APPENDIX 13 – Toyota RAV 4 ABB Meter Installation Instructions

June '98

Toyota RAV-4 ABB Meter Installation

RAV 4 ABB METER INSTALLATION

Southern California Edison - Electric Vehicle Technical Center

Electric Transportation Division has requested the Installation of ABB meters in selected Electric Vehicles. These meters will allow **Electric Transportation** to collect data relating to the power usage of electric vehicles. For questions relating to the installation of these meters please contact David Douglas at PAX 40296 or Email TSD9662.

The ABB meter is to be installed behind the front grill, on the right hand side of the vehicle, below the top radiator support. This kit includes one Bracket, one ABB meter with cable and connectors attached, four mounting screws (meter to bracket), and a few tie-raps to secure wire loom.

Installation:

Remove charger connector from vehicle and close charge port access. Open hood and locate the charge port wiring connector near the charge port on the passenger side of the vehicle and disconnect this connector see figure #5. Unclip the two loom clamps which hold the charge cable and move cable out of the way. Locate the front A/C mounting bolt in figure #4 and remove. Install bracket through front hole under cross bar hooking bracket over cross bar so the bracket tab with the hole aligns with A/C mounting hole. Slide bracket under A/C mount and bolt into place using existing bolt.

Attach the ABB meter to the front of the bracket with the wires coming from the bottom of the box to the bracket using the four screws or their equivalent.

Thread the vehicle's orange charge cable under existing pipes and tubing as in figure #6 and #7 and connect to the short cable from the ABB meter. Thread the long ABB meter cable through the fasteners which were used to hold the vehicle orange charge cable and plug this cable into the charge port connector. Use tie-raps to secure cable looms.

Test the operation of the ABB Meter.
Put vehicle on charge, look at the ABB meter and check to see that it turned on and that there is not error messages.

Note: In order to preserve the manufactures warranty, do not under any circumstance drill holes or modify the vehicle in any way not expressed in this procedure.

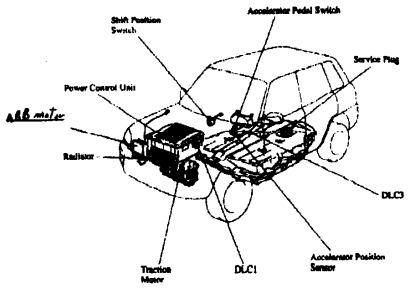


figure #1

This Diagram show the approx. location for the ABB meter installation.

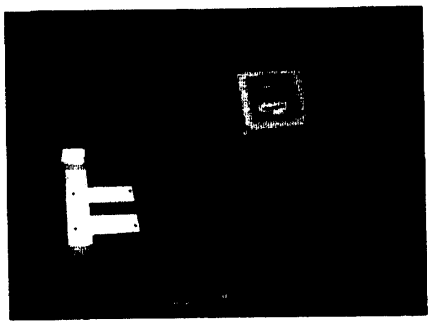


figure #2

Mounting bracket.
ABB meter (inside a weather resistant box).

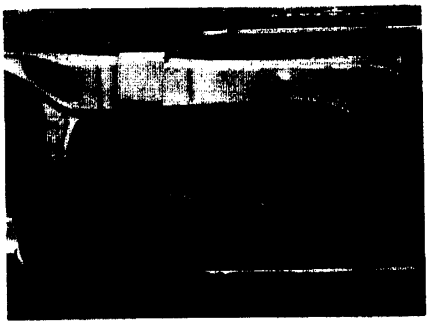


figure #3

Bracket install on top radiator support or cross bar showing the holes used to mount the ABB meter box with.

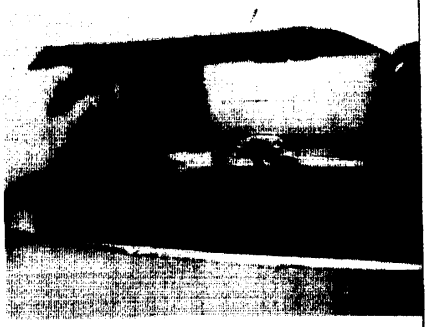


figure #4

Looking through the front grill with the hood up, this shows the mounting bolt used to secure the ABB mounting bracket to the vehicle. The ABB meter will fit neatly into this area and will be detachable if maintenance access is required.

figure #5

This is charge port connector. The extension will plug into each end allowing for a clean non invasive installation. Note also the two cable guides, this orange cable will be moved down to the ABB meter and the long ABB meter cable will take its place.

figure #6

This shows an installed ABB meter. Note the door opens and closes while the box is in place. Note also the orange cable has been routed forward to the ABB meter instead of back toward the charge port.

