FUSE LOCATIONS

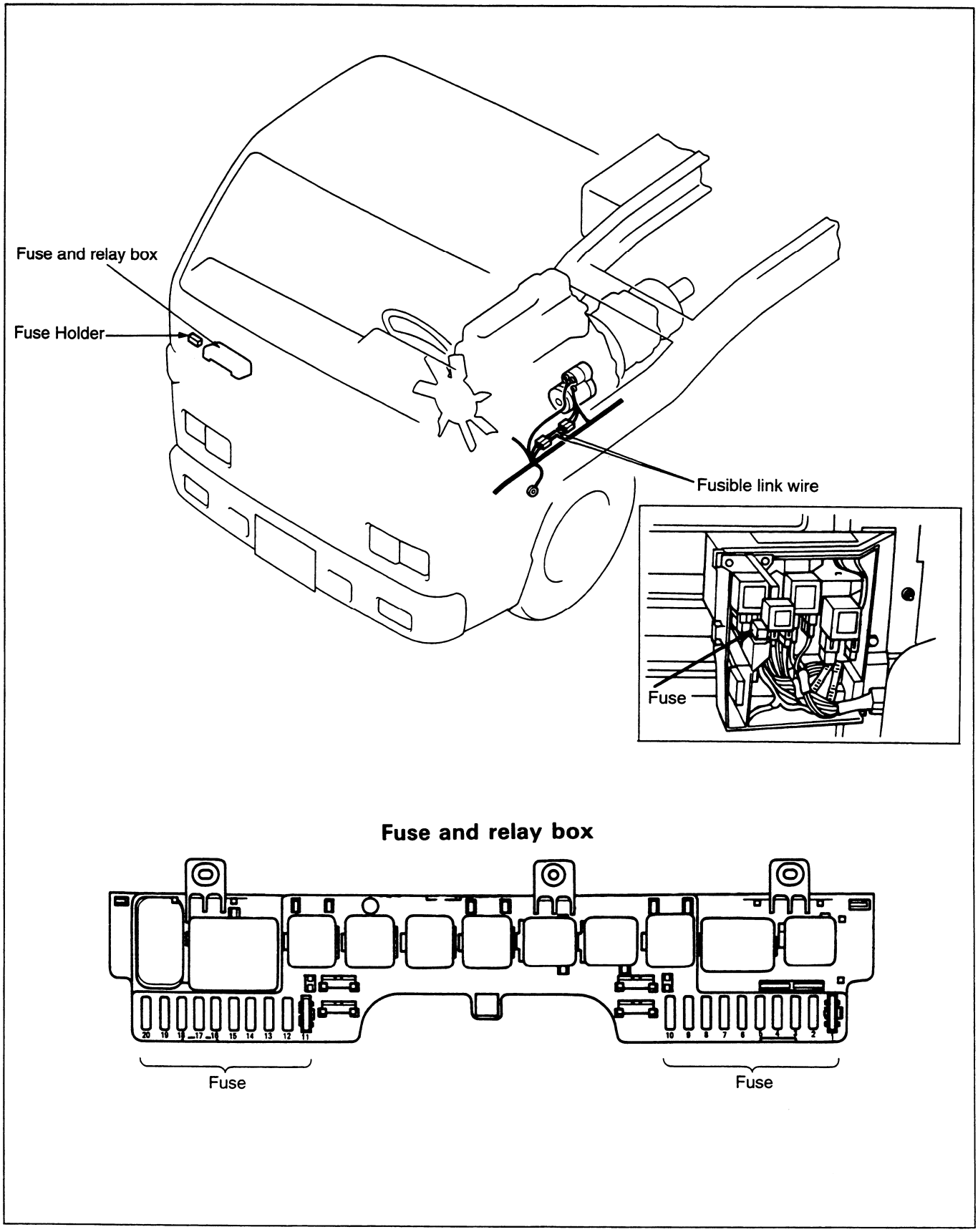


Figure 22. Fuse Locations

FUSE ARRANGEMENT

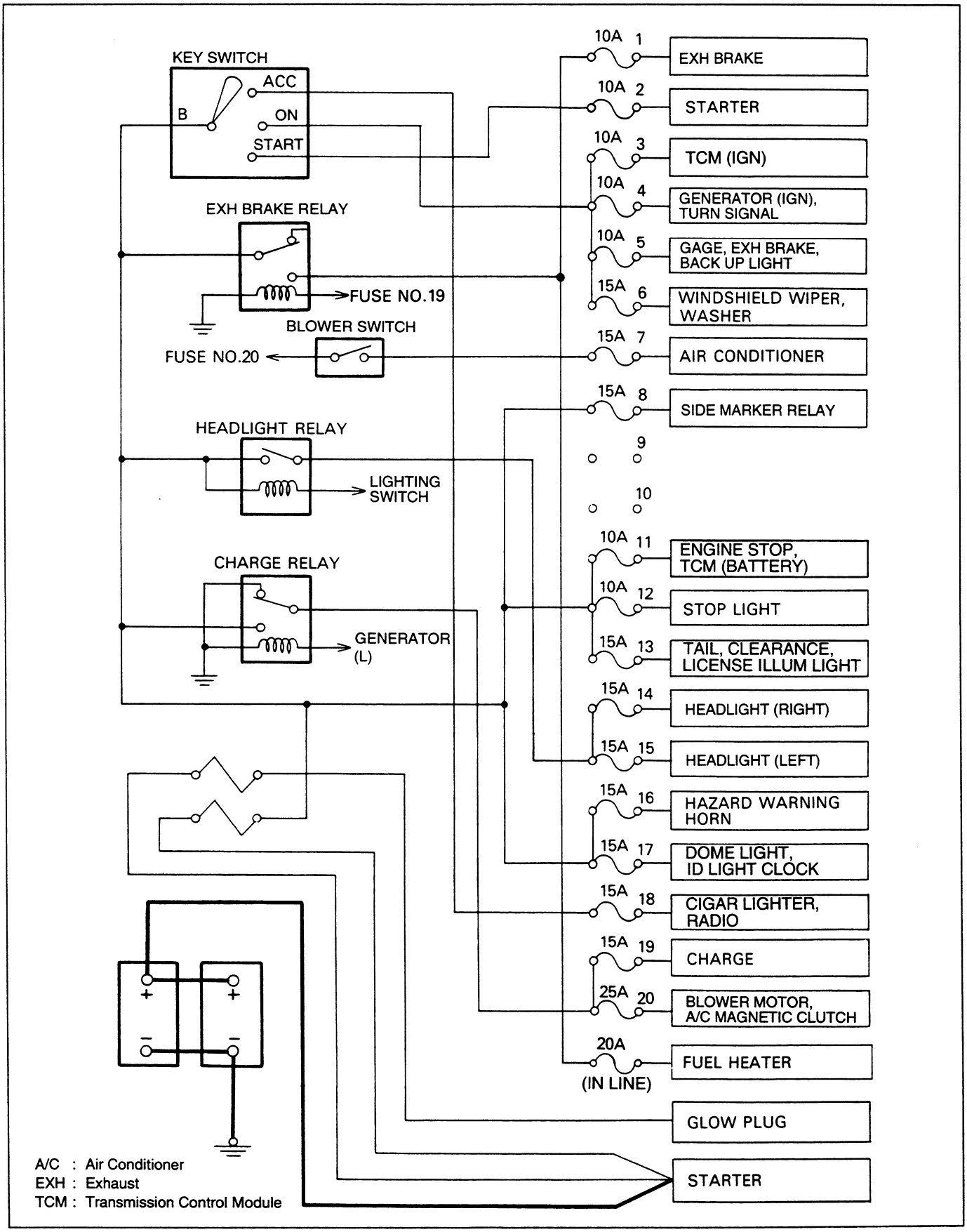


Figure 23. Fuse Arrangement (1)

FUSE ARRANGEMENT <CANADA ONLY>

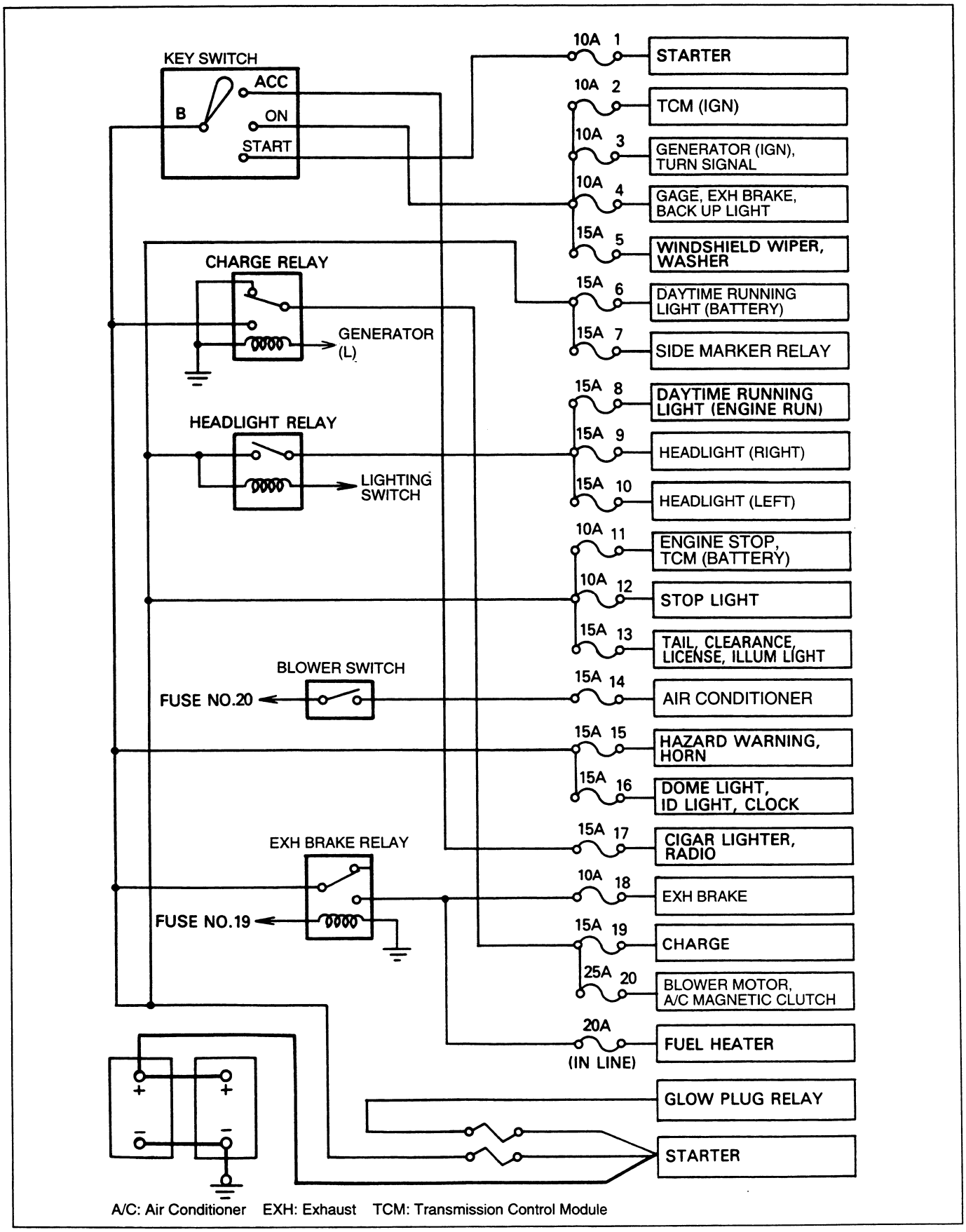


Figure 24. Fuse Arrangement (2)

RELAYS

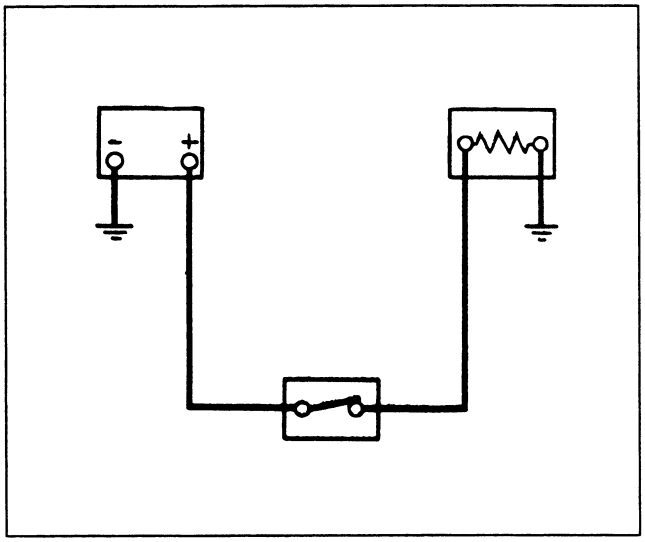


Figure 25. Relayless Circuit

Battery and load location may require that a switch be placed some distance from either component. This means a longer wire and a higher voltage drop (figure 25).

The installation of a relay between the battery and the load reduces the voltage drop (figure 26).

Because the switch controls the relay, the switch can be compact.

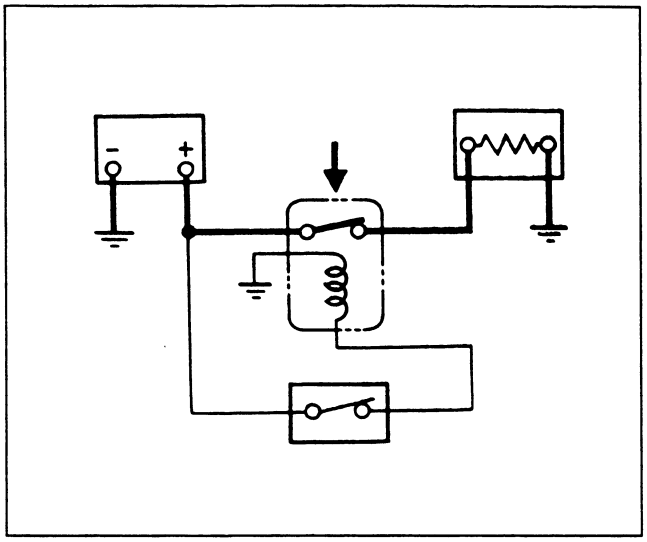


Figure 26. Relay Circuit

RELAY LOCATIONS

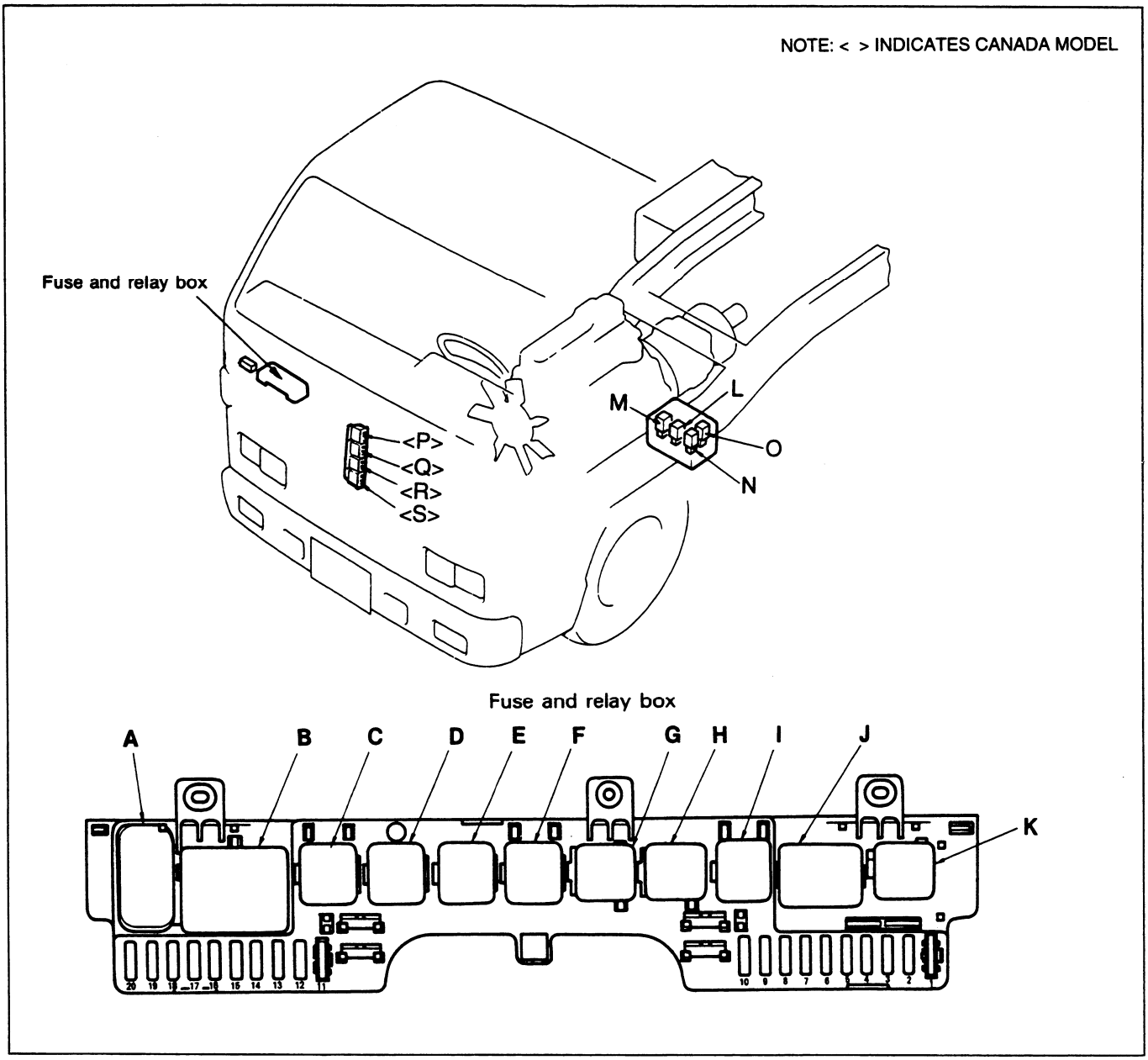


Figure 27. Relay Locations

RELAY LIST

NOTE: < > INDICATES CANADA MODEL

No.	A	B	C	D	E	F	G	H	I	J	K
Usage	Horn	Wiper	ID Light	Charge	Dimmer	Exhaust brake	Tail	Head light	Engine warm cut	Flasher unit	Side marker

No.	L	M	N	O	<P>	<Q>	<R>	<S>
Usage	Glow plug I	Starter	Glow plug II	Exhaust brake control	DRL	DRL Resister	DRL cut (A)	DRL cut (B)

