1. Basic Diagnostic Procedure

A: BASIC PROCEDURES

1. GENERAL DESCRIPTION

The most important purpose of diagnostics is to quickly determine which fault is the root cause of the symptom, to save time and labor.

2. IDENTIFICATION OF TROUBLE CAUSE

1) Using the diagnostics, narrow down the causes.
2) Refer to the wiring diagram and check the system's circuit. If necessary, use a voltmeter, ohmmeter, etc.
3) Before replacing component parts, check for fuse blowout, open wiring harness on the power supply circuit and the ground circuit, and poor connectors, switches, relays, etc. If no problem is encountered, check the component parts.

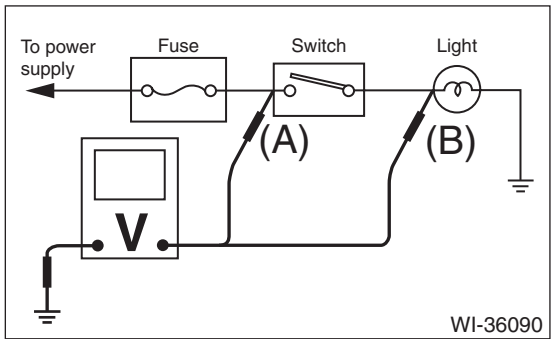
3. SYSTEM OPERATION CHECK

After inspection and repair, ensure that the system operates properly.

B: BASIC INSPECTION

1. VOLTAGE MEASUREMENT

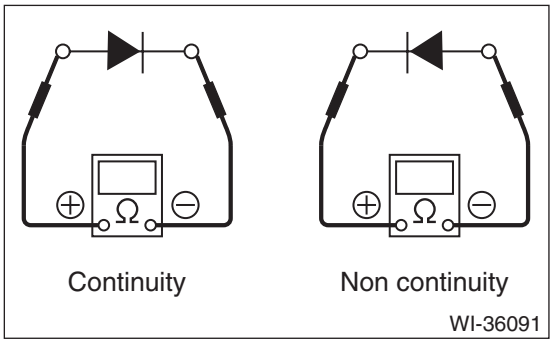
1) Using a voltmeter, connect the negative lead to a good ground point or negative battery terminal. Connect the positive lead to the connector or component terminal.
2) Contact the positive lead of the voltmeter on connector (A). The voltmeter will indicate a voltage.
3) Shift the positive lead contacting the connector (A) to the connector (B). The voltmeter will indicate no voltage.
4) Turn the switch to ON with the positive lead contacting the connector (B).
The voltmeter will indicate a voltage and, at the same time, the light will illuminate.
5) The circuit is normal. If a problem such as a light failing to illuminate occurs, use the procedures above to track down the malfunction.



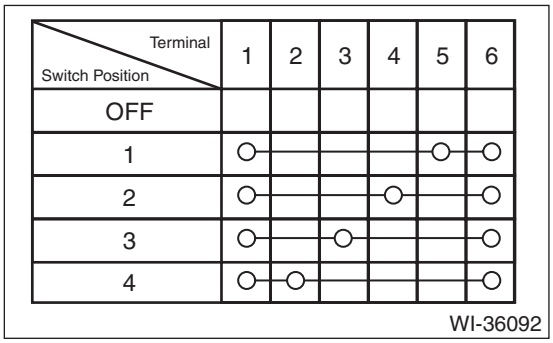
2. CONTINUITY CHECK

1) Disconnect the battery terminal or connector so there is no voltage between the check points.
Contact the leads of an ohmmeter between the check points, and check that there is continuity.
2) When checking the diode continuity using an ohmmeter, allow the positive lead to contact the diode positive side and the negative lead to the negative side. At this time, there must be continuity. Also, when contacting the leads in reverse, there should be no continuity.

NOTE:
Some testers have reverse polarity, therefore, refer to the instruction manual of the tester.

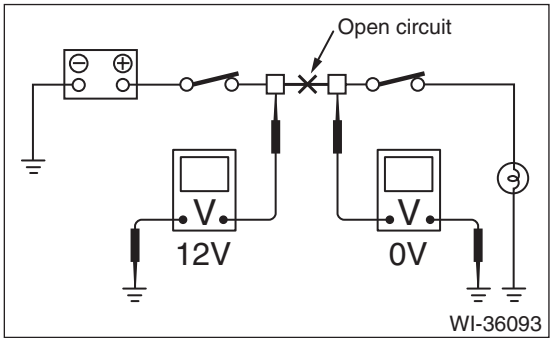


3) When checking switch continuity using an ohmmeter, perform the check while the switch operates. For example, when a switch position is at 3, continuity exists among terminals 1, 3 and 6, as shown below.

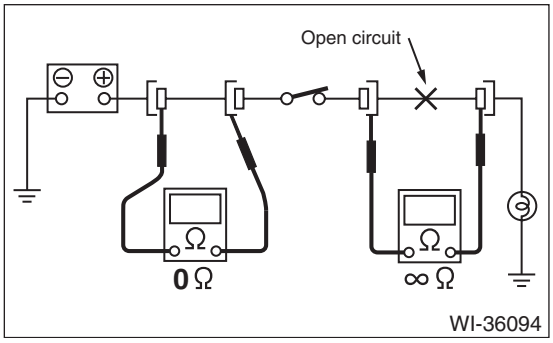


3. HOW TO IDENTIFY AN OPEN CIRCUIT

1) With voltmeter:
An open circuit is determined by measuring the voltage between respective connectors and ground using a voltmeter, starting with the connector closest to the power supply. The power supply must be turned ON so that current flows in the circuit. If voltage is not present between a particular connector and ground, the circuit between that connector and the previously checked point is open.

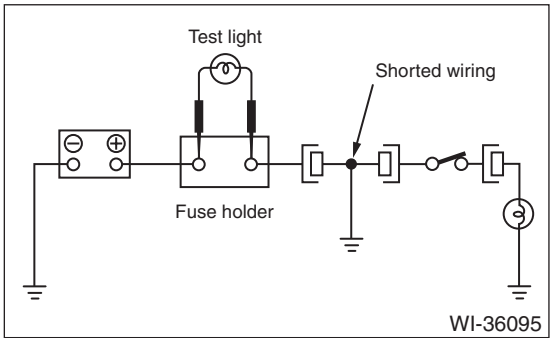


2) With ohmmeter:
Disconnect all connectors affected, and check continuity in the harness between adjacent connectors. When the ohmmeter indicates “infinite”, the harness is open.

