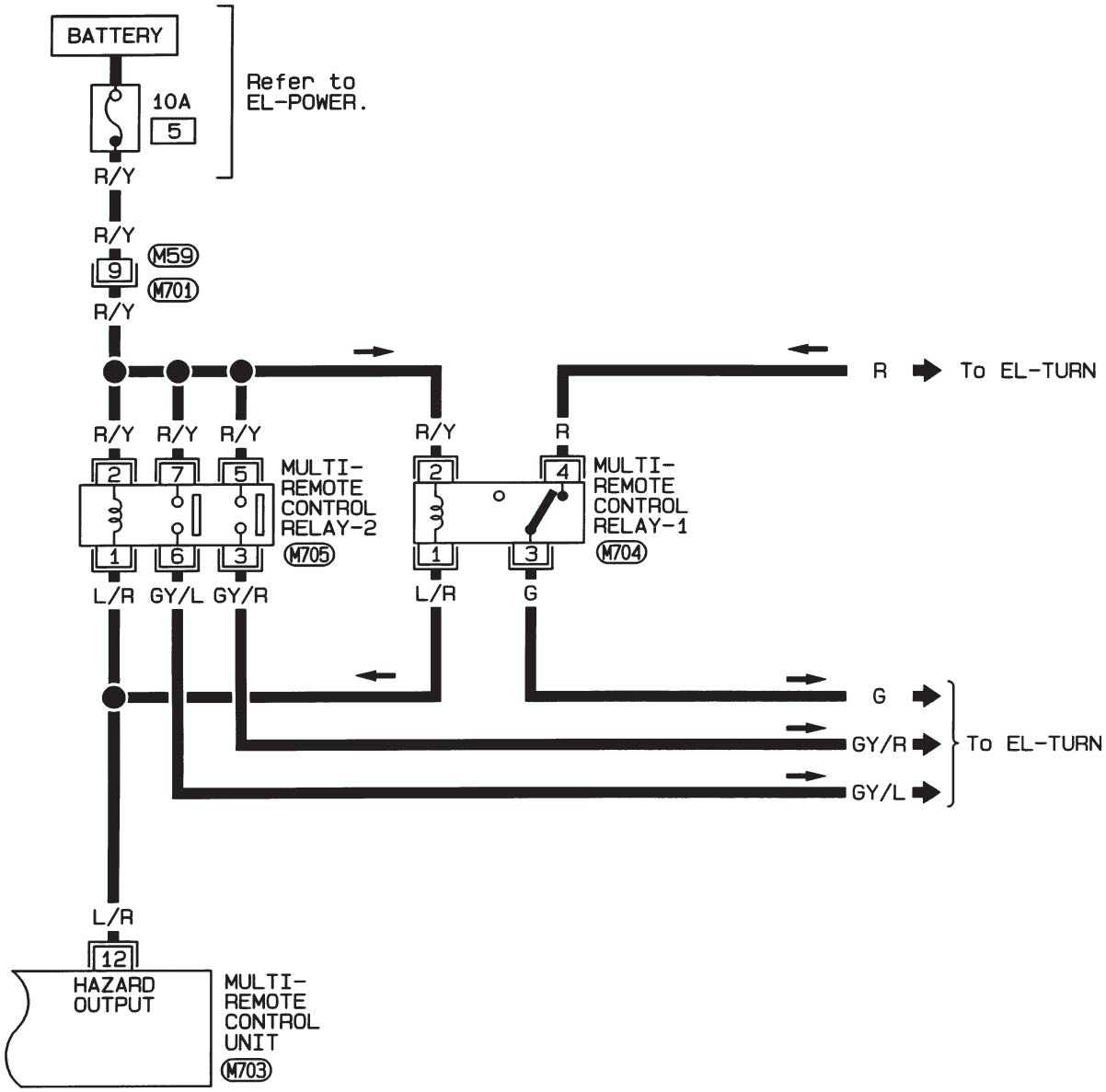


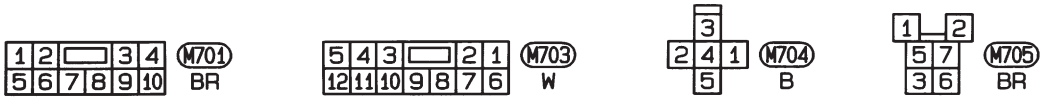


HEL386A

Wiring Diagram — MULTI —/LHD Models (Cont'd)

EL-MULTI-04





HEL387A

Trouble Diagnoses

SYMPTOM CHART

Symptom	Possible cause	Diagnoses/service order
No doors can be locked or unlocked by remote control operation. (See NOTE.)	1. Remote controller battery 2. Key switch (insert) 3. Door switch 4. Power supply circuit for multi-remote control unit 5. Ground circuit for multi-remote control unit 6. Remote controller	1. Check remote controller battery. Refer to EL-180. 2. Check key switch (insert) signal at terminal ⑦ of multi-remote control unit. 3. Check door switch signal at terminals ① and ② of multi-remote control unit. 4. Make sure battery voltage is present at terminal ③ of multi-remote control unit. 5. Check continuity between terminal ⑤ of multi-remote control unit and ground. 6. Replace remote controller. Refer to EL-182.
Driver's door cannot be locked or unlocked by remote controller operation.	1. Driver side door lock actuator circuit	1. Check driver side door lock actuator circuit. Refer to EL-181.
Doors other than driver side cannot be locked or unlocked by remote control operation. (If the power door lock system does not operate correctly, check power door lock system. Refer to EL-169.)	1. Lock/unlock signal to smart entrance control unit	● When locking is not possible: Check continuity between terminal ⑩ of multi-remote control unit and terminal ⑤ of door lock timer. ● When unlocking is not possible: Check continuity between terminal ⑪ of multi-remote control unit and terminal ⑧ of door lock timer.
Hazard reminder does not operate properly.	1. 10A fuse 2. Multi-remote control relay-1 and 2 3. Hazard reminder circuit	1. Check 10A fuse (No. 5, located in the fuse block). 2. Check multi-remote control relay-1 and 2. 3. Check harness for open or short between relays and multi-remote control unit terminal ⑫.
The new ID of remote controller cannot be entered.	1. Remote controller battery 2. Key switch (insert) 3. Door switch 4. Driver's door unlock sensor 5. Accessory power supply circuit for multi-remote control unit 6. Remote controller	1. Check remote controller battery. Refer to EL-180. 2. Check key switch (insert) signal at terminal ⑦ of multi-remote control unit. 3. Check door switch signal at terminals ① and ② of multi-remote control unit. 4. Check driver's door unlock sensor signal at terminal ⑥ of multi-remote control unit. 5. Make sure battery voltage is present at terminal ⑧ of multi-remote control unit while ignition switch is in ACC position. 6. Replace remote controller. Refer to EL-182.

Refer to ''MULTI-REMOTE CONTROL UNIT INSPECTION TABLE'' on next page to check the control unit signals.

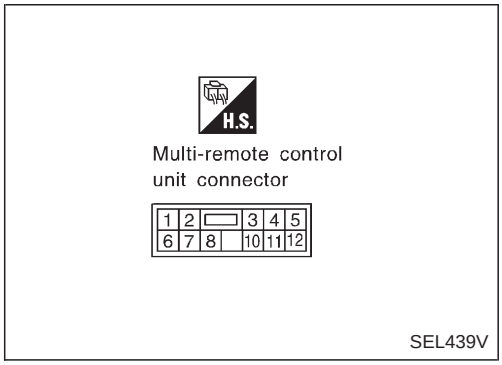
NOTE:

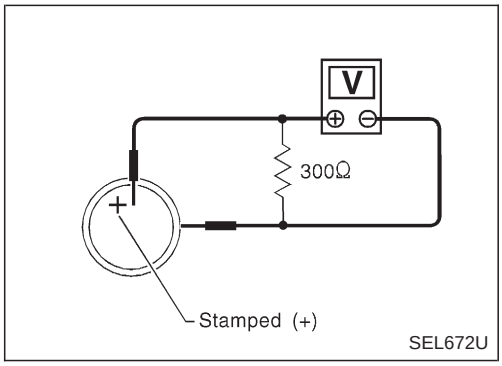
- The unlock operation of multi-remote control system does not activate with key inserted in the ignition key cylinder.
- The lock operation of multi-remote controller does not activate with the key inserted ignition key cylinder or if one of the door is opened.

Trouble Diagnoses (Cont'd)

MULTI-REMOTE CONTROL UNIT INSPECTION TABLE

Terminal No.	Connections	Condition		Voltage (V) (approximate values)
1	Driver side door switch	Driver side door	Opened	0
			Closed	12
2	Door switch (all doors)	One of doors is opened		0
		All doors are closed		12
3	Power source (BAT)	—		12
5	Ground	—		—
6	Driver side door unlock sensor	Driver side door	Locked	5
			Unlocked	0
7	Key switch (insert)	Key is in ignition key cylinder		12
		Key is not in ignition key cylinder		0
8	Accessory power supply	Ignition switch	OFF	0
			ACC or ON	12
10	Lock signal	Remote controller LOCK button is pushed (All doors are closed and key is not in ignition key cylinder.)		0
		Other than above condition		12
11	Unlock signal	Remote controller UNLOCK button is pushed (Key is not in ignition key cylinder.)		0
		Other than above condition		12
12	Multi-remote control relay-1, 2	Remote controller LOCK/UNLOCK button is pushed (All doors are closed and key is not in ignition key cylinder.)		0
		Other than above condition		12





REMOTE CONTROLLER BATTERY CHECK

Remove battery and measure voltage across battery positive and negative terminals, ⊕ and ⊖.

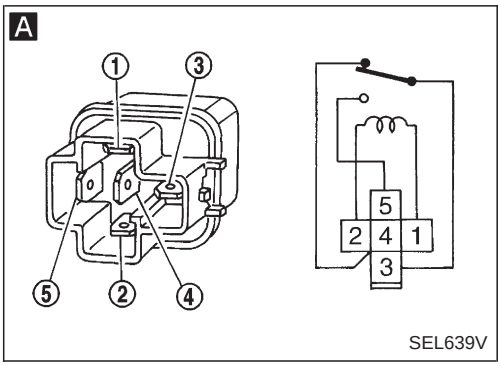
Measuring terminal		Standard value
⊕	⊖	
Battery positive terminal ⊕	Battery negative terminal ⊖	2.5 - 3.0V

Note:
Remote controller does not function if battery is not set correctly.

Trouble Diagnoses (Cont'd)

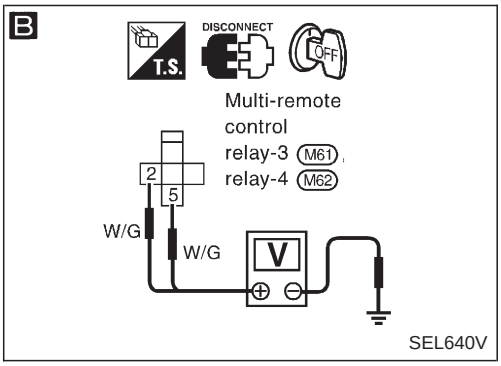
DRIVER SIDE DOOR LOCK ACTUATOR CHECK

A



SEL639V

B



SEL640V

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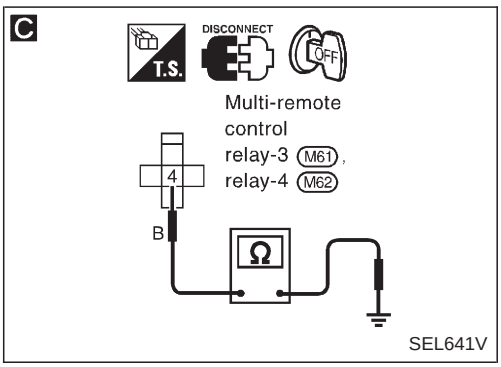

SEL641V

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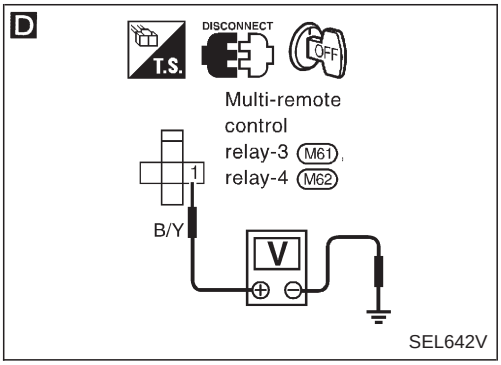
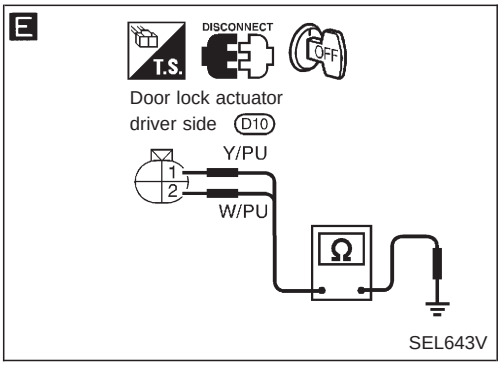


SEL642V

E



SEL643V

A

CHECK MULTI-REMOTE CONTROL RELAY-3, 4.

condition		Continuity existence between terminals	
		③ and ④	③ and ⑤
Battery voltage not applied between each terminal	① and ②	Yes	No
Battery voltage applied between each terminal	① and ②	No	Yes

While applying battery voltage to relay terminals, insert fuse into the circuit.

NG → Replace the relay.

OK ↓

B

CHECK POWER SUPPLY FOR THE RELAYS.
Check voltage between multi-remote control relay-3, 4 terminal ②, ⑤ and ground.
Battery voltage should exist.

NG → Check the following.
- 30A fuse (No. b, located in the fusible link and fuse box).
- Check harness for open or short between fuse and relay.

OK ↓

C

CHECK GROUND CIRCUIT FOR THE RELAYS.
Check continuity between multi-remote control relay-3, 4 terminal ④ and ground.
Continuity should exist.

NG → Repair harness.

OK ↓

D

CHECK LOCK/UNLOCK SIGNAL FOR THE RELAYS.
Check voltage between multi-remote control relay-3, 4 terminal ① and ground.
5V should exist.

NG → Check harness for open or short between multi-remote control relay and multi-remote control unit.

OK ↓

E

CHECK DOOR LOCK ACTUATOR CIRCUIT.
1. Connect the relays.
2. Disconnect driver side door lock actuator.
3. Check continuity between driver side door lock actuator and relays.
   Continuity should exist.

NG → Check harness for open or short between multi-remote control relays and door lock actuator.

OK ↓

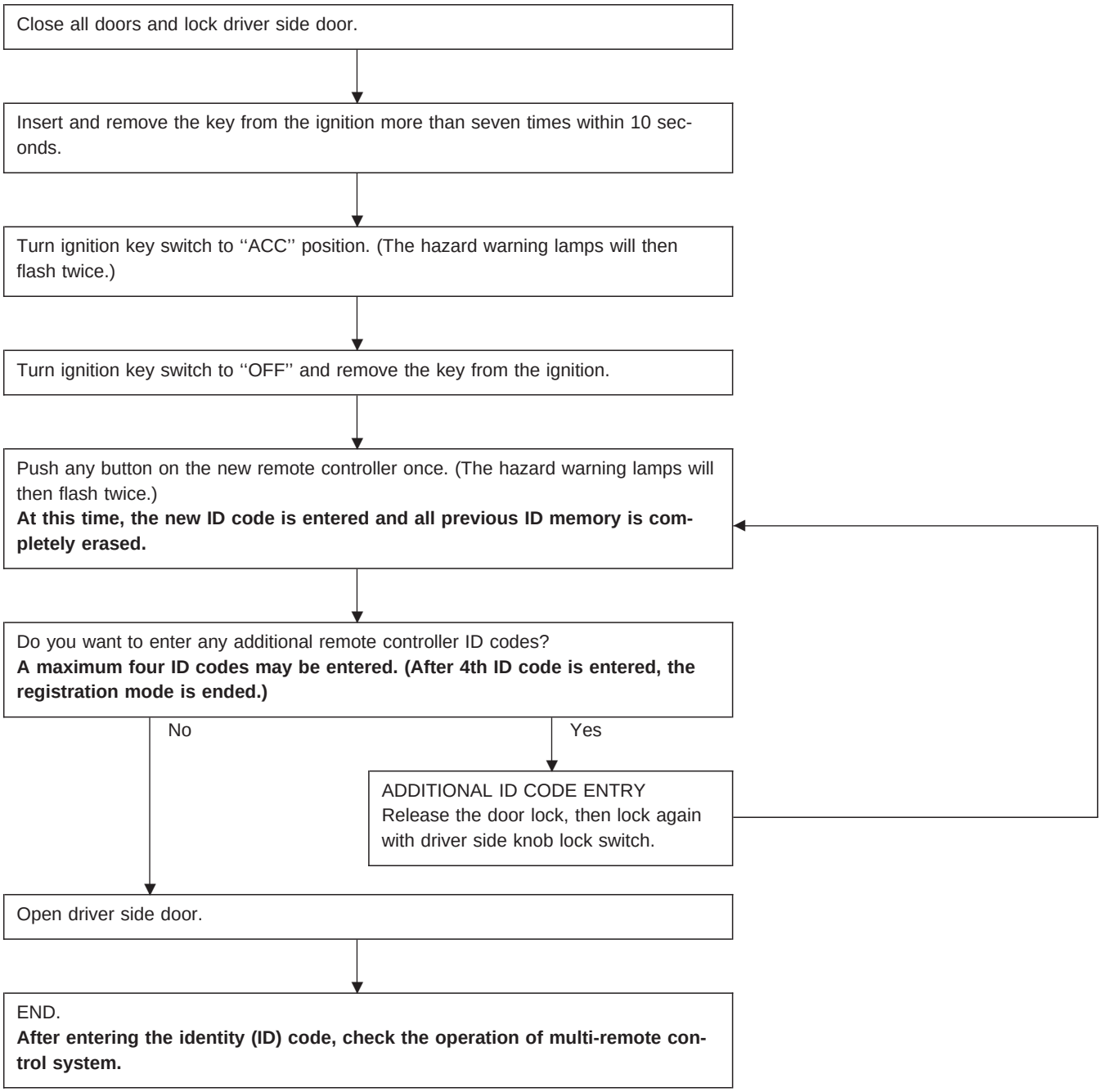
Replace door lock actuator.

ID Code Entry Procedure

Note:
A maximum of four remote controllers can be entered. Any attempt to enter a remote controller will erase all ID codes previously entered. Therefore, be sure to receive all remote controllers from the vehicle owner when any ID code entry is performed.
Enter the identity (ID) code manually when:
- remote controller or control unit is replaced.
- an additional remote controller is activated.

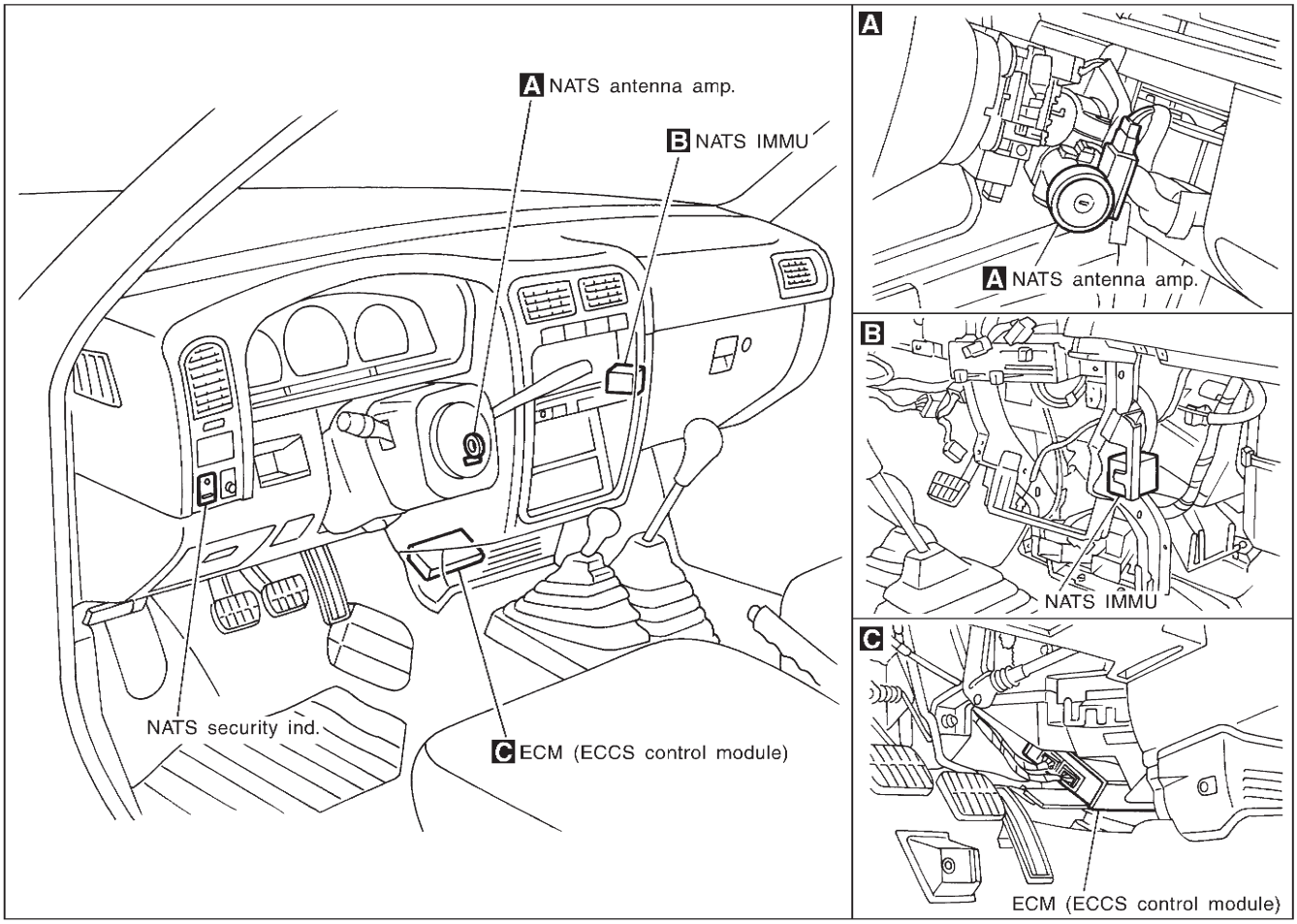
To enter the ID code, follow the procedures below.

PROCEDURE



NOTE:
- **If you need to activate more than two additional new remote controllers, repeat the procedure ''Additional ID code entry'' for each new remote controller.**
- **Any ID codes cannot be entered after termination of the ''setting mode''.**

Component Parts and Harness Connector Location



SEL649V

System Description

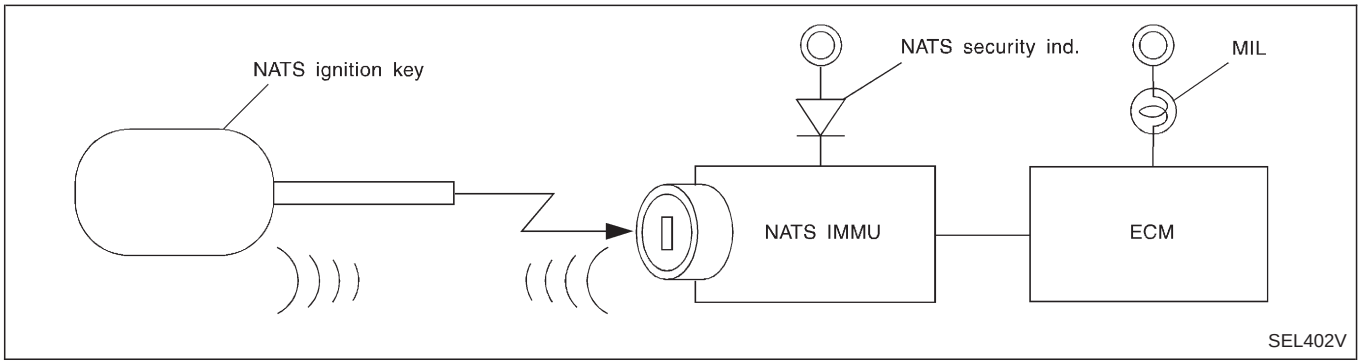
NATS has the following immobiliser functions:

- Since only NATS ignition keys, whose IDs. have been registered into the ECM and IMMU of NATS, allow the engine to run, operation of a stolen vehicle without a NATS registered key is prevented by NATS. That is to say, NATS will immobilize the engine if someone tries to start it without the registered key of NATS.
- Both of the originally supplied ignition key IDs have been NATS registered.
  If requested by the vehicle owner, a maximum of four key IDs can be registered into the NATS components.
- The NATS security indicator (NATS security ind.) blinks when the ignition switch is in ‘‘OFF’’ or ‘‘ACC’’ position. Therefore, NATS warns outsiders that the vehicle is equipped with the anti-theft system.
- When NATS detects trouble, the malfunction indicator lamp (MIL) blinks.
- NATS trouble diagnoses, system initialisation and additional registration of other NATS ignition key IDs must be carried out using CONSULT hardware and CONSULT NATS software.
  When NATS initialisation has been completed, the ID of the inserted ignition key is automatically NATS registered. Then, if necessary, additional registration of other NATS ignition key IDs can be carried out. Regarding the procedures of NATS initialisation and NATS ignition key ID registration, refer to CONSULT operation manual, NATS.
- **When servicing a malfunction of the NATS (indicated by flashing of Malfunction Indicator Lamp) or registering another NATS ignition key ID no., it may be necessary to re-register original key identification. Therefore, be sure to receive all keys from vehicle owner.**

System Composition

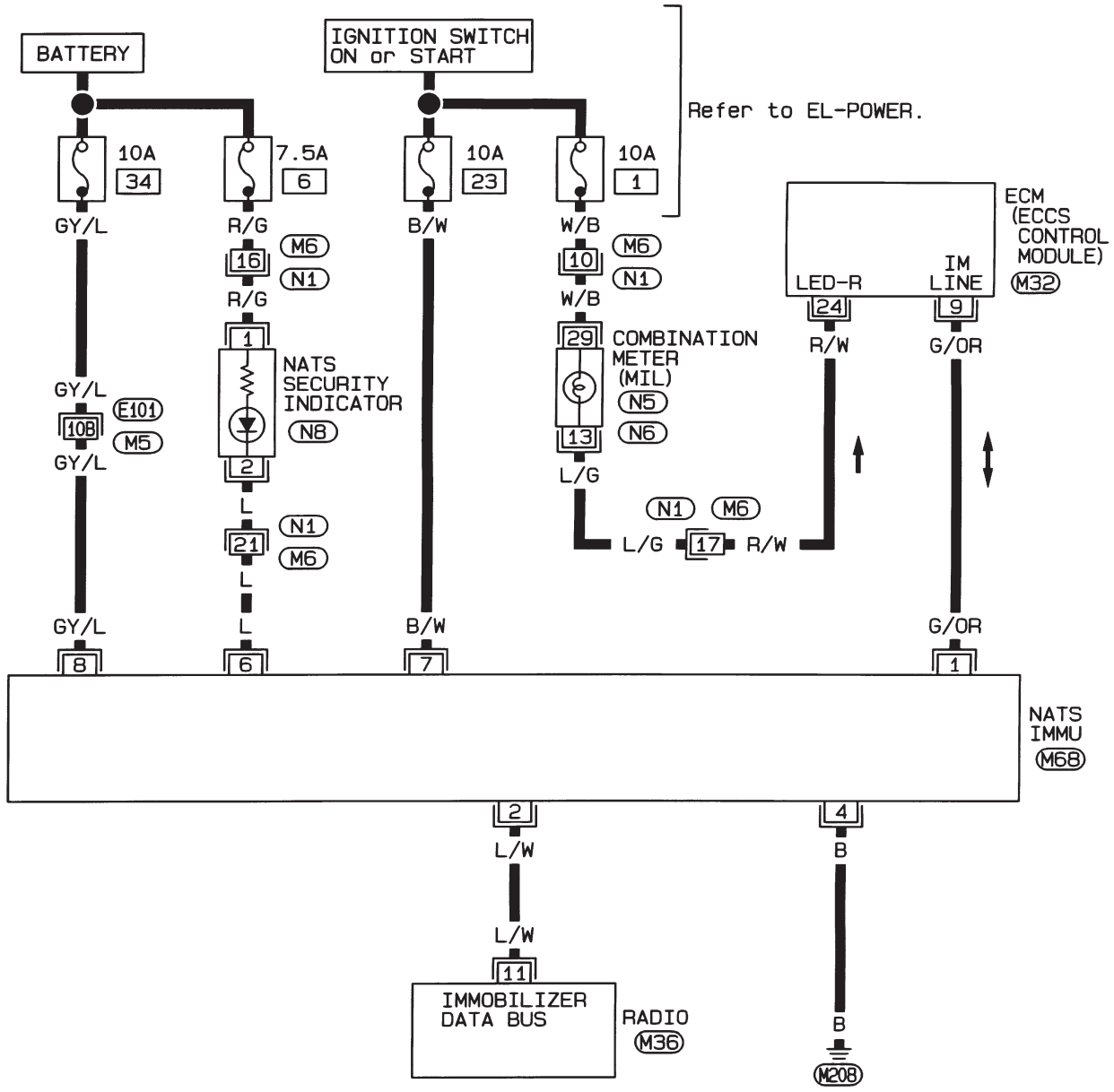
The immobiliser function of the NATS consists of the following:

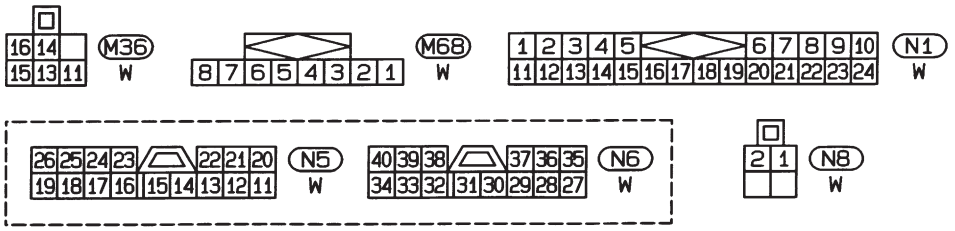
- NATS ignition key
- NATS immobiliser control unit (NATS IMMU) located in the ignition key cylinder
- Engine control module (ECM)
- NATS security indicator
- Malfunction indicator lamp (MIL)



Wiring Diagram — NATS —

EL-NATS-01

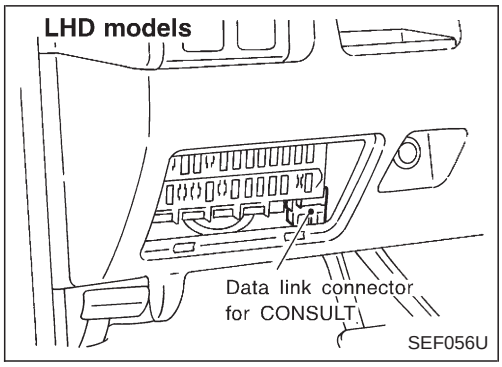




Refer to last page (Foldout page).

M5, E101, M32

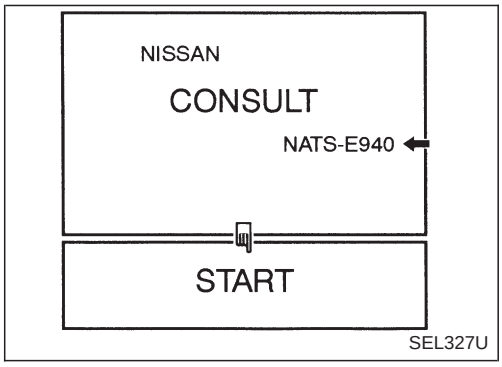
HEL388A



CONSULT

CONSULT INSPECTION PROCEDURE

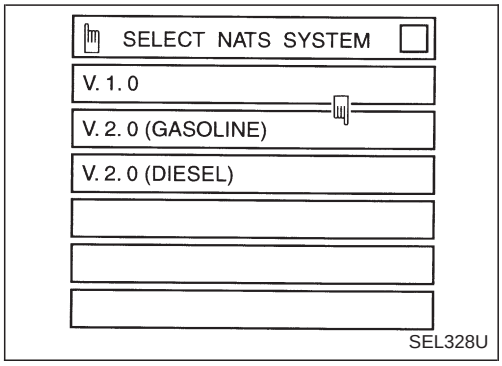
1. Turn off ignition switch.
2. Connect ‘‘CONSULT’’ to Data link connector for CONSULT.



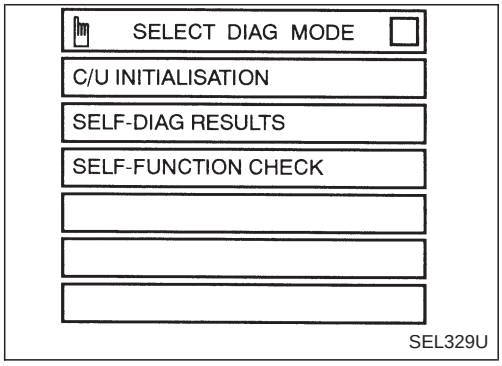
3. Insert NATS program card into CONSULT.

⬅: Program card
NATS-E940

4. Turn on ignition switch.
5. Touch ‘‘START’’.



6. Touch ‘‘V.2.0 (GASOLINE)’’.



7. Perform each diagnostic test mode according to each service procedure.

For further information, see the CONSULT Operation Manual, NATS V2.0 (GASOLINE).