DRL: Daytime Running Light

DIODES

DIODE LOCATIONS

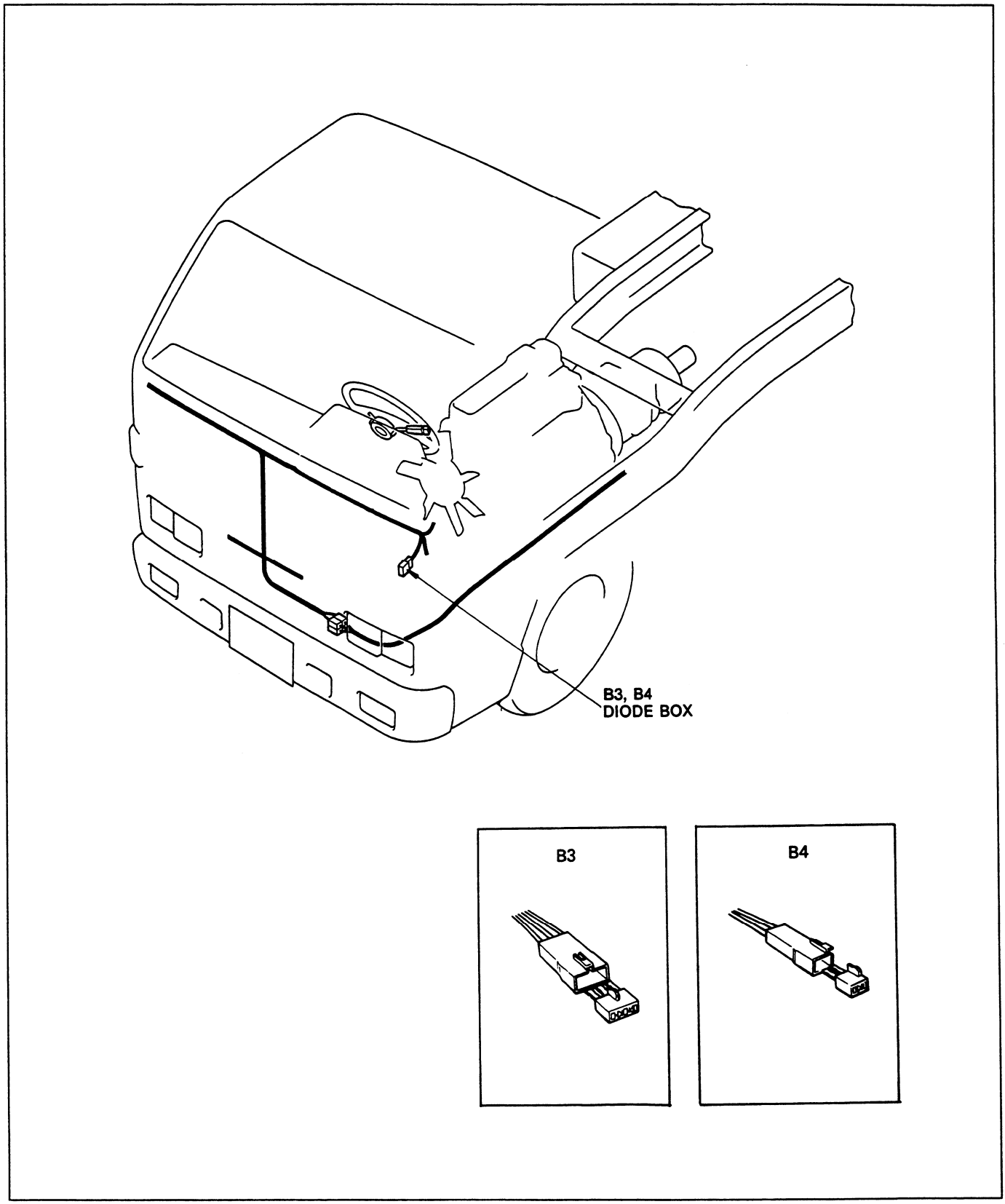


Figure 28. Diode Locations

HARNESS

MAIN HARNESS ROUTING

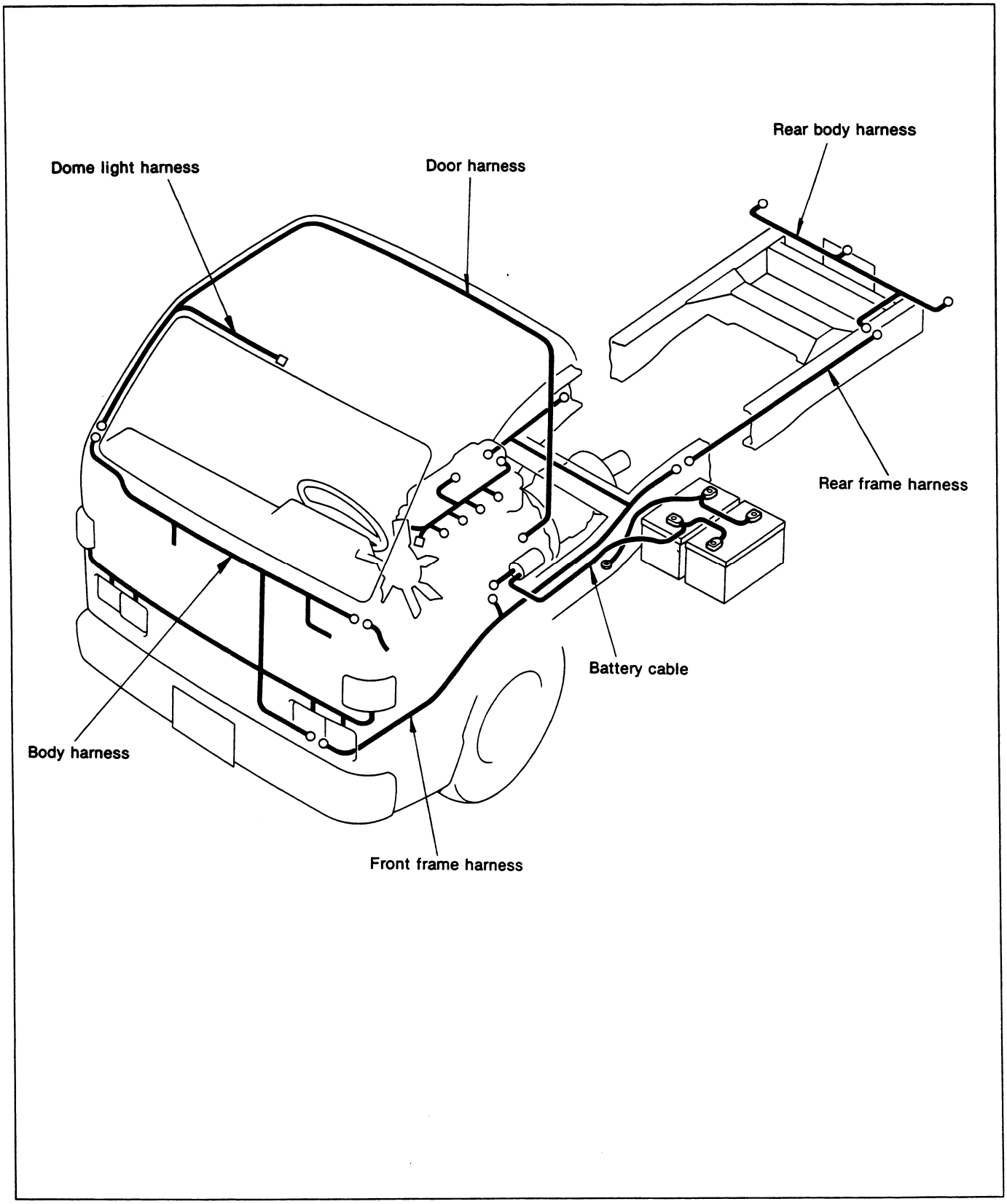


Figure 29. Main Harness Routing

READING THE DIAGRAM

CIRCUIT DIAGRAM AND PARTS LOCATION

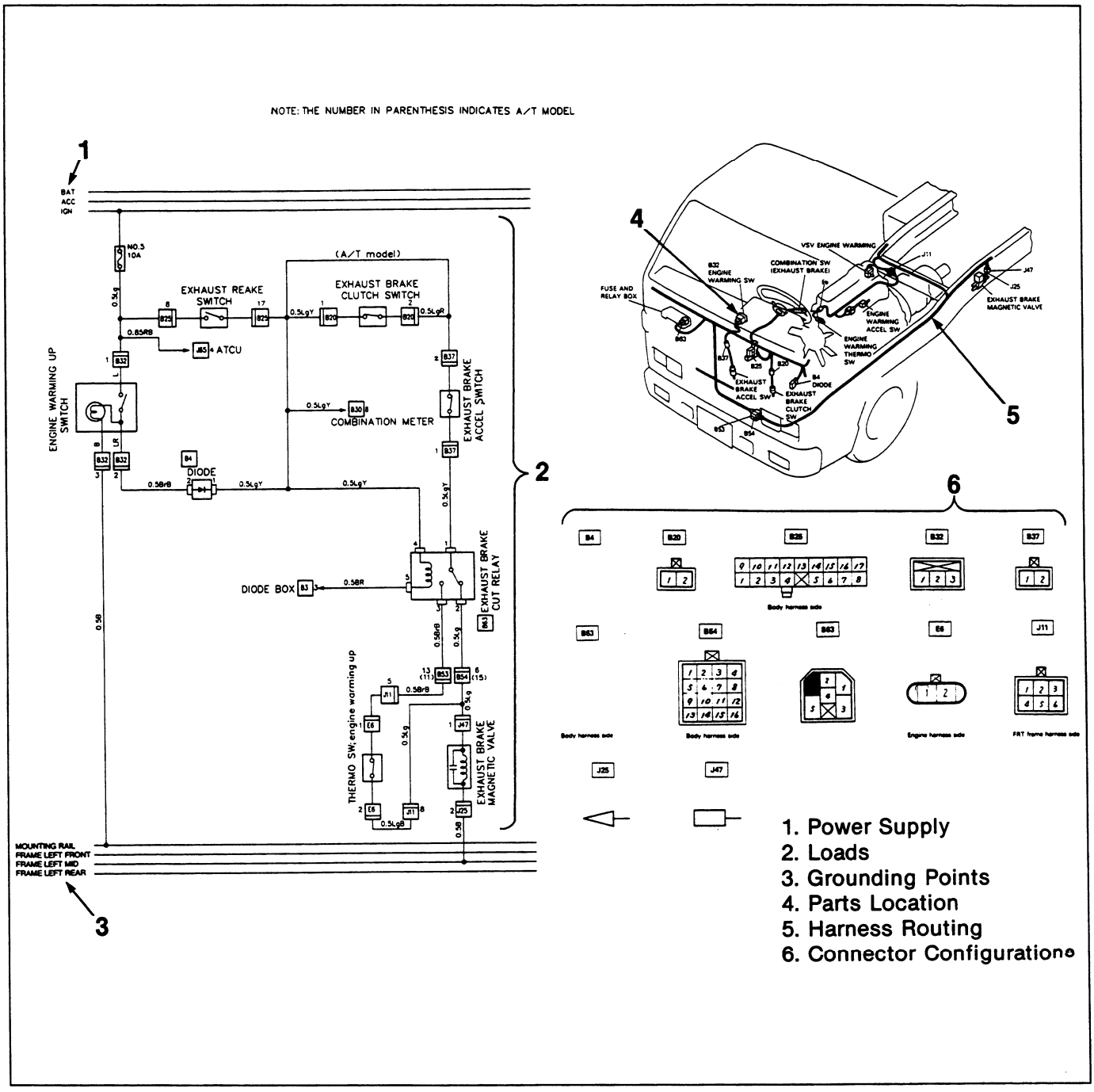


Figure 30. Circuit Diagram and Parts Location

Circuit Diagram

In this manual, each system circuit has its own diagram. The circuit diagram shows the power supply (1), the load or loads (2), and the grounding point(s) (3) (figure 30).

Parts Location

The parts location shows the location of the parts (4) which using the each circuit, harness routing (5) and connector, diode and relay configurations (6) (figure 30).

CONNECTOR

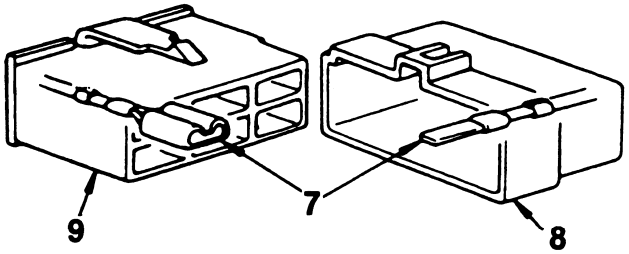
The connector terminal shape (7) determines whether the connector is male (8) or female (9) (figure 31).

The connector housing configuration does not determine whether a connector is male or female (figure 31).

The symbol illustrated in the figure shows a connector in the circuit of this section (figure 32).
(8); Male side connector
(9); Female side connector

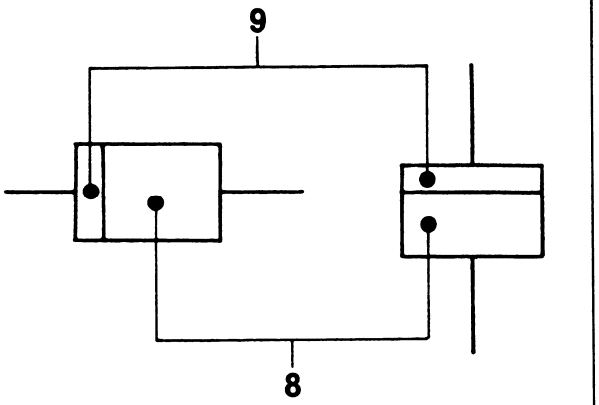
A Connector is identified with a number code (10) (figure 33).

The applicable terminal number (11) is shown for each connector (figure 33).



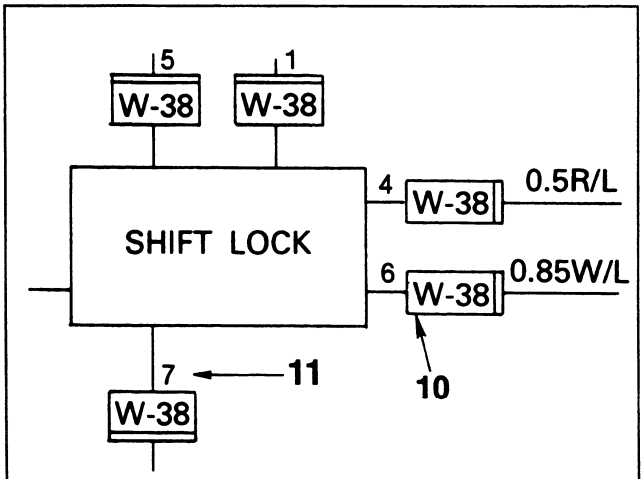
7. Terminal
8. Male Side Connector
9. Female Side Connector

Figure 31. Connector Terminal



8. Male Side Connector
9. Female Side Connector

Figure 32. Symbol Illustrated



10. Connector Number Code
11. Terminal Number

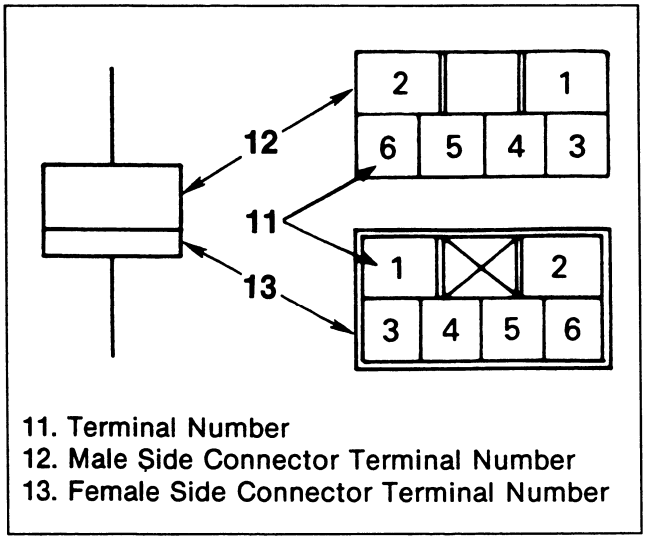
Figure 33. Number Code and Terminal Number

Connector, diode, and relay terminal numbers (11) are clearly shown (figure 34).

Male side connector terminal numbers (12) are in sequence from upper right to lower left.

Female side connector terminal numbers (13) are in sequence from upper left to lower right.

NOTICE: For those connectors on which specific terminal numbers or symbols are shown (such as ECM), the terminal numbers or symbols are used in the circuit diagram, irrespective of the above rule.



