DPIM UPDATES

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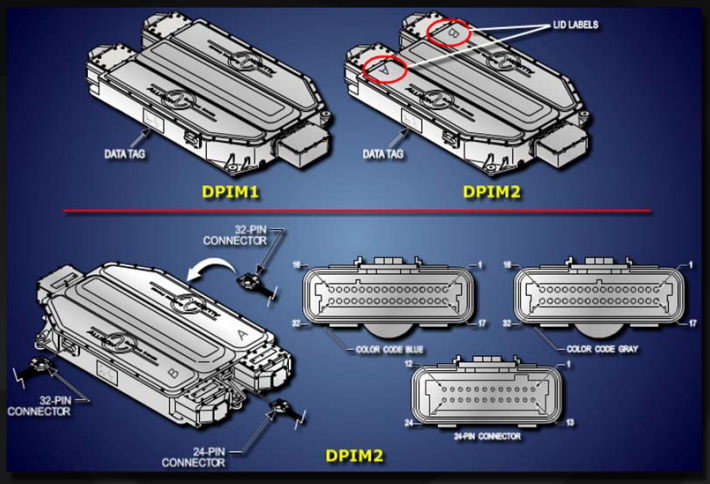
DPIM Updates

Release of DPIM2

- The second generation Dual Power Inverter Module (DPIM2) was released in November 2009, beginning with serial number 7210010001.
  - *DPIM2 lids include the letters A and B (corresponding to each motor) located just above the AC lug box covers.*
  - *The DPIM2 Motor A 32-way connector uses a blue Terminal Position Assurance (TPA) retainer rather than the red version used for DPIM1 units.*



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DPIM UPDATES

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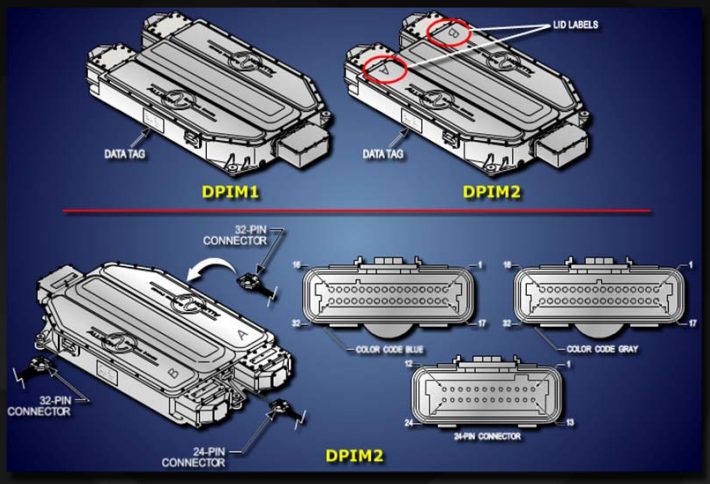
DPIM Updates

Release of DPIM2 (cont'd)

- **DPIM1 and DPIM2 are completely interchangeable with an OEM wiring harness modification.**
  - *The red DPIM1 Motor A 32-way connector TPA is keyed differently and must be replaced with the DPIM2 blue version.*
  - *Wire functions and pin numbers are the same; only the keying is different between the two TPAs.*



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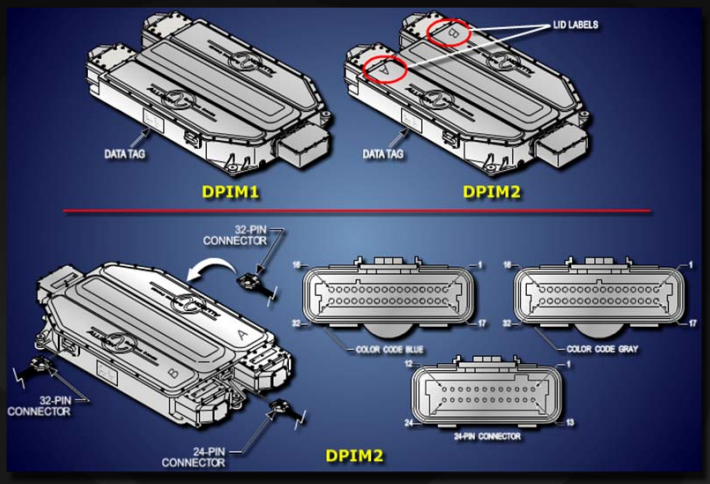
DPIM UPDATES

Release of DPIM2 (cont'd)

- **Additional differences:**
  - *DPIM2 units all include the updated cooler port thread design detailed in SIL 21-EP-06.*
  - *DPIM2 uses two rather than four processors; TCM Reflash will only display EPCU_A and EPCU_B.*
  - *DPIM2 uses different screws to retain the high voltage cables to its bus bars (updated torque is 7-8 Newton Meters or 62-71 inch pounds).*
- **Reference SIL 21-EP-09 for details.**



