GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
B. Reduced Retarder Effect	Retarder accumulator solenoid not being energized	Correct cause for setting these codes: P2685, P2686, P2736, P2738, P2739, C1312, or C1313
	TCM sensing false overheat condition	Use Allison DOC™ For PC–Service Tool or VOM to check retarder temperature sensor. Replace sensor as required.
	Normal response to overheating: • higher retarder fluid temperature • higher engine coolant temperature • higher sump temperature	See Table 6–7 in Section 6 (DTC P0218, P2740)
C. Less Retarder Effect Than Expected	Transmission fluid aerated due to incorrect level	Determine transmission fluid level and correct as required
	Wrong retarder control calibration	Measure retarder charging pressure. Change retarder control calibration, if necessary.
ABNORMAL ACTIVITIES OR RESPONSES		
A. Excessive Creep in First and Reverse Gears	Engine idle speed too high	Adjust to correct idle speed—between 500–800 rpm. Refer to vehicle service manual.
B. No Response to Shift Selector	Shift selector not properly connected	Test shift selector response with Allison DOC™ For PC–Service Tool. If no response, inspect remote connection and replace if necessary
	Using wrong shift selector on dual station equipment	Use other selector
	Faulty shift selector	Replace shift selector
	Incorrect fluid level	Correct fluid level. Refer to appropriate transmission mechanic's tips for proper dipstick calibration.
	Main pressure low	Refer to Low Pressure section
	Logic latch valves sticking (C1, C3, or C5 clutch pressure low)	Overhaul valve body assembly. Refer to appropriate transmission service manual.
C. Vehicle Moves Forward in Neutral*	C1 clutch failed or not released	Rebuild C1 clutch assembly. Refer to appropriate transmission service manual.
D. Vehicle Moves Backward in Neutral*	C3 clutch failed or not released	Rebuild C3 clutch assembly. Refer to appropriate transmission service manual.

* See explanation of NVL in Section 2–3.

GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
D. Vehicle Moves Backward in Neutral*	C3 clutch failed or not released	Rebuild C3 clutch assembly. Refer to appropriate transmission service manual.
EXCESSIVE FLARE — ENGINE OVERSPEED ON FULL-THROTTLE UPSHIFTS	TPS Adjustment:	
	— Overstroke	— Adjust TPS linkage for proper stroke (Appendix F)
	— Loose	— Tighten loose bolts or connections
	Incorrect calibration	Correct calibration
	TCM input voltage low	Test electrical system and all connections from battery and TCM
	Incorrect fluid level	Correct fluid level. Refer to appropriate mechanic's tips for proper dipstick calibration measurements.
	Low main pressure	See Low Pressure section
	Erratic speed sensor signal	Refer to DTC P0716, P0721, or P0726
	Sticking solenoid regulator valve (see Solenoid and Clutch sections)	Clean and repair solenoid regulator valve. Refer to appropriate transmission service manual.
	Piston seals leaking or clutch plates slipping in range involved (see Range Clutch Troubleshooting section)	Overhaul transmission. Refer to appropriate transmission service manual.
RANGE CLUTCH TROUBLESHOOTING SECTION		
EXCESSIVE SLIPPAGE AND CLUTCH CHATTER	Incorrect calibration	Verify calibration
	TCM input voltage low	Test power, ground, charging system, and battery functions
	Throttle position sensor out of adjustment or failed	Adjust or replace throttle position sensor (Appendix F)
	Incorrect speed sensor readings	Refer to DTC P0716, P0721, or P0726
	Incorrect fluid level	Correct fluid level. Refer to appropriate mechanic's tips for proper dipstick calibration measurements.
	Main pressure low	Refer to the Low Pressure section

* See Appendix B—Measure main pressure, clutch pressure, and pressure specifications.

GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
EXCESSIVE SLIPPAGE AND CLUTCH CHATTER *(cont'd)*	Lockup clutch not applied	Inspect lockup clutch system wiring, pressure, and controls; repair as necessary. Refer to appropriate transmission service manual.*
A. Ranges 1, 2, 3, 4 Only (6-speed and 3000 7-speed) Ranges Lo, 1, 2, 3, 4 only (4000 7-Speed)	C1 clutch slipping, leaks at splitline gasket, leaks at rotating clutch seals, leaks at piston seals, C1 clutch plates worn	Inspect control module gasket, C1 clutch plates, and piston and rotating seals; replace/rebuild as necessary. Refer to appropriate transmission service manual.*
B. Ranges 4, 5, 6 Only (6-speed, 7-speed)	C2 clutch slipping, leaks at splitline gasket, leaks at rotating clutch seals, leaks at piston seals, C2 clutch plates worn	Inspect control module gasket, C2 clutch plates, and piston and rotating seals; replace/rebuild as necessary. Refer to appropriate transmission service manual.*
C. Ranges 3, 5, R Only (6-speed and 4000 7-speed) Ranges Lo, 3, 5, R only (3000 7-speed)	C3 clutch slipping, leaks at face seals, leaks at piston seals, C3 clutch plates worn	Inspect control module face seals, C3 clutch plates, and piston seals; replace/rebuild as necessary. Refer to appropriate transmission service manual.*
D. Ranges 2, 6 Only (6-speed and 7-speed)	C4 clutch slipping, leaks at face seals, leaks at piston seals, C4 clutch plates worn	Inspect control module face seals, C4 clutch plates, and piston seals; replace/rebuild as necessary. Refer to appropriate transmission service manual.*
E. Ranges 1, R Only (6-speed and 7-speed)	C5 clutch slipping, leaks at face seals, leaks at piston seals, C5 clutch plates worn	Inspect control module face seals, C5 clutch plates, and piston seals; replace/rebuild as necessary. Refer to appropriate transmission service manual.*
F. Range Lo Only (7-Speed)	C6 clutch slipping, leaks at splitline gasket(s), leaks at piston seals, C6 clutch plates worn	Inspect control module gasket, adapter gasket, T-Case gasket(s) C6 clutch plates, and piston seals; replace/rebuild as necessary. Refer to appropriate transmission service manual.*
	LOW PRESSURE SECTION	
A. Low Main Pressure in All Ranges (Including C6, T-Case)	Incorrect fluid level	Correct fluid level. Refer to the appropriate mechanic's tips for correct dipstick calibration.*
	Oil filter element clogged or faulty	Replace oil filter. Refer to the appropriate mechanic's tips.

* See Appendix B—Measure main pressure, clutch pressure, and pressure specifications.

GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
A. Low Main Pressure in All Ranges (Including C6, T-Case) (cont'd)	Plugged or faulty suction filter	Clean or replace oil suction filter element and refill the transmission. Refer to the appropriate mechanic's tips.
	Main pressure regulator valve sticking	Overhaul control module assembly. Refer to appropriate transmission service manual.
	Main pressure regulator valve spring weak, broken, or missing	Test spring and replace if necessary. Refer to appropriate transmission service manual.
	Control module body leakage (separator plate not flat, separator plate gasket leakage, loose control valve body bolts)	Replace or rebuild control module assembly. Care should be taken when removing and labeling shift springs. Refer to appropriate transmission service manual.
	Faulty or incorrect fluid pressure gauge	Repair or replace gauge
	Oil pump worn or damaged	Replace or rebuild oil pump. Refer to appropriate transmission service manual.
B. Clutch Pressure Low in Specific Ranges, Normal Pressure in Other Ranges		See Range Clutch Troubleshooting section and Appendix B
C. Low Lubrication Pressure	Incorrect fluid level	Correct fluid level. Refer to the appropriate mechanic's tips for proper dipstick calibration.
	Plugged lube filter	Change filter. Refer to the appropriate mechanic's tips.
	Excessive internal fluid leakage	Measure other pressures (above items); also inspect control module mounting bolts; lubrication valve and spring. Refer to appropriate transmission service manual.
	Broken or damaged converter regulator retaining pin	Replace damaged or broken parts. Refer to appropriate transmission service manual.
	Cooler lines restricted or leaking	Inspect for kinks, leakage; reroute or replace lines as necessary

GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
C. Low Lubrication Pressure (cont'd)	Lubrication valve sticking	Replace lubrication valve
	Cooler plugged	Clean or replace cooler
	Faulty gauge	Repair or replace gauge
STALLS IN FIRST RANGE		
A. High Stall Speeds	Not in gear	Select **D** (Drive)
	Low fluid level, aerated fluid	Add fluid to proper level. Refer to the appropriate mechanic's tips for proper dipstick calibration.
	Incorrect torque converter	Replace torque converter. Refer to appropriate transmission service manual.
	Clutch pressure low	Refer to Low Pressure section and Appendix B
	C1 or C5 clutch slipping. ***NOTE: Use the Allison DOC™ For PC–Service Tool to check turbine speed.***	Rebuild C1 or C5 clutch. Refer to appropriate transmission service manual.
	Higher power engine	Confirm proper engine match
B. Low Stall Speeds	Engine not performing efficiently (may be due to plugged or restricted injectors, high altitude conditions, dirty air filters, out of time, throttle linkage, electronic engine controls problem)	Refer to vehicle engine manufacturer's manual or vehicle service manual
	Stall speeds of 66 percent of normal implies freewheeling stator	Replace or rebuild converter assembly. Refer to appropriate transmission service manual.
	Incorrect torque converter	Install correct torque converter. Refer to appropriate transmission service manual.
OVERHEATING IN ALL RANGES	Aerated fluid—incorrect fluid level	Adjust fluid to proper level, check for defective pump. Refer to the appropriate mechanic's tips and transmission service manual.
	Air flow to cooler obstructed	Remove air flow obstruction
	Engine overheat	Correct overheat situation. Refer to vehicle service manual.

GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
OVERHEATING IN ALL RANGES *(cont'd)*	Inaccurate temperature gauge or sending unit	Replace gauge and/or sending unit
	Inaccurate sump temperature sensor	Replace temperature sensor or internal harness. Refer to appropriate transmission service manual.
	Transmission cooler lines reversed	Connect cooler lines properly (oil and water should flow in opposite directions)
	Fluid cooler lines restricted	Remove restrictions, clean or replace lines. Refer to vehicle service manual.
	Torque converter (wrong converter, no lockup, stuck stator, or slipping stator)	Replace or repair converter assembly. Refer to appropriate transmission service manual. ***NOTE: Stuck stator will not allow cool down in neutral.***
	Cooler flow loss due to internal leakage	Overhaul transmission. Refer to appropriate transmission service manual.
	Inadequate cooler sizing	See vehicle OEM for specifications
	Excessive cooler circuit pressure drop	Test for plugged cooler, lines too small, collapsed hose, too many elbows in circuit
FLUID COMES OUT OF THE FLUID FILL TUBE AND/OR BREATHER	Dipstick loose	Tighten cap, replace if necessary
	Fluid level too high	Drain to proper level. Refer to the appropriate mechanic's tips.
	Fluid level too low	Add fluid to proper level
	Breather stopped up—clogged	Clean or replace breather. Refer to appropriate transmission service manual.
	Fluid contaminated with foreign liquid	Drain and replace fluid. Locate and fix source of additional fluid. Refer to appropriate transmission service manual if repair is needed.
	Dipstick or fill tube seal worn	Replace seal or dipstick
	Incorrect dipstick marking	Calibrate dipstick. Refer to the appropriate mechanic's tips.

GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
NOISE OCCURRING INTERMITTENTLY (BUZZING)	Low fluid level	Add fluid to proper level. Refer to the appropriate mechanic's tips for proper dipstick calibration.
	Air leak in oil suction screen canister	Replace oil suction screen canister. Refer to appropriate transmission service manual.
	Clogged filters	Replace filters. Refer to the appropriate mechanic's tips.
	Aerated fluid causes noisy pump	Correct fluid level. Refer to the appropriate mechanic's tips for proper dipstick calibration.
	Low main pressure causes main regulator valve to oscillate	See Low Pressure section
LEAKING FLUID (OUTPUT SHAFT)	Faulty or missing seal at output flange	Install new lip-type seal in rear of transmission housing. Refer to appropriate transmission service manual.
	Machine lead on output flange seal surface	Replace flange
	Flange worn at seal surface	Replace flange
	Insufficient seal around seal OD	When replacing seal, apply sealant. Refer to appropriate transmission service manual.
	Damaged, missing, or loose output flange bolts	Replace and/or torque output flange bolts
	Damaged or missing flange button O-ring	Replace flange button O-ring
	Damaged or missing bolt O-rings	Replace O-rings
TRANSMISSION INPUT	Front seal leaks	Replace front seal. Refer to appropriate transmission service manual.
	Converter leaks	Inspect converter seals, cracked converter pump tangs, converter cover, or converter housing porosity; replace parts as required. Refer to appropriate transmission service manual.
	PTO driveline out of specification	Bring driveline into specification

GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
DIRTY FLUID	Failure to change fluid and filters	Change fluid and install new filters. Refer to the appropriate mechanic's tips.
	Excessive heat	Refer to Overheating section
	Damaged fluid filter/seals	Replace oil filter/seals. Refer to the appropriate mechanic's tips.
	Substandard fluid	Use recommended fluid. Refer to the appropriate mechanic's tips.
	Clutch/transmission failure	Overhaul transmission. Refer to appropriate transmission service manual.
	POWER TAKEOFF (PTO)*	
A. Leaks	Damaged or cocked seal	Replace seal
	PTO flange grooved at seal	Replace PTO flange
	Loose flange	Inspect flange and bolts; replace if necessary and properly torque bolts
	Loose bolts or damaged gaskets	Replace gasket and/or properly torque bolts
	Loose or damaged hydraulic lines (clutched drive)	Tighten fittings. Replace if necessary.
B. Noisy PTO	Faulty driven component	Replace faulty driven component
	Gears or bearings worn, damaged, or contaminated	Rebuild PTO with new gears or bearings
C. No or Intermittent Operation (Clutched Drive)	Electrical problem (switch, connectors, solenoid, or wires)	Inspect for electrical problem and repair (Appendix E)
	Damaged or worn clutch	Rebuild clutch assembly
	Clutch piston seals damaged or missing	Rebuild clutch assembly
	Inadequate fluid pressure to PTO	Inspect and repair fluid pressure supply; line kinked, loose, or plugged; orifice too small
	Engine speed outside operating band	Increase or reduce engine speed to move within operating band
	Drive or driven gear teeth damaged	Replace damaged gears. Refer to appropriate transmission service manual.

* Contact your nearest Allison dealer/distributor with specific questions relating to PTO repair.

GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
	TRANSFER CASE (T-CASE)	
A. Will Not Go Into Lo Range	TPS adjustment	Properly adjust TPS (Appendix F)
	Engine speed too high	Reduce Engine Speed
	Wrong calibration	Calibrate properly
	Wrong control module (6 speed instead of 7 speed)	Install correct control module
	Faulty wiring, solenoid connectors	Inspect wiring and connectors in control module. Refer to appropriate transmission service manual.
	Faulty C6 seals	Replace C6 assembly piston seals. Refer to appropriate transmission service manual.
	Worn C6 clutch plates	Rebuild C6. Refer to appropriate transmission service manual.
B. Makes Excessive Noise	Improperly shimmed bearings	Inspect all T-case bearings as directed in transmission repair manual. Reshim as necessary.
C. No Front Output Drive	Differential clutch bad (C7 piston seals, C7 rotating seals, C7 clutch plates, C7 check ball)	Rebuild differential clutch. Refer to appropriate transmission service manual.
	C7 electrical (wires, solenoids, terminals, connectors)	Inspect and repair C7 electrical system (Appendix E)
D. Transmission Fluid Leaks	Damaged output seal, output flange seal journal, gasketed mating surfaces, bearing endcaps, electrical connector, oil scavenge line	Determine source of leak and repair. Refer to appropriate transmission service manual.

GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–2. Resistance Module Troubleshooting Data

Description	Resistance Test in Resistance Module*		Voltage Signal**		Wiring to Control Device
	Terminals	Resistance KΩ ± 5%	% Retarder Application	Voltage ± 0.2V	Device Terminal
Auto Full On	A to C	12	100	3.6	No connections
Pressure Switch Full On High	A to C	32	0 100	1.1 3.6	A B
3-Step E-10R Bendix Pedal	A to C	32	0 32 58 100	1.1 1.9 2.8 3.6	A B C D
6-Step Hand Lever — Off Position 1 Position 2 Position 3 Position 4 Position 5 Position 6	A to C	32	 0 16 28 48 65 84 100	 1.1 1.5 1.9 2.3 2.8 3.2 3.6	 + 1 2 3 4 5 6
Auto 1/2 On	A to C	12	50	2.4	No connections
3 Pressure Switches — Low Medium High	A to C	32	0 32 68 100	1.1 1.9 2.3 3.6	 A B A B A B
Auto 1/3 On 2 Pressure Switches Auto Medium High	A to C	21.4	 32 68 100	 1.9 2.8 3.6	 A B A B
Dedicated Pedal	No Tests	Interface not a resistance module	0 100	0.7–1.2 3.4–3.5	A B C

* Resistance module must be disconnected from the wiring harness and retarder control devices.
** These voltages must be measured between terminals A and B.

GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

NOTES

APPENDICES

APPENDIX A—IDENTIFICATION OF POTENTIAL CIRCUIT PROBLEMS

NOTES

APPENDIX A—IDENTIFICATION OF POTENTIAL CIRCUIT PROBLEMS

Intermittent codes are a result of faults that are detected, logged, and then disappear, only to recur later. If, when troubleshooting, a code is cleared in anticipation of it recurring and it does not, check the items in the following list for the fault's source.

A. Circuit Inspection

Intermittent power/ground problems—can cause voltage problems during TCM diagnostic checks which can set various codes depending upon where the TCM was in the diagnostic process.

- Damaged terminals.
- Dirty or corroded terminals.
- Terminals not fully seated in the connector. Inspect indicated wires by uncoupling connector and gently pulling on the wire at the rear of the connector and checking for excessive terminal movement.
- Connectors not fully mated. Inspect for missing or damaged locktabs.
- Screws or other sharp pointed objects pushed into or through one of the harnesses.
- Harnesses which have rubbed through and may be allowing intermittent electrical contact between two wires or between wires and vehicle frame members.
- Broken wires within the braiding and insulation.

B. Finding an Intermittent Fault Condition

To find a fault, like one of those listed, examine all connectors and the external wiring harnesses. Harness routing may make it difficult to see or feel the complete harness. However, it is important to thoroughly check each harness for chafed or damaged areas. Road vibrations and bumps can damage a poorly installed harness by moving it against sharp edges and cause some of the faults. If a visual inspection does not identify a cause, move and wiggle the harness by hand until the fault is duplicated.

The next most probable cause of an intermittent code is an electronic part exposed to excessive vibration, heat, or moisture. Examples of this are:

(1) Exposed harness wires subjected to moisture.

(2) A defective connector seal allows moisture to enter the connector or part.

(3) An electronic part (TCM, shift selector, solenoid, or throttle sensor) affected by vibration, heat, or moisture may cause abnormal electrical conditions within the part.

When troubleshooting Item 3, eliminate all other possible causes before replacing any parts.

Another cause of intermittent codes is good parts in an abnormal environment. The abnormal environment will usually include excessive heat, moisture, or voltage. For example, an TCM that receives excessive voltage will generate a diagnostic code as it senses high voltage in a circuit. The code may not be repeated consistently because different circuits may have this condition on each check. The last step in finding an intermittent code is to observe if the code is set during sudden changes in the operating environment.

Troubleshooting an intermittent code requires looking for common conditions that are present whenever the code is diagnosed.

APPENDIX A—IDENTIFICATION OF POTENTIAL CIRCUIT PROBLEMS

C. Recurring Conditions

A recurring condition might be:

- Rain
- Outside temperature above or below a certain temperature
- Only on right-hand or left-hand turns
- When the vehicle hits a bump, etc.

If such a condition can be related to the code, it is easier to find the cause. If the time between code occurrences is very short, troubleshooting is easier than if it is several weeks or more between code occurrences.

APPENDIX B— MEASURING CLUTCH AND RETARDER PRESSURES

Testing individual clutch pressures helps to determine if a transmission malfunction is due to a mechanical or an electrical problem. Properly making these pressure checks requires transmission and vehicle (or test stand) preparation, recording of data, and comparing recorded data against specifications provided. These instructions are for all 3000 and 4000 Product Families transmissions.

NOTE: Determine if there are diagnostic codes set which are related to the transmission difficulty you are evaluating. Proceed to make mechanical preparations for measuring clutch pressures after codes have first been evaluated.

A. Transmission and Vehicle Preparation

1. Remove the plugs from the pressure tap locations where measurement is desired (Figure B–1).

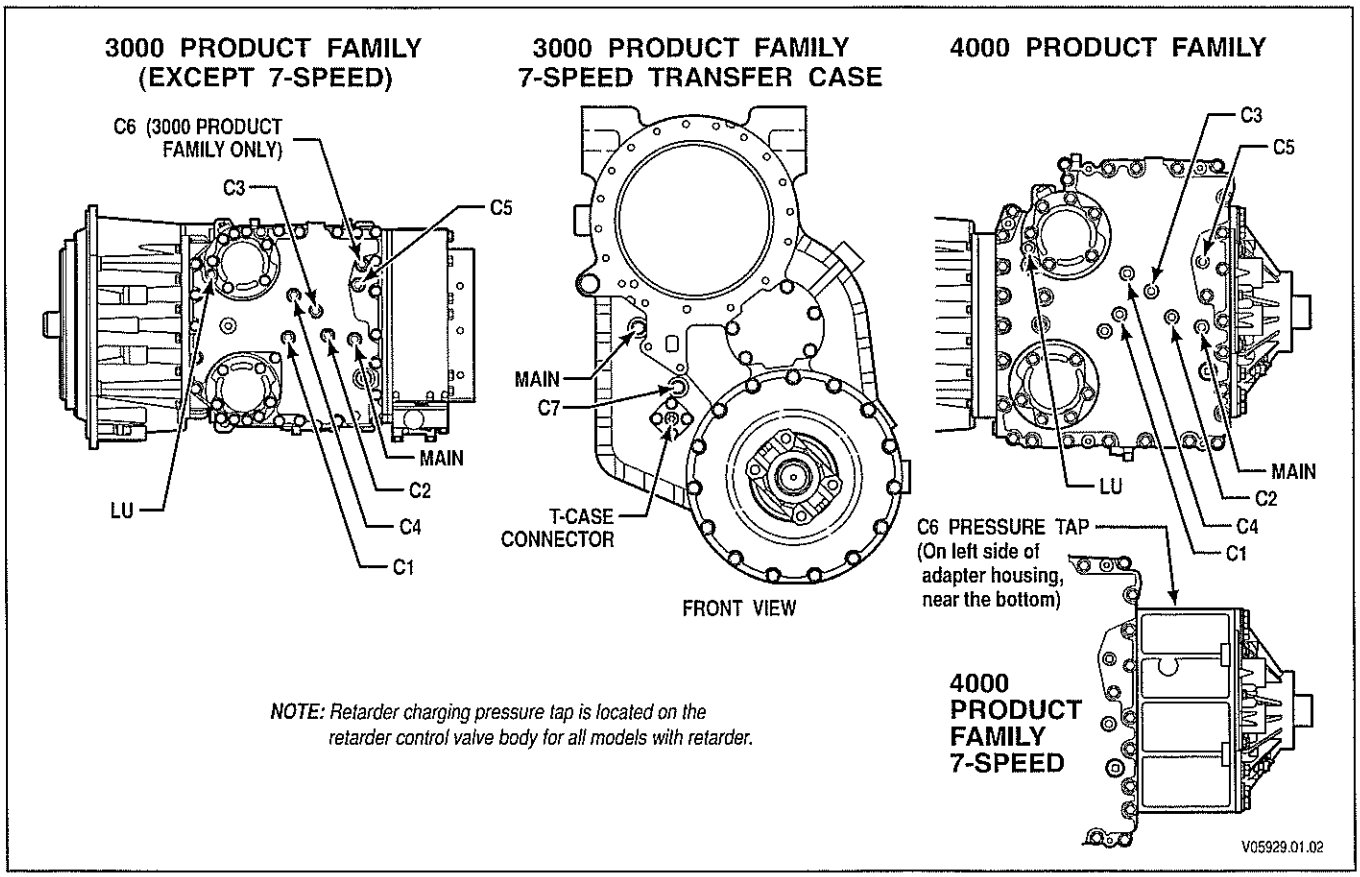


Figure B–1. Clutch Pressure Check Points

CAUTION: **Be sure that the hydraulic fittings have the same thread as the plugs removed (7/16-20 UNF-2A). Also please note that these fittings must be straight thread, O-ring style. Failure to do this will result in damage to the control module.**

2. Install hydraulic fittings suitable for attaching pressure gauges or transducers.

3. Connect pressure gauges or transducers. Pressure gauge set J 26417-A is available for this purpose. See Table B–2 for pressure levels expected.