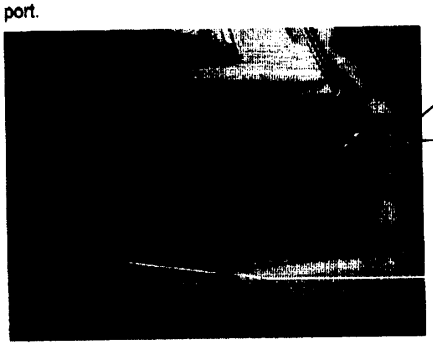
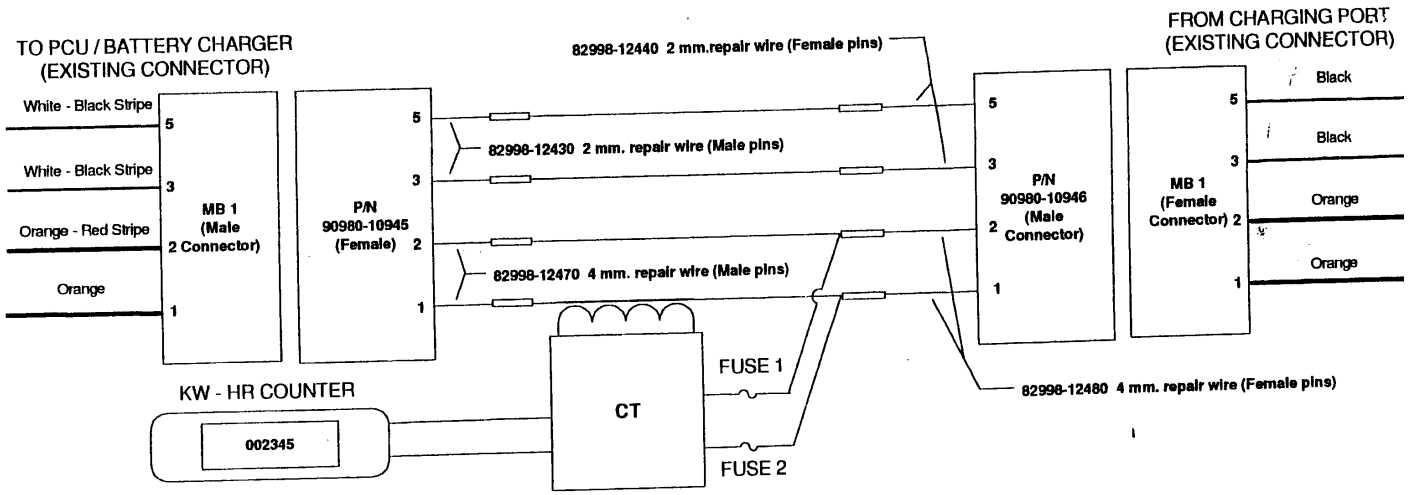


figure #7

This shows the charge port connector bottom left and the orange cable routing upper right. Note the use of the existing cable clamps.

RECOMMENDED INDUCTIVE kW - HR. METER INSTALLATION ON RAV4 EV



PARTS LIST

1) 90980-10946 Five cavity connector (Male)
1) 90980-10945 Five cavity connector (Female)
2) 82998-12430 2 mm. repair wire (Male pins)
2) 82998-12440 2 mm.repair wire (Female pins)
2) 82998-12470 4 mm. repair wire (Male pins)
2) 82998-12480 4 mm. repair wire (Female pins)
4) 00204-34130 Small butt connectors
4) 00204-34138 Large butt connectors
Shrink Wrap for covering butt connetors
16-18 ga. and 12 ga. Stranded and insulated automotive grade wire (class THWN or eq.)

NOTES:

Fuse 1 and Fuse 2 rated at: .25 amp @ 250V

Connector MB1 is a five cavity orange colored connector located under the hood near charging connector. (see attached location sheet)

Signal wires to CT from pin 1&2 of the series harness are 16 - 18 ga.

Series harness wire size:
12 ga. for wiring between pins 1 & 2
16-18 ga. for wiring between pins 3 & 5.

