

ALLISON HYBRID

ESS SERVICE & REPAIR



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Resources

- Allison Hybrid H 40/50 Energy Storage System Service Manual.
 - SM4162EN
- Service Information Letters (SILs).
 - Product updates available on the Allison Extranet.
- The H 40/50 EP System Parts Catalog.
 - Available on the Allison Extranet, in print and on CD.
- Special Tools.
 - Specifically designed for ESS service and repair.



Printed Parts Catalog – PC3171EN

CD Parts Catalog – CD3717EN



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1 of 5



RESOURCES: Electrical Safety Section



NOTE: This resource link has multiple pages and information changes frequently. Reference the source document for complete, current information.

SECTION 2—ELECTRICAL SAFETY

2-1. ELECTRICAL SYSTEMS

WARNING!

The Allison Electric Drive EP 40/50 System™ uses potentially hazardous electrical energy. All EP 40/50 System™ components are identified with warning labels or symbols (see Figure 2-1, Figure 2-2, and Figure 2-3). **DO NOT** attempt to service components containing potentially hazardous electrical energy if you are not trained to do so.

All persons working with potentially hazardous electric energy should familiarize themselves with safe electrical work practices. References to publicly available documentation that can assist a technician in developing the safe electrical work practices required to service the EP 40/50 System™ electrical system are at the end of this section.

EP 40/50 System™ Normal Operating Conditions:

ESS Voltage Range: 432–780 VDC
DPIM Voltage Range: –350 to +350A



Figure 2-1. DPIM Warning Label

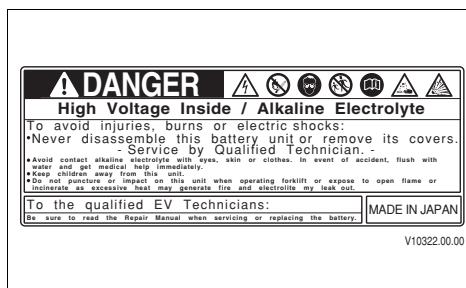


Figure 2-2. ESS Warning Label

a. High Voltage Interlock Loop

The Allison EP 40/50 System™ uses a High Voltage Interlock Loop (HVIL) to attempt to prevent access to energized potentially hazardous electrical circuits. The HVIL is comprised of a 12V control circuit routed to switches on cover plates located on all hybrid components where potentially hazardous electrical energy may exist. When a switch is open the HVIL circuit is open, and is described as invalid.

An open HVIL circuit detected during ignition key-on will prohibit the pre-charge sequence from occurring (ESS relays will remain open). Diagnostic code 80 22 (HVIL Invalid—Shutdown) will be logged and the **STOP SYSTEM** lamp will illuminate. Engine cranking will not occur.

An open HVIL circuit detected during forward or reverse operation will log DTC 80 21 (HVIL Invalid). DTC 80 21 is not displayed on the PBSS and does not result in an active system shutdown. If DTC 80 21 remains active when N (Neutral) is selected and output speed is zero, DTC 80 22 will be logged. With DTC 80 22 active, the **STOP SYSTEM** lamp will illuminate and an active system shutdown will occur.

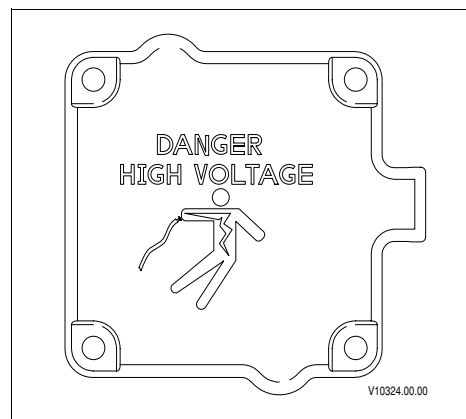


Figure 2-3. EV Drive™ Warning (Lug Box)