APPENDIX B— MEASURING CLUTCH AND RETARDER PRESSURES

4. Be sure that engine speed can be monitored (Allison DOC™ For PC–Service Tool may be used for this purpose).

5. Be sure that transmission sump fluid temperature can be measured (Allison DOC™ For PC–Service Tool may be used for this purpose).

6. Be sure that the transmission has enough fluid for cold operation until an operating temperature fluid level can be set.

7. Bring the transmission to normal operating temperature of 71–93°C (160–200°F). Inspect for fluid leaks in the added pressure gauge/transducer lines. Repair leaks as needed. Be sure that fluid level is correct.

B. Recording Data

1. Use the Allison DOC™ For PC–Service Tool, which allows checking of individual range clutch pressures, with the vehicle stationary. Consult Appendix N or Allison publication GN3433EN, User Guide for Allison DOC™ PC–Service Tool, for Action Request and select Clutch Test Mode. Follow instructions to test clutch pressures in individual ranges.

*NOTE: **Check lockup clutch pressure by driving the vehicle in a range where lockup can be obtained. Record the pressure values at the engine speed and sump fluid temperature values shown in Table B–1. The lockup clutch is functioning correctly when engine speed and turbine speed values are equal as recorded from Allison DOC™ For PC–Service Tool.***

2. Consult Table B–1 and locate the transmission model that you are testing.

3. Operate the transmission at the conditions shown in Table B–1 and record engine speed, transmission sump fluid temperature, main hydraulic pressure, and clutch pressures in the ranges where a problem is suspected.

Table B–1. Clutch Pressure Test Conditions

Transmission Model/Test Type	Engine rpm	Sump Fluid Temperature	Range	Clutches Pressurized
All Models (except 3000 Product Family)—Idle Test	580–620	71–93°C (160–200°F)	Neutral Reverse 1C 2C (2nd range start)	C5 C3 C5 C1 C5 C1 C4
3000 Product Family—Idle Test	580–620	71–93°C (160–200°F)	Neutral Reverse LowC 1C	C5 C3 C5 C3 C6 C1 C5
3000 Product Family (except 7-Speed Models)—High Speed	2080–2120	71–93°C (160–200°F)	Reverse Neutral 1C 2C 2L 3L 4L 5L 6L	C3 C5 C5 C1 C5 C1 C4 C1 C4 LU C1 C3 LU C1 C2 LU C2 C3 LU C2 C4 LU

APPENDIX B— MEASURING CLUTCH AND RETARDER PRESSURES

Table B–1. Clutch Pressure Test Conditions *(cont'd)*

Transmission Model/ Test Type	Engine rpm	Sump Fluid Temperature	Range	Clutches Pressurized
3000 Product Family 7-Speed Models—High Speed	2080–2120	71–93°C (160–200°F)	Reverse Neutral LowC 1C 2C 2L 3L 4L 5L 6L	C3 C5 C5 C3 C6 C1 C5 C1 C4 C1 C4 LU C1 C3 LU C1 C2 LU C2 C3 LU C2 C4 LU
4000 Product Family—High Speed	1780–1820	71–93°C (160–200°F)	Reverse Neutral LowC** 1C 2C 2L 3L 4L 5L 6L	C3 C5 C5 C1 C6 C1 C5 C1 C4 C1 C4 LU C1 C3 LU C1 C2 LU C2 C3 LU C2 C4 LU
			** Only applies to HD 4070.	

C. Comparing Recorded Data to Specifications

1. Be sure that engine speed and transmission sump fluid temperatures were within the values specified in Table B–1.
2. Compare the main pressure and clutch pressure data, recorded in Step B, with the specifications in Table B–2.
3. If clutch pressures are within specifications, return the transmission and vehicle to their original configuration and proceed with electrical troubleshooting.
4. If clutch pressures are not within specification, take corrective action to replace the internal parts of the transmission necessary to correct the problem. (Refer to the appropriate transmission service manual for the model being tested.)
5. Review pressure values after the transmission has been repaired.
6. Return the transmission to its original configuration. (Remove instrumentation and reinstall any components removed for the pressure testing.)

Table B–2. Main Pressure and Clutch Pressure Specifications (Sump Fluid Temperature Same as in Table B–1)

Transmission Model/Test Type	Engine rpm	Range	Main Press. Spec kPa [psi]	Clutches Applied	Range Clutch Press. Spec* kPa [psi]	Lube Pressure Spec* kPa [psi]	Dropbox Main Press. Spec* kPa [psi]
3000 Product Family—Idle	580–620	Neutral Main Mod OFF	1515–2035 (220–295)	C5	1440–2035 (210–295)	10–35 (1–5)	1440–2035 (210–295)
		Neutral Main Mod ON	1310–1725 (190–250)	C5	1235–1725 (180–250	10–35 (1–5)	1235–1725 (180–250)
		Reverse Main Mod OFF	1450–2035 (210–295)	C3, C5	1375–2035 (200–295)	10–35 (1–5)	1375–2035 (200–295)
		Reverse Main Mod ON	1170–1585 (170–230)	C3, C5	1095–1585 (160–230)	10–35 (1–5)	1095–1585 (160–230)
		Low C (3000 7-Speed) Main Mod OFF	1240–1725 (180–250)	C3, C6	1165–1725 (170–250)	10–35 (1–5)	1165–1725 (170–250)
		Low C (3000 7-Speed) Main Mod ON	870–1340 (125–195)	C3, C6	795–1340 (115–195)	10–35 (1–5)	795–1340 (115–195)
		1C Main Mod OFF	1240–1725 (180–250)	C1, C5	1165–1725 (170–250)	10–35 (1–5)	1165–1725 (170–250)
		1C Main Mod ON	870–1340 (125–195)	C1, C5	795–1340 (115–195)	10–35 (1–5)	795–1340 (115–195)
		2C Main Mod OFF	1240–1725 (180–250)	C1, C4	1165–1725 (170–250)	10–35 (1–5)	1165–1725 (170–250)
		2C Main Mod ON	870–1340 (125–195)	C1, C4	795–1340 (115–195)	10–35 (1–5)	795–1340 (115–195)

Table B–2. Main Pressure and Clutch Pressure Specifications (Sump Fluid Temperature Same as in Table B–1) *(cont'd)*

Transmission Model/Test Type	Engine rpm	Range	Main Press. Spec kPa [psi]	Clutches Applied	Range Clutch Press. Spec* kPa [psi]	Lube Pressure Spec* kPa [psi]	Dropbox Main Press. Spec* kPa [psi]
3000 Product Family—High Speed	2080–2120	Neutral Main Mod OFF	1805–2205 (260–320)	C5	1730–2205 (250–320)	160–240 (23–35)	1730–2205 (250–320)
		Neutral Main Mod ON	1415–1725 (205–250)	C5	1335–1725 (195–250)	160–240 (23–35)	1335–1725 (195–250)
		Reverse	1805–2205 (260–320)	C3, C5	1730–2205 (250–320)	160–240 (23–35)	1730–2205 (250–320)
		Low C (3000 7-Speed)	1550–1965 (225–285)	C3, C6	1475–1965 (215–285)	160–240 (23–35)	1475–1965 (215–285)
		1C	1550–1965 (225–285)	C1, C5	1475–1965 (215–285)	160–240 (23–35)	1475–1965 (215–285)
		2C	1550–1965 (225–285)	C1, C4	1475–1965 (215–285)	160–240 (23–35)	1475–1965 (215–285)
		2L	1080–1365 (155–200)	C1, C4, LU	1005–1365 (145–200)	160–240 (23–35)	1005–1365 (145–200)
		3C	1550–1965 (225–285)	C1, C3	1475–1965 (215–285)	160–240 (23–35)	1475–1965 (215–285)
		3L	1080–1365 (155–200)	C1, C3, LU	1005–1365 (145–200)	160–240 (23–35)	1005–1365 (145–200)
		4C	1550–1965 (225–285)	C1, C2	1475–1965 (215–285)	125–200 (18–30)	1475–1965 (215–285)
		4L	1080–1365 (155–200)	C1, C4, LU	1005–1365 (145–200)	125–200 (18–30)	1005–1365 (145–200)
		5C	1550–1965 (225–285)	C2, C3	1475–1965 (215–285)	125–200 (18–30)	1475–1965 (215–285)
		5L	1080–1365 (155–200)	C2, C3, LU	1005–1365 (145–200)	125–200 (18–30)	1005–1365 (145–200)
		6C	1345-1590 (220–290)	C2, C4	1270-1590 (185-230)	125–200 (18–30)	1270-1590 (185-230)
		6L	1035–1415 (150–205)	C2, C4, LU	960–1415 (140–205)	125–200 (18–30)	960–1415 (140–205)

Table B–2. Main Pressure and Clutch Pressure Specifications (Sump Fluid Temperature Same as in Table B–1) *(cont'd)*

Transmission Model/Test Type	Engine rpm	Range	Main Press. Spec kPa [psi]	Clutches Applied	Range Clutch Press. Spec* kPa [psi]	Lube Pressure Spec* kPa [psi]	Dropbox Main Press. Spec* kPa [psi]
4000 Product Family—Idle	580–620	Neutral Main Mod OFF	1515–2055 (220–300)	C5	1440–2055 (210–300)	3.5 min (0.5 min)	
		Neutral Main Mod ON	1310–1725 (190–250)	C5	1235–1725 (180–250)	3.5 min (0.5 min)	
		Reverse Main Mod OFF	1450–2055 (210–300)	C3, C5	1375–2055 (200–300)	3.5 min (0.5 min)	
		Reverse Main Mod ON	1170–1585 (170–230)	C3, C5	1095–1585 (160–230)	3.5 min (0.5 min)	
		Low C (4000 7-Speed) Main Mod OFF	1240–1725 (180–250)	C1, C6	1165–1725 (170–250)	3.5 min (0.5 min)	
		Low C (4000 7-Speed) Main Mod ON	870–1340 (125–195)	C1, C6	795–1340 (115–195)	3.5 min (0.5 min)	
		1C Main Mod OFF	1240–1725 (180–250)	C1, C5	1165–1725 (170–250)	3.5 min (0.5 min)	
		1C Main Mod ON	870–1340 (125–195)	C1, C5	795–1340 (115–195)	3.5 min (0.5 min)	
		2C Main Mod OFF	1240–1725 (180–250)	C1, C4	1165–1725 (170–250)	3.5 min (0.5 min)	
		2C Main Mod ON	870–1340 (125–195)	C1,C4	795–1340 (115–195)	3.5 min (0.5 min)	

Table B–2. Main Pressure and Clutch Pressure Specifications (Sump Fluid Temperature Same as in Table B–1) *(cont'd)*

Transmission Model/Test Type	Engine rpm	Range	Main Press. Spec kPa [psi]	Clutches Applied	Range Clutch Press. Spec* kPa [psi]	Lube Pressure Spec* kPa [psi]	Dropbox Main Press. Spec* kPa [psi]
4000 Product Family—High Speed	1780–1820	Neutral Main Mod OFF	1805–2055 (260–300)	C5	1730–2055 (250–300)	160–240 (23–35)	
		Neutral Main Mod ON	1415–1725 (205–240)	C5	1340–1725 (195–240)	160–240 (23–35)	
		Reverse	1805–2055 (260–300)	C3, C5	1730–2055 (250–300)	160–240 (23–35)	
		Low C (4000 7-Speed)	1550–1795 (225–260)	C1, C6	1475–1795 (215–260)	160–240 (23–35)	
		1C	1550–1795 (225–260)	C1, C5	1475–1795 (215–260)	160–240 (23–35)	
		2C	1550–1795 (225–260)	C1, C4	1475–1795 (215–260)	160–240 (23–35)	
		2L	1080–1365 (155–200)	C1, C4, LU	1005–1365 (145–200)	160–240 (23–35)	
		3C	1550–1795 (225–260)	C1, C3	1475–1795 (215–260)	160–240 (23–35)	
		3L	1080–1365 (155–200)	C1, C3, LU	1005–1365 (145–200)	160–240 (23–35)	
		4C	1550–1795 (225–260)	C1, C2	1475–1795 (215–260)	125–200 (18–30)	
		4L	1080–1365 (155–200)	C1, C4, LU	1005–1365 (145–200)	125–200 (18–30)	
		5C	1550–1795 (225–260)	C2, C3	1475–1795 (215–260)	125–200 (18–30)	
		5L	1080–1365 (155–200)	C2, C3, LU	1005–1365 (145–200)	125–200 (18–30)	
		6C	1345–1590 (195–230)	C2, C4	1270–1590 (185–230)	125–200 (18–30)	
		6L	1035–1235 (150–180)	C2, C4, LU	960–1235 (140–180)	125–200 (18–30)	

* To pass this specification, measured clutch pressures **must be** within 75kPa (10 psi) of actual measured main pressure and still be within the minimum and maximum value of this specification.

APPENDIX B— MEASURING CLUTCH AND RETARDER PRESSURES

D. Retarder Pressure Checks—3000 and 4000 Product Families

1. 3000 Product Family Low Speed/Low Torque Transmission Dyno Test

   a. 3000 Product Family (except 3500 RDS/EVS/SPS, and MD 3560) Test Conditions:

   - Second Range Lockup, 100 Percent Retarder Apply, Input Speed = 1075–1125 rpm

   b. 3500 RDS/EVS/SPS and MD 3560 Test Conditions:

   - Second Range Lockup, 100 Percent Retarder Apply, Input Speed = 1350–1400 rpm

Table B–3. Retarder Specifications At Above Test Conditions

Parameter To Check	High Capacity	Medium Capacity	Low Capacity
Main Pressure–kPa [psi]	1080–1365 (155–200)	1080–1365 (155–200)	1080–1365 (155–200)
Retarder Charge Pressure – kPa [psi]	215–310 (31–45)	215–310 (31–45)	215–310 (31–45)
Cooler In Temperature – °C (°F)	150 (300) Max (Ref)	150 (300) Max (Ref)	150 (300) Max (Ref)

2. 3000 Product Family High Speed Vehicle Road Test Conditions:

   - Fourth Range Lockup, 100 Percent Retarder Apply, Input Speed =1900–2000 rpm

Table B–4. Retarder Specifications At Above Test Conditions

Parameter To Check	High Capacity	Medium Capacity	Low Capacity
Main Pressure–kPa [psi]	1080–1365 (155–200)	1080–1365 (155–200)	1080–1365 (155–200)
Retarder Charge Pressure–kPa [psi]	539–608 (78–88)	446–521 (65–76)	384–444 (56–64)
Cooler In Temperature–°C [°F]	150 [300] Max (Ref)	150 [300] Max (Ref)	150 [300] Max (Ref)

3. 4000 Product Family Low Speed/Low Torque Transmission Dyno Test

   a. 4000 Product Family (except 4500 models) Test Conditions:

   - Second Range Lockup, 100 Percent Retarder Apply, Input Speed = 1025–1075 rpm

   b. 4500 Model Test Conditions:

   - Second Range Lockup, 100 Percent Retarder Apply, Input Speed = 1190–1240 rpm

Table B–5. Retarder Specifications At Above Test Conditions

Parameter To Check	High Capacity	Medium Capacity	Low Capacity
Main Pressure–kPa [psi]	1080–1365 (155–200)	1080–1365 (155–200)	1080–1365 (155–200)
Retarder Charge Pressure–kPa [psi]	148–232 (21–34)	148–232 (21–34)	148–232 (21–34)
Cooler In Temperature–°C [°F]	150 [300] Max (Ref)	150 [300] Max (Ref)	150 [300] Max (Ref)

APPENDIX B— MEASURING CLUTCH AND RETARDER PRESSURES

4. 4000 Product Family High Speed Vehicle Road Test Conditions:
   - Fourth Range Lockup, 100 Percent Retarder Apply, Input Speed = 1550-1650 rpm

Table B–6. Retarder Specifications At Above Test Conditions

Parameter To Check	High Capacity	Medium Capacity	Low Capacity
Main Pressure–kPa [psi]	1080–1365 (155–200)	1080–1365 (155–200)	1080–1365 (155–200)
Retarder Charge Pressure–kPa [psi]	373–434 (54–63)	320–381 (46–55)	267–330 (39–48)
Cooler In Temperature–°C [°F]	150 [300] Max (Ref)	150 [300] Max (Ref)	150 [300] Max (Ref)

APPENDIX B— MEASURING CLUTCH AND RETARDER PRESSURES

NOTES

APPENDIX C—SOLENOID AND CLUTCH CHART

BASIC CONFIGURATION

Range	Solenoid Variable Bleed						Clutches					
	PCS1 N/O	PCS2 N/O	PCS3 N/C	PCS4 N/C	TCC N/C	SS1 On/Off	C1	C2	C3	C4	C5	LU
6	X			X	O			Y		Y		O
5	X		X		O	X		Y	Y			O
4					O	X	Y	Y				O
3		X	X		O	X	Y		Y			O
2		X		X	O	X	Y			Y		O
1		X	X		O		Y				Y	O
N–C5	X	X	X	*						*	Y	
NVL	X	X	X	X						Y	Y	
N–C4	X	X		X						Y		
N–C3	X								Y			
R	X		X						Y		Y	

NOTE: *See Page C–2 for legend.*

7-SPEED CONFIGURATION (3000 and 4000 Product Families)

Range	Solenoid Variable Bleed									Clutches							
	PCS1 N/O	PCS2 N/O	PCS3 N/C	PCS4 N/C	TCC N/C	SS1 On/Off	SS2 On/Off	PCS5 N/L	PCS6 N/L	C1	C2	C3	C4	C5	LU	C6	DIF
6	X			X	O						Y		Y		O		O
5	X		X		O	X					Y	Y			O		O
4					O	X				Y	Y				O		O
3		X	X		O	X				Y		Y			O		O
2		X		X	O	X				Y			Y		O		O
1		X	X		O					Y				Y	O		O
LO-3700	X						X	X	X			Y				Y	O
LO-4700		X					X		X	Y						Y	O
N–C5	X	X	X	*									*	Y			O
NVL	X	X		X									Y	Y			O
N–C4	X	X		X									Y				O
N–C3	X											Y					O
R	X		X									Y		Y			

NOTE: *See Page C–2 for legend.*

APPENDIX C—SOLENOID AND CLUTCH CHART

LEGEND

X	Indicates solenoid is electrically ON.
Y	Indicates clutch is hydraulically applied.
Blank	Indicates solenoid is electrically OFF or clutch is not hydraulically applied.
O	Optional ON or OFF.
*	See NVL explanation below.
NVL	**As a diagnostic response:** If Turbine Speed is below 150 rpm when Output Speed is below 100 rpm and Engine Speed is above 400 rpm, Neutral Very Low (NVL) is commanded when N–C5 (Neutral) is the selected range. NVL is achieved by turning PCS4 solenoid "on" in addition to PCS3 being "on", which locks the output. Otherwise, PCS4 solenoid is turned off N1 (Neutral). **As a commanded range when shifting to Fire Truck Pump Mode:** While wire 123 is energized before wire 122 is energized when going into Fire Truck Pump Mode, Neutral Very Low (NVL) will be commanded to lock the output to assist the shifting of the split-shaft PTO transfer case from road mode to pump mode. While wire 123 is de-energized before wire 122 is de-energized when shifting out of Fire Truck Pump Mode, Neutral Very Low (NVL) will be commanded to lock the output to assist the shifting of the split-shaft PTO transfer case from pump mode to road mode.

APPENDIX D—WIRE/CONNECTOR CHART

The connector information in this appendix is provided for the convenience of the servicing technician. The connector illustration and pin identifications for connection to Allison Transmission components will be accurate. Allison Transmission components are the TCM, speed sensors, retarder connectors, transmission connectors, and shift selectors. Other kinds of connectors for optional or customer-furnished components are provided based on typical past practice for an Allison-designed system.

Contact St. Clair Technologies, Inc. or your vehicle manufacturer for information on connectors not found in this appendix.

NOTE: The following abbreviation guide should be used to locate connector termination points for wires in the Allison 4th Generation wiring harness(es).

