

This manual provides information on the electrical circuits installed on vehicles by dividing them into a circuit for each system.

The actual wiring of each system circuit is shown from the point where the power source is received from the battery as far as each ground point. (All circuit diagrams are shown with the switches in the OFF position.)

When troubleshooting any problem, first understand the operation of the circuit where the problem was detected (see System Circuit section), the power source supplying power to that circuit (see Power Source section), and the ground points (see Ground Points section). See the System Outline to understand the circuit operation.

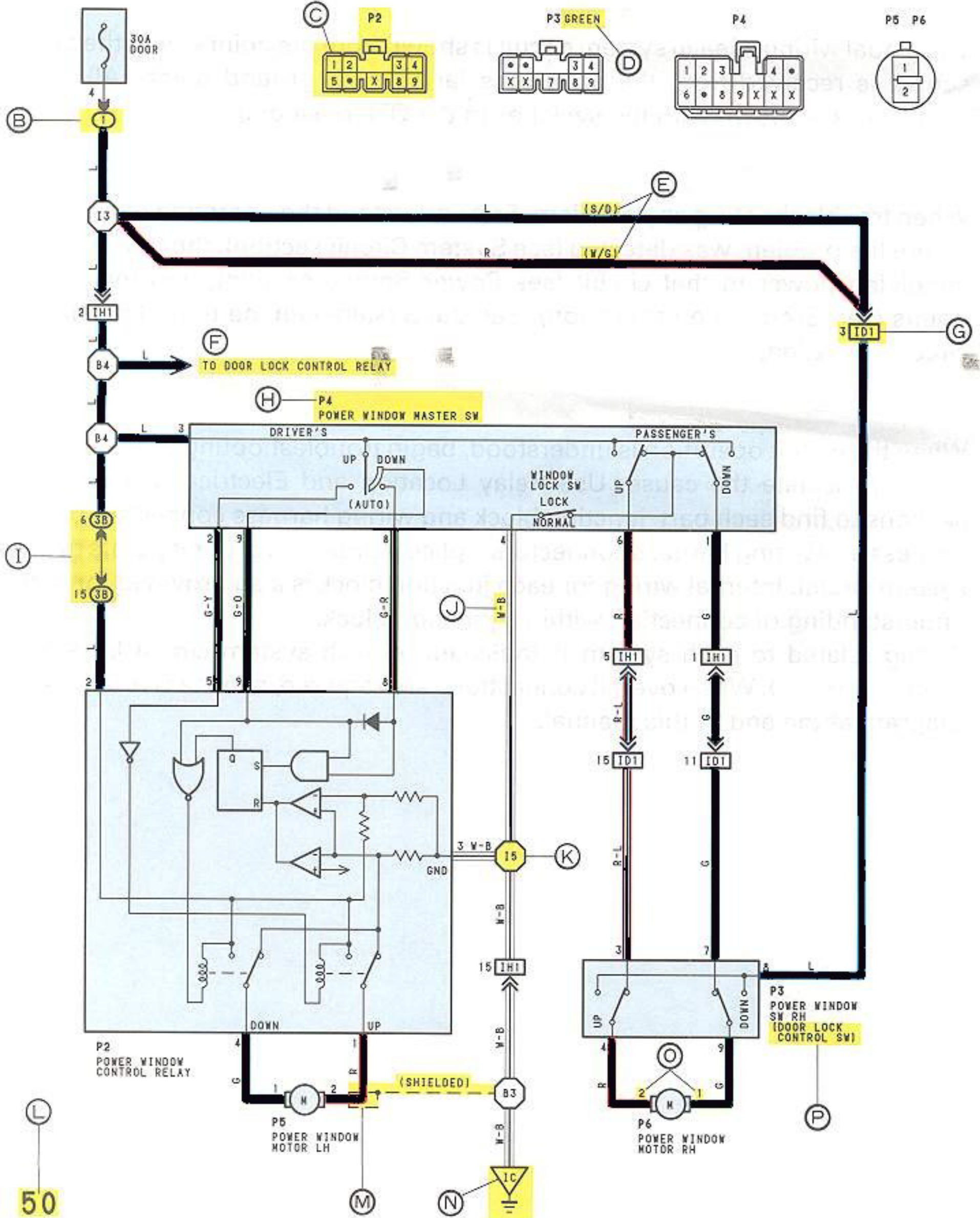
When the circuit operation is understood, begin troubleshooting of the problem circuit to isolate the cause. Use Relay Location and Electrical Wire Routing sections to find each part, junction block and wiring harness connectors, wiring harness and wiring harness connectors, splice points, and ground points of each system circuit. Internal wiring for each junction block is also provided for better understanding of connection within a junction block.

Wiring related to each system is indicated in each system circuit by arrows (from___, to___). When overall connections are required, see the Overall Wiring Diagram at the end of this manual.

B HOW TO USE THIS MANUAL

* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.

POWER WINDOW

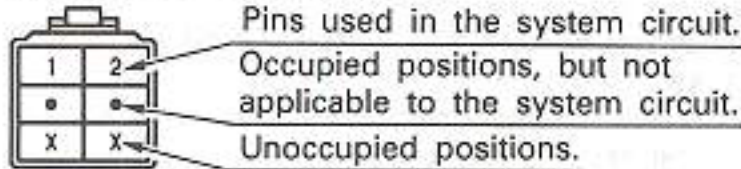


- (A): System Title
- (B): Indicates a Relay Block. No shading is used and only the Relay Block No. is shown to distinguish it from the J/B.

Example: (1) Indicates Relay Block No. 1.

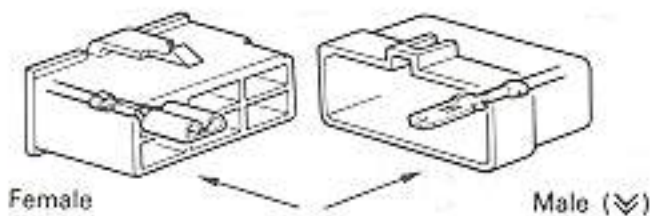
- (C): Indicates the connector to be connected to a part (the numeral indicates the pin No.)

Explanation of pin use.



The pins shown are only for the highest grade, or only include those in the specification.

- (D): Connector Color
Connectors not indicated are milky white in color.
- (E): () is used to indicate different wiring and connector, etc. when the vehicle model, engine type, or specification is different.
- (F): Indicates related system.
- (G): Indicates the wiring harness and wiring harness connector. The wiring harness with male terminal is shown with arrows (↗). Outside numerals are pin numbers.



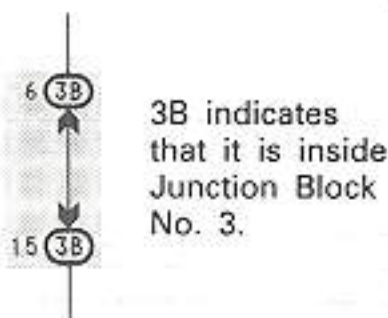
The first letter of the code for each wiring harness and wiring harness connector(s) indicates the component's location, e.g., "E" for the Engine Compartment, "I" for the Instrument Panel and Surrounding area, and "B" for the Body and Surrounding area.

When more than one code has the first and second letters in common, followed by numbers (e.g., IH1, IH2), this indicates the same type of wiring harness and wiring harness connector.

- (H): Represents a part (all parts are shown in sky blue). The code is the same as the code used in parts position.

- (I): Junction Block (The number in the circle is the J/B No. and the connector code is shown beside it). Junction Blocks are shaded to clearly separate them from other parts (different junction blocks are shaded differently for further clarification).

Example:



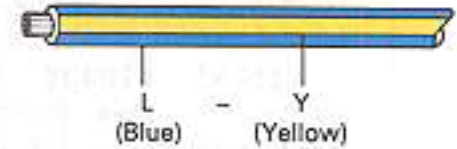
- (J): Indicates the wiring color.

Wire colors are indicated by an alphabetical code.

B = Black	L = Blue	R = Red
BR = Brown	LG = Light Green	V = Violet
G = Green	O = Orange	W = White
GR = Gray	P = Pink	Y = Yellow

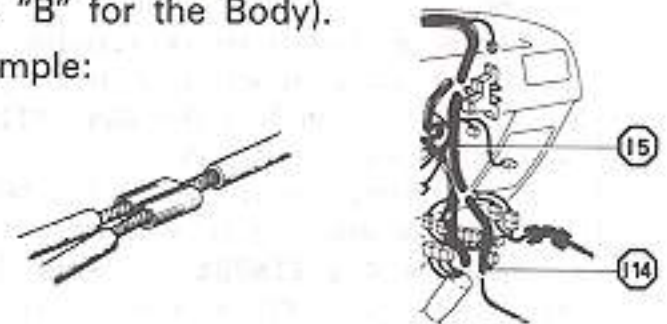
The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

Example: L - Y



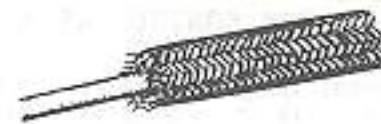
- (K): Indicates a wiring Splice Point (Codes are "E" for the Engine Room, "I" for the Instrument Panel, and "B" for the Body).

Example:



The Location of Splice Point I 5 is indicated by the shaded section.

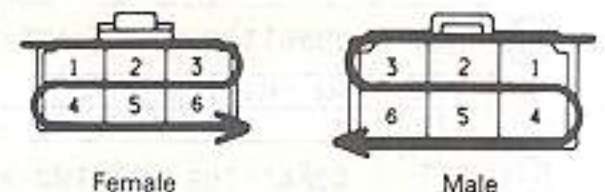
- (L): Page No.
- (M): Indicates a shielded cable.



- (N): Indicates a ground point.
The first letter of the code for each ground point(s) indicates the component's location, e.g., "E" for the Engine Compartment, "I" for the Instrument Panel and Surrounding area, and "B" for the Body and Surrounding area.

- (O): Indicates the pin number of the connector. The numbering system is different for female and male connectors.

Example: Numbered in order from upper left to lower right Numbered in order from upper right to lower left



- (P): When 2 parts both use one connector in common, the parts connector name used in the wire routing section is shown in square brackets [].

