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SIL 35-EP-16, Rev. A
September, 2017
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SUBJECT: Replacing the Signal Interface Card and Encoder Cards Inside the Dual Power Inverter Module 2 (DPIM2)

MODELS AFFECTED: H 40/50 EP™ System Equipped with DPIM2

Tools Required:

- Electrostatic Discharge Wrist Strap (Tool Number 7744 (available at Allison.service-solutions.com) or equivalent) refer to Figure 3.
- Pick or Small Flat Blade Screwdriver
- Torx-Plus® T20 Bit
- Torx-Plus® T25 Bit
- Loctite® 242
- Loctite® 425

Introduction:

This Service Information Letter (SIL) announces the availability of the signal interface card (P/N 29547435) and the encoder cards for inverter A (P/N 29547461) and inverter B (P/N 29547434). This SIL includes the procedure to replace the signal interface card and the encoder cards located inside the DPIM2. The availability of these service parts eliminates the need for a complete DPIM2 replacement under certain failure conditions.

Signal Interface Card:

The 24-way signal interface card distributes the main 12V power and grounds, wake-up and torque control signals, and the CAN interface to each of the inverters in the DPIM2. The OEM 24-way harness connects to the signal interface card at the AC end of the DPIM2 between inverters A and B.

Encoder Cards:

There are two (2) encoder cards in the DPIM2, one for inverter A and one for inverter B. The encoder cards pass speed sensor and Resistance Temperature Device (RTD) output signals from each motor to the DPIM. They also pass the HVIL circuit to the high voltage lug boxes at each motor. The OEM 32-way connectors that go to the drive unit motors connect to the encoders near the DC end of the DPIM2 on each side.

Refer to Table 1, Table 2, and Table 3 for service components, part numbers, and quantities.

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Please Note: Allison Transmission Service Information Letters are intended for use by professional, trained technicians, not for the "do-it-yourselfer." They are written to inform those technicians of conditions that may occur on some transmission models (or serial numbers ranges) or to provide information that could assist in the proper servicing of a specific Allison transmission. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do a job properly and safely. If a condition is described, do not assume that the Service Information Letter applies to your transmission, or that your transmission has the condition described. Product evolution and information updates are inevitable. Please see your authorized Allison Transmission service dealer or distributor to understand if your particular transmission may benefit from the information contained within the Service Information Letter.

Table 1. Signal Interface Card Service Parts (refer to Figure 1)

Part Name	Part Number	Quantity
Signal Interface Card	29547435	1
EMI Gasket	29540711	1
Screw, M4x14mm	29540721	4

Table 2. Inverter A Encoder Card Service Parts (refer to Figure 2)

Part Name	Part Number	Quantity
Encoder, Inverter A	29547461	1
EMI Gasket	29540712	1
Screw, M4x14mm	29540721	4

Table 3. Inverter B Encoder Card Service Parts (refer to Figure 2)

Part Name	Part Number	Quantity
Encoder, Inverter B	29547434	1
EMI Gasket	29540712	1
Screw, M4x14mm	29540721	4



NOTE: Perform the necessary troubleshooting prior to ordering service parts P/N 29547435 , P/N 29547461, and P/N 29547434 . Contact Allison TAC at (800) 252-5283 to confirm the signal interface card or encoder card failure.



WARNING: DO NOT rely on the High Voltage Interlock Loop (HVIL) or control systems to de-energize the system. Always perform the Electrical Disconnect Verification Procedure to be sure the system is discharged before servicing components.

DO NOT attempt to bypass any High Voltage Interlock for any reason. Tampering with the HVIL may result in injury. Failure to follow proper safety procedures may result in serious personal injury or death.



NOTE: Allison Transmission, Inc. requires that the DPIM be removed from the vehicle prior to component replacement. Prior to removal of the DPIM, refer to the H 40/50 EP™ System Troubleshooting Manual (TS5812EN) and perform the Electrical Disconnect Verification Procedure.



NOTE: The signal interface card or encoder card replacement should NOT be performed if smoke and/or water damage are present.