Table D–1. Appendix D Abbreviation Guide

Termination Point Abbreviation	Connector Name
ABS	Anti-lock Brake System
ARTN	Analog Return
CAN	Controller Area Network
DDRD	Diagnostic Connector—Deutsch
DDRP	Diagnostic Connector—Packard
GPI	General Purpose Input
GPO	General Purpose Output
J1939	J1939 Datalink From ECU Selector (S) Harness
NE	Engine Speed Sensor
NO	Output Speed Sensor
NT	Turbine Speed Sensor
OBDII	Diagnostic Connector—GMC On Board Diagnostics
OLS	Oil Level Sensor
PCS	Pressure Control Solenoid
PS	Pressure Switch—Control Module
PWM	Pulse Width Modulation
RMR	Retarder Modulation Request Device
RNGTRM	Chassis Ground Ring Terminal
RTEMP	Retarder Temperature—Retarder Housing
SCI	Serial Communication Interface
SS	Shift Solenoid
TCASE	3000 Product Family 7-Speed Transfer Case
TPS	Throttle Position Sensor
TRANS	Transmission Feedthrough Harness
VIM	Vehicle Interface Module

APPENDIX D—WIRE/CONNECTOR CHART

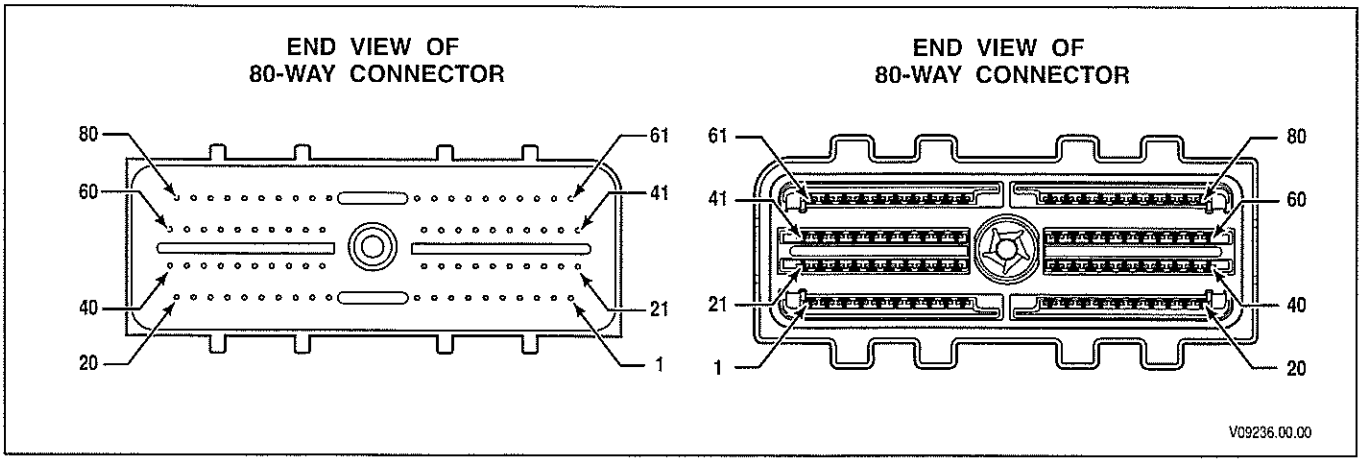


Figure D–1. 80-Way TCM Connector

80-Way TCM Connector

Terminal No.	Color	Wire No.	Description	Termination Point(s)
1	Blue	101	GPI 6 (–)	Vehicle System
2	Yellow	102	GPI 2 (+)	Vehicle System
3	Yellow	103	TCM Digital Return	Vehicle System
4	Yellow	104	GPO 2 (–)	Vehicle System or VIM-B1
5	Orange	105	GPO 4 (–)	Vehicle System or VIM-C2
6	Yellow	106	CAN 2 High (+)	IES CAN A or H
7	Yellow	107	Internal Terminating Resister CAN 1 (TCM)	Vehicle System
8	Green	108	CAN 1 Low (–)	J1939 B or L
9	Gray	109	Battery (–)	Vehicle System or VIM-A2
10	Pink	110	Battery (+)	Vehicle System or VIM-E2
11	Orange	111	High Side Driver Feed (HSD1)	Trans Connector (Pin 1)
12	Pink	112	Signal Reference 5V	Trans Connector (Pin 16) TPS (Pin C) RMR (Pin C)
13	White	113	GPO 8 (–)	Vehicle System
14	Blue	114	Strip Shift Selector Bit-4	Strip Shift Selector (Pin C)
15	White	115	Pressure Control Solenoid (PCS5)	Retarder Solenoid (Pin A) or T-Case (Pin A)
16	Blue	116	OLS	Trans Connector (Pin 15)
17	Blue	117	GPI 10 (–)	Vehicle System
18			Not used in 3000 and 4000 Product Families	
19	Blue	119	Shift Solenoid (SS2)	Trans Connector (Pin 17) or Retarder Accumulator Solenoid (Pin A)
20	Blue	120	Turbine Speed Sensor—Low	NT-B (4000) or Trans Connector (Pin 14) (3000)
21	Green	121	ABS/GPI 8 (–)	Vehicle System
22	Yellow	122	GPI 4 (–)	Vehicle System
23	Green	123	GPI 1 (+)	Vehicle System
24	White	124	GPO 5	Vehicle System
25	Tan	125	Vehicle Speed Signal	Input for Vehicle Speedometer or VIM-B2
26	Yellow	126	Internal Terminating Resistor CAN 2 (TCM)	Vehicle System
27	Green	127	CAN 2 Low (–)	IES CAN B or L
28	Yellow	128	CAN 1 High (+)	J1939 A or H
29	Green	129	CHECK TRANS (–)	Vehicle System

APPENDIX D—WIRE/CONNECTOR CHART

80-Way TCM Connector *(cont'd)*

Terminal No.	Color	Wire No.	Description	Termination Point(s)
30	White	130	GPO 1 (+)	Vehicle System or VIM-D2
31	Yellow	131	HSD3	Trans Connector (Pin 11), Retarder Accumulator Solenoid (Pin B), and Retarder Solenoid (Pin B) or T-Case (Pin-B)
32	White	132	SAE J1708 High	J1708 High
33	Yellow	133	PCS3	Trans Connector (Pin 9)
34	No Color	134	Allison-supplied J1939 Shift Selector	Allison J1939 Shift Selector (Pin 11)
35	Blue	135	Engine Water Temperature	Engine Water Temp (Pin A)
36	Orange	136	PCS1	Trans Connector (Pin 4)
37	White	137	TCC Solenoid	Trans Connector (Pin 12)
38	Tan	138	Strip Shift Selector Bit-Parity	Strip Shift Selector (Pin E)
39	Orange	139	Engine Speed Sensor—Low	NE-B
40	Green	140	Output Speed Sensor—Low	NO-B or T-Case (Pin D)
41	Tan	141	Neutral Start Output (+)	To OEM supplied starter relay or VIM-D1
42	White	142	GPI 5 (–)	Vehicle System
43	Blue	143	GPI 3 (+)	Vehicle System
44	Blue	144	PWM/TPS Input	Vehicle System or TPS (Pin B)
45	Orange	145	GPO 3 (–)	Vehicle System or VIM-F3
46	N/A	146	ISO 9141	Vehicle System
47	Green	147	CAN 2 Low	IES CAN B or L
48	Yellow	148	CAN 1 High	J1939 A ot H
49	N/A	149	CAN 1 Shield	J1939 C or S
50	Pink	150	GPO 7 (–)	Vehicle System
51	White	151	SS1	Trans Connector (Pin 10)
52	Green	152	PCS2	Trans Connector (Pin 5)
53	Green	153	Strip Shift Selector Bit-2	Strip Shift Selector (Pin B)
54	Tan	154	Sump Temp Sensor	Trans Connector (Pin 18)
55	White	155	PCS4	Trans Connector (Pin 2)
56	Yellow	156	Retarder Request Sensor	RMR (Pin B)
57	White	157	GPI 12 (–)	Vehicle System
58	Green	158	TCM Analog Return	Trans Connector (Pin 19), RMR (Pin A), TPS (Pin A), Engine Water Temp (Pin B), Retarder Temp (Pin B)
59	Tan	159	Engine Speed Sensor—High	NE-A
60	Yellow	160	Output Speed Sensor—High	NO-A or T-Case (Pin C)
61	Orange	161	GPI 7 (–)	Vehicle System
62	Yellow	162	GPI 9 (–)	Vehicle System or VIM-F1
63	Yellow	163	Ignition Power	Vehicle System or VIM-F1
64	Blue	164	GPO 6 (–)	Vehicle System
65	Tan	165	Reverse Warning	Vehicle System or VIM-F2
66	Yellow	166	CAN 2 High	IES CAN A or H
67	N/A	167	CAN 2 Shield	IES CAN C or S
68	Green	168	CAN 1 Low	J1939 B or L
69	Gray	169	Battery (–)	Vehicle System or VIM-A1
70	Pink	170	Battery (+)	Vehicle System or VIM-E1
71	Yellow	171	HSD2	Trans Connector (Pin 6)
72	Blue	172	SAE J1708 Low	J1708 Low
73	Orange	173	Strip Shift Selector Bit-1	Strip Shift Selector (Pin A)

APPENDIX D—WIRE/CONNECTOR CHART

80-Way TCM Connector *(cont'd)*

Terminal No.	Color	Wire No.	Description	Termination Point(s)
74	Blue	174	MAIN MOD Solenoid	Trans Connector (Pin 8)
75	Orange	175	Retarder Temperature	Retarder Temp (Pin A)
76	Yellow	176	TransID	Trans Connector (Pin 20)
77	Green	177	PS1	Trans Connector (Pin 3)
78	White	178	PCS6	Trans Connector (Pin 7)
79	Pink	179	GPI 11 (–)	Vehicle System
80	Orange	181	Turbine Speed Sensor—High	NT-A (4000) or Trans Connector (Pin 13) (3000)

APPENDIX D—WIRE/CONNECTOR CHART

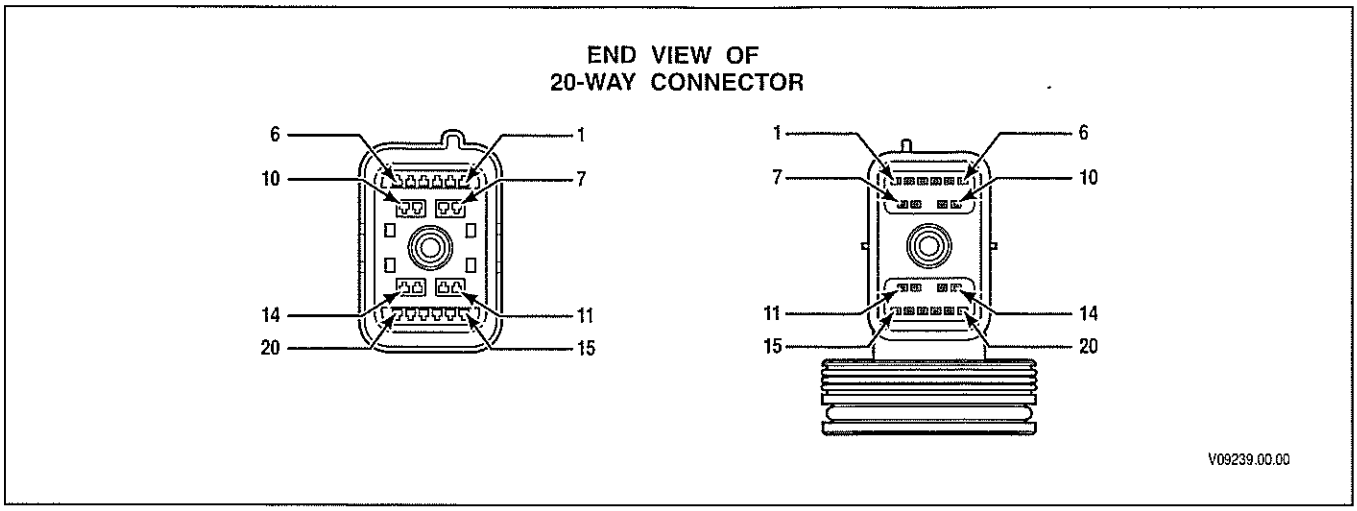


Figure D–2. 20-Way AFL Transmission Connector

20-Way AFL Transmission Connector

Terminal No.	Recommended Wire Color	Wire No.	Description	Termination Point(s)
1	Orange	111	HSD1	TCM-11, TID Wire 176, MAIN MOD-A, PCS4-A, PCS6-A
2	White	155	PCS4, Low	TCM-55, PCS4-B
3	Green	177	Pressure Switch PS1 Input	TCM-77, PS1-A
4	Orange	136	PCS1, Low	TCM-36, PCS1-B
5	Green	152	PCS2, Low	TCM-52, PCS2-B
6	Yellow	171	HSD2	TCM-71, PCS1-A, PCS2-A, PCS3-A, SS1-A
7	White	178	PCS6, Low (7-speed only)	TCM-78, PCS6-B
8	Blue	174	MAIN MOD Solenoid, Low	TCM-74, MAIN MOD-B
9	Yellow	133	PCS3, Low	TCM-33, PCS3-B
10	White	151	SS1, Low	TCM-51, SS1-B
11	Yellow	131	HSD3	TCM-31, TCC-A, SS2-A (7-speed only)
12	White	137	TCC Solenoid, Low	TCM-37, TCC-B
13	Orange	180	Turbine Speed Sensor, High (3000 only)	TCM-80, NT-A
14	Blue	120	Turbine Speed Sensor, Low (3000 only)	TCM-20. NT-B
15	Blue	116	OLS Input	TCM-16, OLS-B
16	Pink	112	5V Reference Voltage	TCM-12, OLS-C, TPS-C, RMR-C
17	Blue	119	SS2, Low (7-speed only)	TCM-19, SS2-B
18	Tan	154	Sump Temperature Sensor Input	TCM-58, Sump Temp-B
19	Green	158	Analog Return	TCM-58, OLS-A, Sump Temp-A, PS1-B, RMR-A, TPS-A, RTR Temp-B, Engine Water Temp-B
20	Yellow	176	TransID	TCM-76, Wire 111

APPENDIX D—WIRE/CONNECTOR CHART

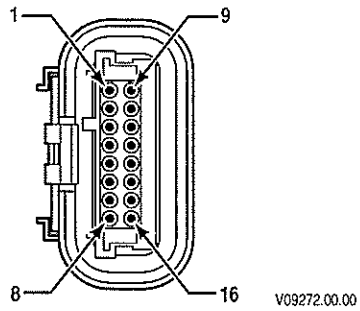


Figure D–3. Pushbutton or Lever Shift Selector Connector

Pushbutton Or Lever Shift Selector Connector

Terminal No.	Recommended Wire Color	Wire No.	Description	Termination Point(s)
1				
2				
3			Dimmer Input	Vehicle System
4				
5			Battery Ground	
6			Shift Selector 2 ID	Battery Ground
7			J1939 Internal Termination Resistor Jumper, if used	Shift Selector Pin 16
8			CAN High J1939	J1939 A or H
9				
10				
11			PWM Directional Signal	TCM-34
12			Ignition Sense	Vehicle System
13			Battery Voltage	Vehicle System
14			CAN 1 Shield J1339	
15			CAN 1 Low	J1939 B or L
16			J1939 Internal Terminal Resistor Jumper, if used	Shift Selector Pin 7

APPENDIX D—WIRE/CONNECTOR CHART

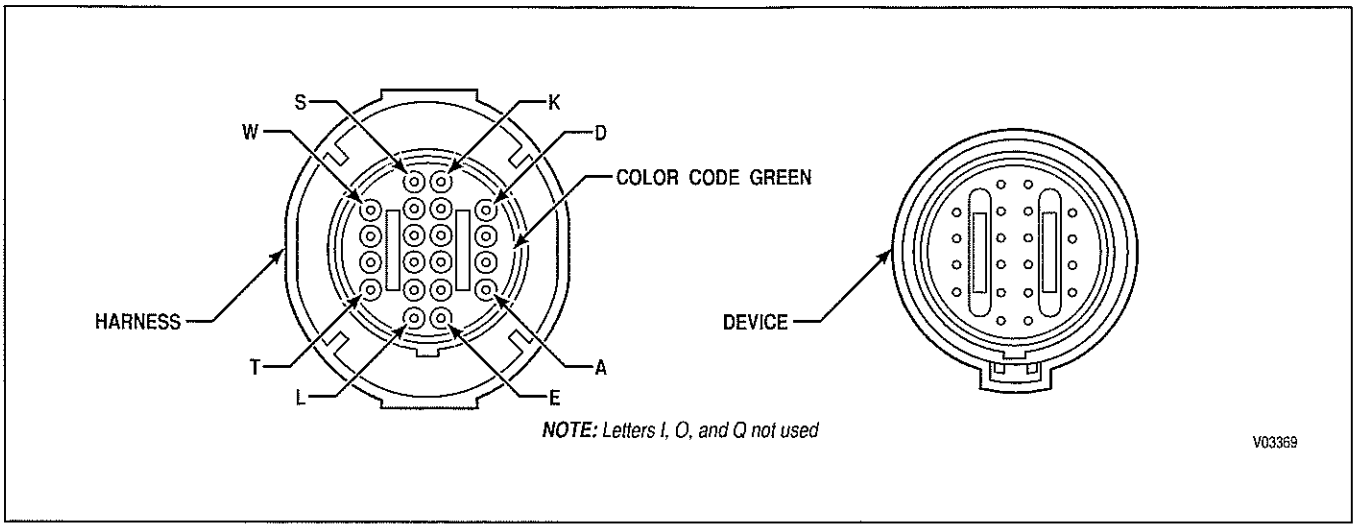


Figure D–4. Strip Shift Selector Connector

Strip Shift Selector

Terminal No.	Recommended Wire Color	Wire No.	Description	Termination Point(s)
A	Orange	173	Strip Selector, Data Bit 1	TCM-73
B	Green	153	Strip Selector, Data Bit 2	TCM-53
C	Blue	114	Strip Selector, Data Bit 4	TCM-14
D				
E	Tan	138	Strip Selector, Parity	TCM-38
F				
G				
H				
J				
K				
L	Tan	150	Lamp Ground	TCM-50
M				
N				
P	Yellow	103	Digital Ground	TCM-3
R			Switch Power	Vehicle System
S				
T				
U				
V				
W				

APPENDIX D—WIRE/CONNECTOR CHART

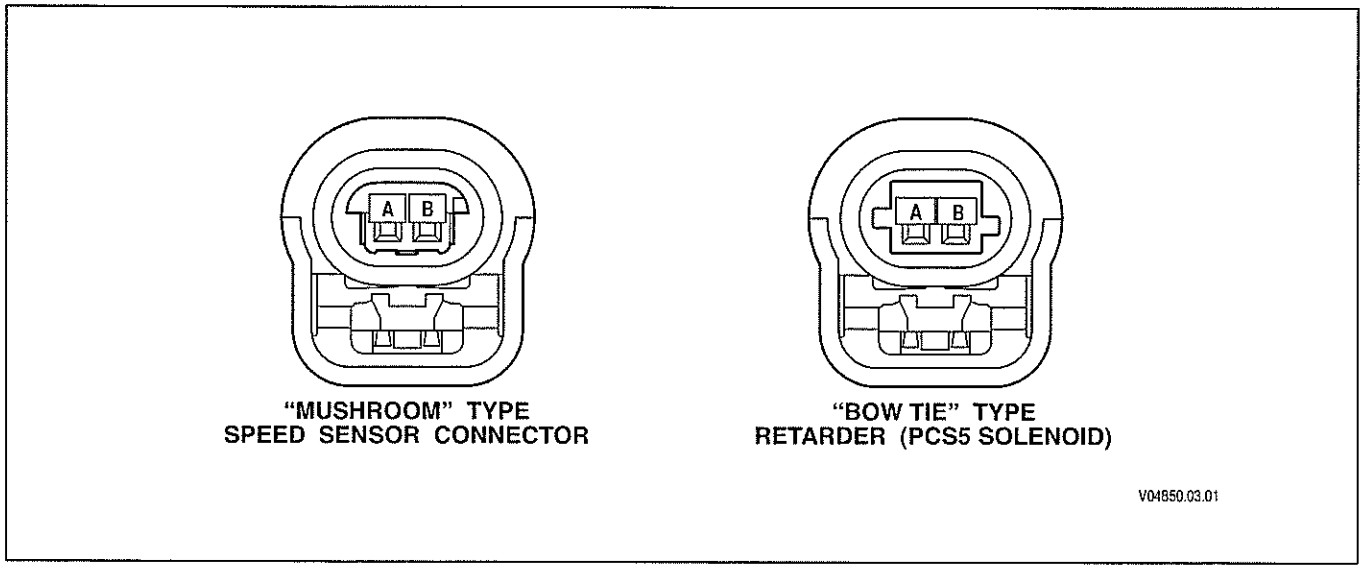


Figure D–5. Delphi-Packard GT150 Speed Sensor and Retarder Connectors

Engine Speed Sensor Connector

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Tan	159	Engine Speed Sensor High	TCM-59
B	Orange	139	Engine Speed Sensor Low	TCM-39

Turbine Speed Sensor Connector (4000 Product Family Only)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Orange	180	Turbine Speed Sensor High	TCM-80
B	Blue	120	Turbine Speed Sensor Low	TCM-20

Output Speed Sensor Connector

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Yellow	160	Output Speed Sensor High	TCM-60
B	Green	140	Output Speed Sensor Low	TCM-40

Retarder (PCS5 Solenoid)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	White	115	PCS5 Low	TCM-15
B	Yellow	131	PCS5 High	TCM-31, TRANS-11

APPENDIX D—WIRE/CONNECTOR CHART

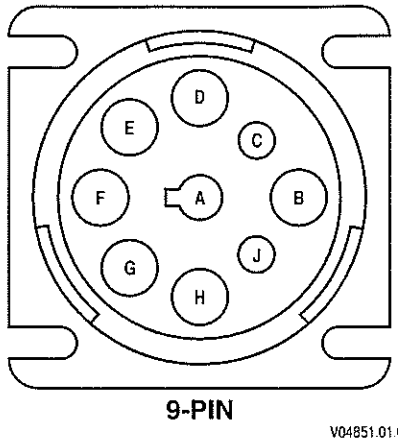


Figure D–6. Deutsch Diagnostic Tool Connector

9-Pin Diagnostic Tool Connector For CAN 1

Terminal No.	Wire No.	Description	Termination Point(s)
A	109 or 169	Battery Return (–)	TCM-9 or TCM-69
B	110 or 170	Battery Power (+)	TCM-10 or TCM-70
C	128 or 148	J1939 High	TCM-28 or TCM-48, J1939-A/H
D	108 or 168	J1939 Low	TCM-8 or TCM-68, J1939-B/L
E	149	J1939 Shield/Ground	TCM-49, J1939-C/S
F	132	Serial Communication (+)	TCM-23, SCI-A
G	172	Serial Communication (–)	TCM-72, SCI-B

APPENDIX D—WIRE/CONNECTOR CHART

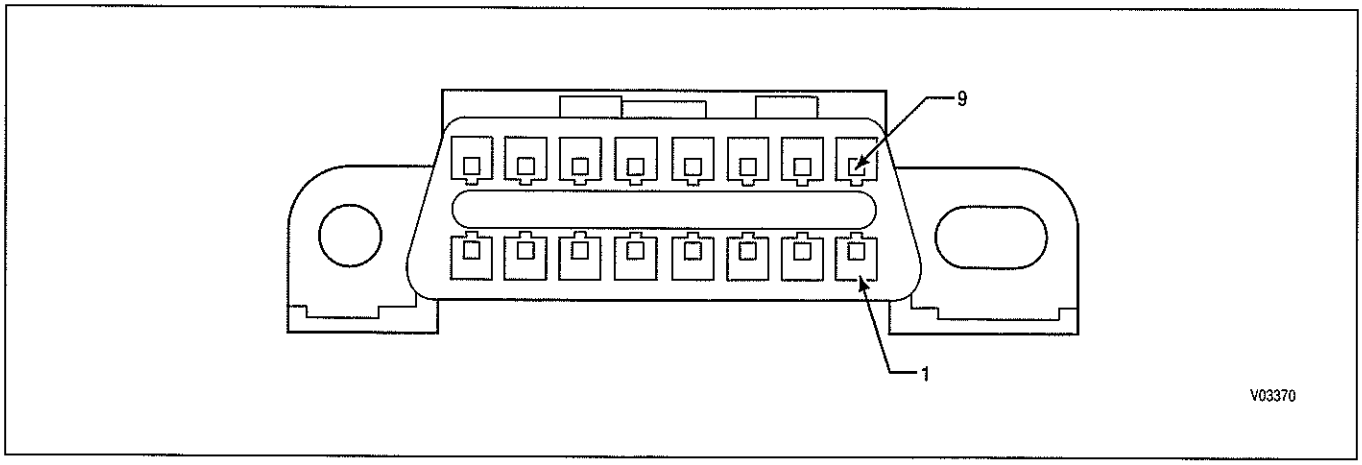


Figure D–7. GMC Connector for OBD-II Diagnostic Adapter

Optional OBD-II Diagnostic Connector

Terminal No.*	Color	Wire No.	Description	Termination Point(s)*
1				
2				
3				
4				
5	Gray	109 or 169	Battery Return (–)	TCM-9 or TCM-69, VIWS-P, PSS-P, SSS-P
6				
7	White	132	Serial Communication Interface, High	TCM-32, SCI-A
8				
9				
10				
11				
12				
13				
14				
15	Blue	172	Serial Communication Interface, Low	TCM-72, SCI-B
16	Yellow	163	Ignition Sense (+)	TCM-63, VIWS-E

* Terminal number and termination points shown only apply when an Allison Transmission recommended harness configuration and bulkhead connector are used.