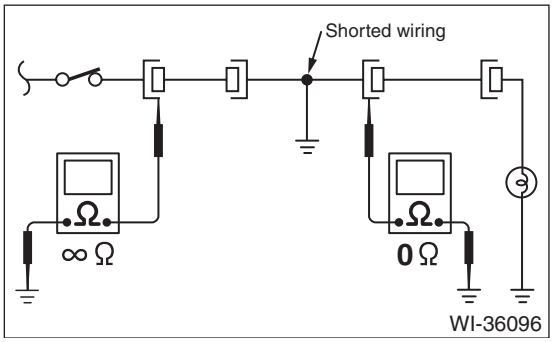


4. HOW TO DETERMINE A SHORT CIRCUIT

1) With test light:
Connect a test light (rated at approx. 3 watts) in place of the blown fuse and allow current to flow through the circuit. Disconnect one connector at a time. At that time, always start with the connector located farthest from the power supply. If the test light goes out when a connector is disconnected, the harness between that connector and the next connector (farther from the power supply) is shorted.



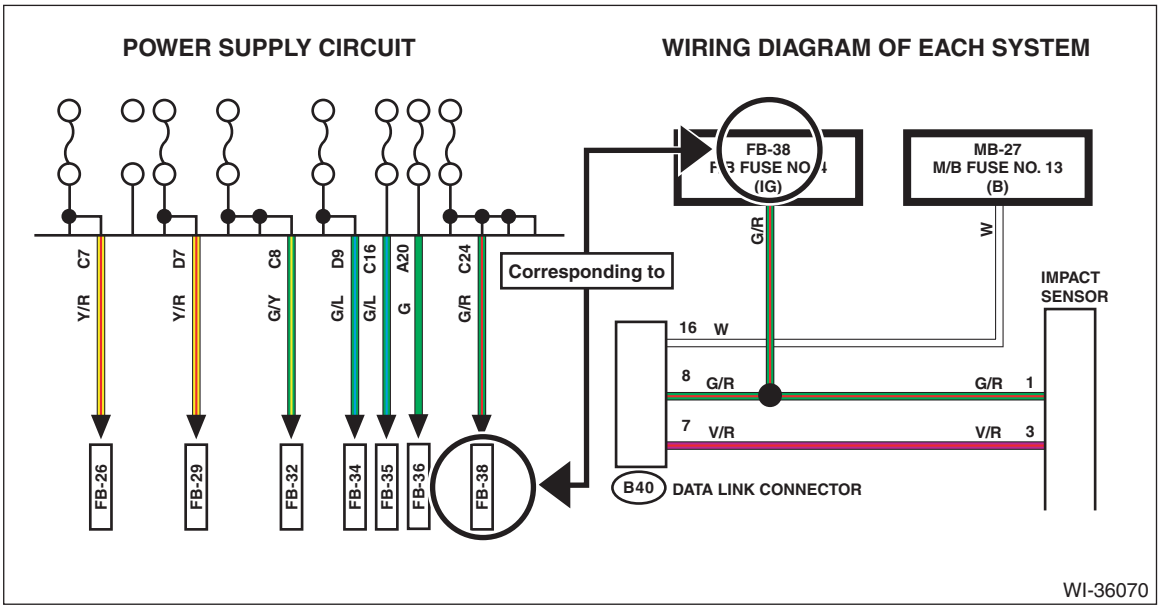
2) With ohmmeter:
Disconnect all affected connectors, and check continuity between each connector and ground. When the ohmmeter indicates continuity between a particular connector and a ground, that connector is shorted.



C: HOW TO READ WIRING DIAGRAMS

1. POWER SUPPLY CIRCUIT

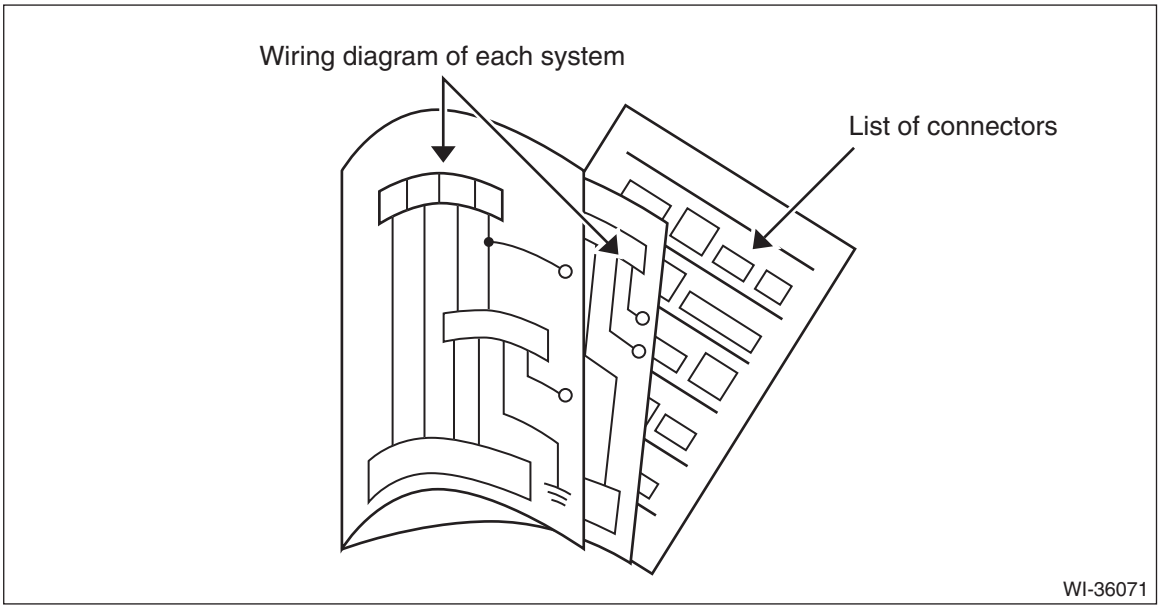
Circuits are described to indicate the power supply in the wiring diagram of each system. “MB-5”, “MB-6”, etc., which are used as power-supply symbols throughout the text, correspond with those shown in the “DC POWER SUPPLY CIRCUIT” in the wiring diagram of each system. Accordingly, using the DC power supply circuit and the wiring diagram of each system permits service personnel to understand the entire electrical arrangement of the system.