B HOW TO USE THIS MANUAL

Q

SYSTEM OUTLINE

WITH THE IGNITION SW TURNED ON, THE CURRENT FLOWS TO TERMINAL 3 OF THE POWER WINDOW MASTER SW, TERMINAL 2 OF THE POWER WINDOW CONTROL RELAY AND TERMINAL 8 OF THE POWER WINDOW SW THROUGH THE DOOR FUSE.

1. DRIVER'S WINDOW "MANUAL UP" OPERATION BY MASTER SW

HOLDING MANUAL SW(DRIVER'S) ON "UP" POSITION LOCATED IN POWER WINDOW MASTER SW, THE CURRENT FLOWS TO TERMINAL 5 OF THE POWER WINDOW CONTROL RELAY THROUGH TERMINAL 3 OF THE MASTER SW → TERMINAL 2 TO OPERATE A POWER WINDOW CONTROL RELAY. THUS THE CURRENT INSIDE THE RELAY FLOWS FROM TERMINAL 2 OF THE RELAY → TERMINAL 1 → TERMINAL 2 OF THE POWER WINDOW MOTOR → TERMINAL 1 → TERMINAL 4 OF THE RELAY → TERMINAL 3 → TO GROUND. THE MOTOR TURNS TO ASCENT THE WINDOW. RELEASING THIS SW, THE ROTATION OF MOTOR IS STOPPED AND THE WINDOWS CAN STOP AT WILL POINT.

(FOR THE "MANUAL DOWN" OPERATION, CURRENT FLOWS IN THE REVERSE DIRECTION BECAUSE THE TERMINALS WHERE IT FLOWS ARE CHANGED).

2. DRIVER'S WINDOW "AUTO DOWN" OPERATION BY MASTER SW

ONCE THE "AUTO DOWN" BUTTON OF THE MASTER SW IS PUSHED, THE CURRENT FLOWS TERMINAL 9 OF THE POWER WINDOW CONTROL RELAY THROUGH TERMINAL 3 OF THE MASTER SW → TERMINALS 8 AND 9 TO OPERATE THE RELAY. THUS THE CURRENT INSIDE THE POWER WINDOW CONTROL RELAY FLOWS FROM TERMINAL 2 OF THE RELAY → TERMINAL 4 → TERMINAL 1 OF THE POWER WINDOW MOTOR → TERMINAL 2 → TERMINAL 1 OF THE RELAY → TERMINAL 3 → TO GROUND. THE MOTOR CONTINUES THE ROTATION ENABLING TO DESCENT THE WINDOW.

THE WINDOW DESCENDS TO THE END POSITION, THE CURRENT WILL BE CUT OFF TO RELEASE THE AUTO DOWN FUNCTION BASED ON THE INCREASING CURRENT BETWEEN TERMINAL 2 OF THE RELAY AND TERMINAL 1 IN RELAY.

3. DRIVER'S WINDOW AUTO DOWN RELEASE OPERATION BY MASTER SW

HOLDING THE MANUAL SW(DRIVER'S) ON "UP" POSITION IN OPERATING AUTO DOWN, THE CURRENT FROM TERMINAL 3 OF THE MASTER SW PASSING TERMINAL 2 FLOWS TERMINAL 5 OF THE RELAY AND RELEASES THE AUTO DOWN FUNCTION IN THE POWER WINDOW CONTROL RELAY. RELEASING THE HAND FROM SW, WINDOW STOPS AND CONTINUING ON TOUCHING SW, THE FUNCTION SWITCHES TO MANUAL UP OPERATION.

4. PASSENGER'S WINDOW UP OPERATION(MASTER SW) AND WINDOW LOCK SW OPERATION

HOLDING PASSENGER'S WINDOW SW(MASTER SW) ON "UP", THE CURRENT FLOWS FROM TERMINAL 3 OF THE MASTER SW PASSING TERMINAL 6 TO TERMINAL 3 OF THE POWER WINDOW SW(PASSENGER'S) → TERMINAL 4 → TERMINAL 2 OF THE MOTOR → TERMINAL 1 → TERMINAL 9 OF THE POWER WINDOW SW → TERMINAL 7 → TERMINAL 1 OF THE MASTER SW → TERMINAL 4 TO GROUND. THE MOTOR RUNS TO ASCENT THE WINDOW. RELEASING THIS SW, THE ROTATION OF MOTOR IS STOPPED AND WINDOW CAN STOP AT WILL PLACE. SWITCHING THE WINDOW LOCK SW IN "LOCK" POSITION, THE CIRCUIT IS OPENED AND STOPPED THE MOTOR ROTATION.

(FOR THE DOWN OPERATION, CURRENT FLOWS IN THE REVERSE DIRECTION BECAUSE THE TERMINALS WHERE IT FLOWS ARE CHANGED).

R

SERVICE HINTS

P2 POWER WINDOW CONTROL RELAY

3-GROUND:ALWAYS CONTINUITY

2-GROUND:APPROX.12 VOLTS WITH IGNITION SW AT ON POSITION

5-GROUND:APPROX.12 VOLTS WITH IGNITION SW AT ON POSITION AND MASTER SW AT UP POSITION

8-GROUND:APPROX.12 VOLTS WITH IGNITION SW AT ON POSITION AND MASTER SW AT AUTO DOWN POSITION

9-GROUND:APPROX.12 VOLTS WITH IGNITION SW AT ON POSITION AND MASTER SW AT DOWN OR AUTO DOWN POSITION

P4 POWER WINDOW MASTER SW

4-GROUND:ALWAYS CONTINUITY

3-GROUND:APPROX.12 VOLTS WITH IGNITION SW AT ON POSITION

WINDOW LOCK SW

OPEN WITH WINDOW LOCK SW AT LOCK POSITION

S

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
P2	21	P4	21	P6	21
P3	21	P5	21		

T

○ : RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCK (RELAY BLOCK LOCATION)
1	16	R/B NO.1 (INSTRUMENT PANEL LEFT SIDE)

U

○ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
3B	14	J/B NO.3 AND COWL WIRE (INSTRUMENT PANEL LEFT SIDE)

V

□ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
ID1	26	FRONT DOOR RH WIRE AND COWL WIRE (RIGHT KICK PANEL)
IN1	26	FRONT DOOR LH WIRE AND COWL WIRE (LEFT KICK PANEL)

W

▽ : GROUND POINTS

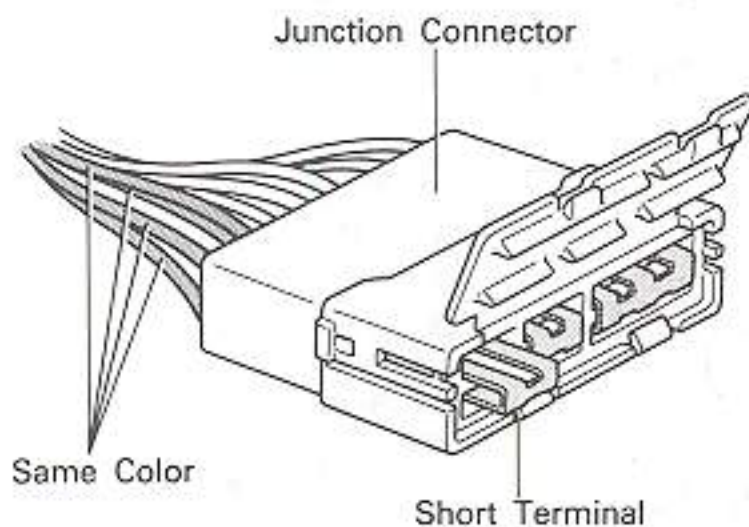
CODE	SEE PAGE	GROUND POINT LOCATION
IC	24	COWL LEFT

X

○ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESSES WITH SPLICE POINTS
I5	24	COWL WIRE

- Ⓚ: Explains the system outline.
- Ⓡ: Indicates values or explains the function for reference during troubleshooting.
- Ⓢ: Indicates the reference page showing the position on the vehicle of the parts in the system circuit.
 Example: Part "P4" (Power Window Master SW) is on page 21 of the manual.
 * The letter in the code is from the first letter of the part, and the number indicates its order in parts starting with that letter.
 Example: P4
 └── Part is 4th in order
 └── Power Window Master SW
- Ⓣ: Indicates the reference page showing the position on the vehicle of Relay Block Connectors in the system circuit.
 Example: Connector "1" is described on page 16 of this manual and is installed on the left side of the instrument panel.
- Ⓤ: Indicates the reference page showing the position on the vehicle of J/B and Wire Harness in the system circuit.
 Example: Connector "3B" connects the Cowl Wire and J/B No. 3. It is described on page 14 of this manual, and is installed on the instrument panel left side.
- Ⓥ: Indicates the reference page describing the wiring harness and wiring harness connector (the female wiring harness is shown first, followed by the male wiring harness).
 Example: Connector "ID1" connects the front door RH wire (female) and cowl wire (male). It is described on page 26 of this manual, and is installed on the right side kick panel.
- Ⓦ: Indicates the reference page showing the position of the ground points on the vehicle.
 Example: Ground point "IC" is described on page 24 of this manual and is installed on the cowl left side.
- Ⓧ: Indicates the reference page showing the position of the splice points on the vehicle.
 Example: Splice point "I 5" is on the Cowl Wire Harness and is described on page 24 of this manual.

HINT:

Junction connector (code: J1, J2, J3, J4, J5, J6, J7, J8, J9) in this manual include a short terminal which is connected to a number of wire harnesses. Always perform inspection with the short terminal installed. (When installing the wire harnesses, the harnesses can be connected to any position within the short terminal grouping. Accordingly, in other vehicles, the same position in the short terminal may be connected to a wire harness from a different part.) Wire harness sharing the same short terminal grouping have the same color.