APPENDIX D—WIRE/CONNECTOR CHART

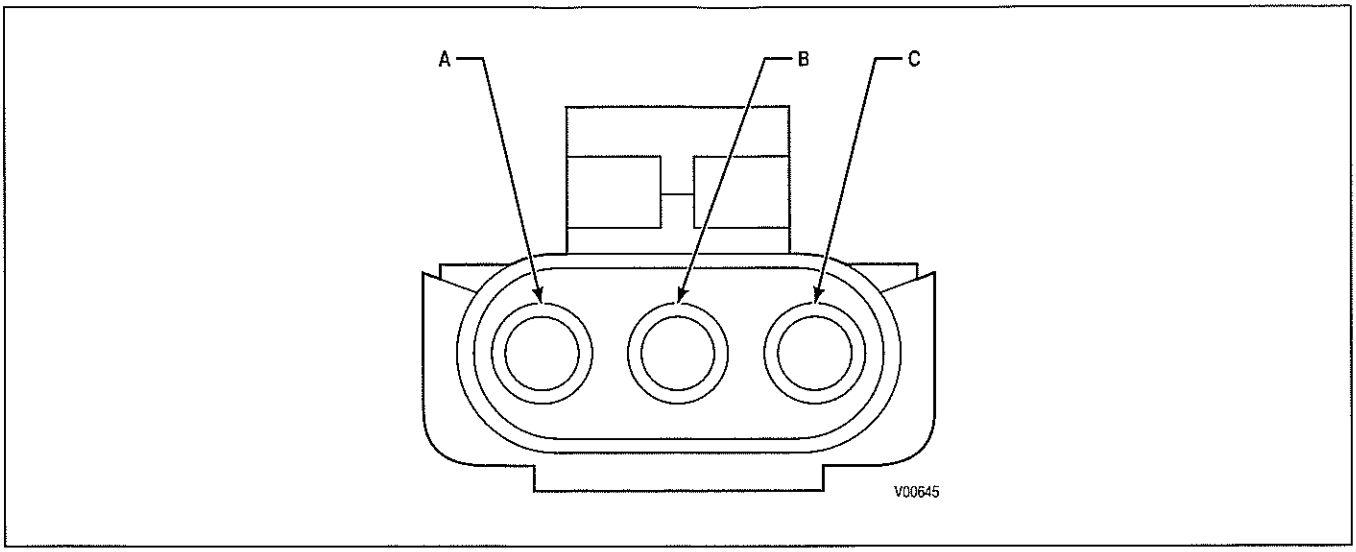


Figure D–8. TPS Connector

Throttle Position Sensor Connector

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Green	158	Analog Return	TCM-58; TRANS-19, RMR-A
B	Blue	144	TPS Signal	TCM-44
C	Pink	112	TPS High	TCM-12, RMR-C, TRANS-16

APPENDIX D—WIRE/CONNECTOR CHART

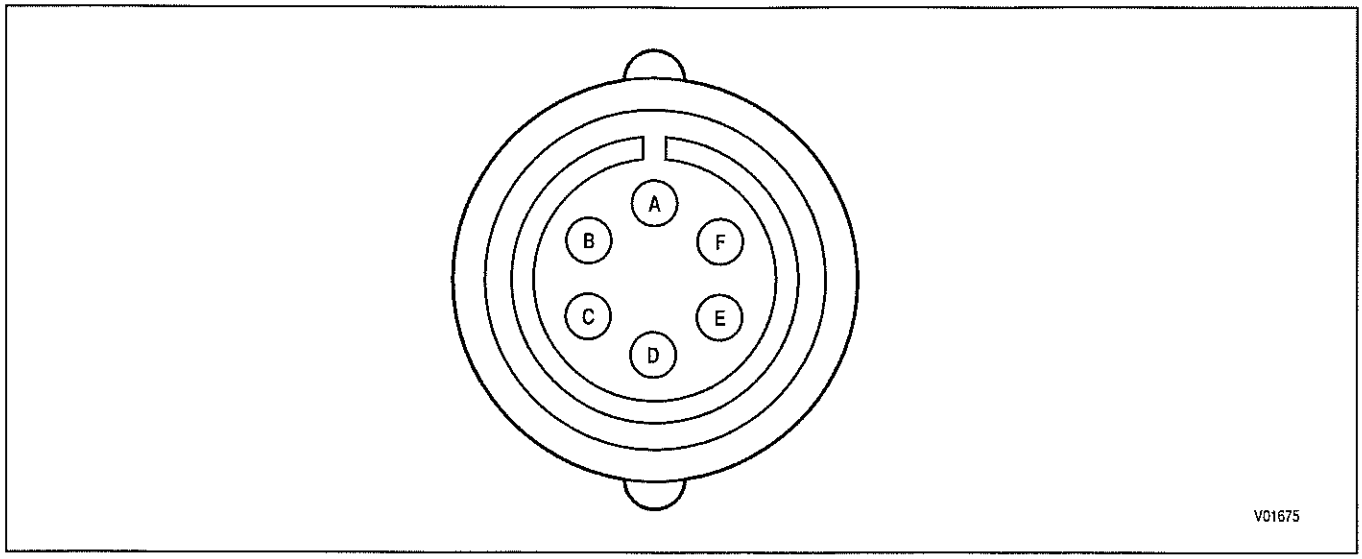


Figure D–9. Transfer Case Connector (3000 Product Family 7-Speed)

Transfer Case Connector (3000 Product Family 7-Speed Only)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	White	115	PCS5 (Diff Lock) Low	TCM-15
B	Yellow	131	PCS5 (Diff Lock) High	TCM-31, TRANS-11
C	Yellow	160	Output Speed Sensor High	TCM-60
D	Green	140	Output Speed Sensor Low	TCM-40

APPENDIX D—WIRE/CONNECTOR CHART

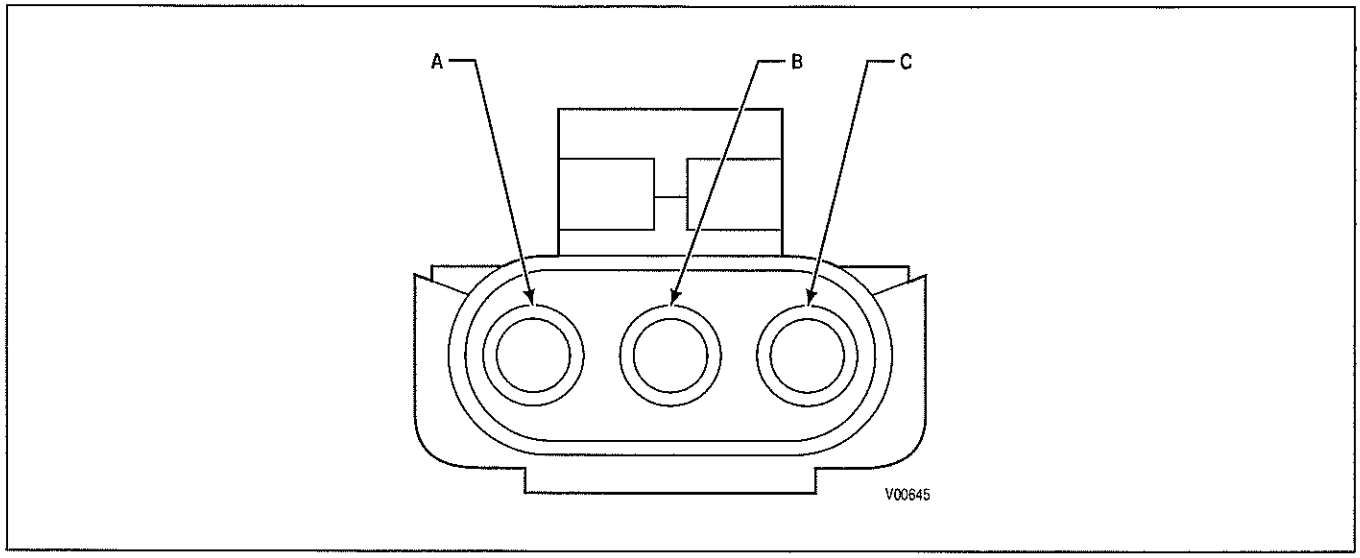


Figure D–10. Retarder Resistance Module/Interface Connector

Retarder Resistance Module/interface Connector

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Green	158	Analog Return	TCM-58, TRANS-19, TPS-A, Engine Water Temp-B, RMR-A, Retarder Temp-B
B	Yellow	156	Retarder Mod.	TCM-56
C	Pink	112	Retarder Mod. High	TCM-12, TRANS-16, TPS-C

APPENDIX D—WIRE/CONNECTOR CHART

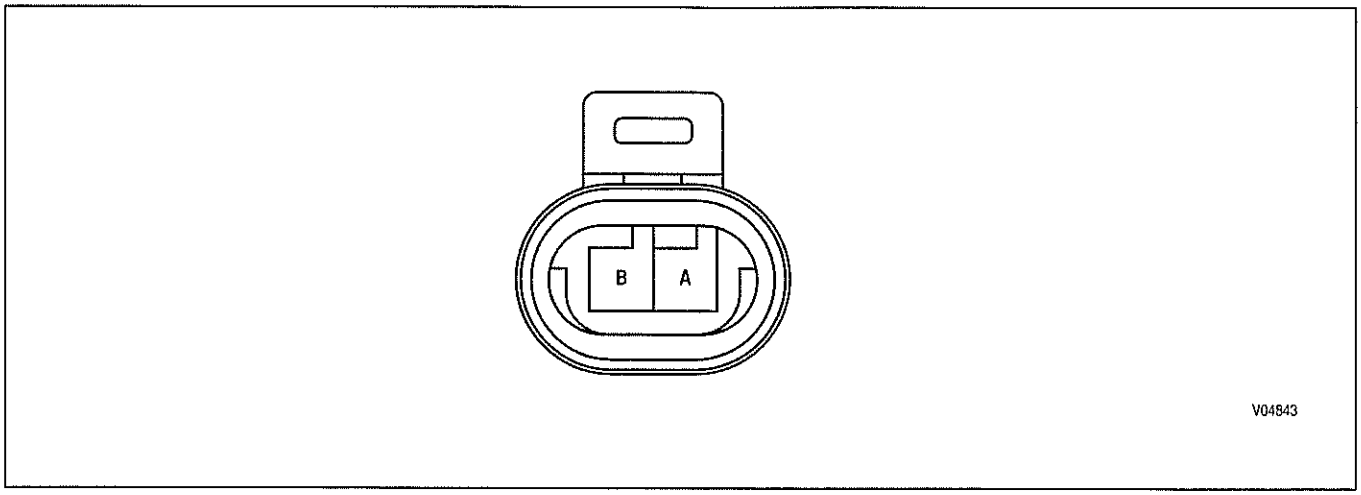


Figure D–11. Retarder Temperature Sensor Connector (3000 and 4000 Product Families)

Retarder Temperature Sensor Connector
3000 and 4000 Product Families

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Orange	175	Retarder Temperature Input	TCM-75
B	Green	158	Analog Return	TCM-58, TRANS-19, RMR-A, TPS-A, Engine Water Temp-B

APPENDIX D—WIRE/CONNECTOR CHART

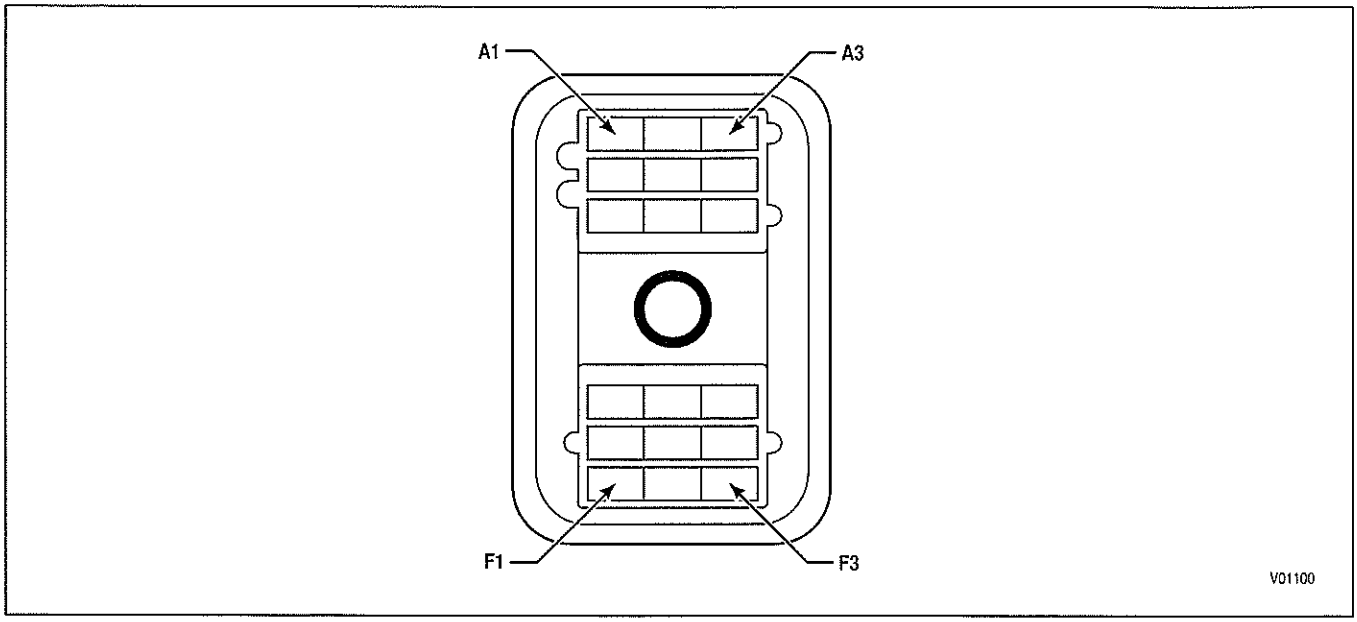


Figure D–12. VIM Connector (Harness)

VIM Connector (Harness)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A1	Gray	169	Battery Return (–)	TCM-69
A2	Gray	109	Battery Return (–)	TCM-9
A3			Reserved	
B1	Yellow	104	GPO 2	TCM-4
B2	Tan	125	Speedometer Signal	TCM-25
B3			Reserved	
C1			Reserved	
C2	White	124	GPO 4	TCM-24
C3			Reserved	
D1	Tan	141	Neutral Start	TCM-41
D2	Orange	145	GPO 3	TCM-45
D3			Reserved	
E1	Pink	170	Battery Power (+)	TCM-70
E2	Pink	110	Battery Power (+)	TCM-10
E3			Reserved	
F1	Yellow	163	Ignition Sense (+)	TCM-63
F2	Tan	165	Reverse Warning	TCM-65
F3	White	130	GPO 1	TCM-30

APPENDIX D—WIRE/CONNECTOR CHART

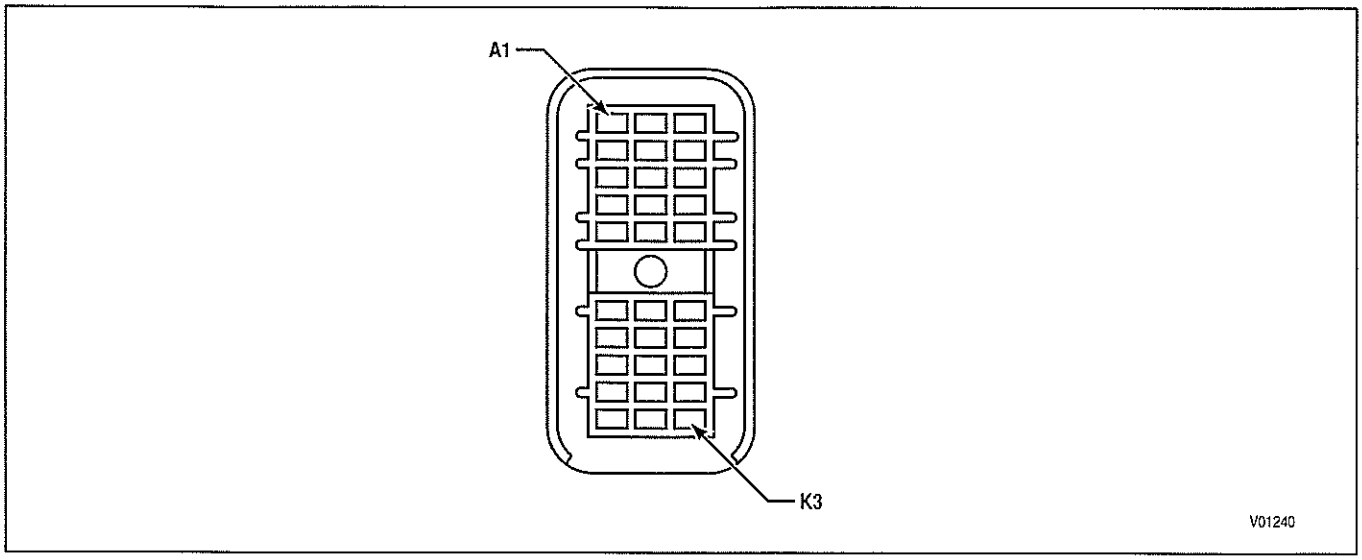


Figure D–13. VIM Connector (Harness)

VIM Connector (Harness 30-Way)

Terminal No.	Color*	Wire No.*	Description	Termination Point(s)*
A1			Reverse Warning Relay—Normally Open	
A2			Output Wire 145 Relay—Common	
A3			Output Wire 145 Relay—Normally Open	
B1			Reverse Warning Relay—Common	
B2			Output Wire 145 Relay—Normally Closed	
B3			Reserved	
C1			Ignition Power	
C2			Output Wire 130 Relay—Normally Closed	
C3			Reserved	
D1			Output Wire 124 Relay—Normally Closed	
D2			Output Wire 104 Relay—Normally Closed	
D3			Reserved	
E1			Output Wire 124 Relay—Common	
E2			Output Wire 104 Relay—Common	
E3			Output Wire 104 Relay—Normally Open	
F1			Neutral Start Relay—Normally Open	
F2			Output Wire 130 Relay—Common	
F3			Output Wire 130 Relay—Normally Open	
G1			Neutral Start Relay—Common	
G2			Reserved	
G3			Reserved	
H1			Reserved	
H2			Speedometer—Unfiltered	
H3			Reserved	
J1			Battery Power	
J2			Battery Power	
J3			Reserved	
K1			Battery Return	
K2			Battery Return	
K3			Reserved	

* Colors, wire numbers, and termination points are determined by OEM electrical system design.

APPENDIX D—WIRE/CONNECTOR CHART

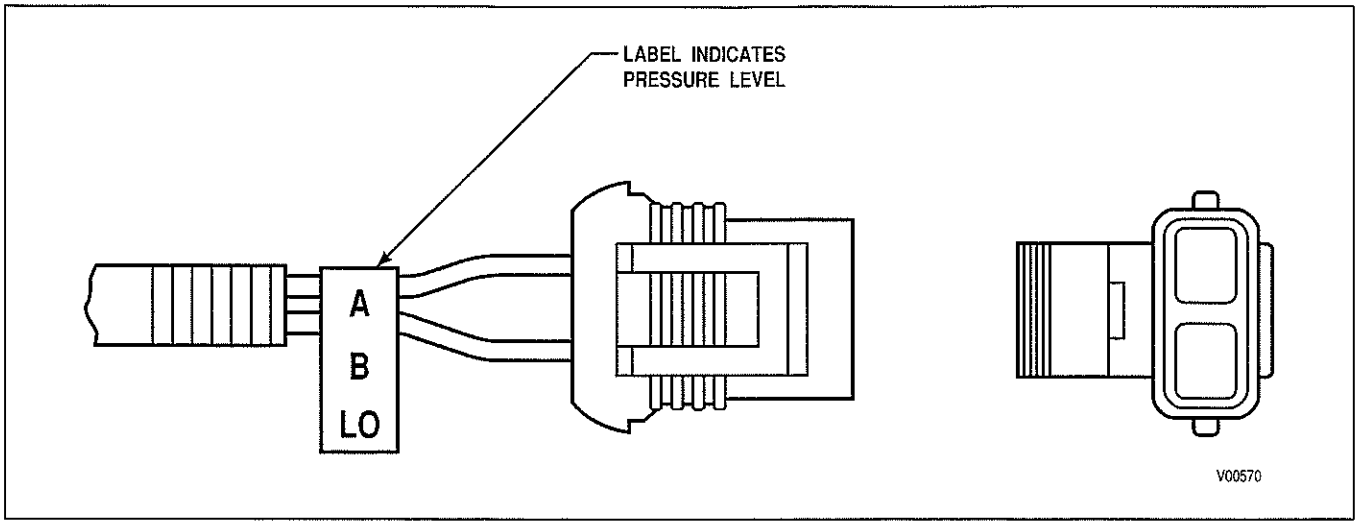


Figure D–14. Resistance Module Type 2—Single Pressure Switch and SCI Interface

Resistance Module Type 2

Terminal No.
A
B

SCI Interface Connector

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	White	132	Serial Communication Interface, High	TCM-32, 9-pin Diagnostic Tool Connector-F
B	Blue	172	Serial Communication Interface, Low	TCM-72, 9-pin Diagnostic Tool Connector-G

* Terminal number and termination points shown only apply when an Allison Transmission recommended harness configuration and bulkhead connector are used.