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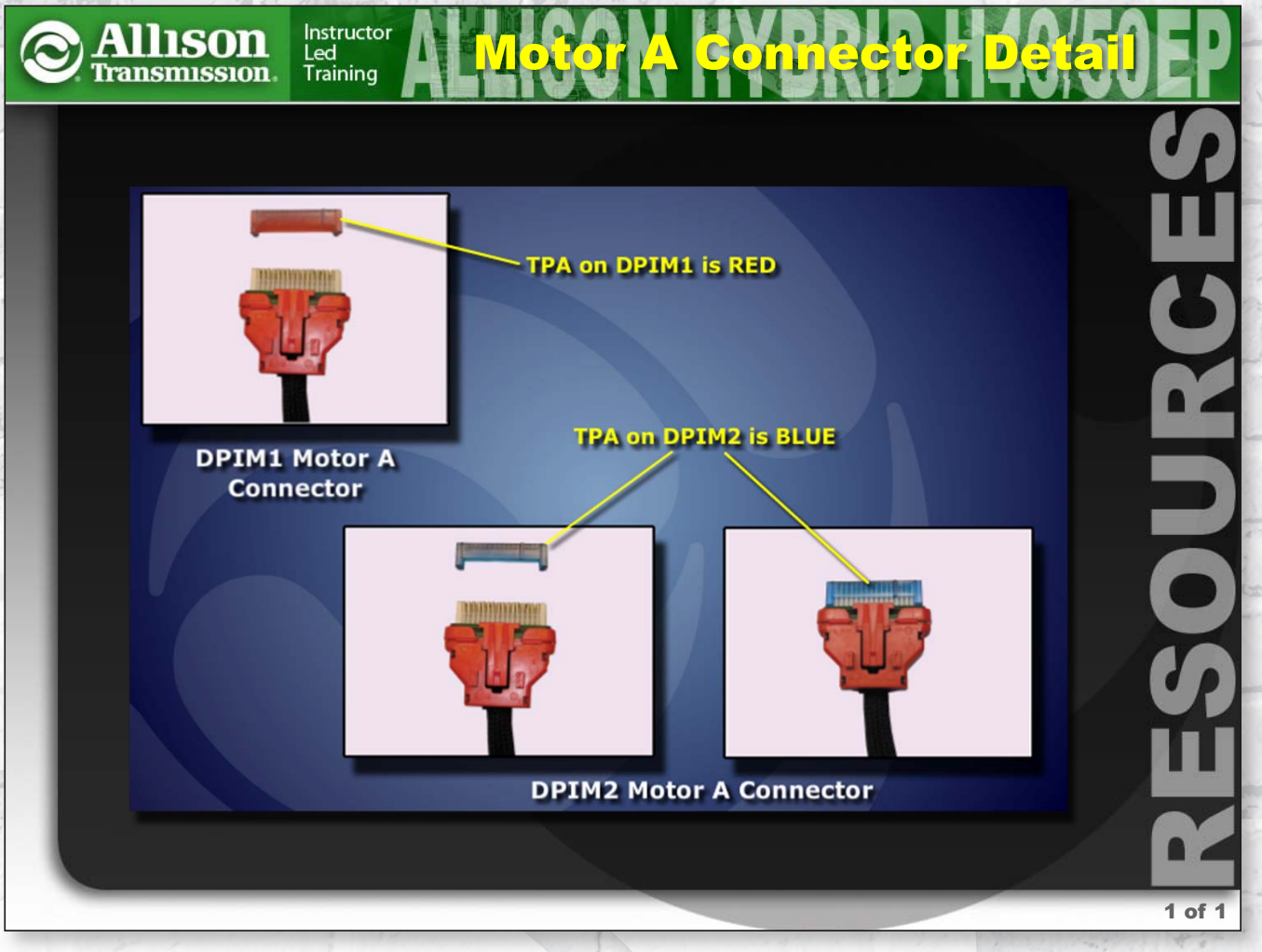
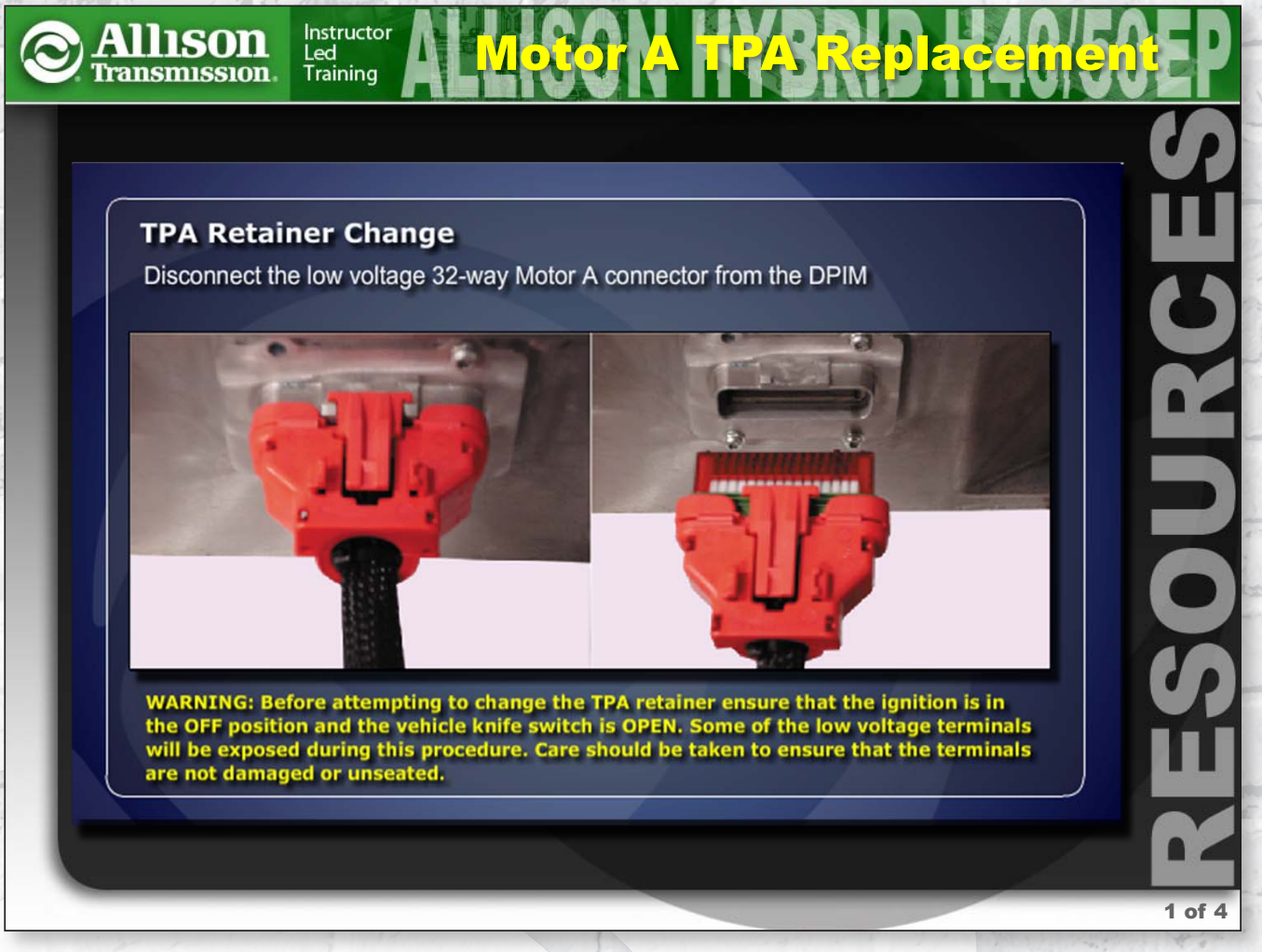
RESOURCES: Motor A Connector Detail