NOTE: The replacement of the signal interface card or encoder cards under Allison supplied warranty **MUST** be approved by Allison Service Engineering prior to removing the DPIM main cover.

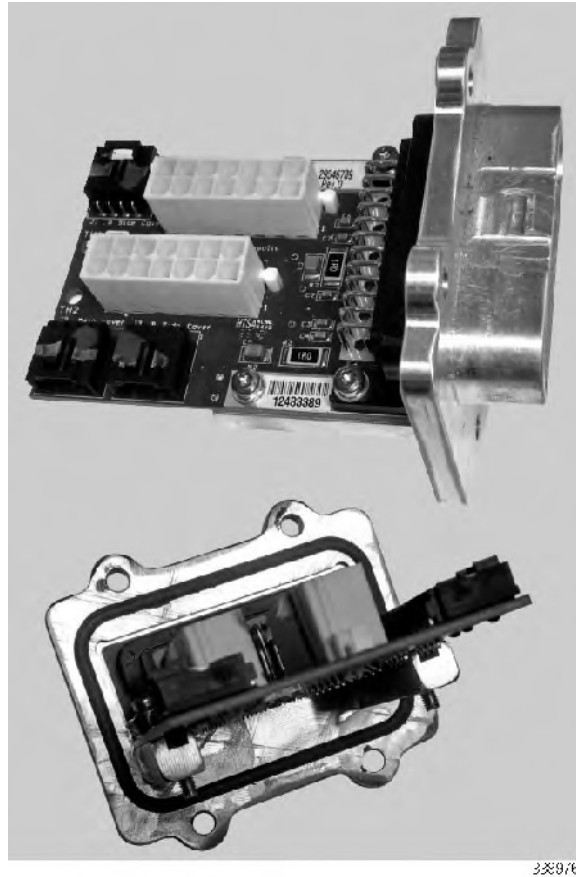


Figure 1. Signal Interface Card

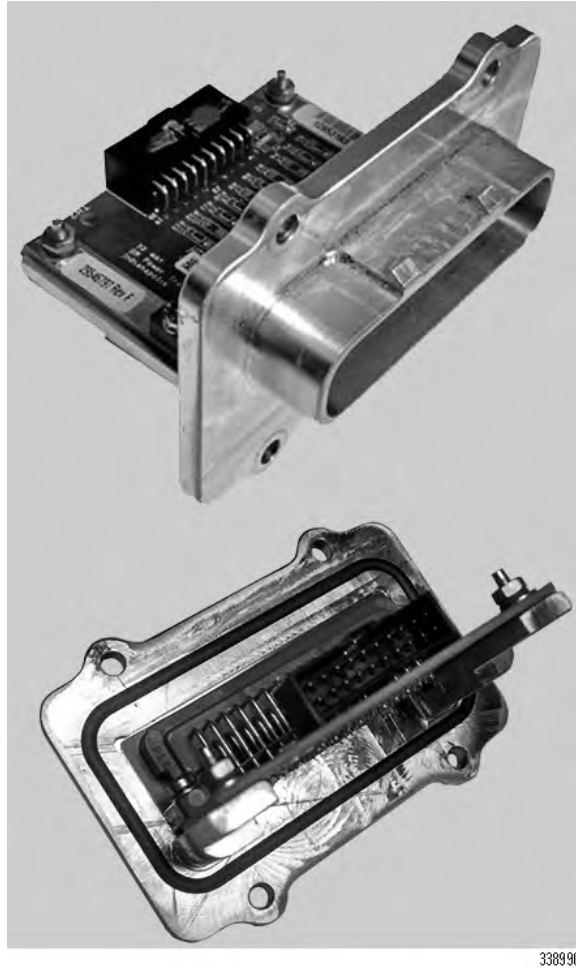


Figure 2. Encoder Card (A and B are similar)

The procedures contained in this SIL are organized into the following sections:

Section 1: Removal of Main Cover

Section 2: Removal and Replacement of the Signal Interface Card

Section 3: Removal and Replacement of the Encoder Card(s)

Section 4: Installation of Main Cover

Section 1: Removal of Main Cover



NOTE: All circuit cards in the DPIM2 are sensitive to electrostatic discharge (ESD). ESD damage can be caused by voltage levels that cannot be felt by humans. When working on the DPIM2, ALWAYS wear an ESD wrist strap to ground any possible electrostatic charge. The strap should be worn around the wrist with the alligator clip securely attached to the DPIM chassis. Refer to Figure 3.



