



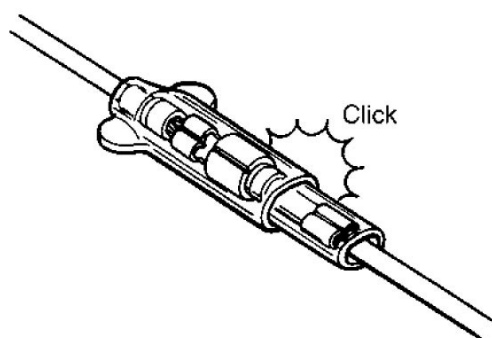
## Precautions for Electrical Circuit Service

When handling the electrical parts or servicing the FI system, observe the following points for the safety of the system.

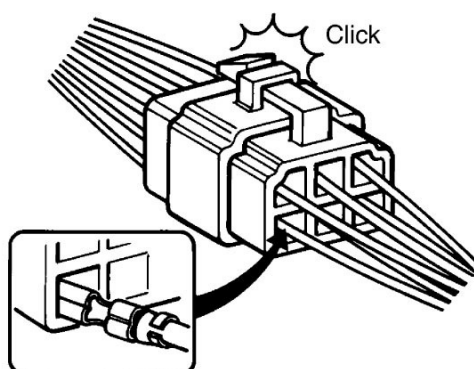
### Electrical Parts

#### Connector / Coupler

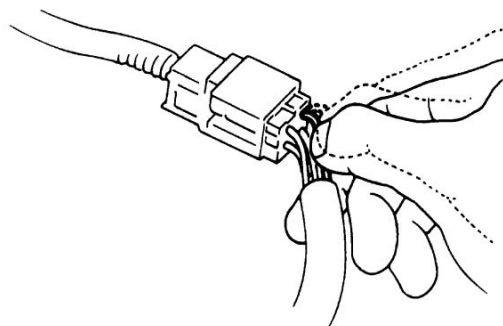
- Faulty FI system is often related to poor electrical contact of connector/coupler. Before servicing individual electronic part, check electrical contact of the connector/coupler.
- When connecting a connector, be sure to push it in until a click is felt.



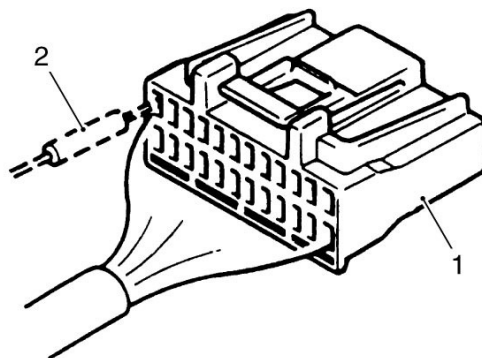
- With a lock type coupler, be sure to release the lock when disconnecting, and push it in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or bending.
- Push in the coupler straightly. An angled or skewed insertion may cause the terminal to be deformed, possibly resulting in poor electrical contact.
- Inspect each terminal for corrosion and contamination. The terminals must be clean and free of any foreign material which could impede proper terminal contact.
- Before refitting the sealed coupler, make sure its seal rubber is positioned properly. The seal rubber may possibly come off the position during disconnecting work and if the coupler is refitted with the seal rubber improperly positioned, it may result in poor water sealing.



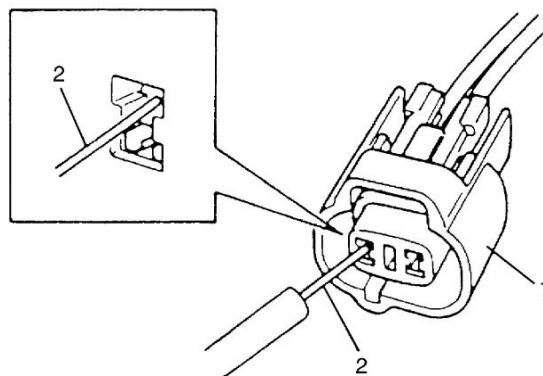
- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.



