DRIVE UNIT OVERHAUL

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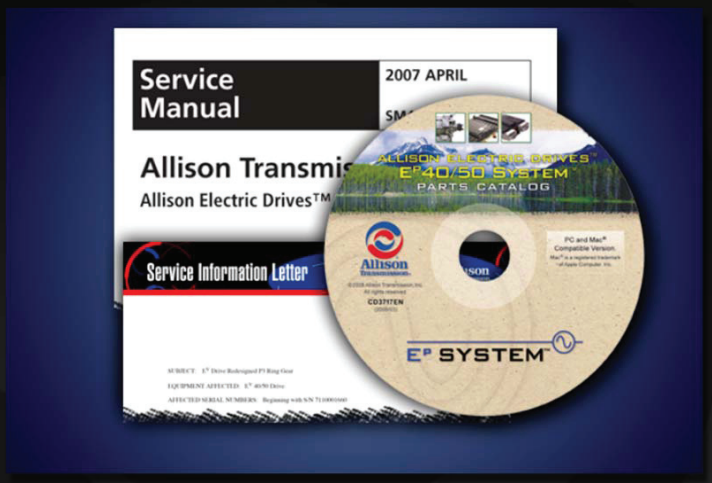
Drive Unit Overhaul

Overhaul Resources

- **Allison Hybrid H 40/50 System Service Manual.**
  - *SM3602EN*
- **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 Drive Unit overhaul.*



Printed Parts Catalog – PC3171EN

CD Parts Catalog – CD3717EN

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1 of 7

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RESOURCES: Electrical Safety

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 E^P 40/50 System™ uses potentially hazardous electrical energy. All E^P 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 E^P 40/50 System™ electrical system are at the end of this section.

E^P 40/50 System™ Normal Operating Conditions:

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

Figure 2–1. DPIM Warning Label

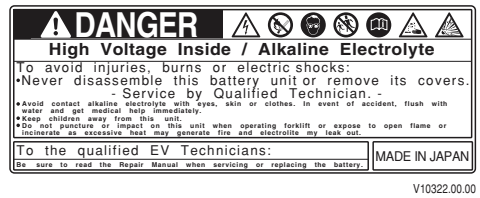

Figure 2–2. ESS Warning Label

a. High Voltage Interlock Loop

The Allison E^P 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.

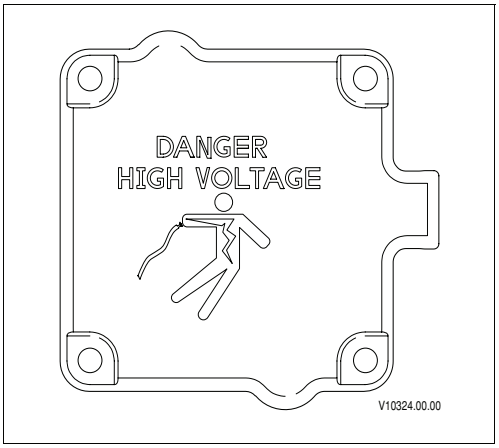

Figure 2–3. E^V Drive™ Warning (Lug Box)

RESOURCES: Drive Unit Special Tools

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

SECTION 4—GENERAL OVERHAUL INFORMATION

4–1. SCOPE

This section provides general information for EV Drive™ maintenance. The information provided includes:

- Tools and equipment required
- Replacement parts information
- Cleanliness and careful handling
- Cleaning and inspection of components
- Assembly procedures
- EV Drive™, DPIM, ESS removal and installation
- Locating torque specifications for plugs, bolts, and nuts

4–2. TOOLS AND EQUIPMENT

a. Improvised Tools and Equipment

The following items may be improvised.

- Work Table—500 kg (1000 lb) capacity (Figure 4–1)
- Stator Housing Fixture—J 46701 or equivalent (Table 4–1)

b. Special Tools

Special tools are illustrated and identified in Table 4–1.

c. Mechanic's Tools and Shop Equipment

The following tools, in addition to the common tools ordinarily required, should be available.