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Figure 3. Electrostatic Discharge Wrist Strap (Typical)

1. Using a Torx-Plus® T25 bit, remove twenty-six (26) M5x18mm machine screws that secure the Main Cover to the DPIM Housing (refer to Figure 4). Set the screws aside for reassembly. Remove the Main Cover. Discard the cover gasket.



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Figure 4. DPIM Main Cover

Section 2: Removal and Replacement of the Signal Interface Card

1. Disconnect the two (2) 14-way white connectors from the signal interface card (refer to Figure 5) by releasing the clip and pulling the connectors up from the card. Do not pull on the wires.

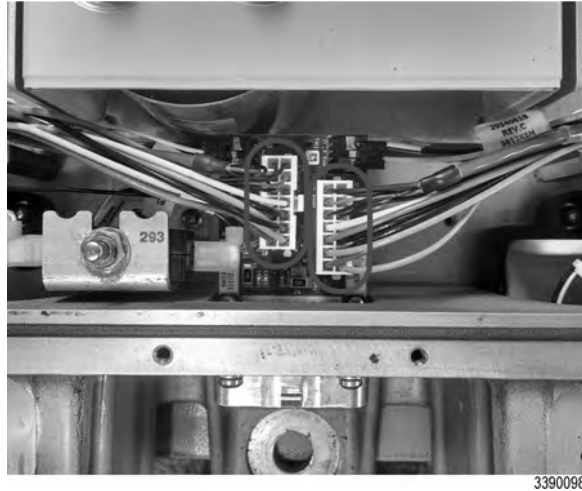


Figure 5. 14-Way White Connector Removal

2. Disconnect the three (3) HVIL switch connectors from the signal interface card (refer to Figure 6) by releasing the clip and pulling the connectors out from headers. Do not pull on the wires. Make note of which connector goes to each header on the card.

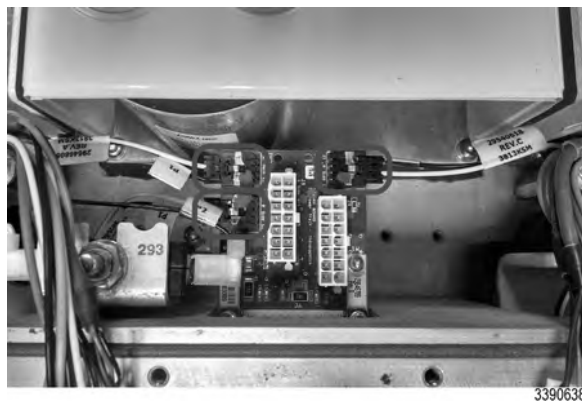


Figure 6. Three (3) HVIL Connector Removal

3. Using a Torx-Plus® T20 bit, remove the four (4) M4x14mm screws securing the signal interface card (refer to Figure 7) to the DPIM housing and remove the card. Discard the signal interface card and the EMI gasket in the mounting flange of the card.

