SPECIFICATIONS (CONT.)

Pedal Height	196 – 204 mm (7.72 – 8.03″)
Pedal Travel	165 – 175 mm (6.50 – 6.89″)
Free Play	12 – 22 mm (0.47 – 0.87″)
Clutch Switch Clearance	0.5 – 1 mm (0.020 – 0.039″)

FASTENER TORQUE

Master Cylinder Push Rod Jam Nut	20 N•m (15 ft. lbs.)
Clutch Switch Jam Nut	20 N•m (15 ft. lbs.)
Pressure Plate Bolts	40 N•m (29 ft. lbs.)
Master Cylinder Bolts	13 N•m (10 ft. lbs.)
Slave Cylinder Bolts	16 N•m (12 ft. lbs.)
Flexible Hose Tube Nuts	20 N•m (15 ft. lbs.)
Slave Cylinder Bleeder Screw	8 N•m (6 ft. lbs.)
Clutch Pedal to Bracket Assembly Mounting Hardware	13 N•m (10 ft. lbs.)

SPECIAL TOOLS

J-35854	Power Bleeder Adapter
J-2619-01	Sliding Hammer
J-39022	Clutch Pilot Aligner

SECTION 8

CAB AND CHASSIS ELECTRICAL

CONTENTS

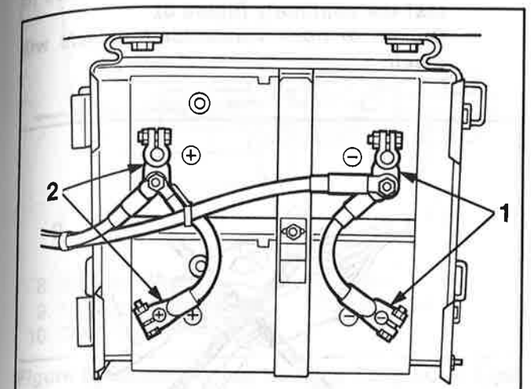
GENERAL INFORMATION

The cab and chassis electrical system operates on a twelve volt power supply with negative ground polarity.
Each wire in the vehicle is of a specific size and has an identifying colored insulation.
These colors are indicated in wiring diagrams and help in tracing circuits and making proper connections.
Some wires are grouped together and either taped or encased in split plastic casing. Such a grouping of wires is called a harness.
The main harness consists of the body harness, and the frame harness.
The harnesses use a split corrugated tube to protect the wires from the elements.
Wire size is determined by current flow, circuit length, and voltage drop.
All wires have color-coded insulation.
Wire color-codes are shown in the circuit diagrams. This makes it easier to trace circuits and to make the proper connections.
Each circuit consists of the following:

1. Power source — the battery and the alternator
2. Wires — To carry electrical current through the circuit
3. Fuses and the fusible link wires — To protect the circuit against current overload
4. Relays — To protect voltage drop between the battery and the circuit parts and to protect the switch points against burning
5. Switches — To open and close the circuit
6. Load — Any device, such as a light or a motor, which converts the electrical current into useful work
7. Ground — To allow the current to flow back to the power source

NOTES FOR WORKING ON ELECTRICAL ITEMS

Battery Cable



1. Battery Ground Cable
2. Battery Positive Cable

Figure 1. Disconnecting The Battery Cable

Disconnecting the Battery Cable (Figure 1)

1. All switches should be "OFF" position.
2. Disconnect the battery ground cable (1).
3. Disconnect the battery positive cable (2).

CAUTION: It is important that the battery ground cable be disconnected first. Disconnecting the battery positive cable first can result in a short circuit.

Connecting the Battery Cable

Follow the disconnecting procedure in the reverse order to connect the battery cables.

CAUTION: Clean the battery terminal and apply light coat of grease to prevent terminal corrosion

Connector Handling

Disconnecting The Connectors (Figures 2 and 3)

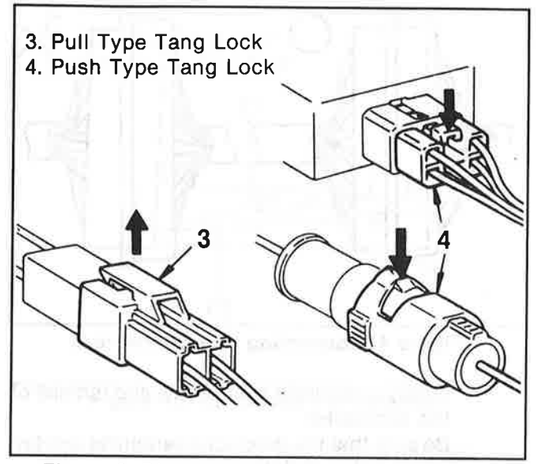


Figure 2. Disconnecting The Connectors (1)

Some connectors have a tang lock to hold the connectors together during vehicle operation.
Some tang locks are released by pulling them towards you (3) (figure 2).
Other tang locks are released by pressing them forward (4) (figure 2).
Determine which type of tang lock the connector you are working on has.
Firmly grasp both sides (male and female) of the connector.
Release the tang lock and carefully pull the two halves of the connector apart.
Never pull on the wires to separate the connectors. This will result in wire breakage (figure 3).