2. WIRING DIAGRAM OF EACH SYSTEM

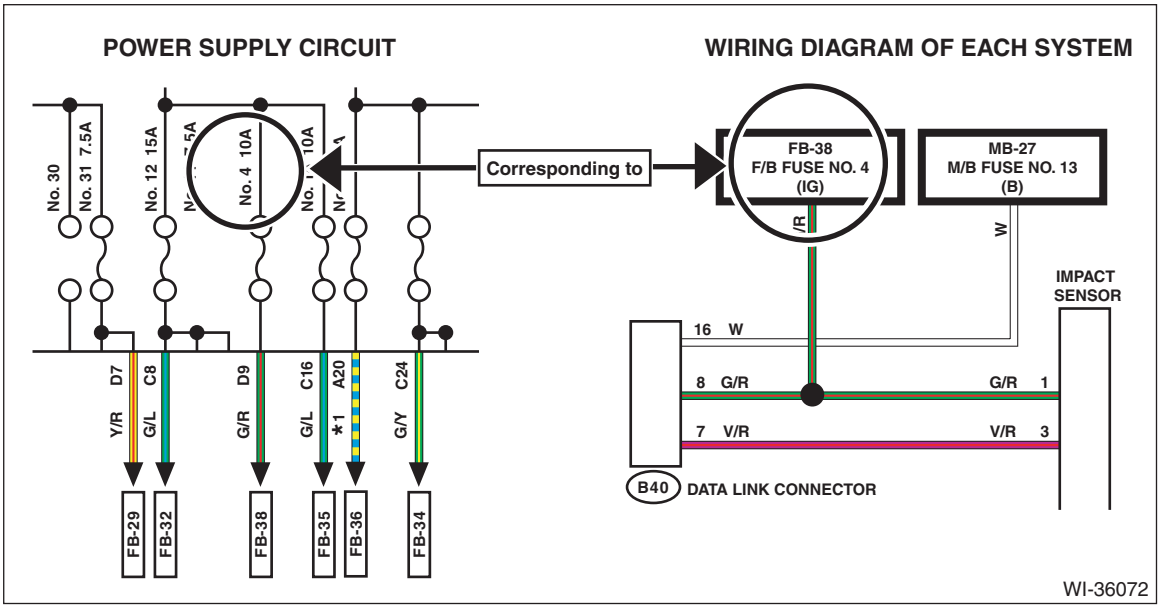
1. **Structure**

After the wiring diagram of each system, a list of connectors used in the system is described.



2. **Fuse No. & rating**

The “Fuse No. & rating” is the same description as that in the DC power supply circuit, and corresponds with that used in the vehicle.