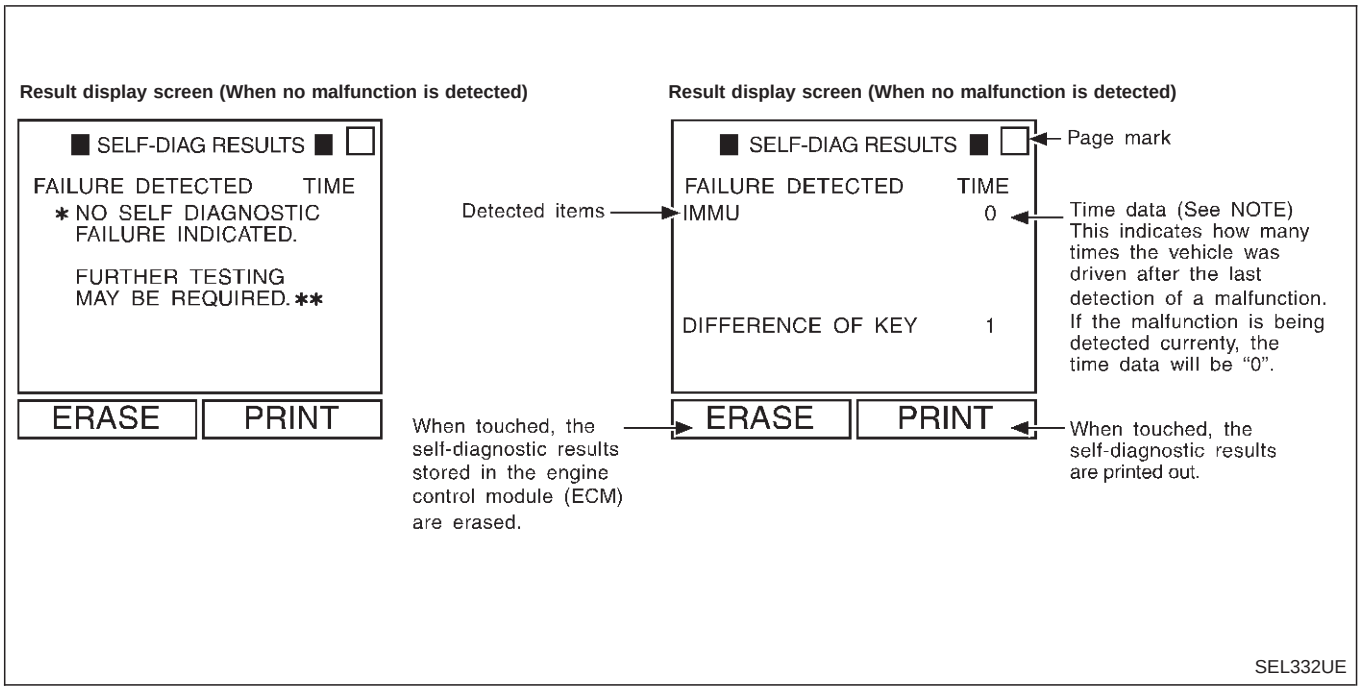
CONSULT (Cont'd)

CONSULT DIAGNOSTIC TEST MODE FUNCTION

CONSULT DIAGNOSTIC TEST MODE	Description
C/U INITIALIZATION	When replacing any of the following three components, C/U initialization is necessary. [NATS ignition key/IMMU/ECM]
SELF-FUNCTION CHECK	ECM checks its own NATS communication interface by itself.
SELF-DIAGNOSTIC RESULTS	Detected items (screen terms) are as shown in the chart below.

NOTE:
When any initialisation is performed, all ID previously registered will be erased. So all NATS ignition keys must be registered again.
The engine cannot be started with an unregistered key. In this case, the system may show ''DIFFERENCE OF KEY'' or ''LOCK MODE'' as a self-diagnostic result on the CONSULT screen.

HOW TO READ SELF-DIAGNOSTIC RESULTS



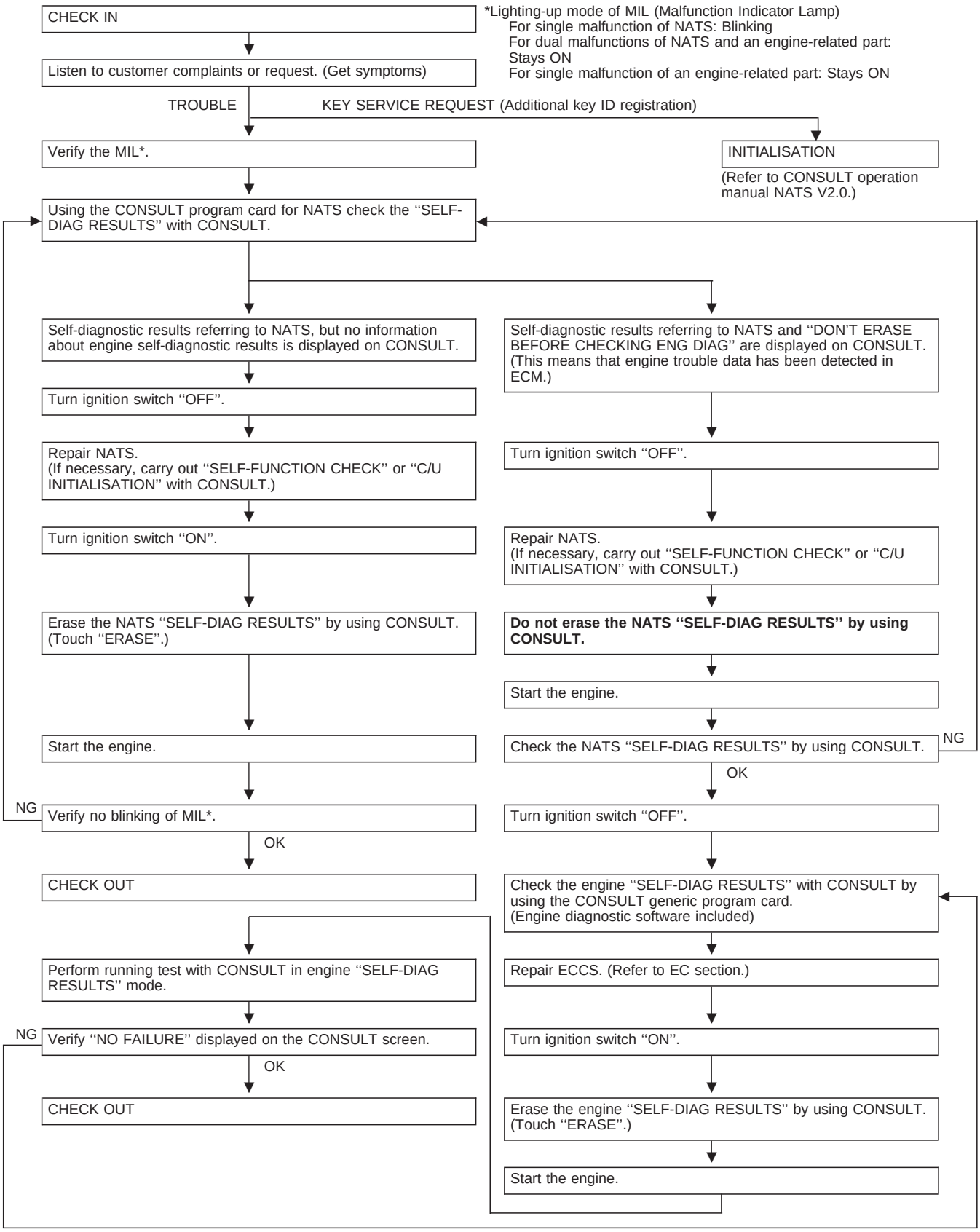
NOTE:
- **If trip number is more than 1, MIL does not blink.**
- **Time data is not indicated for this model.**

SELF-DIAGNOSTIC RESULTS ITEM CHART

Detected items (Screen terms)	Description	Reference page
IMMU	ECM received the signal from IMMU that IMMU is malfunctioning.	EL-190
ECM	ECM is malfunctioning.	EL-190
CHAIN OF ECM-IMMU	Communication impossible between ECM and IMMU.	EL-191
DIFFERENCE OF KEY	IMMU can receive the key ID signal but the result of ID verification between key ID and IMMU is NG.	EL-193
CHAIN OF IMMU-KEY	IMMU cannot receive the key ID signal.	EL-194
ID DISCORD, IMM-ECM	The result of ID verification between IMMU and ECM is NG. System initialisation is required.	EL-194
MINGLE NOISE	Noise (interference) mingled into NATS communication lines during communicating.	EL-195
DON'T ERASE BEFORE CHECKING ENG DIAG	Engine trouble data and NATS trouble data have been detected in ECM.	EL-188
LOCK MODE	When an unregistered ignition key is used, or if the starting operation is carried out two or more times consecutively with the ignition key, IMMU or ECM malfunctioning, NATS will shift the mode to one which prevents the engine from being started.	EL-196

Trouble Diagnoses

WORK FLOW



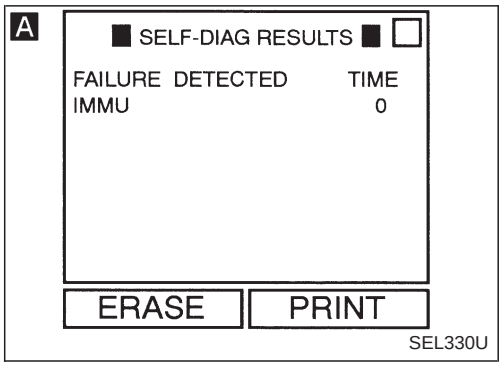
Trouble Diagnoses (Cont'd)

SYMPTOM CHART

SYMPTOM	Displayed "SELF-DIAG RESULTS" on CONSULT screen.	DIAGNOSTIC PROCEDURE (Reference page)	SYSTEM (Malfunctioning part or mode)
● MIL blinking ● Engine will start	IMMU	PROCEDURE 1 (EL-190)	IMMU
	ECM	PROCEDURE 2 (EL-190)	ECM
● MIL blinking ● Engine does not start	CHAIN OF ECM-IMMU	PROCEDURE 3 (EL-191)	Open circuit in battery voltage line of IMMU circuit
			Open circuit in ignition line of IMMU circuit
			Open circuit in ground line of IMMU circuit
			Open or short circuit in communication line between IMMU and ECM
			ECM
			IMMU
	DIFFERENCE OF KEY	PROCEDURE 4 (EL-193)	Unregistered key
			IMMU
	CHAIN OF IMMU-KEY	PROCEDURE 5 (EL-194)	Malfunction of key ID chip
			IMMU
	ID DISCORD, IMM-ECM	PROCEDURE 6 (EL-194)	System initialisation has not yet been completed.
			ECM
			IMMU
	MINGLE NOISE	PROCEDURE 7 (EL-195)	Noise interference in communication line
	LOCK MODE	PROCEDURE 8 (EL-196)	LOCK MODE
● MIL staying ON	DON'T ERASE BEFORE CHECKING ENG DIAG	WORK FLOW (EL-188)	Engine trouble data and NATS trouble data have been detected in ECM.
● Security indicator does not operate properly. ● Engine starts properly.	—	PROCEDURE 9 (EL-197)	Security indicator circuit
			Security indicator
			Continuation of initialisation mode

*Lighting-up mode of MIL (Malfunction Indicator Lamp)
For single malfunction of NATS: Blinking
For dual malfunctions of NATS and an engine-related part: Stays ON
For single malfunction of an engine-related part: Stays ON

Trouble Diagnoses (Cont'd)



DIAGNOSTIC PROCEDURE 1

Self-diagnostic results:
''IMMU'' displayed on CONSULT screen

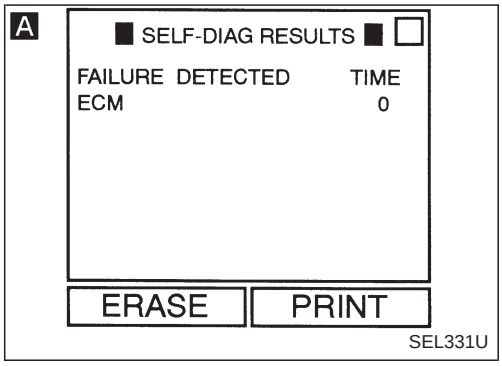
A

Confirm SELF-DIAGNOSTIC RESULTS ''IMMU'' displayed on CONSULT screen.

↓

- IMMU is malfunctioning.

1. Replace IMMU.
2. Perform initialisation with CONSULT.
   For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (GASOLINE)''.



DIAGNOSTIC PROCEDURE 2

Self-diagnostic results:
''ECM'' displayed on CONSULT screen

A

Confirm SELF-DIAGNOSTIC RESULTS ''ECM'' displayed on CONSULT screen.

↓

- ECM is malfunctioning.

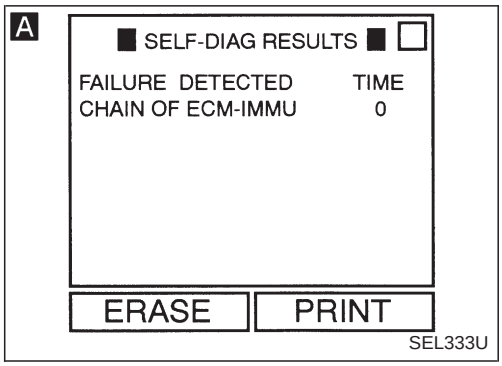
1. Replace ECM.
2. Perform initialisation with CONSULT.
   For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (GASOLINE)''.

Trouble Diagnoses (Cont'd)

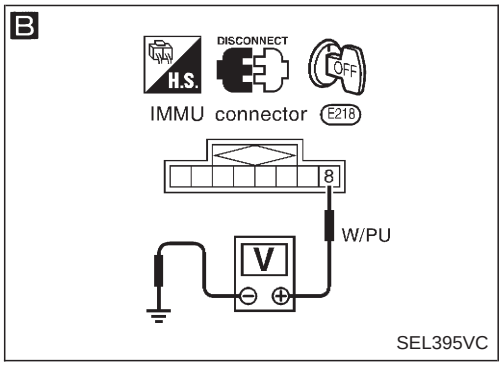
DIAGNOSTIC PROCEDURE 3

Self-diagnostic results:
''CHAIN OF ECM-IMMU'' displayed on CONSULT screen

A



B



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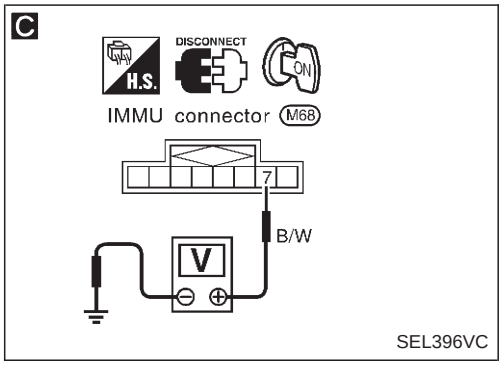
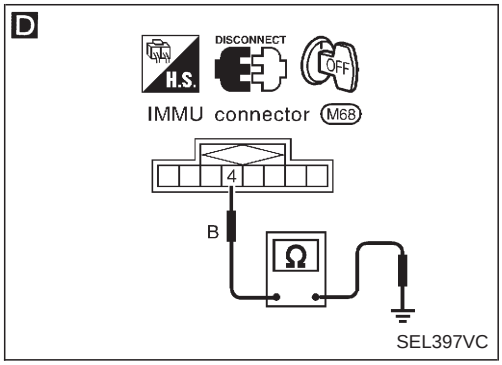
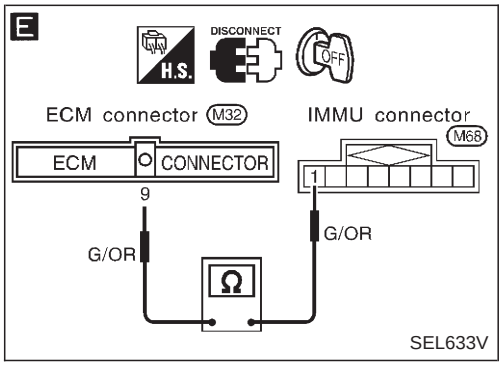


D



E



A

Confirm SELF-DIAGNOSTIC RESULTS ''CHAIN OF ECM-IMMU'' displayed on CONSULT screen.

OK

B

CHECK POWER SUPPLY CIRCUIT FOR IMMU.
Check voltage between IMMU terminal ⑧ and ground.
Battery voltage should exist.

NG → Check the following.
- 10A fuse (No. 34, located in the fusible link and fuse box)
- Harness for open or short between fuse and IMMU connector

OK

C

CHECK IGN SW. ON SIGNAL.
Check voltage between IMMU terminal ⑦ and ground while ignition switch is ''ON'' position.
Battery voltage should exist.

NG → Check the following.
- 10A fuse (No. 23, located in the fuse block)
- Harness for open or short between fuse and IMMU connector

OK

D

CHECK GROUND CIRCUIT FOR IMMU.
Check continuity between IMMU terminal ④ and ground.
Continuity should exist.

NG → Repair harness.

OK

E

CHECK COMMUNICATION LINE OPEN CIRCUIT.
Check continuity between IMMU terminal ① and ECM terminal ⑨.
Continuity should exist.

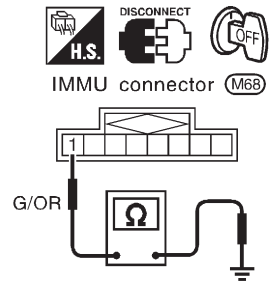
NG → Repair harness.

OK

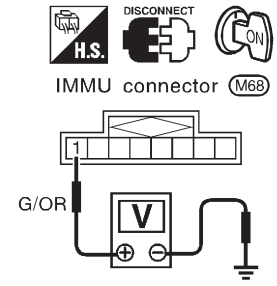
Ⓐ

Trouble Diagnoses (Cont'd)

F



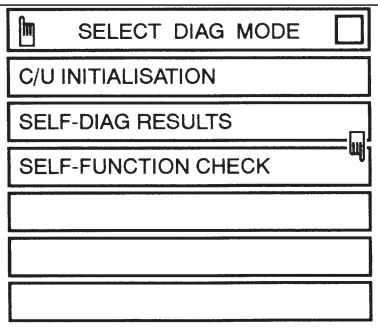
Short to ground check



Short to power circuit check

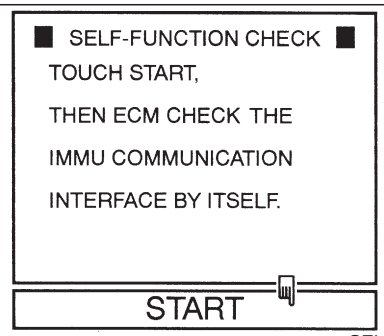
SEL399VC

G



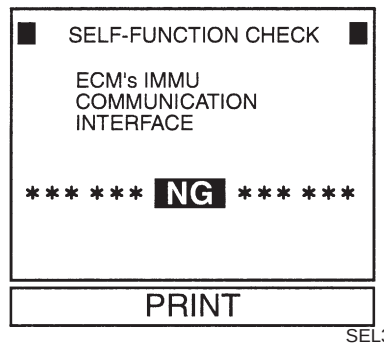
SEL340U

H



SEL341U

I



SEL342U

Ⓐ

F

CHECK COMMUNICATION LINE SHORT CIRCUIT.

1. Disconnect ECM connector and IMMU connector.
2. Check continuity between IMMU terminal ① and ground.
   Continuity should not exist.
3. Turn ignition switch to ON.
4. Check voltage between IMMU terminal ① and ground.
   No voltage should exist.

NG → Repair harness.

OK

G

SELF-FUNCTION CHECK

1. Connect ECM connector and disconnect IMMU connector.
2. Turn ignition switch "ON".
3. Touch "SELF-FUNCTION CHECK" on CONSULT "SELECT DIAG MODE" screen.

H

Touch "START". ECM will then check its communication interface by itself.

NG →

I

● ECM is malfunctioning.

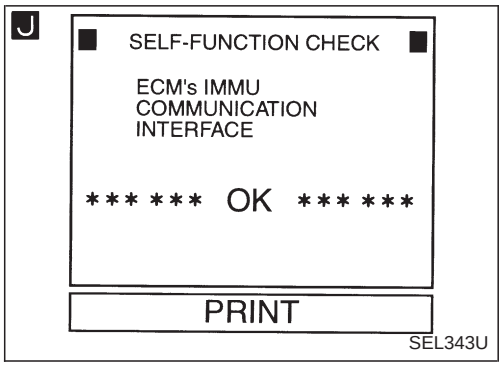
1. Replace ECM.
2. Perform initialisation with CONSULT.
   For the initialisation procedure, refer to "CONSULT operation manual NATS V2.0 (GASOLINE)".

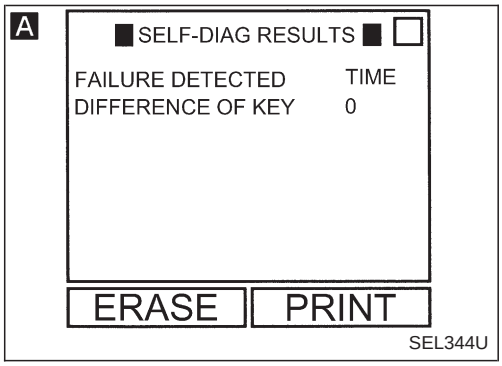
OK

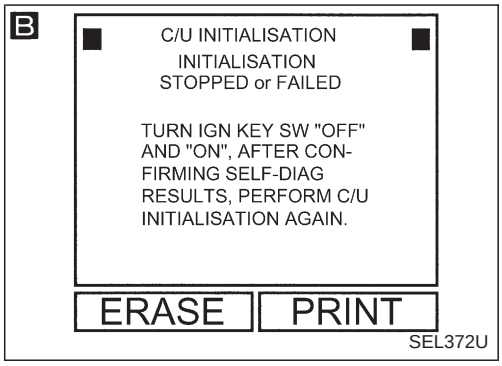
J

● IMMU is malfunctioning.

1. Replace IMMU.
2. Perform initialisation with CONSULT.
   For the initialisation procedure, refer to "CONSULT operation manual NATS V2.0".







DIAGNOSTIC PROCEDURE 4

Self-diagnostic results:
''DIFFERENCE OF KEY'' displayed on CONSULT screen

A

Confirm SELF-DIAGNOSTIC RESULTS ''DIFFERENCE OF KEY'' displayed on CONSULT screen.

OK

PERFORM INITIALISATION.
Perform initialisation with CONSULT.
Re-register all NATS ignition key IDs.
For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0''.
Can the system be initialized?
Note: If the initialisation is not completed or fails, CONSULT shows B message on the screen.

No

- IMMU is malfunctioning.
1. Replace IMMU.
2. Perform initialisation with CONSULT.
   For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (GASOLINE)''.

Yes

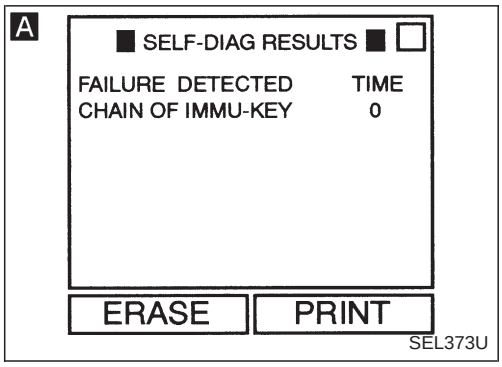
END.
(The ignition key was unregistered.)

Trouble Diagnoses (Cont'd)

DIAGNOSTIC PROCEDURE 5

Self-diagnostic results:
''CHAIN OF IMMU-KEY'' displayed on CONSULT screen

A



Confirm SELF-DIAGNOSTIC RESULTS ''CHAIN OF IMMU-KEY'' displayed on CONSULT screen.

OK

CHECK NATS IGNITION KEY ID CHIP.
Can the engine start with another registered NATS ignition key?

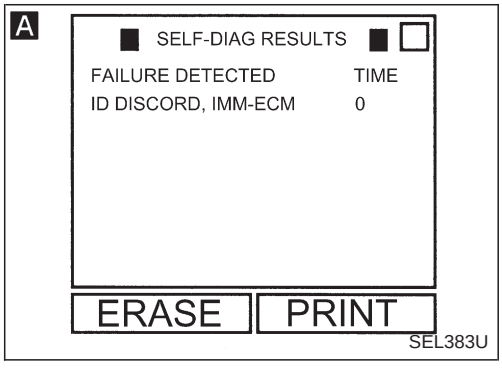
Yes →
- Ignition key ID chip is malfunctioning.
1. Replace the ignition key.
2. Perform initialisation with CONSULT.
   For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (GASOLINE)''.

No ↓
- IMMU is malfunctioning.
1. Replace IMMU.
2. Perform initialisation with CONSULT.
   For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0''.

DIAGNOSTIC PROCEDURE 6

Self-diagnostic results:
''ID DISCORD, IMM-ECM'' displayed on CONSULT screen

A



Confirm SELF-DIAGNOSTIC RESULTS ''ID DISCORD, IMM-ECM*'' displayed on CONSULT screen.

* ''ID DISCORD, IMM-ECM'': Registered ID of IMMU is in discord with that of ECM.

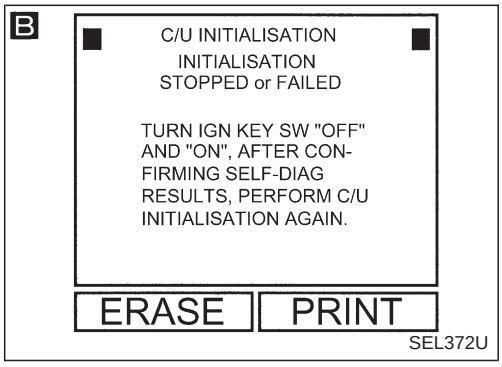
PERFORM INITIALISATION.
Perform initialisation with CONSULT.
Re-register all NATS ignition key IDs.
For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0''.
Can the system be initialized?
Note: If the initialisation is not completed or fails, CONSULT shows B message on the screen.

No →
- ECM is malfunctioning.
1. Replace ECM.
2. Perform initialisation with CONSULT.
   For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (GASOLINE)''.

Yes ↓

END.
(System initialisation was not completed.)

B

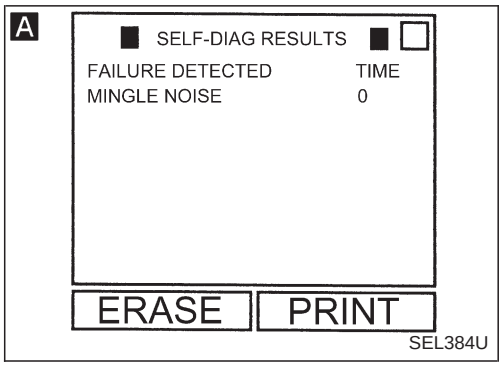


Trouble Diagnoses (Cont'd)

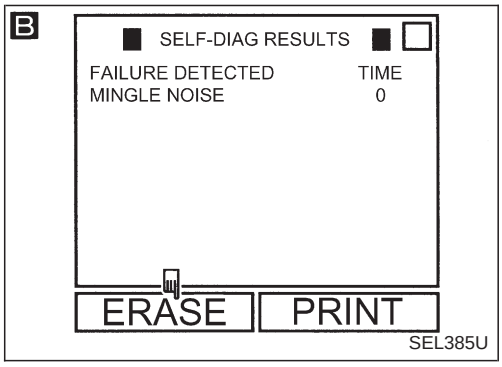
DIAGNOSTIC PROCEDURE 7

Self-diagnostic results:
''MINGLE NOISE'' displayed on CONSULT screen

A



B



A

Confirm SELF-DIAGNOSTIC RESULTS ''MINGLE NOISE'' displayed on CONSULT screen.

↓

Turn off or remove any possible noise sources.

↓

B

Touch ''ERASE'' on CONSULT SELF-DIAGNOSTIC RESULTS screen.

↓

Can the engine start? — No → (back to A)

Yes

↓

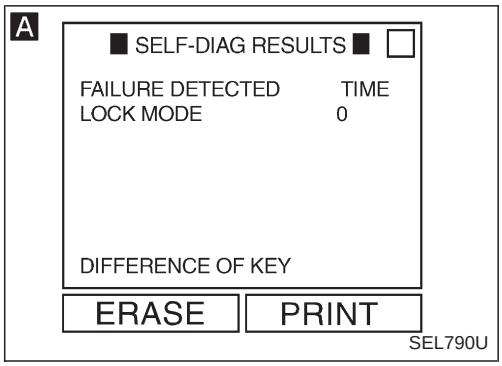
END

Trouble Diagnoses (Cont'd)

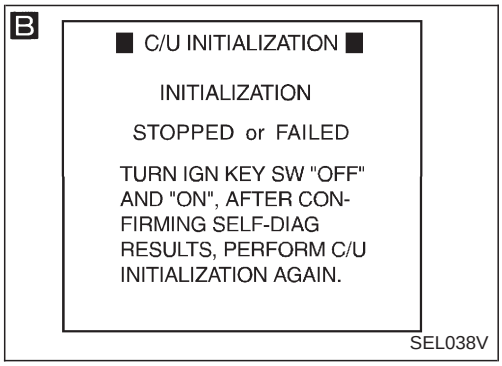
DIAGNOSTIC PROCEDURE 8

Self-diagnostic results: ''LOCK MODE'' displayed on CONSULT screen

A



B



A

Confirm SELF-DIAGNOSTIC RESULTS ''LOCK MODE'' is displayed on CONSULT screen.

1. Turn the ignition switch to OFF position.
2. Turn the ignition key switch to ON position with a registered key. (Do not start engine.) Wait for 5 seconds.
3. Return the key to the OFF position.
4. Repeat steps 2 and 3 twice (total of three cycles).
5. Start the engine.

Can the engine start?

Yes → System is OK. (Now the system is escaped from ''LOCK MODE''.)

No

CHECK NATS IMMU INSTALLATION. Refer to ''How to Replace NATS IMMU'' in EL-197.

NG → Reinstall NATS IMMU correctly.

OK

PERFORM INITIALISATION. Perform initialisation with CONSULT. For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (GASOLINE)''.

Can the system be initialized?

Note: If the initialisation is incompleted or failed, CONSULT shows B message on the screen.

Yes → System is OK.

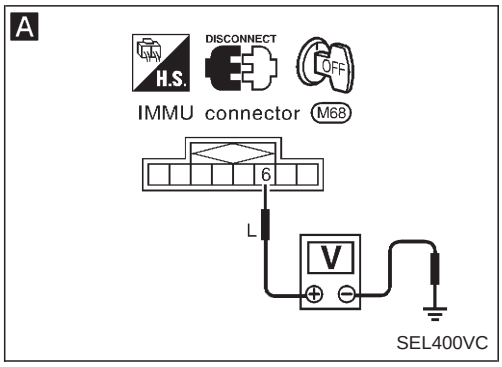
No

Go to DIAGNOSTIC PROCEDURE 5, EL-194 to check ''CHAIN OF IMMU-KEY''.

Trouble Diagnoses (Cont'd)

DIAGNOSTIC PROCEDURE 9

Security indicator check



A

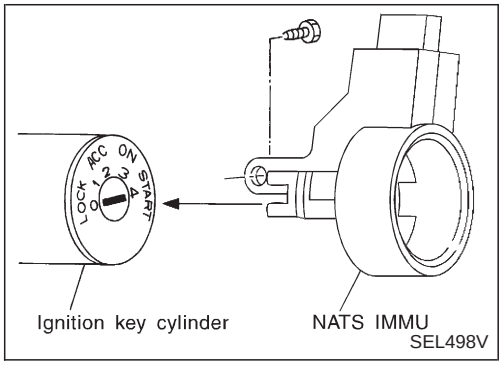
CHECK INDICATOR CIRCUIT.
1. Disconnect NATS IMMU connector.
2. Check voltage between NATS IMMU terminal (6) and ground.
   Battery voltage should exist.

NG →

Check the following.
- 7.5A fuse (No. 6, located in the fuse block)
- Security indicator
- Harness for open or short between fuse and security indicator
- Harness for open or short between NATS IMMU and security indicator

OK ↓

PERFORM INITIALISATION.
Perform initialisation with CONSULT.
For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (GASOLINE)''.