APPENDIX D—WIRE/CONNECTOR CHART

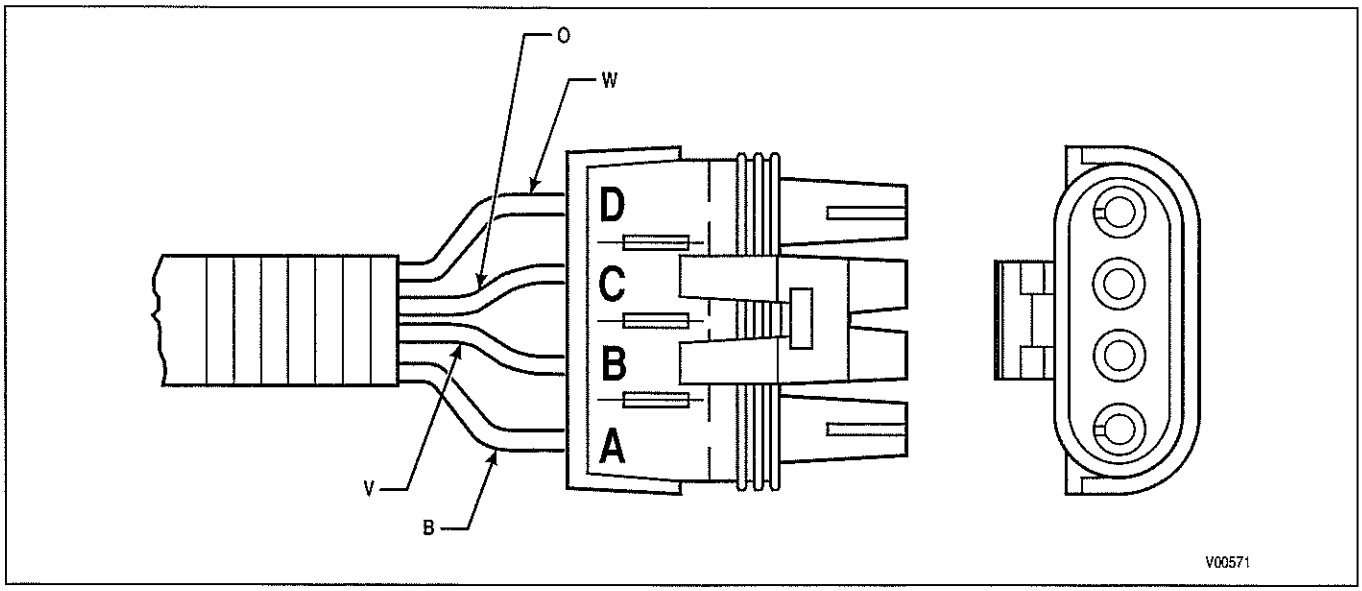


Figure D–15. Resistance Module Type 3—Bendix E-10R Pedal

Resistance Module Type 3

Terminal No.	Wire Color
A	Blue
B	Violet
C	Orange
D	White

APPENDIX D—WIRE/CONNECTOR CHART

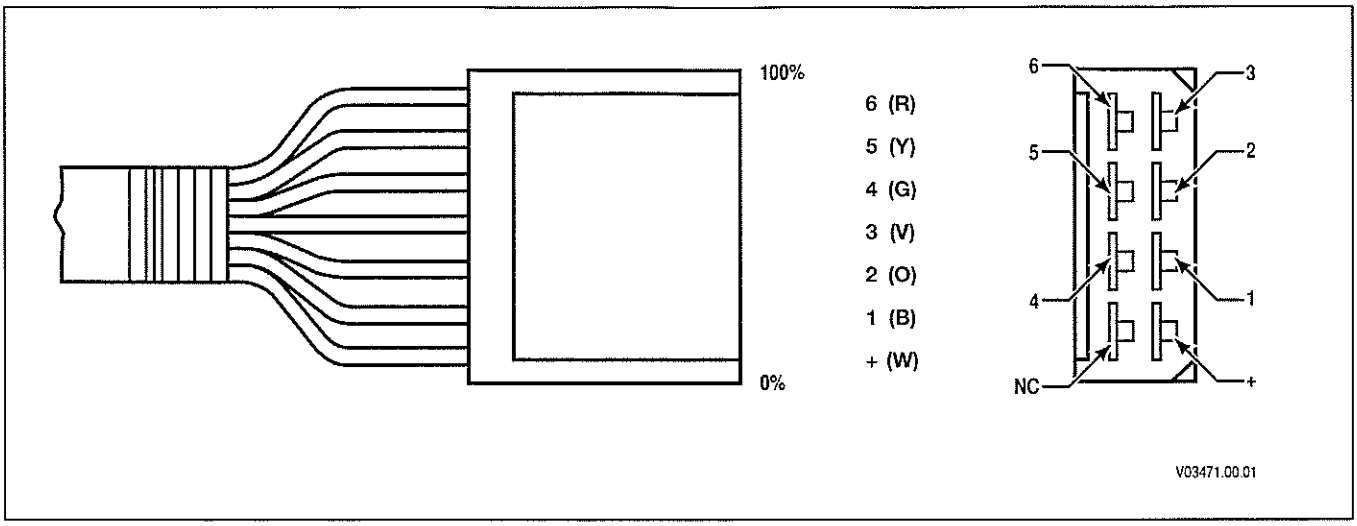


Figure D–16. Resistance Module Type 5—Hand Lever

Resistance Module Type 5

Terminal No.	Wire Color
+	White
1	Blue
2	Orange
3	Violet
4	Green
5	Yellow
6	Red

APPENDIX D—WIRE/CONNECTOR CHART

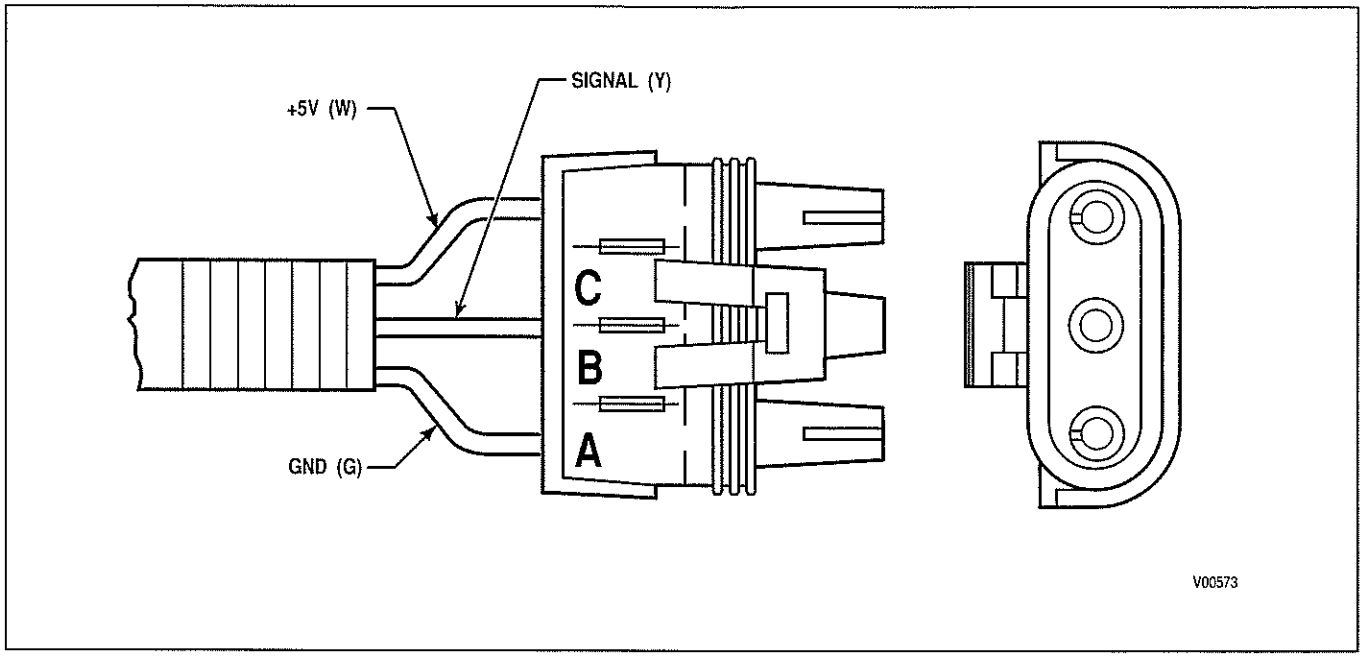


Figure D–17. Resistance Module Type 7—Dedicated Pedal

Resistance Module Type 7

Terminal No.	Wire Color
A	Green
B	Yellow
C	White

APPENDIX D—WIRE/CONNECTOR CHART

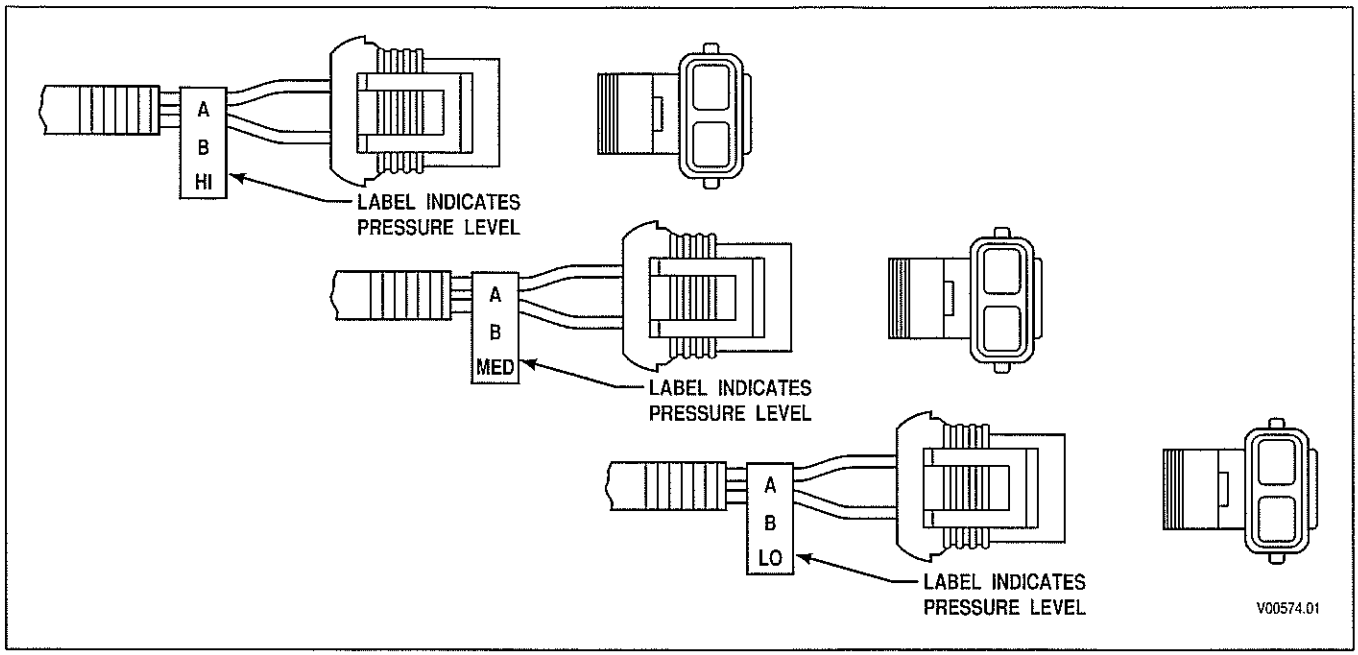


Figure D–18. Resistance Module Type 8—Three Pressure Switch

Resistance Module Type 8

Low Pressure

Terminal No.	Wire Color
A	White
B	Blue

Medium Pressure

Terminal No.	Wire Color
A	White
B	Orange

High Pressure

Terminal No.	Wire Color
A	White
B	Violet

APPENDIX D—WIRE/CONNECTOR CHART

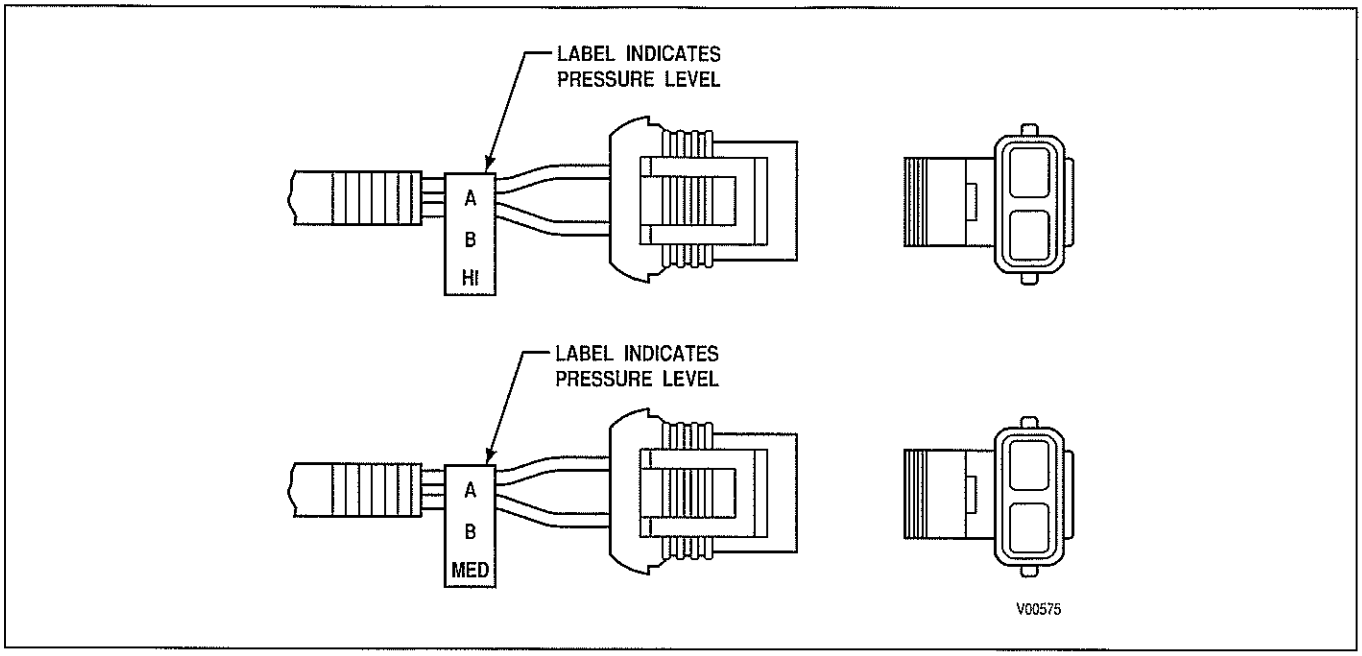


Figure D–19. Resistance Module Type 9—Two Pressure Switch

Resistance Module Type 9

Medium Pressure

Terminal No.	Wire Color
A	White
B	Orange

High Pressure

Terminal No.	Wire Color
A	White
B	Violet

APPENDIX D—WIRE/CONNECTOR CHART

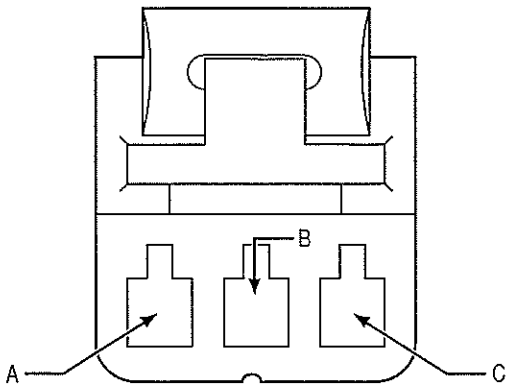


Figure D–20. Oil Level Sensor Plug

3-Way Connector (Redesigned OLS)

Terminal No.	Color	Wire No.	Description	Termination Point(s) 20-Way Feedthrough Harness Connector
A	Black	158	Analog Return	TRANS-19
B	White	116	OLS Input	TRANS-15
C	Red	112	Sensor Power	TRANS-16

APPENDIX D—WIRE/CONNECTOR CHART

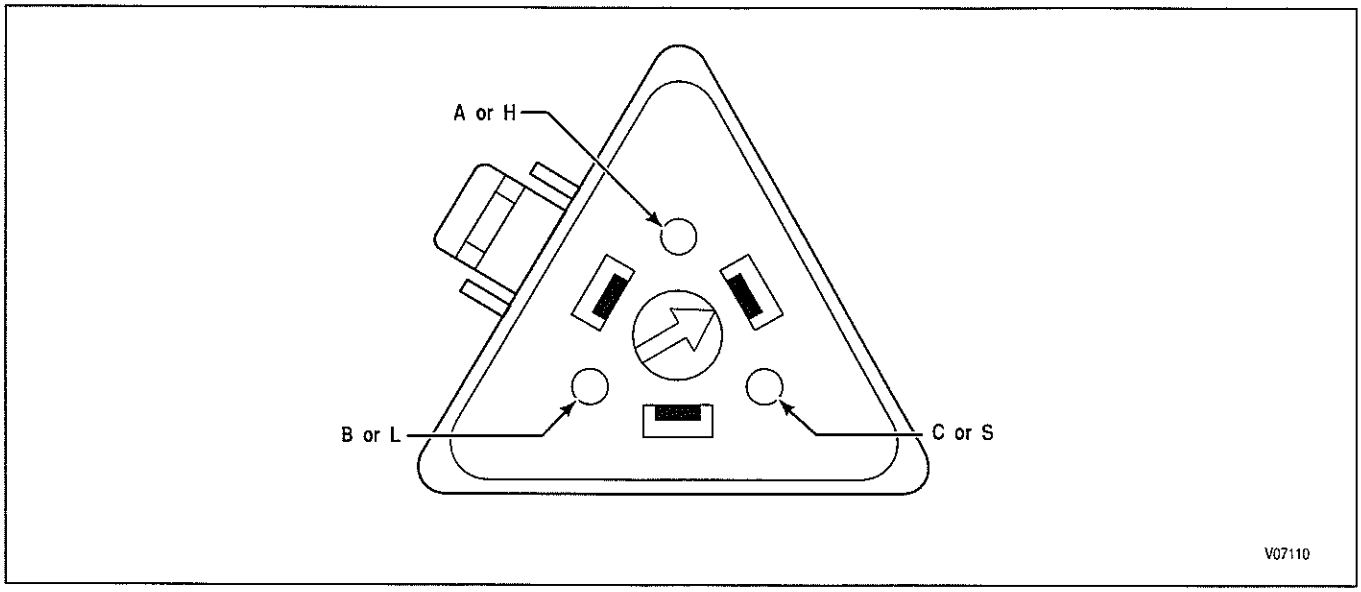


Figure D–21. J1939 Interface Connector

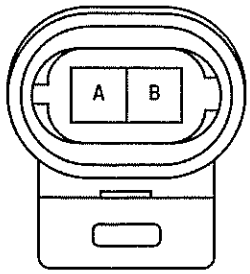
J1939 Interface Connector

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A or H	Yellow	128	J1939 Controller #1, High	TCM-28 and/or TCM-48
B or L	Green	108	J1939 Controller #1, Low	TCM-8 and/or TCM-68
C or S	N/A	149	J1939 Shield #1	TCM-49

IES CAN Interface Connector

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A or H	Yellow	106	CAN Controller #2, High	TCM-6 and/or TCM-66
B or L	Green	127	CAN Controller #2, Low	TCM-27 and/or TCM-47
C or S	N/A	167	CAN Shield #2	TCM-67

APPENDIX D—WIRE/CONNECTOR CHART



RETARDER ACCUMULATOR (SS2 SOLENOID)

V04850.04.00

Figure D–22. Retarder Accumulator Solenoid Connector

Accumulator (SS2) Solenoid

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Blue	119	SS2 Low	TCM-19
B	Yellow	131	SS2 High	TCM-31, TRANS-11

APPENDIX D—WIRE/CONNECTOR CHART

NOTES

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

NOTE: Allison Transmission is providing for service of wiring harnesses and wiring harness components as follows:

- ***Repair parts for the internal wiring harness and for wiring harness components attached to the shift selector will be available through the Allison Transmission Parts Distribution Center (PDC). Use the P/N from your appropriate parts catalog or from Appendix E in this manual. Allison Transmission is responsible for warranty on these parts.***
- ***Repair parts for the external harnesses and external harness components must be obtained from St. Clair Technologies Inc. (SCTI). SCTI provides parts to any Allison customer or OEM and is responsible for warranty on these parts. SCTI recognizes Allison Transmission, manufacturers, and SCTI part numbers. SCTI provides a technical HELPLINE at 519-627-1673 (Wallaceburg). SCTI will have parts catalogs available. The SCTI addresses and phone numbers for parts outlets are:***

St. Clair Technologies, Inc.
920 Old Glass Road
Wallaceburg, Ontario, Canada N8A 4L8
Phone: 519-627-1673
Fax: 519-627-4227

St. Clair Technologies, Inc.
Calle Damanti S/N Col
Guadalupe—Guaymas
Sonora, Mexico CP85440
Phone: 011-526 2222-43834
Fax: 011-526-2222-43553

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

List Of Special Tools Required To Service Allison 4th Generation Controls Wiring Harnesses

Tool Number	Tool Type	Paragraph Reference
23046604	Splice, Sealed (14–16 AWG)	E–15
23046605	Splice, Sealed (18–22 AWG)	E–15
J 25070	Heat Gun	E–15
J 34182	Crimping Tool	E–12, E–13, E–14
J 34513	Remover Tool	E–12
J 35123	Crimping Tool (Alternate)	E–5, E–6, E–7
J 35606	Crimping Tool (Alternate)	E–10
J 35615	Wire Stripper	E–6, E–7, E–9, E–15
J 35689-A	Remover Tool	E–5, E–6, E–7, E–8
J 38125-6	Crimping Tool	E–10
J 38125-7	Crimping Tool	E–5, E–6, E–7, E–9, E–11
J 38125-8	Crimping Tool	E–16
J 38125-10	Remover Tool	E–10
J 38125-12A	Crimping Tool	E–1, E–2, E–3, E–16
J 38125-13	Remover Tool	E–11, E–16
J 38528-3	Remover Tool	E–12
J 38852	Crimping Tool (Alternate)	E–10
J 39227	Remover Tool	E–4
J 39842	Terminal Remover/Installer (3000 7-Speed T-Case)	E–13
J 41193	Connector Repair Kit (FMTV)	E–13
J 41193-1	Guide Pin	E–13
J 41193-2	Insertion Tool	E–13
J 41194	Extractor/Inserter	E–12
J 42215	Crimping Tool	E–8
J 47139	Crimping Tool	E–1, E–2, E–3