- Common hand tools, metric where required
- Metric wrench set (sockets, box-end wrenches, and Allen wrenches)
- Snapring pliers
- Micrometer (metric preferred)
- Depth micrometer (metric preferred)
- Dial indicator set (metric preferred)

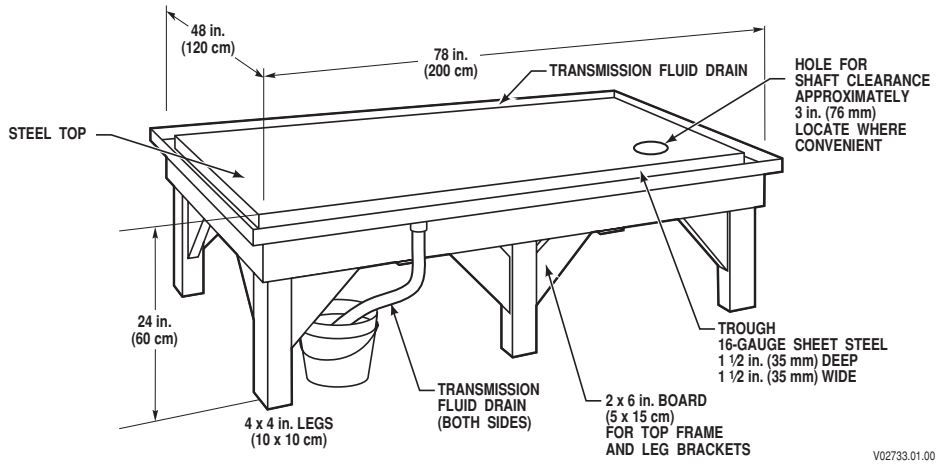

Figure 4–1. Work Table

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Drive Unit Overhaul Tips – General Note

- Before starting the overhaul, review the SILs for updates to procedures and components, and to ensure proper parts interchangeability if necessary.

2 of 7

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Drive Unit Overhaul Tips – General Measurement Tips

- To ensure accurate measurements, all parts should be clean and free from lubricant prior to taking measurements.

3 of 7

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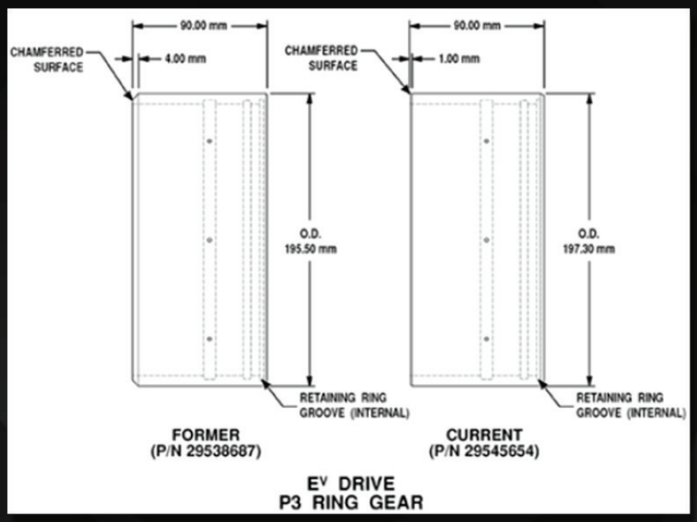
ALLISON HYBRID H40/50EP

Drive Unit Overhaul

Drive Unit Overhaul Tips – Redesigned P3 Ring Gear

- A redesigned P3 Ring Gear was released in February 2007.
- The former ring gear (P/N 29538687) and current ring gear (P/N 29545654) are completely interchangeable.
- The update reduced the depth of the chamfered surface and increased the ring gear outside diameter.
- Reference SIL 4-EP-04 for details.