RESOURCES: Motor A TPA Replacement



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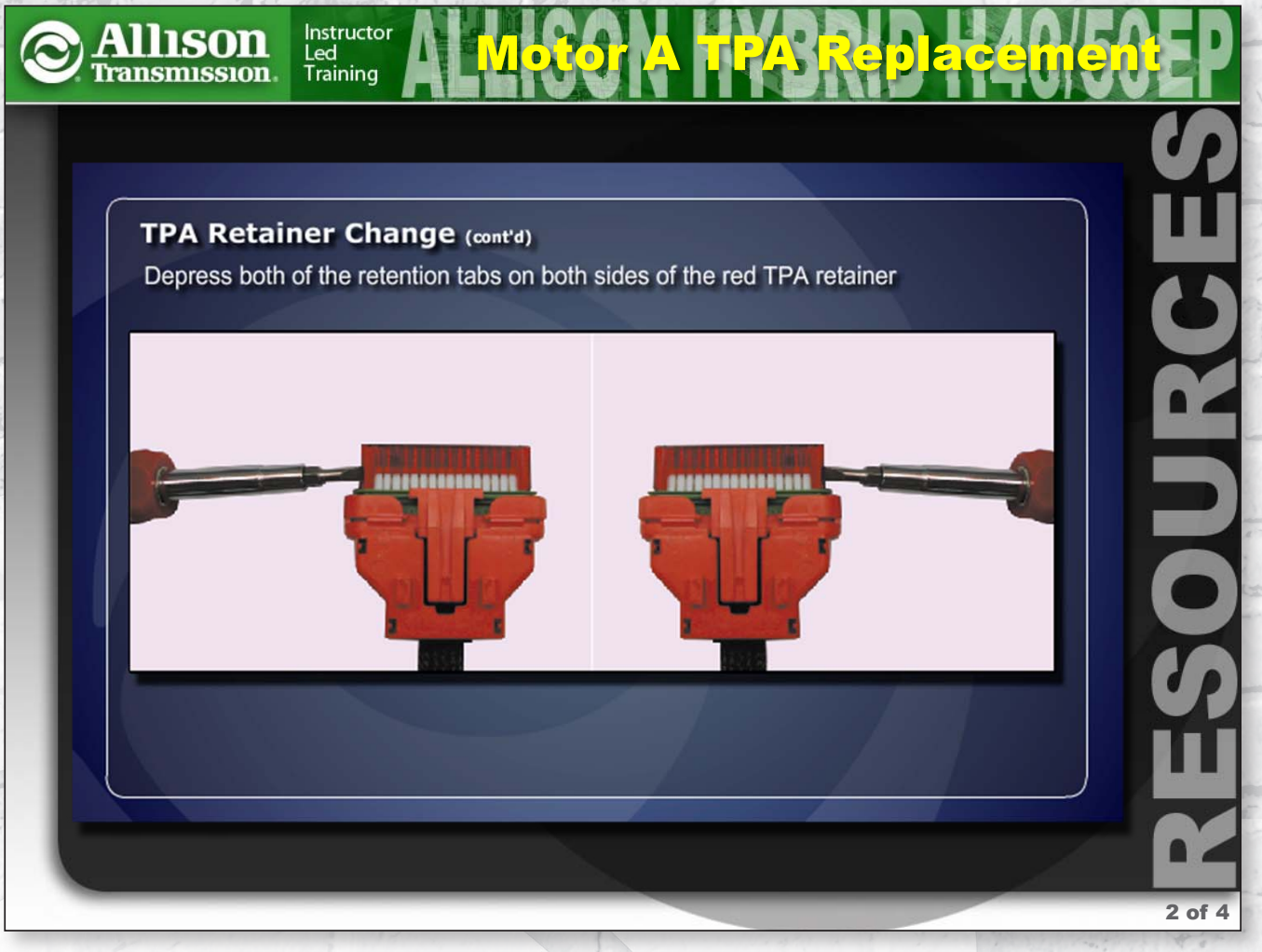
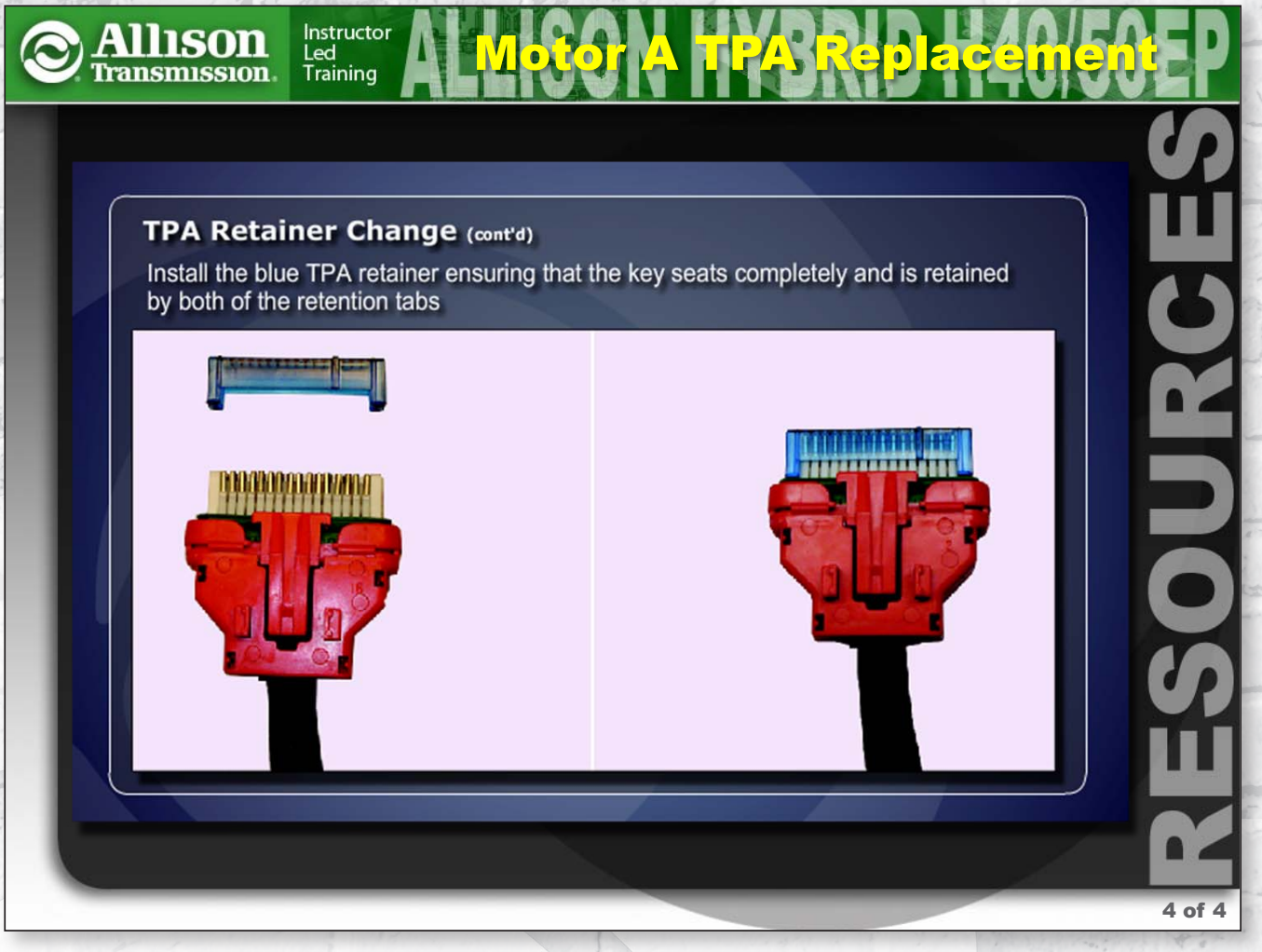
RESOURCES: Motor A TPA Replacement