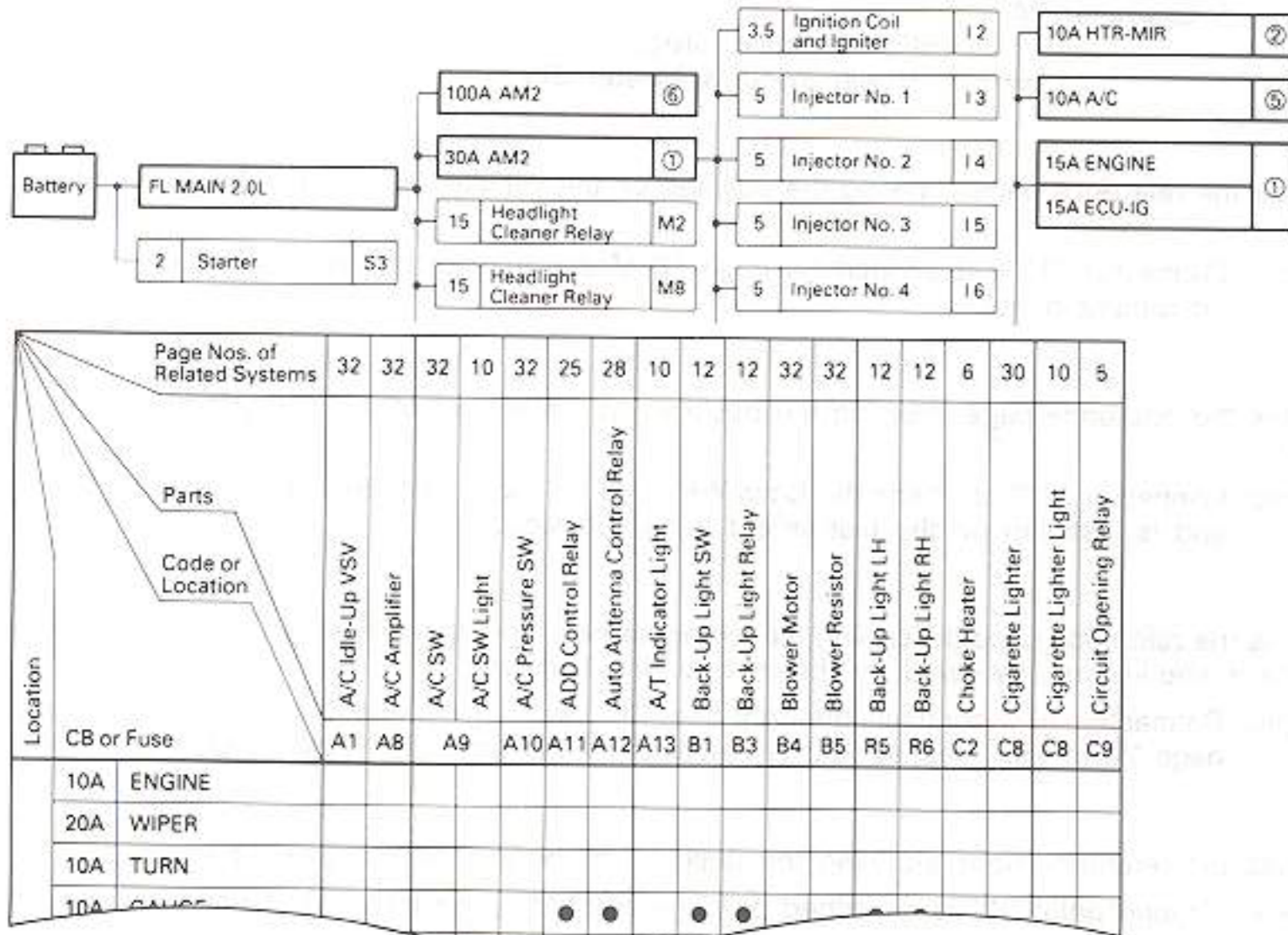
B HOW TO USE THIS MANUAL

The "Current Flow Chart" section, describes which parts each power source (fuses, fusible links, and circuit breakers) transmits current to. In the Power Source circuit diagram, the conditions when battery power is supplied to each system are explained. Since all System Circuit diagrams start from the power source, the power source system must be fully understood.

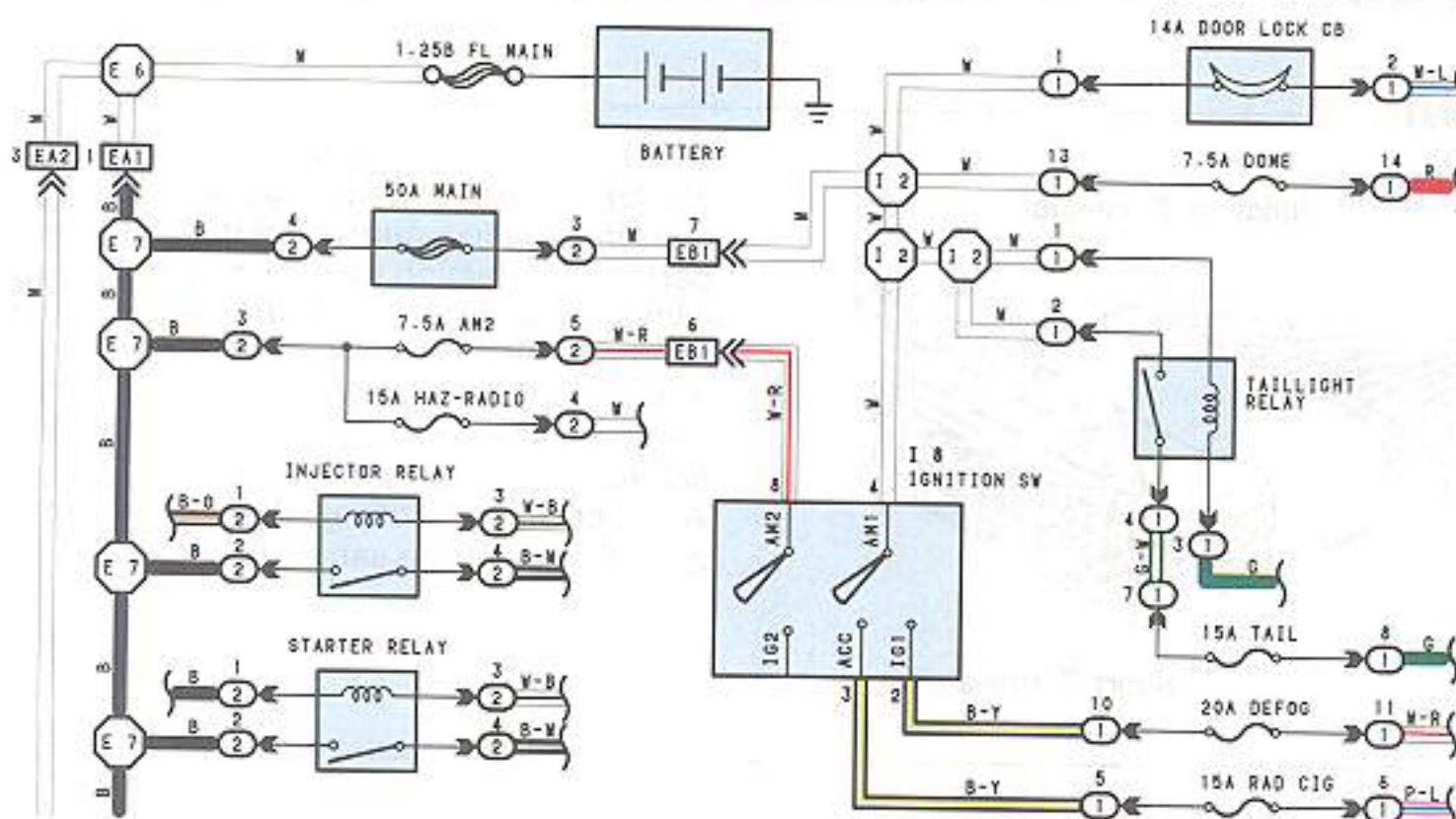
H POWER SOURCE (Current Flow Chart)

The chart below shows the route by which current flows from the battery to each electrical source (Fusible Link, Circuit Breaker, Fuse, etc.) and other parts.

The next page and following pages shown the parts to which each electrical source outputs current.