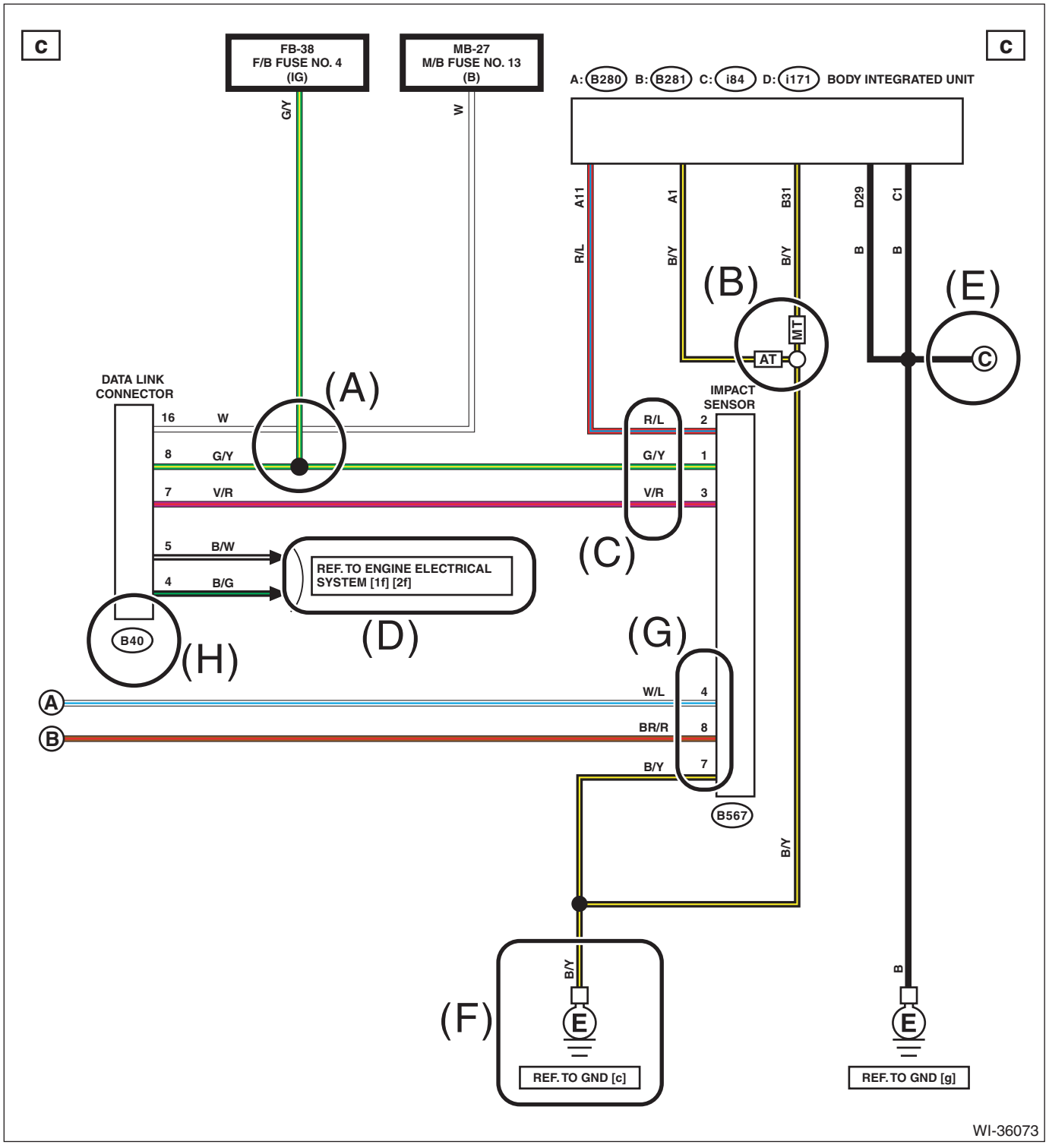


3. **Wiring diagram of each system**

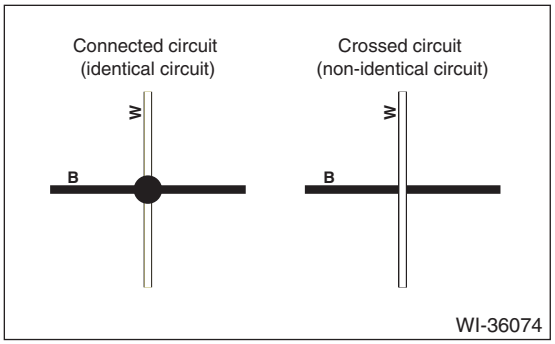
To help figure out the route from the DC power supply circuit, wiring diagrams are classified and described in each system.

NOTE:

This manual includes harness information. Information of parts that are not routed via harness and adapter code is described as a reference. If no information is described in this manual, refer to each section.



- (A): Wire connection and crossing in a circuit



- (B): Classification by specifications

If a circuit differs from another circuit according to vehicle specifications, the specification difference is indicated with abbreviations.

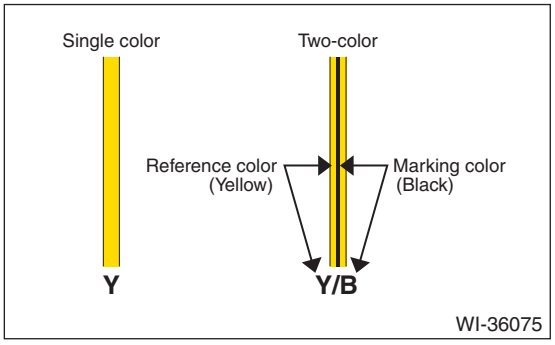
- (C): Color code

Indicates the color of harness and connector housing.

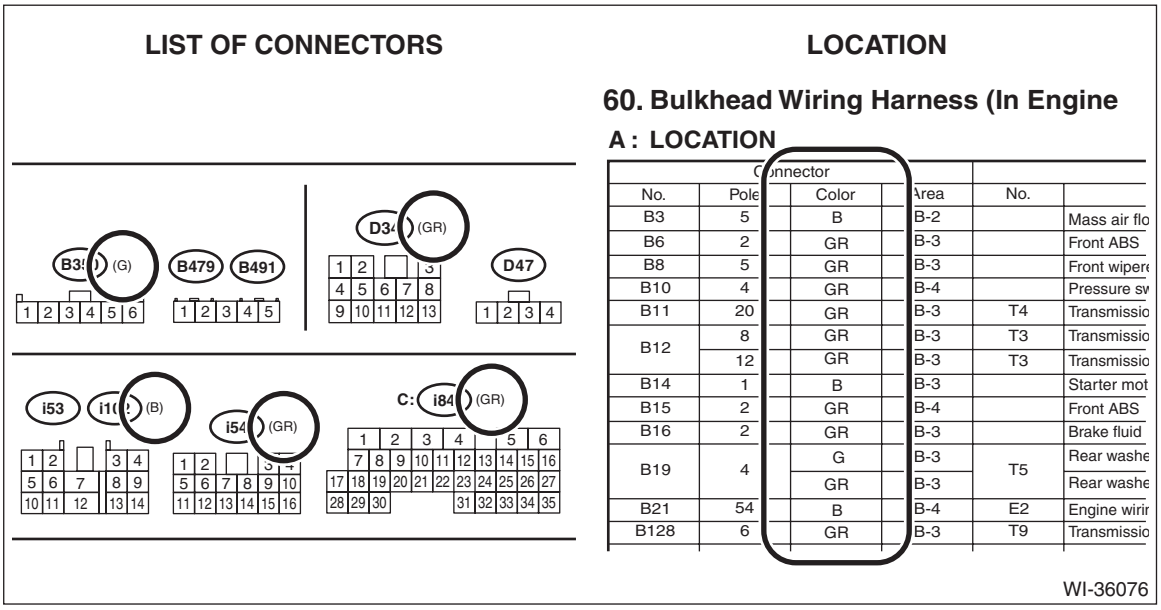
Color code	Color	Color code	Color	Color code	Color
B	Black	S	Shield line	GR	Gray
G	Green	V	Violet	LG	Light green
L	Blue	W	White	SB	Sky blue
O	Orange	Y	Yellow	★	White or natural color
P	Pink	BE	Beige		
R	Red	BR	Brown		

(Color code of harness)

Single color is indicated with a color code, and double colors are indicated with “standard color / marking color”.