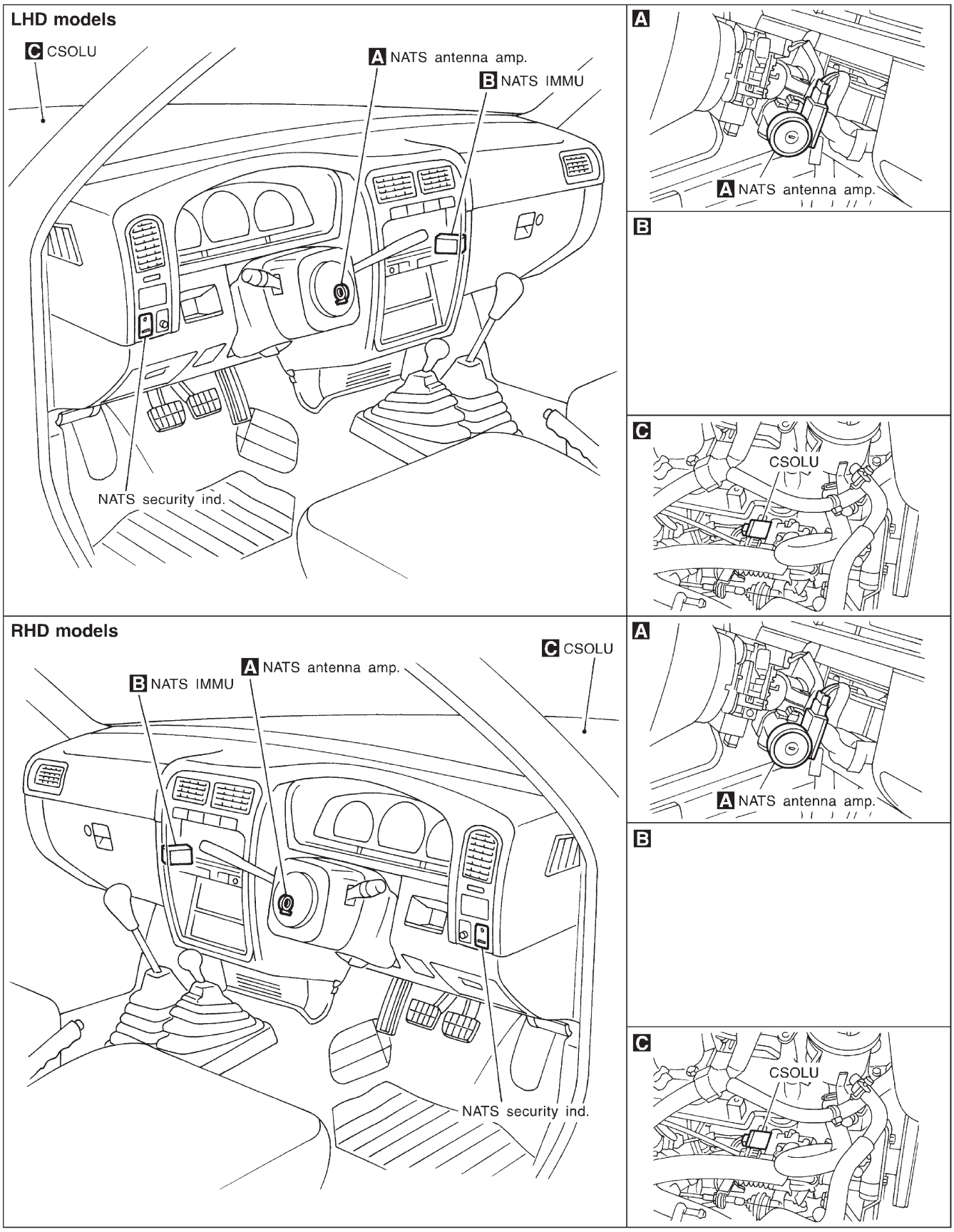


How to Replace NATS IMMU

NOTE:

- **If NATS IMMU is not installed correctly, NATS system will not operate properly and SELF-DIAG RESULTS on CONSULT screen will show ''LOCK MODE'' or ''CHAIN OF IMMU-KEY''.**

Component Parts and Harness Connector Location



SEL650V

System Description

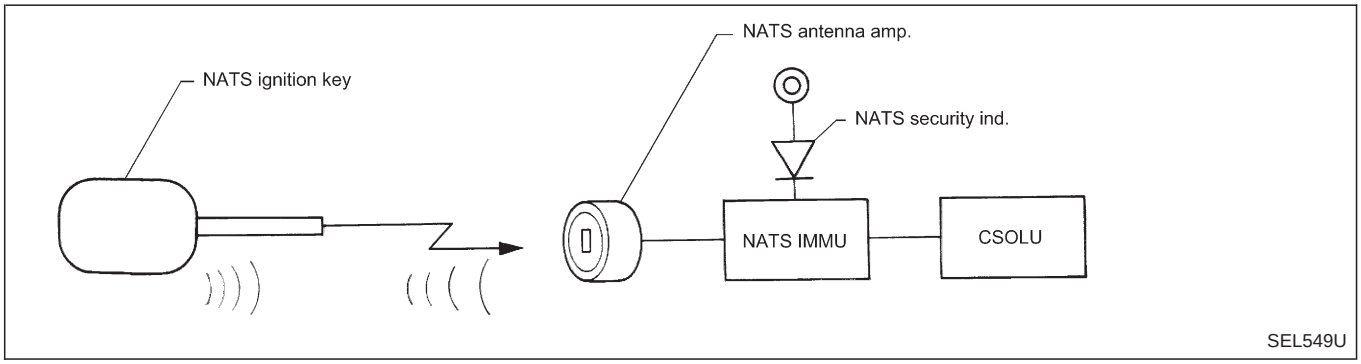
NATS has the following immobiliser functions:

- Since only NATS ignition keys, whose IDs. have been registered into the NATS immobiliser control unit (NATS IMMU), allow the engine to run, operation of a stolen vehicle without a NATS registered key is prevented by NATS.
- Both of the originally supplied ignition key IDs have been NATS registered.
  If requested by the vehicle owner, a maximum of four key IDs can be registered into the NATS components.
- The NATS security indicator (NATS security ind.) blinks when the ignition switch is in ''OFF'' or ''ACC'' position. Therefore, NATS warns outsiders that the vehicle is equipped with the anti-theft system.
- If NATS detects trouble, the NATS security indicator comes on while engine is running or ignition switch is in ''ON'' position.
- When servicing NATS (trouble diagnoses, NATS initialisation and additional registration of other NATS ignition key IDs), CONSULT hardware and CONSULT NATS software is necessary.
- There are two types of NATS initialisation, one is ''SYSTEM INITIALISATION'' and another is ''IMMU INITIALISATION''.
  When NATS initialisation has been completed, the ID of the inserted ignition key is automatically NATS registered. Then, if necessary, additional registration of other NATS ignition key IDs can be carried out.
  Regarding the procedures of NATS initialisation and NATS ignition key ID registration, refer to CONSULT operation manual, NATS V2.0 (Diesel).
- **When servicing a malfunction of the NATS (indicated by lighting of NATS security ind.) or registering another NATS ignition key ID no., it may be necessary to re-register original key identification. Therefore, be sure to receive all keys from vehicle owner.**

System Composition

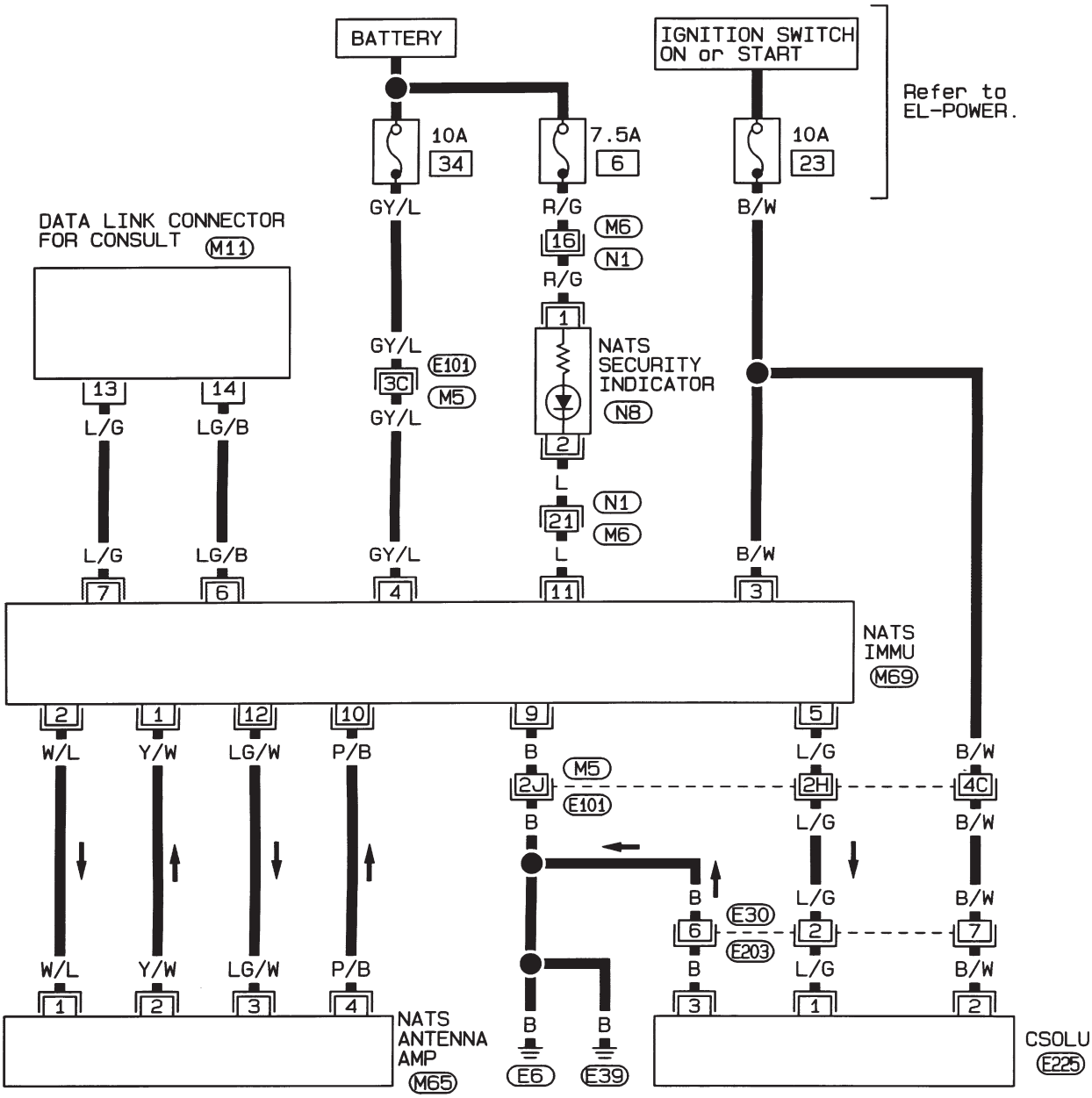
The immobiliser function of the NATS consists of the following:

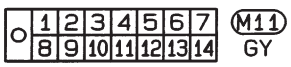
- NATS ignition key
- NATS antenna amp. located in the ignition key cylinder
- NATS immobiliser control unit (NATS IMMU)
- Coded solenoid unit installed in the injection pump assembly (CSOLU)
- NATS security indicator (NATS security ind.)

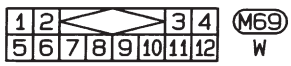


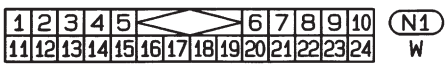
Wiring Diagram — NATS —/LHD Models

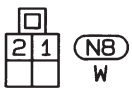
EL-NATS-02

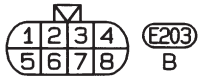


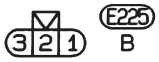












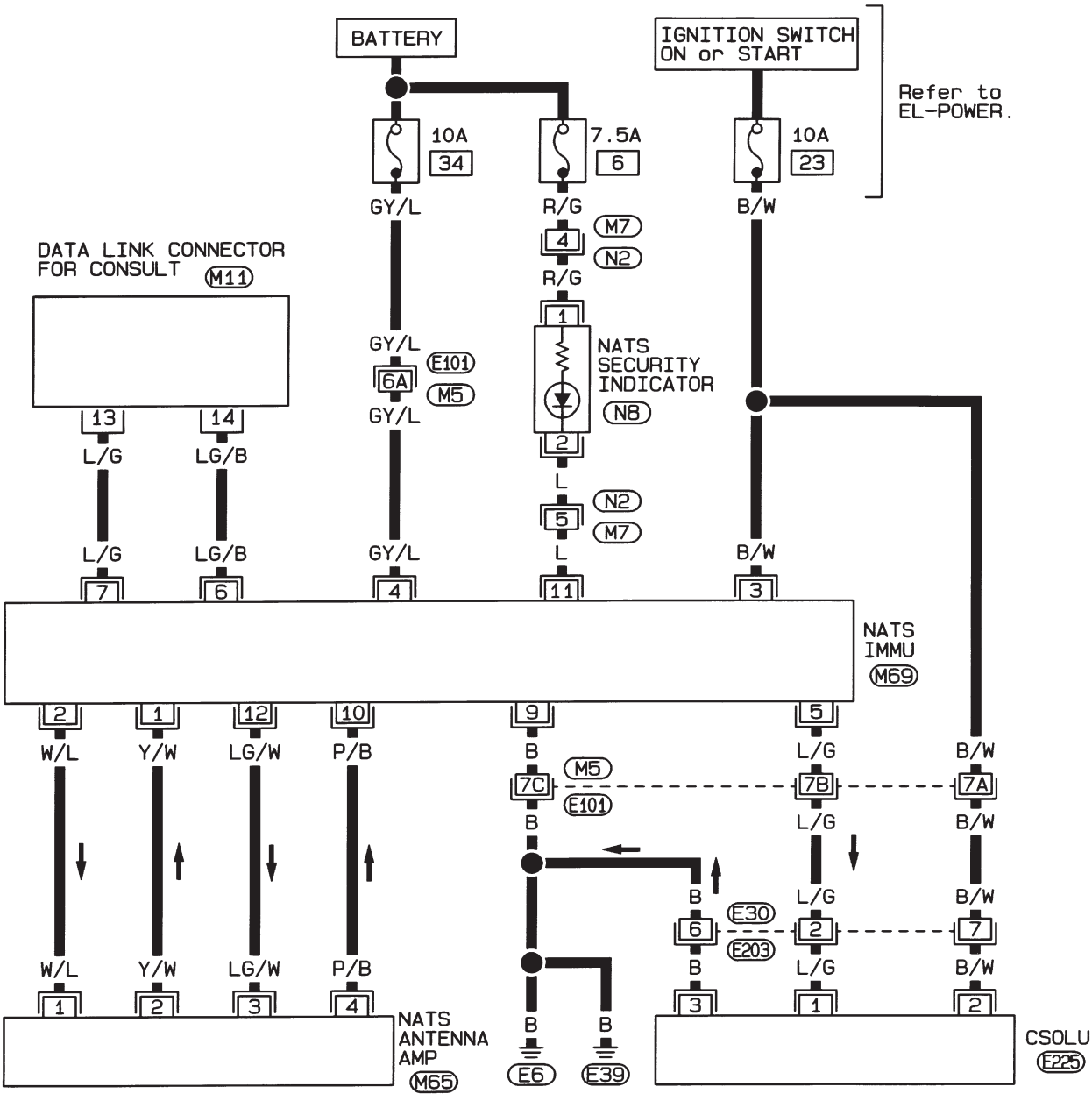
Refer to last page (Foldout page).

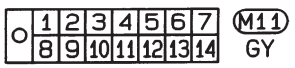
M5, E101

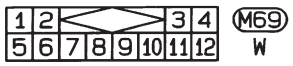
HEL389A

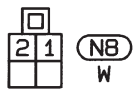
Wiring Diagram — NATS —/RHD Models

EL-NATS-03





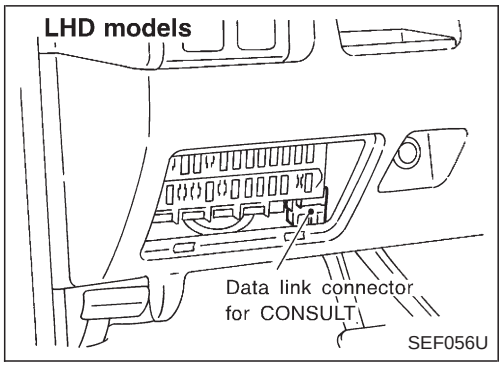




Refer to last page (Foldout page).

M5, E101

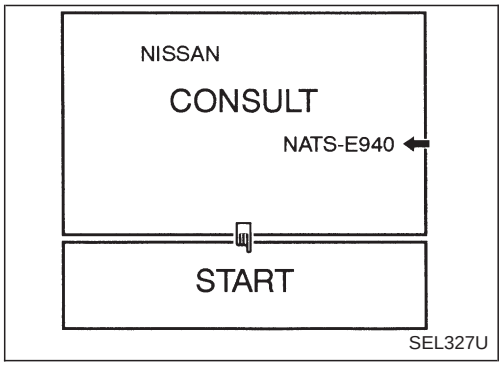
HEL390A



CONSULT

CONSULT INSPECTION PROCEDURE

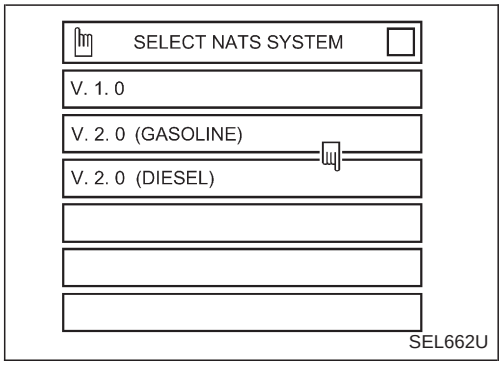
1. Turn off ignition switch.
2. Connect ''CONSULT'' to Data link connector for CONSULT.



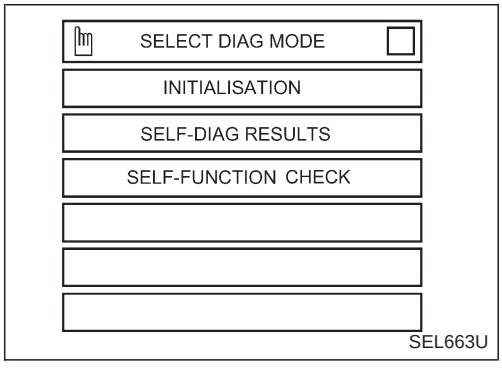
3. Insert NATS program card into CONSULT.

⬅: Program card
NATS-E940

4. Turn on ignition switch.
5. Touch ''START''.

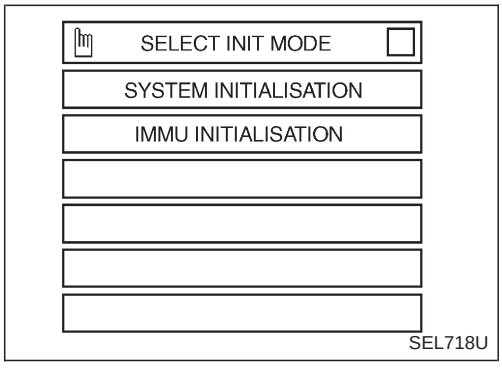


6. Touch ''V.2.0 (DIESEL)''.



7. Perform each diagnostic test mode according to each service procedure.

For further information, see the CONSULT Operation Manual, NATS V2.0 (Diesel).



NOTE:
Two types of initialisation (system initialisation and IMMU initialisation) are available. For details, refer to ''INITIALISATION'' in next page.

CONSULT (Cont'd)

CONSULT DIAGNOSTIC TEST MODE FUNCTION

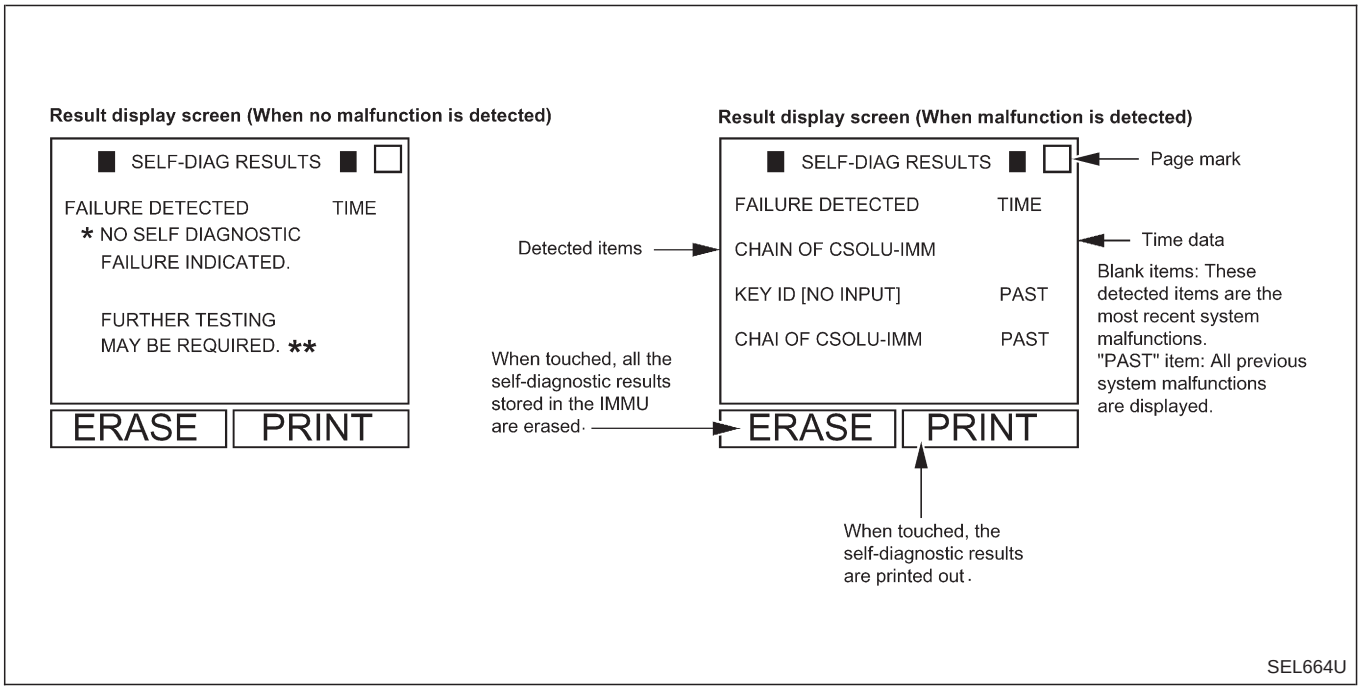
CONSULT diagnostic test mode	Description
C/U INITIALISATION	Two types of initialisation are available. For details, refer to ''INITIALISATION'' shown below.
SELF-FUNCTION CHECK	IMMU checks its own NATS communication interface.
SELF-DIAGNOSTIC RESULTS	Self-diagnostic results can be read and erased quickly.

INITIALISATION

Initialisation type	Description
SYSTEM INITIALISATION	All registered ignition key IDs in IMMU and CSOLU can be registered. **It takes around 16 minutes.** When the following component is replaced, this initialisation is required. ● IMMU ● CSOLU
IMMU INITIALISATION	All registered ignition key IDs in IMMU can be initialised and new IDs can be registered. When the following component is replaced or new NATS ignition key is registered, this initialisation is required. ● NATS ignition key

NOTE:
When any of initialisation is performed, all of ID codes previously registered will be erased. So all of NATS ignition keys must be registered again.
If unregistered key is used to try to start the engine, the system may show ''KEY ID [DIFFERENCE]'' as a self-diagnostic result on CONSULT screen.

HOW TO READ SELF-DIAGNOSTIC RESULTS



CONSULT (Cont'd)

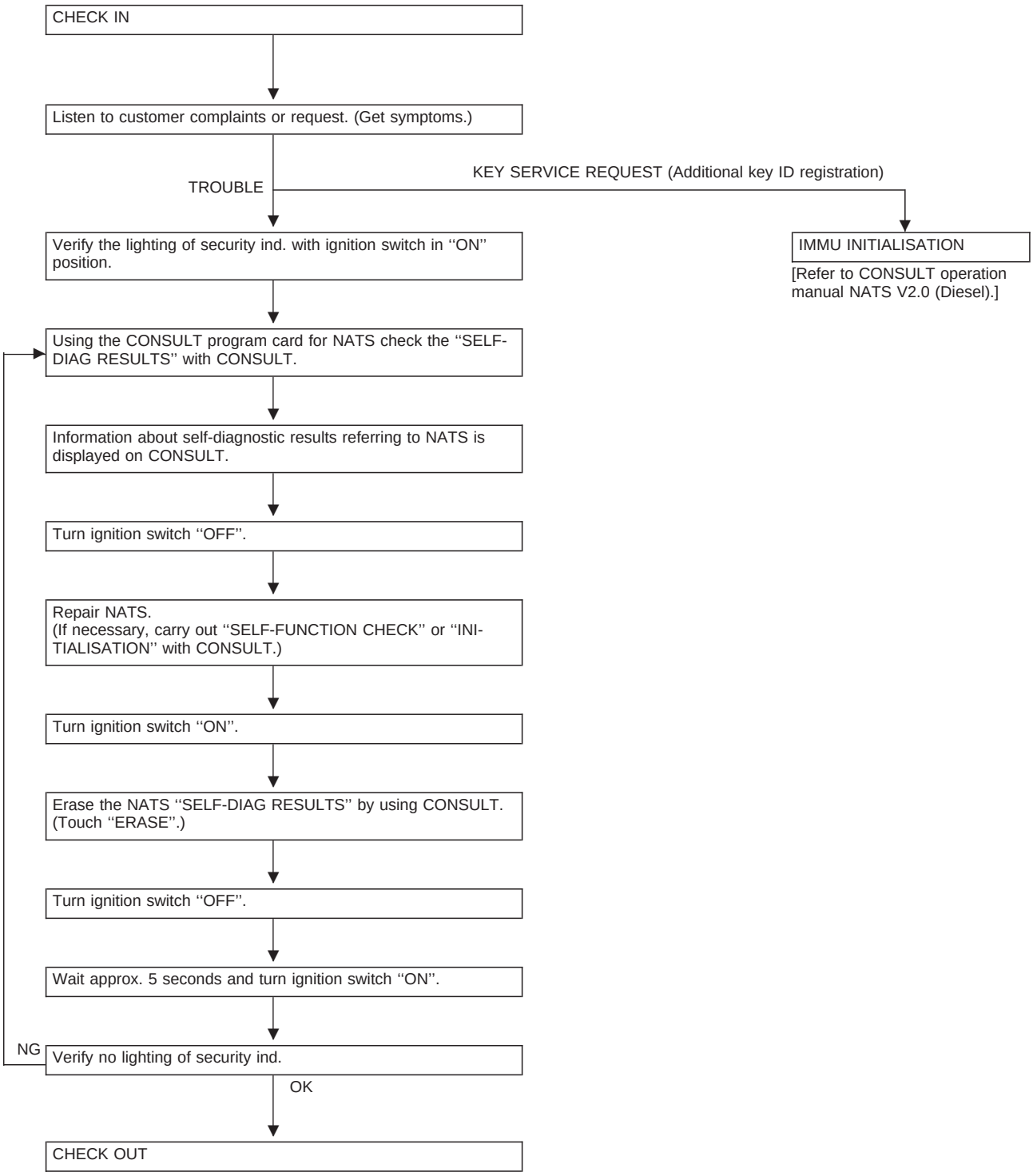
SELF-DIAGNOSTIC RESULTS ITEM CHART

Detected items (Screen terms)	Description	Reference page
IMMU	IMMU is malfunctioning.	EL-207
CSOLU	IMMU received the signal from CSOLU that CSOLU is malfunctioning.	EL-207
CHAIN OF CSOLU-IMM	Communication impossible between CSOLU and IMMU.	EL-208
KEY ID [DIFFERENCE]	IMMU can receive the key ID signal but the result of ID verification between key ID and IMMU is NG.	EL-210
KEY ID [NO INPUT]	IMMU cannot receive the key ID signal. In the case of multiple malfunctions, just this item can be displayed prior to the other malfunctioning items.	EL-211
ID DSCORD, IMM-CSLU	The result of ID verification between IMMU and CSOLU is NG. System initialisation is required.	EL-213

NOTE:
When CONSULT shows ''IMPOSSIBLE TO PROCEED'' displayed on its screen, it means that CONSULT fails to access to the NATS. In this case, perform diagnostic procedure 7, EL-214.

Trouble Diagnoses

WORK FLOW

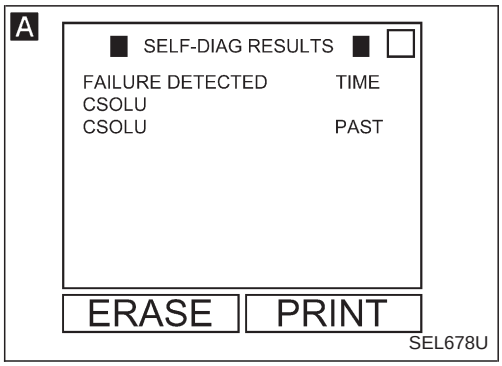


SYMPTOM CHART

Symptom	Displayed ''SELF-DIAG RESULTS'' on CONSULT screen	Diagnostic Procedure (Reference page)	System (Malfunctioning part or mode)
● No lighting/lighting of security indicator with ignition switch in ''ON'' position ● Hard to start engine	IMMU	PROCEDURE 1 (EL-207)	IMMU
● Lighting of security indicator with ignition switch in ''ON'' position ● Hard to start engine	CSOLU	PROCEDURE 2 (EL-207)	CSOLU
	CHAIN OF CSOLU-IMM	PROCEDURE 3 (EL-208)	Open circuit in ignition line of CSOLU
			Open circuit in ground line of CSOLU
			Open or short circuit in communication line between IMMU and CSOLU
			IMMU
			CSOLU
	KEY ID [NO INPUT]	PROCEDURE 5 (EL-211)	Open or short circuit in communication line between ANT/AMP and IMMU
			Open circuit in power source line of ANT/AMP circuit
			Open circuit in ground of ANT/AMP circuit
			Malfunction of key ID chip
			IMMU
			Antenna amp.
	ID DISCORD, IMM-CSLU	PROCEDURE 6 (EL-213)	System initialisation has not yet been completed.
			CSOLU
			IMMU
● Hard to start engine ● Lighting of security indicator with ignition switch in ''ON'' position (See note)	KEY ID [DIFFERENCE]	PROCEDURE 4 (EL-210)	Unregistered key
● Hard to start engine ● No lighting of security indicator. ● Impossible to proceed with the CONSULT diagnoses	After touch ''START'', CONSULT screen displays ''IMPOSSIBLE TO PROCEED''.	PROCEDURE 7 (EL-214)	Open or short circuit in communication line between IMMU and CONSULT data link connector
			Open or short circuit in antenna amp. power source circuit between IMMU and antenna amp.
			Open circuit in power source line of IMMU circuit
			Open circuit in ignition line of IMMU circuit
			Open circuit in ground line of IMMU circuit
			IMMU
● NATS security ind. does not blink with ignition switch in ''OFF'' or ''ACC''. ● Engine starts properly.	—	PROCEDURE 8 (EL-216)	NATS security ind.
			Open circuit between fuse and NATS IMMU
			Continuation of initialisation mode

NOTE: NATS security ind. may light off for 1 minute after ignition switch is turned to ''OFF'' position.

Trouble Diagnoses (Cont'd)



DIAGNOSTIC PROCEDURE 1

Self-diagnostic results:

''IMMU'' displayed on CONSULT screen

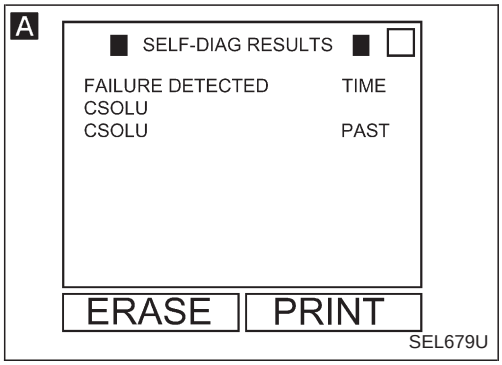
A

Confirm SELF-DIAGNOSTIC RESULTS ''IMMU'' displayed on CONSULT screen.

↓

- IMMU is malfunctioning.

1. Replace IMMU.
2. Perform system initialisation with CONSULT.
   For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (Diesel)''.



DIAGNOSTIC PROCEDURE 2

Self-diagnostic results:

''CSOLU'' displayed on CONSULT screen

A

Confirm SELF-DIAGNOSTIC RESULTS ''CSOLU'' displayed on CONSULT screen.

↓

- CSOLU is malfunctioning.

1. Replace CSOLU. (See NOTE.)
2. Perform system initialisation with CONSULT.
   For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (Diesel)''.

NOTE:
When replacing CSOLU, it cannot be removed from injection pump assembly because of its anti-theft construction. The injection pump assembly should be removed complete with CSOLU, and a Link Service rebuilt unit (complete with CSOLU) installed in its place.

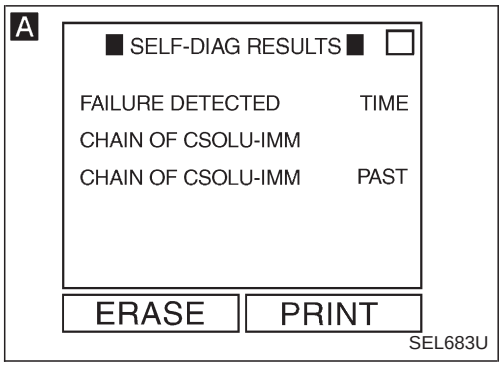
Trouble Diagnoses (Cont'd)

DIAGNOSTIC PROCEDURE 3

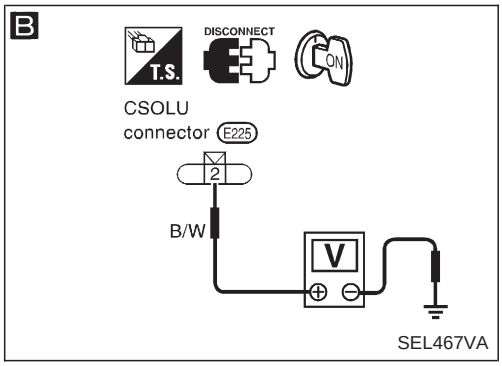
Self-diagnostic results:

''CHAIN OF CSOLU-IMM'' displayed on CONSULT screen

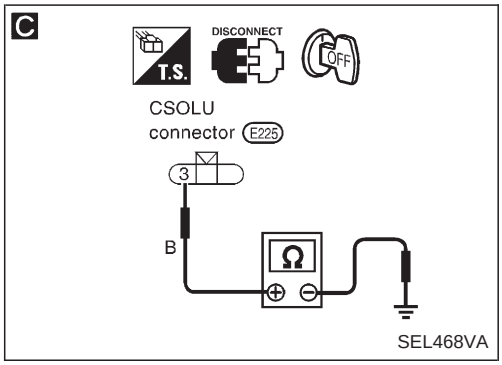
A



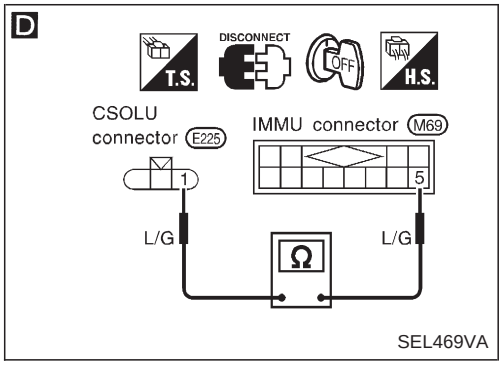
B



C



D



A

Confirm SELF-DIAGNOSTIC RESULTS ''CHAIN OF CSOLU-IMM'' displayed on CONSULT screen.

OK

B

CHECK CSOLU POWER SOURCE CIRCUIT.
Check voltage between CSOLU terminal ② and ground.
Battery voltage should exist.

NG → Check the following.
- 10A fuse (No. 23, located in the fuse block)
- Harness for open or short between fuse and CSOLU connector

OK

C

CHECK GROUND CIRCUIT FOR CSOLU.
Check harness continuity between CSOLU terminal ③ and ground.
Continuity should exist.

NG → Repair harness.

OK

D

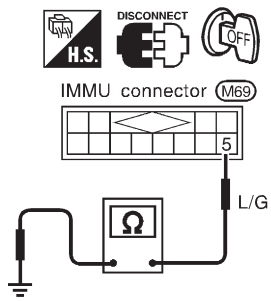
CHECK COMMUNICATION LINE OPEN CIRCUIT.
1. Disconnect CSOLU connector and IMMU connector.
2. Check harness continuity between CSOLU terminal ① and IMMU terminal ⑤.
Continuity should exist.

NG → Repair harness.

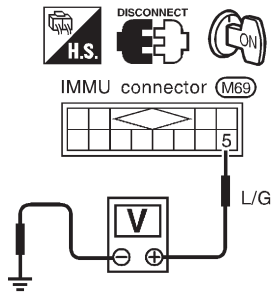
OK

Ⓐ

E



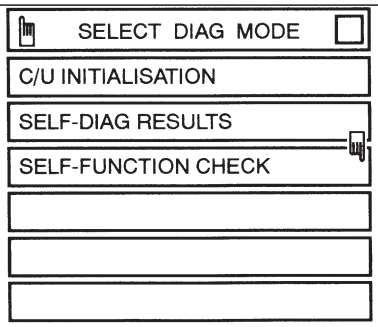
Short to ground check



Short to power circuit check

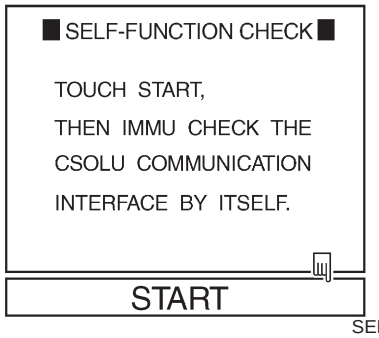
SEL455VA

F



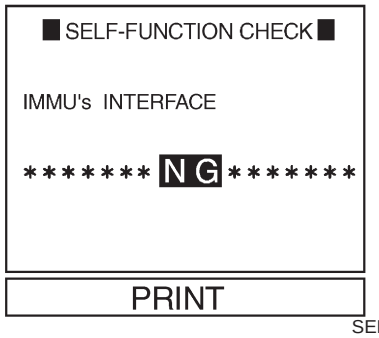
SEL340U

G



SEL690U

H



SEL691U

Ⓐ

E

CHECK COMMUNICATION LINE SHORT CIRCUIT.