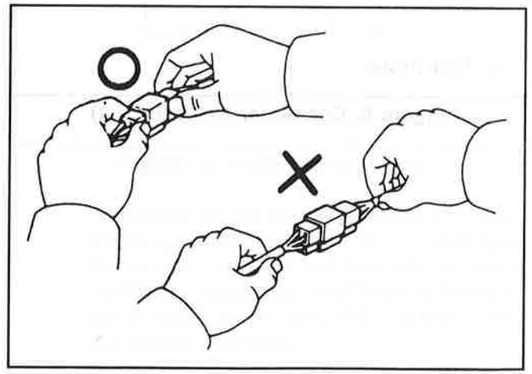


Figure 3. Disconnecting The Connectors (2)

Connecting the Connectors (Figure 4)

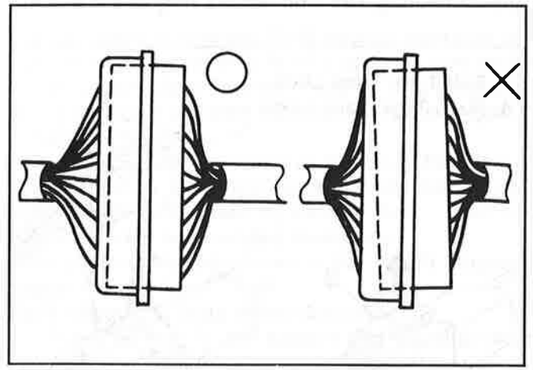


Figure 4. Connecting The Connectors

Firmly grasp both sides (male and female) of the connector.
Be sure that the connector terminals and terminal holes match.
Be sure that both sides of the connector are aligned with each other.
Firmly but carefully push the two sides of the connector together until a distinct click is heard.

Connector Inspection (Figures 5 and 6)

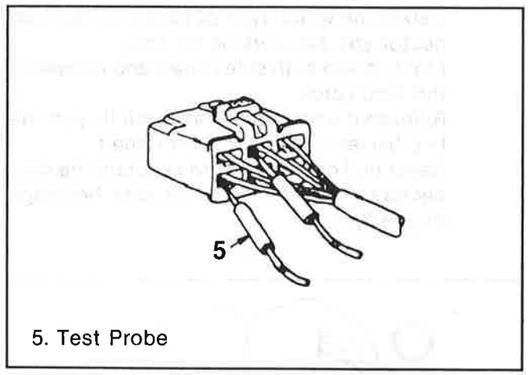


Figure 5. Connector Inspection (1)

Use a circuit tester to check the connector for continuity.
Insert the test probes (5) from the connector wire side (figure 5).

CAUTION: Never insert the circuit tester test probes (5) into the connector open side to test the continuity (figure 6).
Broken or open connector terminals will result.

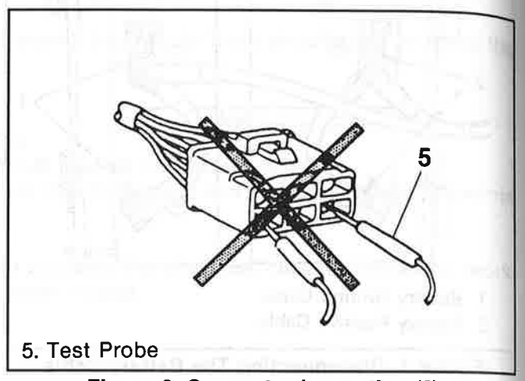


Figure 6. Connector Inspection (2)

Waterproof Connector Inspection (Figure 7)

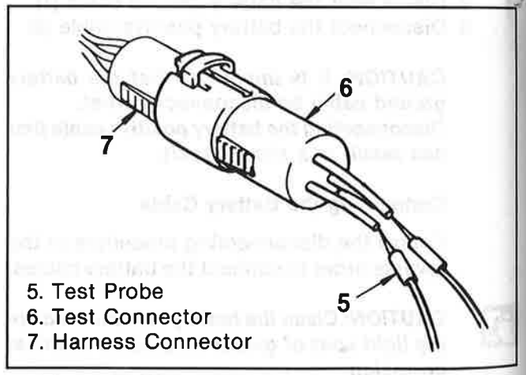


Figure 7. Waterproof Connector Inspection

It is not possible to insert the test probes into the connector wire side of a waterproof connector.
Use one side of a connector (6) with its wires cut to make the test.
Connect the test connector (6) to the connector (7) to be tested.
Connect the test probes (5) to the cut wires to check the connector continuity.

Connector Pin Removal

Connector Housing Tang Lock Type (Figure 8)

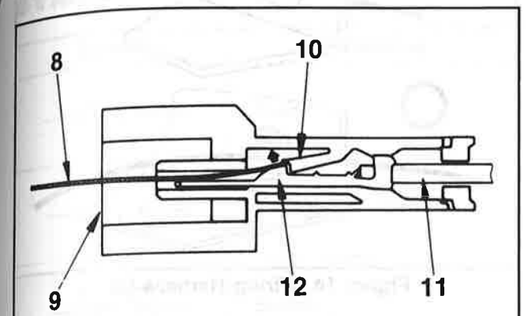


Figure 8. Disconnecting Hausing Tang Lock Type

1. Insert slender shaft (8) into the connector housing open end (9).
2. Push the tang lock (10) up (in the direction of the arrow in the illustration).
   Pull the wire (11) with terminal (12) free from the wire side of the connector.

Pin Tang Lock Type (Figure 9)

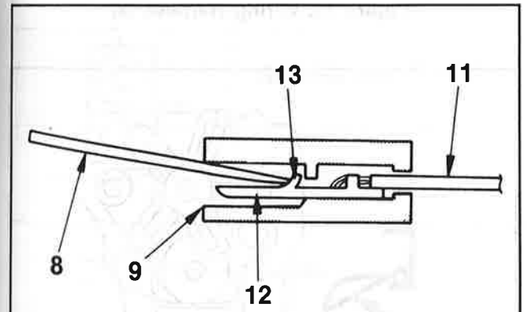


Figure 9. Disconnecting Terminal Tang Lock Type

1. Insert a slender shaft (8) into the connector housing open end (9).
2. Push the tang lock (13) flat (toward the wire side of the connector).
   Pull the wire (11) with terminal (12) free from the wire side of the connector.