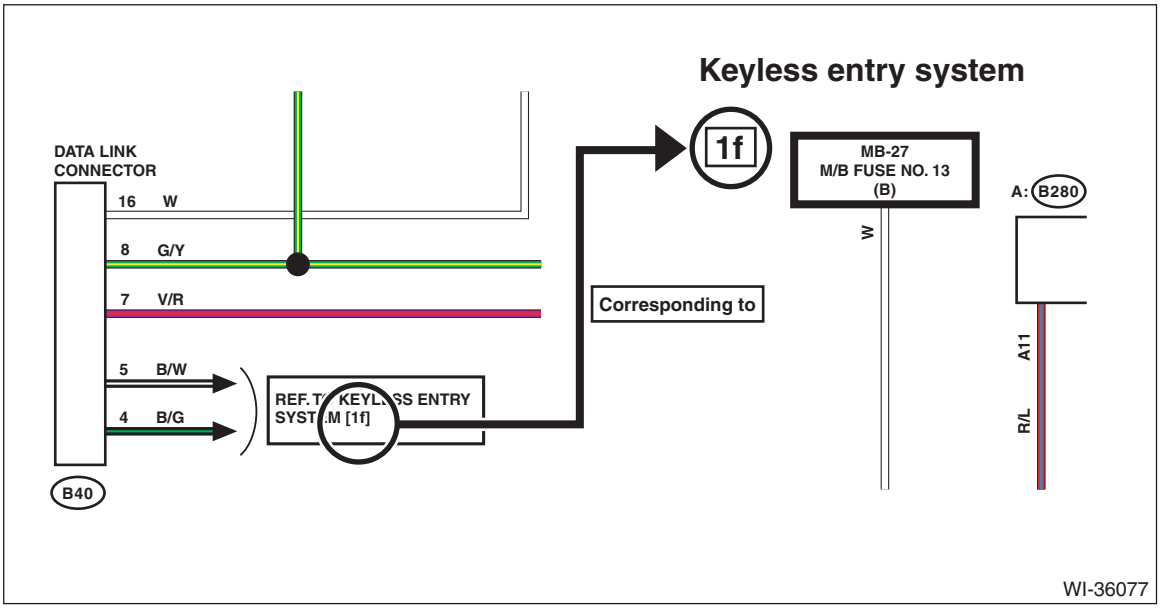
(Color code of connector housing)
Used in the connector list and the locations.



Connector No.	Pole	Color	Area	No.	
B3	5	B	B-2		Mass air flo
B6	2	GR	B-3		Front ABS
B8	5	GR	B-3		Front wiper
B10	4	GR	B-4		Pressure sw
B11	20	GR	B-3	T4	Transmissio
B12	8	GR	B-3	T3	Transmissio
	12	GR	B-3	T3	Transmissio
B14	1	B	B-3		Starter mot
B15	2	GR	B-4		Front ABS
B16	2	GR	B-3		Brake fluid
B19	4	G	B-3	T5	Rear washe
		GR	B-3		Rear washe
B21	54	B	B-4	E2	Engine wirir
B128	6	GR	B-3	T9	Transmissio

- (D): Connection to another system in the same circuit

Indicates the connecting to with alphanumeric characters, which correspond to the descriptions shown on the upper section of each page.

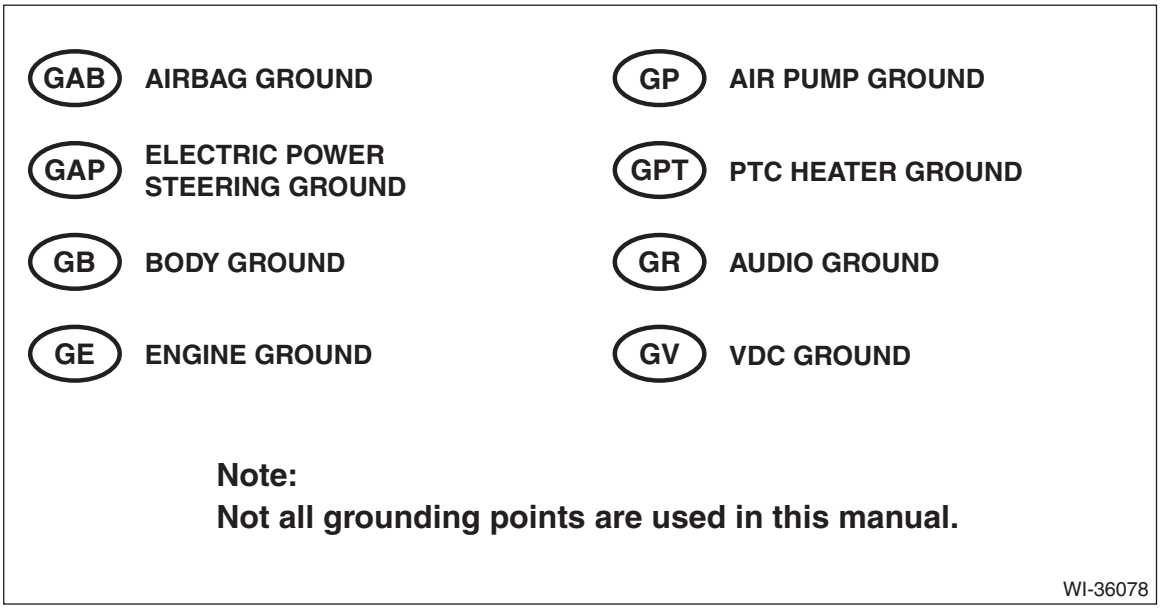


- (E): Connections in the system

Indicates with alphabetic characters, which correspond to the same alphabetic characters shown in the following pages.

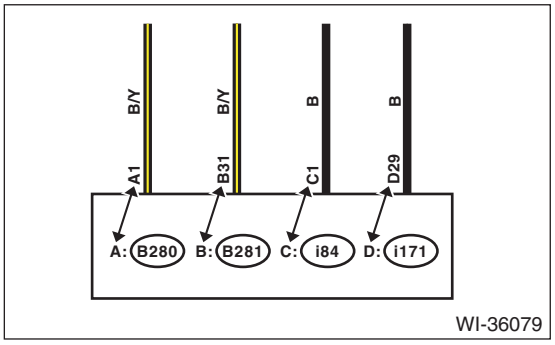
• (F): Ground

The ground points shown in the ground circuit refer to the following, which correspond to the locations.



• (G): Terminal No.

Indicates the terminal number of the connector to be connected. If several connectors are connected to a component, they are identified with alphabetic characters.



• (H): Connector No.