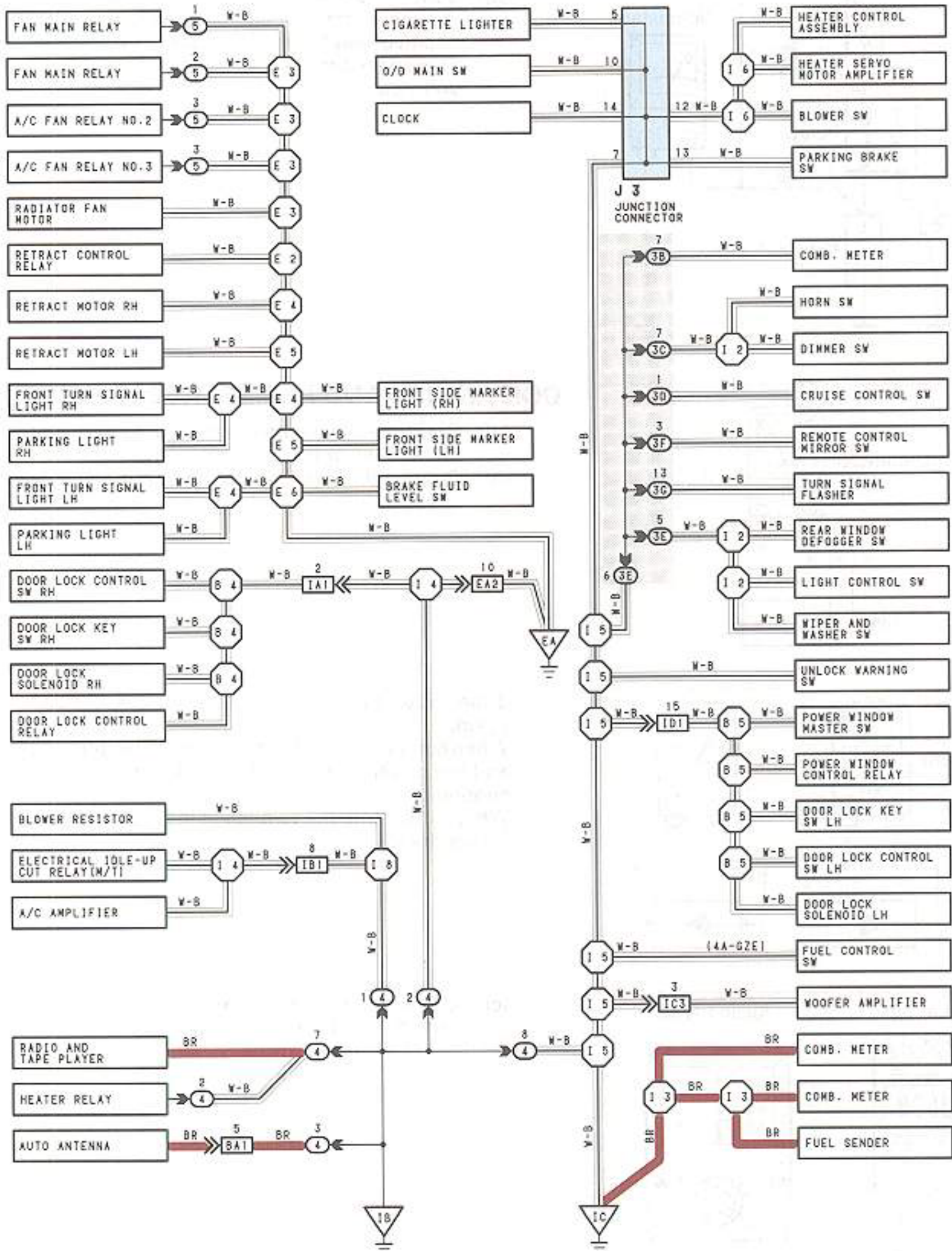
POWER SOURCE



* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.

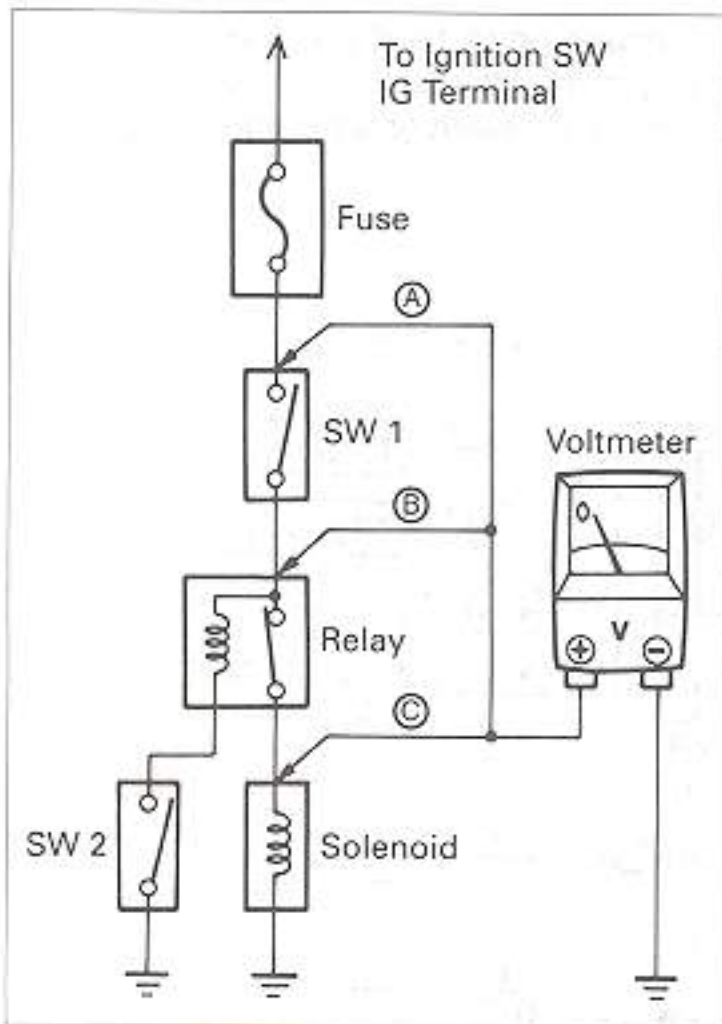
The ground points circuit diagram shows the connections from all major parts to the respective ground points. When troubleshooting a faulty ground point, checking the system circuits which use a common ground may help you identify the problem ground quickly. The relationship between ground points (∇_{EA} , ∇_{IB} and ∇_{IC} shown below) can also be checked this way.

J GROUND POINTS



* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.

C TROUBLESHOOTING



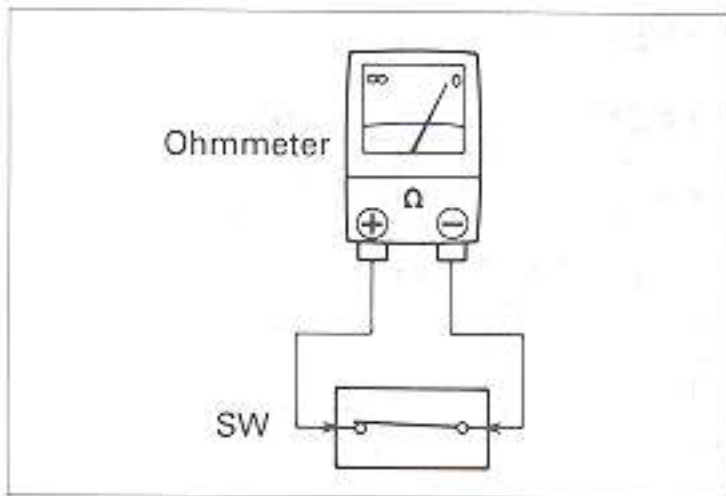
VOLTAGE CHECK

- (a) Establish conditions in which voltage is present at the check point.

Example:

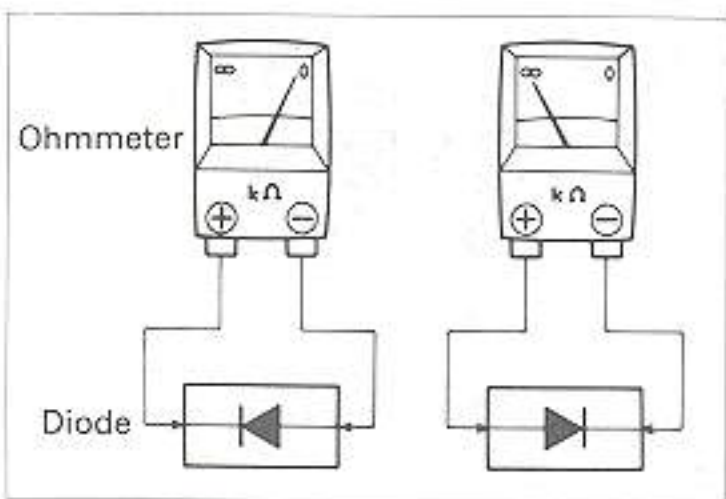
- (A) – Ignition SW on
- (B) – Ignition SW and SW 1 on
- (C) – Ignition SW, SW 1 and Relay on (SW 2 off)

- (b) Using a voltmeter, connect the negative lead to a good ground point or negative battery terminal, and the positive lead to the connector or component terminal. This check can be done with a test light instead of a voltmeter.



CONTINUITY AND RESISTANCE CHECK

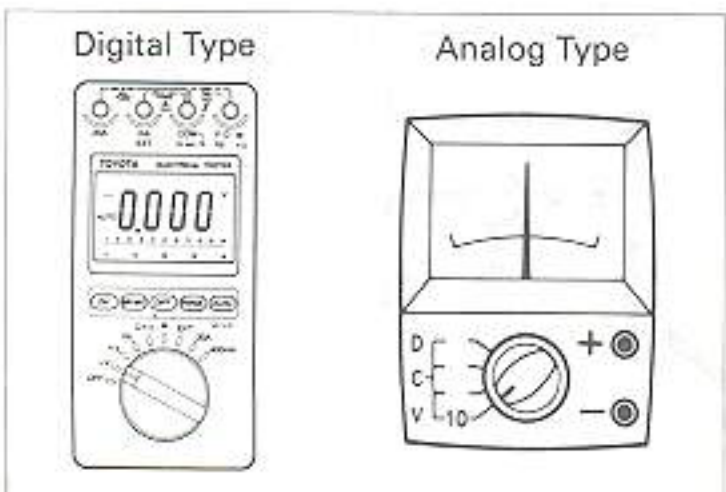
- (a) Disconnect the battery terminal or wire so there is no voltage between the check points.
 (b) Contact the two leads of an ohmmeter to each of the check points.