1. Disconnect CSOLU connector and IMMU connector.
2. Check continuity between IMMU terminal ⑤ and ground.
   Continuity should not exist.
3. Turn ignition switch to ON.
4. Check voltage between IMMU terminal ⑤ and ground.
   No voltage should exist.

NG → Repair harness.

OK ↓

F

SELF-FUNCTION CHECK

1. Connect IMMU connector and disconnect CSOLU connector.
2. Turn ignition switch "ON".
3. Touch "SELF-FUNCTION CHECK" on CONSULT "SELECT DIAG MODE" screen.

G

Touch "START". IMMU will then check its communication interface by itself.

NG → H

H

- IMMU is malfunctioning.

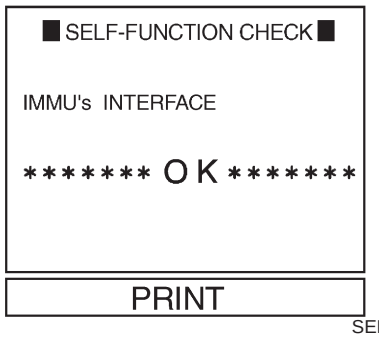
1. Replace IMMU.
2. Perform system initialisation with CONSULT. For the initialisation procedure, refer to "CONSULT operation manual NATS V2.0 (Diesel)".

OK ↓

I

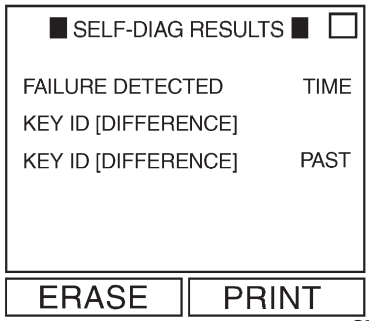
- CSOLU is malfunctioning.
  1. Replace CSOLU.
  2. Perform system initialisation with CONSULT. For the initialisation procedure, refer to "CONSULT operation manual NATS V2.0 (Diesel)".

I



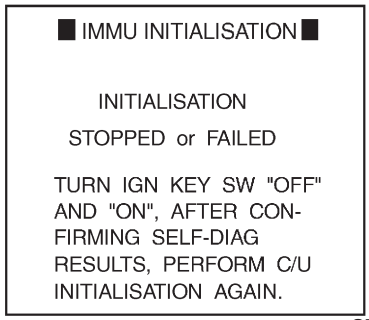
SEL692U

A



SEL693U

B



SEL694U

DIAGNOSTIC PROCEDURE 4

Self-diagnostic results:

''KEY ID [DIFFERENCE]'' displayed on CONSULT screen

A

Confirm SELF-DIAGNOSTIC RESULTS ''KEY ID [DIFFERENCE]'' is displayed on CONSULT screen.

1. Turn the ignition switch to OFF position and wait 1 minute.
   (After 1 minute, security indicator will blink.)
2. Turn the ignition key switch to ON position with a registered key.
   (Do not start engine.) Wait 5 seconds.
3. Return the key to the OFF position.
4. Repeat steps 2 and 3 twice (total of three cycles).
5. Start the engine.
   Can the engine start?

Yes → System is OK.

No

PERFORM IMMU INITIALISATION.
Perform IMMU initialisation with CONSULT.
For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (Diesel)''.
Can the system be initialised?
Note: If the initialisation is incompleted or failed, CONSULT shows B message on the screen.

Yes → System is OK.

No

Go to DIAGNOSTIC PROCEDURE 5, EL-211 to check ''KEY ID [NO INPUT]''.

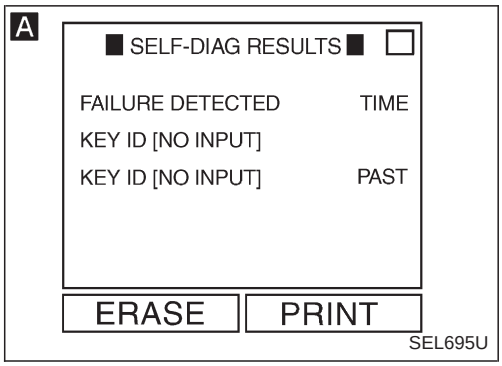
Trouble Diagnoses (Cont'd)

DIAGNOSTIC PROCEDURE 5

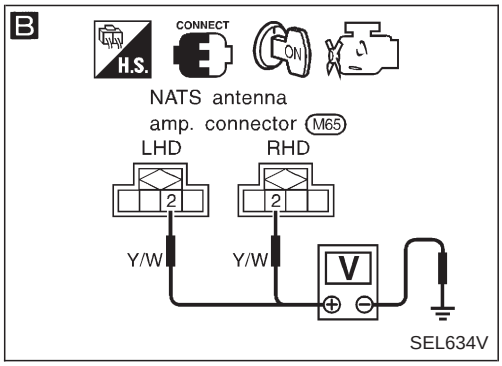
Self-diagnostic results:

''KEY ID [NO INPUT]'' displayed on CONSULT screen

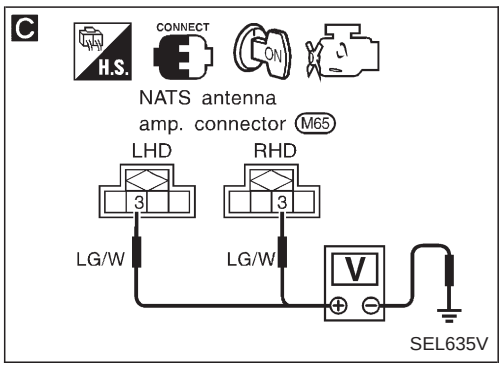
A



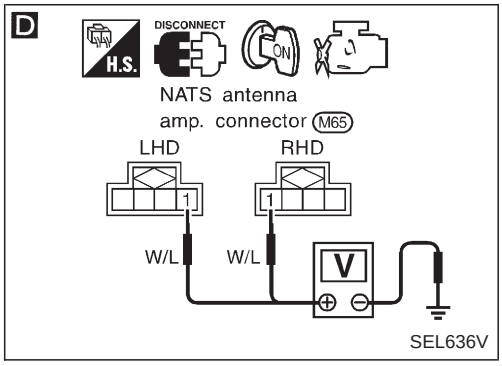
B



C



D



A

Confirm SELF-DIAGNOSTIC RESULTS ''KEY ID [NO INPUT]'' displayed on CONSULT screen.

OK

CHECK NATS IGNITION KEY ID CHIP.
Start engine with another registered NATS ignition key.
Can the engine start?

Yes

- Ignition key ID chip is malfunctioning.

1. Replace the ignition key.
2. Perform IMMU initialisation with CONSULT. For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (Diesel)''.

No

B

CHECK IMMU FUNCTION 1.

1. Turn ignition switch ''ON''.
2. Check voltage between IMMU terminal ② and ground.

Time (After turning ignition switch ''ON''.)	Voltage [V]
For approx. 0.5 sec.	Approx. 2.3 - 5
After 1 sec.	0

Note:
Do not remove NATS antenna amp. from the ignition key cylinder.

NG

Check harness for open or short between IMMU and NATS antenna amp. If harness is OK, replace IMMU. After replacing IMMU, perform system initialisation with CONSULT.
For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (Diesel)''.

OK

C

CHECK IMMU FUNCTION 2.

1. Turn ignition switch ''ON''.
2. Check voltage between NATS antenna amp. terminal ③ and ground.
   Voltage:
   6 sec. after turning ignition switch ''ON''
   Approx. 4.5 - 5.3V

Note:
Do not remove NATS antenna amp. from the ignition key cylinder.

NG

OK

D

CHECK IMMU OUTPUT VOLTAGE.

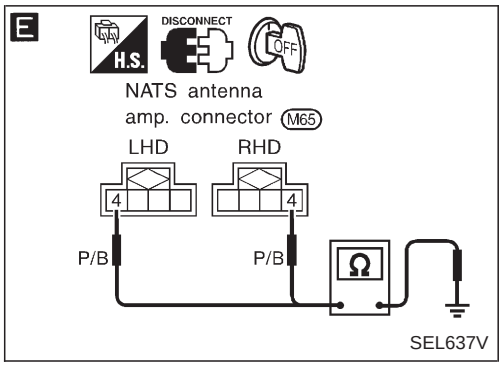
1. Turn the ignition switch ''ON''.
2. Check voltage between NATS antenna amp. terminal ① and ground.
   Voltage: More than 4.7V

NG

OK

Ⓐ

Trouble Diagnoses (Cont'd)



Ⓐ

E

CHECK ANTENNA AMP. GROUND LINE CIRCUIT.

1. Turn ignition switch ''OFF''.
2. Check continuity between NATS antenna amp. terminal ④ and ground. **Continuity should exist.**

NG → Check harness for open or short between NATS antenna amp. and IMMU. If harness is OK, replace IMMU. After replacing IMMU, perform system initialisation with CONSULT. For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (Diesel)''.

OK ↓

NATS antenna amp. is malfunctioning. When replacing the amp. hold on to amp. body. Take care not to pull on amp. harness.

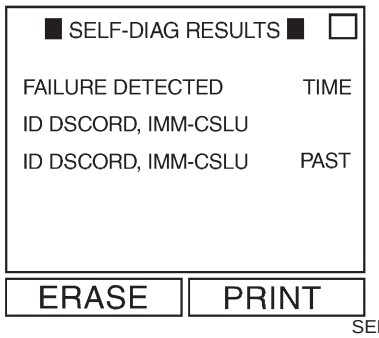
Trouble Diagnoses (Cont'd)

DIAGNOSTIC PROCEDURE 6

Self-diagnostic results:

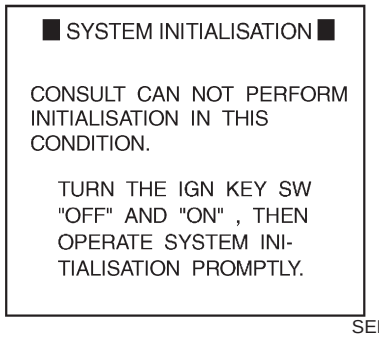
''ID DSCORD, IMM-CSLU'' displayed on CONSULT screen

A



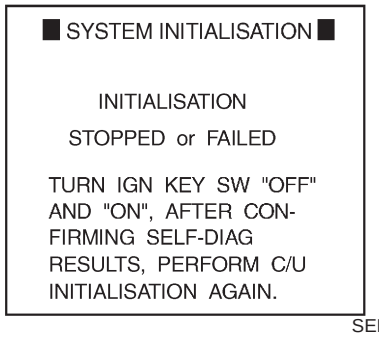
SEL696U

B



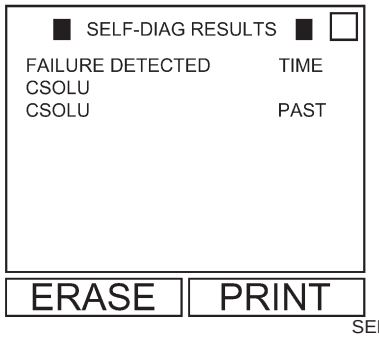
SEL698U

C



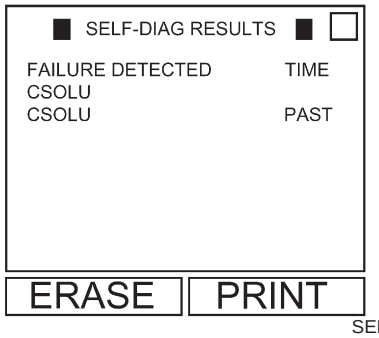
SEL697U

D



SEL678U

E



SEL679U

A

Confirm SELF-DIAGNOSTIC RESULTS ''ID DSCORD, IMM-CSLU*'' displayed on CONSULT screen.

* ''ID DSCORD, IMM-CSLU'': Registered ID of IMMU is in discord with that of CSOLU.

Perform system initialisation with CONSULT. Re-register all NATS ignition key IDs. For the operation of system initialisation, refer to ''CONSULT operation manual NATS V2.0 (Diesel)''.

Initialisation incompleted

B

Turn the ignition key and CONSULT power switch ''OFF''. Then turn the ignition key ''ON''.

Initialisation incompleted or failed with CONSULT

C

Confirm system initialisation result ''INITIALISATION STOPPED OR FAILED'' displayed on CONSULT screen.

Initialisation completed

Start engine.

OK

END

CHECK SELF-DIAG RESULTS.
1. Turn the ignition switch ''OFF'' and ''ON''.
2. Touch ''SELF-DIAG RESULTS'' on CONSULT ''SELECT DIAG MODE'' screen.

''IMMU'' is displayed.

''CSOLU'' is displayed.

D

If ''IMMU'' is displayed on CONSULT screen, IMMU is malfunctioning.

Replace IMMU.

E

If ''CSOLU'' is displayed on CONSULT screen, CSOLU is malfunctioning.

Replace CSOLU.

Perform system initialisation with CONSULT. For the operation of system initialisation, refer to ''CONSULT operation manual NATS V2.0 (Diesel)''.

Trouble Diagnoses (Cont'd)

DIAGNOSTIC PROCEDURE 7

Self-diagnostic results:

''IMPOSSIBLE TO PROCEED'' displayed on CONSULT screen

A

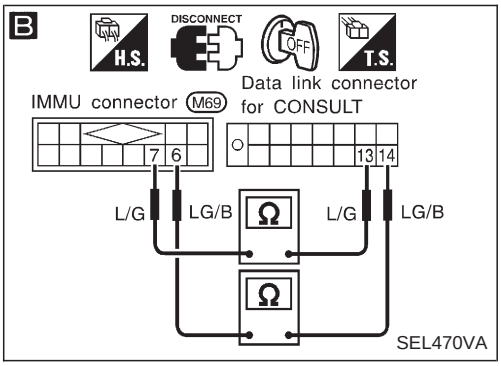
IMPOSSIBLE TO PROCEED

1.Turn off both IGN KEY SW and CONSULT.

2.Try to start from the beginning again.

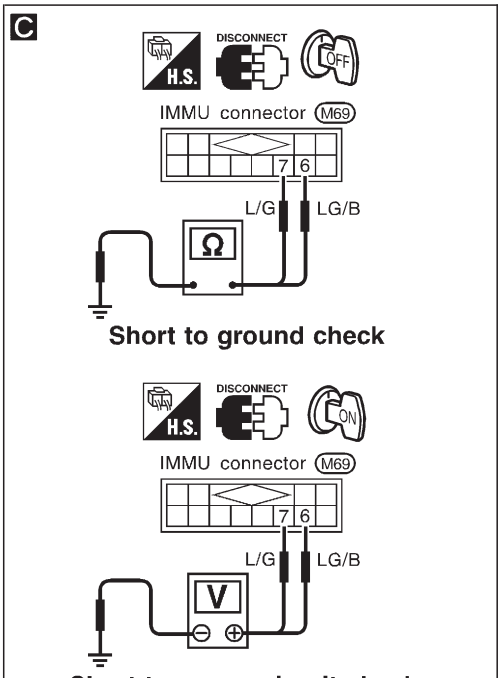
SEL719U

B



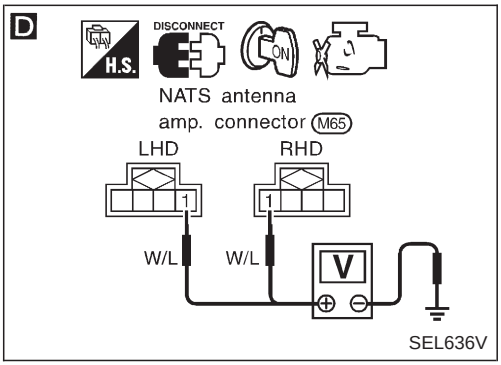
SEL470VA

C



SEL471VA

D



SEL636V

A

CHECK CONSULT SCREEN.
1. Touch ''V.2.0 (DIESEL)'' on ''SELECT NATS SYSTEM'' screen.
2. Confirm ''IMPOSSIBLE TO PROCEED'' displayed on CONSULT screen.

B

CHECK OPEN CIRCUIT BETWEEN IMMU AND CONSULT.
1. Disconnect IMMU connector and CONSULT from data link connector.
2. Check continuity between the following IMMU terminals and data link connector terminals.

IMMU terminal	Data link connector terminal	Continuity
⑦	⑬	Yes
⑥	⑭	Yes

NG → Repair harness.

OK

C

CHECK SHORT CIRCUIT BETWEEN IMMU AND CONSULT.
1. Disconnect IMMU connector and CONSULT from data link connector.
2. Check continuity between IMMU connector terminal ⑥, ⑦ and ground.
   Continuity should not exist.
3. Turn ignition switch to ON.
4. Check voltage between IMMU terminal ⑥, ⑦ and ground.
   No voltage should exist.

NG → Repair harness.
Note:
If the circuit is short to power circuit, IMMU may be damaged. After repairing, perform self-diagnosis with CONSULT again.

OK

D

CHECK NATS ANTENNA AMP. POWER SOURCE CIRCUIT.
1. Disconnect NATS antenna amp. connector.
2. Turn ignition switch ''ON''.
3. Check voltage between antenna amp. terminal ① and ground.
   Voltage: More than 4.7V

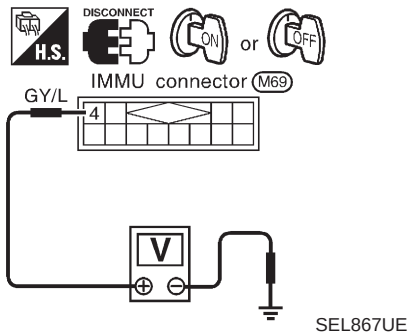
NG (0V) → NATS antenna amp. +5V line is short-circuited with ground line.
Repair harness or connectors.

OK

Ⓐ

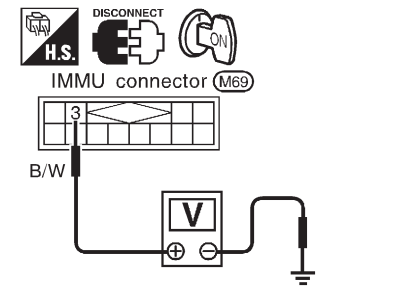
Trouble Diagnoses (Cont'd)

E



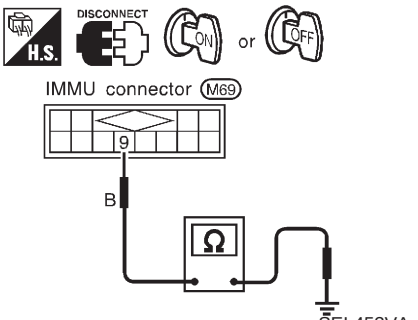
SEL867UE

F



SEL868UE

G



SEL453VA

Ⓐ

E

CHECK POWER SUPPLY CIRCUIT FOR IMMU.
Check voltage between terminal ④ of IMMU and ground with CONSULT or tester.
Voltage: Battery voltage

NG →
Check the following.
- 10A fuse (No. 34 , located in the fusible link and fuse box)
- Harness for open or short between fuse and IMMU connector

OK ↓

F

CHECK IGN SW. ON SIGNAL.
Check voltage between terminal ③ of IMMU and ground with CONSULT or tester.
Voltage: Battery voltage

NG →
Check the following.
- 10A fuse (No. 23 , located in the fuse block)
- Harness for open or short between fuse and IMMU connector

OK ↓

G

CHECK GROUND CIRCUIT FOR IMMU.
Check harness continuity between IMMU terminal ⑨ and ground.
Continuity should exist.

NG →
Repair harness.

OK ↓

- IMMU is malfunctioning.

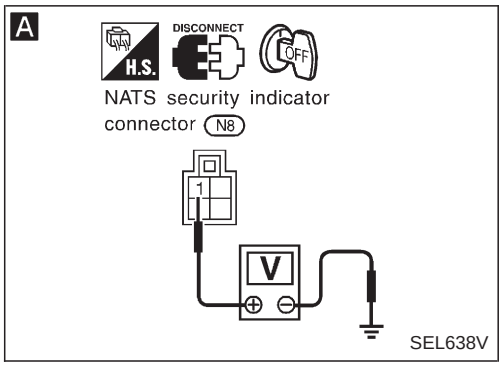
1. Replace IMMU.
2. Perform system initialisation with CONSULT.
   For the operation of system initialisation, refer to ''CONSULT operation manual NATS V2.0 (Diesel)''.

Trouble Diagnoses (Cont'd)

DIAGNOSTIC PROCEDURE 8

''NATS SECURITY IND. DOES NOT LIGHT UP''

A



CHECK INDICATOR POWER SUPPLY CIRCUIT.
Check voltage between security indicator terminal (1) and ground.
Battery voltage should exist.

NG → Check the following.
- 7.5A fuse (No. 6, located in the fuse block)
- Harness for open or short between fuse and security indicator

OK ↓

Check security indicator.

NG → Replace security indicator.

OK ↓

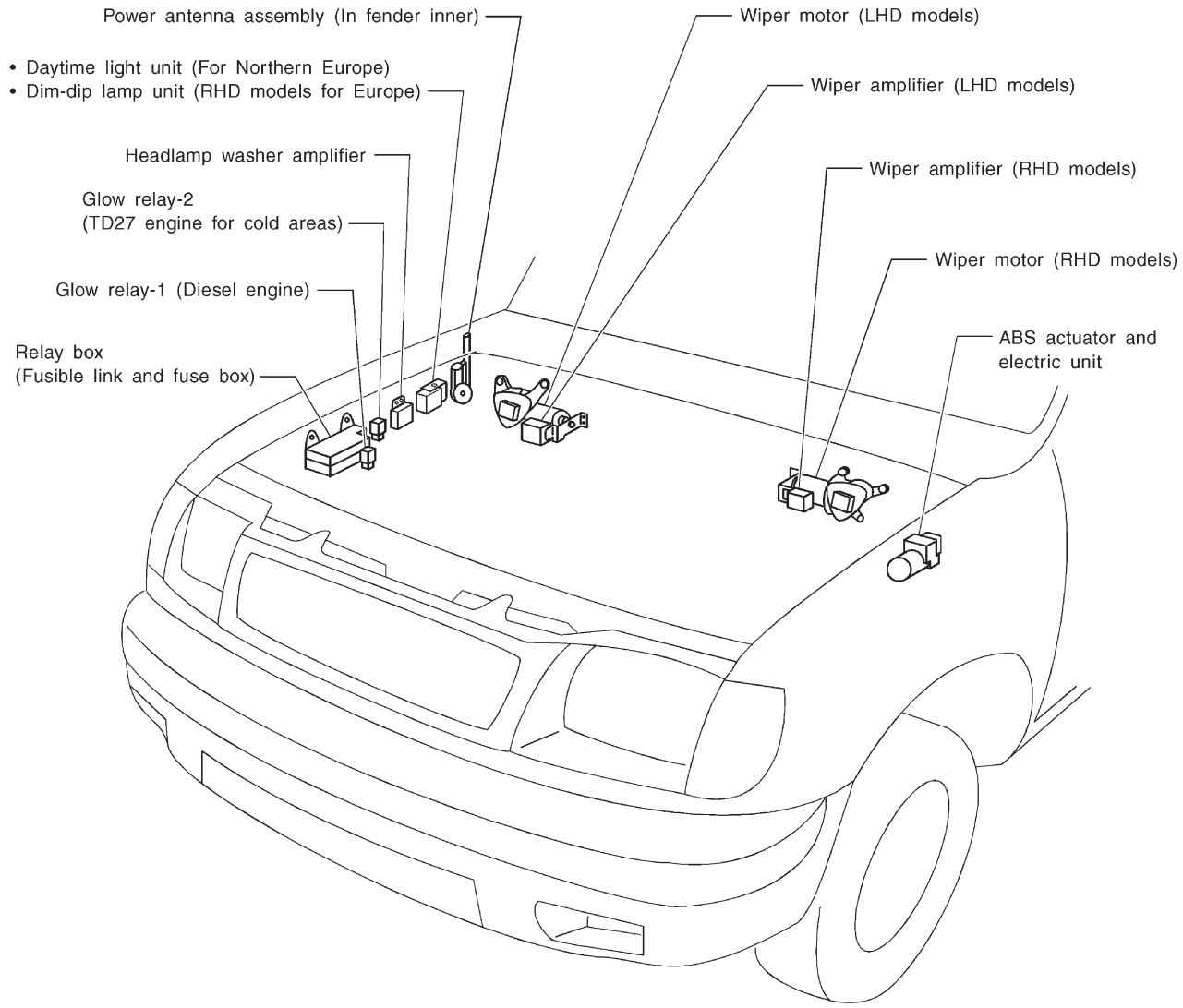
PERFORM INITIALISATION.
Perform IMMU initialisation with CONSULT.
For the initialisation procedure, refer to ''CONSULT operation manual NATS V2.0 (Diesel)''.
Does security indicator operate after initialisation has completed?

No → Check harness for open or short between NATS IMMU and security indicator.

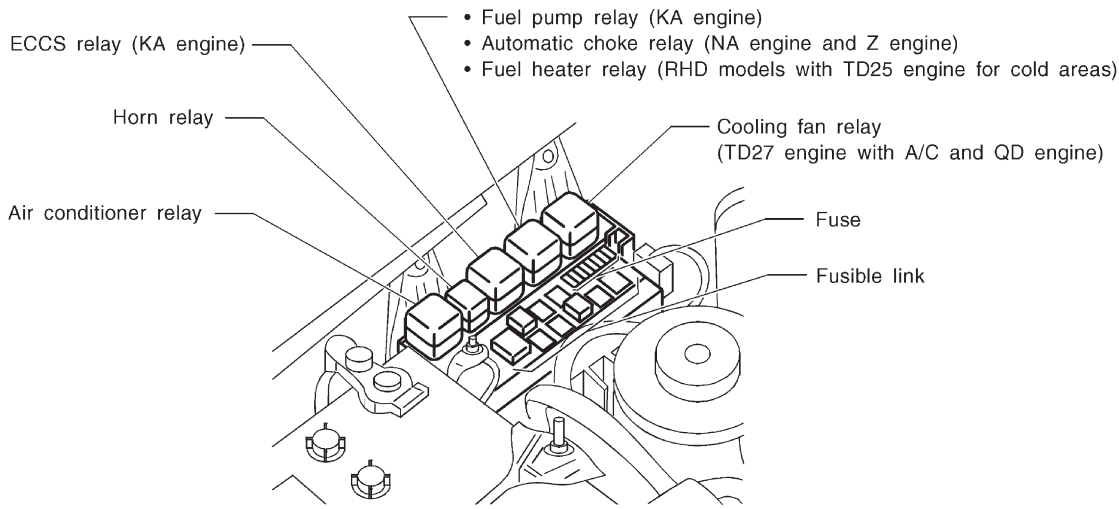
Yes ↓

END

Engine Compartment



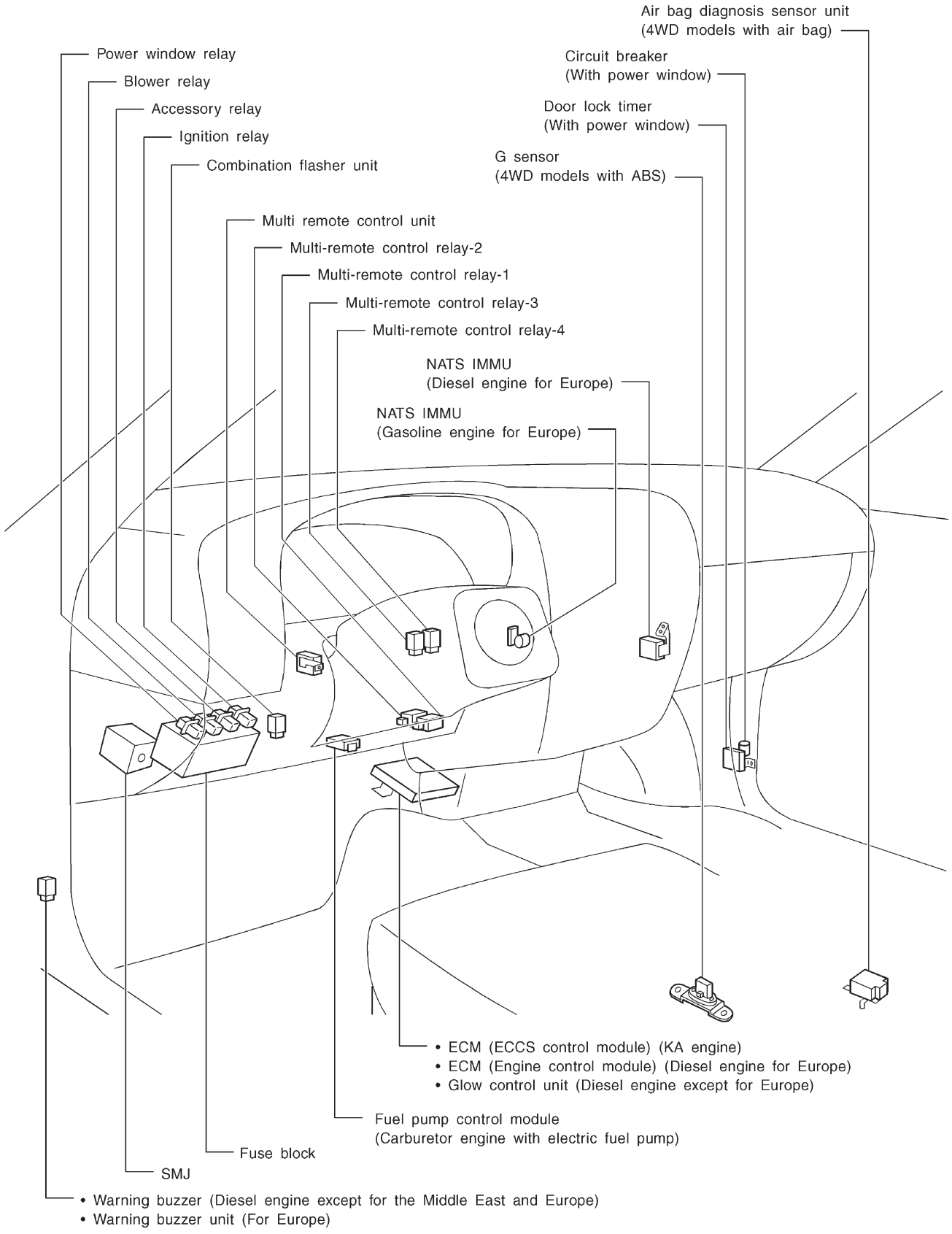
RELAY BOX



HEL391A

Passenger Compartment

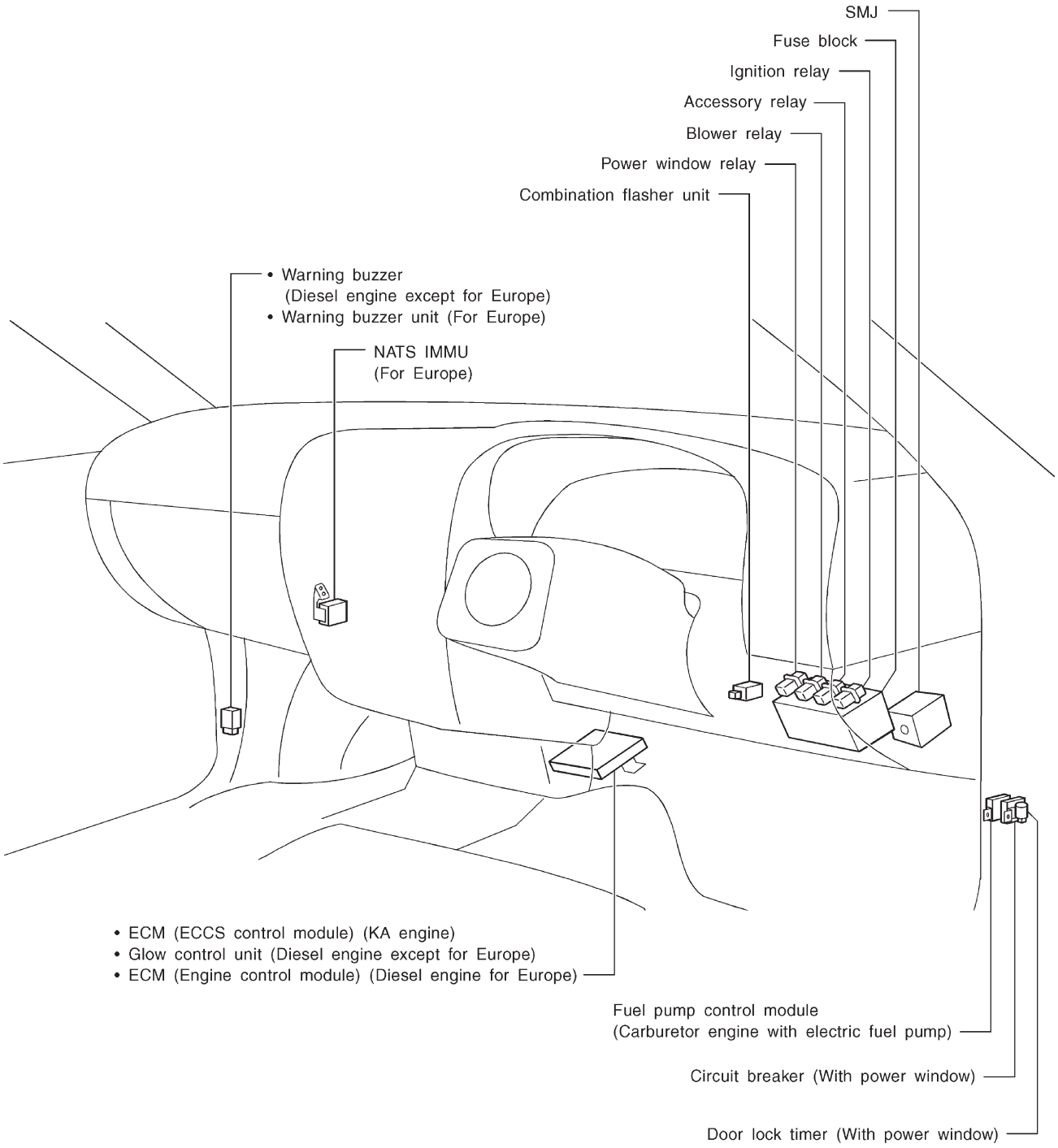
LHD MODELS



HEL392A

Passenger Compartment (Cont'd)