11. Terminal Number
12. Male Side Connector Terminal Number
13. Female Side Connector Terminal Number

Figure 34. Connector Terminal Number

SYSTEM REPAIR

STARTING AND ENGINE STOP

CIRCUIT DIAGRAM (M/T-1)

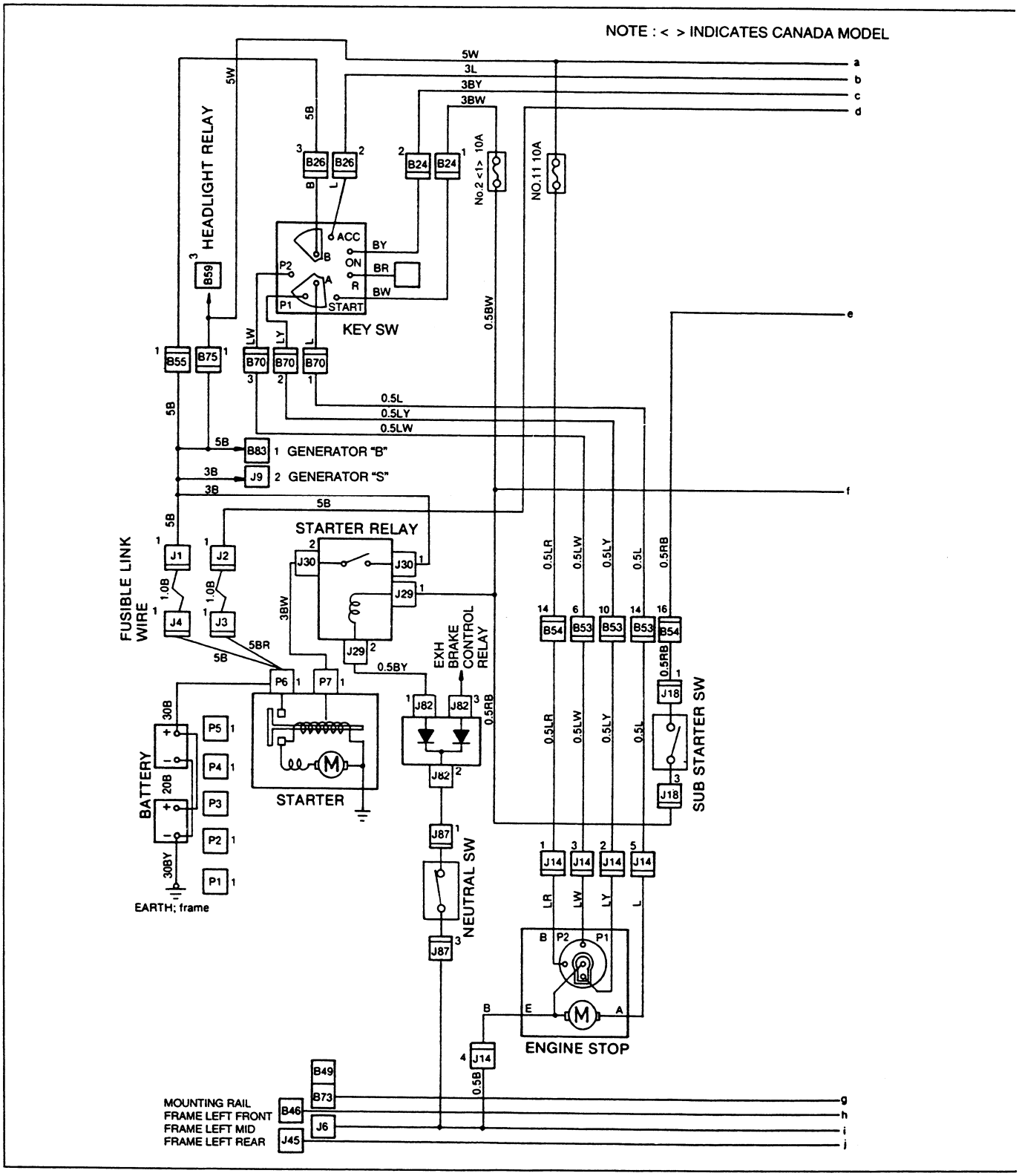
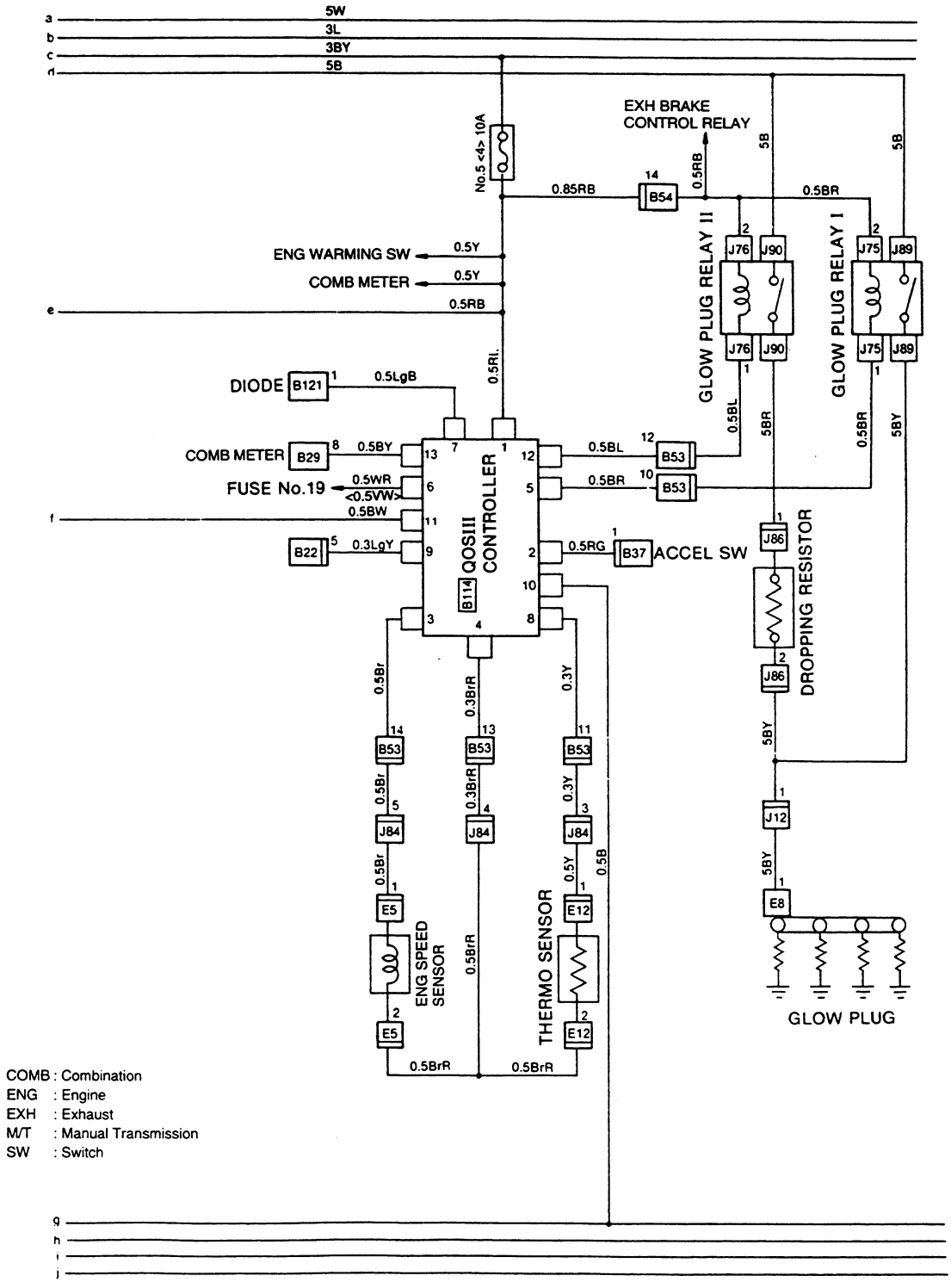


Figure 37. Circuit Diagram (M/T-1)

CIRCUIT DIAGRAM (M/T-2)



COMB : Combination
ENG : Engine
EXH : Exhaust
M/T : Manual Transmission
SW : Switch

Figure 38. Circuit Diagram (M/T-2)

STARTING AND ENGINE STOP (CONT.)

CIRCUIT DIAGRAM (A/T-1)

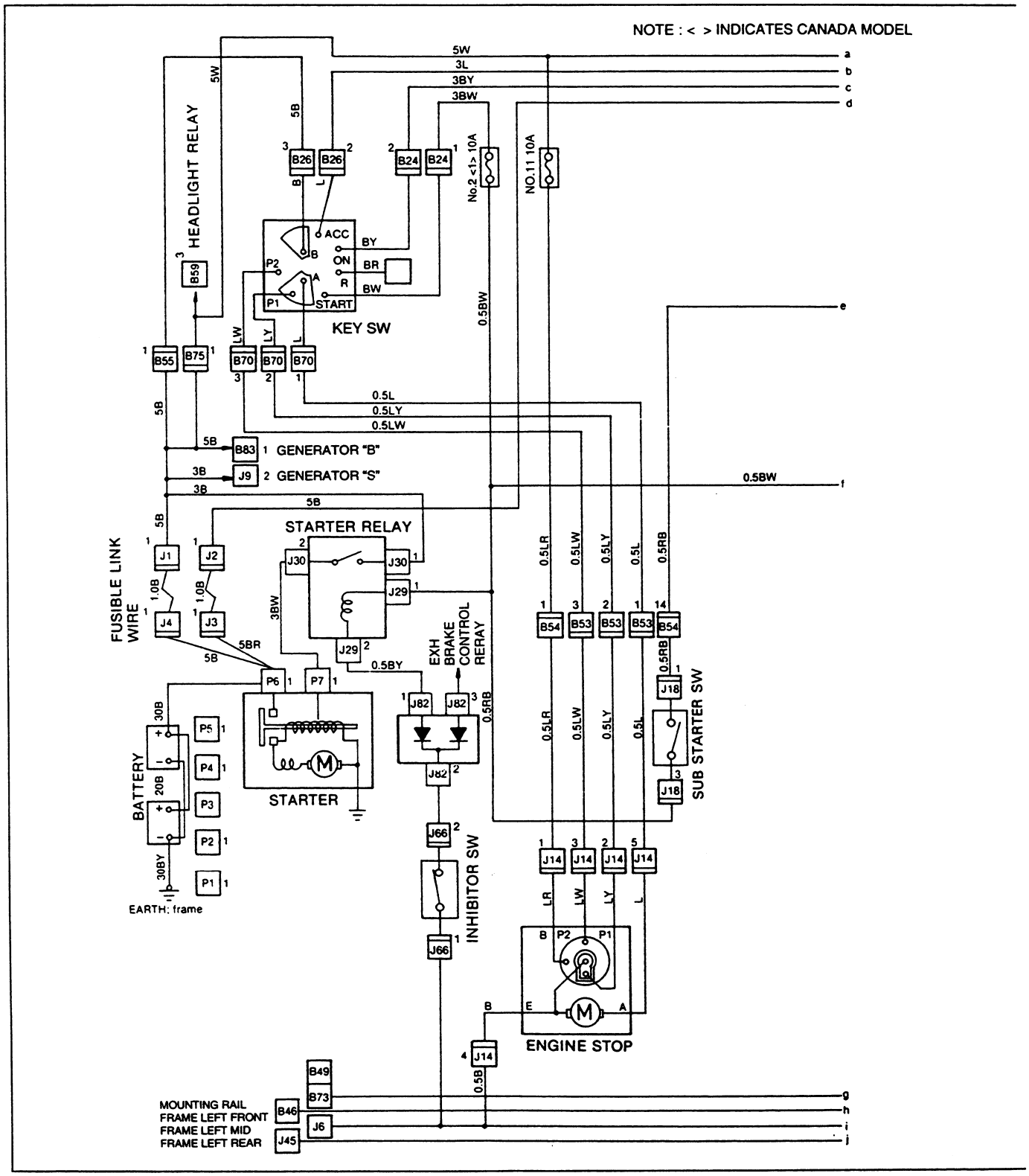


Figure 39. Circuit diagram (A/T-1)

CIRCUIT DIAGRAM (A/T-2)

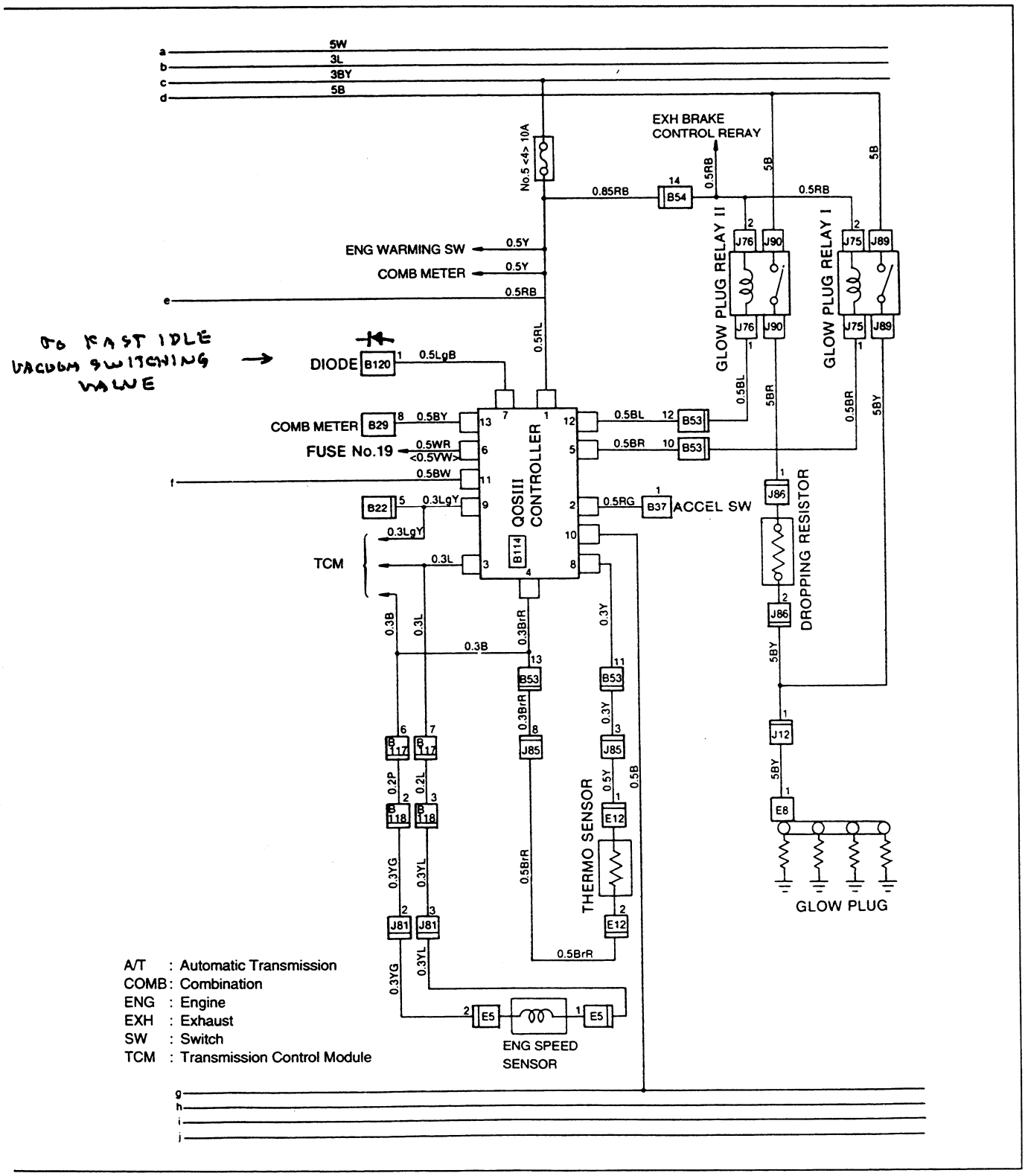


Figure 40. Circuit Diagram (A/T-2)

PARTS LOCATION AND CONNECTOR CONFIGURATIONS

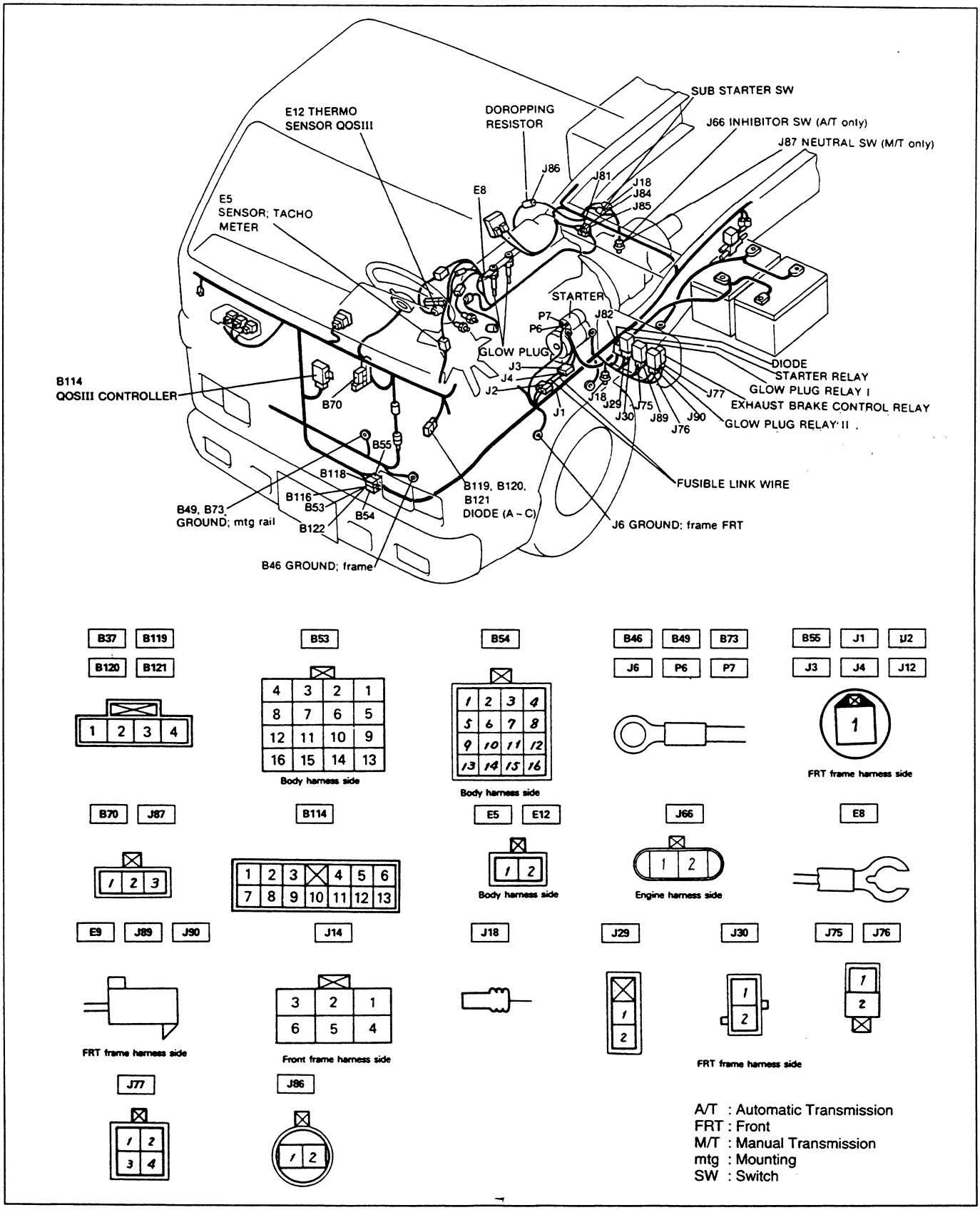


Figure 41. Parts Location and Connector Configurations

SYSTEM FUNCTION

Key Switch

Key switch has the function to start engine as well as the other functions to switch power source, to stop engine and to lock steering etc.

The following table shows the key switch connections.

Connector / Terminal / Key position		B26		B24			B70			Locking device	
		3	2	2		1	1	2	3		
		B	ACC	ON	R	ST	B1	P1	P2	Key inserted	ACC→LOCK
Key pulled out	LOCK						○—○			Lock	
Key inserted	LOCK									Lock	Free
	ACC	○—○					○—○			Free	
	ON	○—○—○					○——○				
	START	○——		○—○—○			○——○				

Preheating System (QOSIII)

When the key switch is turned to "ST" before the indicator light goes out (Figure 43)

Indicator light

The indicator light remains lit over a varying period of time required to activate the quick preheater according to the engine coolant temperature, and informs the driver when the engine is ready for starting.

(Operation)

When the key switch is turned to the "ON" position, it supplies a signal to activate the indicator timer inside the QOS III controller. The indicator light is turned and kept on over a necessary time (ti) according to the engine coolant temperature (figure 44).