- When taking measurements at electrical connector / coupler (1) using a tester probe (2), be sure to insert the probe from the wire harness side (rear) of the connector / coupler.



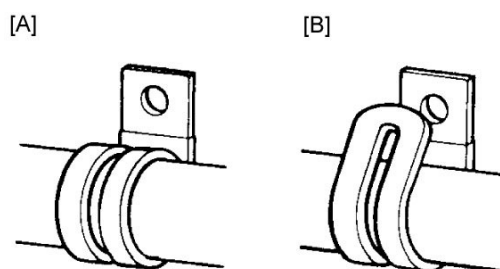
- When connecting meter probe (2) from the terminal side of the coupler (1) because it cannot be connected from harness side, use extra care not to bend the male terminal of coupler or force its female terminal open for connection.  
In case of such coupler as shown connect probe as shown to avoid opening female terminal.  
Never connect probe where male terminal is supposed to fit.



- Avoid applying grease or other similar material to connector/coupler terminals to prevent electric trouble.

## Clamp

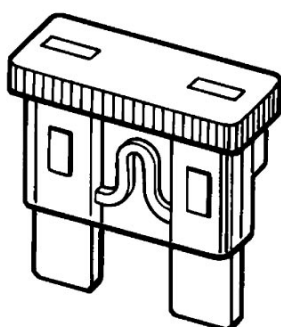
- Clamp the wire harness at such positions as indicated in [Wiring Harness Routing Diagram](#).
- Bend the clamp properly so that the wire harness is clamped securely.
- In clamping the wire harness, use care not to allow it to hang down.
- Do not use wire or any other substitute for the band type clamp.



[A]:	Correct clamping	[B]:	Incorrect clamping
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## Fuse

- When a fuse is blown, always investigate the cause to correct it and then replace the fuse.
- Do not use a fuse of different capacity.
- Do not use wire or any other substitute for the fuse.

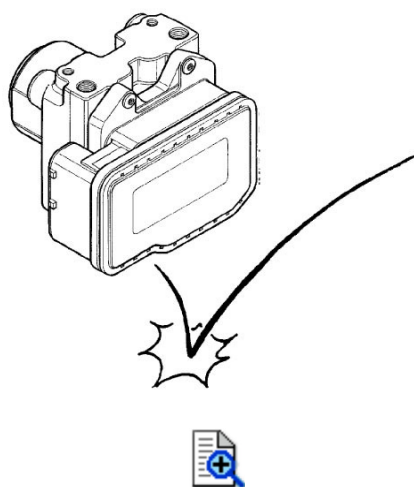
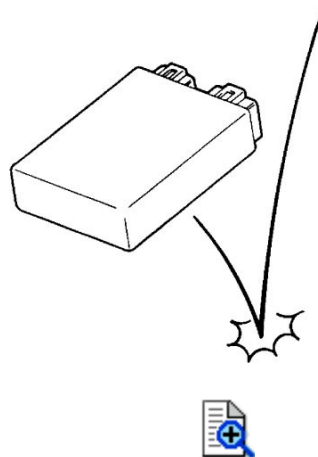


## Switch

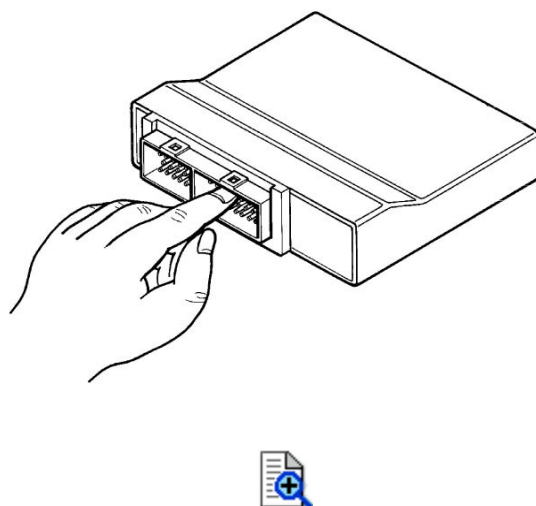
Never apply grease material to switch contact points to prevent damage.