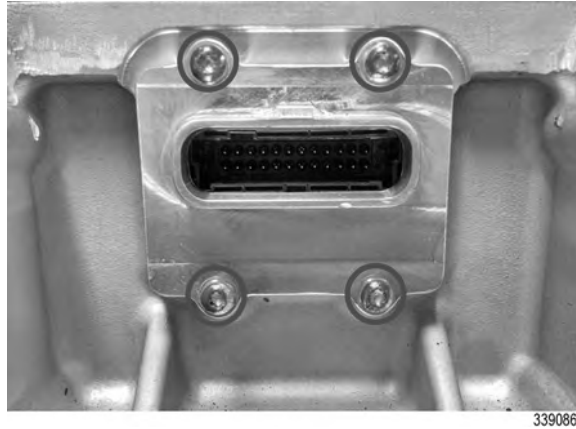


Figure 7. Signal Interface Card Mounting Screws

4. Ensure the EMI gasket mating surface on the DPIM housing is clean (refer to Figure 8).

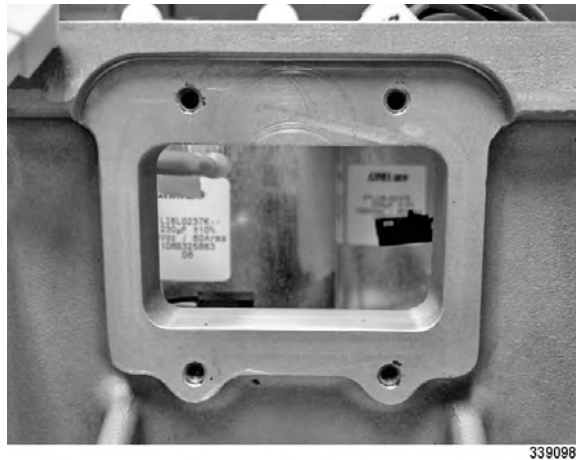


Figure 8. EMI Gasket Surface

5. Install a new EMI gasket (P/N 29540711) into the new signal interface card (P/N 29547435) mounting flange groove (refer to Figure 9). Ensure the gasket is fully seated in the groove and is not twisted, stretched, or torn. Place the new signal interface card through the DPIM housing.

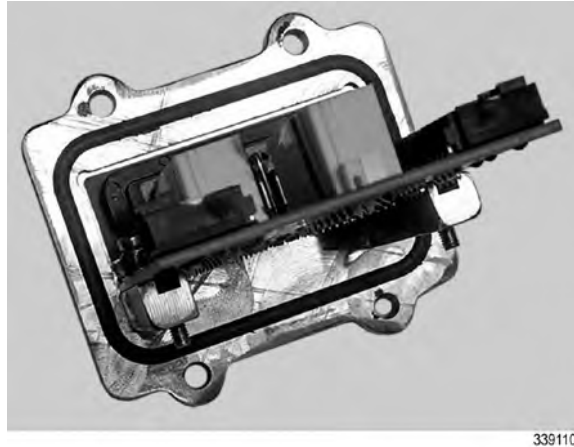


Figure 9. New EMI Gasket on New Signal Interface Card

6. Apply one drop of Loctite® 425 or Loctite® 242 thread locking compound to the end of the external threads of the four (4) M4x14mm screws. Using a Torx-Plus® T20 bit, install the four (4) M4x14mm screws securing the signal interface card (refer to Figure 10). Torque the four (4) M4x14mm screws to 1.2-1.5 N·m (10.6-13.3 in·lb).



Figure 10. Installing Signal Interface Card Mounting Screws

7. Connect the three (3) HVIL switch connectors to the appropriate header on the signal interface card (refer to Figure 11). White printed text is provided near the headers to indicate which switch goes to each header. Ensure the clips on the connector are fully seated to prevent the connectors from coming loose.

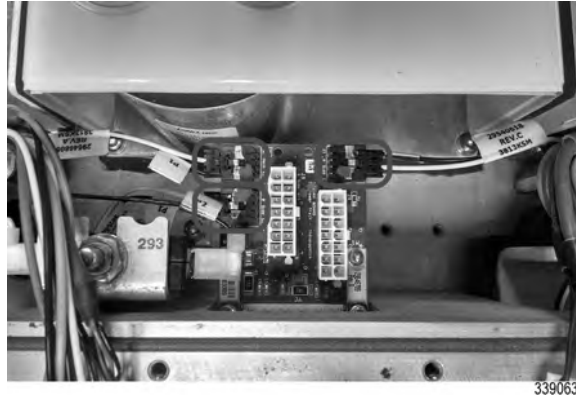


Figure 11. Three (3) HVIL Connector Installation

8. Connect the two (2) 14-way white connectors to the signal interface card (refer to Figure 12). Ensure the clips on the connectors are fully seated to prevent the connectors from coming loose.