When the key switch is turned to the "START" position while the indicator light is on, the indicator timer is canceled immediately and the indicator light goes out.

Quick preheater

The quick preheater heats the glow plug instantly by supplying a large amount of current to the glow plug.

(Operation)

When the key switch is turned to the "ON" position, it supplies a signal to the QOS III controller to activate glow plug relay I and start quick preheating (figure 42).

The quick preheating ends as soon as the key switch is returned from the "START" to "ON" positions.

Quick after-glow

The quick after-glow sustains the high temperature, obtained by quick preheating, for a predetermined period of time.

(Operation)

When the key switch is returned from the "START" to "ON" positions, it supplies a signal to the QOS III controller to reactivate glow plug relay I and activate quick after-glow over a period of time (td_1 or td_2) according to the engine coolant temperature (figure 44).

td_1: When the accelerator pedal is not depressed or when the engine is not running.

td_2: When the accelerator pedal is depressed and when the engine is running.

After-glow

The after-glow sustains the temperature over a period of time following the quick after-glow by supplying a normal current to the glow plug.

(Operation)

When the charge relay goes on, it activates the after-glow timer in the QOS III controller. This causes glow plug relay II to start and maintain after-glow continuously for 360 seconds (ta) (figure 43).

Both glow plug relay I and II go off, however, when the vehicle speed sensor and the engine speed sensor detect the vehicle speed over 18km/h (11 mph) and engine revolution over 1,650 RPM respectively (figures 42 and 43).

Only glow plug relay II is reactivated and after-glow is continued when the vehicle speed and the engine revolution drop to 9km/h (5.6 mph) and 300 RPM respectively (figures 42 and 43).

Glow plug Relay II goes off when the engine coolant temperature rises above 40 °C (104 °F) and remains off even if the engine coolant temperature drops below that level.

When the key switch is turned to "START" after the indicator light goes out (Figure 43)

When the indicator light goes off, it sends a signal to the QOS III controller to postpone activation of glow plug relay I and activate quick after-glow for a period of time (td_1) according to the engine coolant temperature (figure 44).

Otherwise, the preheating system operates the same as when the key switch is turned to "START" before the indicator light goes out.

When the key switch is left in the "ON" position (Figure 43)

When the indicator light goes off, it sends a signal to the QOS III controller to postpone activation of glow plug relay I and activate quick after-glow for a period of time (td_1) according to the engine coolant temperature (figure 44).

Preheating is ended then.

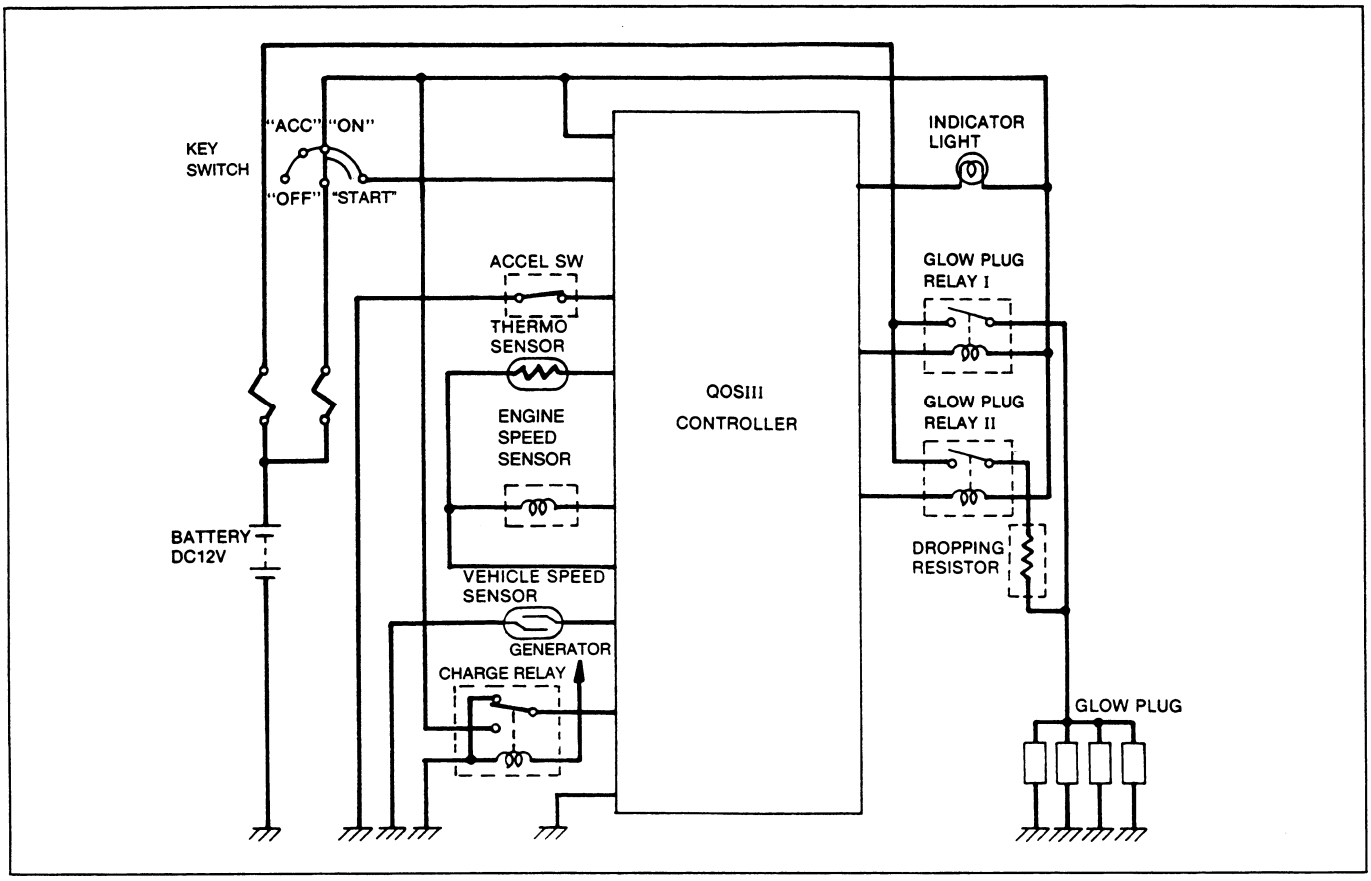
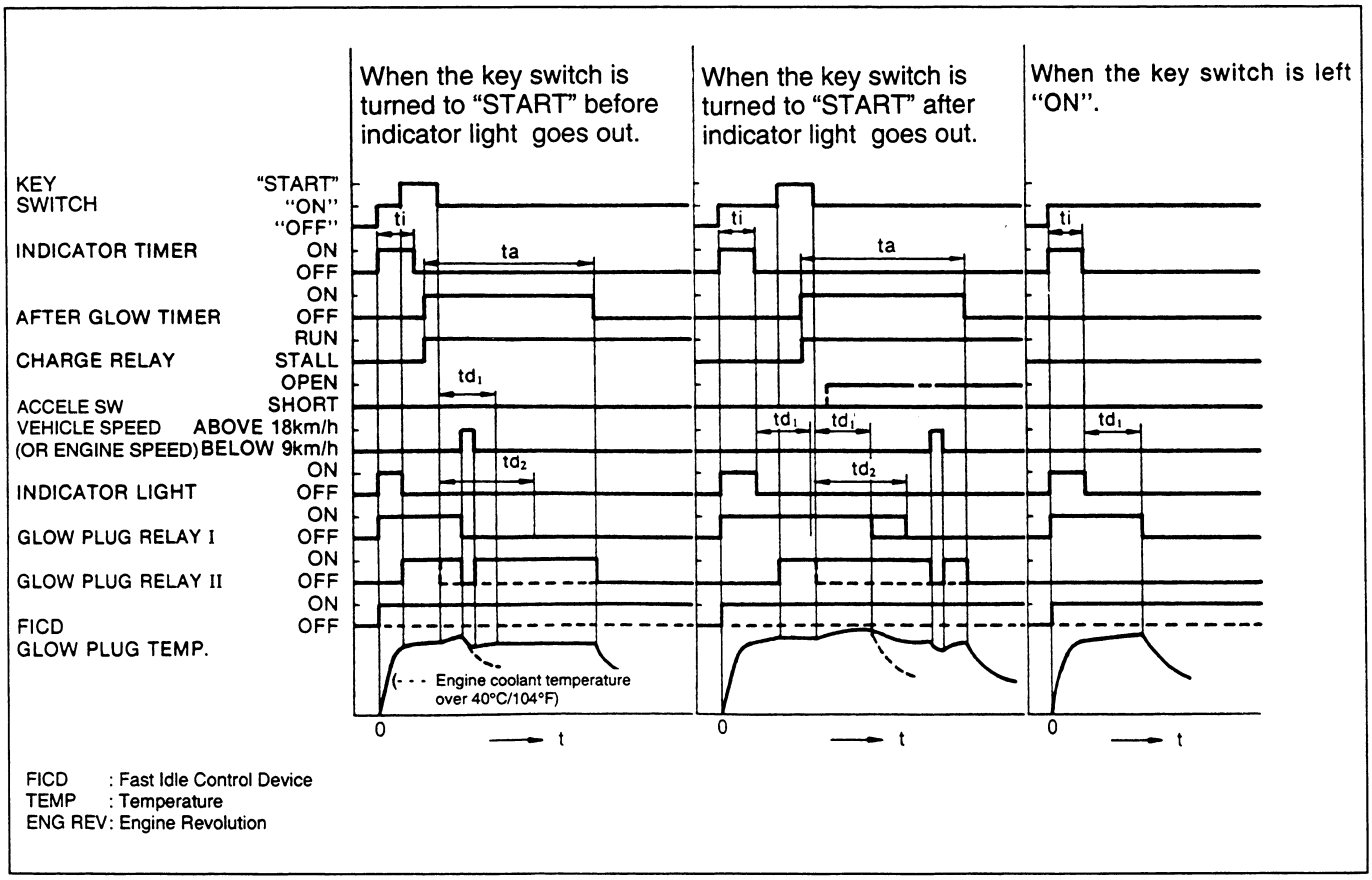


Figure 42. Block Chart of QOSIII System



FICD : Fast Idle Control Device
TEMP : Temperature
ENG REV: Engine Revolution

Figure 43. Timing Chart of QOSIII System

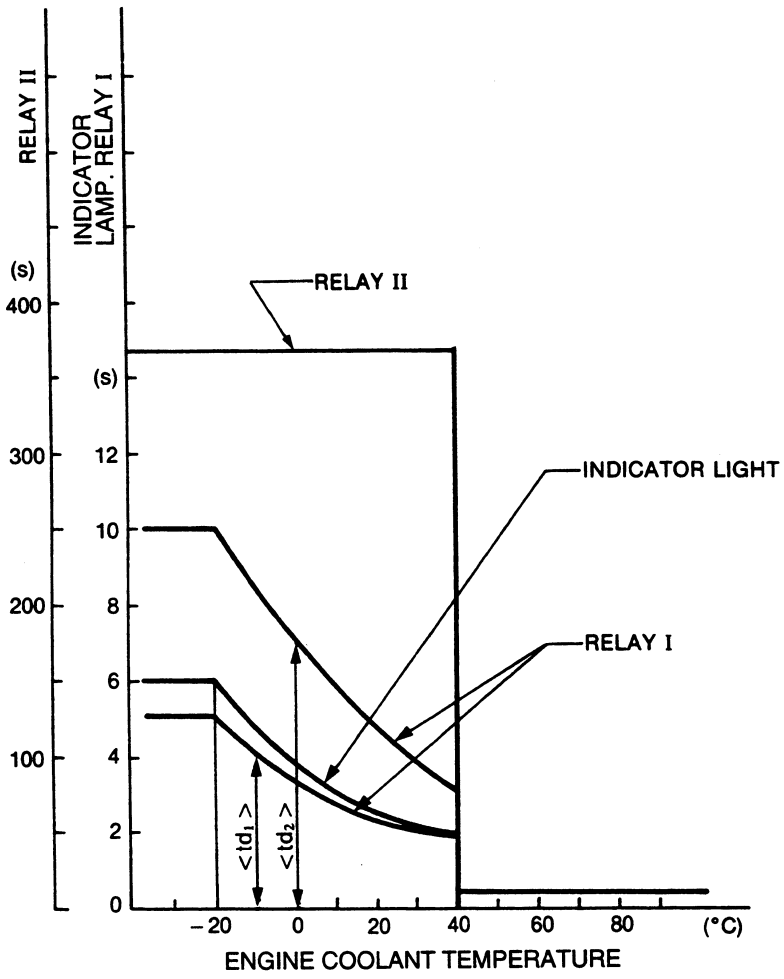


Figure 44. Operating Chart of Indicator light and Glow Plug Relay I, II

Sub Start System

The key switch must be in the "ON" position.

With the transmission switch is "Neutral" position (Neutral switch is "ON" position) push the sub-start switch button, located behind the cab. This operate the starter relay and preheating system, thus making the engine starting.

Engine Stop System

The engine stop circuit is activated by the key switch. When the key switch is turned to the LOCK position, the motor in the engine stop circuit is energized. The motor pulls a cable which is connected to a fuel cut lever. The engine stop circuit takes its power directly from the battery and is protected by a fusible link wire and fuse No. 11.

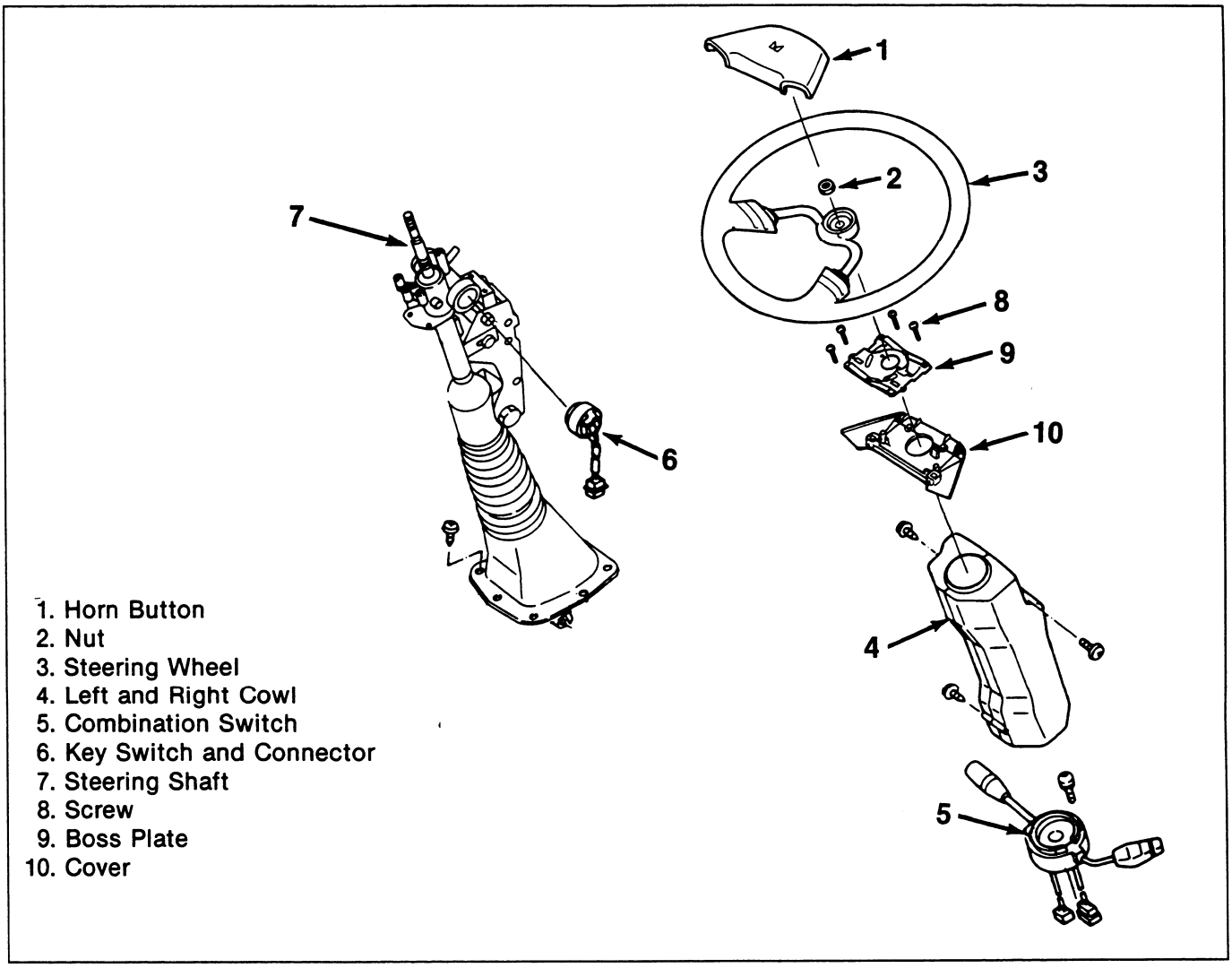
DIAGNOSIS

PROBLEM	CHECK POINT	TROUBLE CAUSE	CORRECTION
Engine Continues to Run after Operate the Key SW is Turned to the LOCK position	1. Fuse No. 11	1. Poor fuse contact or blown	1. Reinstall or replace the fuse No. 11
	2. Engine stop motor continuity between connector 4 [J14] - 5 [J14]	2. Engine stop motor faulty	2. Replace the engine stop motor
	3. Continuity between connector 2 [J14] - 4 [J14] when key SW is in "LOCK" position	3. Open circuit or poor connector contact	3. Repair open circuit or connector contact
	4. Continuity between connector 3 [J14] - 4 [J14] when key SW is in "START" position	4. Open circuit or poor connector contact	4. Repair open circuit or connector contact
	5. Fuel cut cable	5. Fuel cut cable is not adjusted correctly	5. Adjust the cable

SW: Switch

ON-VEHICLE SERVICE

Key Switch and Combination Switch

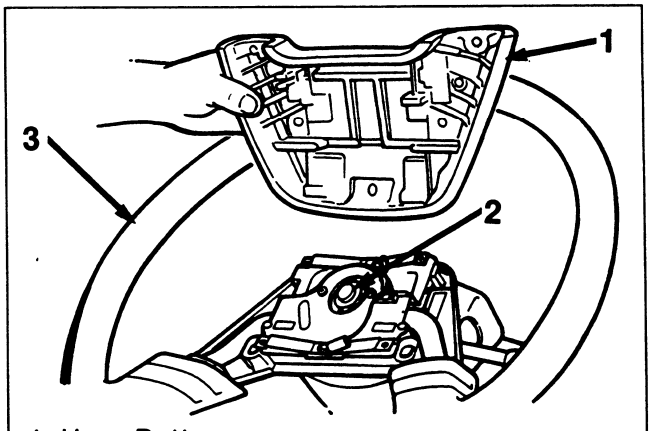


1. Horn Button
2. Nut
3. Steering Wheel
4. Left and Right Cowl
5. Combination Switch
6. Key Switch and Connector
7. Steering Shaft
8. Screw
9. Boss Plate
10. Cover

Figure 45. Key Switch and Combination Switch

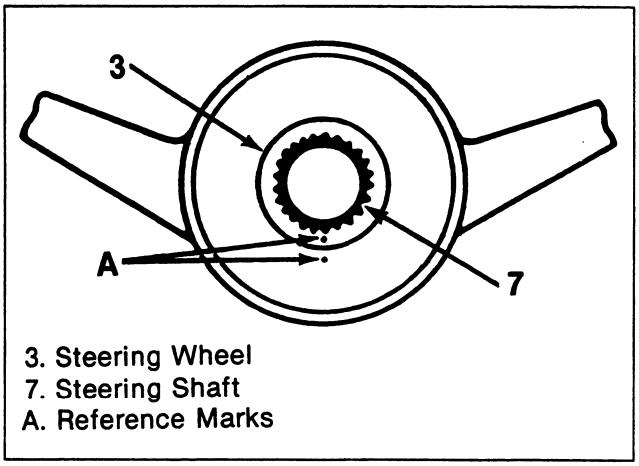
Remove or Disconnect

1. **Horn Button (Figure 46)**
   Pull out the horn button (1) by hand.
2. **Nut**
3. **Steering Wheel (Figure 47)**
   - Apply a setting mark across the steering wheel and shaft to ensure reassembly of the steering wheel in the original position.
   - Pull the steering wheel upward to remove it.