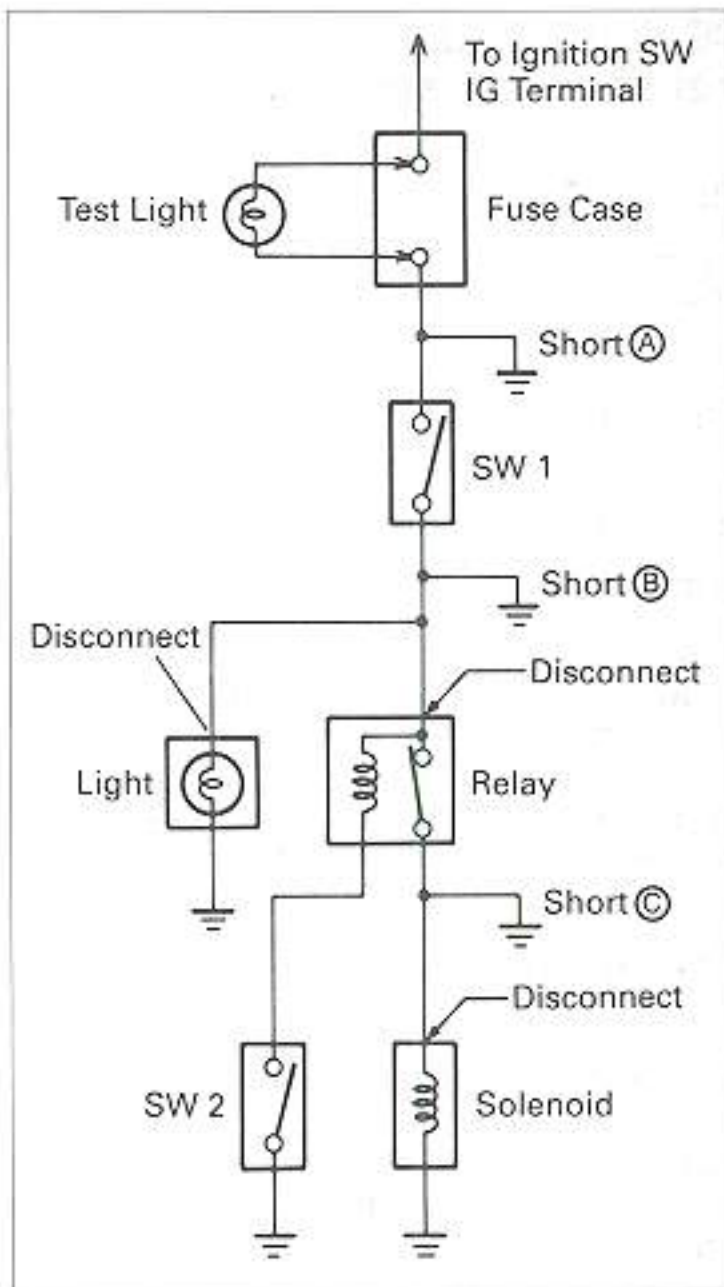
If the circuit has diodes, reverse the two leads and check again.

When contacting the negative lead to the diode positive side and the positive lead to the negative side, there should be continuity.

When contacting the two leads in reverse, there should be no continuity.



- (c) Use a volt/ohmmeter with high impedance (10 k Ω /V minimum) for troubleshooting of the electrical circuit.



FINDING A SHORT CIRCUIT

- Remove the blown fuse and disconnect all loads of the fuse.
- Connect a test light in place of the fuse.
- Establish conditions in which the test light comes on.

Example:

- Ignition SW on
 - Ignition SW and SW 1 on
 - Ignition SW, SW 1 and Relay on (Connect the Relay) and SW 2 off (or Disconnect SW 2)
- Disconnect and reconnect the connectors while watching the test light. The short lies between the connector where the test light stays lit and the connector where the light goes out.
 - Find the exact location of the short by lightly shaking the problem wire along the body.

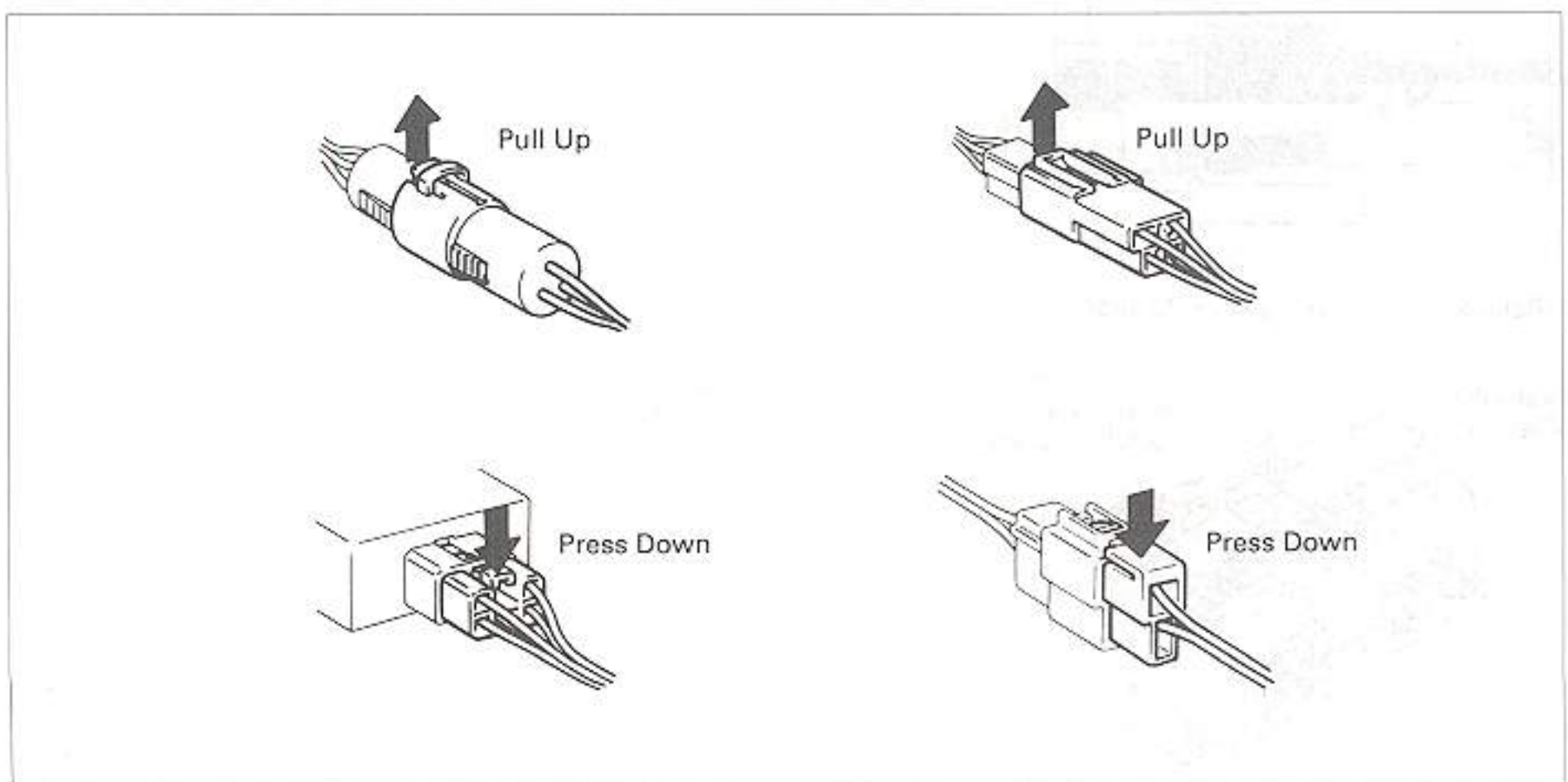
CAUTION:

- Do not open the cover or the case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)
- When replacing the internal mechanism (ECU part) of the digital meter, be careful that no part of your body or clothing comes in contact with the terminals of leads from the IC, etc. of the replacement part (spare part).

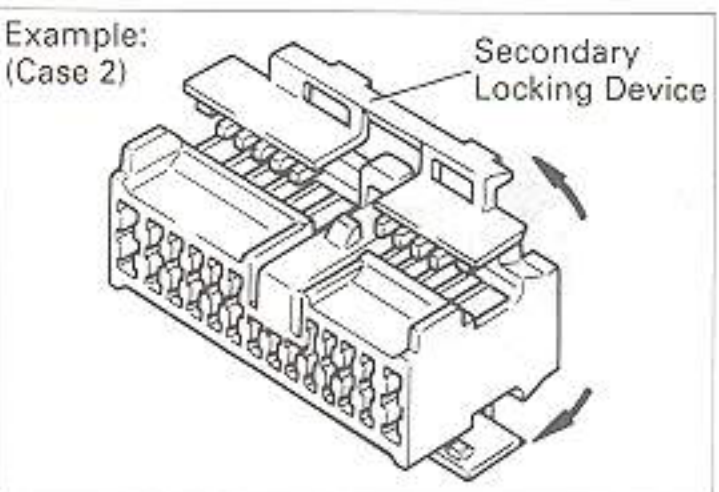
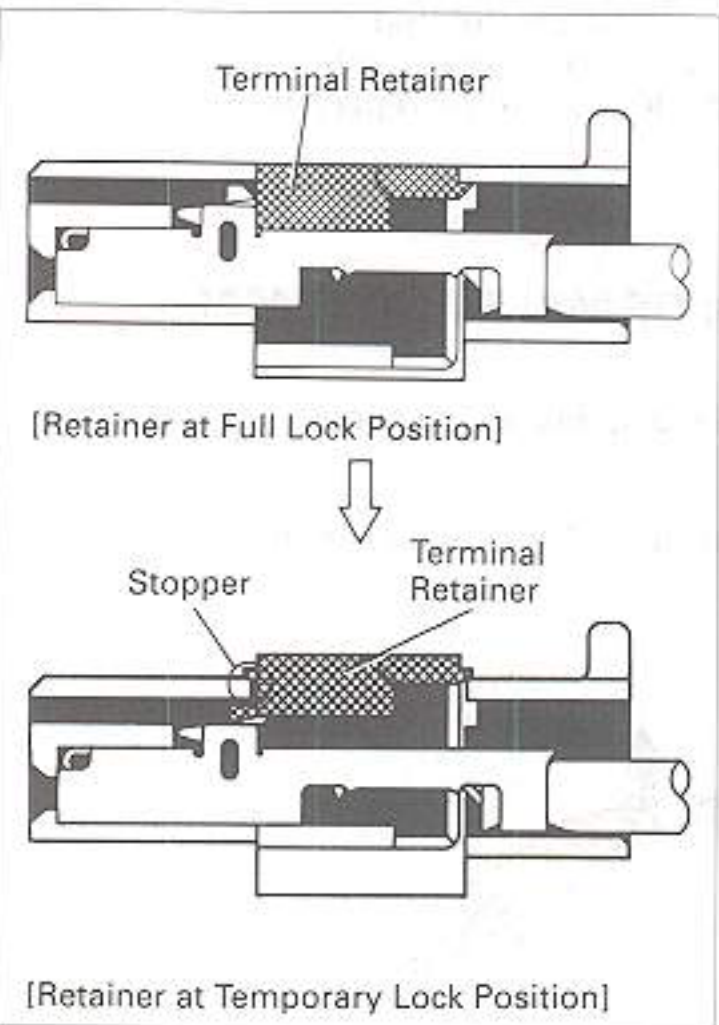
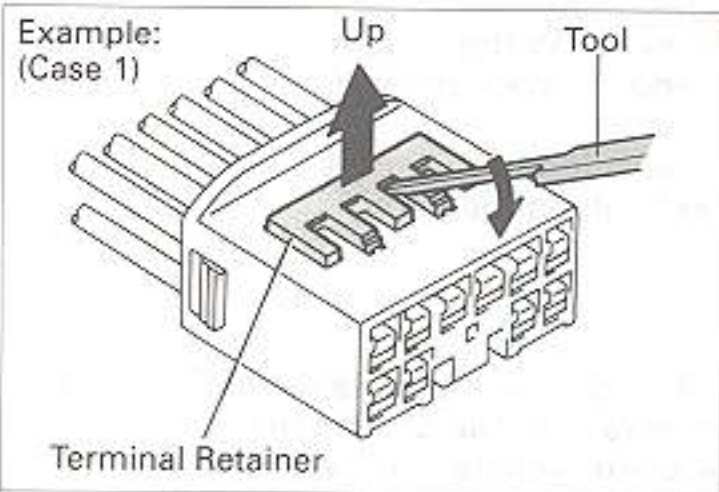
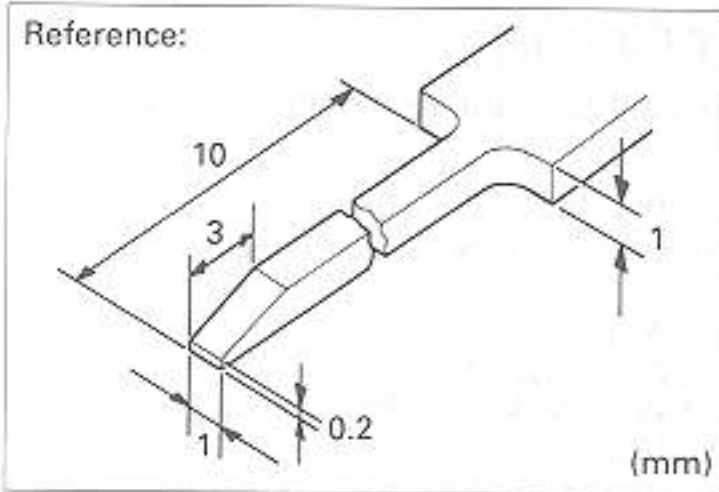
DISCONNECTION OF MALE AND FEMALE CONNECTORS