## ECM / ABS control unit / Various sensors

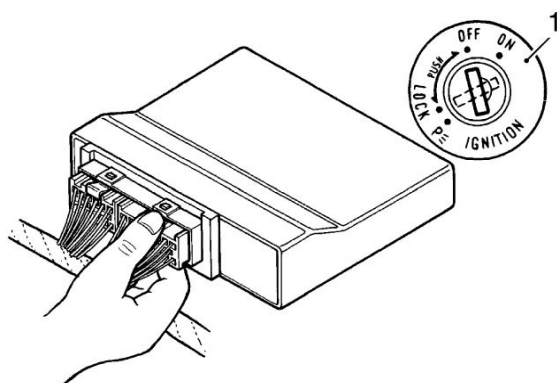
- Since each component is a high-precision part, great care should be taken not to apply any severe impacts during removal and installation.



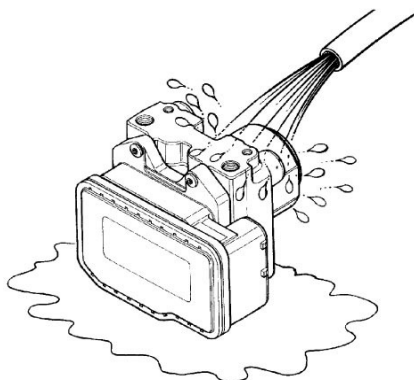
- Be careful not to touch the electrical terminals of the electronic parts (ECM, etc.). The static electricity from your body may damage them.



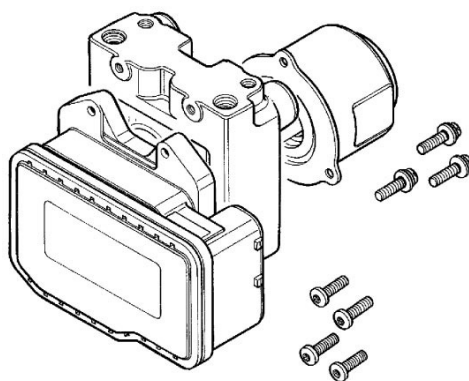
- When disconnecting and connecting the coupler, make sure to turn OFF the ignition switch (1), or electronic parts may get damaged.



- Never allow dust or water to contact the ABS control unit/HU.

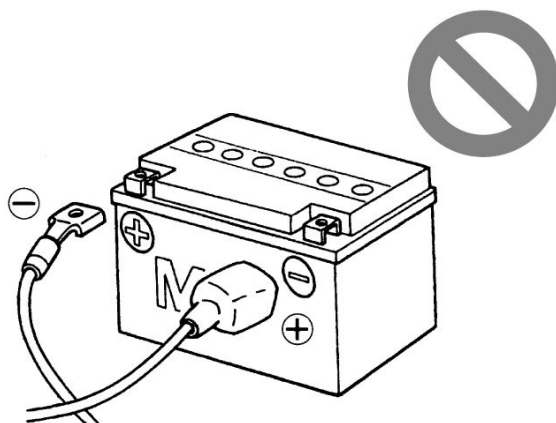


- The ABS control unit/HU cannot be disassembled.  
Replace the whole unit with a new one.