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

NOTES

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

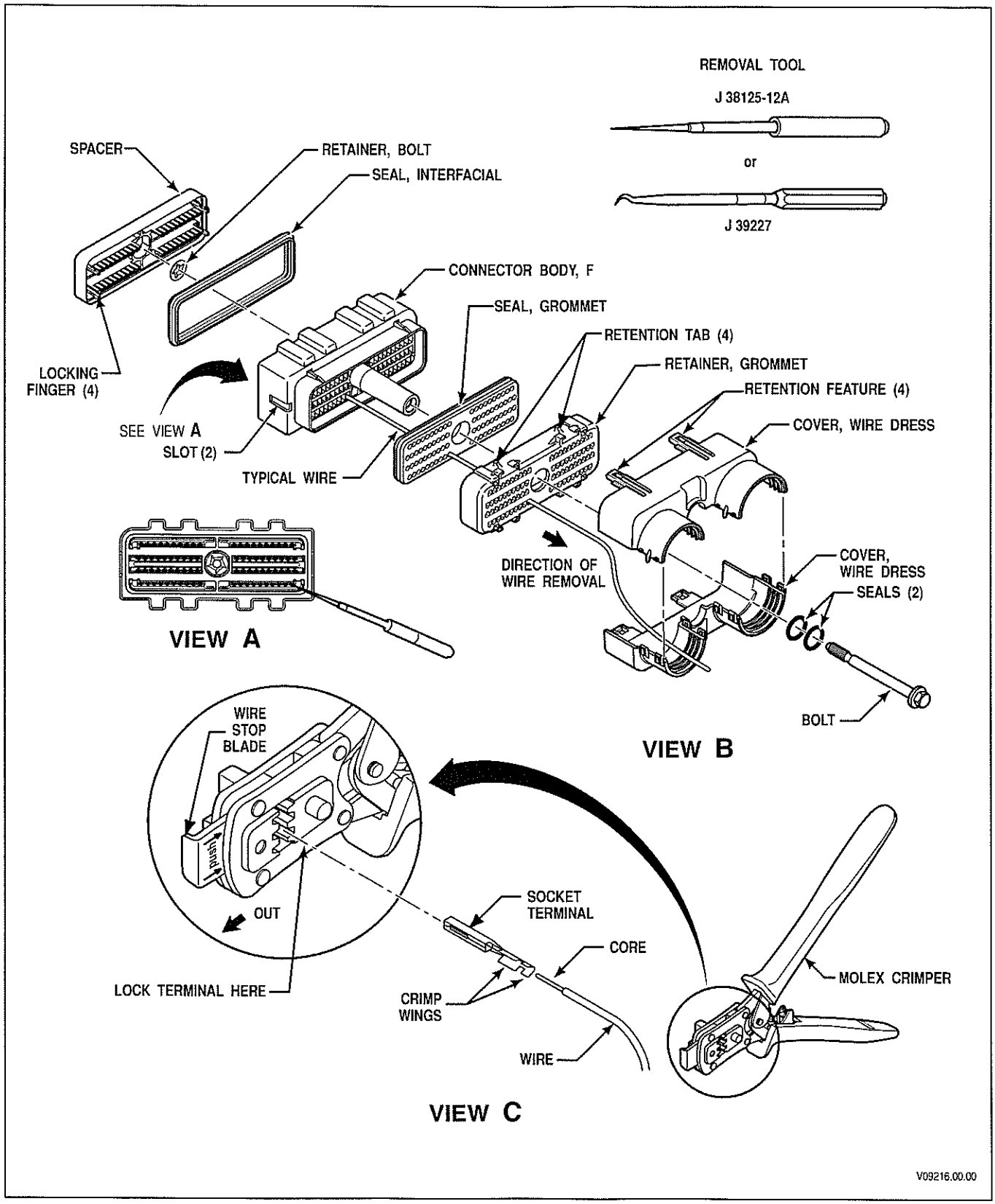


Figure E–1A. AFL 80F Bolt-Assist TCM Connector

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

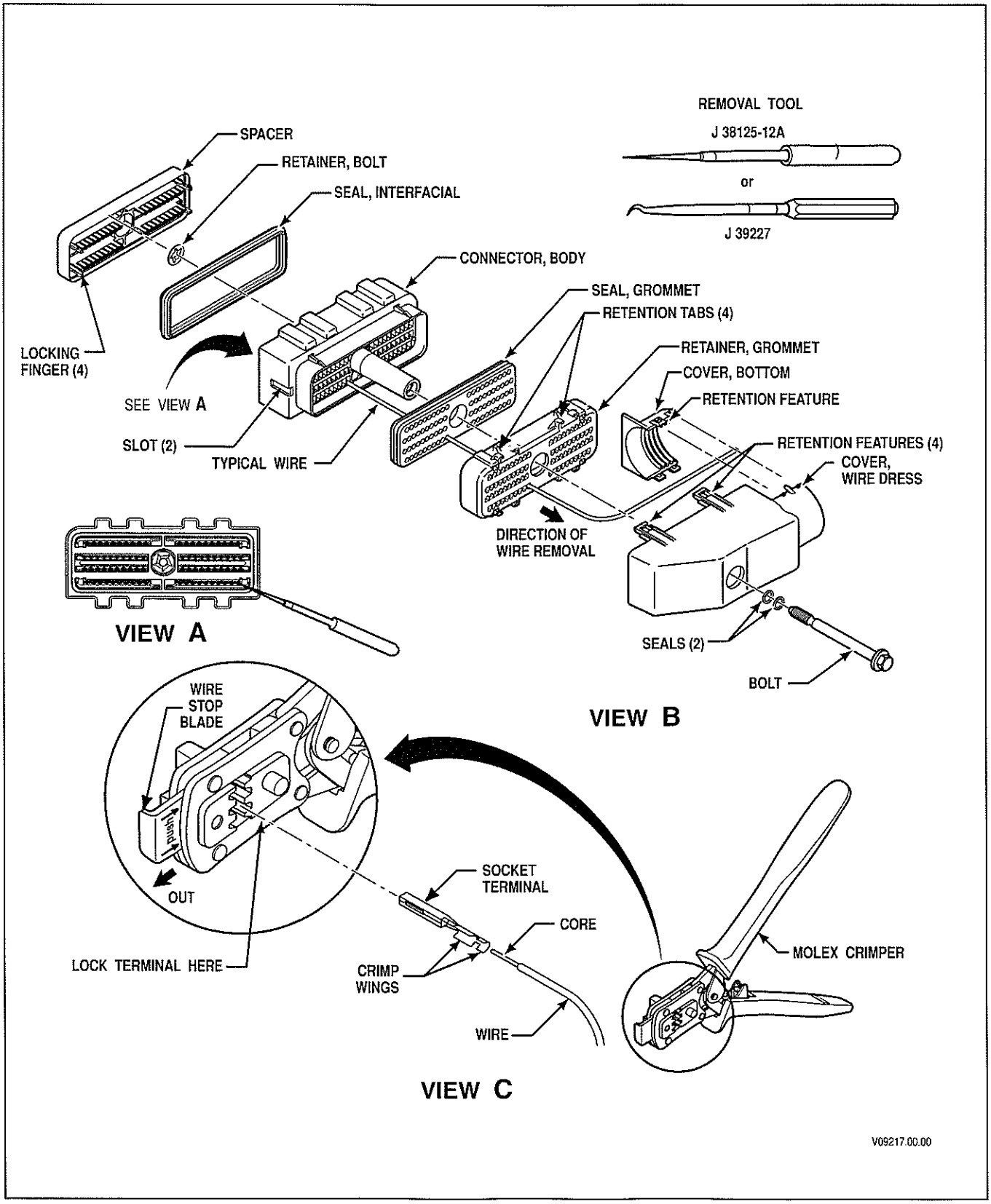


Figure E–1B. AFL 80F Bolt-Assist, Direction 'A' 90 Degree TCM Connector

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

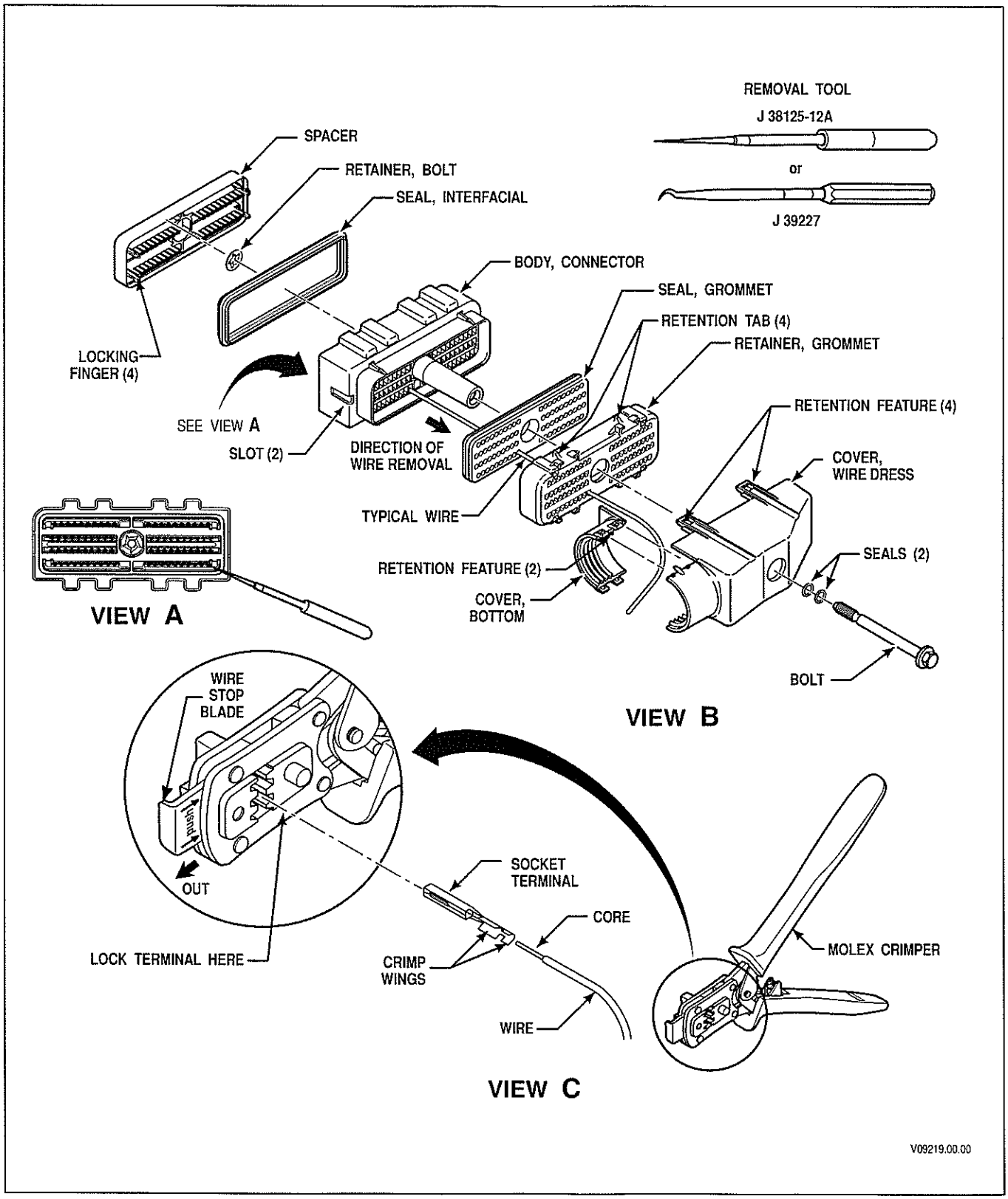


Figure E–1C. AFL 80F Bolt-Assist, Direction 'B' 90 Degree TCM Connector

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–1. AFL AUTOMOTIVE 80F BOLT ASSIST CONNECTORS (TCM CONNECTOR)

A. TCM Connector, Assembly 80F Bolt Assist (refer to Figure E–1A)

Required Tools

Crimping Tool	J 47139
Remover Tool	J 38125-12A

Use	Description	St. Clair P/N	Manufacturers P/N
TCM Connector 80F, Bolt	Kit, Connector Assembly, 80F, Bolt Assist	300278	
	Connector Assembly, 80F, Bolt	300243	R-61991-001
	Spacer 80F		E-4540
	Seal, Interfacial		E-4539
	Connector Body, 80F Bolt		E-4538
	Bolt		E-4543-001
	Seal, Bolt		E-4544
	Retainer Bolt		E-4545
	Grommet, Wire Seal		E-4541
	Grommet, Retainer	300244	E-4542
	Cover A, Wire Dress	300245	E-4550
	Cover B, Wire Dress	300246	E-4551
	Terminal, Receptacle	300247	33001-0004
	Plug, Cavity Seal	300008	12034413
	Wire Cover Kit 80W Bolt	300235	
	Cover A, Wire Dress	300245	E-4550
	Cover B, Wire Dress	300246	E-4551
	Bolt Kit	300234	
	Bolt		E-4543-001
	Seal, Bolt		E-4544
	Retainer, Bolt		E-4545

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

B. TCM Connector, Assembly 80F Bolt Assist, Direction 'A' 90 Degree Wire Dress (refer to Figure E–1B)

Required Tools

Crimping Tool	J 47139
Remover Tool	J 38125-12A

Use	Description	St. Clair P/N	Manufacturers P/N
TCM Connector	Kit, Connector Assembly, 80F, Bolt Assist, 90 Degree, Dir A		
	Connector Assembly, 80F	300243	R-61991-001
	Bolt, 90 Degree, Dir A		
	Spacer, 80F		E-4540
	Seal, Interfacial		E-4539
	Connector Body, 80F Bolt		E-4538
	Bolt		E-4543-001
	Seal, Bolt		E-4544
	Retainer, Bolt		E-4545
	Grommet, Wire Seal		E-4541
	Grommet, Retainer	300244	E-4542
	Cover, Wire Dress, 80F, Dir A		E-6206-002
	Cover, Bottom		E-4555
	Terminal, Receptacle	300247	33001-0004
	Plug, Cavity Seal	300008	12034413
	Wire Cover Kit 80W Bolt	300236	
	Cover, Wire Dress, 80F, Dir A		E-6206-001
	Cover, Bottom		E-4555

Read disassembly process/procedure thoroughly before beginning disassembly.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

C. TCM Connector, Assembly 80F Bolt Assist, Direction 'B' 90 Degree Wire Dress (refer to Figure E–1C)

Required Tools

Crimping Tool	J 47139
Remover Tool	J 38125-12A

Use	Description	St. Clair P/N	Manufacturers P/N
TCM Connector 80F, Bolt	Kit, Connector Assembly, 80F, Bolt Assist, 90 Degree, Dir B	300278	
	Connector Assembly, 80F Bolt, 90 Degree, Dir B	300243	R-61991-001
	Spacer 80F		E-4540
	Seal, Interfacial		E-4539
	Connector Body, 80F Bolt		E-4538
	Bolt		E-4543-001
	Seal, Bolt		E-4544
	Retainer, Bolt		E-4545
	Grommet, Wire Seal		E-4541
	Grommet, Retainer	300244	E-4542
	Cover, Wire Dress, 80F, Dir B		E-6206-001
	Cover, Bottom		E-4555
	Terminal, Receptacle	300247	33001-0004
	Plug, Cavity Seal	300008	12034413
	Wire Cover Kit 80W Bolt	300237	
	Cover, Wire Dress, 80F, Dir B		E-6206-002
	Cover, Bottom		E-4555

D. Terminal Removal

1. Loosen the bolt (Figure E–1A, B, or C, View B) that retains 80-way connector to the transmission control module (TCM).
2. Separate the 80-way connector from the TCM.
3. Refer to the proper Figure for the connector being used:
   a. Refer to Figure E–1A, View B. Use a small-bladed screwdriver to gently unlatch the retention features (4) of the wire dress cover and separate the two halves.
   b. Refer to Figures E–1B or E–1C, View B. Use a small-bladed screwdriver to gently unlatch the retention features (2) of the wire dress cover and remove it from the backshell wire dress. Gently release the retention features (4) of the backshell wire dress and remove it from the connector body.
4. Insert a small-bladed screwdriver in between the connector body and the grommet retainer (Figure E–1A, B, or C, View B) and carefully pry the grommet retainer away from the connector body. Slide the grommet retainer along the wires away from the connector body. If the grommet seal stayed with the connector body, also slide it away from the connector body and seat it into the grommet retainer, allowing better access to the wires.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

D. Terminal Removal *(cont'd)*

5. Insert a small-bladed screwdriver through the slot in the connector body (being careful not to damage the green interfacial seal) and apply upward pressure on the red spacer until it lifts to the pre-stage location on one side (approximately 1/8 inch). Repeat this process on the other side so it is removed evenly. Carefully continue to evenly lift the red spacer out of the connector body until the four lock tabs release. Remove the red spacer completely. The red spacer **must be replaced** if any of the four lock tabs are broken during removal.
6. Make a note for reassembly purposes of which wire (number) goes into which terminal cavity in the connector body.
7. Insert the metal blade of J 38125-12A or J 39227 removal tool into the small hole in the front of the connector body above or below the desired terminal/wire lead cavity location (See Figures E–1A, B, or C, View A).
8. Remove the selected terminal by gently lifting the locking finger with the removal tool and pulling the wire and terminal rearward out of the connector.

*NOTE: **Care should be taken not to damage or break the terminal locking fingers during removal. If a locking finger is damaged or broken, proper terminal retention will be lost after reassembly.***

E. Terminal Crimping

1. Carefully strip the insulation from the wire to leave 4.70–5.60 mm (0.185–0.220 inch) of bare wire (core) exposed.
2. Refer to Figures E–1A, B, or C, View C. Pull out the wire stop blade of the crimping tool so it is clear of the terminal crimp area. Place the terminal all the way into the appropriate wire size opening of the J 47139 crimping tool until it contacts the stop and is properly oriented. Squeeze the handle enough to keep the terminal in place in the tool but not enough to compress the crimp wings.
3. Push in the wire stop blade until it touches the terminal. Insert the wire core into the terminal, with the core held against the wire stop blade.
4. Hold the wire and terminal against the stops until the terminal is fully crimped. Squeeze the crimper handle until the ratchet releases.
5. Pull out the wire stop blade and remove the crimped terminal and wire.

*NOTE: **If cavities do not have a terminal/wire lead or grommet cover pin (or if grommet cover pin is damaged) install cavity plug #12034413 into corresponding cavity in grommet seal in connector body.***

6. Repeat as necessary.
7. Slide the grommet retainer containing the grommet seal along the wires and snap it into place on the connector body.
8. When all terminals have been inserted, be sure the green interfacial seal is properly located on the connector body and not damaged. Install the red spacer into the connector body. Push it into the connector body until it is fully seated against the connector body.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E. Terminal Crimping *(cont'd)*

NOTE: If the red spacer will not seat properly on the connector body, be sure all terminals are fully seated.

9. Refer to the proper Figure for the connector being used:
   a. Refer to Figure E–1A. Align and press together the two halves of the wire dress cover until they lock. Align the four retention features on the wire dress cover with the four lock tabs on the grommet retainer and press the wire dress cover onto the grommet retainer until all four retention features lock.
   b. Refer to Figures E–1B or E–1C. Align the four retention features of the backshell wire dress with the four lock tabs on the grommet retainer and press the backshell wire dress onto the grommet retainer until all four retention features lock. Align the wire dress cover with the backshell wire dress and press into place until it locks on both sides.
10. Reconnect the 80-way connector to the TCM and tighten connector bolt to specified torque value (N·m) shown on the wire dress cover (DO NOT OVER-TORQUE).

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

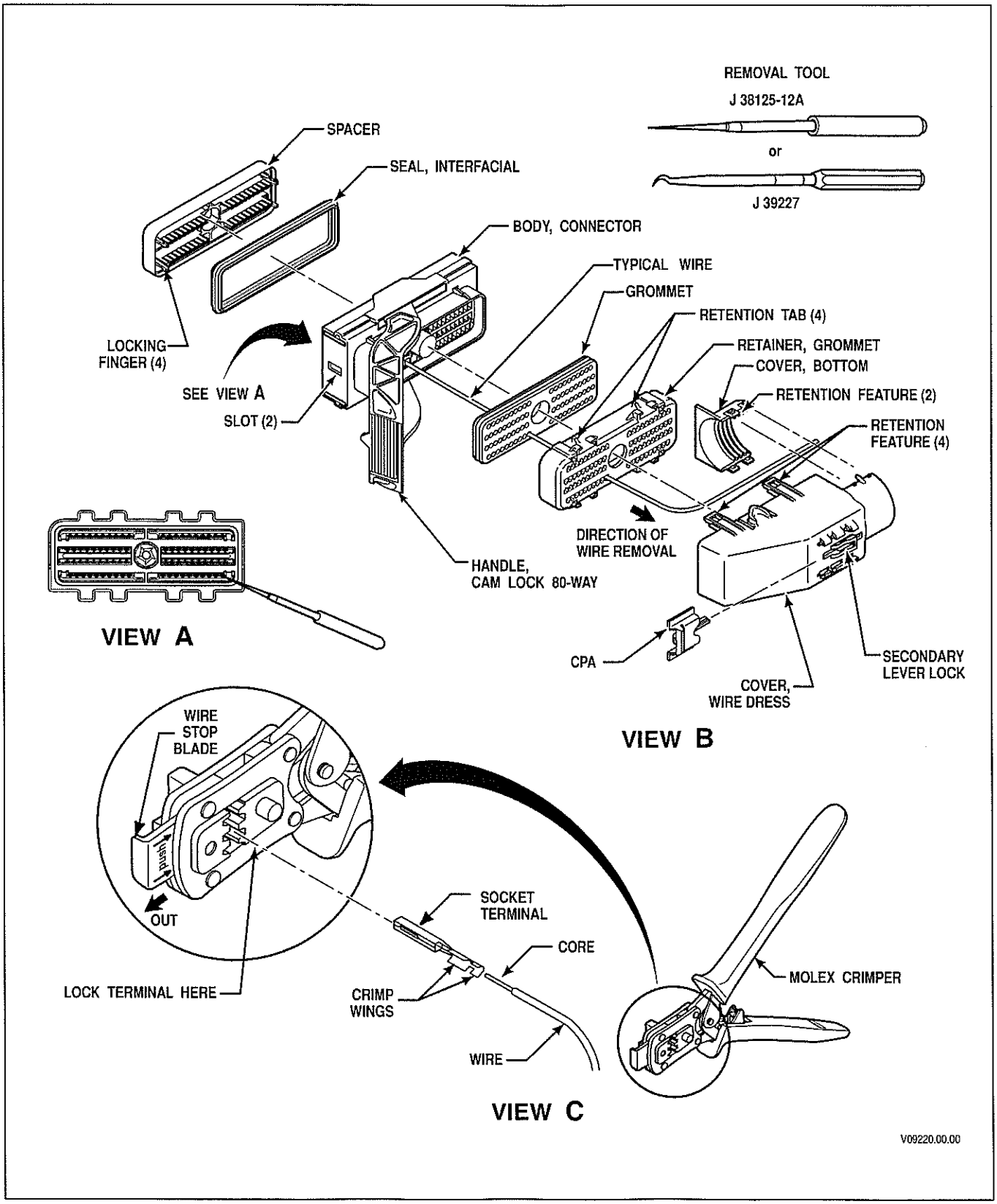


Figure E–2A. AFL 80F Cam-Assist, Direction 'A' TCM Connector

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

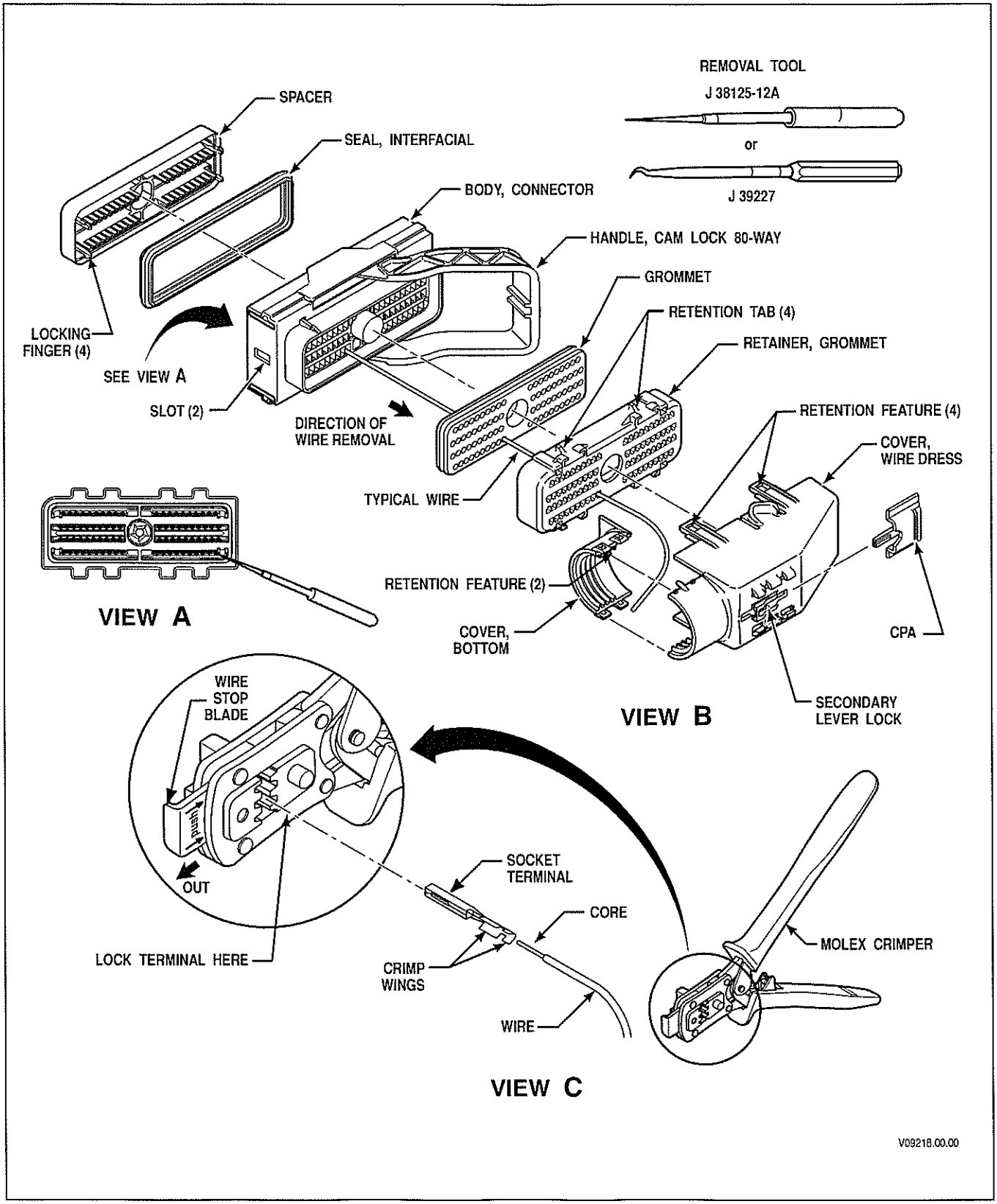


Figure E–2B. AFL 80F Cam-Assist, Direction 'B' TCM Connector

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–2. AFL AUTOMOTIVE 80F CAM-ASSIST CONNECTORS (TCM CONNECTOR)