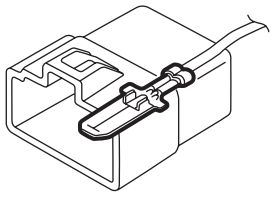
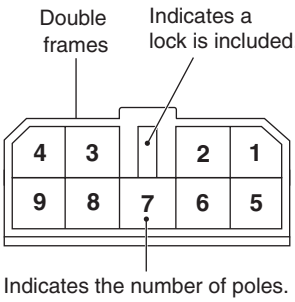
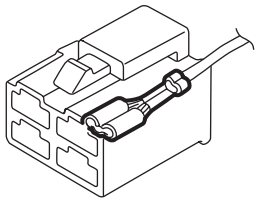
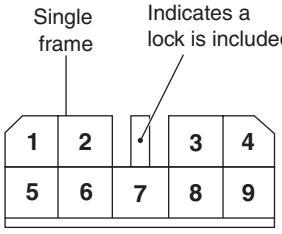
The first alphabetic characters of the connector number correspond with the following symbols that indicate harnesses or systems.

Symbol	Harness/cord	Symbol	Harness/cord
AB	Airbag wiring harness	F	Front wiring harness
AD	Adapter cord		Generator cord
AT/T	Transmission cord	i	Instrument panel Wiring harness
B	Bulkhead wiring harness		
D	Door cord / Rear gate code	R	Rear wiring harness
E	Engine wiring harness		Fuel cord / Roof cord
	Oxygen sensor cord		Rear gate cord / Trunk lid cord
ST	Steering cord		

4. **Connector**

The following shows the connector shape, lock position, connection and terminal number that are used in this manual.

For connector shape, refer to the list of connectors.

Connector used in vehicle	Connector shown in wiring diagram		
	Connector sketch	Wiring diagram symbol	Terminal arrangement order
 Male connector			Numbered in order from upper right to lower left.
 Female connector			Numbered in order from upper left to lower right.

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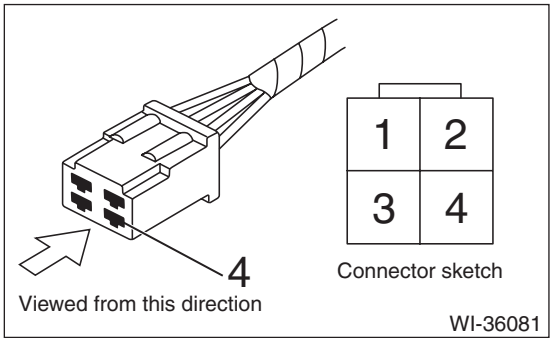
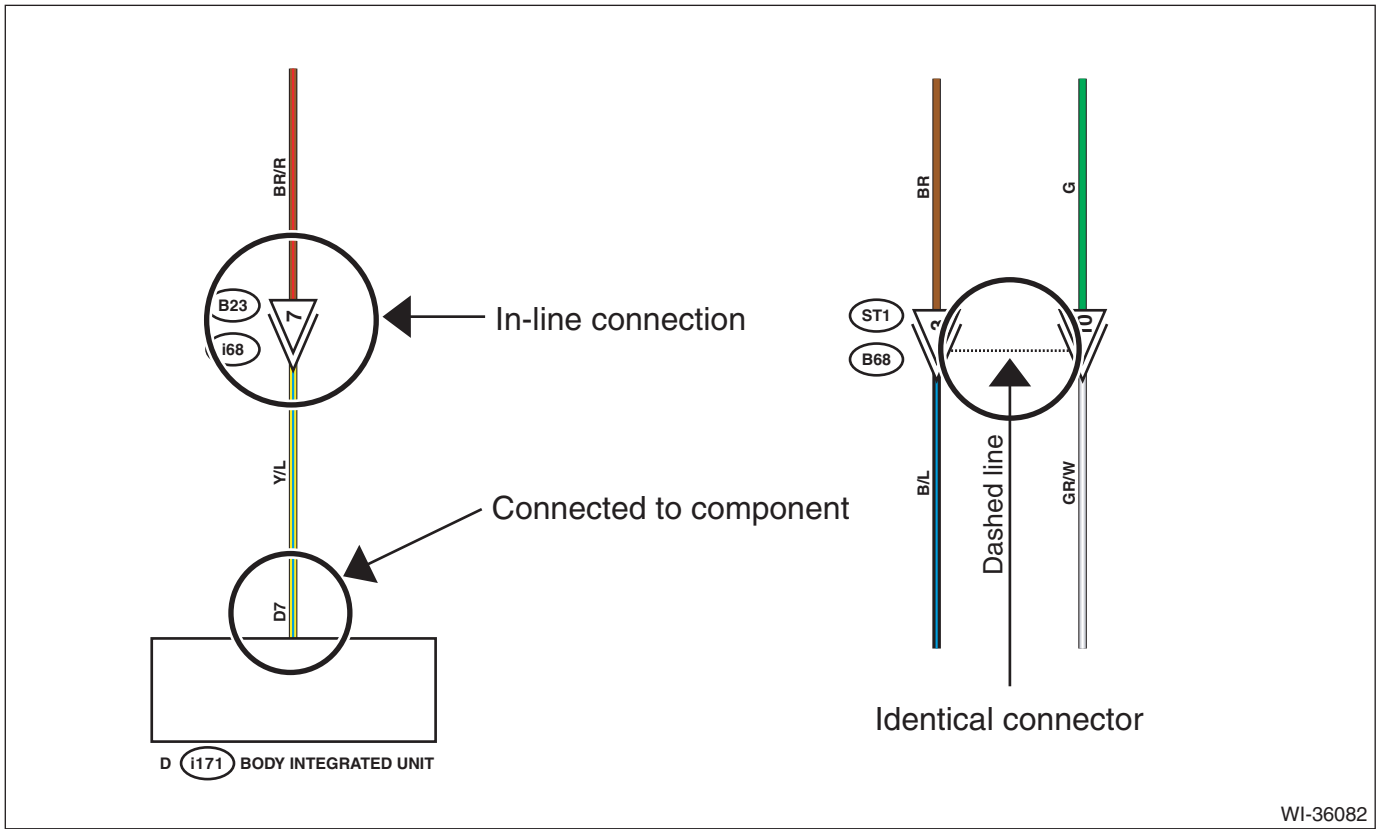
- The sketch of the connector and the terminal number are indicated in a disconnected state which is viewed from the terminal side.