1. Horn Button
2. Nut
3. Steering Wheel

Figure 46. Removing Horn Button

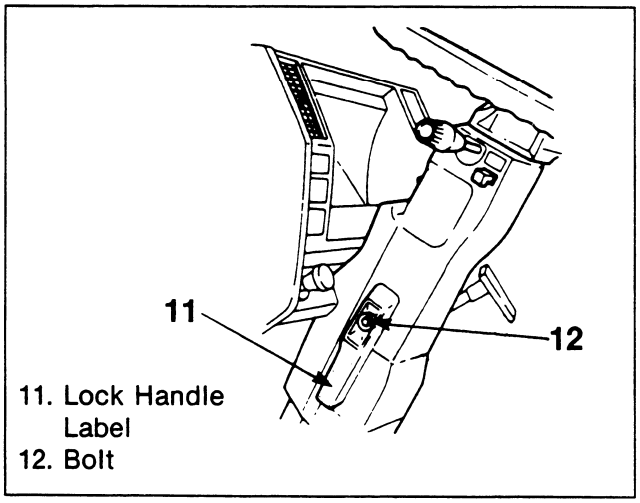


3. Steering Wheel
7. Steering Shaft
A. Reference Marks

Figure 47. Apply Setting Marks

4. Cowl (Figure 48)
- Pull out the lock handle label (11).
- Remove the lock handle by turning the bolt (12) clockwise, as the bolt has left thread.

5. Combination Switch (Figure 49)
- Remove the four (4) bolts.
- Pull the combination switch upward to remove it.



11. Lock Handle Label
12. Bolt

Figure 48. Removing Lock Handle

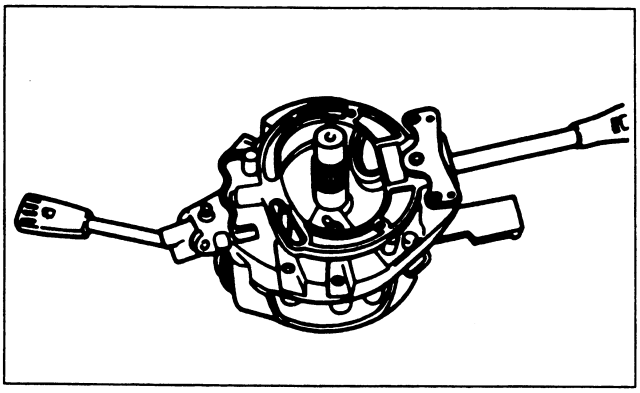
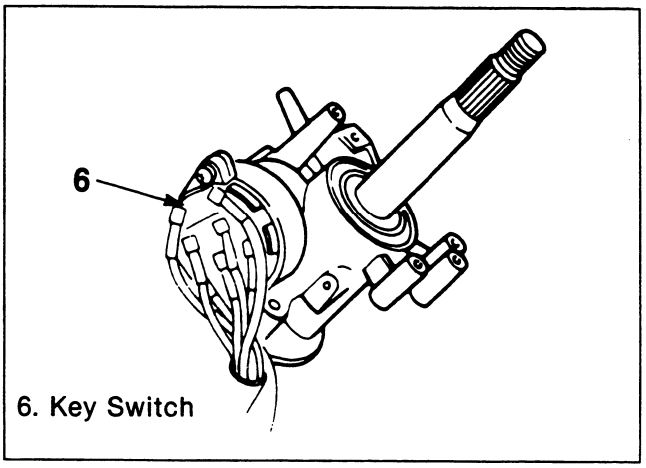


Figure 49. Combination Switch

6. Key Switch (Figure 50)
- Remove the three (3) bolts to disconnect the connector (6).
- Remove the key switch from the steering shaft.



6. Key Switch

Figure 50. Removing Key Switch

Install or Connect

1. Key Switch
2. Combination Switch
3. Cowl
4. Steering Wheel (Figure 47)

Apply Multipurpose type grease to the contact ring to prevent wear and noise.

Install the steering wheel on the shaft by aligning setting marks applied at removal.

5. Nut

Tighten

- Steering wheel nut (2) to 55 N·m (41 lb·ft).

6. Horn Button

Sub Start System

Remove or Disconnect

1. Sub Start Switch
- Relay box cover.
- Nut (1) (figure 51).
- Disconnect the connector.

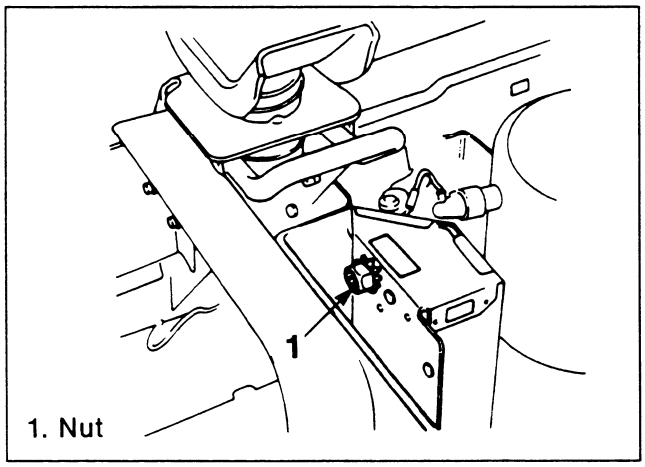


Figure 51. Sub Start Switch

2. Neutral Switch
- Disconnect the connector.
- Neutral switch from the transmission (figure 52).

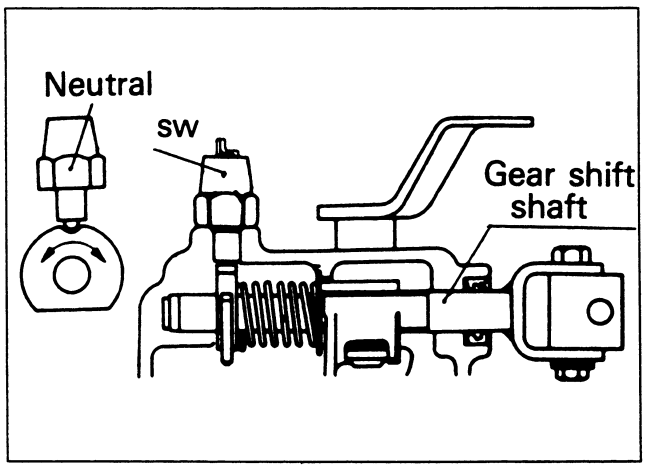


Figure 52. Neutral Switch

3. Inhibitor Switch
Refer to "7A2 INHIBITOR SWITCH" in this manual.

Inspect

1. Sub Start Switch (Figure 53)
Check the switch continuity between terminal when push the switch button (2).

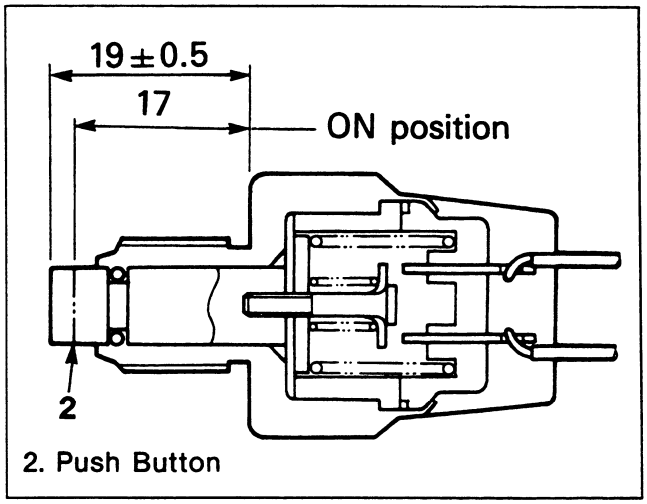


Figure 53. Sub Start Switch

2. Neutral Switch (Figure 54)
Check the switch continuity when installed on the transmission.
- When neutral: Continuity
- When shifted: No continuity

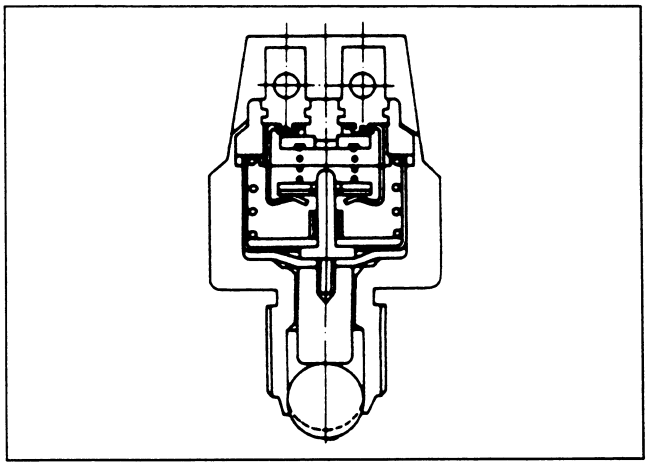


Figure 54. Neutral Switch

3. Inhibitor Switch
Refer to "7A2 INHIBITOR SWITCH" in this manual.

Install or Connect

Follow the removal procedure in the reverse order to install.

Be absolutely sure to apply liquid gasket to the neutral switch threaded portion.

This will prevent oil leakage.

Engine Stop System

Fuel Cut Cable Adjustment (Figure 55)

1. Turn the key switch to LOCK position.
2. Loosen the fuel cut cable adjusting bolt (1).

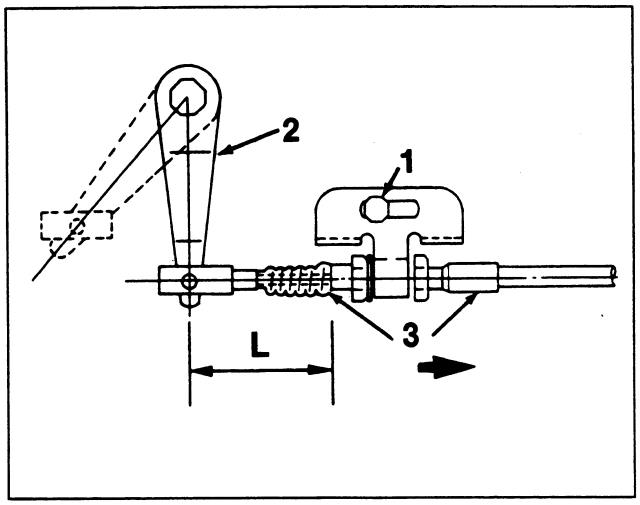


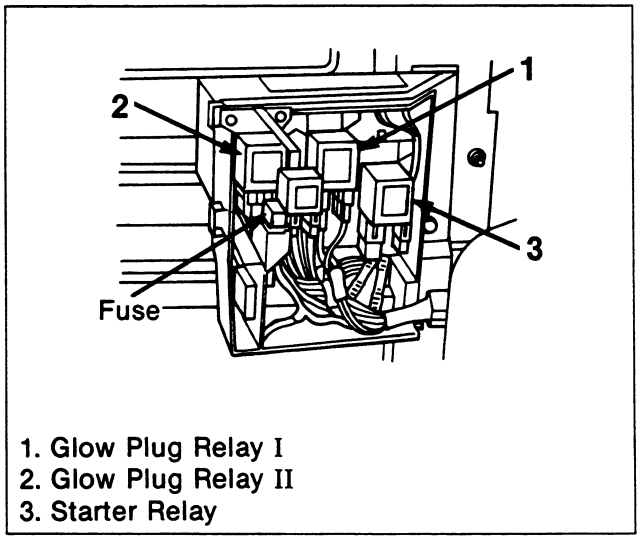
Figure 55. Fuel Cut Cable Adjustment

3. Hold the fuel cut lever (2) in the fully shut position and pull the cable (3) in the direction of the arrow to remove slack from distance (L).
4. Tighten the adjusting bolt (1).

Preheating System: Glow Plug Relay I, II and Starter Relay

Remove or Disconnect (Figure 56)

1. Push the tang lock flat and pull the relay an upward.
2. Disconnect the connector.



1. Glow Plug Relay I
2. Glow Plug Relay II
3. Starter Relay

Figure 56. Glow Plug Relay I, II and Starter Relay

Inspect

1. Glow Plug Relay I, II and Starter Relay (Figure 57)

Check continuity between terminals.

Condition \ Terminal No.	(a)	(b)	(c)	(d)
Resistance approx. 80Ω			○	○
Continuity when applying battery voltage between (c) and (d)	○	○		

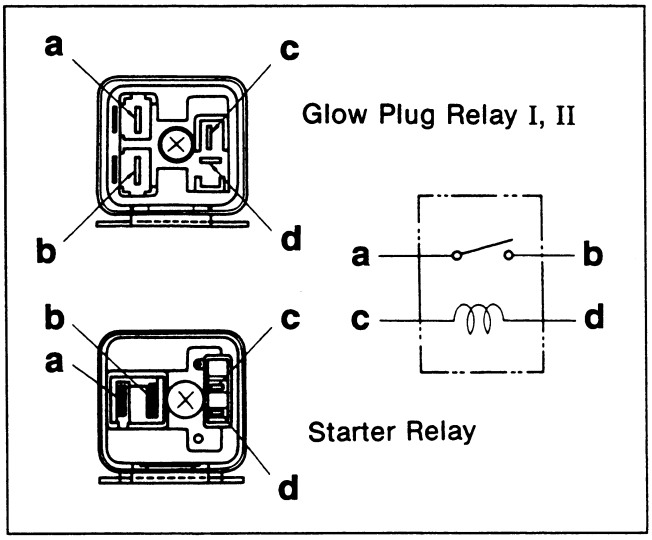
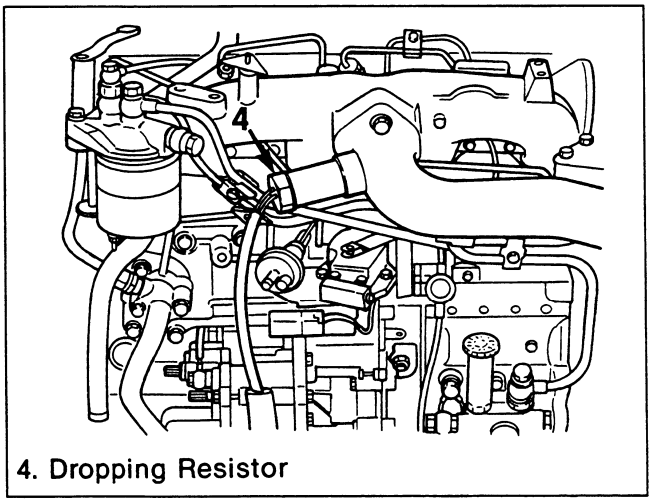


Figure 57. Glow Plug Relay I, II and Starter Relay

2. Dropping Resistor

Check resistance between terminal.
Resistance 0.21–0.25Ω at 25°C (77°F).



4. Dropping Resistor

Figure 58. Dropping Resistor

Install or Connect

Follow the removal procedure in the reverse order to install.