Connector Pin Insertion (Figure 10)

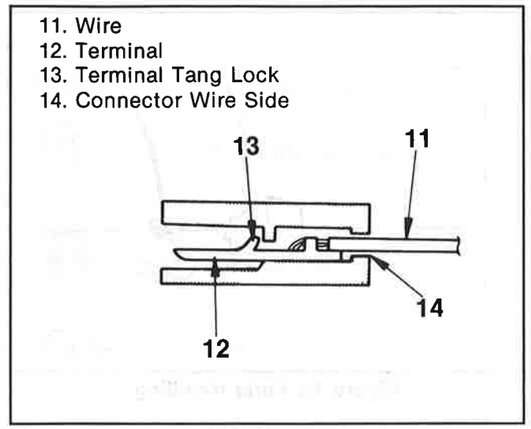


Figure 10. Connector Pin Insertion

1. Check that the tang lock (13) is fully up.
2. Insert the terminal (12) from the connector wire side (14).
   Push the terminal in until the tang lock colses firmly.
3. Gently pull on the wires (11) to make sure that connector terminal is firmly set in place.

Fuse Replacement

(Figure 11)

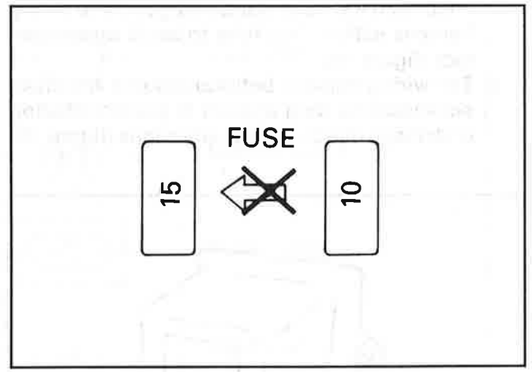


Figure 11. Fuse Replacement

The replacement fuse must have the same amperage specification as the original fuse. Never replace a burn out fuse with a fuse of a different amperage specification. Doing so can result in an electrical fire or other serious circuit damege.

Parts Handling

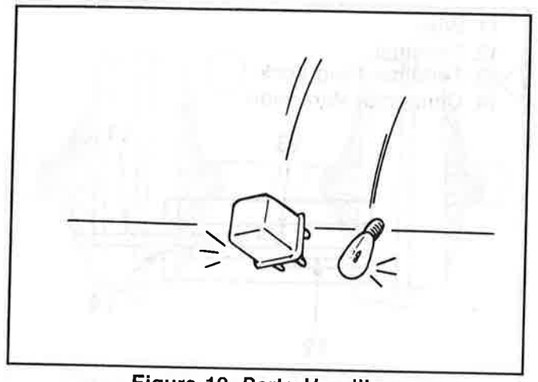


Figure 12. Parts Handling

Be careful when handling electrical parts. They must not be dropped or thrown, otherwise short circuit or disorder may result.

Wiring Harness

1. When assembling the parts, be careful not to bite or wedge the wiring harness (figure 13).
2. All electrical connections must be kept clean and tight.
3. Use a grommet or guard tube to protect the wiring harness from contacting a sharp edge or surface (figure 14).
4. Position the wiring harness with enough clearance from the other parts and guard the wiring harness with a vinyl tube to avoid direct contact (figure 15).
5. The wiring harness between engine and chassis should be long enough to prevent chafing or damage due to various vibrations (figure 16).

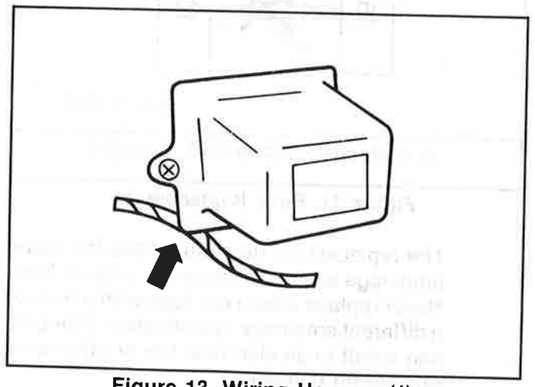


Figure 13. Wiring Harness (1)

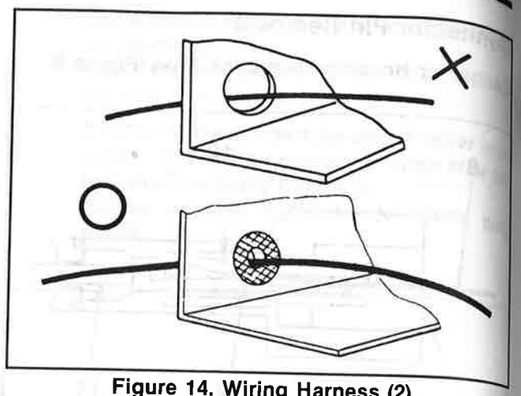


Figure 14. Wiring Harness (2)