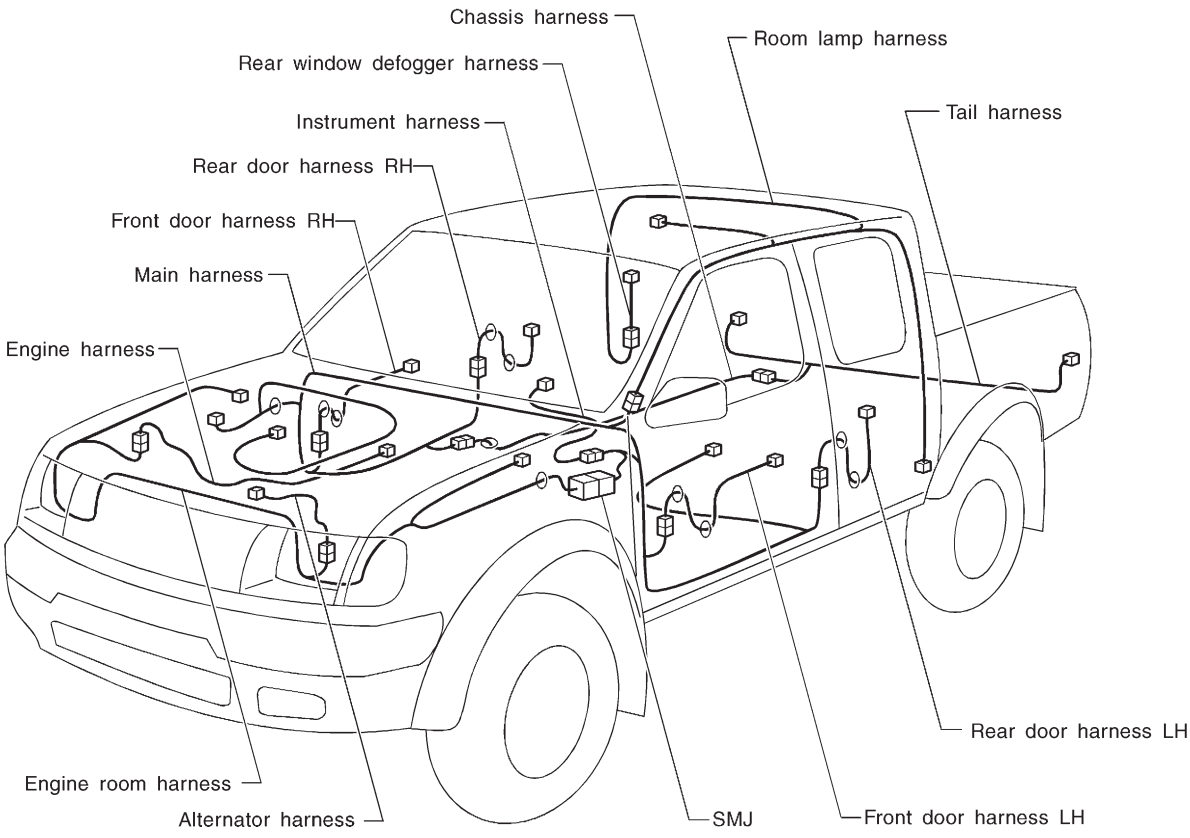
RHD MODELS



HEL393A

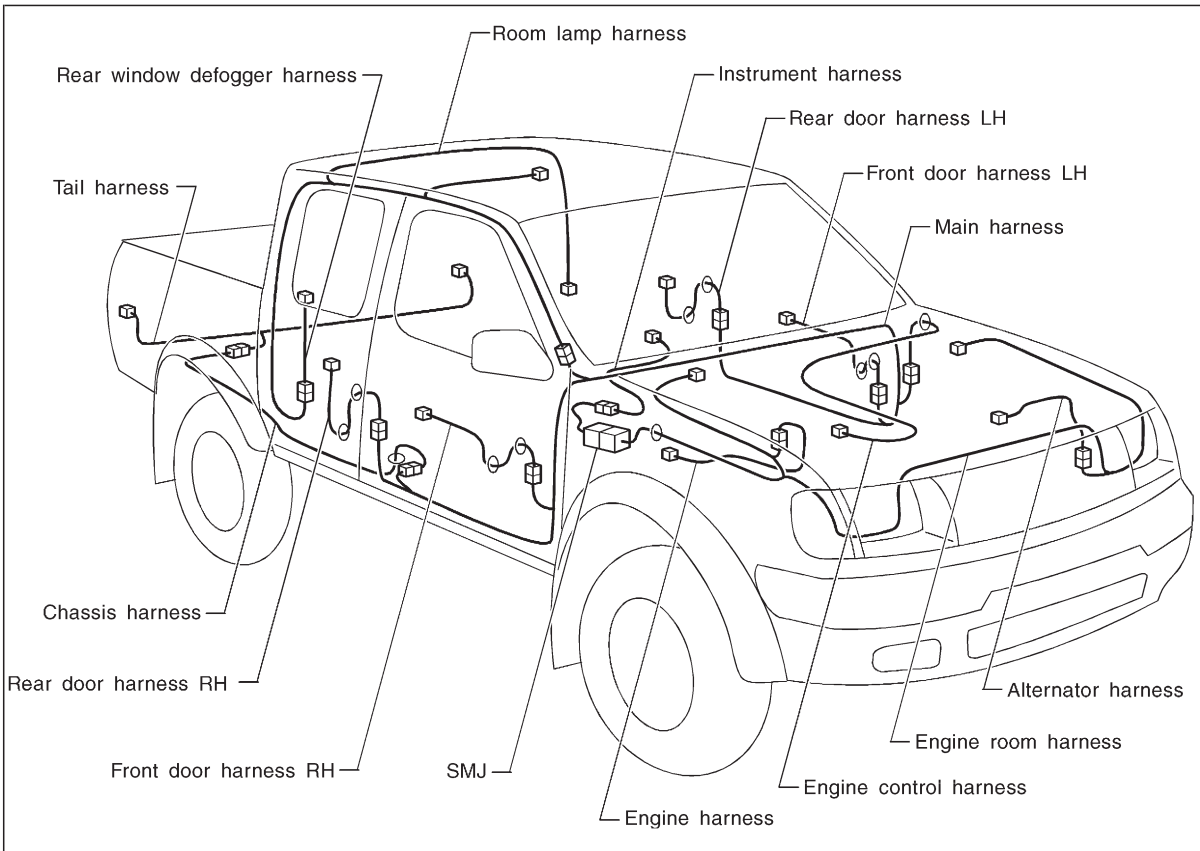
Outline

LHD MODELS



HEL394A

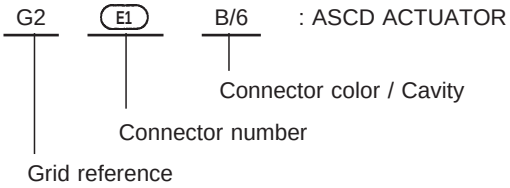
RHD MODELS



HEL847

How to Read Harness Layout

Example:



The following Harness Layouts use a map style grid to help locate connectors on the drawings:
- Main Harness (Instrument Panel, Engine Compartment)
- Engine Room Harness
- Engine Control Harness

To use the grid reference

1) Find the desired connector number on the connector list.
2) Find the grid reference.
3) On the drawing, find the crossing of the grid reference letter column and number row.
4) Find the connector number in the crossing zone.
5) Follow the line (if used) to the connector.

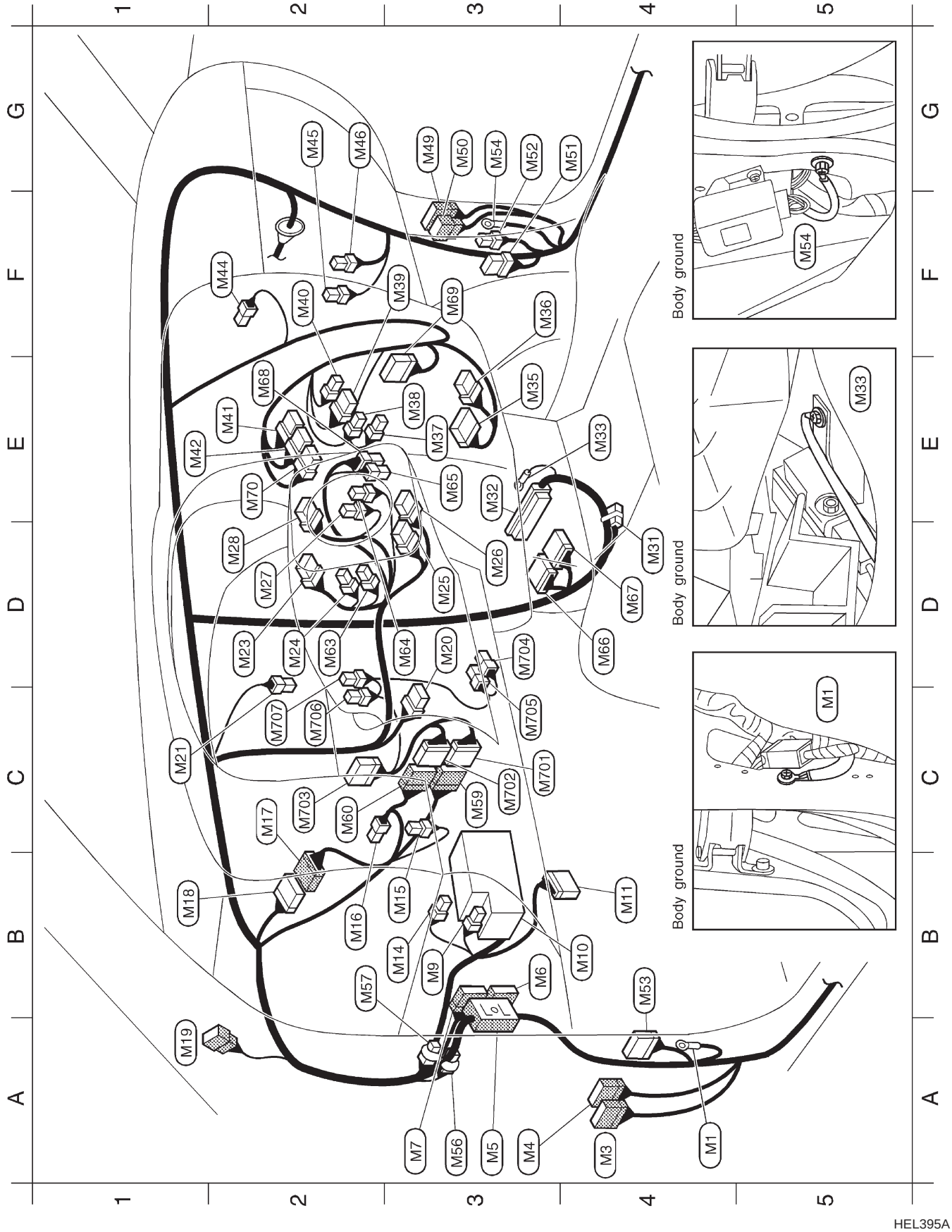
CONNECTOR SYMBOL

Main symbols of connector (in Harness Layout) are indicated in the below.

Connector type	Water proof type		Standard type	
	Male	Female	Male	Female
● Cavity: Less than 4 ● Relay connector				
● Cavity: From 5 to 8				
● Cavity: More than 9				
● Ground terminal etc.	—			

Main Harness

INSTRUMENT PANEL — LHD MODELS FOR EUROPE



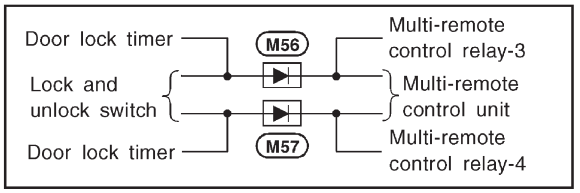
HEL395A

A4 (M1) — : Body ground
A4 (M3) W/12 : To (D1)
A3 (M4) W/12 : To (D2)
A3 (M5) SMJ : To (E101)
B3 (M6) W/24 : To (N1)
A3 (M7) W/20 : To (N2)
B3 (M9) L/4 : Power window relay
B4 (M10) — : Fuse block
B4 (M11) GY/14 : Data link connector for CONSULT
B3 (M14) W/3 : Fuse block
B3 (M15) B/3 : Combination flasher unit
B2 (M16) B/2 : Stop lamp switch
C2 (M17) Y/12 : To (M18) (4WD models with air bag)
B1 (M18) Y/12 : To (M17) (4WD models with air bag)
A1 (M19) W/6 : To (R1)
D3 (M20) W/6 : Ignition switch
C1 (M21) W/1 : Parking brake switch (Stick type)
D2 (M23) BR/8 : Lighting switch • Turn signal lamp switch
D2 (M24) BR/4 : Lighting switch
D3 (M25) Y/6 : Spiral cable (4WD models with air bag)
D3 (M26) W/6 : Spiral cable (2WD models with air bag)
D2 (M27) B/1 : Horn switch
D2 (M28) GY/8 : Wiper and washer switch
D4 (M31) GY/6 : Joint connector (KA engine)
E3 (M32) W/64 : ECM (ECCS control module) (KA engine)
E4 (M33) — : Body ground (KA engine)
E3 (M35) W/10 : Radio
F3 (M36) W/6 : Radio (Models with 4-speakers and KA engine for Europe)
E3 (M37) B/2 : Cigarette lighter
E3 (M38) W/3 : A/C switch
F3 (M39) W/6 : Fan switch
F2 (M40) W/2 : Fan switch illumination
E2 (M41) W/8 : Hazard switch
E1 (M42) W/6 : Rear window defogger switch
F2 (M44) BR/4 : Thermo control amplifier
G2 (M45) BR/4 : Fan resistor
G2 (M46) W/2 : Blower motor
G3 (M49) W/12 : To (D31)
G3 (M50) W/6 : To (D32)
G4 (M51) W/8 : Door lock timer
G3 (M52) W/2 : Circuit breaker
B4 (M53) B/12 : Warning buzzer unit
G3 (M54) — : Body ground
A3 (M56) –/2 : Diode (For multi-remote control system)
B2 (M57) –/2 : Diode (For multi-remote control system)
C3 (M59) BR/10 : To (M701) (4WD models)
C2 (M60) W/12 : To (M702) or jumping connector (4WD models)
D2 (M63) W/3 : Rear fog lamp switch
D3 (M64) W/2 : Key switch
E3 (M65) W/4 : NATS antenna amp. (TD engine)
D4 (M66) GY/20 : ECM (Engine control module) (TD engine)
D4 (M67) GY/16 : ECM (Engine control module) (TD engine)
E2 (M68) W/8 : NATS IMMU (KA engine)
F3 (M69) W/12 : NATS IMMU (TD engine)
E2 (M70) L/8 : Headlamp washer switch

Sub-harness (For multi-remote control system)

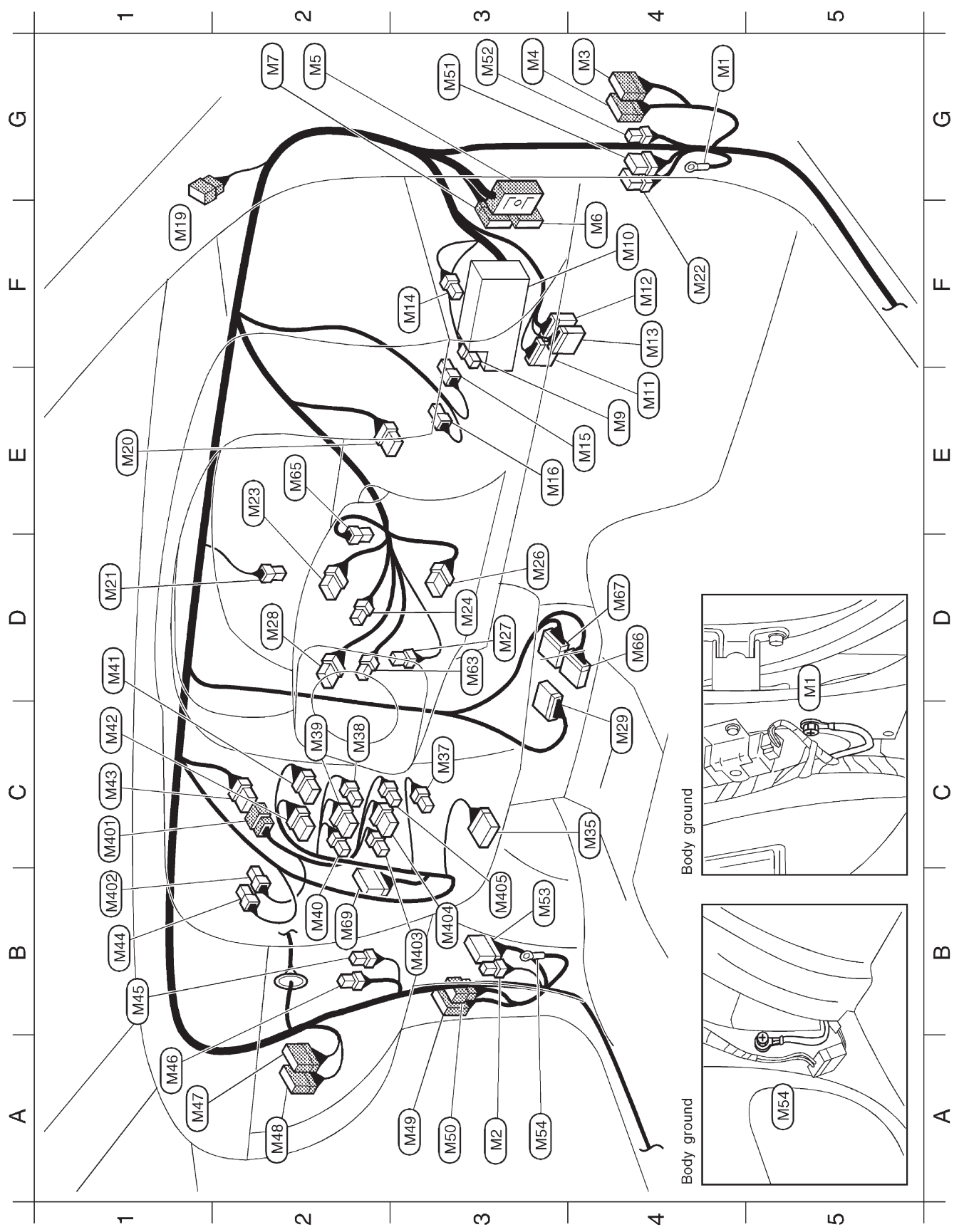
C3 (M701) BR/10 : To (M59)
C3 (M702) W/12 : To (M60)
C2 (M703) W/12 : Multi-remote control unit
D3 (M704) B/5 : Multi-remote control relay-1
C3 (M705) BR/6 : Multi-remote control relay-2
C2 (M706) B/5 : Multi-remote control relay-3
C2 (M707) B/5 : Multi-remote control relay-4

Diode (M56), (M57)



Main Harness (Cont'd)

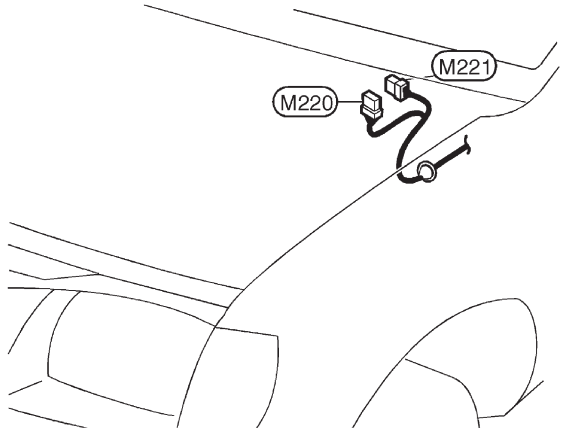
INSTRUMENT PANEL — RHD MODELS



HEL397A

G4 (M1) — : Body ground
A3 (M2) W/2 : Warning buzzer (Diesel engine except for Europe and Australia)
G4 (M3) W/12 : To (D1)
G3 (M4) W/12 : To (D2) (With power window)
G2 (M5) SMJ : To (E101)
F4 (M6) W/24 : To (N1)
G2 (M7) W/20 : To (N2) (For Europe)
E4 (M9) L/4 : Power window relay
F4 (M10) — : Fuse block
E4 (M11) GY/14 : Data link connector for CONSULT (KA engine and for Europe)
F4 (M12) B/12 : Check connector (NA engine)
F4 (M13) B/10 : Check connector (Z engine)
F3 (M14) W/3 : Fuse block
E4 (M15) B/3 : Combination flasher unit
E3 (M16) B/2 : Stop lamp switch
F1 (M19) W/6 : To (R1)
E1 (M20) W/6 : Ignition switch
D1 (M21) W/1 : Parking brake switch (Stick type)
F4 (M22) W6 : Fuel pump control module (NA engine and Z engine)
E2 (M23) BR/8 : Lighting switch • Turn signal lamp switch
D3 (M24) BR/4 : Lighting switch
D3 (M26) W/6 : Spiral cable (For Europe)
D3 (M27) B/1 : Horn switch
D2 (M28) GY/8 : Wiper and washer switch
C4 (M29) W/12 : Glow control unit (Diesel engine except for Europe)
C4 (M35) W/10 : Radio
C3 (M37) B/2 : Cigarette lighter
C2 (M38) W/3 : A/C switch (For Europe and Australia)
C2 (M39) W/6 : Fan switch (For Europe and Australia)
B2 (M40) W/2 : Fan switch illumination (For Europe and Australia)
D1 (M41) W/8 : Hazard switch
C1 (M42) W/6 : Rear window defogger switch (For Europe and double cab for Australia)
C1 (M43) B/8 : To (M401) (Except for Europe and Australia)
B1 (M44) BR/4 : Thermo control amplifier (For Europe and Australia)
B1 (M45) BR/4 : Fan resistor
A1 (M46) W/2 : Blower motor
A1 (M47) W/10 : To (F55) (KA engine)
A2 (M48) W/24 : To (F54) (KA engine)
A3 (M49) W/12 : To (D31)
A3 (M50) W/6 : To (D32) (With power window)
G3 (M51) W/8 : Door lock timer (Double cab ST grade)
G3 (M52) W/2 : Circuit breaker (Double cab ST grade)
B3 (M53) B/12 : Warning buzzer unit (For Europe)
A3 (M54) — : Body ground
D3 (M63) W/3 : Rear fog lamp switch (For Europe)
E2 (M65) W/4 : NATS antenna amp. (For Europe)
D4 (M66) GY/20 : ECM (Engine control module)(Diesel engine for Europe)
D4 (M67) GY/16 : ECM (Engine control module)(Diesel engine for Europe)
B2 (M69) W/12 : NATS IMMU (For Europe)

Engine compartment



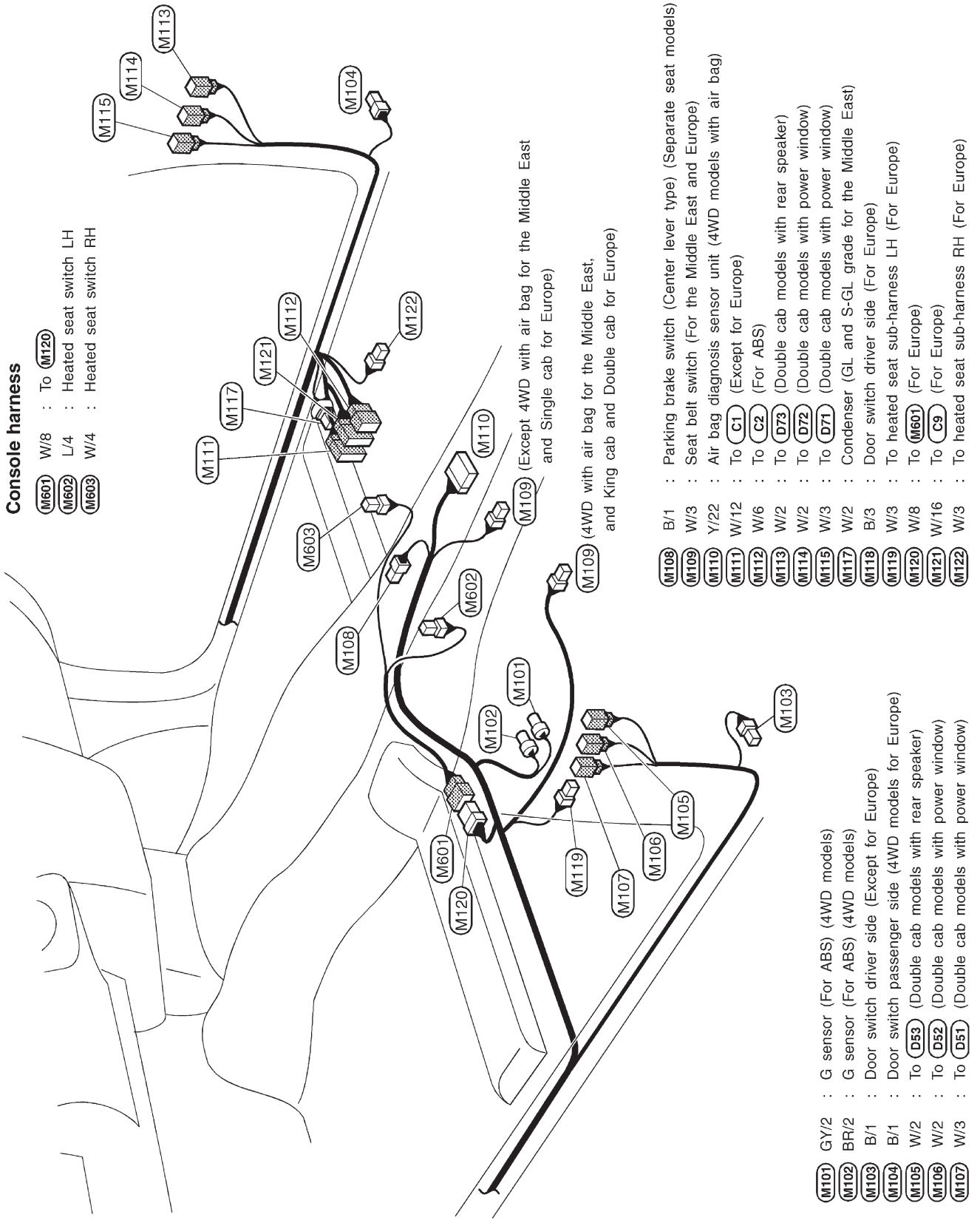
(M220) GY/8 : Wiper amplifier or jumping connector (Diesel engine models for Europe and Australia)
(M221) W/6 : Wiper motor (Except KA engine)

Sub-harness (Except for Europe and Australia)

C1 (M401) B/8 : To (M43)
B1 (M402) BR/4 : Thermo control amplifier (Models with A/C)
B3 (M403) W/2 : Fan switch illumination
B3 (M404) W/6 : Fan switch
B3 (M405) W/3 : A/C switch (Models with A/C)

Main Harness (Cont'd)

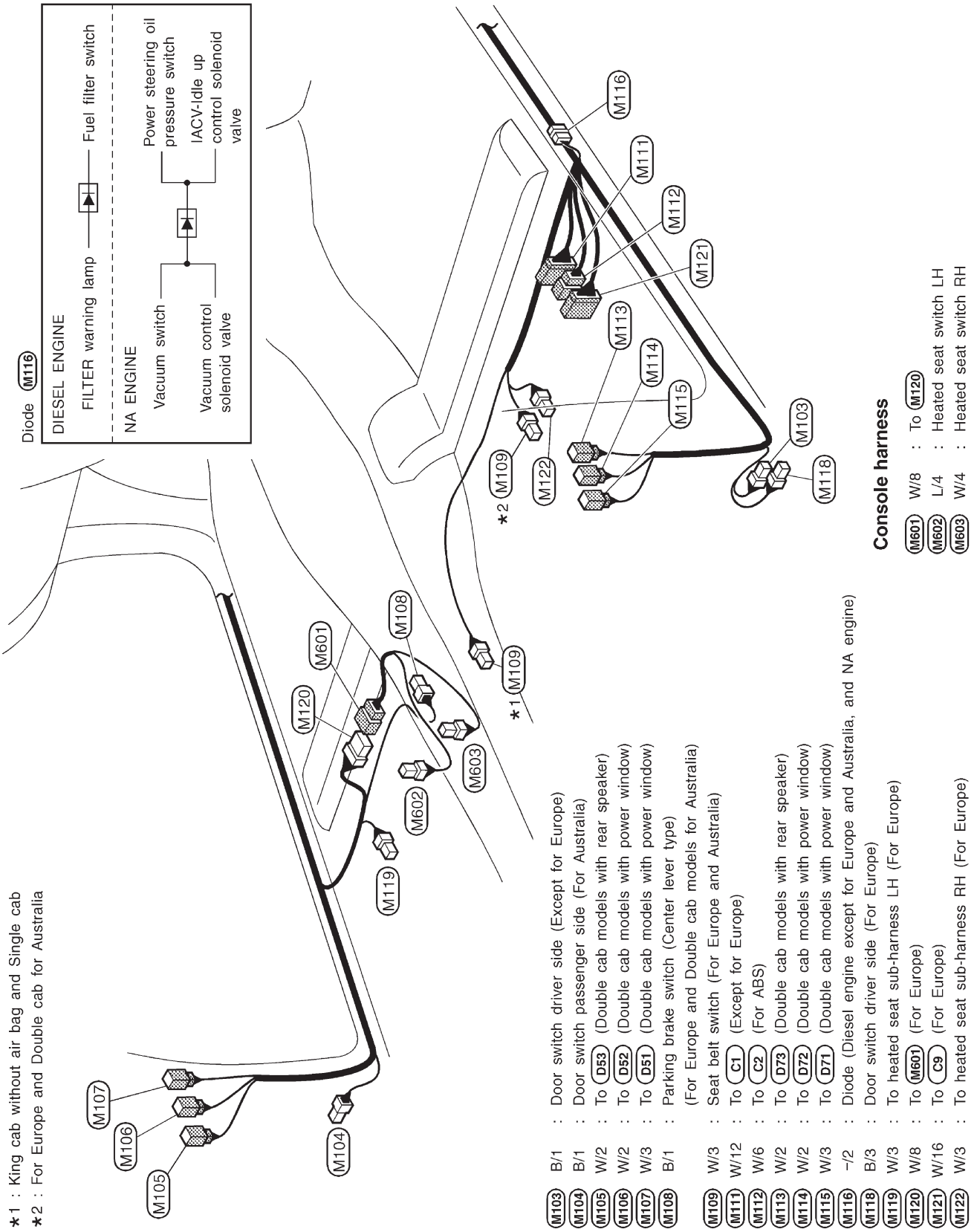
BODY SIDE — LHD MODELS



HEL399A

Main Harness (Cont'd)

BODY SIDE — RHD MODELS



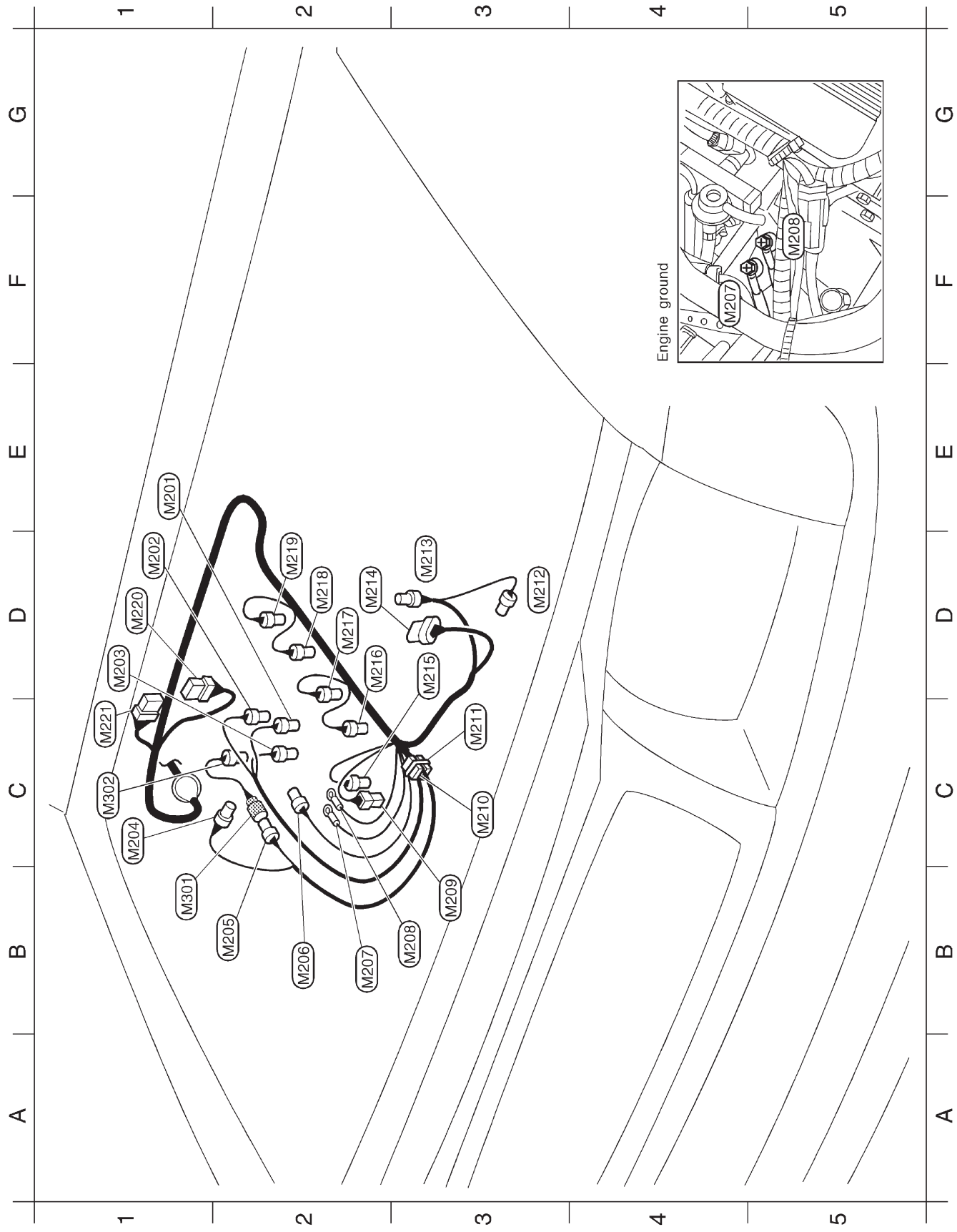
∗1 : King cab without air bag and Single cab
∗2 : For Europe and Double cab for Australia

M103 B/1 : Door switch driver side (Except for Europe)
M104 B/1 : Door switch passenger side (For Australia)
M105 W/2 : To D53 (Double cab models with rear speaker)
M106 W/2 : To D52 (Double cab models with power window)
M107 W/3 : To D51 (Double cab models with power window)
M108 B/1 : Parking brake switch (Center lever type)
(For Europe and Double cab models for Australia)
M109 W/3 : Seat belt switch (For Europe and Australia)
M111 W/12 : To C1 (Except for Europe)
M112 W/6 : To C2 (For ABS)
M113 W/2 : To D73 (Double cab models with rear speaker)
M114 W/2 : To D72 (Double cab models with power window)
M115 W/3 : To D71 (Double cab models with power window)
M116 –/2 : Diode (Diesel engine except for Europe and Australia, and NA engine)
M118 B/3 : Door switch driver side (For Europe)
M119 W/3 : To heated seat sub-harness LH (For Europe)
M120 W/8 : To M601 (For Europe)
M121 W/16 : To C9 (For Europe)
M122 W/3 : To heated seat sub-harness RH (For Europe)