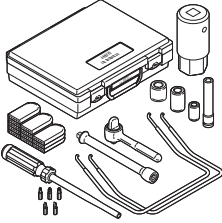
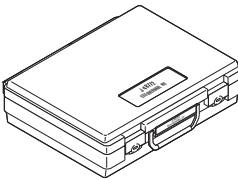
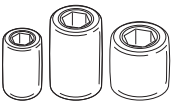
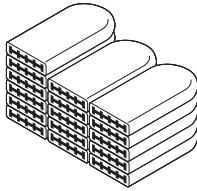
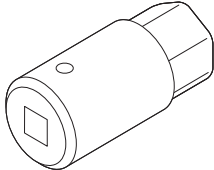


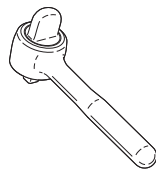
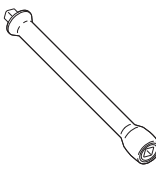
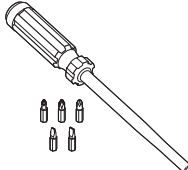
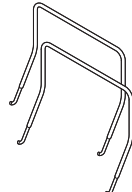
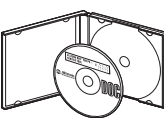
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RESOURCES: ESS Special Tools

3-3. SPECIAL TOOLS

The following tools, in addition to common hand tools, are required:

| Illustration | Tool No./ Description |
|---|---|
|  | J 48772 ESS Maintenance Tool Kit |
|  | J 48781 ESS Maintenance Tool Kit Case |
|  | J 48775, J 48776, J 48777 8 mm, 10 mm, 12 mm Sockets, Insulated |
|  | J 48778 Terminal Insulator |
|  | J 48780 46 mm Socket |

| | |
|--|---|
|  | J 48811 1/4 inch drive Ratchet, Insulated |
|  | J 48812-1 12 inch, 1/4 inch drive Ratchet Extension, Insulated |
|  | J 48929 Screwdriver/with bits, Insulated |
|  | J 48779 ESS Battery Sub-pack Removal Tool |
|  | J 46995 Allison DOCTM For PC-Allison Electric Drives (AED) |

* We believe this source and its tools to be reliable. These tools may be available from other manufacturers. Allison Transmission, Inc. does not endorse, indicate any preference for, or assume any responsibility for the products or tools from these firms, or for any such items that may be available from other sources.

** Kent-Moore Tool Division, 28635 Mound Road,
Warren, Michigan 48092
1-800-328-6657 US
1-507-455-7223 International



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Electrical Safety

- Dangerous voltages exist inside the ESS.
 - Use the appropriate precautions prior to and during service procedures.
- All tools utilized inside the ESS must be insulated and rated for use in high voltage electrical applications.
- OSHA approved 1000VDC isolation gloves should be worn when servicing components inside the ESS.



2 of 5



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Small Parts Caution

- Small parts dropped during service procedures can fall directly to the bottom of the ESS tub.
- Parts retrieval may necessitate unwanted or repeated ESS disassembly.
- All parts must be accounted for after completing service procedures.
 - *Metal parts left in the ESS could cause short circuits and permanent ESS damage.*



3 of 5



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Labeling During Disassembly

- Label all components and wire prior to removal to facilitate proper re-installation.
- If electrical connections are not re-installed properly, malfunctions and/or damage will occur to the ESS and related components.



4 of 5



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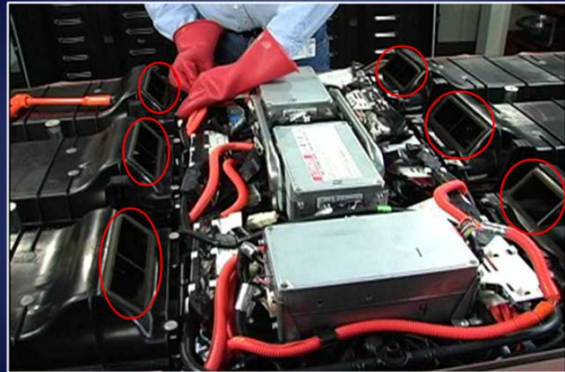


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Sub-Pack Vent Ducts

- Keep tools and material away from the vent ducts on each of the six battery sub-packs.
 - *Any conductive material dropped into a battery sub-pack has the potential to create dangerous high voltage shorts resulting in personal injury and component damage.*



5 of 5