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4 of 7

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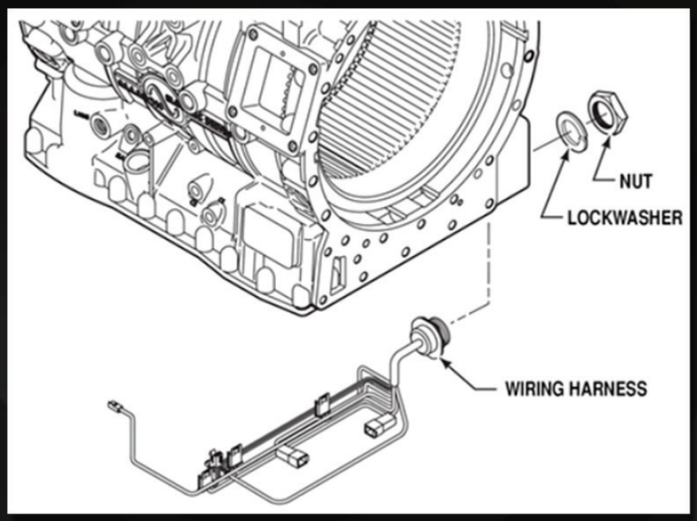
Drive Unit Overhaul

Drive Unit Overhaul Tips – Removal of Lockwasher on Internal Harness

- The lockwasher on the drive unit main electrical connector has been eliminated to improve external nut thread engagement.
- There is no change to the part number for the transmission harness.
- When replacing the internal harness, discard the lockwasher and torque the external nut to the specification shown in SIL 7-EP-05.



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5 of 7

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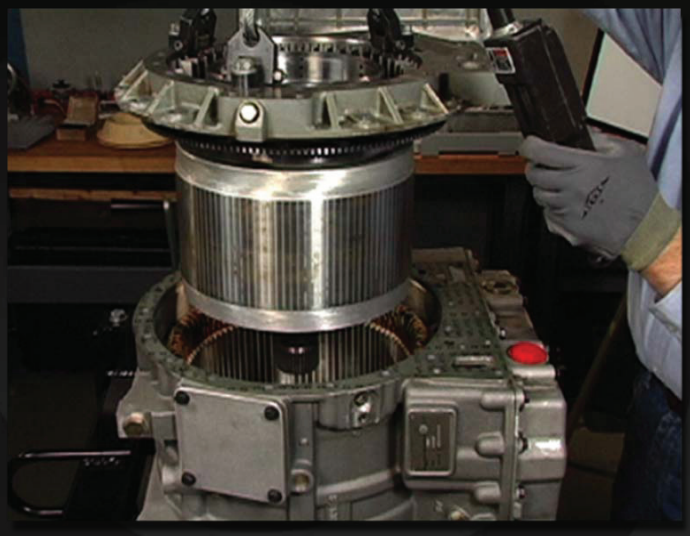
Drive Unit Overhaul Tips – Handling Motor B Module

- Use care when positioning the Motor B module during module rebuild.
  - *The length of the main shaft can complicate this procedure.*
- Be sure to use the appropriate lifting equipment and seek help from another person to avoid injury to yourself and damage to the module.



6 of 7

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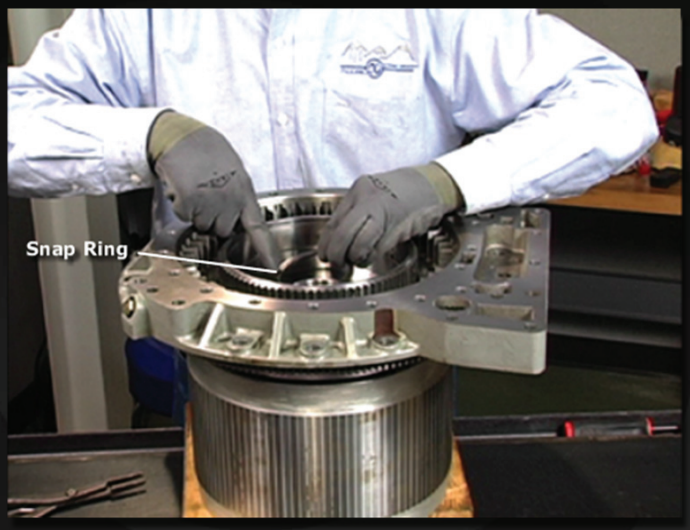
Drive Unit Overhaul Tips – C2 Clutch Module

- When removing the C2 Clutch module from the main housing, be sure to leave the snap ring retaining the C2 clutch drum to Motor B in place until the module is fully removed from the main housing.
  - *Removing this snap ring prematurely will leave Motor B seated in the main housing with no good means of lifting it out.*



7 of 7

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