HEL400A

Main Harness (Cont'd)

ENGINE COMPARTMENT — KA24E ENGINE (LHD models)



HEL854

E1 (M201) BR/2 : Swirl control valve control solenoid valve
D1 (M202) B/2 : EVAP canister purge control solenoid valve
D1 (M203) GY/4 : IACV-AAC valve • IACV-FICD solenoid valve
C1 (M204) GY/3 : Mass air flow sensor
B2 (M205) GY/3 : To (M301)
B2 (M206) GY/2 : Intake air temperature sensor
B2 (M207) — : Engine ground
B3 (M208) — : Engine ground
B3 (M209) B/1 : Thermal transmitter
C3 (M210) W/2 : Condenser
C3 (M211) –/2 : Resistor
D3 (M212) B/1 : Compressor
D3 (M213) GY/2 : Distributor
D2 (M214) GY/6 : Distributor
D3 (M215) GY/2 : Engine coolant temperature sensor
D2 (M216) B/2 : Injector No.1
D2 (M217) B/2 : Injector No.2
D2 (M218) B/2 : Injector No.3
D2 (M219) B/2 : Injector No.4
D1 (M220) GY/8 : Wiper amplifier or jumping connector (SE grade and for Europe)
C1 (M221) W/6 : Wiper motor

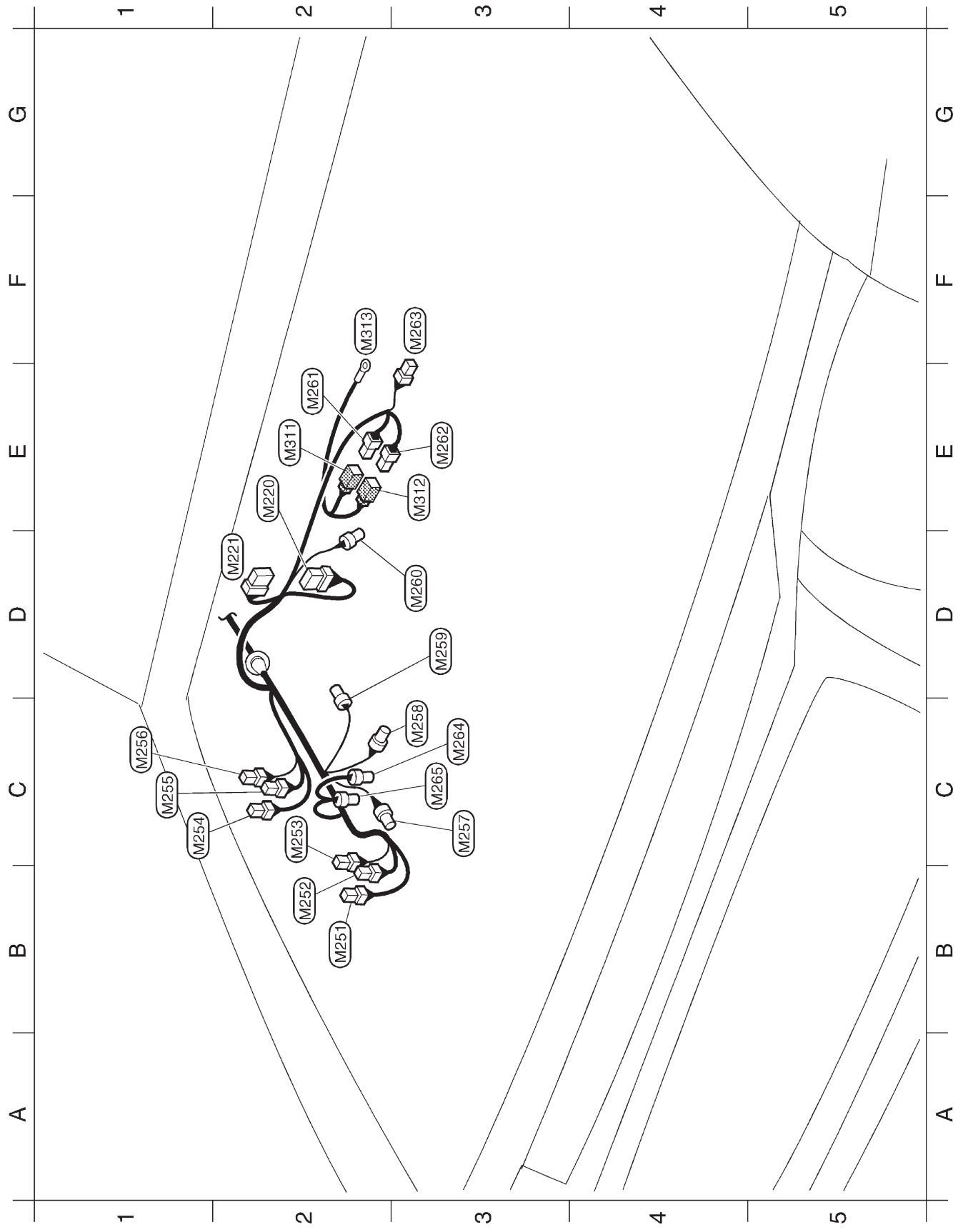
Sub-harness

B1 (M301) GY/3 : To (M205)
C1 (M302) BR/3 : Throttle position sensor

HEL401A

Main Harness (Cont'd)

ENGINE COMPARTMENT — EXCEPT KA24E ENGINE (LHD models)



HEL402A

E2 (M220) GY/8 : Wiper amplifier (AX grade)
D2 (M221) W/6 : Wiper motor
B2 (M251) W/1 : Glow relay-1 (Diesel engine)
B2 (M252) W/1 : Glow relay-1 (Diesel engine)
C2 (M253) G/2 : Glow relay-1 (Diesel engine)
C1 (M254) W/1 : Glow relay-2 (TD27 engine for cold areas)
C1 (M255) W/1 : Glow relay-2 (TD27 engine for cold areas)
C1 (M256) G/2 : Glow relay-2 (TD27 engine for cold areas)
C3 (M257) BR/2 : Fuel return control solenoid valve (NA engine)
C3 (M258) GY/2 : Vacuum switch (NA engine)
D3 (M259) BR/2 : Fuel filter switch (Diesel engine)
D3 (M260) GY/3 : Carburetor (NA engine and Z engine)
E2 (M261) B/1 : To (M311) (QD engine)
E3 (M262) L/2 : To (M312) (TD engine)
F3 (M263) B/2 : Dropping resistor (TD27 engine for cold areas)
C3 (M264) B/2 : EGRC-solenoid valve (Throttle chamber)(For Europe)
C3 (M265) BR/2 : EGRC-solenoid valve (EGR valve)(For Europe)

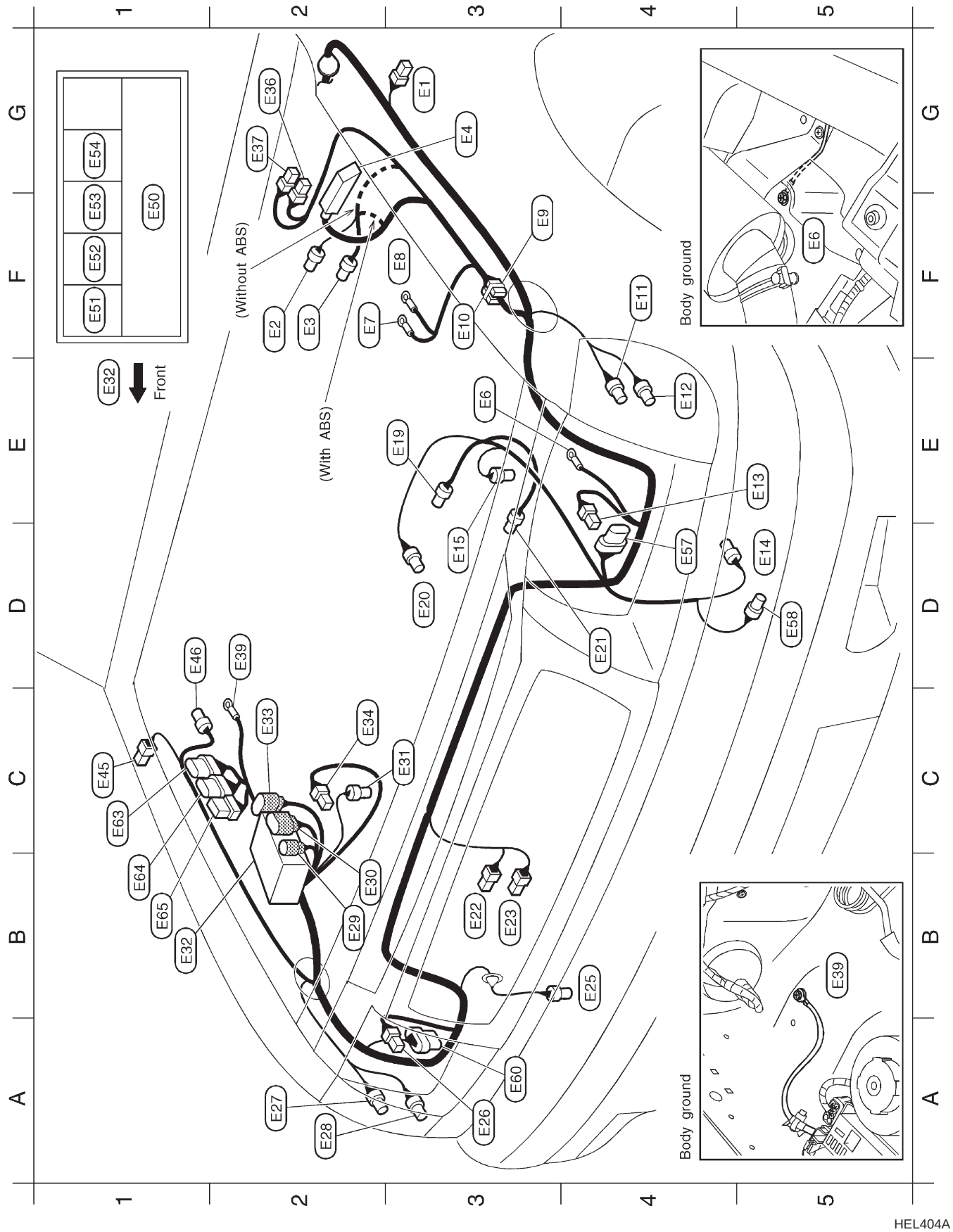
Sub-harness (Diesel engine)

E2 (M311) B/1 : To (M261) (QD engine)
E3 (M312) L/2 : To (M262) (TD engine)
F2 (M313) — : Glow plug

HEL403A

Engine Room Harness

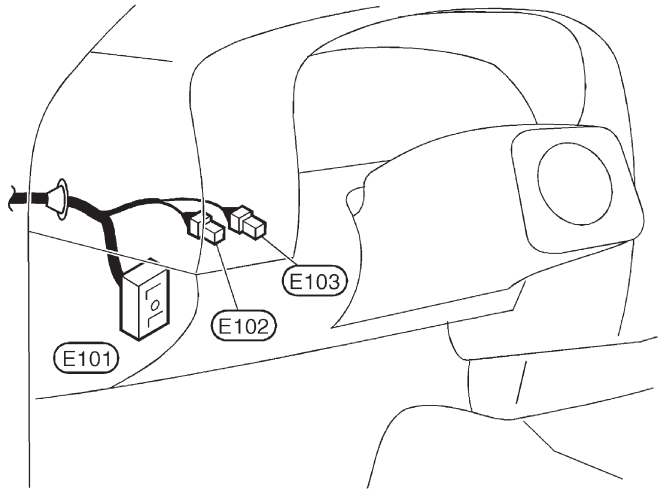
LHD MODELS — GASOLINE ENGINE



HEL404A

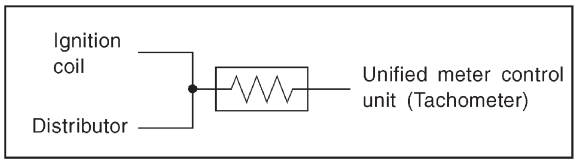
G3 (E1) B/2 : Side turn signal lamp LH (For Europe and China)
F2 (E2) GY/2 : Brake fluid level switch
F2 (E3) GY/3 : Heated oxygen sensor (KA engine)
G3 (E4) B/31 : ABS actuator and electric unit (For ABS)
E3 (E6) — : Body ground
F2 (E7) — : Ignition coil (NA engine and Z engine)
F3 (E8) — : Ignition coil (NA engine and Z engine)
F3 (E9) –/2 : Resistor (NA engine and Z engine)
F3 (E10) W/2 : Condenser (NA engine and Z engine)
F4 (E11) GY/3 : Front combination lamp LH (Except for Europe and China)
E4 (E12) BR/3 : Front combination lamp LH (For Europe and China)
E5 (E13) B/3 : Headlamp LH
D5 (E14) GY/2 : Washer motor
D3 (E15) BR/2 : Front wheel sensor LH (For ABS)
E3 (E19) GY/3 : Distributor (NA engine and Z engine)
D3 (E20) B/2 : Vacuum control solenoid valve (NA engine)
D4 (E21) B/1 : Compressor (NA engine and Z engine)
B3 (E22) B/1 : Horn low
B3 (E23) B/1 : Horn high
B4 (E25) B/4 : Triple-pressure switch
A3 (E26) B/3 : Headlamp RH
A2 (E27) GY/3 : Front combination lamp RH (Except for Europe and China)
A2 (E28) BR/3 : Front combination lamp RH (For Europe and China)
B2 (E29) GY/2 : To (E204)
B2 (E30) B/8 : To (E203)
C3 (E31) GY/2 : Front wheel sensor RH (For ABS)
B1 (E32) — : Relay box (Fusible link and fuse box)
C2 (E33) GY/8 : To (E205)
C2 (E34) B/1 : Battery
G2 (E36) B/1 : ISC-FI pot control solenoid valve (NA engine and Z engine)
G2 (E37) B/1 : ISC-FI pot control solenoid valve (NA engine and Z engine)
D2 (E39) — : Body ground
C1 (E45) B/2 : Side turn signal lamp RH (For Europe and China)
D1 (E46) GY/3 : Power antenna (For the Middle East)
F1 (E50) — : Fusible link and fuse box
F1 (E51) L/4 : Air conditioner relay
F1 (E52) W/3 : Horn relay
F1 (E53) L/4 : ECCS relay (KA engine)
G1 (E54) B/5 : Automatic choke relay (NA engine and Z engine)
L/4 : Fuel pump relay (KA engine)
D4 (E57) GY/6 : Headlamp aiming motor LH (For Europe)
D5 (E58) GY/2 : Headlamp washer motor (For Europe)
A3 (E60) GY/6 : Headlamp aiming motor RH (For Europe)
C1 (E63) GY/8 : Daytime light unit (With daytime light system)
B1 (E64) GY/6 : Daytime light unit (With daytime light system)
B1 (E65) W/6 : Headlamp washer amplifier (For Europe)

PASSENGER COMPARTMENT

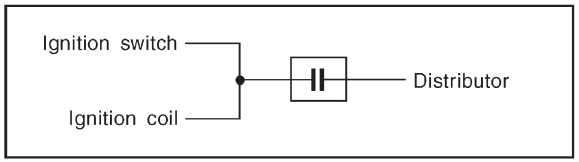


(E101) SMJ : To (M5)
(E102) W/4 : Fuse block
(E103) B/2 : Fuse block

Resistor (E9)

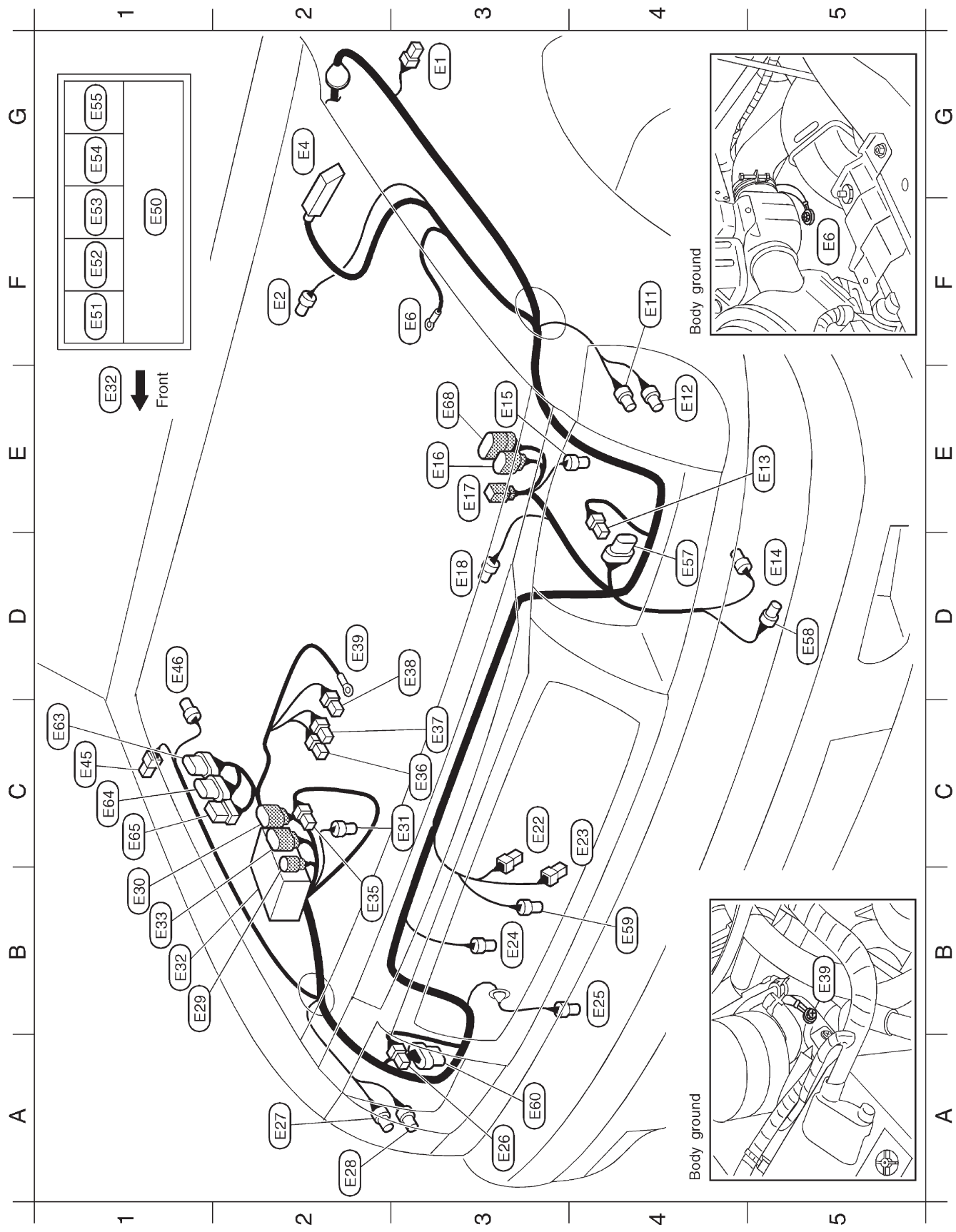


Condenser (E10)



Engine Room Harness (Cont'd)

LHD MODELS — DIESEL ENGINE

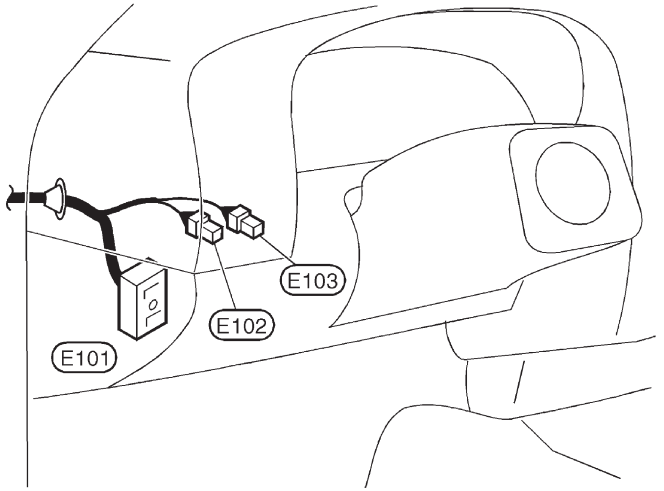


HEL406A

G3 (E1) B/2 : Side turn signal lamp LH (For Europe)
F2 (E2) GY/2 : Brake fluid level switch
G2 (E4) B/31 : ABS actuator and electric unit (For ABS)
F3 (E6) — : Body ground
F4 (E11) GY/3 : Front combination lamp LH (Except for Europe)
E4 (E12) BR/3 : Front combination lamp LH (For Europe)
E5 (E13) B/3 : Headlamp LH
D5 (E14) GY/2 : Washer motor
E3 (E15) BR/2 : Front wheel sensor LH (For ABS)
E3 (E16) GY/8 : To (A3) (Except for Europe)
E3 (E17) B/2 : To (A2)
D3 (E18) GY/2 : Thermoswitch (Except TD27 engine for cold areas and TD engine 2WD models with ABS for Europe)
C3 (E22) B/1 : Horn low
C4 (E23) B/1 : Horn high (Except TD27 engine for cold areas)
B3 (E24) GY/2 : Cooling fan motor (Except TD27 engine for cold areas and TD engine 2WD models with ABS for Europe)
B4 (E25) B/4 : Triple-pressure switch
A3 (E26) B/3 : Headlamp RH
A2 (E27) GY/3 : Front combination lamp RH (Except for Europe)
A2 (E28) BR/3 : Front combination lamp RH (For Europe)
B2 (E29) GY/2 : To (E204)
B1 (E30) B/8 : To (E203) (For Europe)
C3 (E31) GY/2 : Front wheel sensor RH (For ABS)
B1 (E32) — : Relay box (Fusible link and fuse box)
B1 (E33) GY/8 : To (E205)
B2 (E35) B/1 : To (E206)
C3 (E36) B/1 : IACV-FICD solenoid valve
C3 (E37) B/1 : IACV-FICD solenoid valve
D3 (E38) GY/1 : Vacuum warning switch
D2 (E39) — : Body ground
C1 (E45) B/2 : Side turn signal lamp RH (For Europe)
D1 (E46) GY/3 : Not used (For Europe except 2WD models with ABS)
F1 (E50) — : Fusible link and fuse box
F1 (E51) L/4 : Air conditioner relay
F1 (E52) W/3 : Horn relay
F1 (E53) L/4 : Not used (For Europe except 2WD models with ABS)
G1 (E54) L/4 : Not used (For Europe except 2WD models with ABS)
G1 (E55) L/4 : Cooling fan relay (Except TD27 engine for cold areas and TD engine 2WD models with ABS for Europe)

D4 (E57) GY/6 : Headlamp aiming motor LH (For Europe)
D5 (E58) GY/2 : Headlamp washer motor (For Europe)
B4 (E59) BR/2 : Not used (For Europe except 2WD models with ABS)
A3 (E60) GY/6 : Headlamp aiming motor RH (For Euroep)
C1 (E63) GY/6 : Daytime light unit (With daytime light system)
C1 (E64) GY/8 : Daytime light unit (With daytime light system)
C1 (E65) W/6 : Headlamp washer amplifier (For Europe)
E3 (E68) GY/10 : To (A13) (For Europe)

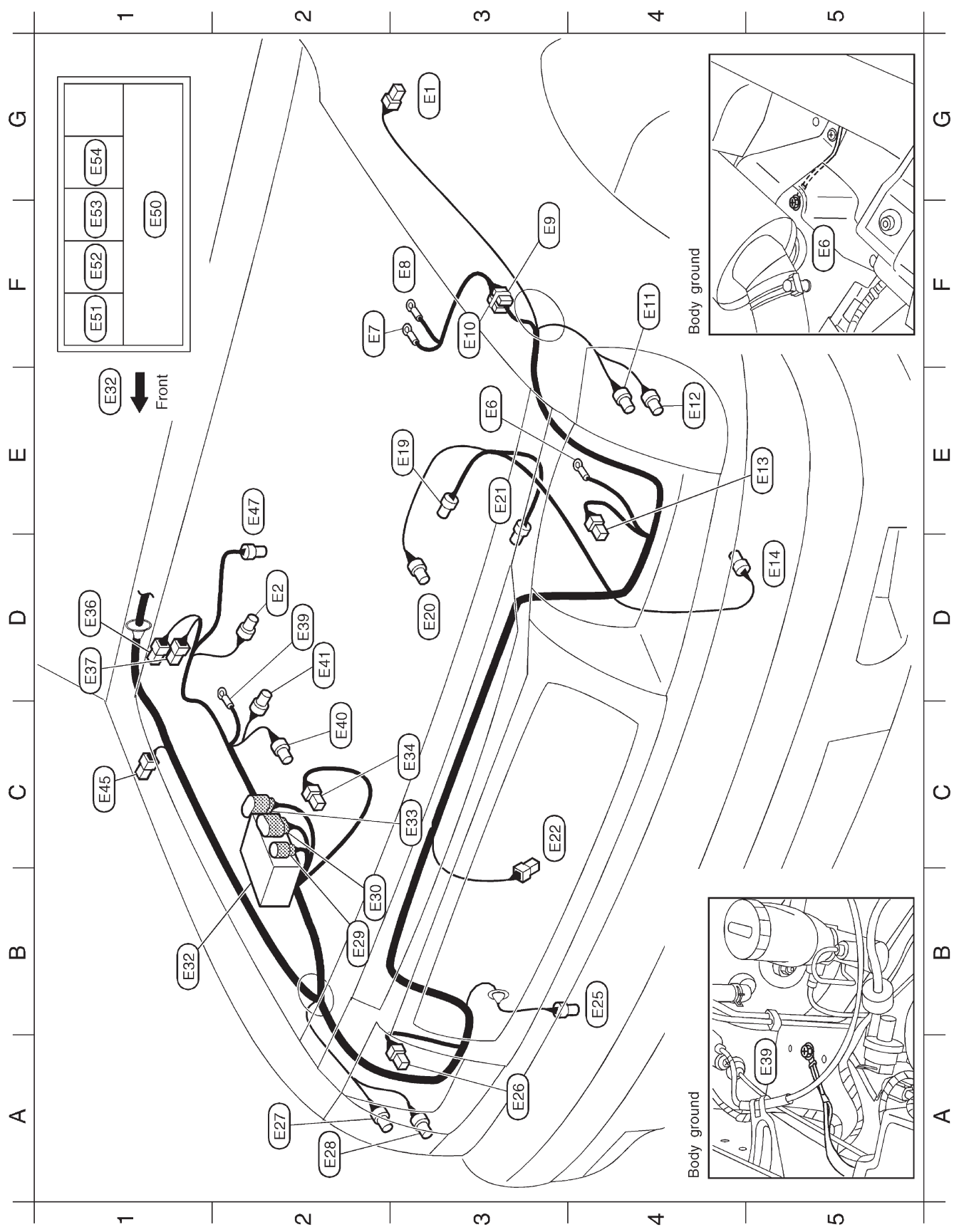
PASSENGER COMPARTMENT



(E101) SMJ : To (M5)
(E102) W/4 : Fuse block
(E103) B/2 : Fuse block

Engine Room Harness (Cont'd)

RHD MODELS — GASOLINE ENGINE



HEL862

Engine Room Harness (Cont'd)

E101 SMJ : To M5
E102 W/4 : Fuse block
E103 B/2 : Fuse block

Resistor E9

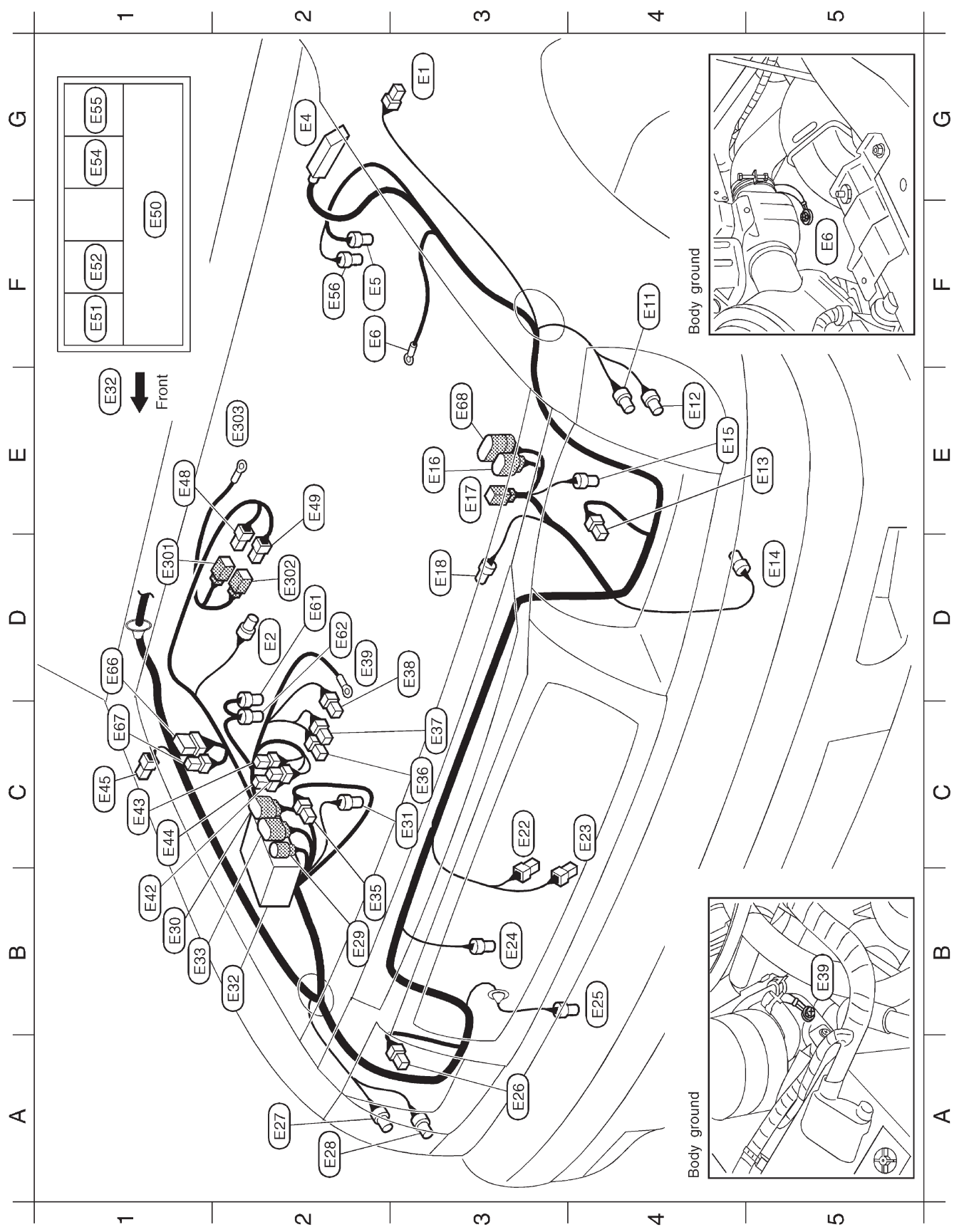
Condenser E10

G3 E1 B/2 : Side turn signal lamp LH (For Australia)
D2 E2 GY/2 : Brake fluid level switch
E3 E6 — : Body ground
F2 E7 — : Ignition coil (NA engine and Z engine)
F3 E8 — : Ignition coil (NA engine and Z engine)
F3 E9 –/2 : Resistor (NA engine and Z engine)
F3 E10 W/2 : Condenser (NA engine and Z engine)
F4 E11 GY/3 : Front combination lamp LH (Except for Australia)
E4 E12 BR/3 : Front combinaiton lamp LH (For Australia)
E5 E13 B/3 : Headlamp LH
D5 E14 GY/2 : Washer motor
E3 E19 GY/3 : Distributor (NA engine and Z engine)
D3 E20 B/2 : Vacuum control solenoid valve (NA engine)
E3 E21 B/1 : Compressor (Except for Australia)
C3 E22 B/1 : Horn low
B4 E25 B/4 : Triple-pressure switch
A3 E26 B/3 : Headlamp RH
A2 E27 GY/3 : Front combination lamp RH (Except for Australia)
A2 E28 BR/3 : Front combination lamp RH (For Australia)
B2 E29 GY/2 : To E204
B2 E30 B/8 : To E203
B1 E32 — : Relay box (Fusible link and fuse box)
C3 E33 GY/8 : To E205
C3 E34 B/1 : Battery
D1 E36 B/1 : ISC-FI pot control solenoid valve (Except for Australia)
D1 E37 B/1 : ISC-FI pot control solenoid valve (Except for Australia)
D2 E39 — : Body ground
C2 E40 BR/2 : Fuel return control solenoid valve (NA engine)
D2 E41 GY/2 : Vacuum switch (NA engine)
C1 E45 B/2 : Side turn signal lamp RH (For Australia)
E2 E47 GY/3 : Carburetor (NA engine and Z engine)
F1 E50 — : Fusible link and fuse box
F1 E51 L/4 : Air conditioner relay
F1 E52 W/3 : Horn relay
F1 E53 L/4 : ECCS relay (KA engine)
G1 E54 B/5 : Automatic choke relay (NA engine and Z engine)
L/4 : Fuel pump relay (KA engine)

HEL863

Engine Room Harness (Cont'd)