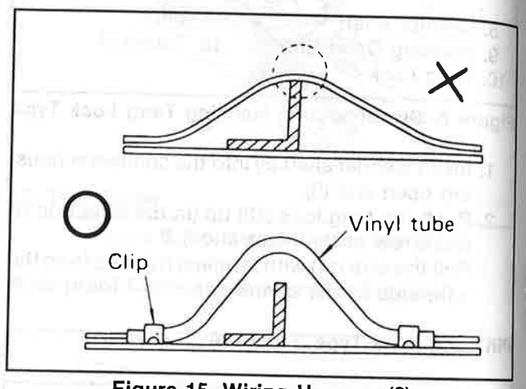


Figure 15. Wiring Harness (3)

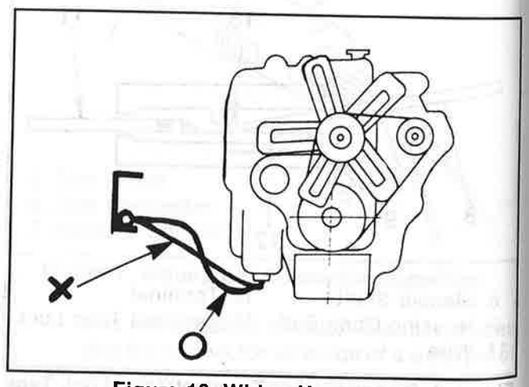


Figure 16. Wiring Harness (4)

SYMBOLS AND ABBREVIATIONS

SYMBOLS

Symbol	Meaning	Symbol	Meaning
	Fuse		Single filament bulb
	Fusible link wire		Double filament bulb
	Switch	M	Motor
	Switch		Variable resistor Rheostat
	Contact wiring		Vacuum switching valve Coil (Inductor), Solenoid, Magnetic valve
+ –	Battery		Relay
	Diode		
	Electronic part		Connector
	Resistor		Light emitted diode
	Speaker		Reed switch
	Buzzer		Condenser
	Circuit breaker		Horn

Figure 17. Symbols

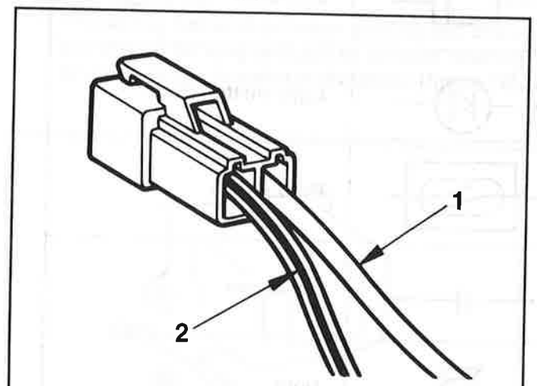
ABBREVIATIONS

Abbreviation	Meaning	Abbreviation	Meaning
A	Ampere(s)	OD	Overdrive
A.C	Alternating Current	OPT	Optional equipment
A/C	Air Conditioner	RH	Right Hand Side
ACC	Accessories	RR	Rear
A/T	Automatic Transmission	ST	Start
ATCU	Automatic Transmission Control Unit	STD	Standard
CSD	Cold Start Device	SW	Switch
EXH	Exhaust	TEMP	Temperature
FLW	Fusible Link Wire	V	Volt(s)
FRT	Front	VSV	Vacuum Switching Valve
IC	Integrated Circuit	W	Watt(s)
IG	Ignition	W/	With
KW	Kilowatts	W/O	Without
LH	Left Hand Side	WOT	Wide Open Throttle
M/T	Manual Transmission	Ω	Ohm

PARTS FOR ELECTRICAL CIRCUIT

WIRING

WIRE COLOR



1. Single Color Wire
2. Colored Stripe Wire

Figure 18. Wire Color

All wires have color-coded insulation.
Wires belonging to a system's main harness will have a single color (1).
Wires belonging to system's sub-circuits will have a colored stripe (2).
Striped wires use the following code to show wire size and colors.

Example: 0.5 G R

- 0.5 — Wire size (0.5 mm²)
- G — Green (Base color)
- R — Red (Stripe color)

Abbreviations are used to indicate wire color within a circuit diagram.
Refer to the following table.

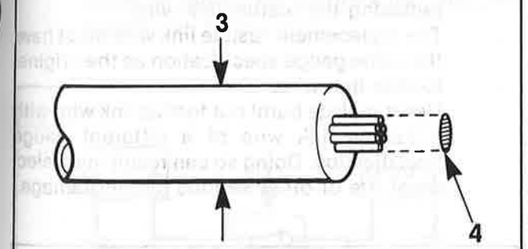
Wire color coding

Color-coding	Meaning	Color-coding	Meaning
B	Black	Br	Brown
W	White	Lg	Light green
R	Red	Gy	Grey
G	Green	P	Pink
Y	Yellow	Sb	Sky blue
L	Blue	V	Violet
O	Orange		

Distinction of Circuit by Wire Base Color

Base color	Circuits	Base color	Circuits
B	Starter circuit and grounding circuit	Y	Instrument circuit
W	Charging circuit	L, O, Br	Other circuits
R	Lighting circuit	Lg, Gy	
G	Signal circuit	P, Sb, V	

WIRE SIZE



3. Outside Diameter
4. Cross Sectional Area

Figure 19. Wire Size

The size of wire, used in a circuit is determined by the amount of current (amperage), the length of the circuit, and the voltage drop allowed.
The following wire size and load capacity, shown below, are specified by JIS (Japanese Industrial Standard).
(Nominal size means approximate cross sectional area).