RESOURCES: Motor A TPA Replacement

RESOURCES: Motor A TPA Replacement



DPIM UPDATES

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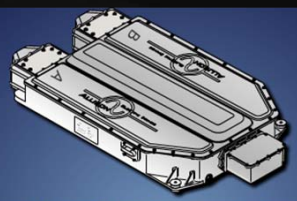
DPIM Updates

DPIM2 Software

- **All DPIM units are shipped without software – system and diagnostic tool communication requires units to be programmed with software.**
  - *SIDs are created based on hardware configuration and system application (reference SIL 2-EP-08 for details).*
  - *The 4th field in the SID identifies the vehicle's hardware configuration based on the Hardware Configuration Chart in SIL 21-EP-09.*
  - *When replacing a DPIM1 with a DPIM2, the SID must be updated so the 4th field matches the hardware configuration.*
  - *Example: "F" indicates a MY10 engine, 4th Generation TCM/VCM, DPIM2 and ESS2.*



SIL 21-EP-09 Table 1. Hardware Configuration

	Hardware Configuration			
SID Number	Engine	TCM/VCM Type	Inverter Type	Battery Pack
VVX0XXX YYY Z	MY06 or earlier	Pre 4th Gen	DPIM1	ESS1
VVX1XXX YYY Z	MY07	Pre 4th Gen	DPIM1	ESS1
VVX2XXX YYY Z	MY06 or earlier	Pre 4th Gen	DPIM1	ESS2
VVX3XXX YYY Z	MY07	Pre 4th Gen	DPIM1	ESS2
VVX4XXX YYY Z	MY06 or earlier	Pre 4th Gen	DPIM2	ESS1
VVX5XXX YYY Z	MY06 or earlier	Pre 4th Gen	DPIM2	ESS2
VVX6XXX YYY Z	MY07	Pre 4th Gen	DPIM2	ESS1
VVX7XXX YYY Z	MY07	Pre 4th Gen	DPIM2	ESS2
VVXFXXX YYY Z	MY10	4th Gen	DPIM2	ESS2

4th field in the SID indentifies hardware configuration

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DPIM UPDATES

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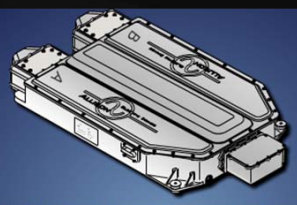
DPIM Updates

DPIM2 Software (cont'd)

- **Download the new SID as a TCM Assembly Number by adding an "HEV" prefix; for example:**
  - *A DPIM1 is being replaced with a DPIM2 in a bus with SID 64-G0001-002-U.*
  - *The TCM Assembly Number is represented by SID fields 3 through 7 (G0001), so the installing technician should log into the PCCS web server and download HEVG4001 using the TCM Assembly Number download option (the "4" in this number is the hardware configuration identifier indicating MY06 or earlier engine; Pre-4th Generation TCM/VCM; DPIM2; ESS1).*



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VVX2XXX YYY Z	MY06 or earlier	Pre 4th Gen	DPIM1	ESS2
VVX3XXX YYY Z	MY07	Pre 4th Gen	DPIM1	ESS2
VVX4XXX YYY Z	MY06 or earlier	Pre 4th Gen	DPIM2	ESS1
VVX5XXX YYY Z	MY06 or earlier	Pre 4th Gen	DPIM2	ESS2
VVX6XXX YYY Z	MY07	Pre 4th Gen	DPIM2	ESS1
VVX7XXX YYY Z	MY07	Pre 4th Gen	DPIM2	ESS2
VVXFXXX YYY Z	MY10	4th Gen	DPIM2	ESS2

4th field in the SID indentifies hardware configuration

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DPIM UPDATES

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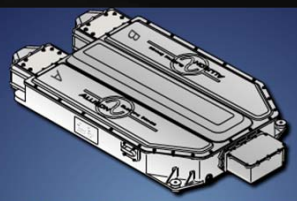
DPIM Updates

DPIM2 Software (cont'd)

- **Download the new SID as a TCM Assembly Number by adding an "HEV" prefix; for example (cont'd):**
  - *After installing the DPIM2, the entire vehicle must be reflashed with the updated SID to match the new hardware configuration (other SID fields may change compared to the original, but the hardware field should continue to indicate "4" in this example).*



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VVX**2**XXX YYY Z	MY06 or earlier	Pre 4th Gen	DPIM1	ESS2
VVX**3**XXX YYY Z	MY07	Pre 4th Gen	DPIM1	ESS2
VVX**4**XXX YYY Z	MY06 or earlier	Pre 4th Gen	DPIM2	ESS1
VVX**5**XXX YYY Z	MY06 or earlier	Pre 4th Gen	DPIM2	ESS2
VVX**6**XXX YYY Z	MY07	Pre 4th Gen	DPIM2	ESS1
VVX**7**XXX YYY Z	MY07	Pre 4th Gen	DPIM2	ESS2
VVX**F**XXX YYY Z	MY10	4th Gen	DPIM2	ESS2