CHARGING

CIRCUIT DIAGRAM

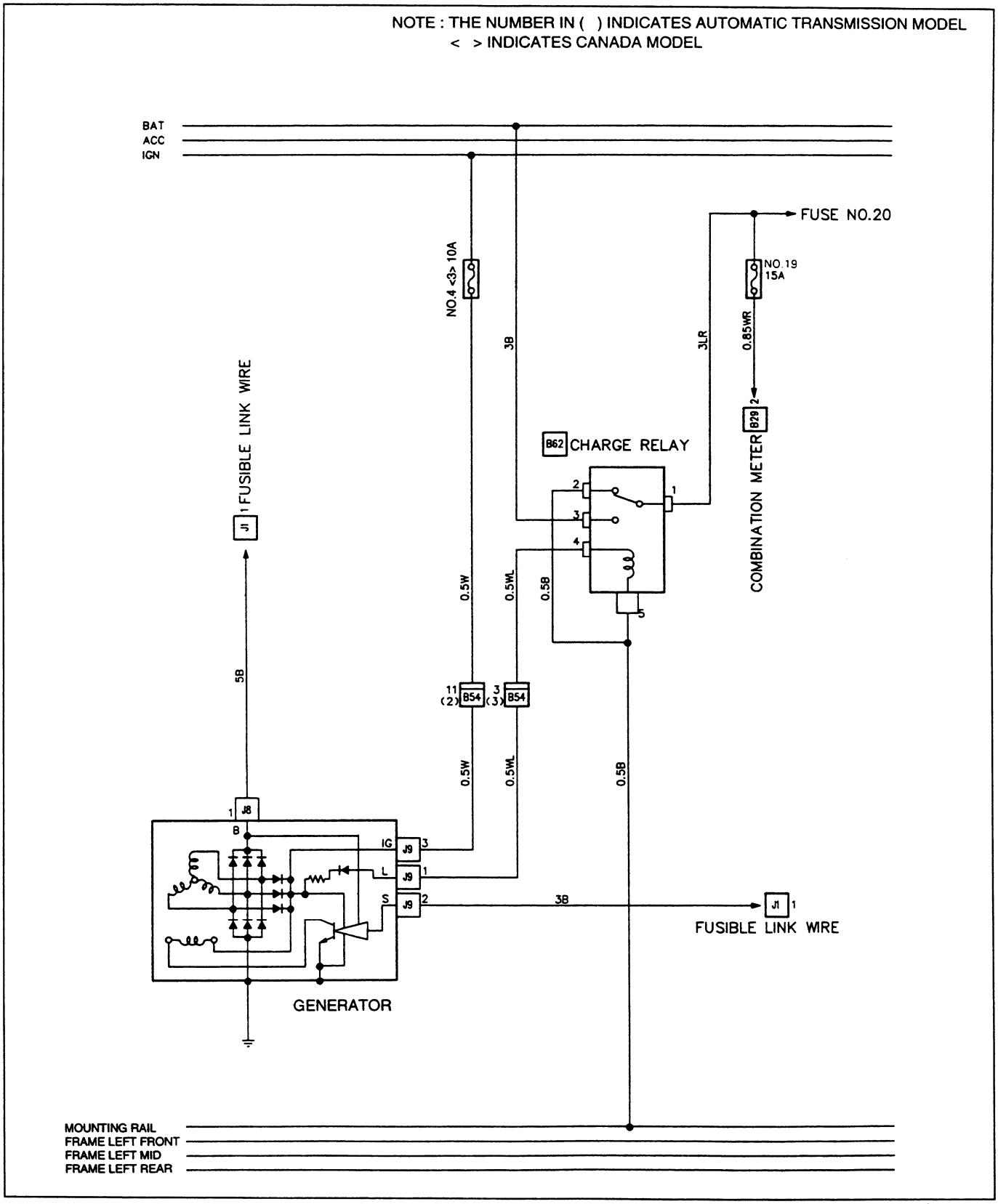
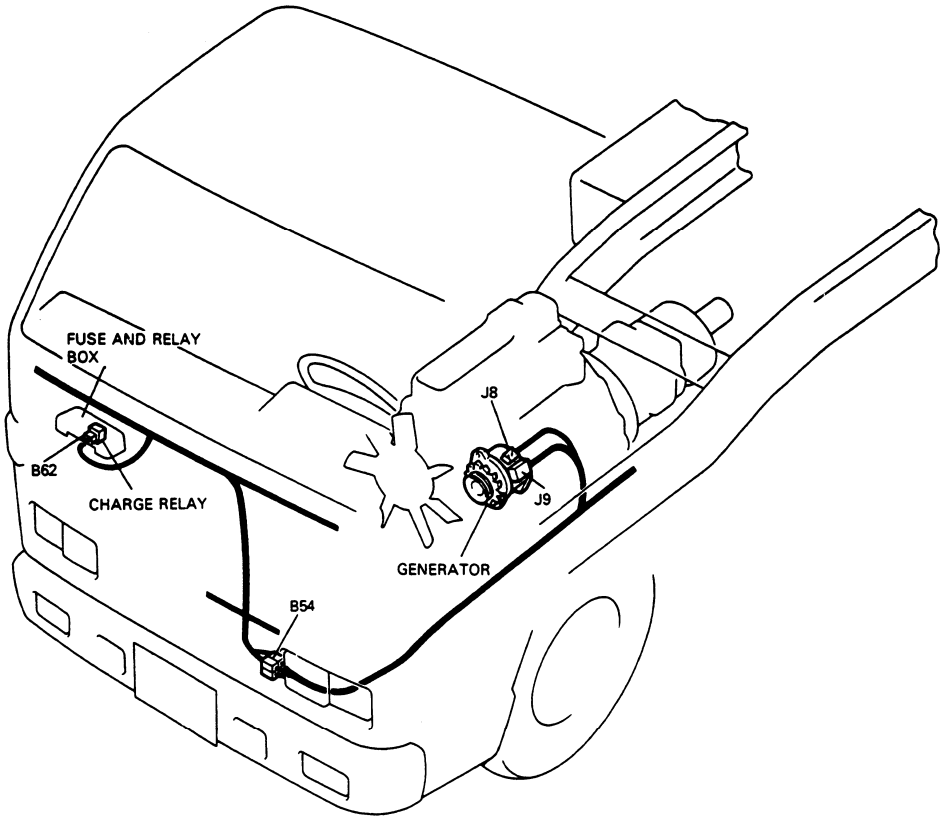


Figure 59. Circuit Diagram

PARTS LOCATION AND CONNECTOR CONFIGURATIONS



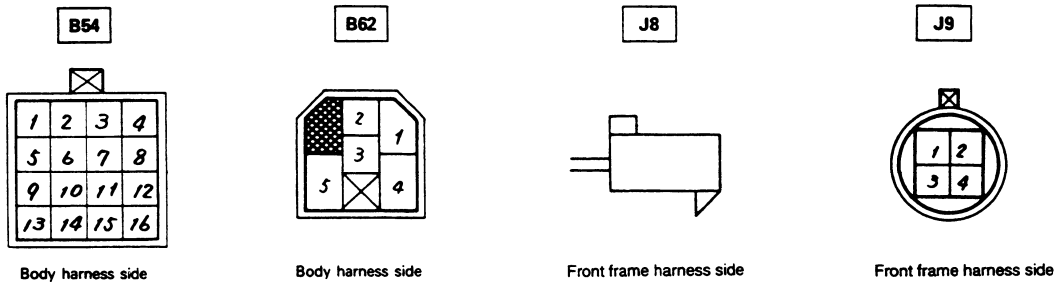


Figure 60. Rarts Location and Connector Configurations

Inspect

Charge Relay (Figure 61)

Check continuity between terminals.

Condition \ Terminal No.	(1)	(2)	(3)	(4)	(5)
Continuity	○	○			
Resistance approx. 80Ω				○	○
Continuity when applying battery voltage between (4) and (5)	○		○		

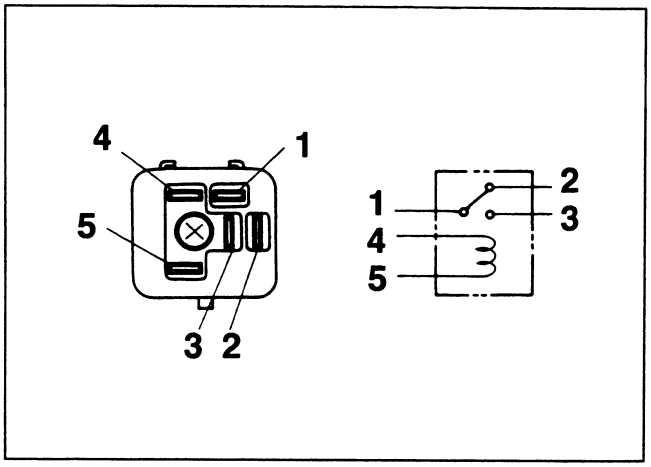


Figure 61. Charge Relay

EXHAUST BRAKE AND ENGINE WARMING UP

CIRCUIT DIAGRAM (M/T-1)

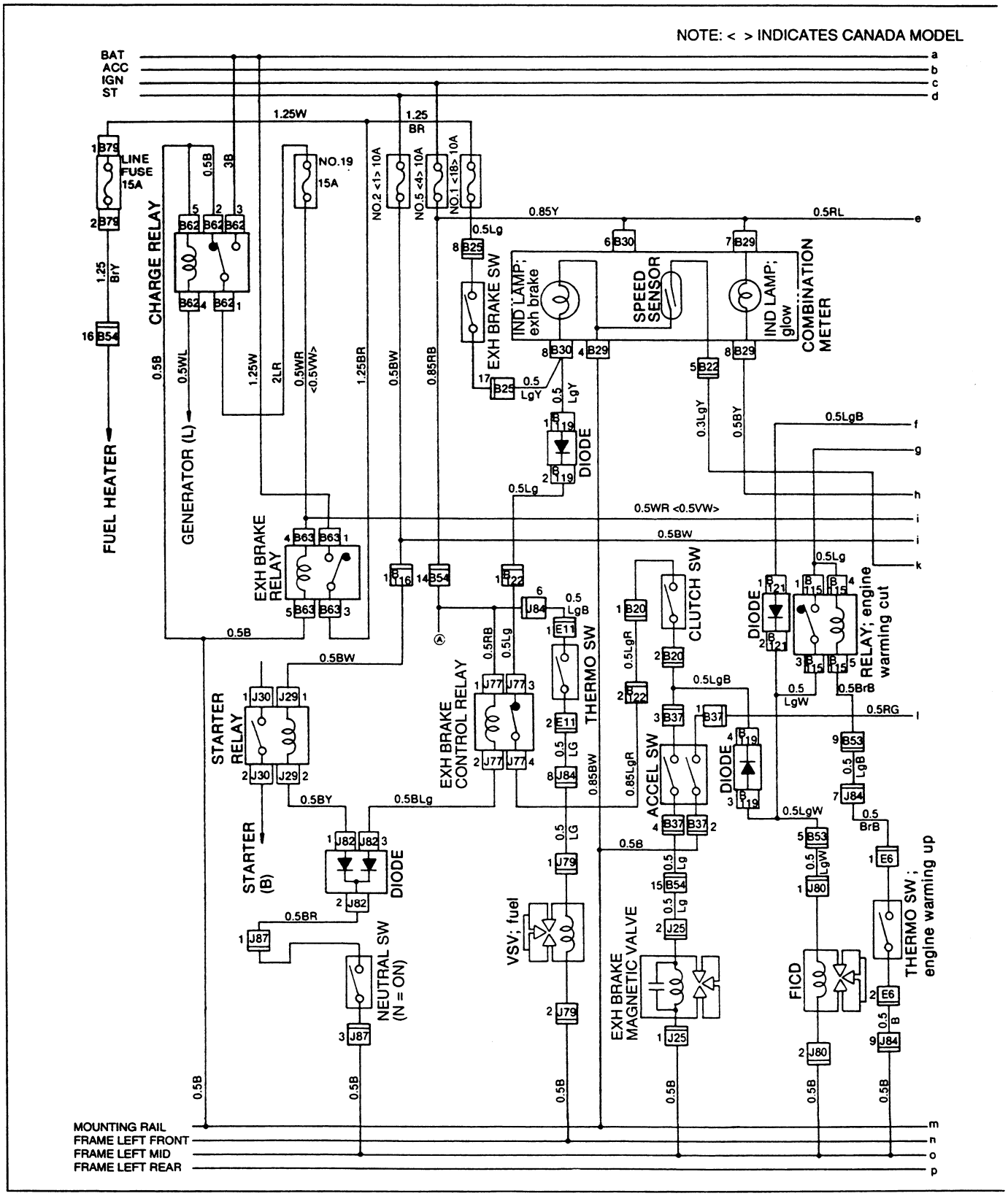


Figure 62. Circuit Diagram (M/T-1)

CIRCUIT DIAGRAM (M/T-2)

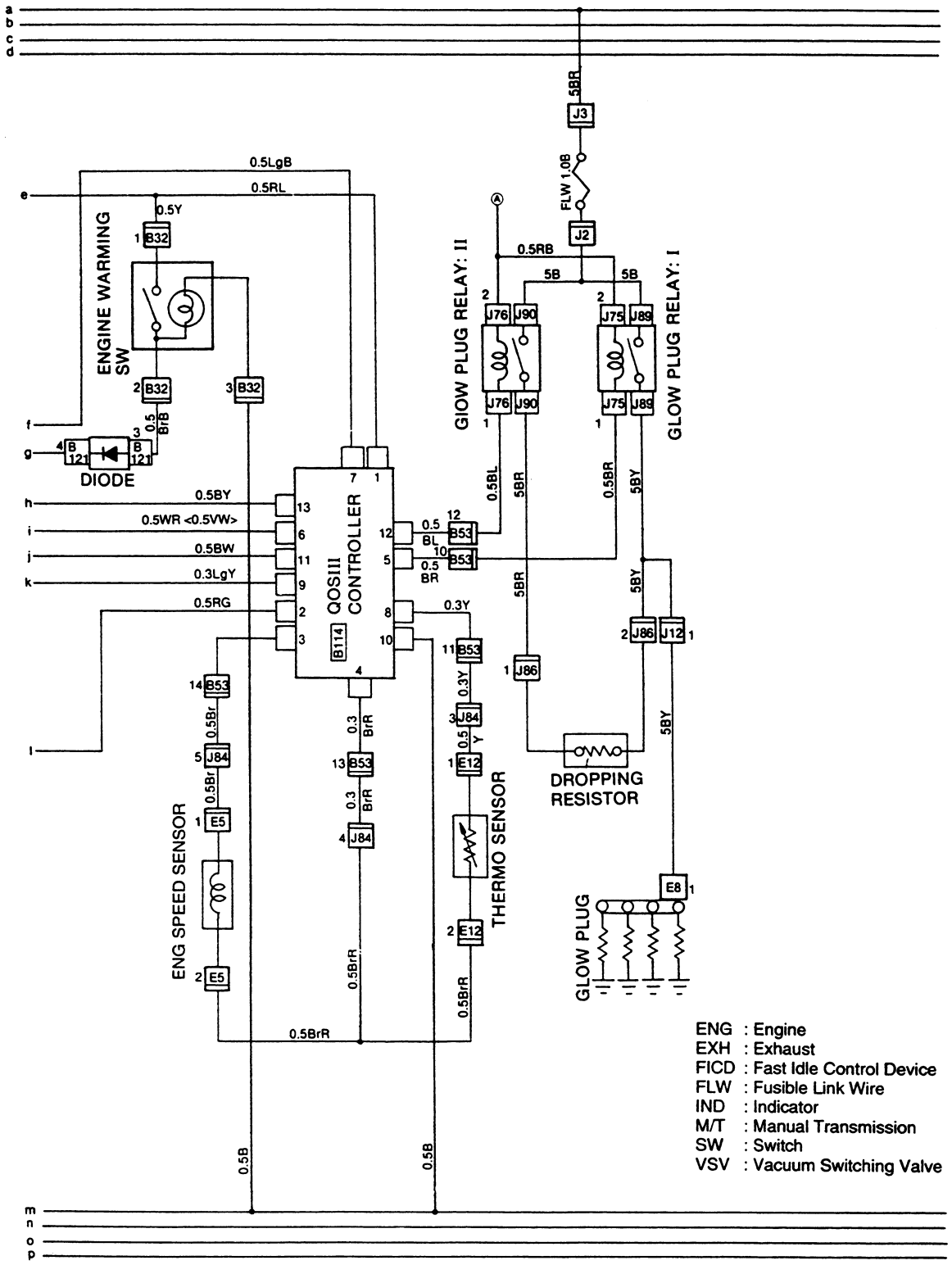


Figure 63. Circuit Diagram (M/T-2)

EXHAUST BRAKE AND ENGINE WARMING UP (CONT.)

CIRCUIT DIAGRAM (A/T-1)

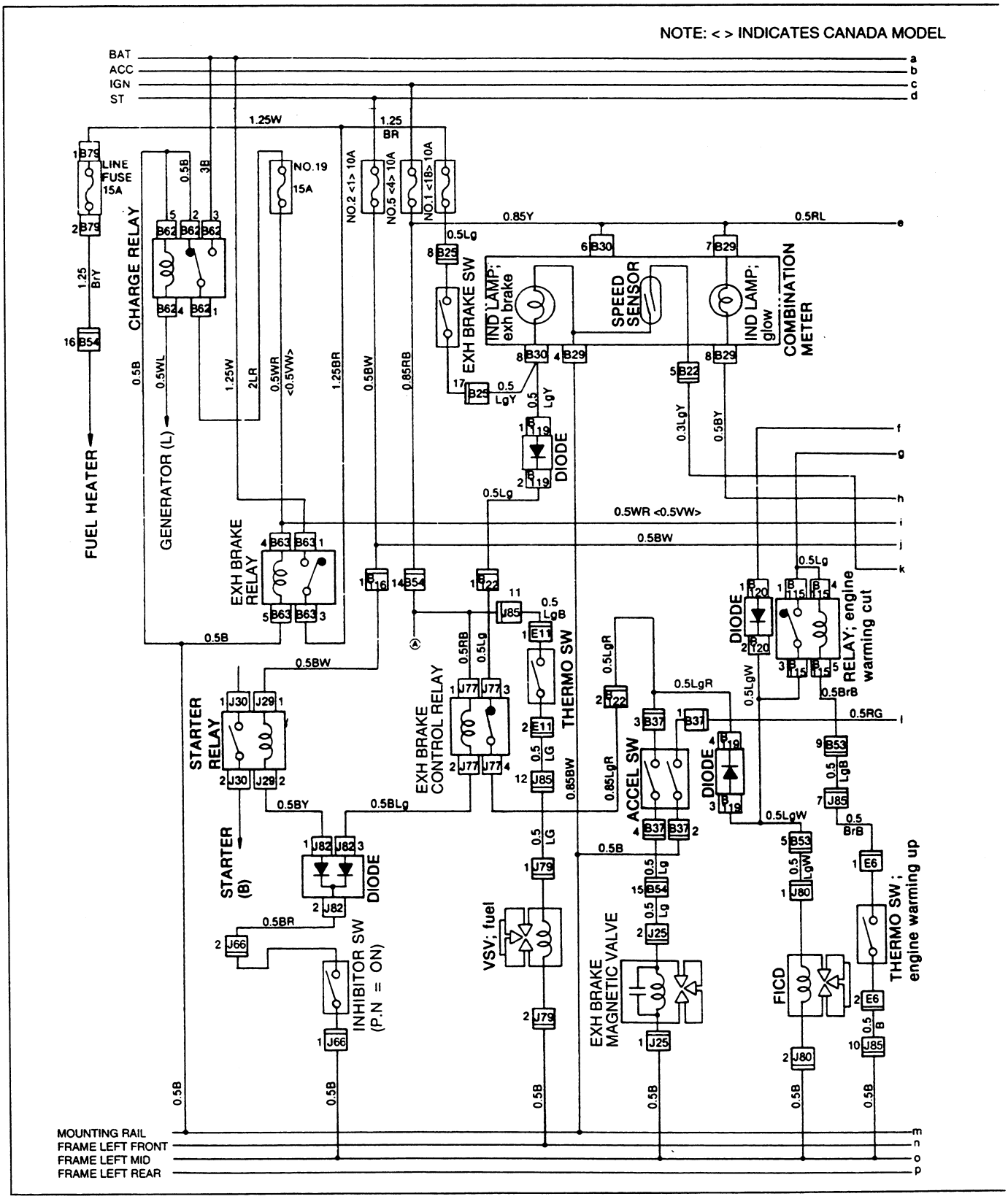


Figure 64. Circuit Diagram (A/T-1)

CIRCUIT DIAGRAM (A/T-2)