Example: 0.5 G R

- 0.5 — Wire size (0.5 mm²)

Nominal size	Cross sectional area (mm²)	Outside diameter (mm)	Allowable current (A)	Allowable power (W)	
				(12V)	(24V)
0.3	0.372	1.8	7	80	160
0.5	0.563	2.2	9	110	220
0.85	0.885	2.4	12	140	280
1.25	1.29	2.7	15	180	360
2	2.09	3.1	20	240	480
3	3.30	3.8	27	320	640
5	5.23	4.6	37	440	880
8	7.95	5.5	47	560	1120
15	13.36	7.0	59	700	1410
20	20.61	8.2	84	1000	2010

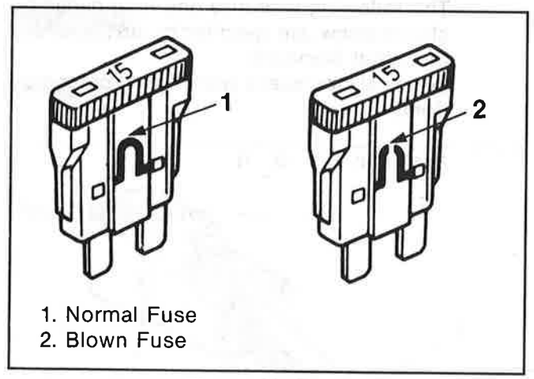
FUSES

Fuse (Figure 20)

Fuses are the most common form of circuit protection used in vehicle wiring. A fuse is a thin piece of wire or strip of metal encased in a glass or plastic housing. It is wired in series with the circuit it protects. When there is an overload of current in a circuit, such as a short or a ground, the wire or metal strip is designed to burn out and interrupt the flow of current. This prevents a surge of high current from reaching and demaging other components in the circuit.

A blown fuse is easily seen.
(1) Normal
(2) Blown

Determine the cause of the overload before replacing the fuse.
The replacement fuse must have the same amperage specification as the original fuse. Never replace a blown fuse with a fuse of a different amperage specification. Doing so can result in an electrical fire or other serious circuit damage.



1. Normal Fuse
2. Blown Fuse

Figure 20. Fuse

Fusible Link Wire (Figure 21)

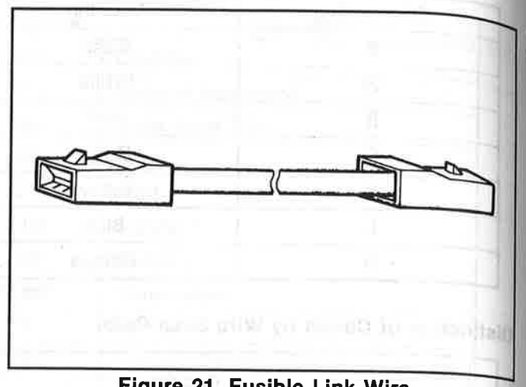


Figure 21. Fusible Link Wire

Fusible link wire operate in basically the same manner as main fuse.
Fusible link wires consist of short lengths of insulated wire inserted in series with the circuit they protect.
Use a circuit tester to check the fusible link wire.

Determine the cause of the overload before replacing the fusible link wire.
The replacement fusible link wire must have the same gauge specification as the original fusible link wire.
Never replace burnt out fusible link wire with a fusible link wire of a different gauge specification. Doing so can result in an electrical fire or other serious circuit damage.

Nominal size	Color	(A)
0.3	Brown	13
0.4	Green	16
0.7	Red	21
1.0	Black	26
2.0	Blue	36

RELAYS

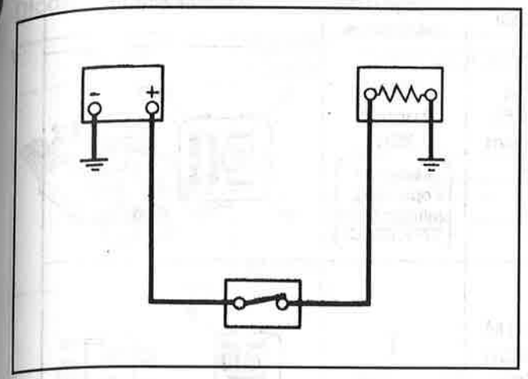


Figure 22. Relayless Circuit

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 22).
The installation of a relay between the battery and the load reduces the voltage drop (figure 23).
Because the switch controls the relay, the switch can be compct.

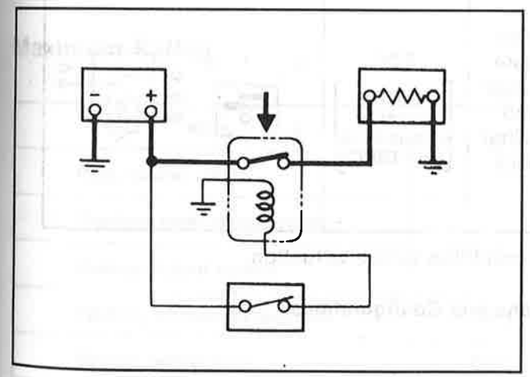
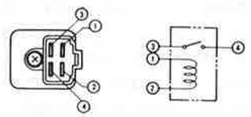
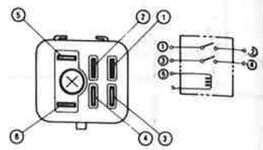
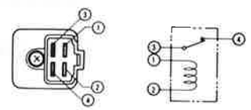
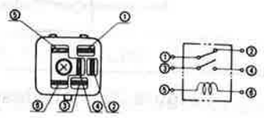
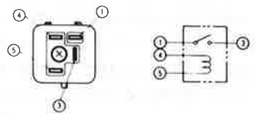
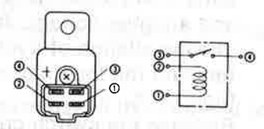
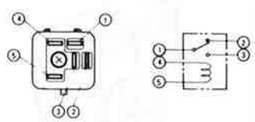
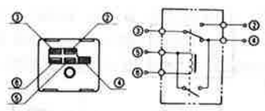