4th field in the SID indentifies hardware configuration

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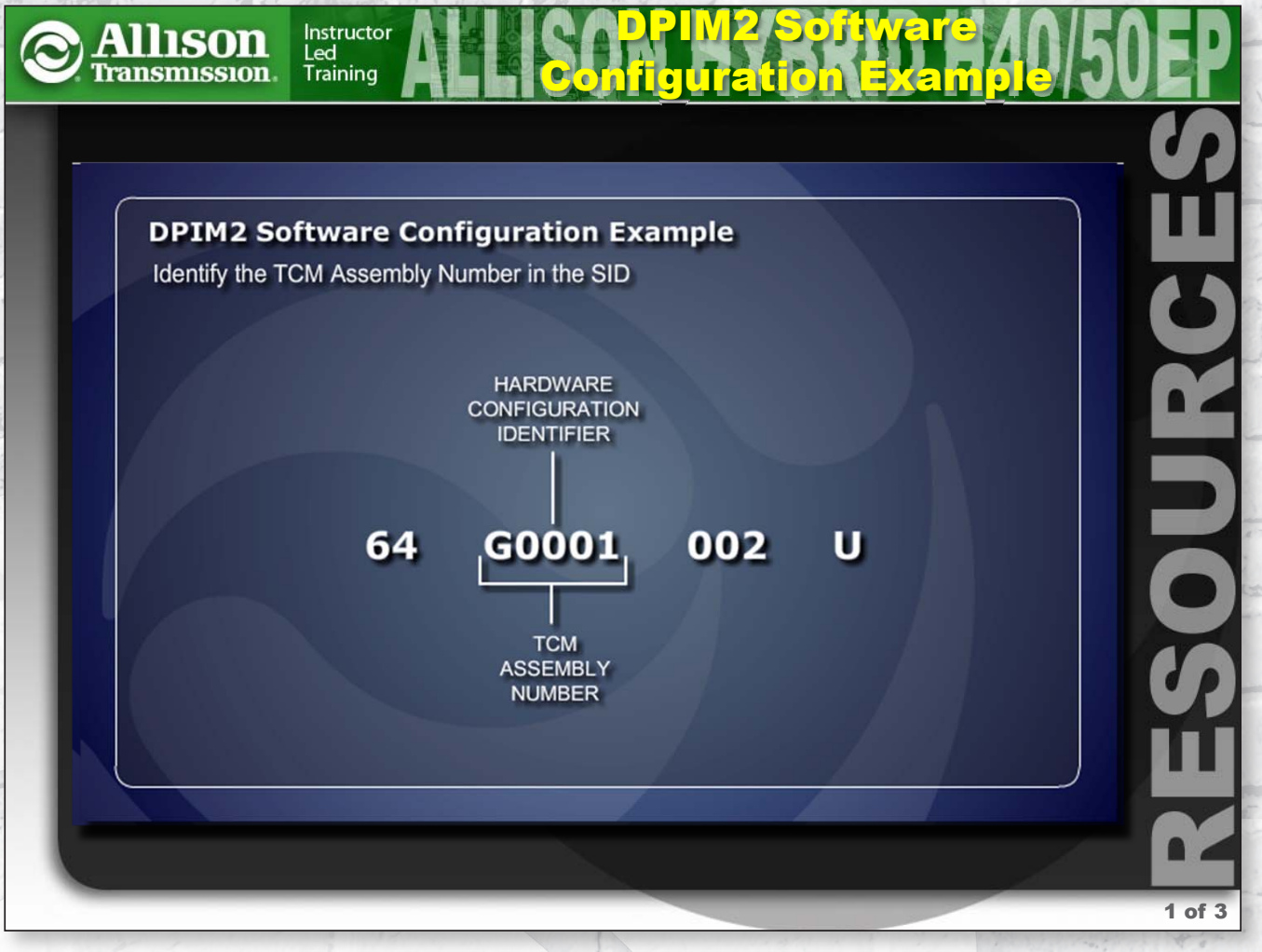
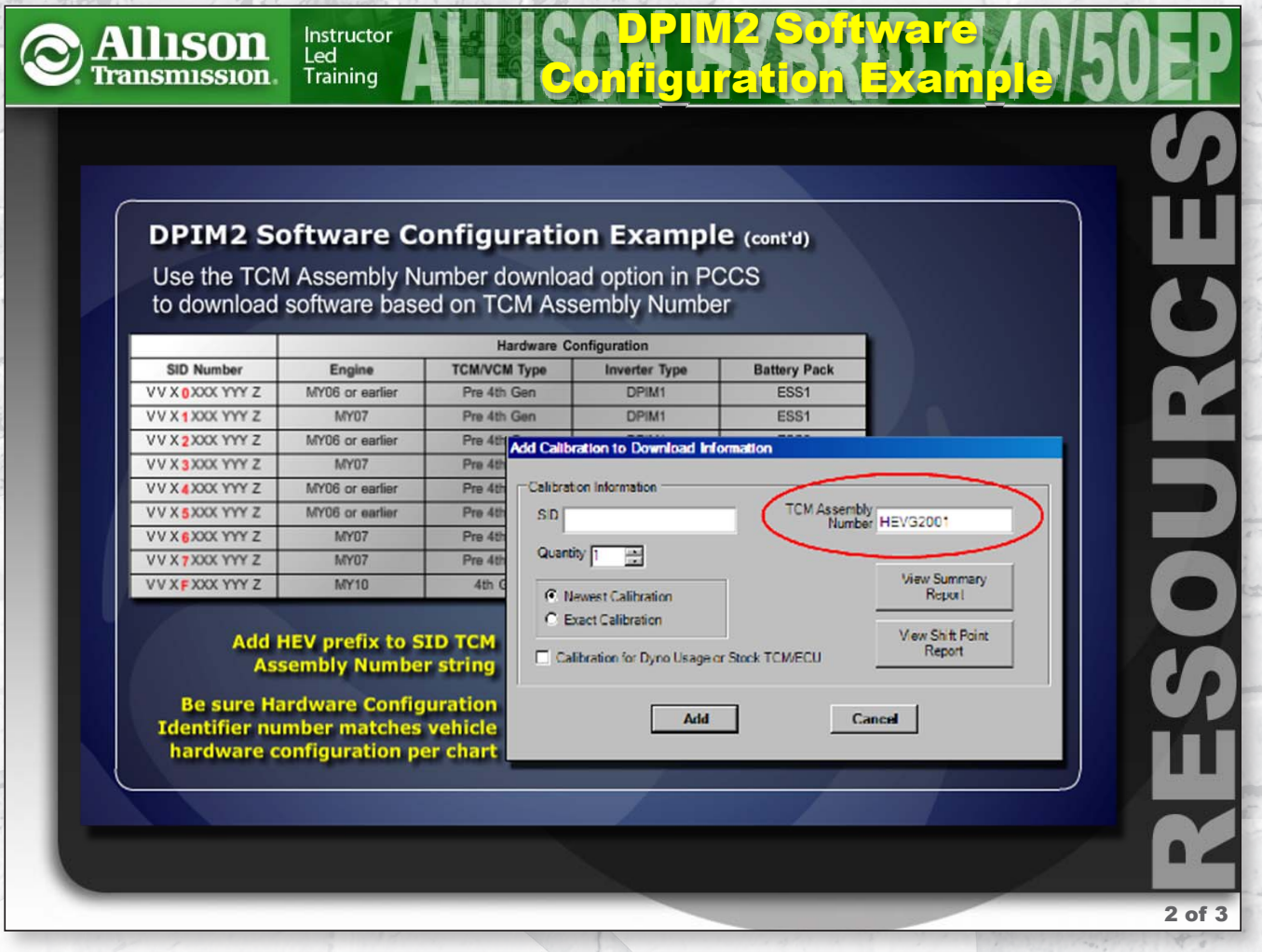
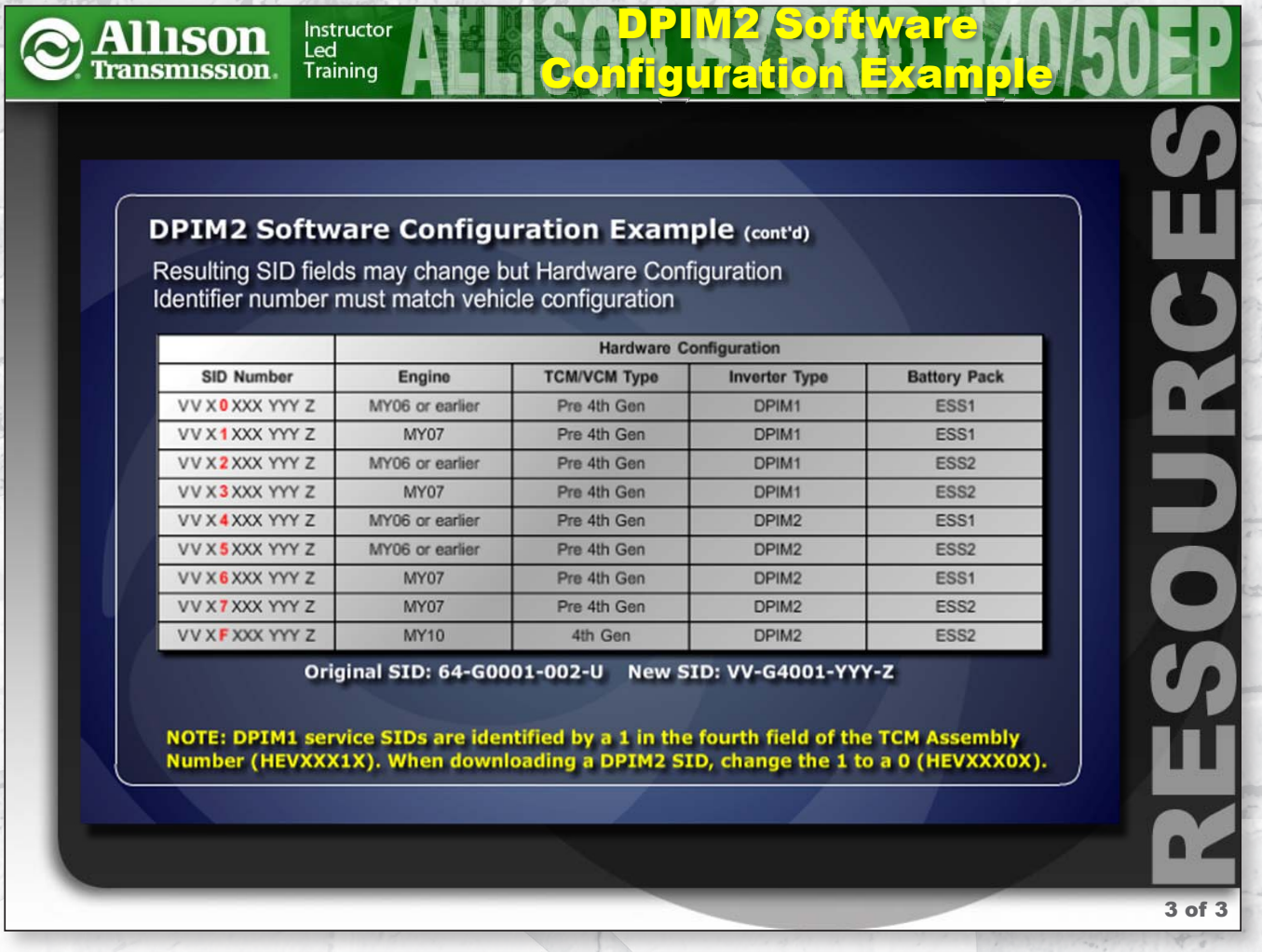
RESOURCES: DPIM2 Software Configuration Example