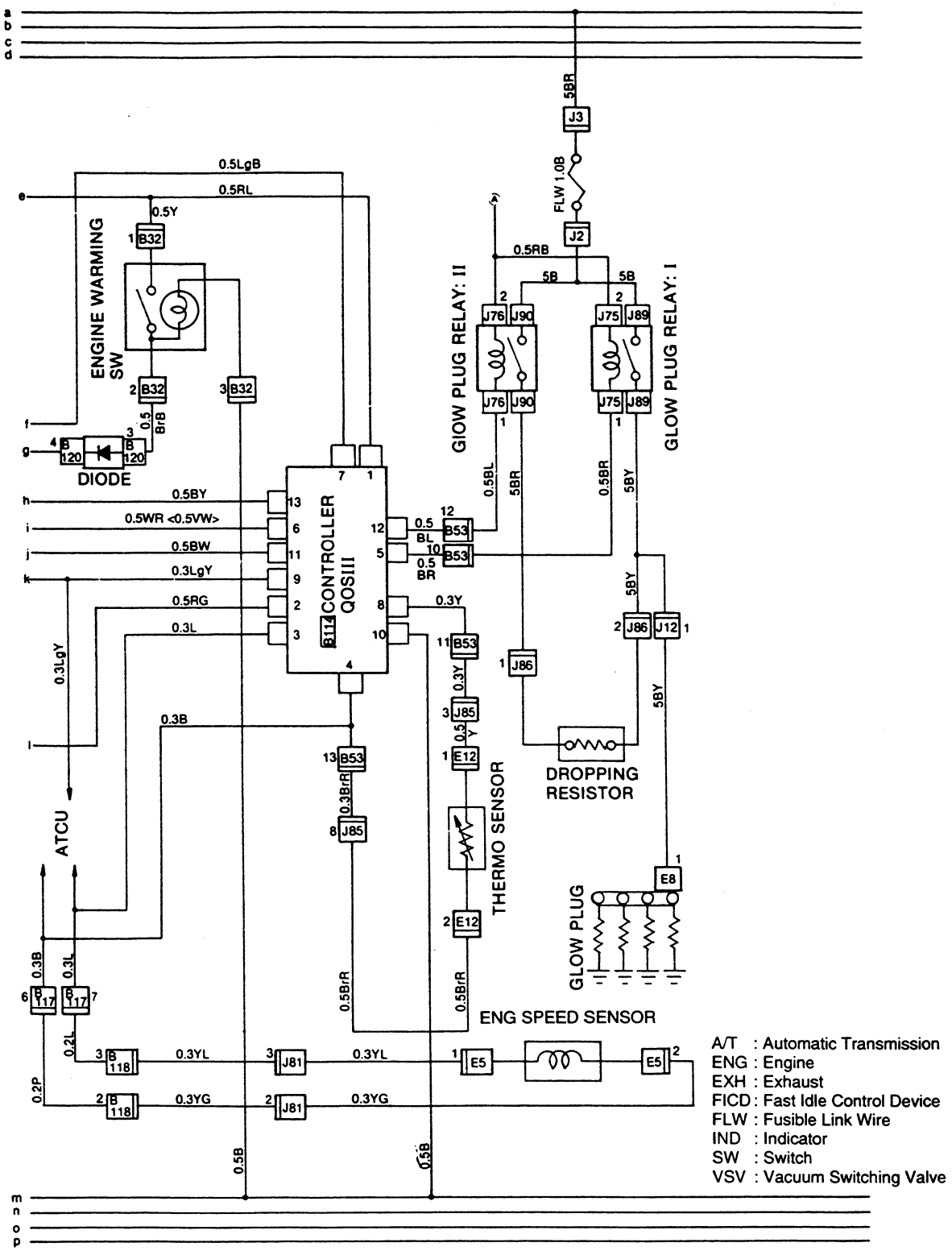


Figure 65. Circuit Diagram (A/T-2)

PARTS LOCATION

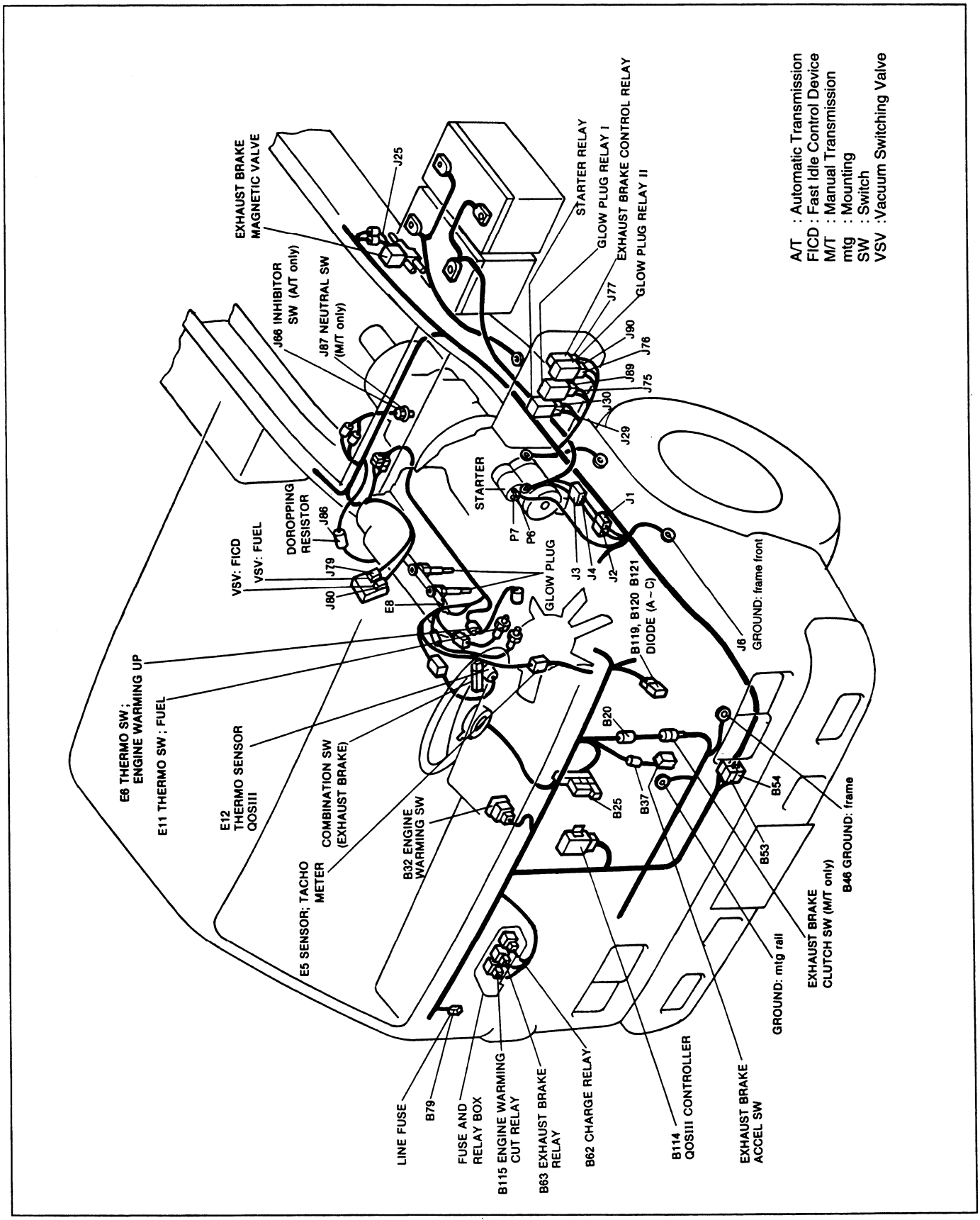


Figure 66. Parts Location

CONNECTOR CONFIGURATIONS

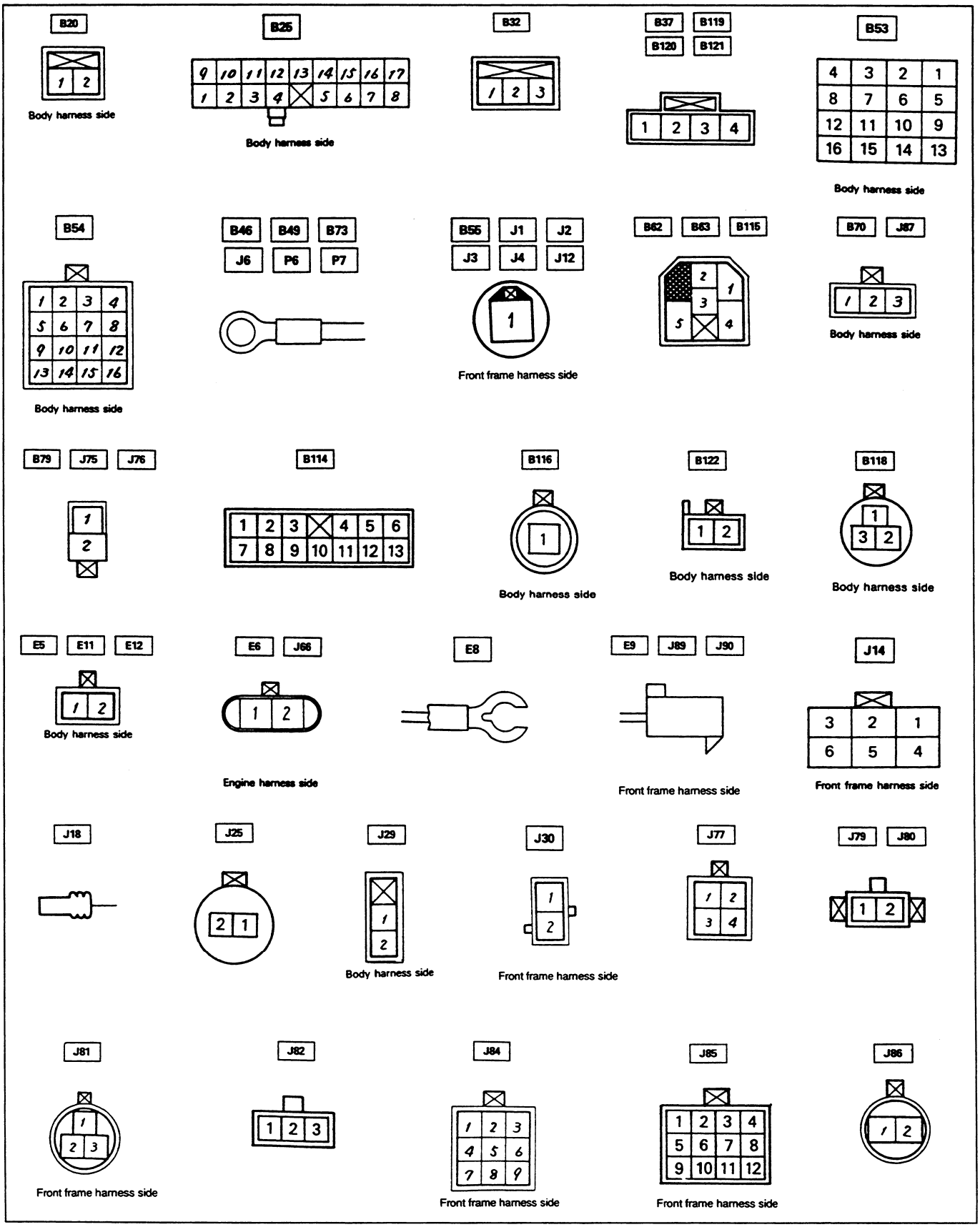


Figure 67. Connector Configurations

FUNCTION

Exhaust Brake

- When the engine starts, the generator turns the charge relay on, which causes the exhaust brake relay to go on via fuse No. 19.
- When the exhaust brake switch is turned on, electricity flows via the diode to the exhaust brake control relay and lights the indicator light at the same time.
- The exhaust brake control relay goes on when the neutral switch (Manual Transmission: M/T) or inhibitor switch (Automatic Transmission: A/T) is off (when M/T is in a position other than neutral and A/T is in a position other than P or N).
- When the exhaust brake control relay goes on, a working current flows via the clutch switch and the accelerator switch to the magnetic valve.
- Both the clutch switch and accelerator switch are normally closed. When both clutch and accelerator pedals are in the released position (engine at idle/clutch fully engaged), current flows to the magnetic valve.
- When energized, the magnetic valve opens, allowing vacuum to flow from vacuum pump and tank to the vacuum chamber.
- When supplied with a vacuum source, the vacuum chamber pulls the exhaust brake valve shut. With the engine brake valve shut, exhaust pressure allows the engine to become a more effective brake.
- If the clutch or accelerator pedal is depressed, the clutch switch or accelerator switch opens, or neutral /inhibitor switch is on, the exhaust brake control relay opens. The power supply to the magnetic valve is interrupted. The magnetic valve closes, removing vacuum from the vacuum chamber. The vacuum chamber spring then pushes the exhaust brake valve back open. Normal engine operation resumes.

Engine Warming-Up

Automatic Engine Warm-Up

When the engine coolant temperature is below 40 °C (104 °F) when the engine is started, a working current is supplied by the QOSIII controller to the upperstream of the accelerator switch. But all other conditions than the accelerator switch remain unchanged. Therefore, the magnetic valve is turned on and activates the exhaust brake valve to promote the engine warm-up. When the engine coolant temperature rises above the 40 °C (104 °F) level, the QOSIII controller automatically deactivates the engine warm-up function.

Manual Engine Warm-Up

When the engine warming switch goes on with the engine coolant temperature below 70 °C (158 °F) and the key switch is turned on, the indicator light built into the switch lights up and the engine warming cut relay goes on at the same time. This causes electricity to flow to the magnetic valve and activates the exhaust brake valve to promote the engine warm-up. When the engine coolant temperature rises above the 70 °C (158 °F) level, the thermo switch and the engine warming cut relay go off simultaneously. The engine warm-up function is ended as a result.

DIAGNOSIS

PROBLEM	CHECK POINT	TROUBLE CAUSE	CORRECTION
Engine Warming Up		NOTE: < >INDICATES CANADA MODEL	
Engine Warming Up Indicator Light does not Light when Warming Up SW is ON position	1. Exhaust brake function (Should be operate) 2. Indicator light bulb continuity 3. Continuity between fuse No. 5 <4> - 1 [B32] 4. Continuity between 3[B32] - ground	1. Poor fuse No. 5 <4> contact or blown 2. Bulb burned out or loose contact 3. Open circuit or bad connections 4. Open circuit or bad connections	1. Reinstall or replace the fuse No. 5 <4> 2. Replace or reinstall the bulb 3. Repair open circuit or connector contact 4. Repair open circuit or connector contact
Engine Warming Up does not Operate when Warming Up SW is ON position	1. Exhaust brake function (Should be operate) 2. Thermo SW continuity between 1 [E6] - 2 [E6] when thermo SW is ON 3. Engine warming up cut relay 4. Diode (box) [B3], [B4] continuity (Should be normal)	1. Poor fuse No. 5 <4> contact or blown 2. Poor thermo SW point or connector contact 3. Poor cut relay contact or faulty 4. Diode burned out	1. Reinstall or replace the fuse No. 5 <4> 2. Repair connector contact or replace the thermo SW 3. Reinstall or replace the engine warming up cut relay 4. Replace the diode
Automatic Engine Warming Up does not Operate when Engine Coolant Temperature is below 40°C (104°F)	1. Exhaust brake function (Should be operate) 2. Diode continuity between 1 [B120] - 2 [B120], 3 [B119] - 4 [B119] (Should be normal) 3. QOS III controller	1. Poor fuse No. 5 <4> contact or blown 2. Diode burned out 3. Poor controller connector contact or faulty	1. Reinstall or replace the fuse No. 5 <4> 2. Replace the diode 3. Reinstall or replace the QOS III controller
Exhaust Brake		NOTE: < > INDICATES CANADA MODEL	
Exhaust Brake does not Operate and Indicator Light not Turns ON	1. Fuse No. 19 2. Exhaust brake relay 3. Fuse No. 1 <18> 4. Exhaust brake SW continuity between 8 [B25] - 17 [B25] when SW is ON	1. Poor fuse contact or blown 2. Poor relay connector contact or faulty 3. Poor fuse contact or blown 4. Poor SW point or connector contact	1. Reinstall or replace the fuse No. 19 2. Reinstall or replace the exhaust brake relay 3. Reinstall or replace the fuse No. 1 <18> 4. Repair connector contact or replace the exhaust brake SW

SW: Switch

PROBLEM	CHECK POINT	TROUBLE CAUSE	CORRECTION

Exhaust Brake (Cont.)

NOTE: < > INDICATES CANADA MODEL

Exhaust Brake does not Operate but Indicator Light Turns ON	1. Diode continuity Between 1 [B119] - 2 [B119], 3 [J82] - 2 [J82] (Should be normal)	1. Diode burned out	1. Replace the diode
	2. Fuse No. 5 <4>	2. Poor fuse contact or blown	2. Reinstall or replace the fuse No. 5 <4>
	3. Neutral SW (M/T) / inhibitor SW (A/T) continuity between 1 [J87] - 3 [J87] / 2 [J66] - 1 [J66]	3. Poor SW point or connector contact	3. Repair connector contact or replace the SW
	4. Accel SW continuity between 1 [B37] - 3 [B37] when accel SW is ON	4. Poor SW point or connector contact	4. Repair connector contact or replace the accel SW
	5. Clutch SW continuity between 1 [B120] - 2 [B20] when clutch SW is ON	5. Poor SW point or connector contact	5. Repair connector contact or replace the clutch SW
	6. Magnetic valve continuity between 1 [J25] - 2 [J25]	6. Poor connector contact or defect the magnetic valve	6. Repair connector contact or replace the magnetic valve
	7. Continuity between 2 [J25] - ground	7. Open circuit or bad connections	7. Repair open circuit or connector contact
Exhaust Brake does not Operate but Circuit is normal	Exhaust brake valve	Exhaust brake valve seized or defective	Repair or replace the exhaust brake valve

A/T: Automatic Transmission M/T: Manual Transmission SW: Switch

ON-VEHICLE SERVICE

Exhaust Brake Switch

Remove or Disconnect

Refer to "STARTING AND ENGINE STOP" of "SYSTEM REPAIR" for combination switch removal procedure.

Inspect (Figure 68)

Inspect the switch continuity by following table.

SW position \ Terminal No.	17 B25	8 B25
ON	○—○	
OFF	○	

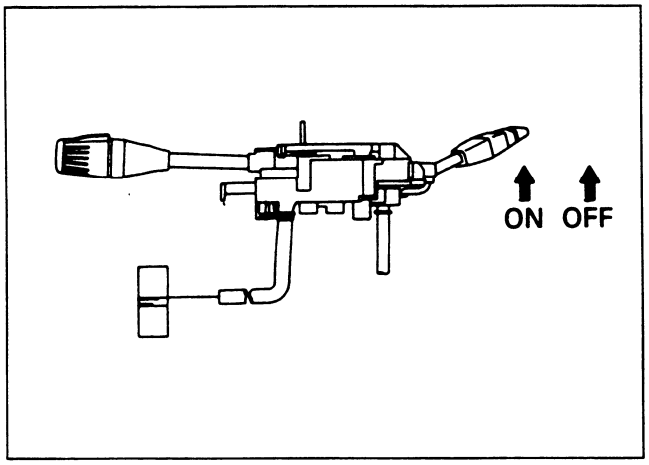


Figure 68. Exhaust Brake Switch

Install or Connect

Refer to "STARTING AND ENGINE STOP" of "SYSTEM REPAIR" for combination switch installation procedure.