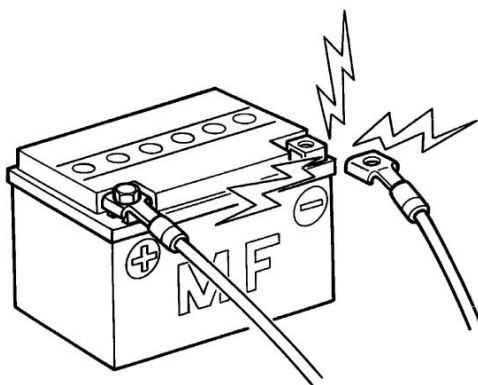


## Battery

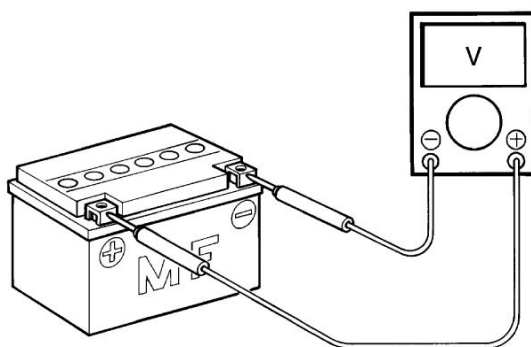
- Select the same type MF battery when replacing the battery.
- Battery connection in reverse polarity is strictly prohibited. Such a wrong connection will damage the components of the FI and ABS systems instantly when reverse power is applied.



- Removing any battery terminal of a running engine is strictly prohibited. The moment such removal is made, damaging counter electromotive force will be applied to the electronic unit which may result in serious damage.



- Before measuring voltage at each terminal, check to make sure that battery voltage is 11 V or higher. Terminal voltage check with a low battery voltage will lead to erroneous diagnosis.



- Never connect any tester (voltmeter, ohmmeter, or whatever) to the electronic unit when its coupler is disconnected. Otherwise, damage to electronic unit may result.
- Never connect an ohmmeter to the electronic unit with its coupler connected. If attempted, damage to ECM or sensors may result.
- Be sure to use a specified voltmeter/ohmmeter. Otherwise, accurate measurements may not be

obtained and personal injury may result.

## Electrical Circuit Inspection Procedure

While there are various methods for electrical circuit inspection, described here is a general method to check for open and short circuit using an ohmmeter and a voltmeter.

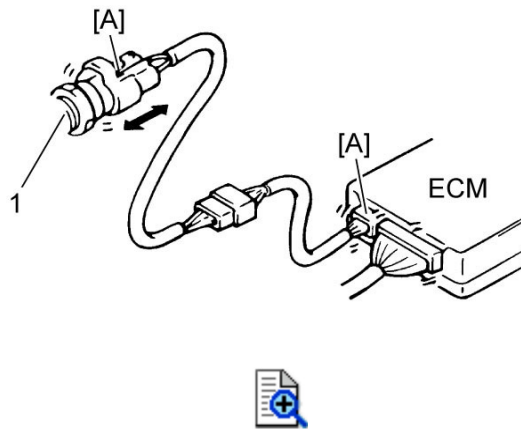
### Open circuit check

Possible causes for the open circuit are as follows. As the cause can exist in the connector/coupler or terminal, they need to be checked carefully.

- Loose connection of connector/coupler
- Poor contact of terminal (due to dirt, corrosion or rust, poor contact tension, entry of foreign object etc.)
- Wire harness being open.
- Poor terminal-to-wire connection.

When checking system circuits including an electronic control unit such as ECM, etc., it is important to perform careful check, starting with items which are easier to check.

- 1) Disconnect the negative (-) cable from the battery.
- 2) Check each connector/coupler at both ends of the circuit being checked for loose connection. Also check for condition of the coupler lock if equipped.

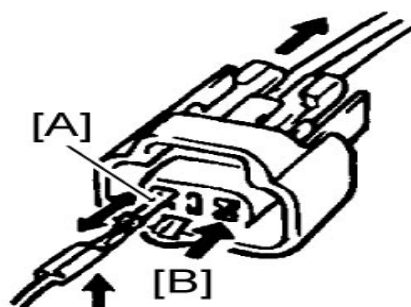


[A]:	Check for loose connection	1.	Sensor
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- 3) Using a test male terminal, check the female terminals of the circuit being checked for contact tension.