Figure 23. Relay Circuit

Relay Specifications and Configurations

Name/ Color	Rated voltage/Coil resistance	Internal circuit	Name/ Color	Rated voltage/Coil resistance	Internal circuit
1M (MR5L)/ Black	12V/ Approx. 80Ω [Minimum operating voltage:7V at 77°F (25°C)]		2M (MR5)/ Brown	12V/ Approx. 80Ω [Minimum operating voltage:7V at 77°F (25°C)]	
1B (MR5L)/ Grey	↑		1B-1M (MR5)/ Grey	↑	
1M (MR5)/ Black (Case), Blue (Base)	↑		Relay; heater	↑ [Minimum operating voltage 9V at 68°F (20°C)]	
1T (MR5)/ Black (General use), Blue (Change relay)	↑		Relay; beam change and passing/ Black	12V [Minimum operating voltage:8V at 68°F (20°C)]	

* Relay contact shown in the wiring diagram indicates condition before actuation.

Figure 24. Relay Specifications and Configurations

DIODES

Diode Specifications and Configurations

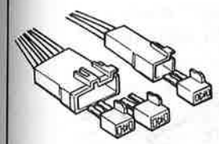
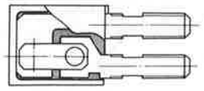
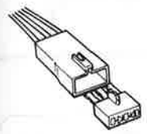
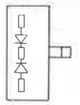
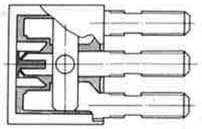
SHAPE	MARK/ COLOR	CONSTRUCTION	CHECKING
	 BLACK	 2 1	Tester connection: 2 (⊕) 1 (⊖) Continuity; 2 (⊖) 1 (⊕) Continuity; No continuity
	 ORANGE	 3 2 1	Tester connection: 3 (⊖) 2 (⊕) Continuity; 2 (⊕) 1 (⊖) Continuity; 3 (⊕) 2 (⊖) No continuity; 1 (⊖) 2 (⊕) No continuity

Figure 25. Diode Specifications and Configurations

Maximum Rating

Items	Rating	Remarks
Peak reverse voltage	400V	At 25°C (77°F)
Transient peak reverse voltage	500V	
Average output current	1.5A	At = 40°C (104°F)
Working ambient temperature	−30°C ~ 80°C (−22°F ~ 176°F)	At 25°C (77°F)
Storage temperature	−40°C ~ 100°C (−40°F ~ 212°F)	

READING THE DIAGRAM

CIRCUIT DIAGRAM AND PARTS LOCATION

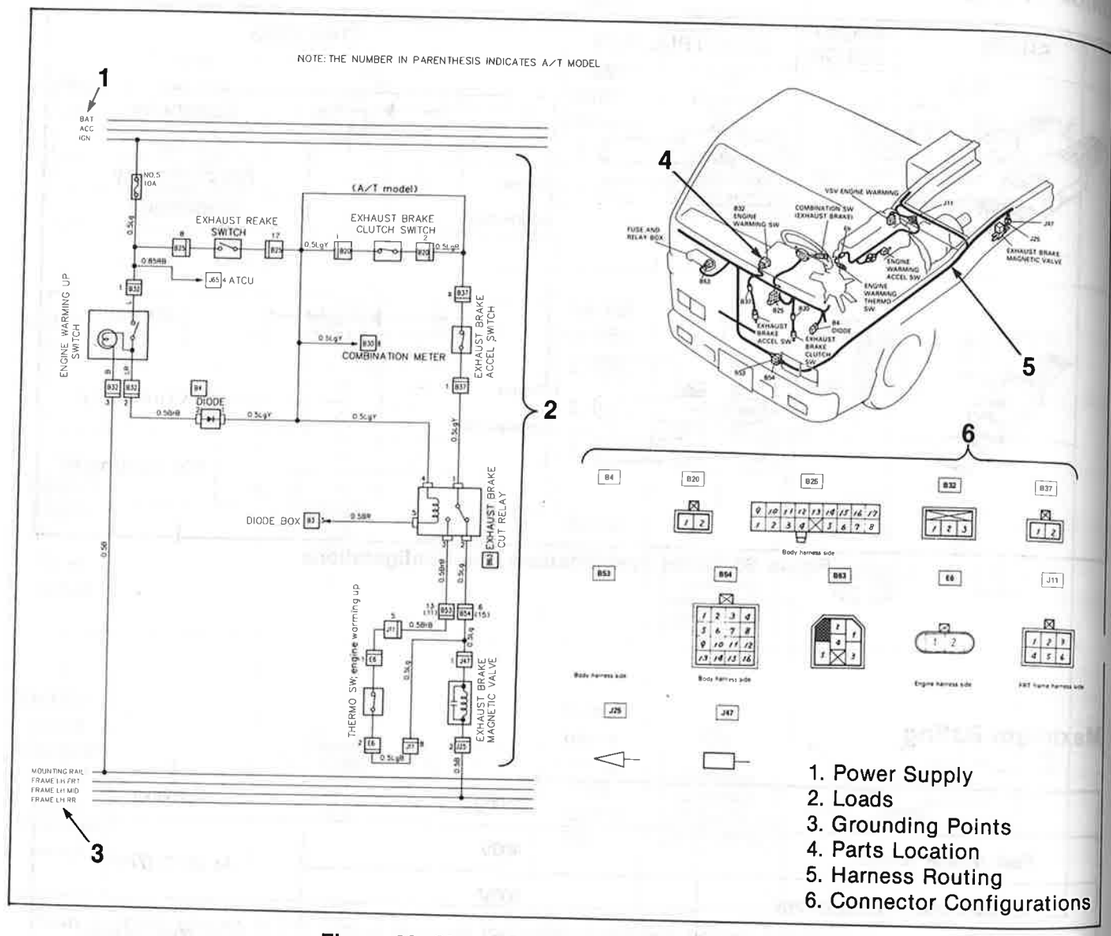


Figure 26. Circuit Diagram and Parts Location

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 26).