A. Connector, Assembly 80F Cam-Assist, 'A' Direction (refer to Figure E–2A)

Required Tools

Crimping Tool	J 47139
Remover Tool	J 38125-12A

Use	Description	St. Clair P/N	Manufacturers P/N
TCM Connector	Kit, Connector Assembly, 80F, Cam-Assist, Dir A		
	Connector Assembly, 80F, Cam-Assist, Dir A		R-62004-001
	Spacer, 80F		E-4540
	Seal, Interfacial		E-4539
	Connector Body, 80F, Cam		E-4547
	Cam, Left		E-4554
	Cam, Right		E-4553
	Handle, Cam		E-4548
	Retainer, Bolt		E-4545
	Grommet, Wire Seal		E-4541
	Grommet, Retainer	300244	E-4542
	Cover, Wire Dress and CPA		E-4589
	Cover, Bottom		E-4555
	Terminal, Receptacle	300247	33001-0004
	Plug, Cavity Seal	300008	12034413
	Wire Cover Kit 80W Cam, Dir A	300238	
	Cover, Wire Dress and CPA		E-4555
	Cover, Bottom		E-4589

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

B. Connector, Assembly 80F Cam-Assist, 'B' Direction (refer to Figure E–2B)

Required Tools

Crimping Tool	J 47139
Remover Tool	J 38125-12A

Use	Description	St. Clair P/N	Manufacturers P/N
TCM Connector	Kit, Connector Assembly, 80F, Cam-Assist, Dir B		
	Connector Assembly, 80F, Cam-Assist, Dir B		R-62004-002
	Spacer, 80F		E-4540
	Seal, Interfacial		E-4539
	Connector Body, 80F, Cam		E-4547
	Cam, Left		E-4554
	Cam, Right		E-4553
	Handle, Cam		E-4548
	Retainer, Bolt		E-4545
	Grommet, Wire Seal		E-4541
	Grommet, Retainer	300244	E-4542
	Cover, Wire Dress and CPA		E-4588
	Cover, Bottom		E-4555
	Terminal, Receptacle	300247	33001-0004
	Plug, Cavity Seal	300008	12034413
	Wire Cover Kit 80W Cam, Dir B	300239	
	Cover, Wire Dress and CPA		E-4555
	Cover, Bottom		E-4588

Read disassembly process/procedure thoroughly before beginning disassembly.

C. Connector Removal (Figures E–2A or B, View B)

1. Remove the CPA from the secondary lever lock and press in on the secondary lever lock while moving the cam lock handle to the unlatched position.
2. Separate connector from Transmission Control Module (TCM).

*NOTE: **Do not attempt to move CAM lever after it is disengaged from the TCM, doing so can break the internal latching mechanism***

3. Refer to Figures E–2A or B, View B. Use a small-bladed screwdriver to gently unlatch the retention features (2) of the wire dress cover and remove it from the backshell wire dress. Gently release the retention features (4) of the backshell wire dress and remove it from the connector body.
4. Insert a small-bladed screwdriver in between the connector body and the grommet retainer (Figure E–2A or B, View B) and carefully pry the grommet retainer away from the connector body. Slide the grommet retainer along the wires away from the connector body. If the grommet seal stayed with the connector body, also slide it away from the connector body and seat it into the grommet retainer, allowing better access to the wires.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

C. Connector Removal (Figures E–2A or B, View B) *(cont'd)*

5. Insert a small-bladed screwdriver through the slot in the connector body (being careful not to damage the blue interfacial seal) and apply upward pressure on the red spacer until it lifts to the pre-stage location on one side (approximately 1/8 inch). Repeat this process on the other side so it is removed evenly. Carefully continue to evenly lift the red spacer out of the connector body until the four lock tabs release. Remove the red spacer completely. The red spacer **must be replaced** if any of the four lock tabs are broken during removal.
6. Make a note for reassembly purposes of which wire (number) goes into which terminal cavity in the connector body.
7. Insert the metal blade of J 38125-12A or J 39227 remover tool into the small hole in the front of the connector body above or below the desired terminal/wire lead cavity location (See Figures E–2A or B, View A).
8. Remove the selected terminal by gently lifting the locking finger with the remover tool and pulling the wire and terminal rearward out of the connector.

*NOTE: **Care should be taken not to damage or break the terminal locking finger during removal. If the locking finger is damaged or broken, proper terminal retention will be lost after reassembly.***

D. Terminal Crimping

1. Carefully strip the insulation from the wire to leave 4.70–5.60 mm (0.185–0.220 inch) of bare wire (core) exposed.
2. Refer to Figures E–2A or B, View C. Pull out the wire stop blade of the crimping tool so it is clear of the terminal crimp area. Place the terminal all the way into the appropriate wire size opening of the J 47139 crimping tool until it contacts the stop and is properly oriented. Squeeze the handle enough to keep the terminal in place in the tool but not enough to compress the crimp wings.
3. Push in the wire stop blade until it touches the terminal. Insert the wire core into the terminal, with the core held against the wire stop blade.
4. Hold the wire and terminal against the stops until the terminal is fully crimped. Squeeze the crimper handle until the ratchet releases.

*NOTE: **If cavities do not have a terminal/wire lead or grommet cover pin (or if grommet cover pin is damaged) install cavity plug #12034413 into corresponding cavity in grommet seal in connector body.***

5. Repeat as necessary.
6. Slide the grommet retainer containing the grommet seal along the wires and snap it into place on the connector body.
7. When all terminals have been inserted, be sure the green interfacial seal is properly located on the connector body and is not damaged. Install the red spacer into the connector body. Push it into the connector body until it is fully seated against the connector body.

*NOTE: **If the red spacer will not seat properly on the connector body, be sure all terminals are fully seated.***

8. Refer to Figures E–2A or B, View B. Align the four retention features of the backshell wire dress with the four lock tabs on the grommet retainer and press the backshell wire dress onto the grommet retainer until all four retention features lock. Align the wire dress cover with the backshell wire dress and press into place until it locks on both sides.
9. To reconnect the 80-way connector to the TCM:
   a. Bring the connector to TCM "squared up", not at an angle.
   b. Keeping hands away from the handle, squarely press the connector onto the TCM until the cam lever handle moves of its own accord approximately 3/4 inch.
   c. Gently complete mating the connector to the TCM by moving the cam lever handle to the locked position.
   d. Slide the CPA back toward the secondary lock.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

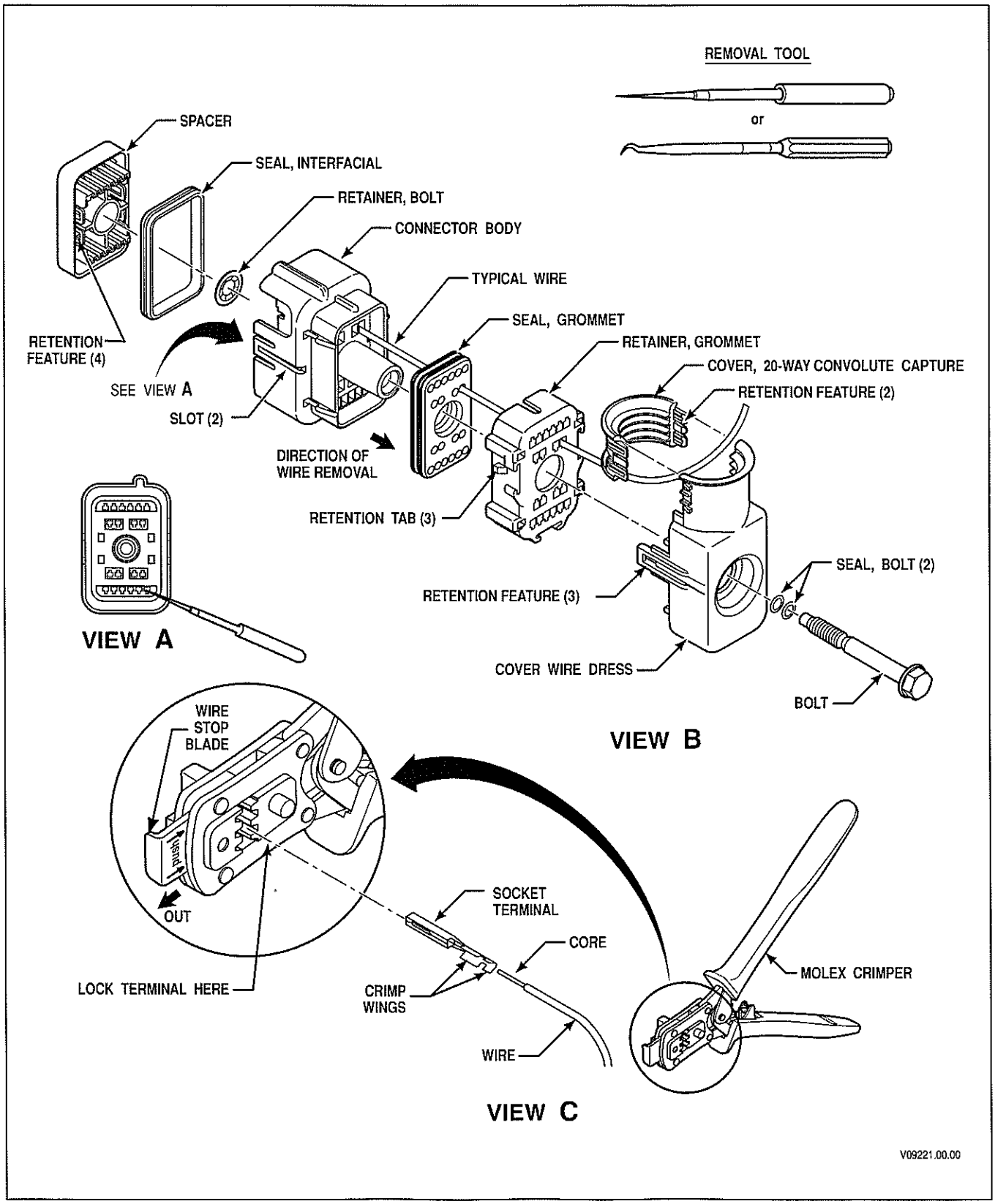


Figure E–3. AFL Automotive 20-Way, Bolt-Assist TCM Connector

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–3. AFL AUTOMOTIVE 20-WAY BOLT-ASSIST CONNECTORS (TCM CONNECTOR)

A. Connector/Terminal Tools

Required Tools

Crimping Tool	J 47139
Remover Tool	J 38125-12A

Use	Description	St. Clair P/N	Manufacturers P/N
TCM Connector (20-way Bolt assist)	Kit, Connector Assembly, 20F, Bolt Assist	300278	
	Connector Assembly, 20F, Bolt Assist	300252	R-62183-001
	Spacer, 80F		E-4564
	Seal, Interfacial		E-4542
	Connector Body, 20F, Bolt		E-4561
	Bolt		E-6187-001
	Seal, Bolt		E-4590
	Retainer, Bolt		E-4545
	Grommet, Wire Seal		E-4565
	Grommet Cover, 20-Way	300253	E-4566
	Cover, Wire Dress	300254	E-4569
	Clip, Convolute	300251	E-4570
	Terminal, Receptacle	300247	33001-0004
	Plug, Cavity Seal	300008	12034413
	Bolt Kit	300241	
	Bolt		E-6187-001
	Seal, Bolt		E-4590
	Retainer, Bolt		E-4545
	Wire Cover Kit	300242	
	Cover, Wire Dress		E-4569
	Clip, Convolute		E-4570

Read disassembly process/procedure thoroughly before beginning disassembly.

1. Loosen the bolt (Figure E–3, View B) that retains 20-way connector to the transmission pass-through connector.
2. Separate the 20-way connector from the transmission pass-through connector.
3. Use a small-bladed screwdriver to gently unlatch the retention features (2) of the wire dress cover and remove it from the backshell wire dress. Gently release the retention features (3) of the backshell wire dress and remove it from the connector body.
4. Insert a small-bladed screwdriver in between the connector body and the grommet retainer (Figure E–1A, B, or C) and carefully pry the grommet retainer away from the connector body. Slide the grommet retainer along the wires away from the connector body. If the grommet seal stayed with the connector body, also slide it away from the connector body and seat it into the grommet retainer, allowing better access to the wires (only required when adding or deleting circuits).

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

A. Connector/Terminal Tools *(cont'd)*

5. Make a note for reassembly purposes of which wire (number) goes into which terminal cavity in the connector body.
6. Insert a small-bladed screwdriver through the slot in the connector body (being careful not to damage the interfacial seal) and apply upward pressure on the spacer until it lifts to the pre-stage location on one side (approximately 1/8 inch). Repeat this process on the other side so it is removed evenly. Carefully continue to evenly lift the spacer out of the connector body until the two lock tabs release. Remove the spacer completely. The spacer **must be replaced** if any one of the four retention features is broken during removal.
7. Insert the metal blade of J 38125-12A or J 39227 remover tool into the small hole in the front of the connector body above or below the desired terminal/wire lead cavity location (See Figures E–3, View A).
8. Remove the selected terminal by gently lifting the locking finger with the remover tool and pulling the wire and terminal rearward out of the connector.

*NOTE: **Care should be taken not to damage or break a terminal locking finger during removal. If a locking finger is damaged or broken, proper terminal retention will be lost after reassembly.***

B. Terminal Crimping

1. Carefully strip the insulation from the wire to leave 4.70–5.60 mm (0.185–0.220 inch) of bare wire (core) exposed.
2. Refer to Figures E–3, View C. Pull out the wire stop blade of the crimping tool so it is clear of the terminal crimp area. Place the terminal all the way into the appropriate wire size opening of the J 47139 crimping tool until it contacts the stop and is properly oriented. Squeeze the handle enough to keep the terminal in place in the tool but not enough to compress the crimp wings.
3. Push in the wire stop blade until it touches the terminal. Insert the wire core into the terminal, with the core held against the wire stop blade.
4. Hold the wire and terminal against the stops until the terminal is fully crimped. Squeeze the crimper handle until the ratchet releases.
5. Pull out the wire stop blade and remove the crimped terminal.

*NOTE: **If cavities do not have a terminal/wire lead or grommet cover pin (or if grommet cover pin is damaged) install cavity plug #12034413 into corresponding cavity in grommet seal in connector body.***

6. Repeat as necessary.
7. Slide the grommet retainer containing the grommet seal along the wires and snap it into place on the connector body (only if removed).
8. Be sure the interfacial seal is properly located on the connector body and not damaged. Install the spacer into the connector body. Push it into the connector body until it is fully seated against the connector body.

*NOTE: **If the spacer will not seat properly on the connector body, be sure all terminals are fully seated.***

9. Refer to Figures E–3, View A. Align the three retention features of the backshell wire dress with the three lock tabs on the grommet retainer and press the backshell wire dress onto the grommet retainer until all three retention features lock. Align the wire dress cover with the backshell wire dress and press into place until it locks on both sides.
10. Reconnect the 20-way connector to the transmission pass-through connector and tighten connector bolt to specified torque value (N·m or lb ft) shown on the wire dress cover (DO NOT OVER-TORQUE).