Check each terminal visually for poor contact (possibly caused by dirt, corrosion, rust, entry of foreign object, etc.). At the same time, check to make sure that each terminal is fully inserted in the coupler and locked.

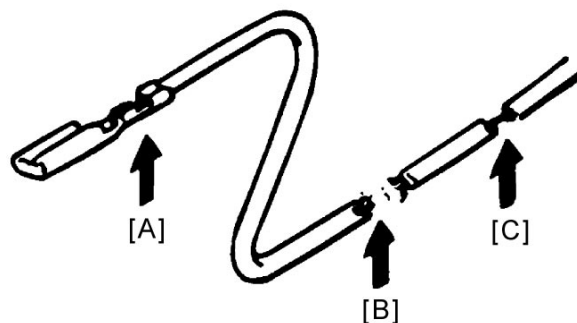
If contact tension is not enough, rectify the contact to increase tension or replace. The terminals must be clean and free of any foreign material which could impede proper terminal contact.





[A]:	Check contact tension by inserting and removing.
[B]:	Check each terminal for bend and proper alignment.

- 4)** Using continuity inspect or voltage check procedure as described below, inspect the wire harness terminals for open circuit and poor connection. Locate abnormality, if any.



[A]:	Looseness of crimping
[B]:	Open
[C]:	Thin wire (A few strands left)

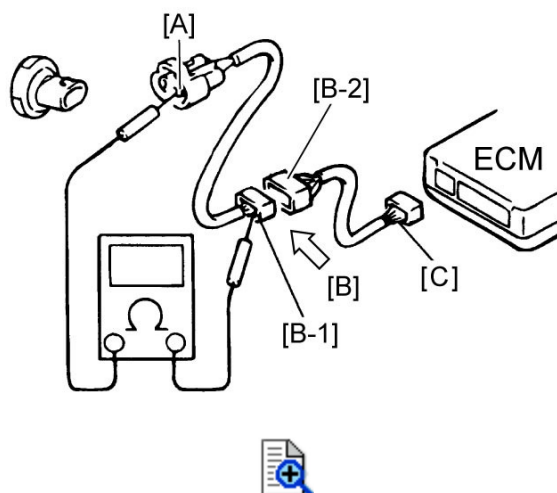
### Continuity check

- 1)** Measure resistance across coupler [B] (between [A] and [C] in the figure).  
If no continuity is indicated (infinity or over limit), the circuit is open between terminals [A] and [C].



- 2)** Disconnect the coupler [B] and measure resistance between couplers [A] and [B-1].  
If no continuity is indicated, the circuit is open between couplers [A] and [B-1]. If continuity is indicated, there is an open circuit between couplers [B-2] and [C] or an abnormality in coupler [B-2] or coupler [C].





### Voltage check

If voltage is supplied to the circuit being checked, voltage check can be used as circuit check.

- 1) With all connectors/couplers connected and voltage applied to the circuit being checked, measure voltage between each terminal and body ground.
- 2) If measurements were taken as shown in the figure and results were listed in the following, it means that the circuit is open between terminals [A] and [B].