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 26).

CONNECTOR

The connector terminal shape (7) determines whether the connector is male (8) or female (9) (figure 27).
The connector housing configuration does not determine whether a connector is male or female (figure 27).
The symbol illustrated in the figure shows a connector in the circuit of this section (figure 28).
(8); Male side connector
(9); Female side connector
A Connector is identified with a number code (10) (figure 29).
The applicable terminal number (11) is shown for each connector (figure 30).

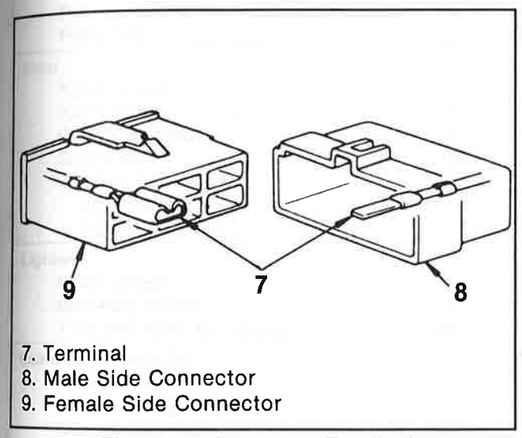


Figure 27. Connector Terminal

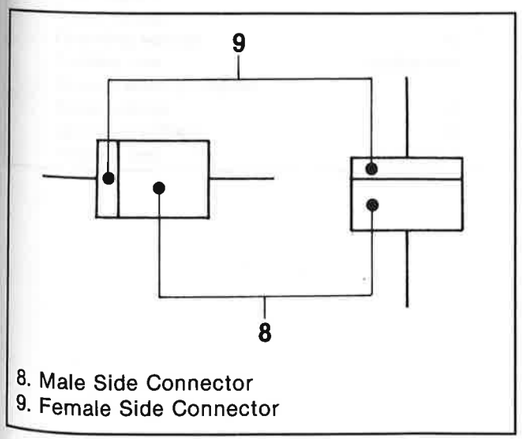


Figure 28. Symbol Illustlated

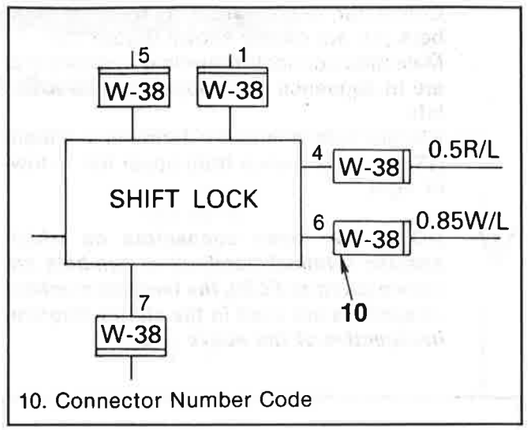


Figure 29. Number Code

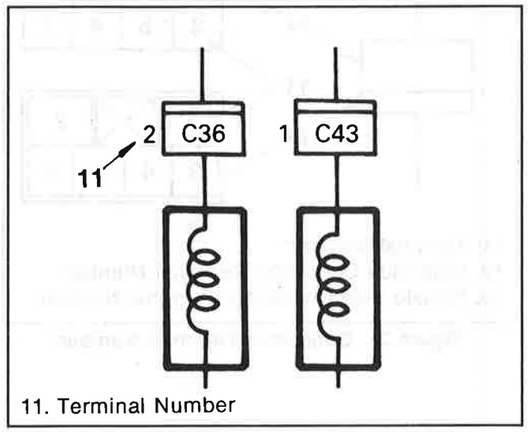
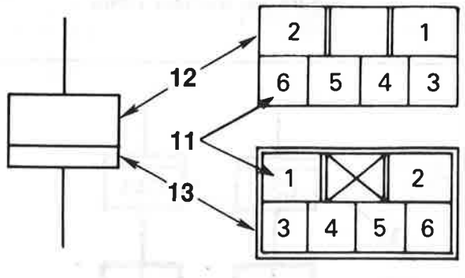


Figure 30. Applicable Terminal Number

Connector, diode, and relay terminal numbers (11) are clearly shown (figure 31).
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.

NOTE: 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 31. Connector Terminal Number