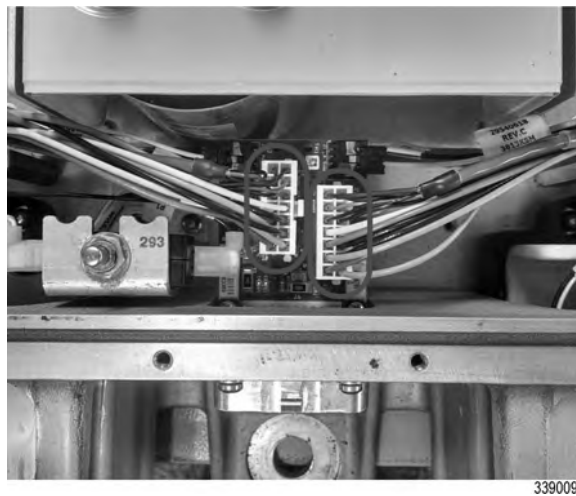


Figure 12. 14-Way White Connector Installation

Section 3: Removal and Replacement of the Encoder Card(s)



NOTE: The steps below show how to remove and replace the inverter A encoder card. Inverter B encoder card removal and replacement follows the same procedure.

1. Using a Torx-Plus® T20 bit, remove the four (4) M4x14mm screws securing the encoder card (refer to Figure 13) to the DPIM housing and remove the card.

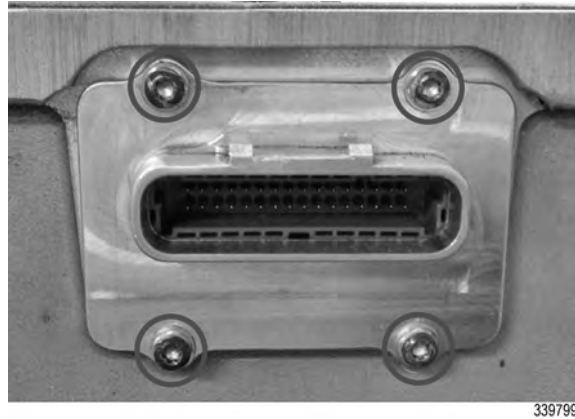


Figure 13. Encoder Card Mounting Screws

2. Using a pick or a small flat blade screwdriver, hold the tab on the internal encoder harness plug and pull the encoder card out and away from the DPIM housing (refer to Figure 14). Discard the encoder card and the EMI gasket in the mounting flange of the card.



Figure 14. Using Pick to Hold Internal Harness While Removing Encoder Card

3. Ensure the EMI gasket mating surface on the DPIM housing is clean (refer to Figure 15).

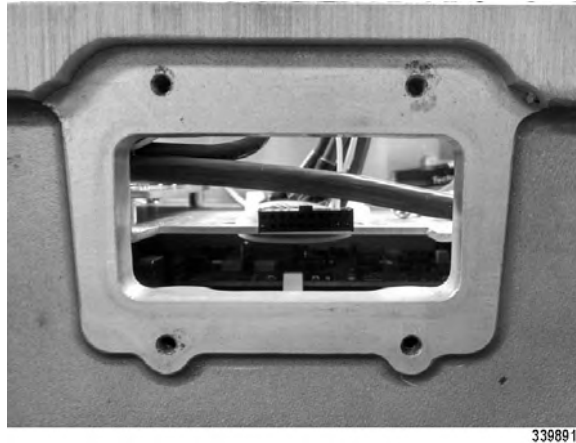


Figure 15. EMI Gasket Surface

4. Install a new EMI gasket (P/N 29540712) into the new encoder card (inverter A P/N 29547461 or inverter B P/N 29547434) mounting flange groove (refer to Figure 16). Ensure the gasket is fully seated in the groove and is not twisted, stretched, or torn. Place the new encoder card through the DPIM housing.