RESOURCES: DPIM2 Software Configuration Example



RESOURCES: DPIM2 Software Configuration Example



DPIM UPDATES

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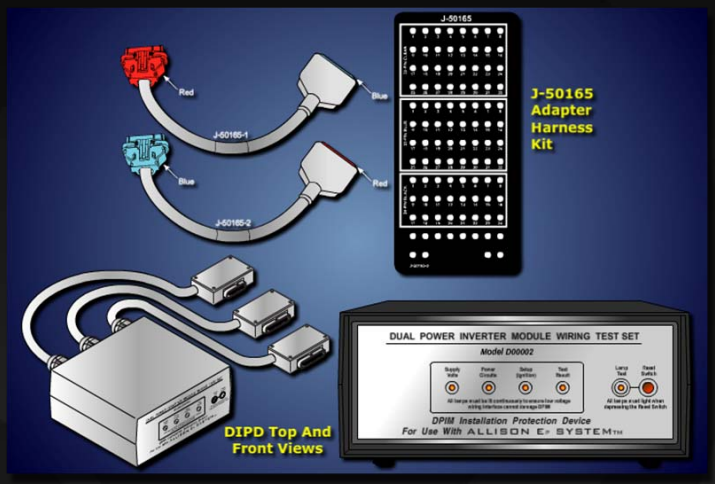
DPIM Updates

DPIM2 Special Tool and Service Kit Updates

- **J-46711 Breakout Harness Assembly can be utilized on DPIM2 units by using harness kit J-50165.**
  - *The harness kit includes two harnesses and a breakout box overlay.*
  - *Use kit harness J-50165-1 and J-50165-2 to connect the breakout harness assembly to the DPIM2*
  - *Use kit harness J-50165-1 to connect the DPIM Installation Protection Device (DIPD) to the DPIM2.*



NOTE: The DIPD will work with DPIM2 units but is not necessary due to a DPIM2 design change that protects the processors from shorts to battery supply and return at every pin.