RHD MODELS — DIESEL ENGINE

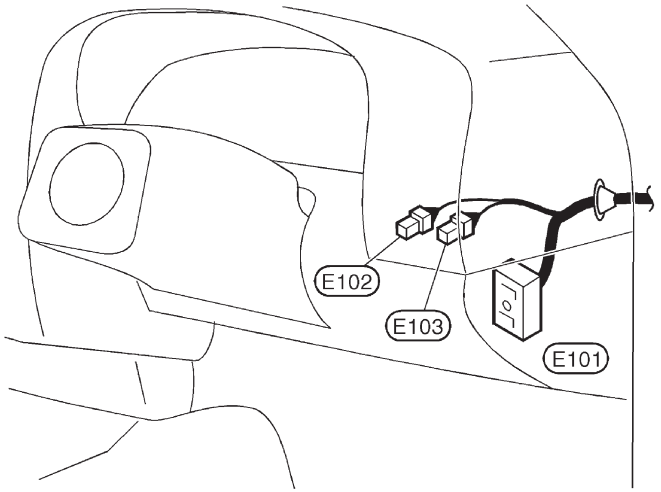


HEL408A

G3 (E1) B/2 : Side turn signal lamp LH (For Australia)
D2 (E2) GY/2 : Brake fluid level switch
G2 (E4) B/31 : ABS actuator and electric unit (For ABS)
F2 (E5) BR/2 : Fuel filter switch
F2 (E6) — : Body ground
F4 (E11) GY/3 : Front combination lamp LH (Except for Europe and Australia)
E4 (E12) BR/3 : Front combination lamp LH (For Europe and Australia)
E5 (E13) B/3 : Headlamp LH
D5 (E14) GY/2 : Washer motor
E4 (E15) BR/2 : Front wheel sensor LH (For ABS)
E3 (E16) GY/8 : To (A3) (Except for Europe)
E3 (E17) B/2 : To (A2)
D3 (E18) GY/2 : Thermoswitch
(TD25 engine except 2WD models with ABS and QD engine)
C3 (E22) B/1 : Horn low
C4 (E23) B/1 : Horn high (For Europe)
B3 (E24) GY/2 : Cooling fan motor
(TD25 engine except 2WD models with ABS and QD engine)
B4 (E25) B/4 : Triple-pressure switch
A3 (E26) B/3 : Headlamp RH
A2 (E27) GY/3 : Front combination lamp RH (Except for Europe and Australia)
A2 (E28) BR/3 : Front combination lamp RH (For Europe and Australia)
B2 (E29) GY/2 : To (E204)
B1 (E30) B/8 : To (E203) (For Europe)
C3 (E31) GY/2 : Front wheel sensor RH (For ABS)
B2 (E32) — : Relay box (Fusible link and fuse box)
B1 (E33) GY/8 : To (E205)
B2 (E35) B/1 : To (E206)
C3 (E36) B/1 : IACV-FICD solenoid valve
C3 (E37) B/1 : IACV-FICD solenoid valve
D3 (E38) GY/1 : Vacuum warning switch (Except for Australia)
D2 (E39) — : Body ground
B1 (E42) W/1 : Glow relay-1
C1 (E43) W/1 : Glow relay-1
C1 (E44) G/2 : Glow relay-1
C1 (E45) B/2 : Side turn signal lamp RH (For Europe and Australia)
E1 (E48) B/1 : To (E301) (QD engine)
E2 (E49) L/2 : To (E302) (TD engine)

F1 (E50) — : Fusible link and fuse box
F1 (E51) L/4 : Air conditioner relay
F1 (E52) W/3 : Horn relay
G1 (E54) L/4 : Fuel heater relay (For Europe)
G1 (E55) L/4 : Cooling fan relay (TD25 engine except 2WD models with ABS and QD engine)
F2 (E56) GY/4 : Fuel filter (For fuel heater)(For Europe)
D2 (E61) B/2 : EGRC-solenoid valve (Throttle chamber)(For Europe)
D2 (E62) BR/2 : EGRC-solenoid valve (EGR valve)(For Europe)
D1 (E66) GY/6 : Dim-dip lamp unit (For Europe)
C1 (E67) GY/4 : Dim-dip lamp unit (For Europe)
E3 (E68) GY/10 : To (A13) (For Europe)

PASSENGER COMPARTMENT

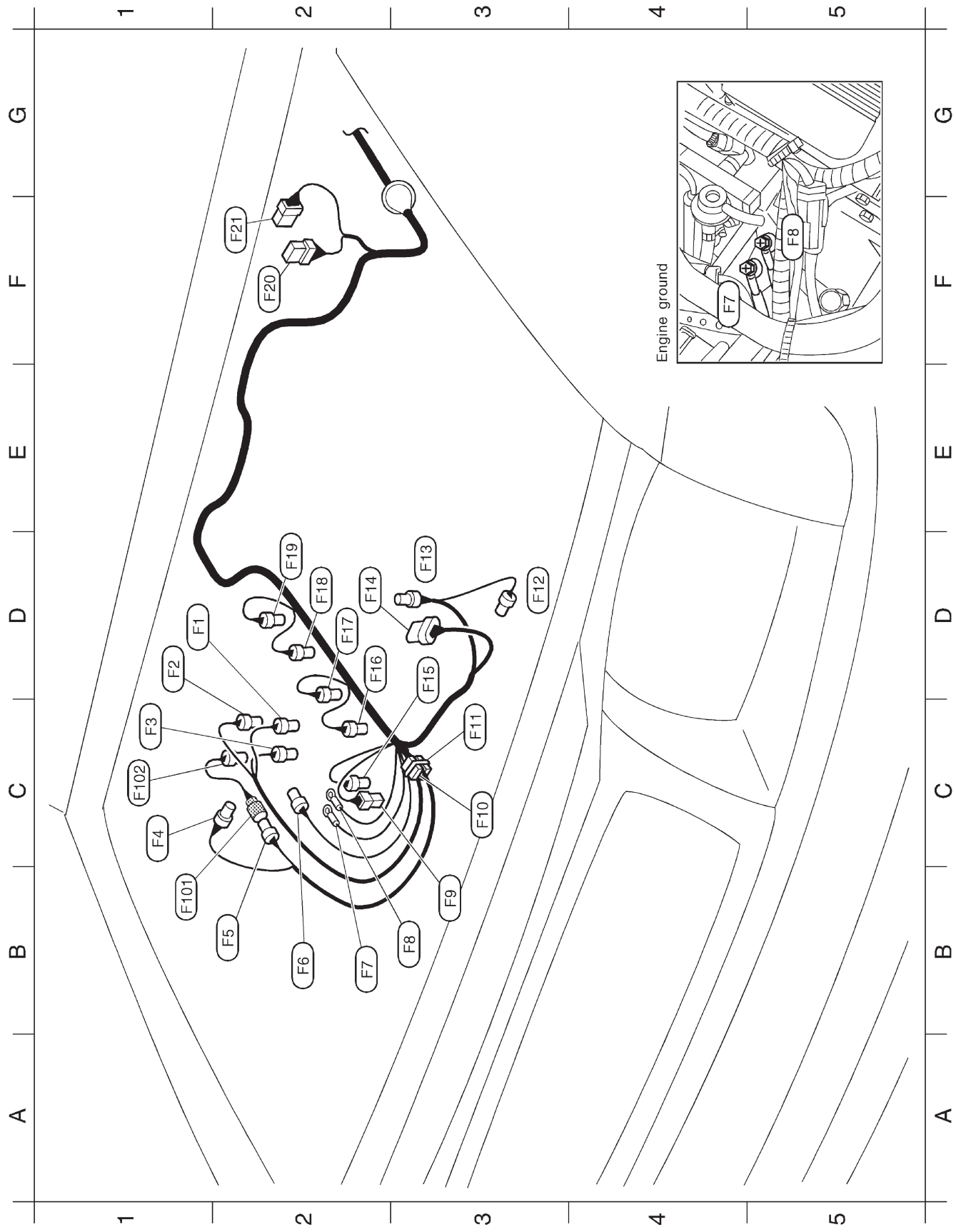


(E101) SMJ : To (M5)
(E102) W/4 : Fuse block
(E103) B/2 : Fuse block

Sub-harness

D1 (E301) B/1 : To (E48) (QD engine)
D2 (E302) L/2 : To (E49) (TD engine)
E2 (E303) — : Glow plug

Engine Control Harness



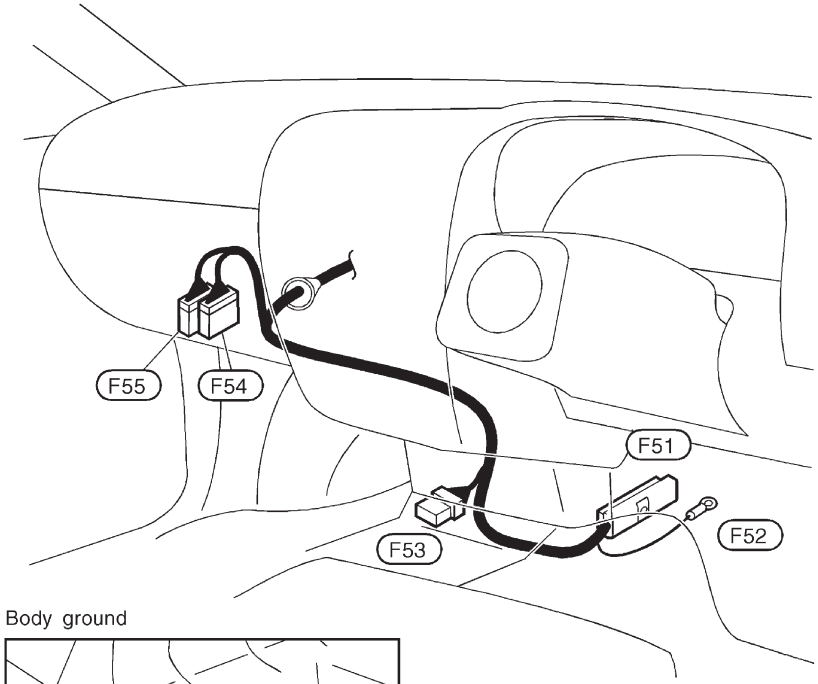
HEL866

D1	F1	BR/2	:	Swirl control valve control solenoid valve
D1	F2	B/2	:	EVAP canister purge control solenoid valve
C1	F3	GY/4	:	IACV-AAC valve • IACV-FICD solenoid valve
C1	F4	GY/3	:	Mass air flow sensor
B2	F5	GY/3	:	To F101
B2	F6	GY/2	:	Intake air temperature sensor
B2	F7	—	:	Engine ground
B3	F8	—	:	Engine ground
B3	F9	B/1	:	Thermal transmitter
C3	F10	W/2	:	Condenser
C3	F11	–/2	:	Resistor
D3	F12	B/1	:	Not used
D3	F13	GY/2	:	Distributor
D2	F14	GY/6	:	Distributor
D3	F15	GY/2	:	Engine coolant temperature sensor
D2	F16	B/2	:	Injector No.1
D2	F17	B/2	:	Injector No.2
D2	F18	B/2	:	Injector No.3
D2	F19	B/2	:	Injector No.4
F2	F20	GY/8	:	Wiper amplifier or jumping connector
F2	F21	W/6	:	Wiper motor

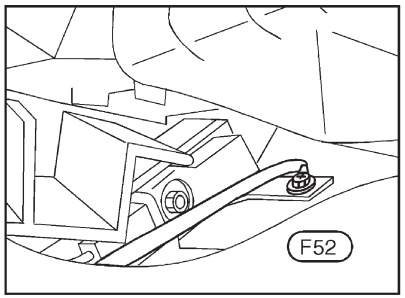
F51	GY/8	:	ECM (ECCS control module)
F52	—	:	Body ground
F53	GY/6	:	Joint connector
F54	W/24	:	To M48
F55	W/10	:	To M47

Sub-harness

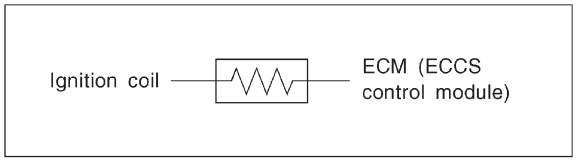
B1	F101	GY/3	:	To F5
C1	F102	BR/3	:	Throttle position sensor



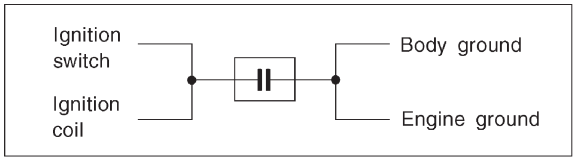
Body ground



Resistor F11

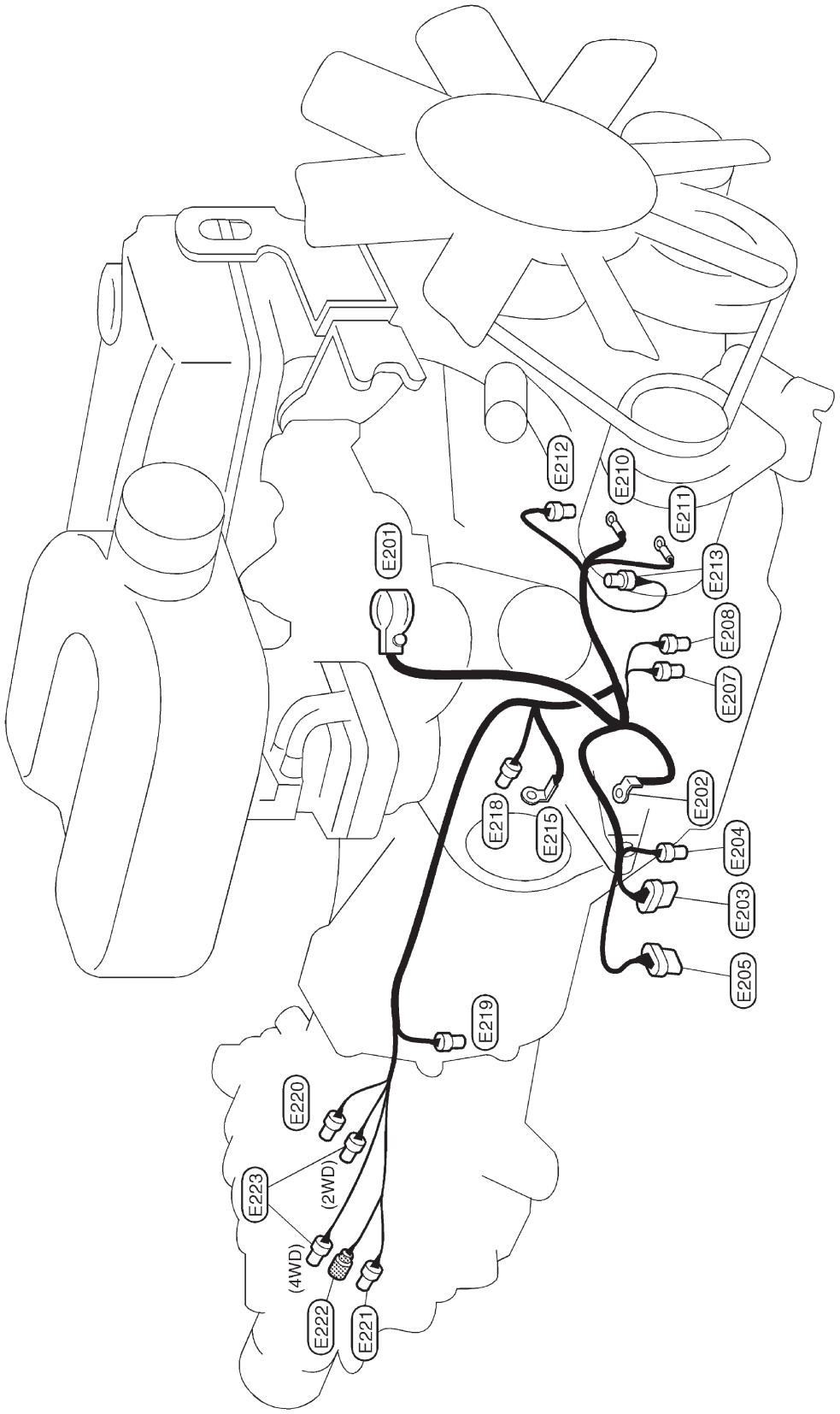


Condenser F10



Engine Harness

KA ENGINE



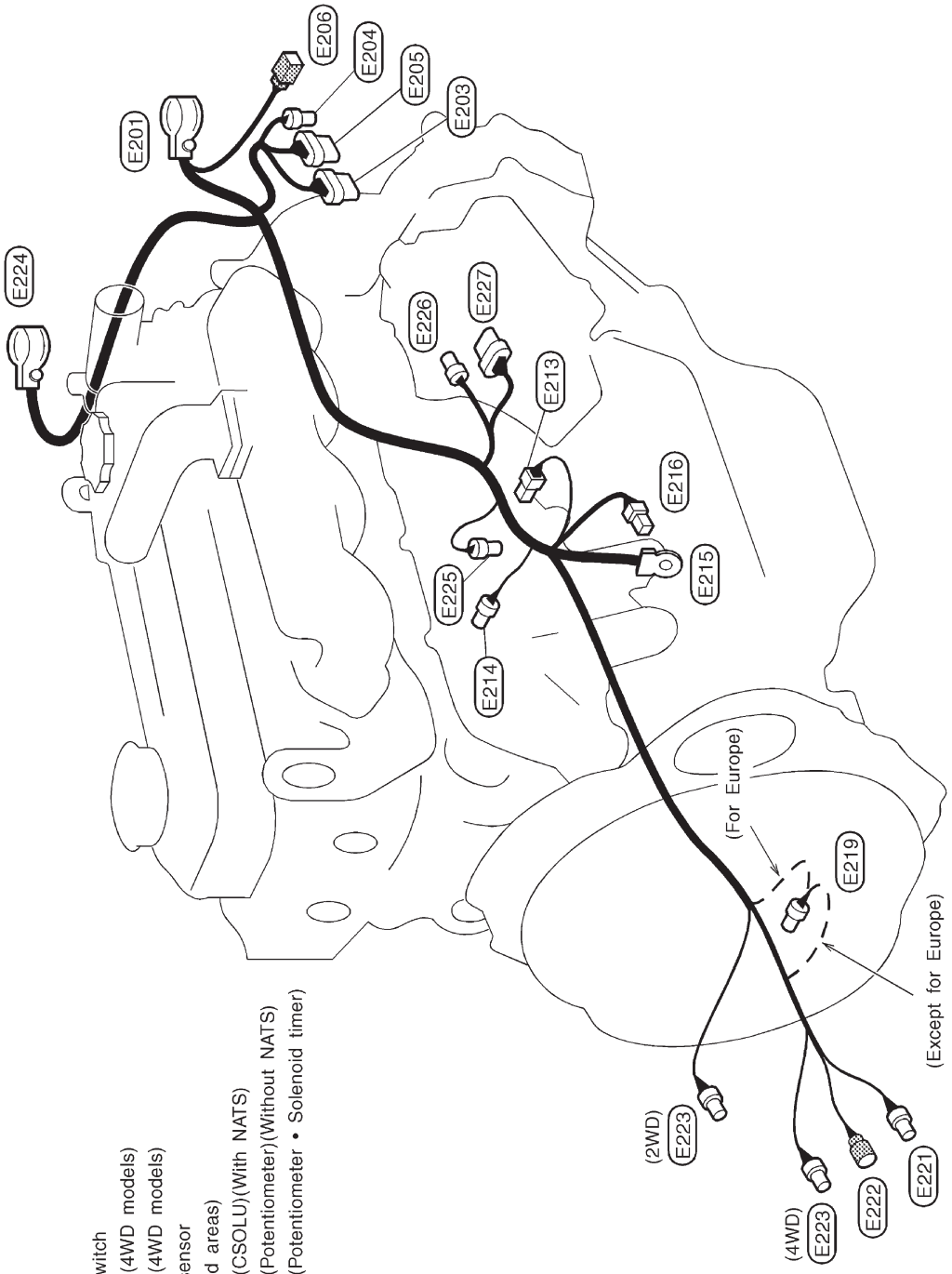
E201 — : Battery
E202 — : Fusible link and fuse box
E203 B/8 : To E30
E204 GY/2 : To E29
E205 GY/8 : To E33
E207 GY/2 : Power steering oil pressure switch (RHD 4WD models)
E208 B/2 : Power steering oil pressure switch (Except RHD 4WD models)
E210 — : Alternator (B)
E211 — : Alternator (E)
E212 GY/2 : Alternator (S,L)

E213 B/1 : Oil pressure switch
E215 — : Starter motor
E218 GY/1 : Starter motor
E219 GY/2 : Back-up lamp switch
E220 B/2 : Neutral position switch
E221 GY/1 : Transfer switch (4WD models)
E222 GY/1 : Transfer switch (4WD models)
E223 GY/2 : Vehicle speed sensor

HEL870

Engine Harness (Cont'd)

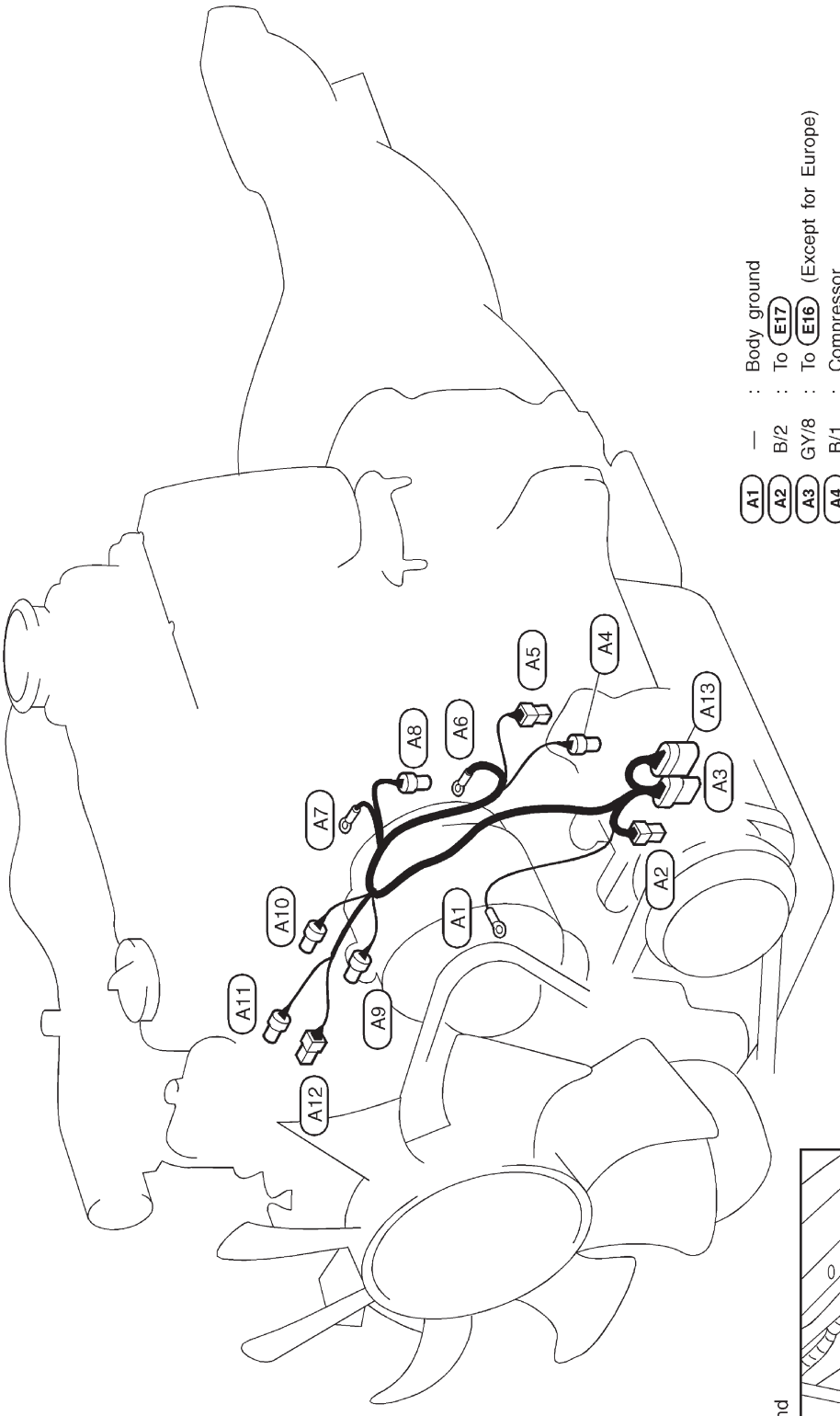
TD ENGINE



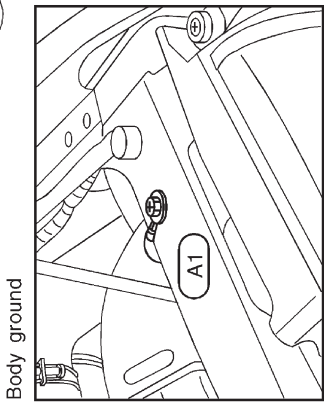
E201 — : Battery
E203 B/8 : To E30
E204 GY/2 : To E29
E205 GY/8 : To E33
E206 B/1 : To E35
E213 B/1 : Oil pressure switch (For warning lamp)
E214 GY/2 : Injection pump (Fuel cut solenoid valve • Solenoid timer) (Without NATS)
E215 — : Starter motor
E216 B/1 : Starter motor
E219 GY/2 : Back-up lamp switch
E221 GY/1 : Transfer switch (4WD models)
E222 GY/1 : Transfer switch (4WD models)
E223 GY/2 : Vehicle speed sensor
E224 — : Battery (For cold areas)
E225 B/3 : Injection pump (CSOLU)(With NATS)
E226 GY/3 : Injection pump (Potentiometer)(Without NATS)
E227 GY/6 : Injection pump (Potentiometer • Solenoid timer) (With NATS)

HEL410A

Alternator Harness



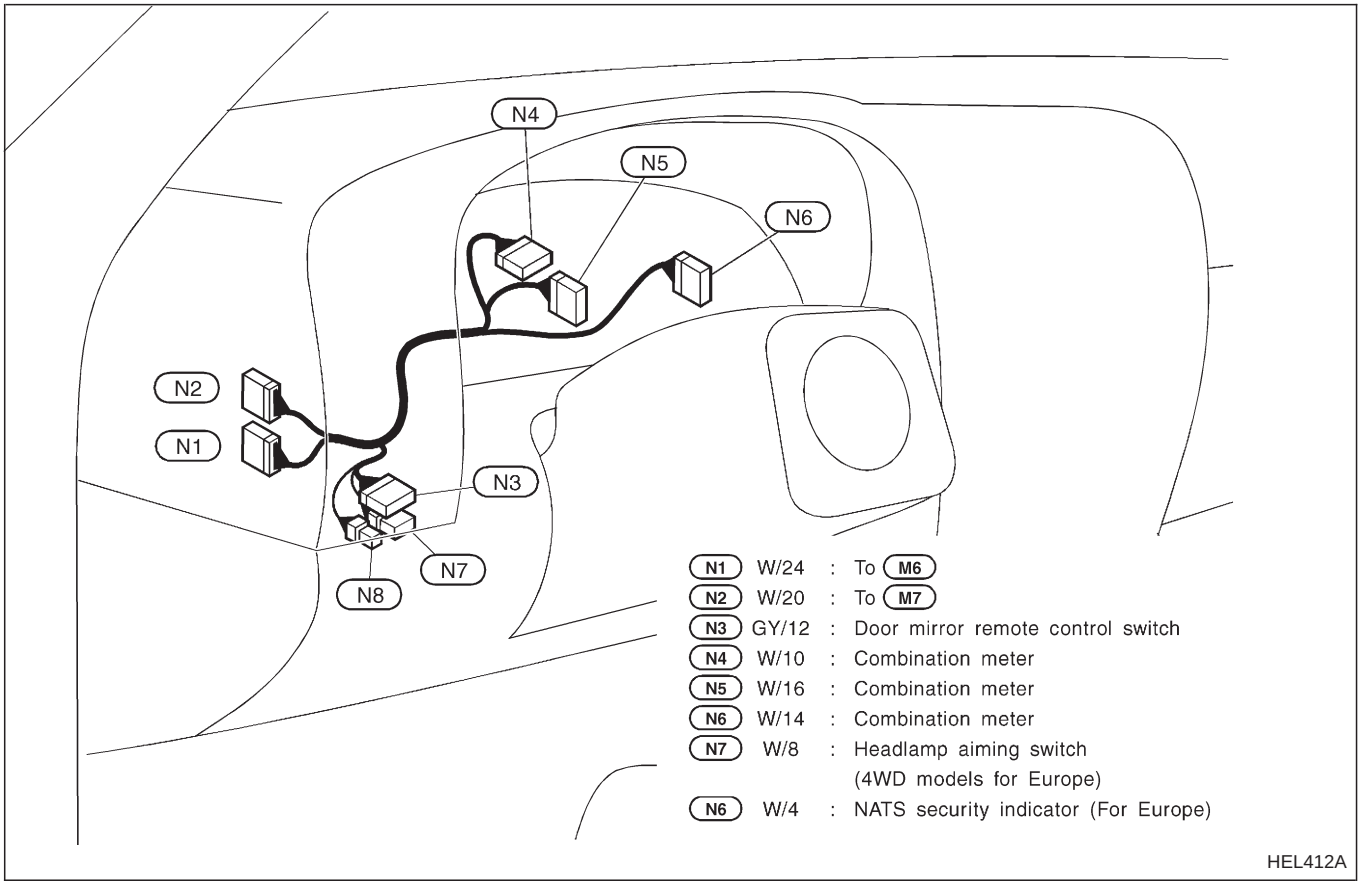
A1 : — : Body ground
A2 : B/2 : To E17
A3 : GY/8 : To E16 (Except for Europe)
A4 : B/1 : Compressor
A5 : B/1 : Oil pressure switch (For fuel heater)
A6 : — : Alternator (B)
A7 : — : Alternator (E)
A8 : GY/2 : Alternator (S,L)
A9 : GY/2 : Not used (Except for Europe)
A10 : BR/2 : Revolution sensor
A11 : GY/2 : Engine coolant temperature sensor
A12 : B/1 : Thermal transmitter
A13 : GY/10 : To E68 (For Europe)