MAIN DATA AND SPECIFICATIONS

EQUIPMENT DATA

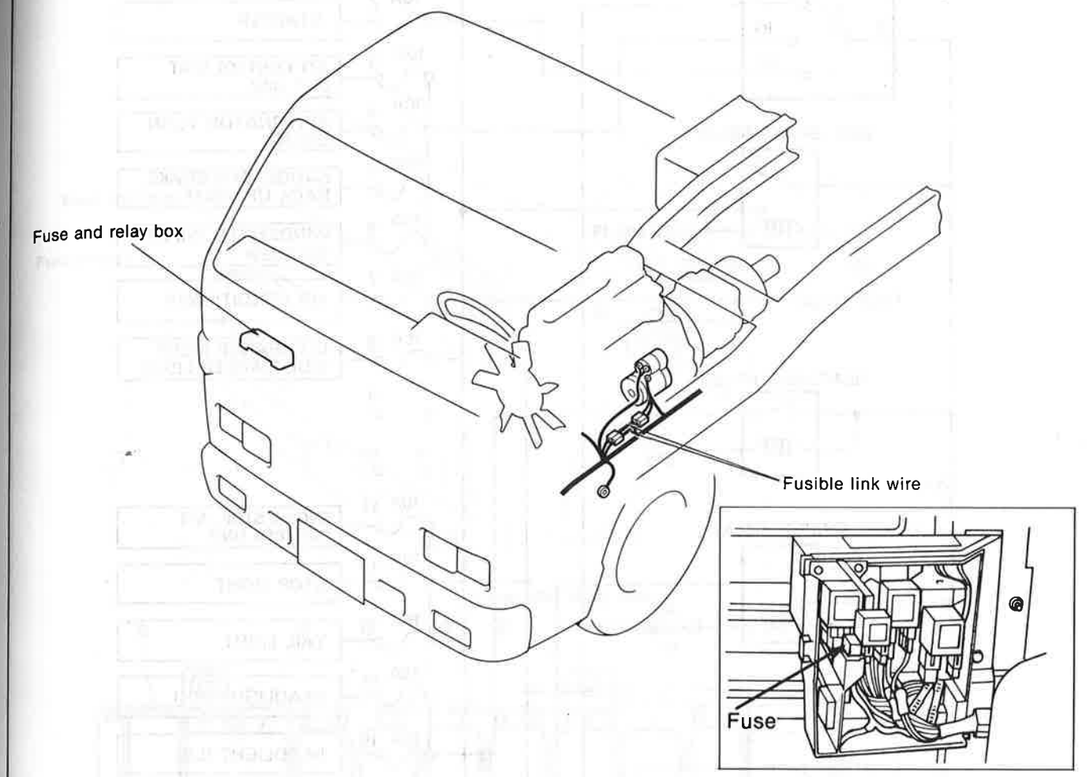
Wiper motor		
Rated voltage	V	12
Operating voltage	V	10 - 15
Min. operating voltage	V	Less than 8
Operating speed at 10 kg.cm load	rpm	
Low speed		42 - 52
High speed		61 - 75
Intermittent wiper relay		
Rated voltage	V	12
Operating voltage	V	10 - 15
Operating cycle	sec	5
Washer motor/Pump		
Rated voltage	V	12
Operating voltage	V	10 - 15
Delivery pressure	kg/cm^2	Approximately 1
Delivery volume	cc/sec	Approximately 100/10
Pump type		Centrifugal
Horn		
Rated voltage	V	12
Rated current	A	3
Operating voltage	V	10 - 14.5
Sound level	dB	110
Standard frequency	Hz	
Low tone		370
High tone		440
Lighter		
Rated voltage	V	12
Maximum current	A	Approx.
Time until ready for lighting	sec	
Illumination controller		
Rated voltage	V	12
Variable voltage range	V	8 - 16
Knob turning angle	deg	0 - 300
Flasher unit		
(Turn signal)		
Rated voltage	V	12
Operating voltage	V	11 - 15
Flashing rate	cycles/min	60 - 120
(Hazard warning flasher)		
Rated voltage	V	12
Operating voltage	V	11 - 13
Flashing rate	cycle/min	60 - 120

BULB SPECIFICATIONS

Light Name		Bulb No.	Rated power V-W	Number of Bulbs	Lens color	Remarks
Headlight	High beam	4651	50	2	White	
	Low/high beam	4652	40/60	2	White	
Combination light	FT turn signal	1157	22	2	Amber	
	Clearance	1157	8	2	Amber	
Rear turn signal light		1156	27	2	Amber	
Tail and stop light		1157	8/27	2	Red	
Back up light		1156	27	2	White	
License plate light		89	7.5	1	White	
Indicator and warning light						
Charging system		74	12 - 1.4	1	Red	
Turn Signal		74	12 - 1.4	2	Green	
High beam		74	12 - 1.4	1	Blue	
Low fuel level		74	12 - 1.4	1	Amber	
Oil pressure		74	12 - 1.4	1	Red	
Parking brake/Brake system		74	12 - 1.4	1	Red	
Exhaust brake		74	12 - 1.4	1	Green	
Glow plug		74	12 - 1.4	1	Amber	
Brake low vacuum		74	12 - 1.4	1	Red	
Overdrive off		74	12 - 1.4	1	Amber	A/T only
Economy drive		158	12 - 3.4	1	Green	A/T only
Instrument cluster light		—	12 - 1.4	1	Green	
A/C-Heater control light		—	12 - 1.4	1	White	
Dome light		—	12 - 10	1	White	

FUSES

FUSE LOCATIONS



Fuse and relay box

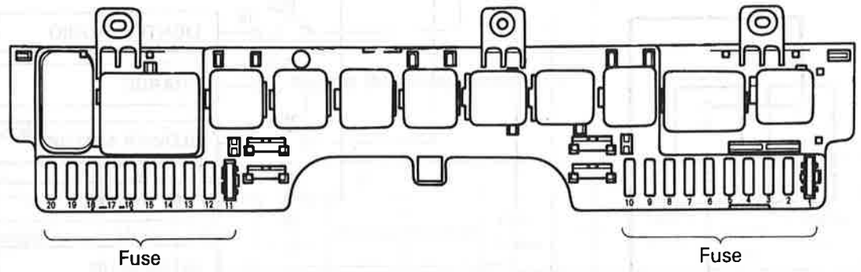


Figure 32. Fuse Locations