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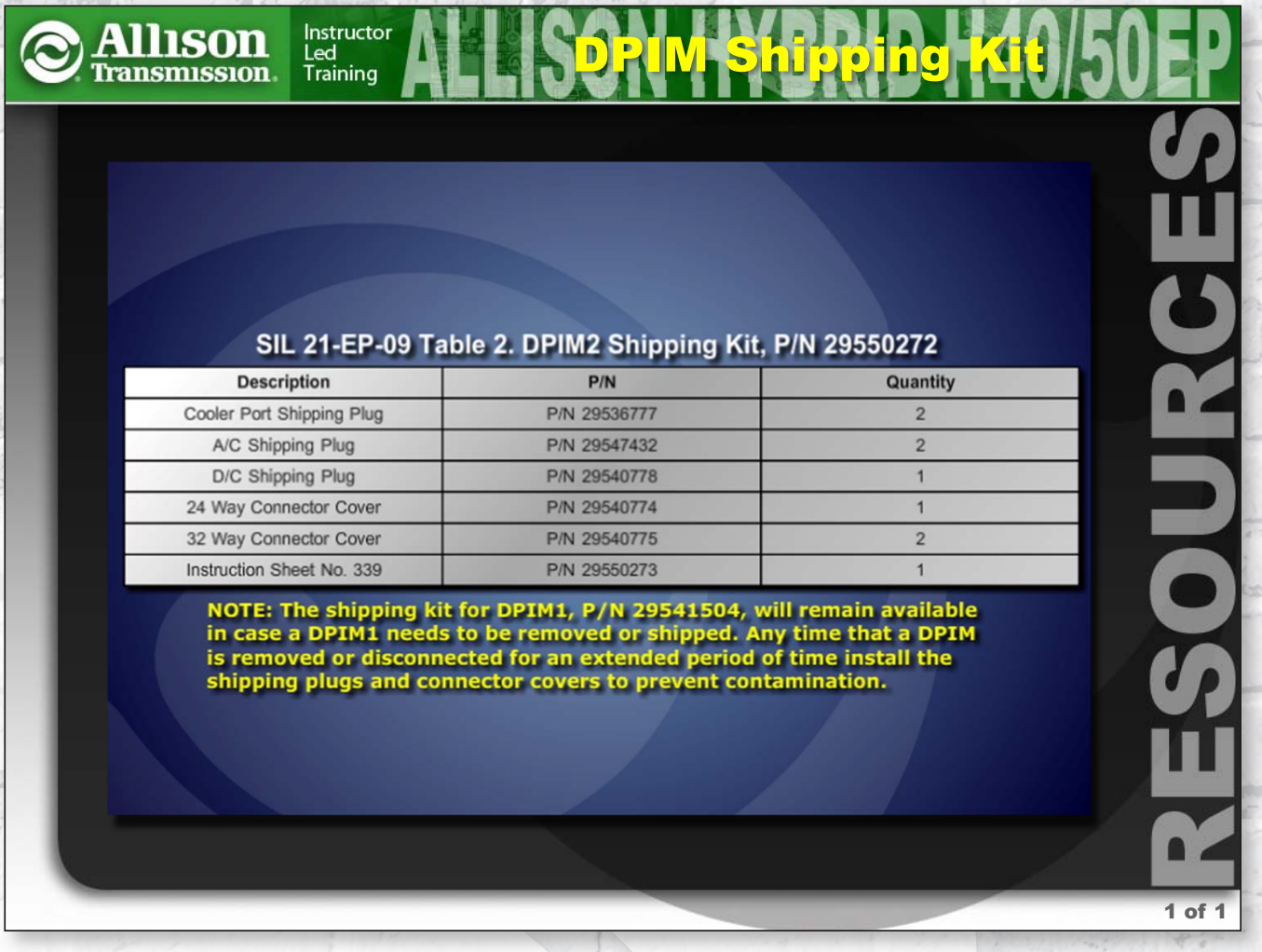
RESOURCES: DPIM Shipping Kit



DPIM UPDATES

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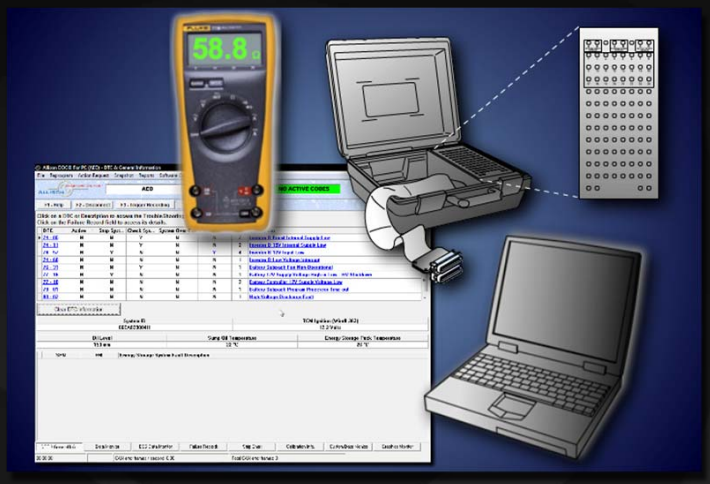
DPIM Updates

DPIM2 DTCs

- Several new DTCs were added with the introduction of DPIM2.
- SIL 21-EP-09 includes a list of DPIM2-specific DTCs plus some DTCs common to DPIM1 and DPIM2 but with different troubleshooting steps.
- The list includes three tests that apply to both DPIM1 and DPIM2:
  - *Inverter circuit test – IGBT check.*
  - *Inverter circuit test – diode tests.*
  - *Capacitor test.*
- Reference SIL 21-EP-09 Appendix A for details.



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RESOURCES: DPIM2 DTCs

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

ix A. DPIM DTCs

NOTE: The Appendix B of this SIL replaces Appendix T of the current Troubleshooting Manual TS3715. These new specifications apply to both DPIM1 and DPIM2.

- Inverter Circuit Test — IGBT Check (Page 233)
- Inverter Circuit Test — Diode Tests (Page 233)
- Capacitor Test (Page 233)

Most of the codes and troubleshooting steps in the SIL are specific to DPIM2. However, codes 73-39, 73-41, 74-39, and 74-41 can set for a DPIM1 or a DPIM2, but each DPIM requires different troubleshooting steps. If troubleshooting a DPIM1 with any of these four codes, use the current Troubleshooting Manual. If troubleshooting a DPIM2 with any of these four codes, use the troubleshooting procedure described in this SIL.