Exhaust Brake Relay

Inspect (Figure 69)

Check continuity between terminals.

Condition \ Terminal No.	(1)	(2)	(3)	(4)	(5)
Continuity	○—○				
Resistance approx. 80Ω				○—○	
Continuity when applying battery voltage between (4) and (5)	○		○		

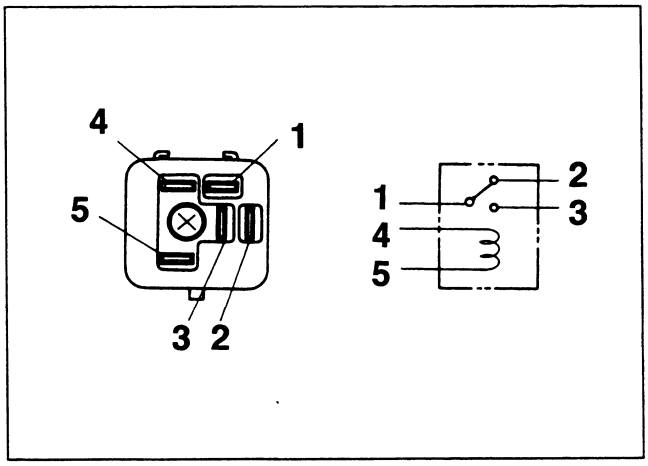


Figure 69. Exhaust Brake Relay

Exhaust Brake Control Relay

Inspect (Figure 70)

Check continuity between terminals.

Condition \ Terminal No.	(1)	(2)	(3)	(4)
Resistance approx. 80Ω	○—○			
Continuity when applying battery voltage between (1) and (2)			○—○	

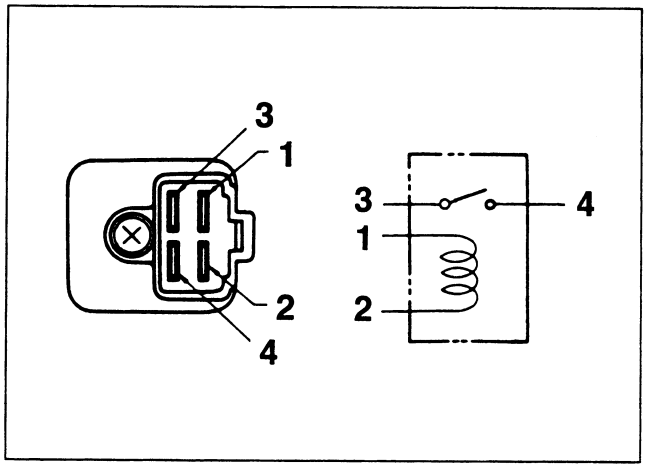


Figure 70. Exhaust Brake Control Relay

Neutral Switch

Refer to "STARTING AND ENGINE STOP" in this section.

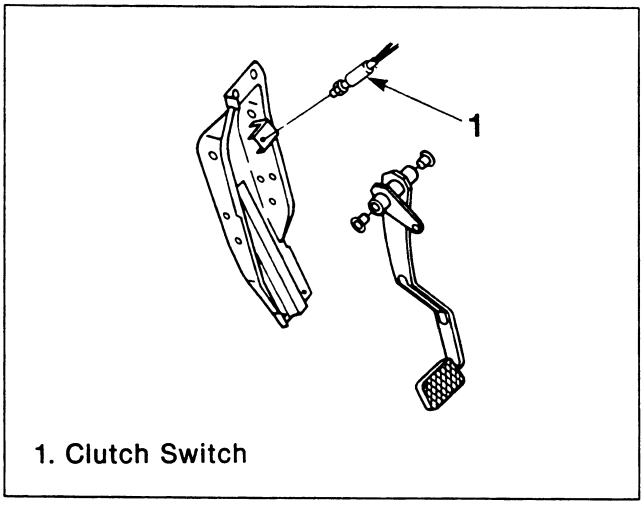
Inhibitor Switch

Refer to "7A2 INHIBITOR SWITCH" in this manual.

Clutch Switch

Remove or Disconnect (Figure 71)

1. Remove the return spring.
2. Disconnect the connector.
3. Remove the clutch switch (1).



1. Clutch Switch

Figure 71. Clutch Switch

Inspect (Figure 72)

Check the clutch switch operate and continuity.

Max. stroke	4 mm (0.16 in)
Operating stroke (OFF)	2.0–2.8 mm (0.07–0.11 in)

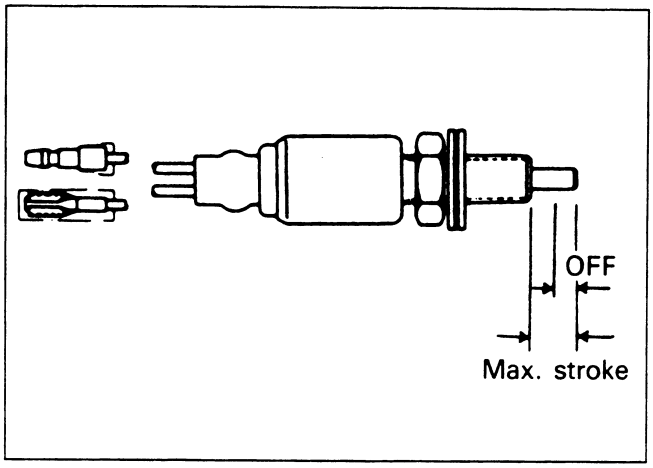


Figure 72. Clutch Switch Specification

Install or Connect

1. Clutch switch to bracket.
2. Temporarily tighten the lock nut.
3. Adjust the clutch switch as follows.
4. Tighten the lock nut.

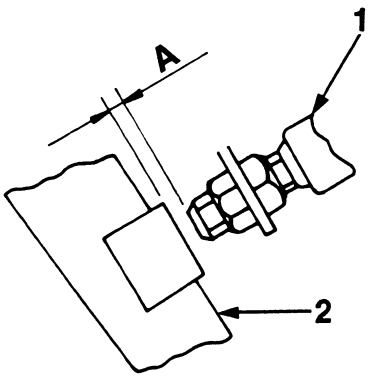
Tighten

- Lock nut to 18 N·m (13 lb·ft).

Adjust

The clutch switch must be adjusted so that when the clutch pedal is released, it closes the switch but does not completely depress the switch plunger. If the plunger is completely depressed by the pedal, switch damage may result.

- Fully depress the switch plunger.
- Adjust the switch in its bracket until 0.5 to 1 mm (0.02 to 0.04 in) clearance exists between the fully depressed switch plunger and the contact area on the clutch lever (A) (figure 73).
- The switch should exhibit an open circuit (no continuity) when the clutch pedal is depressed approximately 0.75 mm (0.03 in). The test may be made with a test light or an ohmmeter connected to the switch plug connector.



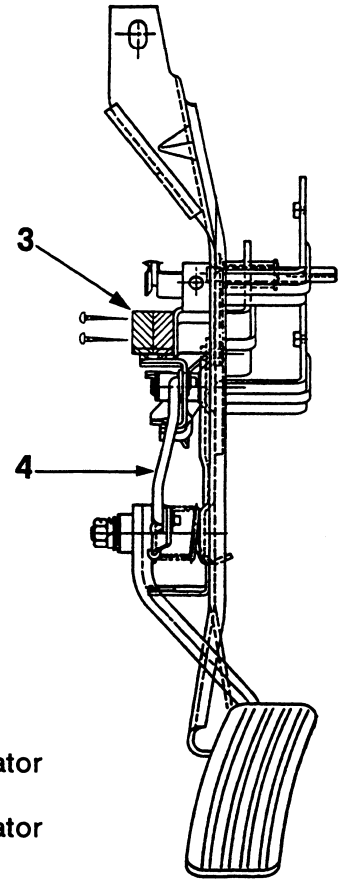
1. Clutch Switch
2. Clutch Pedal Arm

Figure 73. Adjusting Clutch Switch

Accelerator Switch

Remove or Disconnect

1. Disconnect the accel switch connector.
2. Loosen the two (2) screws.
3. Remove the switch.



3. Accelerator Switch
4. Accelerator Link

Figure 74. Accelerator Switch Removal

Inspect (Figures 62 and 64)

Check the accelerator switch continuity using this table.

Terminal No. / Accelerator pedal position	(3)	(4)
Released	○	○
Depressed	○	

Install or Connect

Follow the removal procedure in the reverse order to install the accelerator switch.

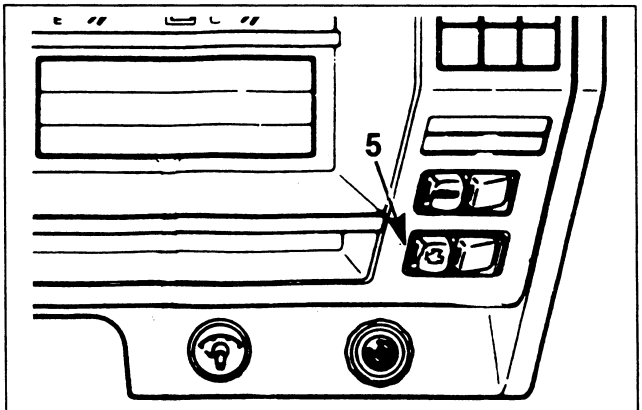
Engine Warming-Up Switch

Remove or Disconnect

1. Insert a screw driver between switch (5) and meter cluster to take out the switch.

   NOTICE: Take care not to scratch the meter cluster.

2. Disconnect the connector.



5. Engine Warming-Up Switch

Figure 75. Engine Warming-Up Switch

Inspect (Figure 76)

1. Inspect the switch continuity by following table.

Terminal / SW position	(1)	(2)	(3)
ON	○	○	○
OFF		○	○

2. Make sure the indicator light turns on, when the engine warming up switch is "ON" with key switch "ON" position.
   Under the above condition, check the indicator light is "ON" even if the exhaust brake switch is "OFF" position.

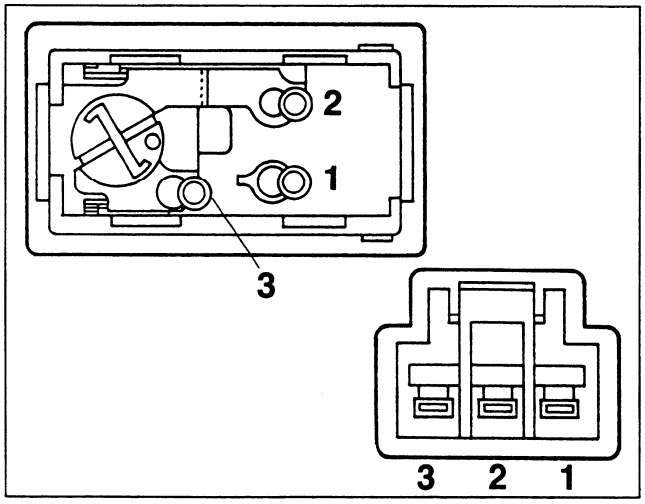


Figure 76. Connector of Switch

Install or Connect

1. Connect the connector.
2. Align the switch to the meter cluster hole.
3. Push the switch until a distinct click is heard.

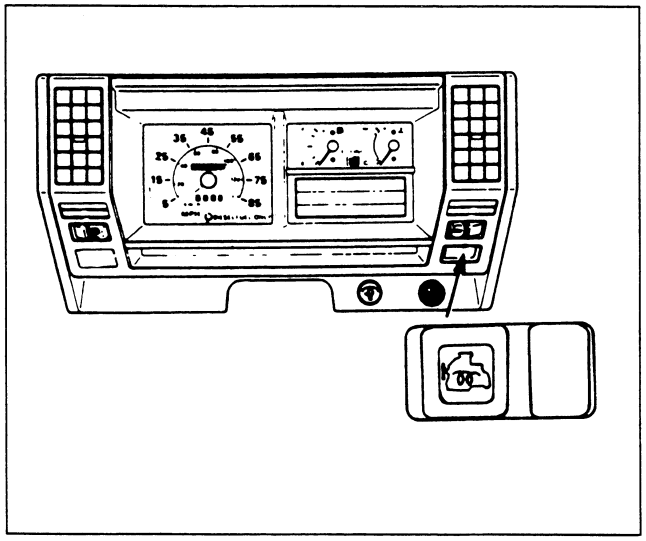


Figure 77. Engine Warming-up Switch Installation

Important

Be absolutely sure that the warming up switch connector is securely connected.

This will prevent poor contact and an open circuit.

Engine Warming Cut Relay

Inspect

Check the continuity between terminals.

Condition \ Terminal No.	(1)	(2)	(3)	(4)	(5)
Continuity	○	○			
Resistance approx. 80Ω				○	○
Continuity when applying battery voltage between (4) and (5)	○		○		

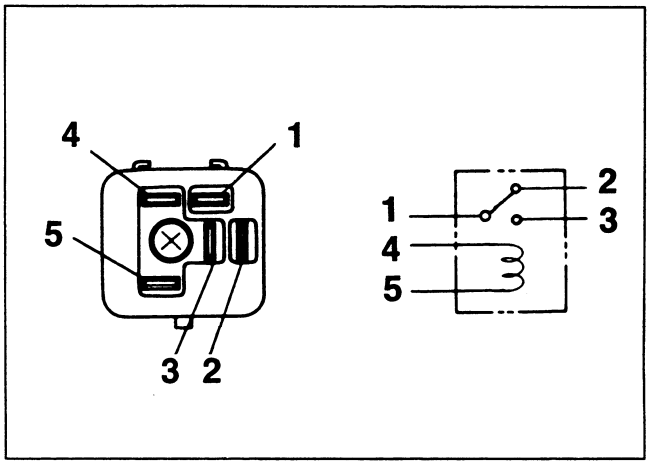
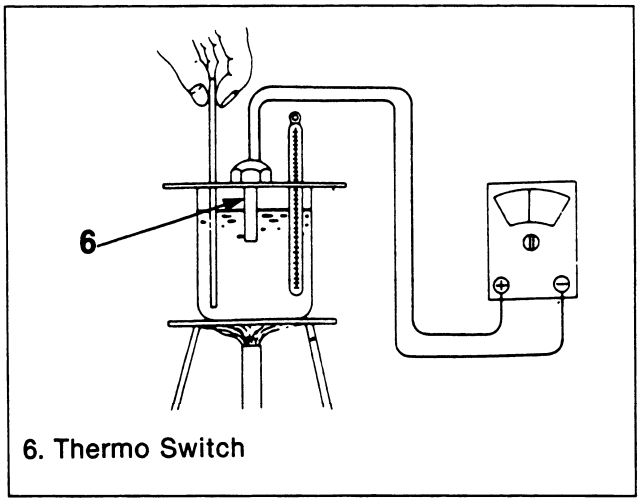


Figure 78. Engine Warming Cut Relay

Thermo Switch

Inspect (Figure 79)

1. Heat the sensing portion of thermo switch by immersing it in the hot water.
2. Make sure there is no continuity when the water temperature is approximately 70 °C (158 °F).
3. Make sure there is continuity when cooling it down to approximately 63 °C (145 °F).
4. LEAKAGE INSPECTION
   Submerge the thermo switch in the hot water at the temperature around 80–90 °C (176–196 °F), for one and half seconds, and check that there is no continuous air bubble from the thermo switch.



6. Thermo Switch

Figure 79. Checking Thermo Switch

Thermo Sensor

Inspect

1. Heat the sensing portion of thermo sensor by immersing it in the hot water.
2. Check the resistance between terminals.

Temp °C (°F)	Resistance Ω
20 (68)	2.2–2.7
80 (176)	Approx. 0.3

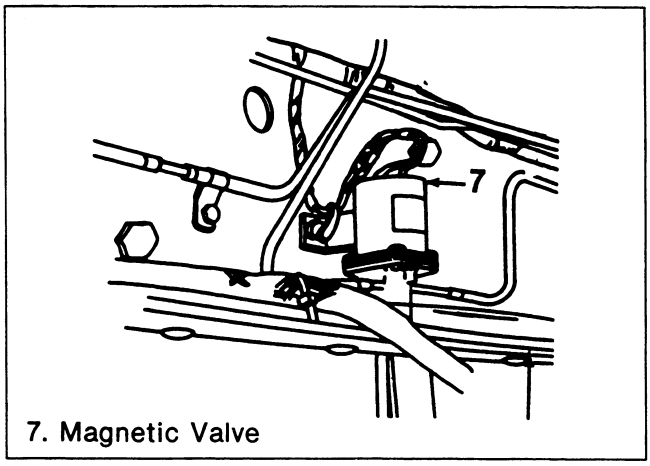
Diode

Use a circuit tester to check the diode continuity. (Refer to "DIODE" of "GENERAL INFORMATION" for checking procedure).

Exhaust Brake Magnetic Valve

Remove or Disconnect (Figure 80)

1. Disconnect the connector and the hose.
2. Remove the magnetic valve (7).



7. Magnetic Valve

Figure 80. Magnetic Valve

Inspect (Figure 81)

1. Check continuity between ports.

Port / Battery voltage	(1)	(2)	(3)
Apply	○	○	
Do not apply		○	○

(1) Inlet port
(2) Outlet port
(3) Exhaust

2. Check that the magnetic valve operates normally when applying battery voltage.

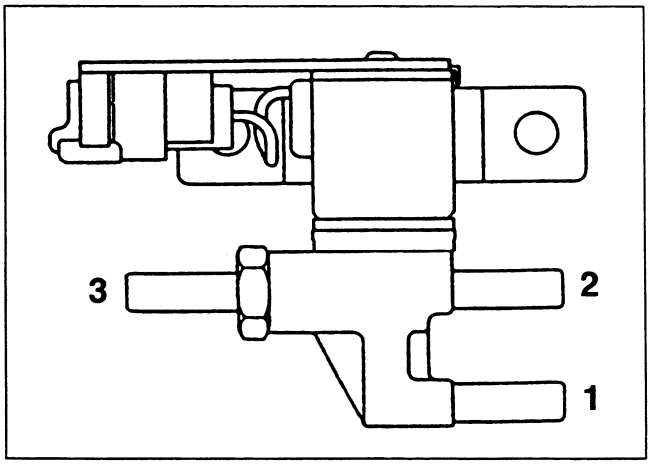


Figure 81. Checking Magnetic Valve

Install or Connect

Follow the removal procedure in the reverse order to install the magnetic valve.