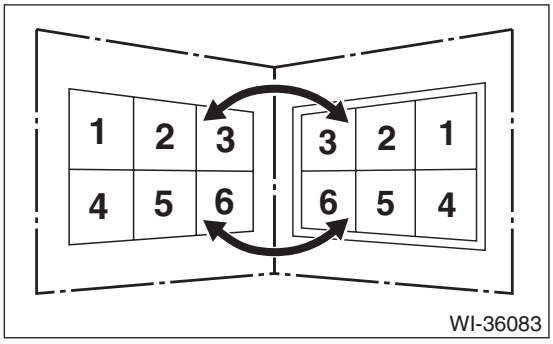


- The sketch of the connector described in the list of connectors usually indicates a female connector.

• The connector used in the wiring diagram of the system indicates only the intermediate connection, therefore, no parts, J/Cs and grounds are described. In addition, if the different circuits are connected with the same connector, a dot line is used to indicate that these are the same.



• When connecting the connector, the terminals with the same number are jointed. When the connector is disconnected, the terminal location is symmetrical.



3. LOCATION

In this manual, the location is classified in each harness, and the connector location is indicated using coordinates.

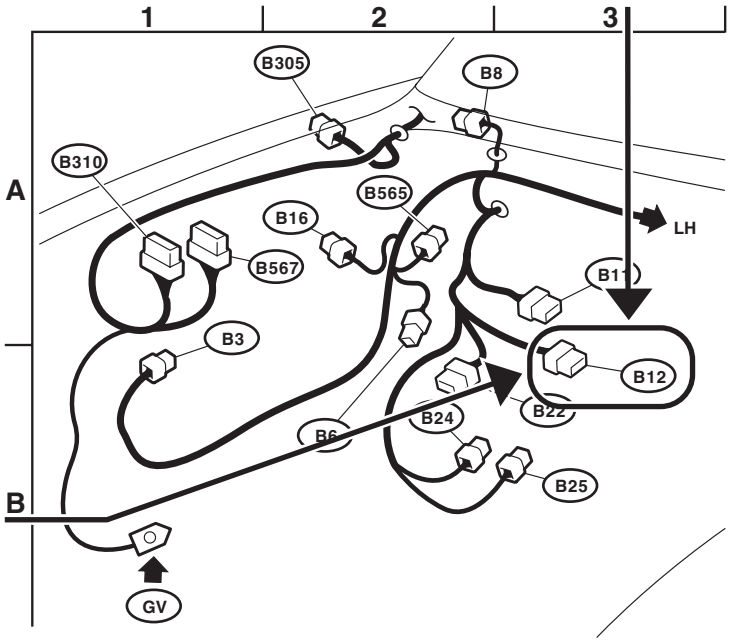
CONNECTOR LOCATION CHART

60. Bulkhead Wiring Harness (In Engine Com

A : LOCATION

Connector					
No.	Pole	Color	Area	No.	
B3	5	B	B-2		Mass air fl
B6	2	GR	B-3		Front ABS
B8	5	GR	B-3		Front wiper
B10	4	GR	B-4		Pressure s
B11	20	GR	B-3	T4	Transmissi
B12	8	GR	B-3	T3	Transmissi
	12	GR	B-3	T3	Transmissi
B14	1	B			Starter mo
B15	2	GR			Front ABS
B16	2	GR			Brake fluid
B19	4	G	B-3	T5	Rear wash
		GR	B-3		Rear wash
B21	54	B	B-4	E2	Engine wir
B128	6	GR	B-3	T9	Transmissi

CONNECTOR LOCATION VIEW



Letters in "Area" corresponds with connector location view.

"B" indicates vertical line and "3" indicates horizontal line in above chart.