To pull apart the connectors, pull on the connector itself, not the wire harness.

HINT: Check to see what kind of connector you are disconnecting before pulling apart.



C TROUBLESHOOTING



HOW TO REPLACE TERMINAL (with terminal retainer or secondary locking device)

1. PREPARE THE SPECIAL TOOL

HINT: To remove the terminal from the connector, please construct and use the special tool or like object shown on the left.

2. DISCONNECT CONNECTOR

3. DISENGAGE THE SECONDARY LOCKING DEVICE OR TERMINAL RETAINER.

(a) Locking device must be disengaged before the terminal locking clip can be released and the terminal removed from the connector.

(b) Use a special tool or the terminal pick to unlock the secondary locking device or terminal retainer.

NOTICE:

Do not remove the terminal retainer from connector body.

Ⓐ For Non-Waterproof Type Connector

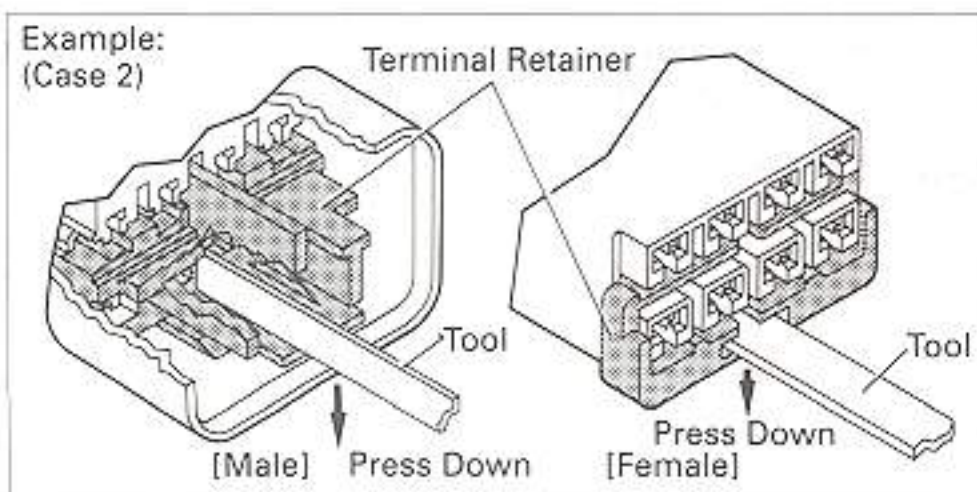
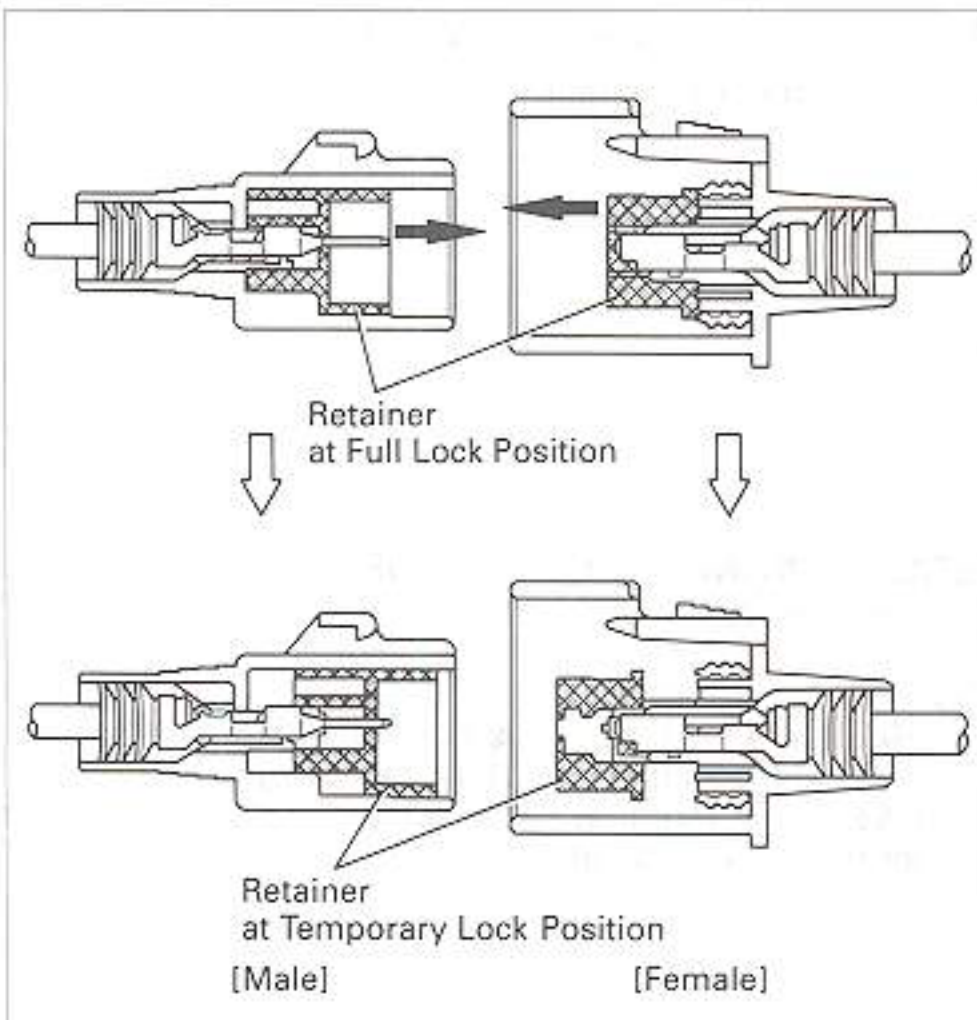
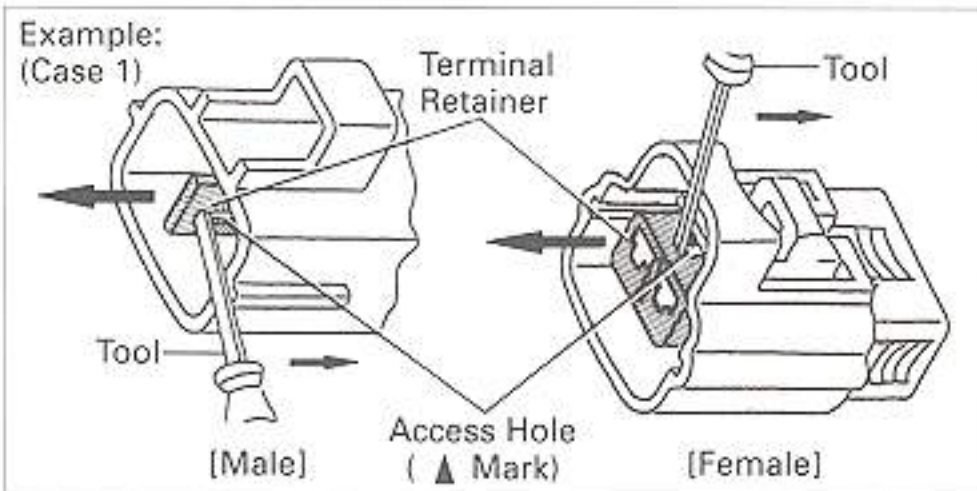
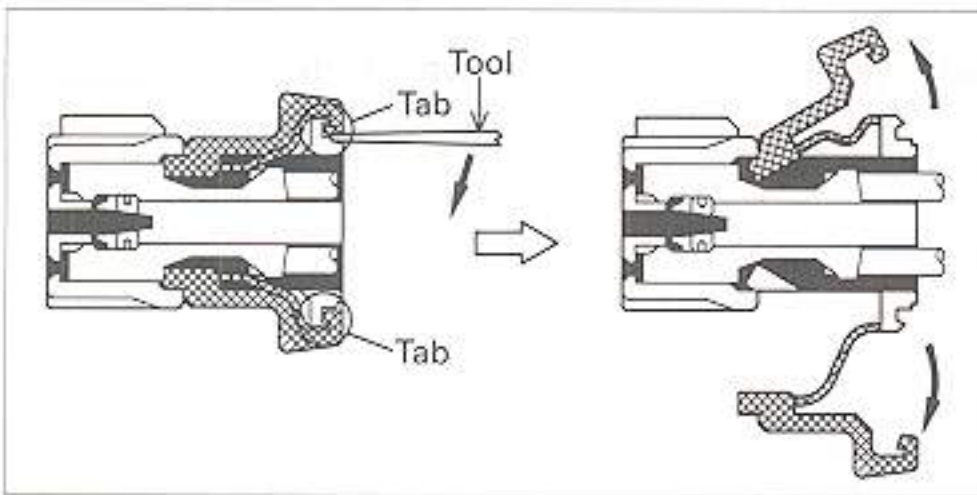
HINT: The needle insertion position varies according to the connector's shape (number of terminals etc.), so check the position before inserting it.