Series harness wire between pin 1 passes through the CT pickup ring

All parts containing part numbers can be ordered at any Toyota dealer or Authorized Service Provider

All series wiring over 10in. long MUST be shielded

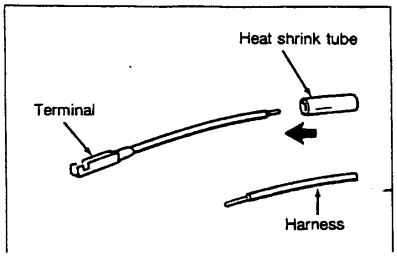
LEGEND

Butt connector

Fuse

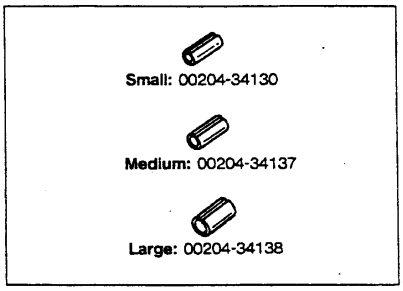
CT — Current Transformer

WIRE SPLICING PROCEDURE



b. Heat shrink tube

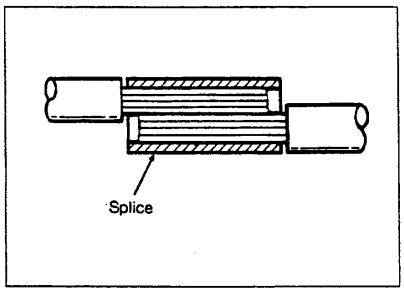
1. Cut a piece of the heat shrink tube that is slightly longer than the splice, and slightly larger in diameter than the splice.
2. Slide the tube over the end of one wire to be spliced. (THIS STEP **MUST** BE DONE PRIOR TO JOINING THE WIRES TOGETHER!)



1. Select correct size of splice from the repair kit.

a. Size is based on the nominal size of the wire (three sizes are available).

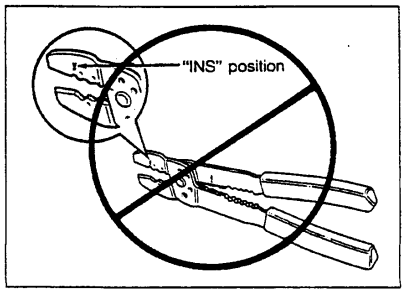
	Part Number	Wire Size
Small	00204-34130	16-22 AWG 1.0 - 0.2 mm
Medium	00204-34137	14-16 AWG 2.0 - 1.0 mm
Large	00204-34138	10-12 AWG 5.0 - 3.0 mm



2. Crimp the replacement terminal lead to the harness lead.

a. Insert the stripped ends of both the replacement lead and the harness lead into the splice, overlapping the wires inside the splice.

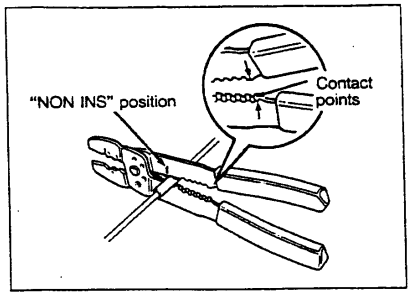
NOTE: Do not place insulation in the splice, only stripped wire.



b. Do not use position marked "INS."

1. The crimping tool has positions marked for insulated splices (marked "INS") that should **not** be used, as they will not crimp the splice tightly onto the wires.

WIRE SPLICING PROCEDURE

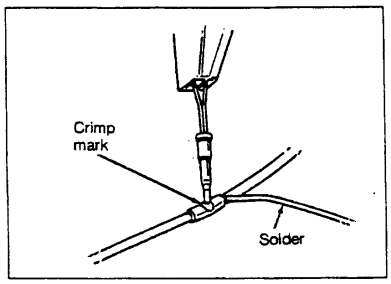


c. Use only position marked "NON INS."

1. With the center of the splice correctly placed between the crimping jaws, squeeze the crimping tool together until the contact points of the crimper come together.

   NOTE: Make sure the wires and the splice are still in the proper position before closing the crimping tool ends. Use steady pressure in making the crimp.

2. Make certain that the splice is crimped tightly.



3. Solder the completed splice using <u>only</u> rosin core solder.

a. Wires and splices <u>must</u> be clean.

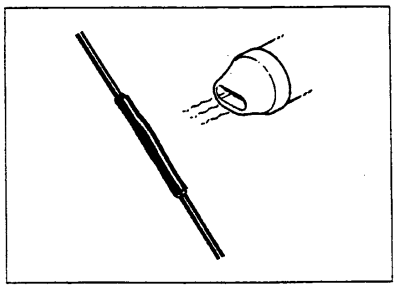
b. A good mechanical joint <u>must</u> exist, because the solder will not hold the joint together.

c. Heat the joint with the soldering iron until the solder melts when pressed onto the joint.

d. Slowly press the solder into the hot splice on one end until it flows into the joint and out the other end of the splice.