Table 3. Diagnostic Trouble Code (DTC) List

DTC Code Description	Light	Restrictive Mode	Failure Record	Page Number
DTC 73-01 (Inverter A PLD Program Error)	Check System	Disable Inverter A, Disable Special Mode	Yes	15
DTC 73-02 (Inverter A Encoder B Power Supply Out-of-Range High)	None	None	Yes	16
DTC 73-03 (Inverter A Boost Internal Supply High)	None	None	Yes	23
DTC 73-04 (Inverter A PLD Heartbeat Error)	Check System	Disable Inverter A, Disable Special Mode	Yes	26
DTC 73-05 (Inverter A Boost Internal Supply Low)	Check System	Disable Inverter A, Disable Special Mode	Yes	27
DTC 73-06 (Inverter A Encoder B Power Supply Out-of-Range Low)	None	None	Yes	30
DTC 73-08 (Inverter A 15V Internal Supply High)	None	None	Yes	37
DTC 73-09 (Inverter A Drive Unit Temperature Circuit)	Check System	Inverter A torque is limited to 70%	Yes	40
DTC 73-10 (Inverter A Phase C, Low IGBT Saturation Fault)	Check System	Disable Inverter A, Disable Special Mode	Yes	45
DTC 73-11 (Inverter A 15V Internal Supply Low)	Check System	Disable Inverter A, Disable Special Mode	Yes	51
DTC 73-16 (Inverter A Phase B, Low IGBT Saturation Fault)	Check System	Disable Inverter A, Disable Special Mode	Yes	54
DTC 73-20 (Inverter A HVIL Short to Ground)	Check System	None	Yes	60
DTC 73-22 (Inverter A Over-current Circuit Error)	None	None	Yes	65
DTC 73-34 (Inverter A Phase C Current Sensor Out-of-Range)	None	None	Yes	66

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DPIM UPDATES

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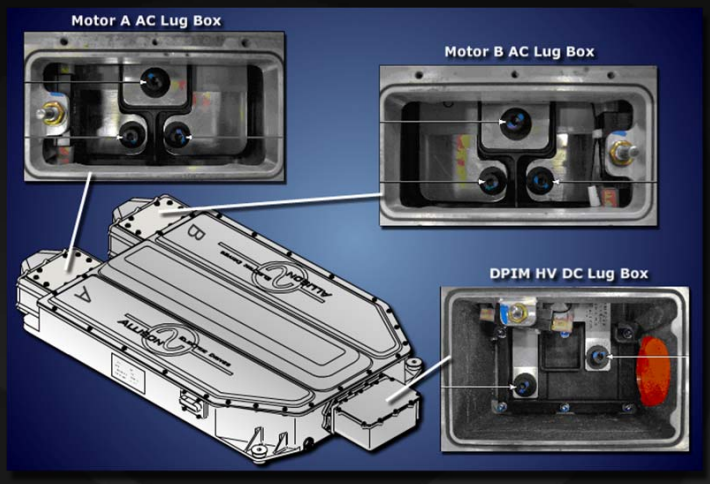
DPIM Updates

DPIM High Voltage Lug Bolts

- **DPIM1 uses varying fasteners for high voltage lug connection.**
  - *Motors A and B Phase A and Phase C lugs use a 25mm long, plated lug bolt (part of kit 29541537).*
  - *DC positive and negative lugs use a 25mm long, plated lug bolt (part of kit 29541537).*
  - *Motors A and B Phase B lugs use a 45mm long, plated lug bolt (part of kit 29541510).*
  - *Both kits include locking and flat washers to accompany the lug bolts.*



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DPIM UPDATES

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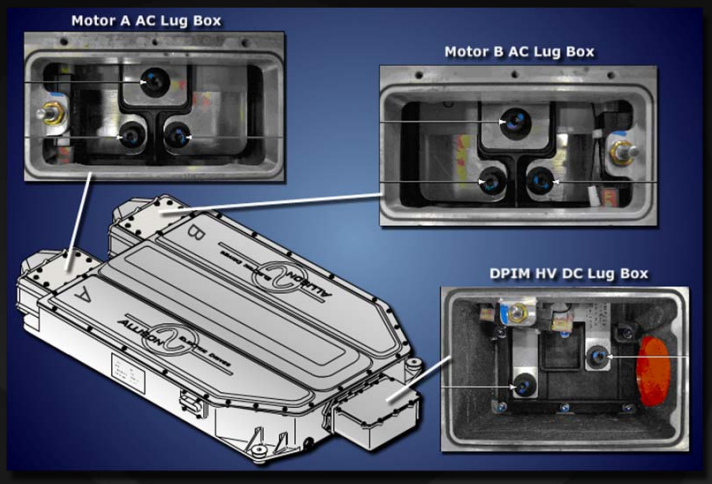
DPIM Updates

DPIM High Voltage Lug Bolts (cont'd)

- DPIM2 uses a single fastener for all lug bolts.
  - *Part number 29548555 is 29mm long with a black oxide finish and captive washers.*
- Reference SIL 20-EP-10 for details.



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DPIM UPDATES

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DPIM Updates

DPIM Cooling System Flush Procedures

- **The DPIM should not be flushed if drive unit fluid becomes contaminated.**
  - *Fluid pressure inside the DPIM is equal to drive unit lube pressure (approx. 4-10 psi).*
  - *Flush carts often exceed this pressure limit and should never be used to clean contaminated DPIMs.*
  - *The use of a flushing cart or any type of pressurized flushing equipment risks DPIM internal seal failure resulting in fluid leaks into the DPIM and high voltage lug boxes.*
  - *As an alternative, Allison recommends removing the DPIM, draining it of all fluid and then reinstalling the DPIM to the vehicle.*
- **Reference SIL 25-EP-10 for details.**

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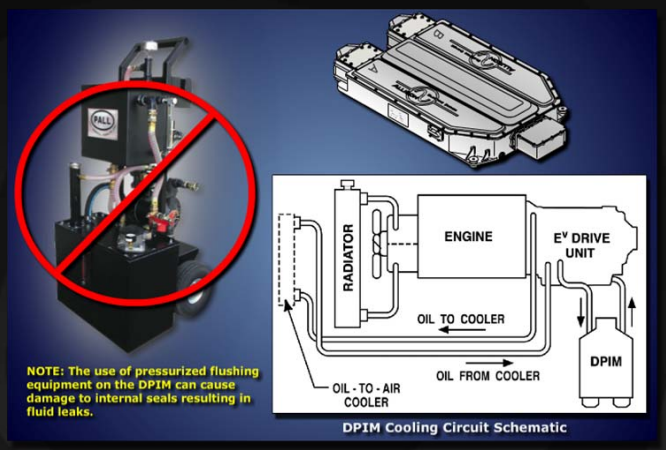

DPIM Cooling Circuit Schematic

Fully draining the DPIM will sufficiently remove contaminates.

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