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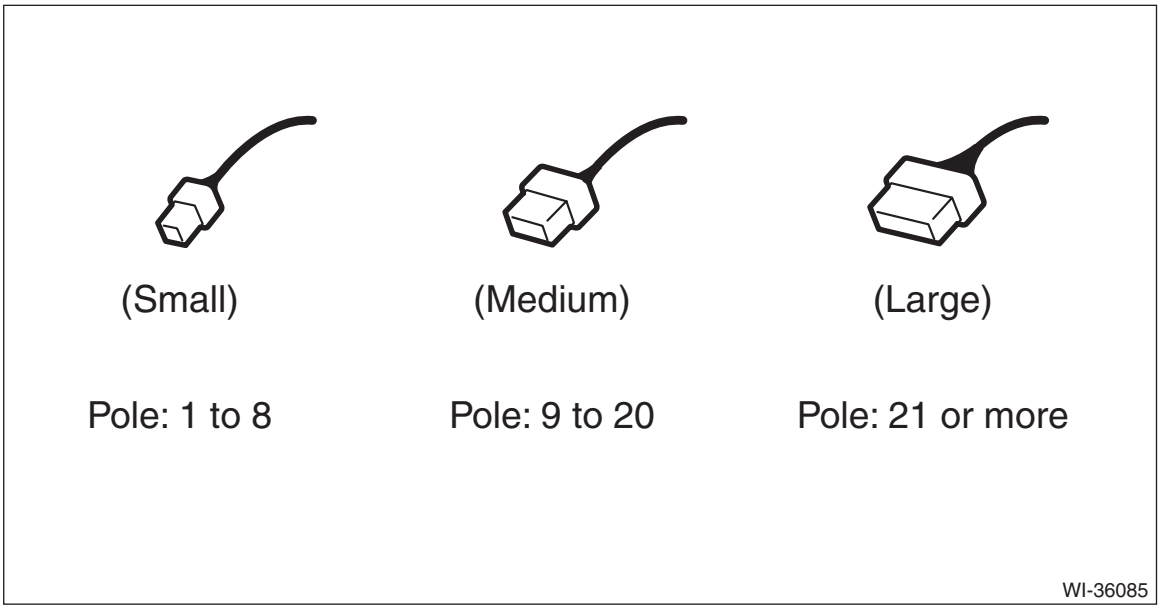
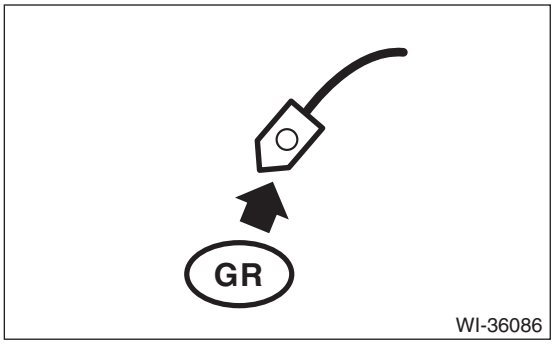
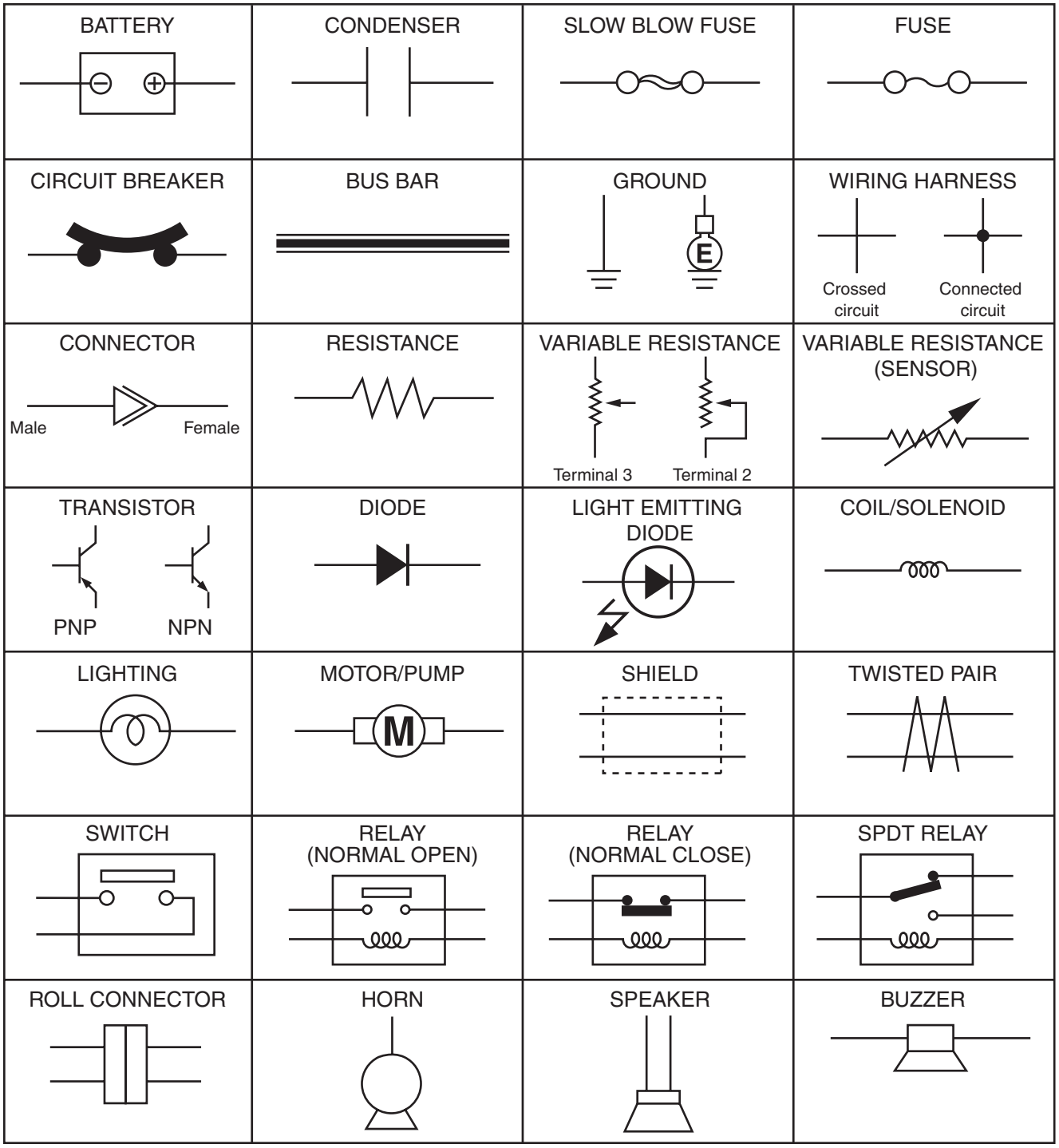
- The following connector symbols are used to easily identify the connectors.



- The ground point is indicated as follows.



4. SYMBOLS IN WIRING DIAGRAMS



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5. ABBREVIATIONS IN THIS MANUAL

Abbr.	Full name
ABS	Anti-lock Brake System
ACC	Accessory
A/C	Air Conditioner
ASSY	Assembly
A/F	Air/Fuel (air fuel ratio sensor)
ATF	Automatic Transmission Fluid
AUX	Auxiliary Audio Input Terminal
AWD	All Wheel Drive
B, BAT	Battery
CAN	Controller Area Network
CL	Close
CM	Control Module
CVT	Continuously Variable Transmission
D	Drive range or Down
DC/DC	Direct Current / Direct Current (converter)
DCCD	Driver's Control Center Differential
DN	Down
E	Ground
ECM	Engine Control Module
EEPROM	Electrically Erasable Programmable Read-Only Memory
EGR	Exhaust Gas Recirculation
ELCM	Evaporative Leak Check Module
F	Front
F/B	Fuse & Relay Box
FL	Front Left
FR	Front Right
G	Gravity (G sensor)
H/L	Headlight
HI	High
I/F	Interface
IG	Ignition
INT	Intermittent
ISO	International Organization for Standardization
J/C	Joint Connector
LCD	Liquid Crystal Display
L, LH	Left Hand
LO	Low
LWR	Lower
M	Motor
M/B	Main Fuse Box
MFD	Multi Function Display
MIST	Wiper for mist
MT	Manual Transmission
N	Neutral Range
OP	Optional Parts or Open
P	Parking or Parking range
PASS	Passing

Abbr.	Full name
R	Reverse Range
RES	Reset
R, RH	Rear or Right Hand
RL	Rear Left
RR	Rear Right
SBF	Slow Blow Fuse
SI-DRIVE	SUBARU Intelligent Drive
ST	Starter
SW	Switch
TCM	Transmission Control Module
TFT	Thin Film Transistor
TPMS	Tire Pressure Monitor System
UP	Up
UPR	Upper
VDC	Vehicle Dynamics Control
WASH	Washer