   NOTE: Do not use more solder than necessary to achieve a good connection. There should not be a "glob" of solder on the splice.

e. When enough solder has been applied, remove the solder from the joint and then remove the soldering iron.



b. Heat shrink tube (provided in the wire repair kit)

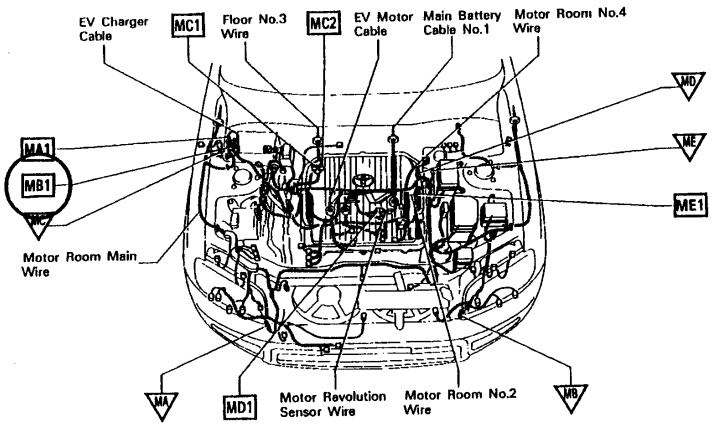
1. Center heat shrink tube over the soldered splice.
2. Using a source of heat, such as a heat gun, gently heat the tubing until it has shrunk tightly around the splice.

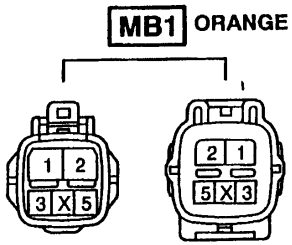
   NOTE: Do not continue heating the tubing after it has shrunk around the splice. It will only shrink a certain amount, and then stop. It will <u>not</u> continue to shrink as long as you hold heat to it, so be careful not to melt the insulation on the adjoining wires by trying to get the tubing to shrink further.

WIRE CONNECTOR LOCATION

G ELECTRICAL WIRING ROUTING

□: Location of Connector Joining Wire Harness and Wire Harness
▽: Location of Ground Points





SRS AIRBAG

RS02V-02

PRECAUTION

NOTICE:

- The TOYOTA RAV4 is equipped with a SRS, which comprises a driver airbag and front passenger airbag. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the SRS, it is possible the SRS may fail to operate when required. Before performing servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedure described in the repair manual.
- Malfunction symptoms of the SRS are difficult to confirm, so the DTCs become the most important source of information when troubleshooting the SRS, always inspect the DTCs before disconnecting the battery.
- Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly and airbag sensor assembly should be inspected.
  (See page RS–11, RS–25, RS–37)
- Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- Never disassemble and repair the steering wheel pad, front passenger airbag assembly or airbag sensor assembly in order to reuse it.
- If the steering wheel pad, front passenger airbag assembly or airbag sensor assembly has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
- Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting the system's electrical circuits.
- Information labels are attached to the periphery of the SRS components. Follow the instruction on the notices.
- After work on the SRS is completed, check the SRS warning light. (See page DI–336)
- If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.

CAUTION:

- Work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery. (The SRS is equipped with a back–up power source so that if work is started within 90 seconds of disconnecting the negative (–) terminal cable of the battery, the SRS may be deployed.)
- When the negative (–) terminal cable is disconnected from the battery, the memory of the clock and audio system will be canceled. So before starting work, make a record of the contents memorized in the audio memory system. When work is finished, reset the audio systems as before and adjust the clock. To avoid erasing the memory of each memory system, never use a back–up power supply from outside the vehicle.
- Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
- Do not expose the steering wheel pad, front passenger airbag assembly or airbag sensor assembly directly to hot air or flames.

BODY ELECTRICAL SYSTEM

PRECAUTION

BE0J0-01

HINT:

Take care to observe the following precautions when performing inspections or removal and replacement of body electrical related parts.

1. HEADLIGHT SYSTEM

Halogen bulbs have pressurized gas inside and require special handling. They can burst or scatter if scratched or dropped. Hold a bulb only by its plastic or metal case.

Don't touch the glass part of a bulb with bare hands.

2. SRS (SUPPLEMENTAL RESTRAINT SYSTEM)

The RAV4 is equipped with an SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the (precautionary) notices in the RS section.

3. AUDIO SYSTEM

If the negative (–) terminal cable is disconnected from the battery, the preset AM, FM 1 and FM 2 stations stored in memory are erased, so be sure to note the stations and reset them after the battery terminal is reconnected.

4. MOBILE COMMUNICATION SYSTEM

If the vehicle is equipped with a mobile communication system, refer to precautions in the IN section.