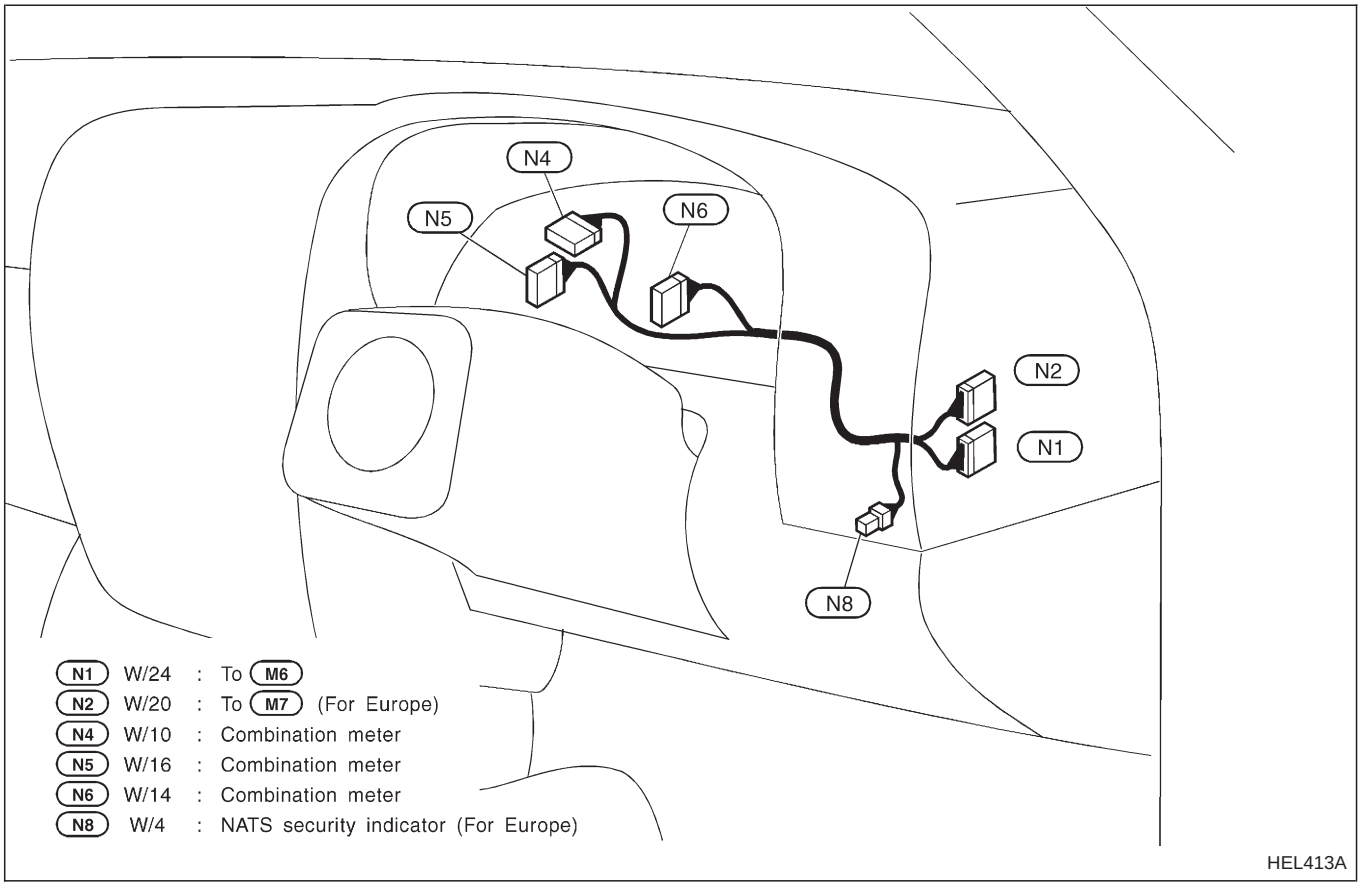
HEL411A

LHD MODELS

Instrument Harness

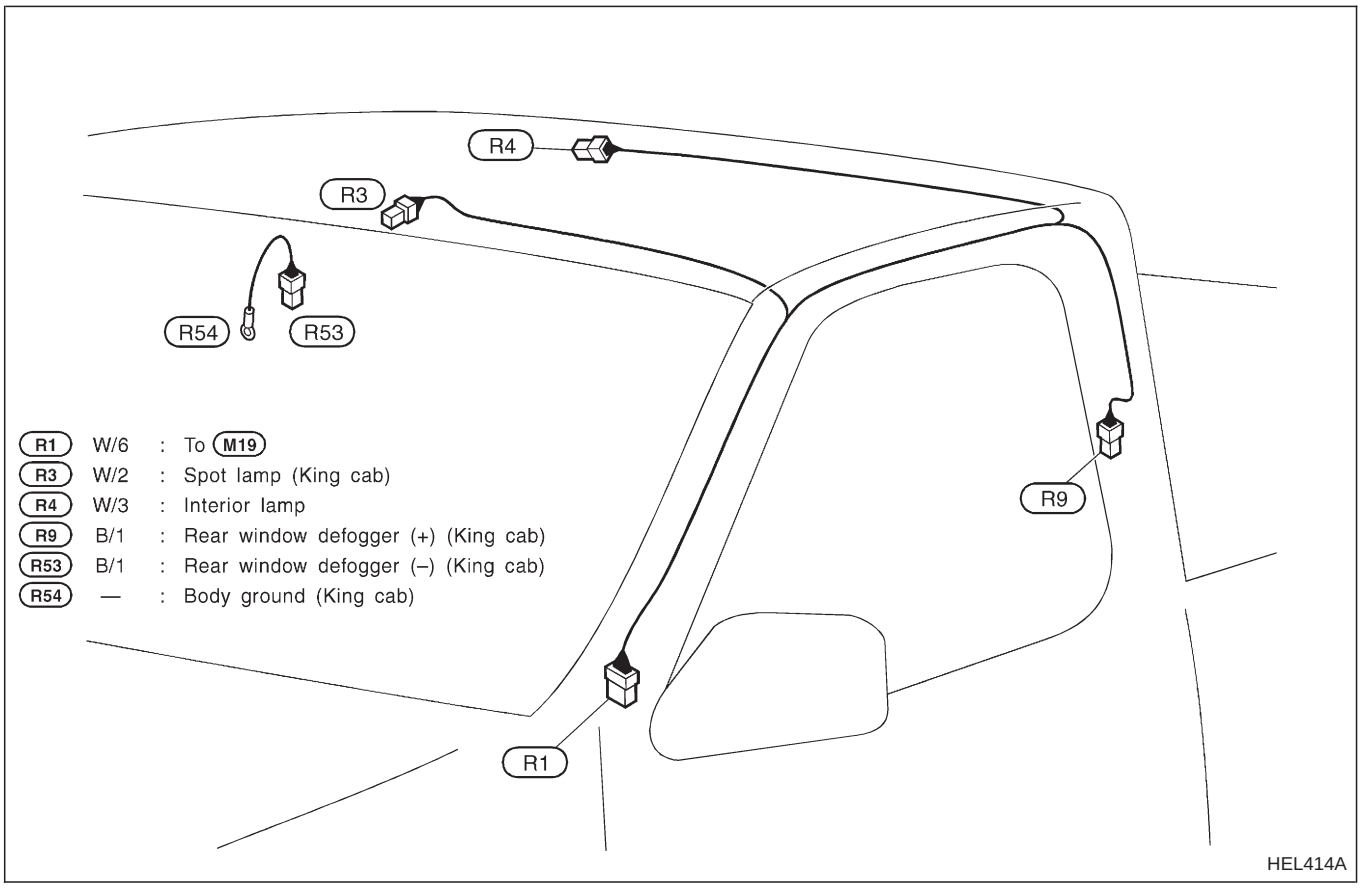


RHD MODELS

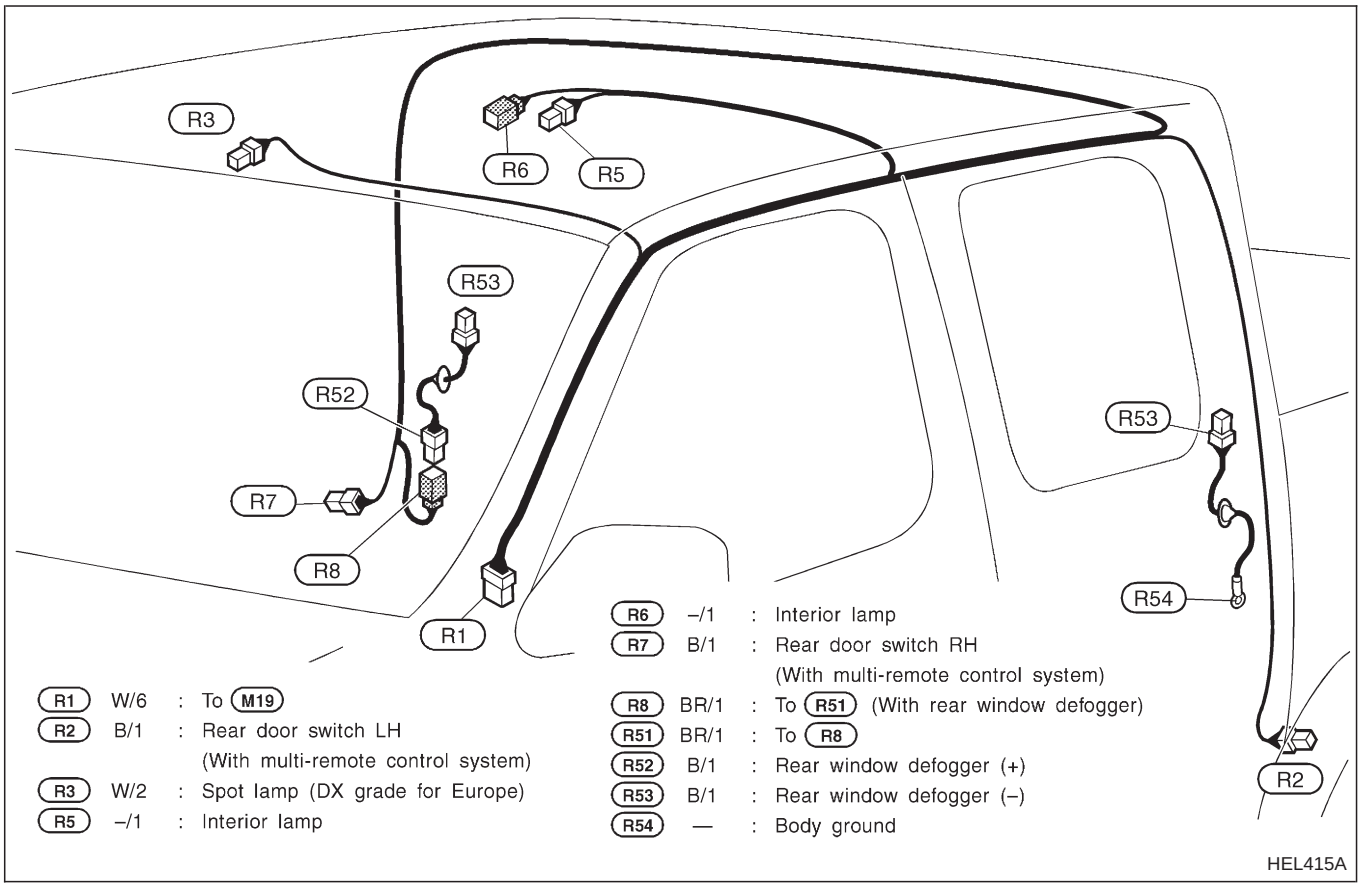


SINGLE AND KING CAB

Room Lamp Harness/LHD Models

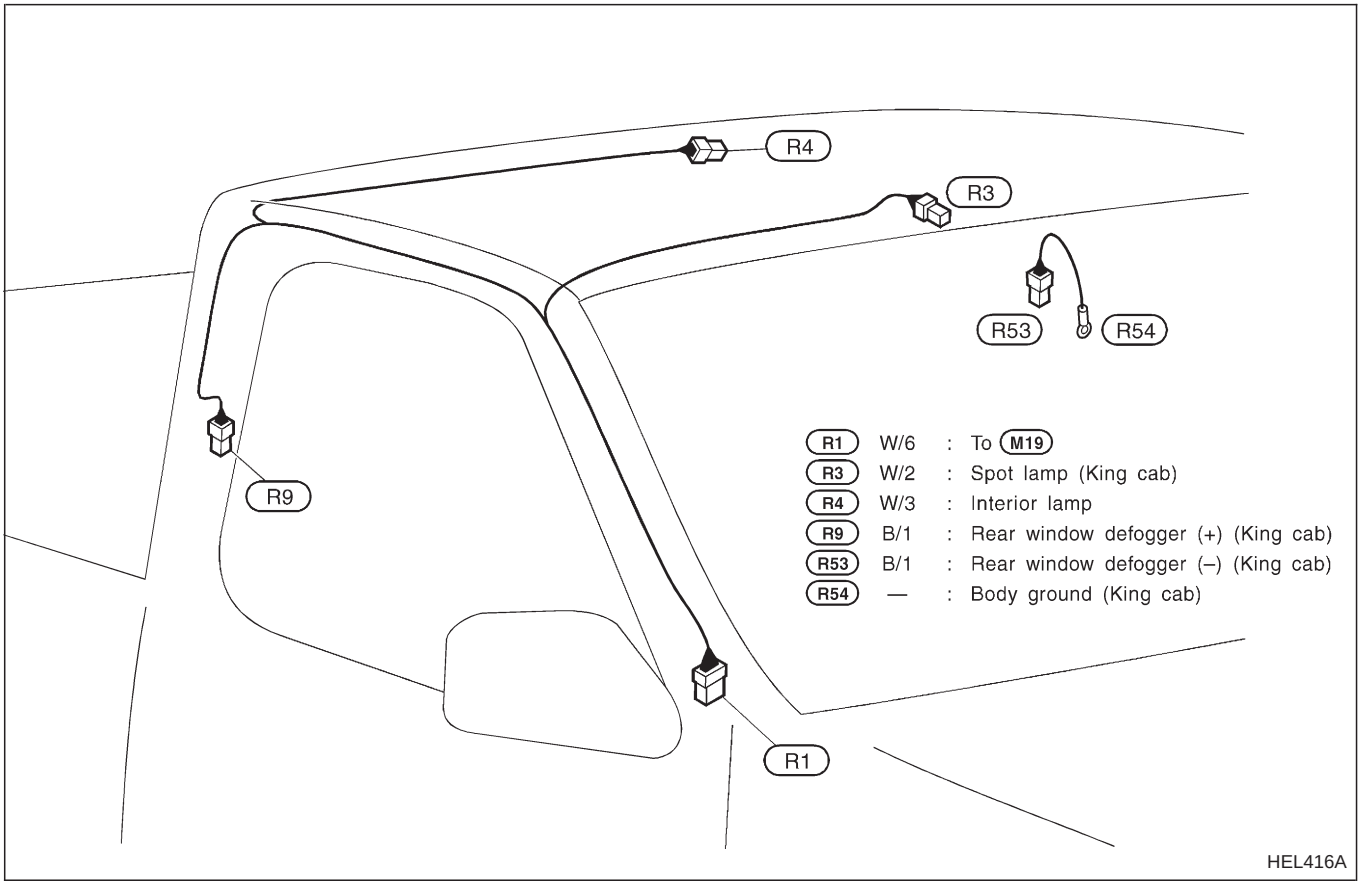


DOUBLE CAB

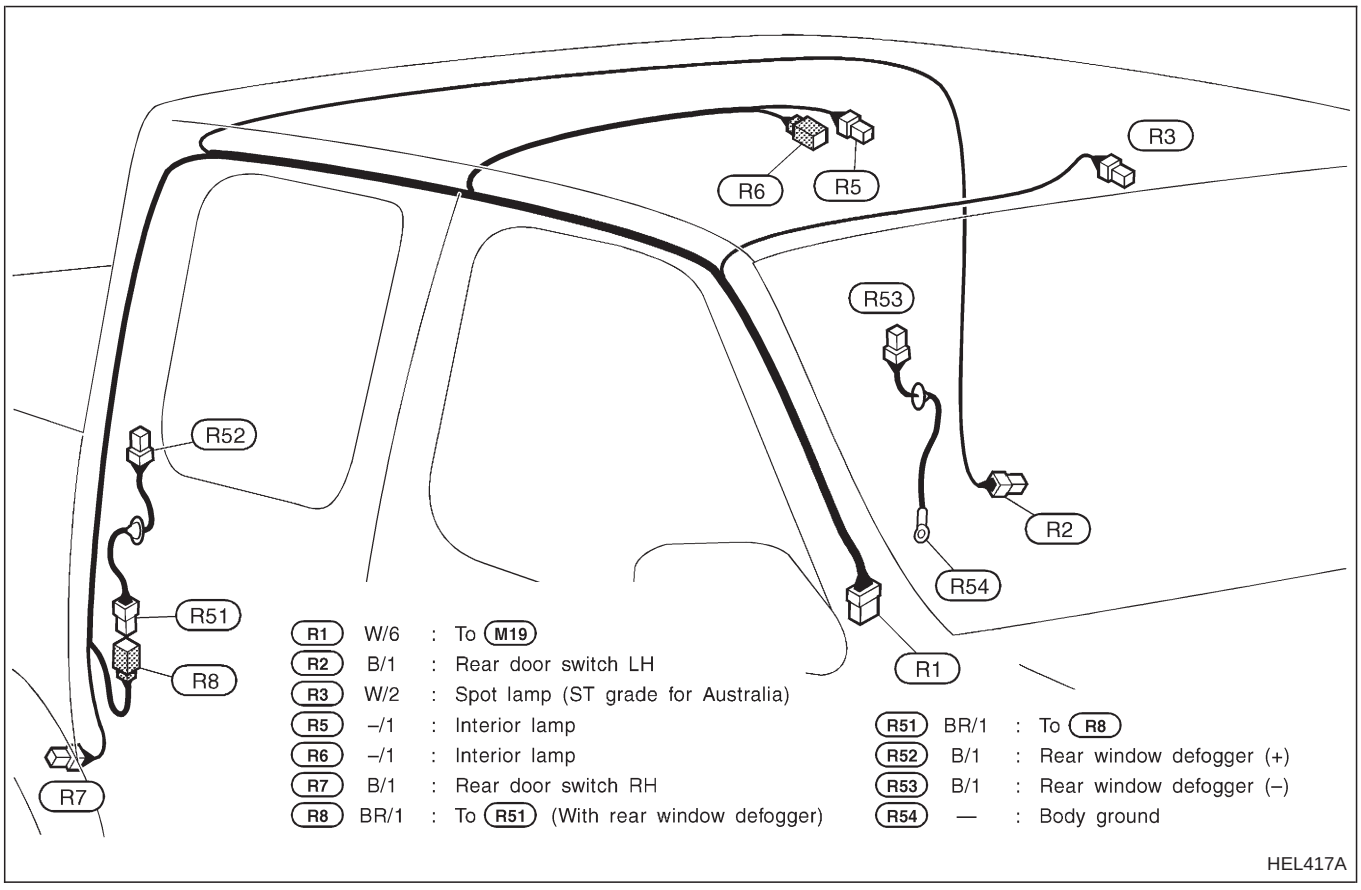


SINGLE AND KING CAB

Room Lamp Harness/RHD Models



DOUBLE CAB



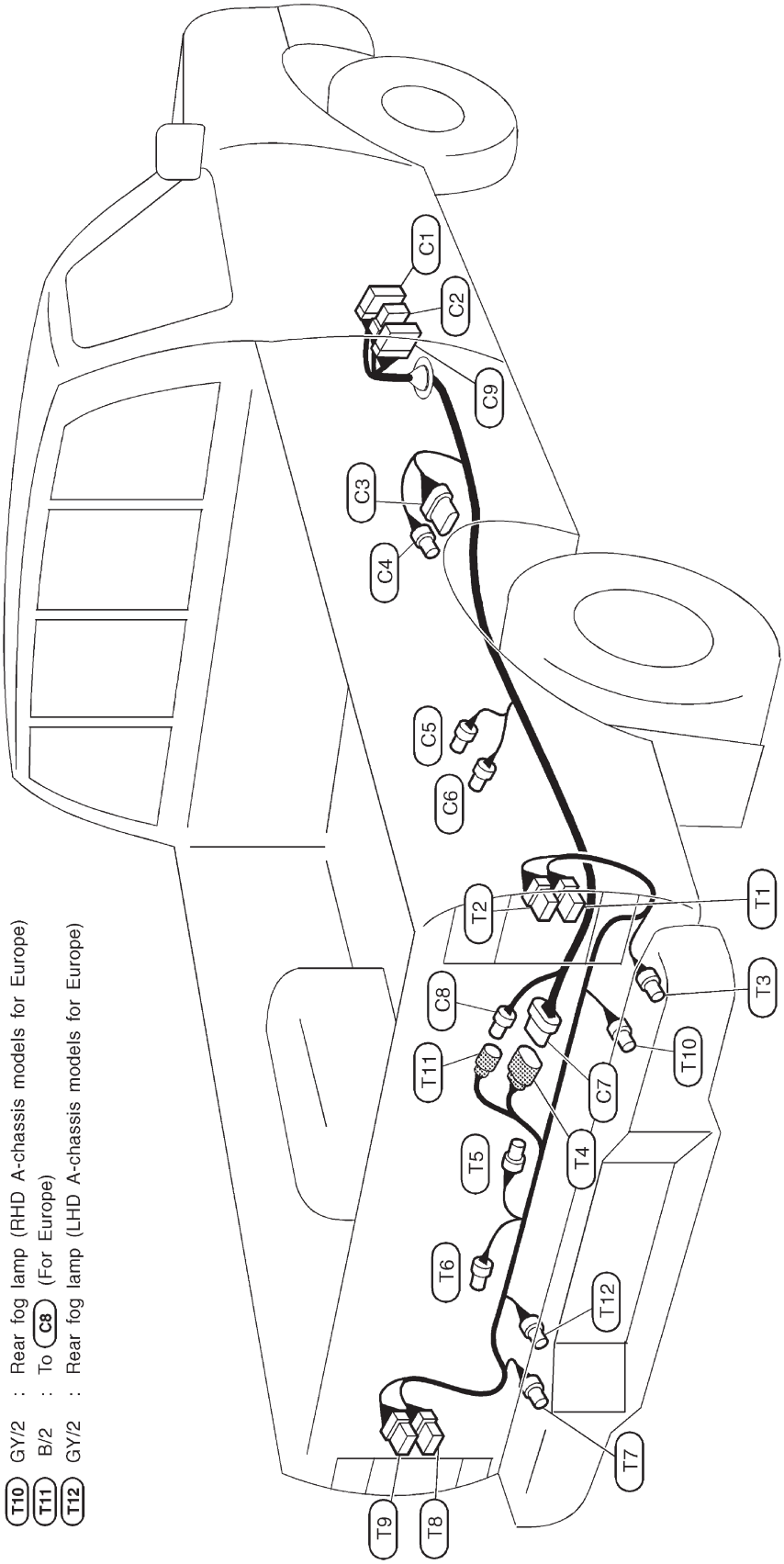
Chassis Harness and Tail Harness

Tail harness

- T1 W/6 : Rear combination lamp RH (A-chassis models and except for Europe and Australia)
- T2 W/8 : Rear combination lamp RH (For Europe, Australia and China except A-chassis models)
- T3 GY/2 : License plate lamp RH (With step bumper)
- T4 GY/8 : To C7
- T5 GY/2 : License plate lamp RH (Without step bumper)
- T6 GY/2 : License plate lamp LH (Without step bumper)
- T7 B/2 : License plate lamp LH (With step bumper)
- T8 W/6 : Rear combination lamp LH (A-chassis models and except for Europe and Australia)
- T9 W/8 : Rear combination lamp LH (For Europe, Australia and China except A-chassis models)
- T10 GY/2 : Rear fog lamp (RHD A-chassis models for Europe)
- T11 B/2 : To C8 (For Europe)
- T12 GY/2 : Rear fog lamp (LHD A-chassis models for Europe)

Chassis harness

- C1 W/12 : To M111 (Except for Europe)
- C2 W/6 : To M112 (With ABS)
- C3 GY/6 : Fuel tank gauge unit (With electric fuel pump)
- C4 GY/3 : Fuel tank gauge unit (With mechanical fuel pump)
- C5 GY/4 : To rear wheel sensor sub-harness (For ABS)(4WD models)
- C6 GY/2 : Rear wheel sensor (For ABS)(2WD models)
- C7 GY/8 : To T4
- C8 B/2 : To T11 (For Europe)
- C9 W/16 : To M121 (For Europe)

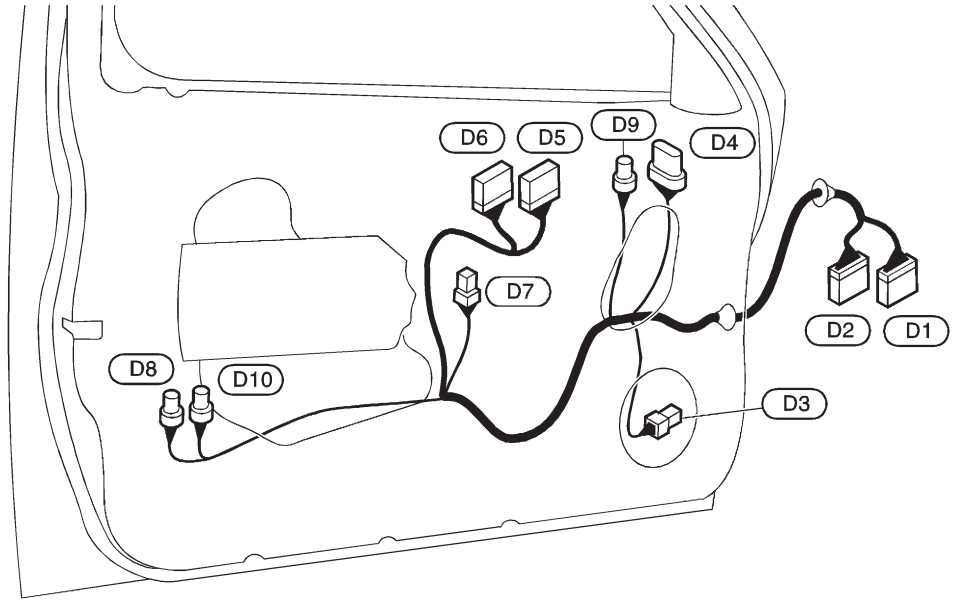


HEL418A

LHD MODELS

Front Door Harness (LH side)

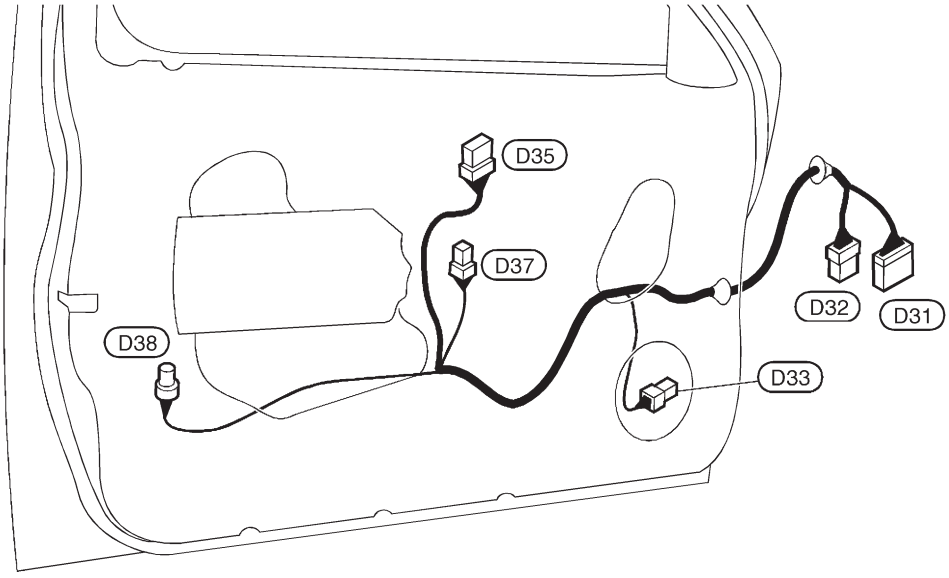
D1 W/12 : To M3
D2 W/12 : To M4 (With power window)
D3 BR/2 : Front speaker
D4 GY/5 : Door mirror actuator (Double cab and King cab models with power window)
D5 W/16 : Power window main switch (With front and rear power window)
D6 W/12 : Power window main switch (With front power window only)
D7 B/2 : Power window regulator (With power window)
D8 GY/2 : Lock knob switch (With power door lock without multi-remote control system)
D9 BR/3 : Not used (With multi-remote contorl system)
D10 GY/4 : Door lock actuator (With multi-remote control system)



HEL419A

RHD MODELS

D31 W/12 : To M49
D32 W/6 : To M50 (With power window)
D33 BR/2 : Front speaker
D35 W/8 : Power window sub-switch (With power window)
D37 B/2 : Power window regulator (With power window)
D38 GY/4 : Door lock actuator (With power door lock)

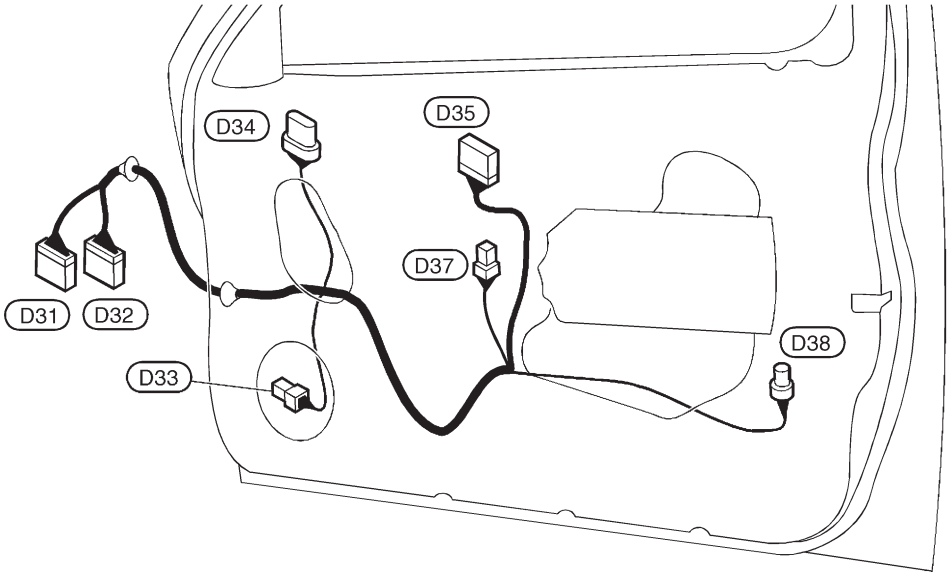


HEL420A

LHD MODELS

Front Door Harness (RH side)

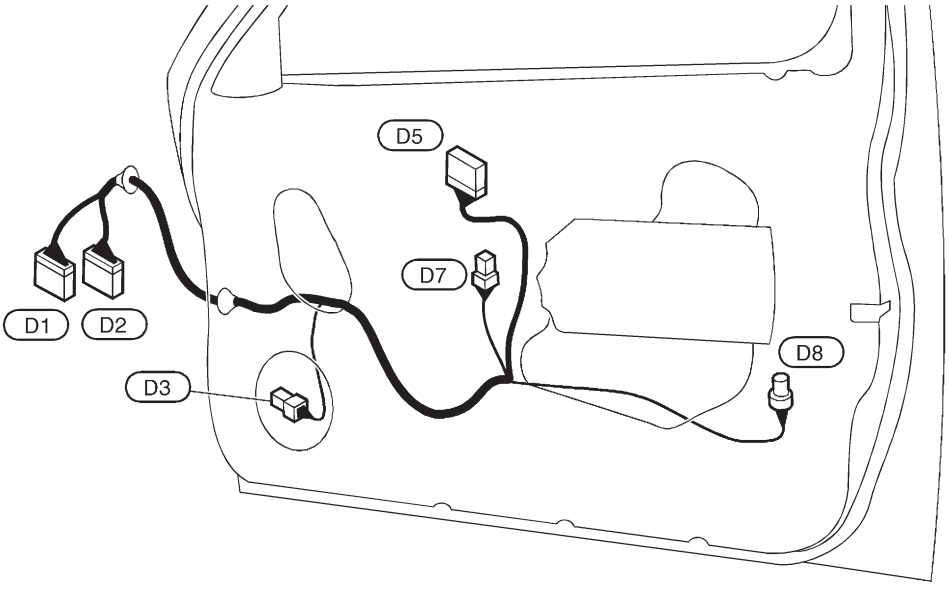
D31 W/12 : To M49
D32 W/6 : To M50 (With power window)
D33 BR/2 : Front speaker
D34 GY/5 : Door mirror actuator (With power window)
D35 W/8 : Power window sub-switch (With power window)
D37 B/2 : Power window regulator (With power window)
D38 GY/4 : Door lock actuator (With power door lock)



HEL880

RHD MODELS

D1 W/12 : To M3
D2 W/12 : To M4 (With power window)
D3 BR/2 : Front speaker
D5 W/16 : Power window main switch (With front and rear power window)
D7 B/2 : Power window regulator (With power window)
D8 GY/2 : Lock knob switch (With power door lock)

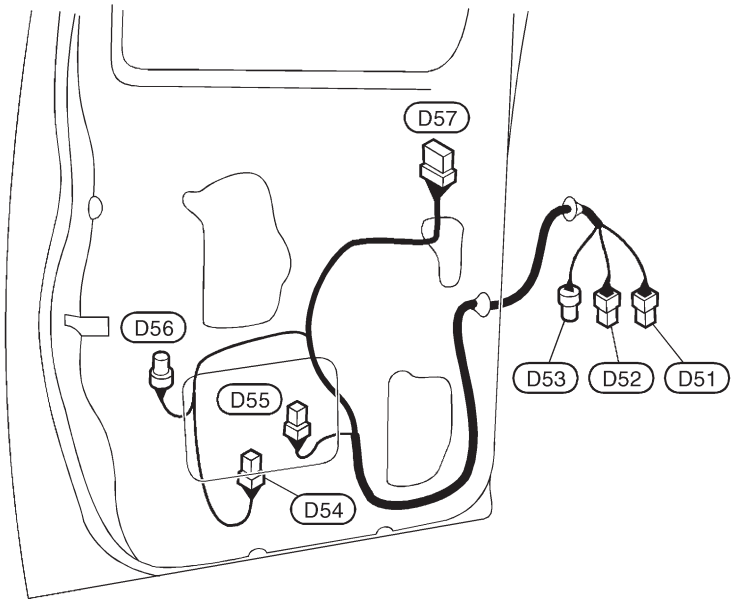


HEL881

Rear Door Harness

LH SIDE

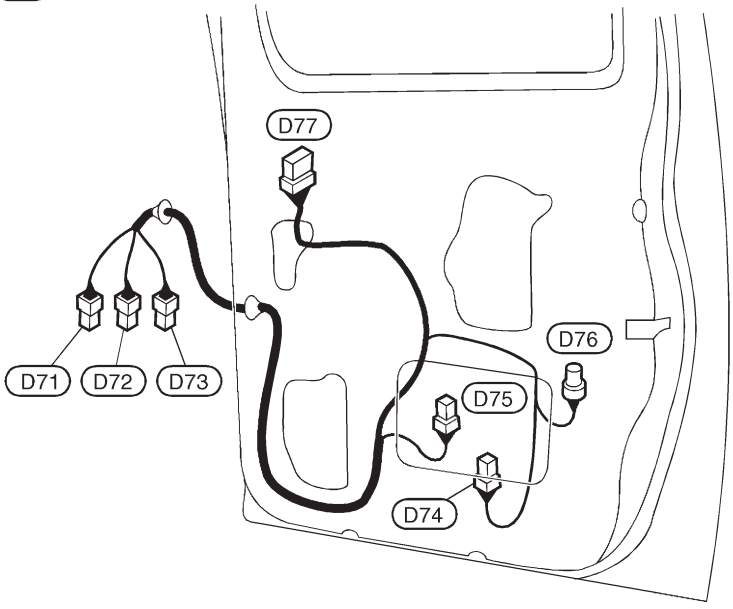
D51 W/3 : To M107
D52 W/2 : To M106
D53 W/2 : To M105
D54 B/2 : Rear speaker
D55 B/2 : Power window regulator
D56 GY/4 : Door lock actuator
D57 W/8 : Power window sub-switch



HEL421A

RH SIDE

D71 W/3 : To M115
D72 W/2 : To M114
D73 W/2 : To M113
D74 B/2 : Rear speaker
D75 B/2 : Power window regulator
D76 GY/4 : Door lock actuator
D77 W/8 : Power window sub-switch



HEL422A

Headlamp

	Wattage (W)
High/low (Semi-sealed beam)	60/55 (H4)

Exterior Lamp

		Wattage (W)
Front combination lamp	Front turn signal	21
	Parking	5
Side turn signal lamp		5
Rear combination lamp	Turn signal	21
	Stop/Tail	21/5
	Back-up	21
	Fog (Except A-chassis)	21
Rear fog lamp (A-chassis)		21
License plate lamp	Standard bumper	5
	Step bumper	21

Interior Lamp

	Wattage (W)
Interior room lamp	10
Spot lamp	8

WIRING DIAGRAM CODES (CELL CODES)

Use the chart below to find out what each wiring diagram code stands for.
Refer to the wiring diagram code in the alphabetical index to find the location (page number) of each wiring diagram.

Code	Section	Wiring Diagram Name
AAC/V	EC	IACV-AAC Valve
ABS	BR	Anti-lock Brake System
A/C, M	HA	Manual Air Conditioner
AUDIO	EL	Audio
BACK/L	EL	Back-up Lamp
BUZZER	EL	Warning Buzzer
CHARGE	EL	Charging System
CHOKE	EC	Automatic Choke
CIGAR	EL	Cigarette Lighter
CLOCK	EL	Clock
CMPS	EC	Camshaft Position Sensor
COOL/F	LC	Cooling Fan Control
DEF	EL	Rear Window Defogger
DIMDIP	EL	Headlamp — With Dim-dip Lamp System
D/LOCK	EL	Power Door Lock
DTRL	EL	Headlamp — With Daytime Light System
ECTS	EC	Engine Coolant Temperature Sensor
EGRC/V	EC	EGRC — Solenoid Valve
FCUT	EC	Fuel Cut Solenoid Valve
F/HEAT	EC	Fuel Heater System
FICD	EC	IACV-FICD Solenoid Valve
FIPOT	EC	ISC-FI Pot
FPCM	EC	Fuel Pump Control Module
F/PUMP	EC	Fuel Pump
F/RTN	EC	Fuel Return Control Solenoid Valve
GLOW	EC	Quick-glow System
H/AIM	EL	Headlamp Aiming Control
HEATER	HA	Heater
H/LAMP	EL	Headlamp
HLC	EL	Headlamp Washer
HO2S	EC	Heated Oxygen Sensor
HORN	EL	Horn
H/SEAT	EL	Heated Seat
IATS	EC	Intake Air Temperature Sensor
IDLE	EC	IACV-Idle Up Control

Code	Section	Wiring Diagram Name
IGN	EC	Ignition System
IGN/SG	EC	Ignition Signal
ILL	EL	Illumination
INJECT	EC	Injector
INT/L	EL	Interior and Spot Lamps
MAFS	EC	Mass Air Flow Sensor
MAIN	EC	Main Power Supply and Ground Circuit
METER	EL	Speedometer, Tachometer, Temp. and Fuel Gauges
MIL/DL	EC	MIL and Data Link Connector For CONSULT
MIRROR	EL	Power Door Mirror
MULTI	EL	Multi-remote Control System
NATS	EL	Nissan Anti-theft System
P/ANT	EL	Power Antenna
PGC/V	EC	Canister Purge Control Solenoid Valve
PLA	EC	Partial Load Advance Control
PNP/SW	EC	Park/Neutral Position Switch
POWER	EL	Power Supply Routing
PST/SW	EC	Power Steering Oil Pressure Switch
R/FOG	EL	Rear Fog Lamp
SRS	RS	Supplemental Restraint System
S/SIG	EC	Start Signal
START	EL	Starting System
STOP/L	EL	Stop Lamp
SWL/V	EC	Swirl Control Valve Control Solenoid Valve
TAIL/L	EL	Parking, License and Tail Lamps
TPS	EC	Throttle Position Sensor
TURN	EL	Turn Signal and Hazard Warning Lamps
VSS	EC	Vehicle Speed Sensor
WARN	EL	Warning Lamps
WINDOW	EL	Power Window
WIPER	EL	Front Wiper and Washer