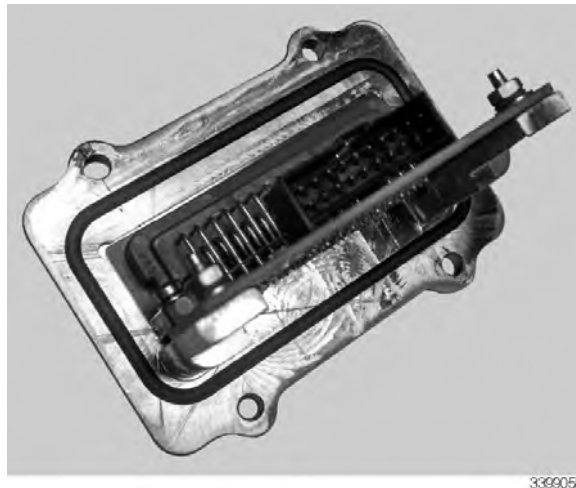


Figure 16. New EMI Gasket on New Encoder Card

5. Using both hands and with index fingers on the internal encoder harness connector, push the encoder into the DPIM with thumbs to seat the encoder harness connector into the header on the encoder board (refer to Figure 17).

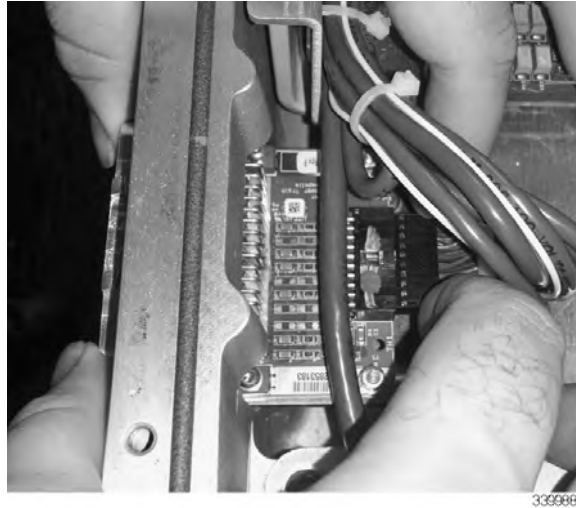


Figure 17. Holding Internal Harness Connector

6. Apply one drop of Loctite® 425 or Loctite® 242 thread locking compound to the end of the external threads of the four (4) M4x14mm screws. Using a Torx-Plus® T20 bit, install the four (4) M4x14mm screws securing the encoder card (refer to Figure 18). Torque the four (4) M4x14mm screws to 1.2-1.5 N·m (10.6-13.3 in·lb).

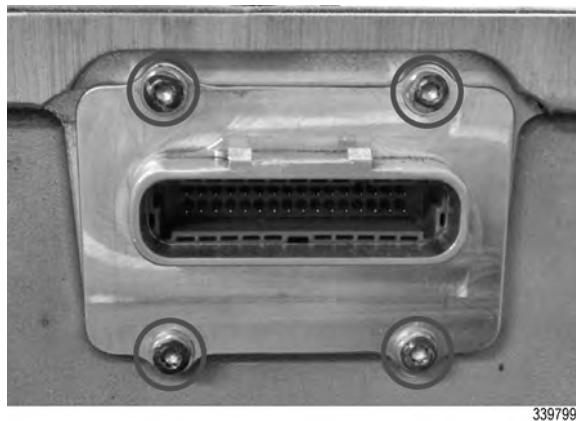


Figure 18. Encoder Card Mounting Screws

Section 4: Installation of Main Cover

1. Ensure the main cover gasket groove is clean and free of debris. Install a new DPIM main cover gasket (P/N 29540714) into the groove ensuring the gasket is fully seated in the groove and is not twisted, stretched, or torn.



NOTE: Verify that all eighteen (18) white protective caps are installed over the capacitor studs in the center of the DPIM. Reinstall or replace any missing caps as necessary.

2. Place the main cover onto the DPIM housing and lift the cover to align the holes. Sliding the cover could cause the gasket to roll out of the groove and become pinched.
3. Using a Torx-Plus® T25 bit, install and finger tighten the twenty-six (26) M5x18mm screws that secure the main cover to the DPIM housing as shown in Figure 19. Torque the screws to 3.1-3.5 N·m (27-31 in·lb).



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Figure 19. DPIM Main Cover



NOTE: For additional information refer to H 40/50 EP™ System Service Manual SM3602EN Appendix E.