#### Voltage between

**[A] and body ground: 0 V**

**[B] and body ground: Approx. 5 V**

**[C] and body ground: Approx. 5 V**

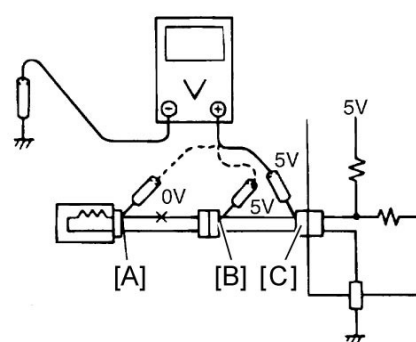
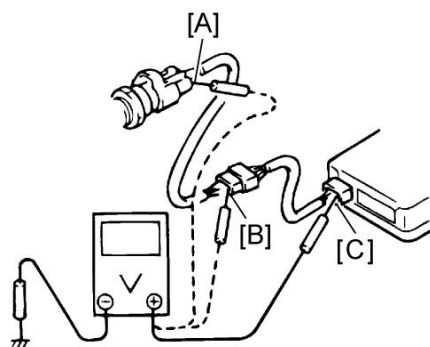
- 3) Also, if measured values are as listed following, a resistance (abnormality) exists which causes the voltage drop in the circuit between terminals [A] and [B].

#### Voltage between

**[A] and body ground: 3 V – 2 V voltage drop**

**[B] and body ground: Approx. 5 V**

**[C] and body ground: Approx. 5 V**



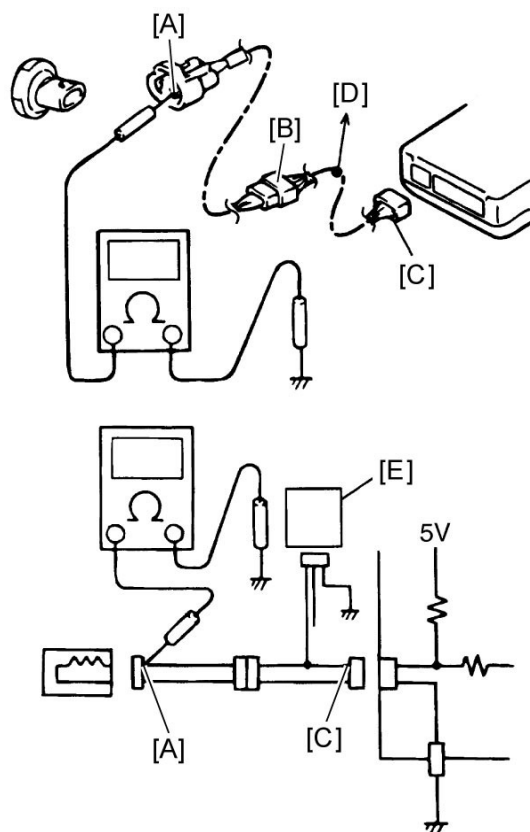
### Short circuit check (Wire harness to ground)

- 1) Disconnect the negative (-) cable from the battery.
- 2) Disconnect the connectors/couplers at both ends of the circuit to be checked.

#### NOTE:

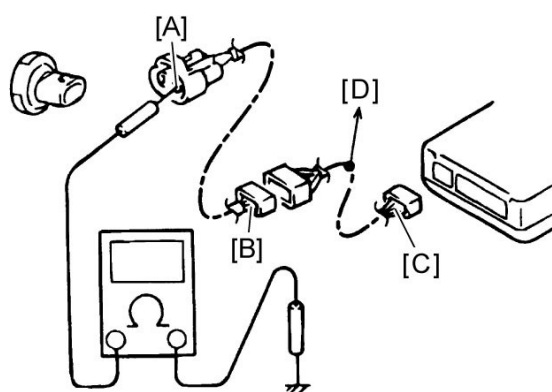
**If the circuit to be checked branches to other parts as shown, disconnect all connectors/couplers of those parts. Otherwise, diagnosis will be wrong.**

- 3) Measure resistance between terminal at one end of circuit ([A] terminal in the figure) and body ground. If continuity is indicated, there is a short circuit to ground between terminals [A] and [C].



[D]:	To other parts	[E]:	Other parts
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- 4)** Disconnect the connector/coupler included in circuit (coupler [B]) and measure resistance between terminal [A] and body ground. If continuity is indicated, the circuit is shorted to the ground between terminals [A] and [B].



[D]:	To other parts
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