"Case 1"

Raise the terminal retainer up to the temporary lock position.

"Case 2"

Open the secondary locking device.



ⓑ For Waterproof Type Connector

HINT: Terminal retainer color is different according to connector body.

Example:

Terminal Retainer	Connector Body
Black or White	: Gray
Black or White	: Dark Gray
Gray or White	: Black

"Case 1"

Type where terminal retainer is pulled up to the temporary lock position (Pull Type).

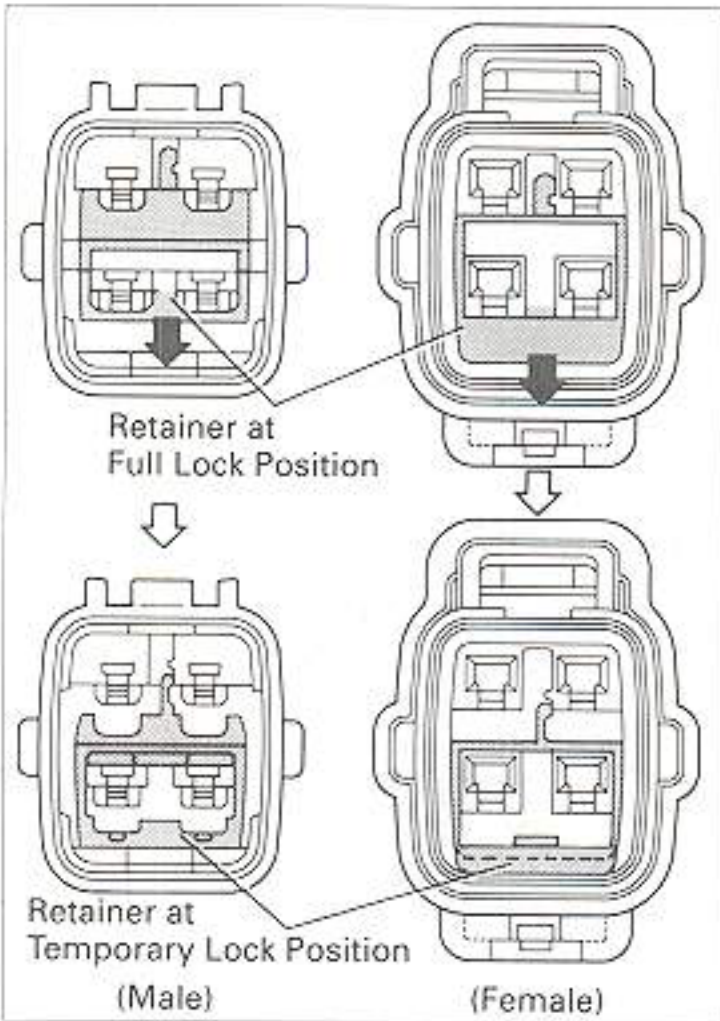
Insert the special tool into the terminal retainer access hole (▲Mark) and pull the terminal retainer up to the temporary lock position.

HINT: The needle insertion position varies according to the connector's shape (Number of terminals etc.), so check the position before inserting it.

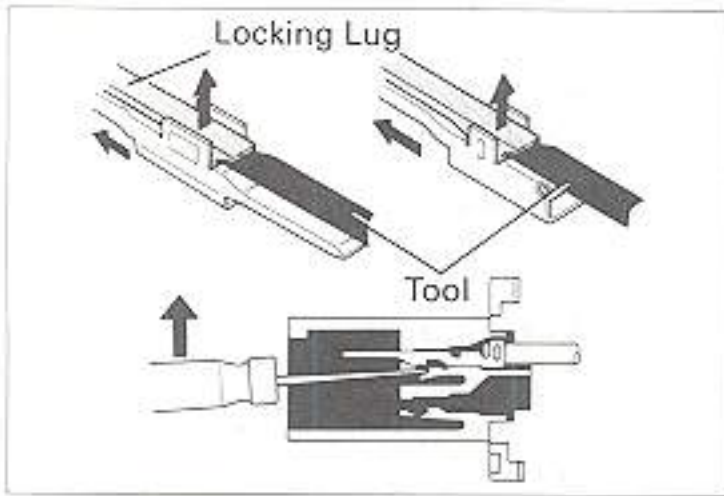
"Case 2"

Type which cannot be pulled as far as Power Lock insert the tool straight into the access hole of terminal retainer as shown.

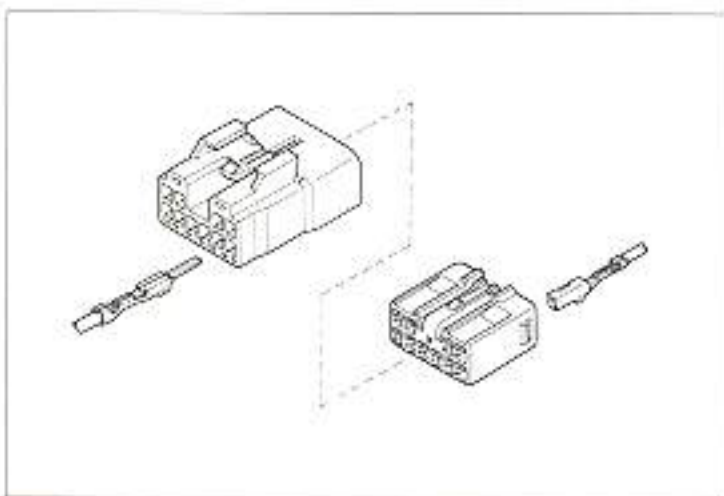
C TROUBLESHOOTING



Push the terminal retainer down to the temporary lock position.



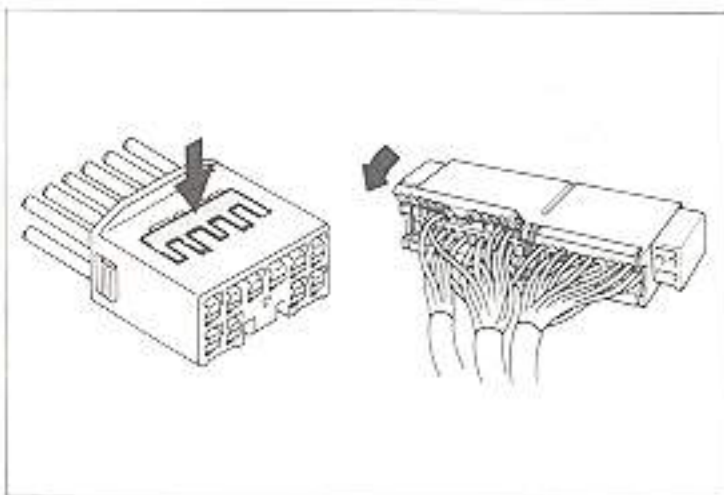
(c) Release the locking lug from terminal and pull the terminal out from rear.



4. INSTALL TERMINAL TO CONNECTOR
- (a) Insert the terminal.

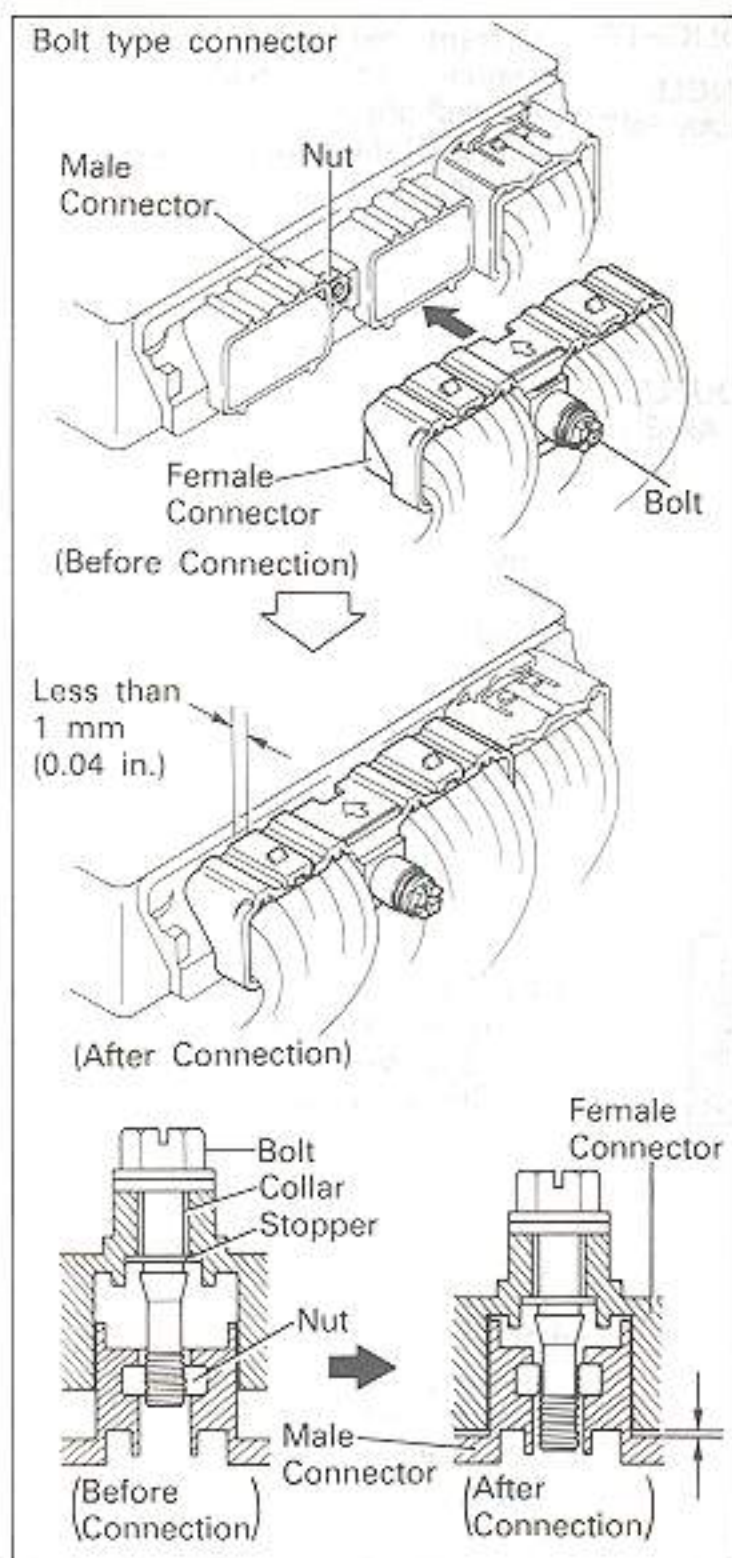
HINT:

1. Make sure the terminal is positioned correctly.
2. Insert the terminal until the locking lug locks firmly.
3. Insert the terminal with terminal retainer in the temporary lock position.



(b) Push the secondary locking device or terminal retainer in to the full lock position.

5. CONNECT CONNECTOR



DISCONNECTION AND CONNECTION OF BOLT TYPE CONNECTORS

For engine control module (engine and electronically controlled transmission ECU) in this vehicle, connectors are used which require a bolt built into the connector to be screwed down to securely connect the connector.

1. Disconnect the connector

After completely loosening the bolt, the two parts of the connector can be separated.

NOTICE:

Do not pull the wire harness when disconnecting the connector.

2. Connect the connector

NOTICE:

Before connecting the connector, always check that the terminals are not bent or damaged.

- (a) Match the guide section of the male connector correctly with the female connector, then press them together.

- (b) Tighten the bolt.

Make sure the connectors are completely connected, by tightening the bolt until there is a clearance of less than 1 mm (0.04 in.) between the bottom of male connector and the end of female connector.

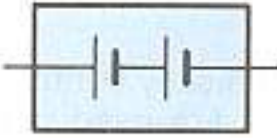






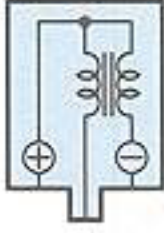












ABBREVIATIONS

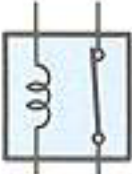
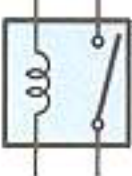

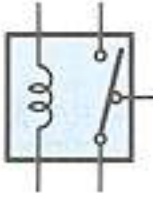



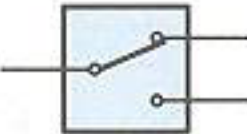
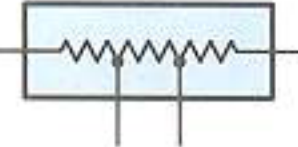
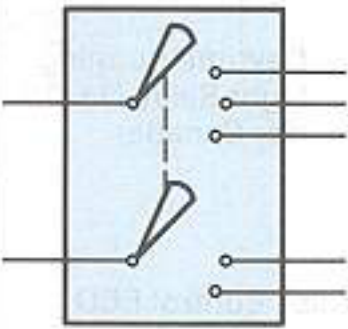

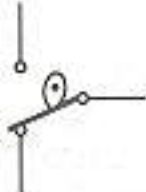

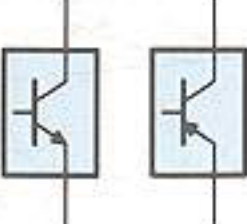





The following abbreviations are used in this manual.

ABS	= Anti-Lock Brake System	O/D	= Overdrive
A/C	= Air Conditioning	PPS	= Progressive Power Steering
ACIS	= Acoustic Control Induction System	R/B	= Relay Block
A/T	= Automatic Transmission	RH	= Right-Hand
COMB.	= Combination	SFI	= Sequential Multiport Fuel Injection
ECU	= Electronic Control Unit	SRS	= Supplemental Restraint System
EFI	= Electronic Fuel Injection	SW	= Switch
EGR	= Exhaust Gas Recirculation	TDCL	= Toyota Diagnostic Communication Link
EVAP	= Evaporative Emission	TEMP.	= Temperature
ISC	= Idle Speed Control	TRAC	= Traction Control System
J/B	= Junction Block	VSV	= Vacuum Switching Valve
LH	= Left-Hand	w/	= With
M/T	= Manual Transmission	w/o	= Without

* The titles given inside the components are the names of the terminals (terminal codes) and are not treated as being abbreviations.

E GLOSSARY OF TERMS AND SYMBOLS

 <p>BATTERY Stores chemical energy and converts it into electrical energy. Provides DC current for the auto's various electrical circuits.</p>	 <p>HEADLIGHTS 1. SINGLE FILAMENT Current flow causes a headlight filament to heat up and emit light. A headlight may have either a single (1) filament or a double (2) filament.</p>
 <p>CAPACITOR (Condenser) A small holding unit for temporary storage of electrical voltage.</p>	 <p>2. DOUBLE FILAMENT</p>
 <p>CIGARETTE LIGHTER An electric resistance heating element.</p>	 <p>HORN An electric device which sounds a loud audible signal.</p>
 <p>CIRCUIT BREAKER Basically a reusable fuse, a circuit breaker will heat and open if too much current flows through it. Some units automatically reset when cool, others must be manually reset.</p>	 <p>IGNITION COIL Converts low-voltage DC current into high-voltage ignition current for firing the spark plugs.</p>
 <p>DIODE A semiconductor which allows current flow in only one direction.</p>	
 <p>DIODE, ZENER A diode which allows current flow in one direction but blocks reverse flow only up to a specific voltage. Above that potential, it passes the excess voltage. This acts as a simple voltage regulator.</p>	 <p>LIGHT Current flow through a filament causes the filament to heat up and emit light.</p>
 <p>DISTRIBUTOR, IIA Channels high-voltage current from the ignition coil to the individual spark plugs.</p>	 <p>LED (LIGHT EMITTING DIODE) Upon current flow, these diodes emit light without producing the heat of a comparable light.</p>
 <p>FUSE A thin metal strip which burns through when too much current flows through it, thereby stopping current flow and protecting a circuit from damage.</p>  <p>FUSIBLE LINK A heavy-gauge wire placed in high amperage circuits which burns through on overloads, thereby protecting the circuit. The numbers indicate the cross-section surface area of the wires.</p>  <p>(for High Current Fuse or Fusible Link)</p>	 <p>METER, ANALOG Current flow activates a magnetic coil which causes a needle to move, thereby providing a relative display against a background calibration.</p>
	 <p>METER, DIGITAL Current flow activates one or many LED's, LCD's, or fluorescent displays, which provide a relative or digital display.</p>
 <p>GROUND The point at which wiring attaches to the Body, thereby providing a return path for an electrical circuit; without a ground, current cannot flow.</p>	 <p>MOTOR A power unit which converts electrical energy into mechanical energy, especially rotary motion.</p>

<p>RELAY</p>  <p>1. NORMALLY CLOSED</p>  <p>2. NORMALLY OPEN</p>	<p>SPEAKER</p> <p>An electromechanical device which creates sound waves from current flow.</p> 
 <p>RELAY, DOUBLE THROW</p> <p>A relay which passes current through one set of contacts or the other.</p>	<p>SWITCH, MANUAL</p>  <p>1. NORMALLY OPEN</p>  <p>2. NORMALLY CLOSED</p> <p>Opens and closes circuits, thereby stopping (1) or allowing (2) current flow.</p>
 <p>RESISTOR</p> <p>An electrical component with a fixed resistance, placed in a circuit to reduce voltage to a specific value.</p>	 <p>SWITCH, DOUBLE THROW</p> <p>A switch which continuously passes current through one set of contacts or the other.</p>
 <p>RESISTOR, TAPPED</p> <p>A resistor which supplies two or more different non adjustable resistance values.</p>	 <p>SWITCH, IGNITION</p> <p>A key operated switch with several positions which allows various circuits, particularly the primary ignition circuit, to become operational.</p>
 <p>RESISTOR, VARIABLE or RHEOSTAT</p> <p>A controllable resistor with a variable rate of resistance. Also called a potentiometer or rheostat.</p>	 <p>SWITCH, WIPER PARK</p> <p>Automatically returns wipers to the stop position when the wiper switch is turned off.</p>
 <p>SENSOR (Thermistor)</p> <p>A resistor which varies its resistance with temperature.</p>	 <p>TRANSISTOR</p> <p>A solidstate device typically used as an electronic relay; stops or passes current depending on the voltage applied at "base".</p>
 <p>SENSOR, ANALOG SPEED</p> <p>Uses magnetic impulses to open and close a switch to create a signal for activation of other components.</p>	<p>WIRES</p>  <p>(1) NOT CONNECTED</p>  <p>(2) SPLICED</p> <p>Wires are always drawn as straight lines on wiring diagrams. Crossed wires (1) without a black dot at the junction are not joined; crossed wires (2) with a black dot or octagonal (○) mark at the junction are spliced (joined) connections.</p>
 <p>SHORT PIN</p> <p>Used to provide an unbroken connection within a junction block.</p>	
 <p>SOLENOID</p> <p>An electromagnetic coil which forms a magnetic field when current flows, to move a plunger, etc.</p>	