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

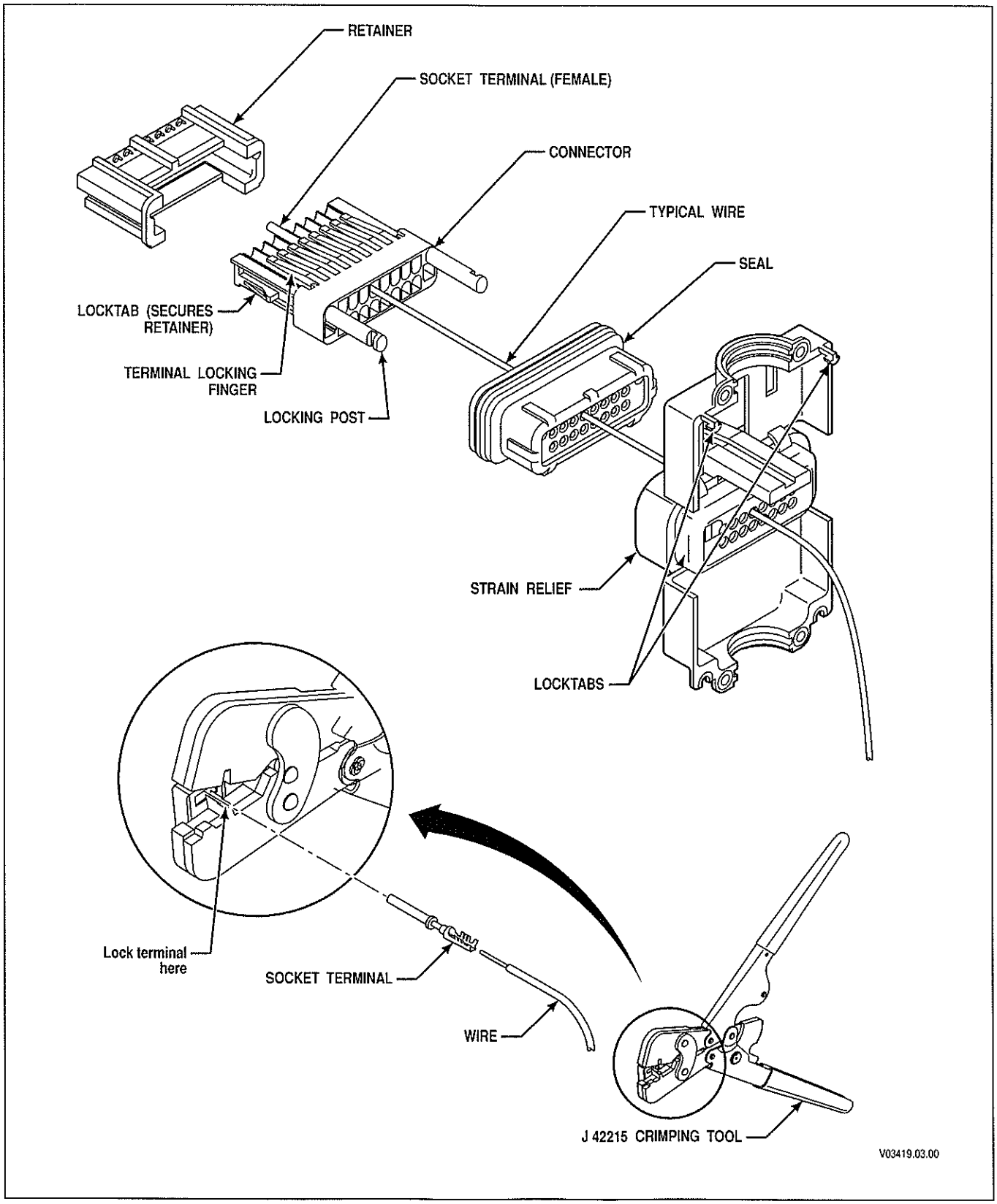


Figure E–4A. Delphi-Packard Micro Pack 16-Way 180 Degree Connector

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

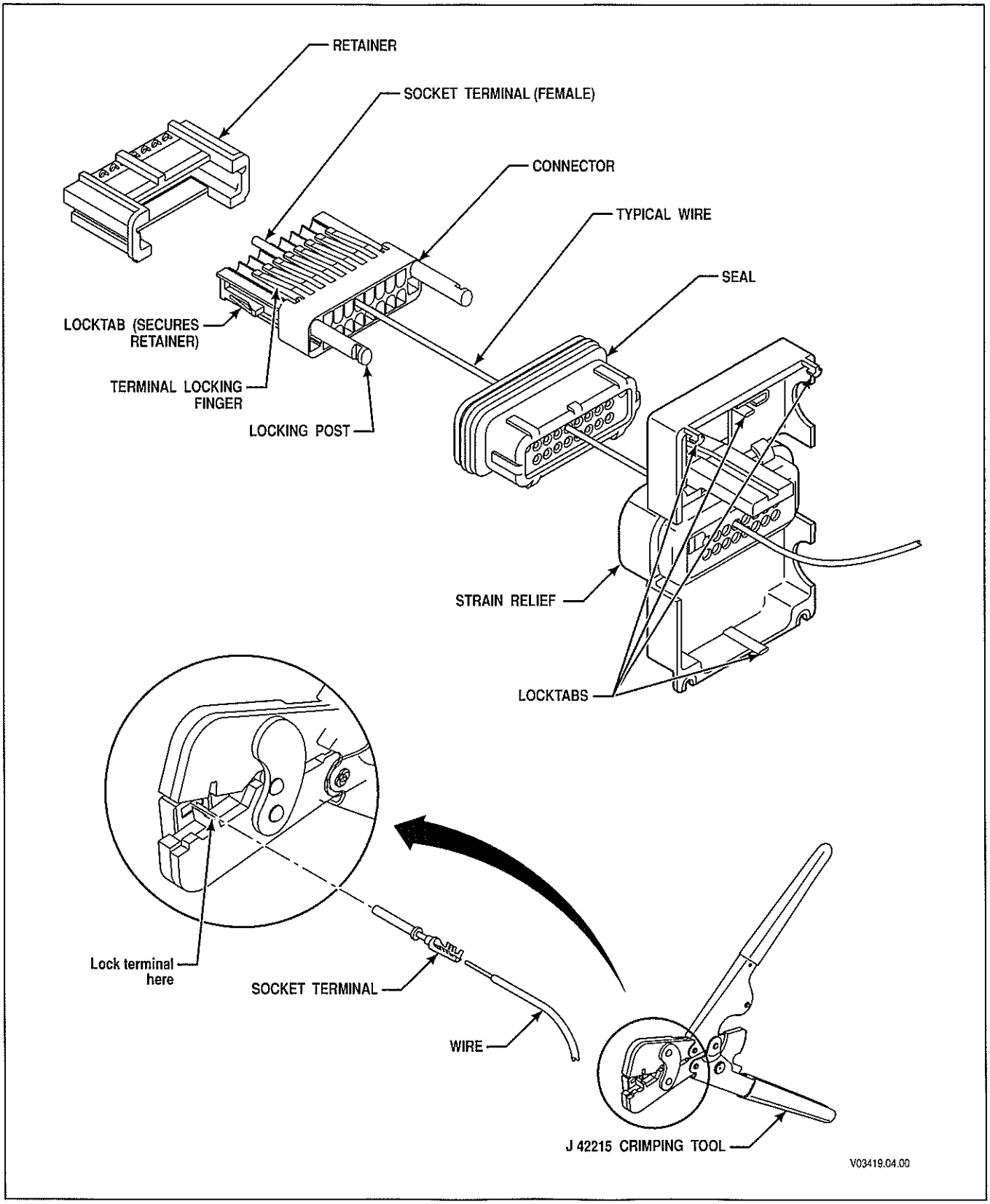


Figure E–4B. Delphi-Packard Micro Pack 16-Way 90 Degree Connector

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

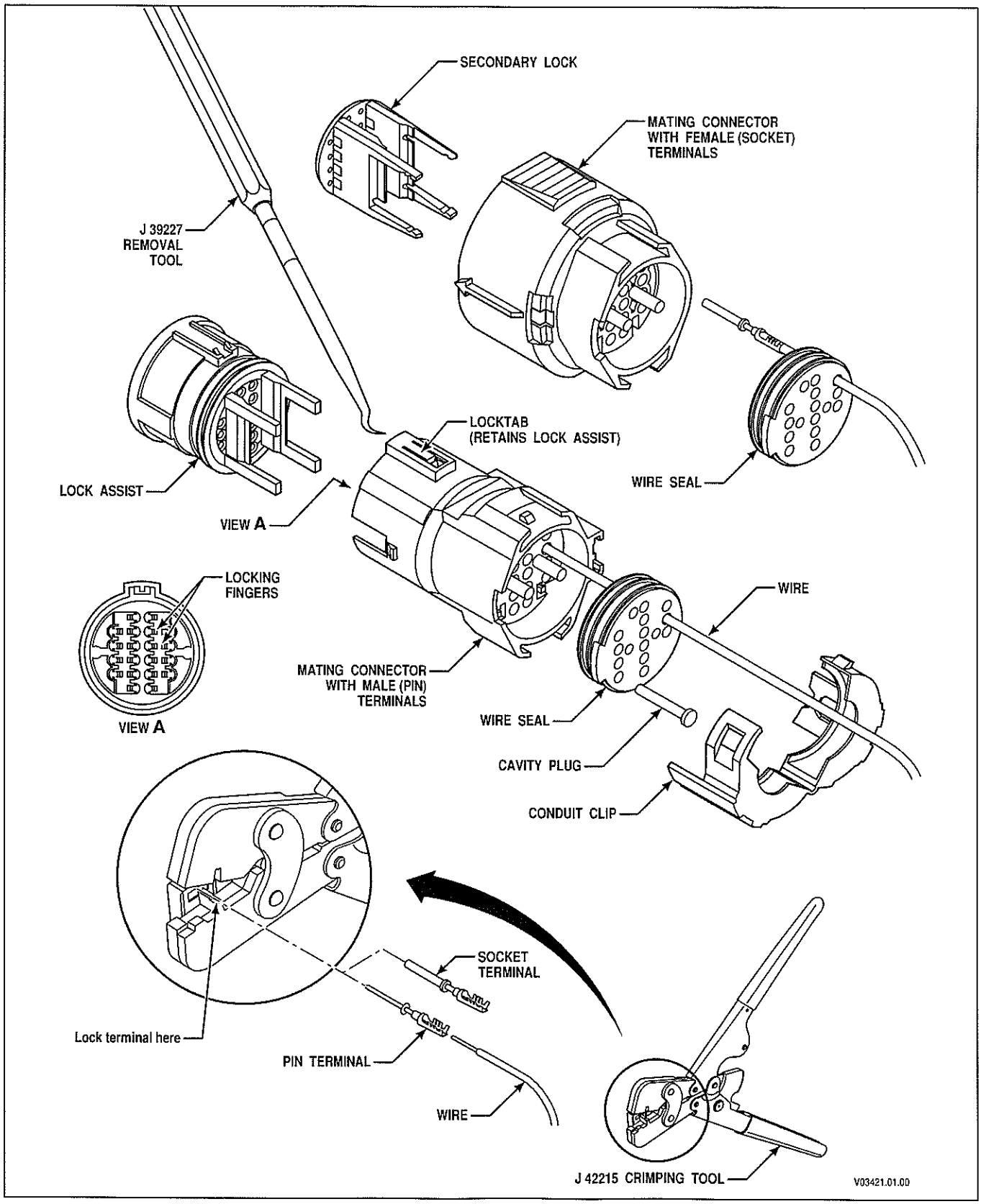


Figure E–4C. Delphi-Packard Micro Pack Connector (Strip Shift Selector)

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–4. DELPHI-PACKARD MICRO PACK 100W CONNECTORS (CAN AND STRIP SHIFT SELECTORS)

A. Connector/Terminal Repairs

Crimping Tool	J 42215
Remover Tool	J 39227

Use	Description	St. Clair P/N	Manufacturers P/N
CAN Shift Selector, 90 Degree	Kit, CAN Shift Selector, 90 Degree	300279	
	Connector, 16F	300255	12191065
	Seal, 16-way	300256	12191066
	TPA Retainer, 16F	300257	12191067
	Strain Relief, 16F, 90 Degree	300258	12191068
	Terminal, 0.8 mm Wire	300087	12084912
	Cavity Plug	300105	12129557
	CPA Lock M/P	300114	12177289
CAN Shift Selector, 180 Degree	Kit, CAN Shift Selector, 180 Degree	300280	
	Connector, 16F	300255	12191065
	Seal, 16-way	300256	12191066
	TPA Retainer, 16F	300257	12191067
	Strain Relief, 16F, 180 Degree	300259	15460298
	Terminal, 0.8 mm Wire	300087	12084912
	Cavity Plug	300105	12129557
	CPA Lock M/P	300114	12177289
Strip Shift Selector, Harness	Connector		12160280
	Wire Seal		15304882
	Secondary Lock		12160494
	Terminal, Socket		12084912
	Cavity Plug		12129557
	Conduit Clip		12176394
Strip Shift Selector, Device	Connector, Gray		12160542
	Wire Seal		12110693
	Lock Assist/Seal		12191176
	Terminal, Pin		12060551
	Cavity Plug		12129557
	Conduit Clip, Black		12176394

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

B. Terminal Removal

1. CAN Shift Selector Harness Connectors (Figure E–4A, 4B, and 4C)

CAUTION:	**The color-code of the strain relief should match the color-code of the retainer. However, cases have been reported where this has not occurred. The retainer color-code and key configuration ensures that the proper wiring harness connector is in the right socket of the ECU. The color-code of the strain relief is of secondary importance and may not agree with the retainer. Change the strain relief to match the color-code of the retainer (Figure E–1A) when color-code mismatch is found.**

   a. Use a small-bladed screwdriver to gently release the locktabs at the splitline of the strain relief.
   b. Spread the strain relief open.
   c. Remove the retainer from the connector by using a small-bladed screwdriver to depress the locktabs on the side of the connector.
   d. Remove a selected terminal by pushing forward on the wire or by lifting the locking finger and pulling the wire and terminal rearward out of the connector.

2. Strip Shift Selector (Device) Connectors (Figure E–4C)
   a. Lift locktab on the side of the connector and remove the lock assist.
   b. Open the conduit clip on the back of the connector after lifting locktabs on each side and sliding clip back to release it from connector.
   c. Use the J 39227 tool to release the locking finger inside the connector and pull the terminal/wire out the rear of the connector.

3. Strip Shift Selector Harness Connectors (Figure E–4C)
   a. Carefully insert a small screwdriver blade between the connector body and the secondary lock. Twist/pry to remove the secondary lock from the connector body.
   b. Open the conduit clip on the back of the connector after lifting locktabs on each side and sliding clip back to release it from connector.
   c. Use the J 39227 tool to release the locking finger inside the connector and pull the terminal/wire out the rear of the connector.

C. Terminal Crimping

1. Carefully strip insulation to leave 5.0 mm ± 0.5 mm (0.20 ± 0.02 inch) of bare wire showing.
2. Insert the new terminal to be crimped in the J 42215 crimping tool. There is a spring-loaded terminal positioner at the front of the tool to hold the terminal in place. Squeeze the crimper handles for a few clicks to start the crimping process but leave room to insert the wire end.
3. Insert the bare wire end into the terminal. Squeeze the crimper handles to complete the crimping process and until the crimper handles open when released to remove the terminal/wire from the tool.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

C. **Terminal Crimping** *(cont'd)*

4. Complete terminal installation for Strip Shift Selector Connectors as follows: (Figure E–4C)
   a. Insert the wire seal in the back of the connector.
   b. Push the terminal/wire assembly through the proper hole in the back of the wire seal. Push the wire in until the terminal clicks into position. Gently pull rearward on the wire to be sure that the terminal is fully seated. Install cavity plugs as needed.
   c. Install the lock assist or secondary lock into the connector body.
   d. Close the conduit clip around the conduit and lock the clip into the rear of the connector body.
5. Complete terminal installation of the CAN Shift Selector Connectors as follows: (Figure E–4A and E–4B)
   a. Align the locking posts on the connector with the seal and push the locking posts through the seal into the mating holes in the strain relief (if the connector was removed from the strain relief).
   b. Push the terminal/wire assembly through the proper hole in the back of the seal. Push the wire in until the terminal clicks into position.

*NOTE: **All terminals must be properly positioned to install the retainer in Step (5c).***

   c. Install the retainer on the connector body to lock the terminals in position. Pull rearward on the wire to be sure that the terminal is fully seated. Install cavity plugs as needed.
   d. Position the conduit inside the strain relief and snap the strain relief halves together.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

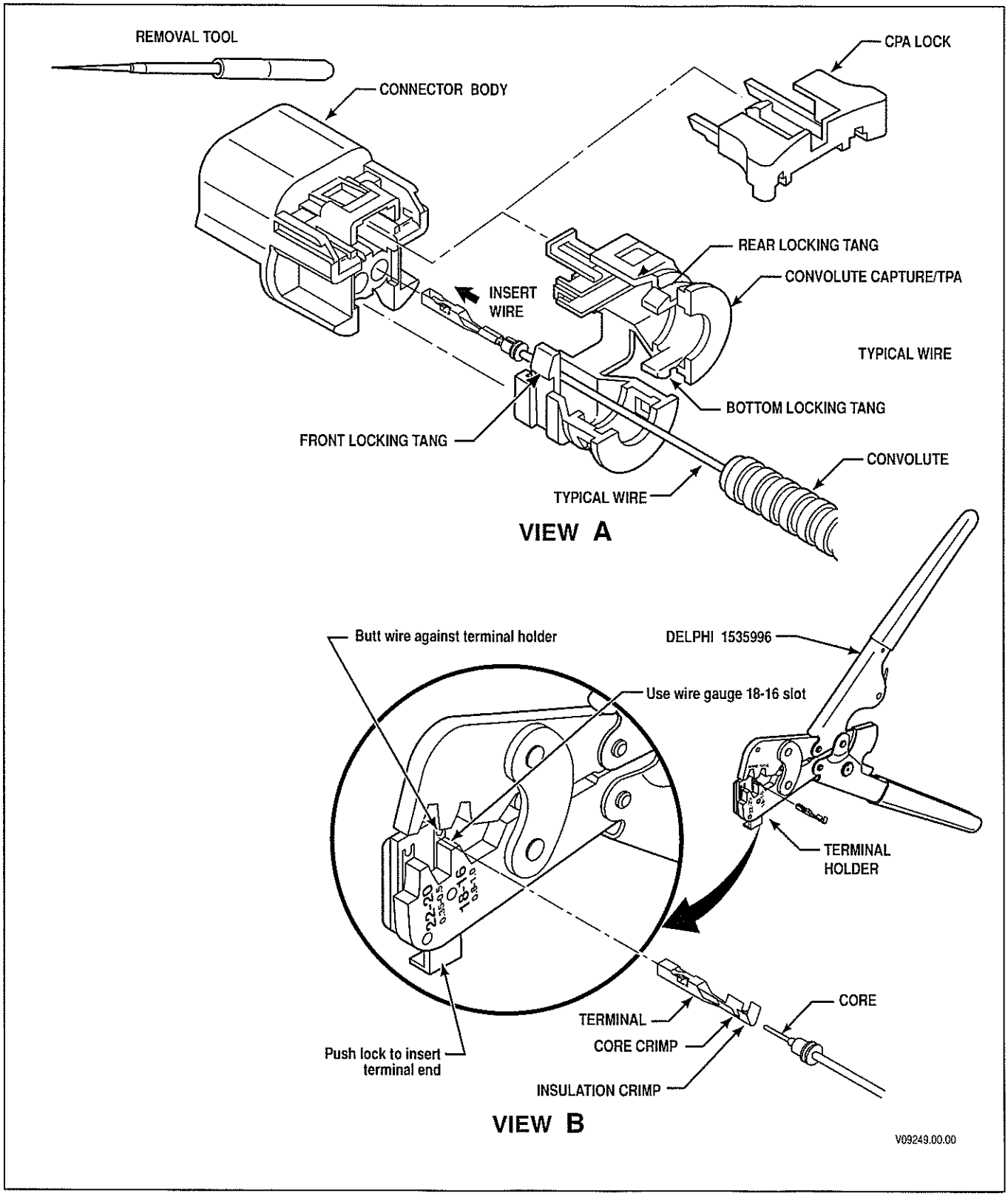


Figure E–5A. Delphi-Packard Metri-Pack GT150 Series Connectors—Push-to-Seat (Speed Sensor; Accumulator Solenoid; Retarder Solenoid)

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

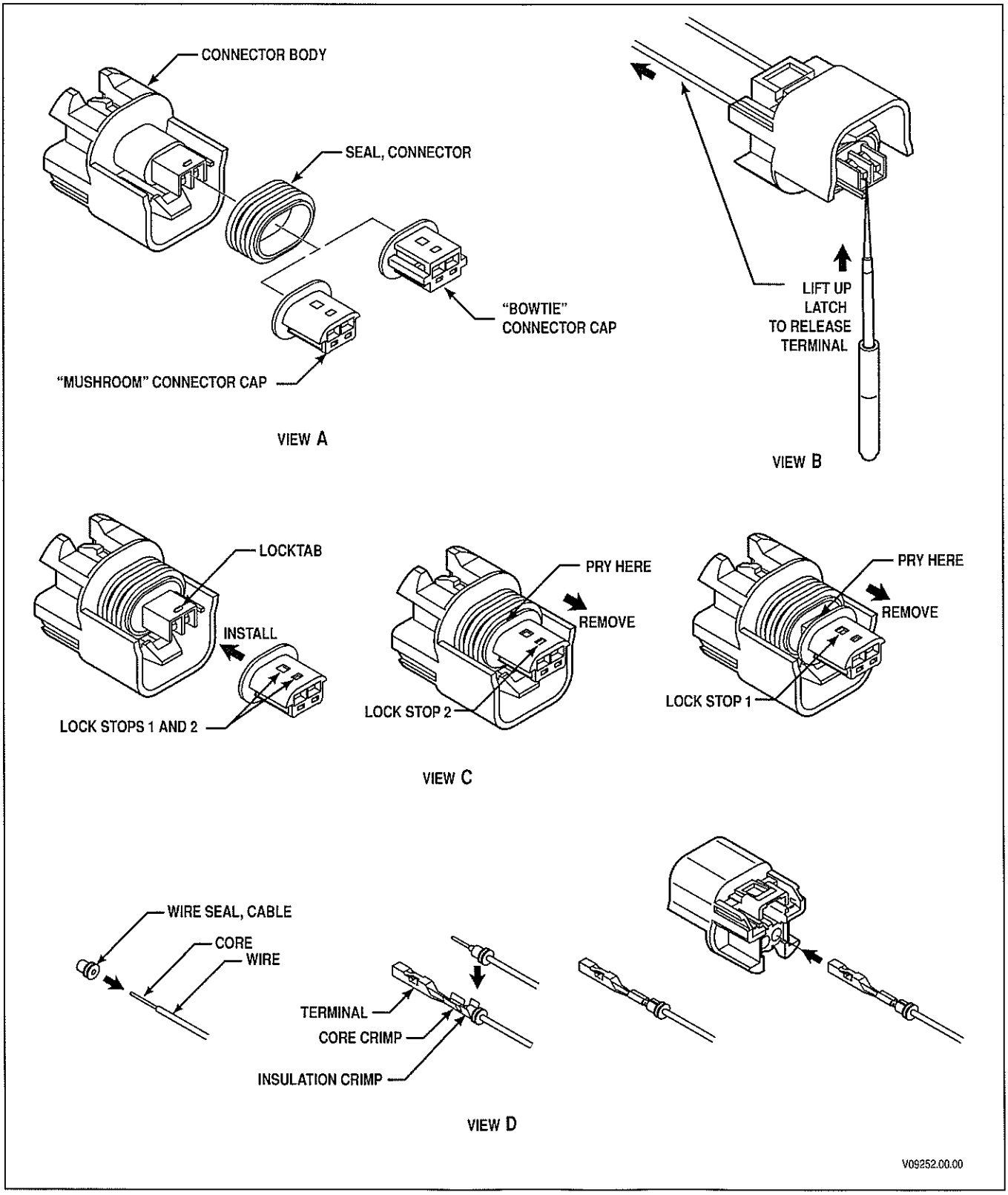


Figure E–5B. Delphi-Packard GT150 Series Connectors—Push-to-Seat (Speed Sensor; Accumulator Solenoid; Retarder Solenoid)

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–5. DELPHI-PACKARD GT150 SERIES CONNECTORS—PUSH-TO-SEAT (SPEED SENSOR; RETARDER SOLENOID)

A. Connector/Terminal Repairs

Tool Description	Part Number
Wire Stripper	J 35615
Crimp Tool	Delphi 15359996
Alternate Crimp Tool	
	J 38125-6 Anvil "1"
	J 38125-7 Anvil "E"
Remover Tool	J 38125-12A
Alternate Removal Tool	J 35689-A

Use	Description	St. Clair P/N	Manufacturers P/N (Current)	Manufacturers P/N (Former)
GT Turbine Speed (Nt)	Kit, GT150, Speed Sensor	300227		
Sensor (4000 Product	Connector Assembly	300260	13520101	15490464
Family)	CPA	300261	15496486	
GT Engine/Output	Terminal	300262	15326267	
(All Models) (Ne/No)	Cable Seal	300263	15305351	
Speed Sensor	Convolute Capture, TPA	300064	15358890	
Retarder Solenoid (PCS5)	Connector Assembly		13523048	13513314
	CPA		15496486	
	Terminal		15326267	
	Cable Seal		15305351	
	Convolute Capture, TPA		15358890	
Retarder Accumulator	Connector Assembly		13520104	
Solenoid	Cable Seal		15305351	
	Terminal		15326267	
	CPA		15496486	
	Convolute Capture, TPA		15358890	

B. Terminal Removal

NOTE: Do not solder crimps.

1. The CPA lock has two positions. The fully locked position retains the connector to the mating connector. The second position allows the connector to be released from the mating connector. To facilitate terminal removal, completely remove the CPA lock by depressing the lock tang and pulling the lock up and away from the connector (Figure E–5A, View A).
2. Remove the convolute capture from the rear of the GT150 connector by raising the retainer clip and pulling on the harness.
3. Remove the convolute capture from the convolute by applying pressure with a small-bladed screwdriver inserted into the front locking tang. Repeat the process on the rear locking tang and open the capture. The wires are now loose in the convolute and can be pulled out a short distance to make terminal installation easier.
4. Two different connector caps, "bowtie" or "mushroom", are used (Figure E–5B, View A). Each connector cap has two stops (Figure E–5B, View C). The cap **must be** completely removed from

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

the connector in order to remove and install a wire and terminal. Remove the appropriate connector cap from the connector by carefully prying up on the cap and push it away from the connector past the lock tab, so that it completely clears the connector. **Be sure seal is not damaged.**

5. Insert the J 38125-12A removal tool between the terminal lock finger and the terminal (Figure E–5B, View B) and carefully lift the finger while pulling the wire and terminal rearward from the connector body (Figure E–5A, View A).
6. If the terminal is to be replaced, cut the terminal between the core and insulation crimp to minimize wire loss.

C. Terminal Crimping—(Delphi 15359996 Crimping Tool)

1. Carefully strip the wire of enough insulation to expose 4.5 mm ± 0.5 mm (0.18 ± 0.02 inch) of bare wire (core).
2. Install a seal onto the wire (Figure E–5D, View D).
3. Pull out the wire stop blade of the crimping tool so it is clear of the terminal crimp area (Figure E–5A, View C). Place the terminal all the way into the appropriate wire size opening of the J 47139 crimping tool until it contacts the stop and is properly oriented. Squeeze the handle just enough to maintain pressure on the terminal so it does not drop out of the tool, but not enough to compress the crimp wings.
4. Push in the wire stop blade until it touches the terminal. Insert the wire core into the terminal, with the core held against the wire stop blade. Position the seal on the wire so the small diameter is in the insulation crimp wing (Figure E–5B, View D).
5. Hold the wire and terminal against the stops and be sure the seal is in the insulation crimp wing. Squeeze the crimping tool handle until it releases. Pull out the wire stop blade and remove the wire and terminal from the tool.
6. Lightly pull on the wire while holding the terminal to be sure the crimp is tight.
7. Repeat as needed to crimp another wire.
8. Insert the terminal and sealed wire into the connector (Figure E–5B, View D) until it stops. Lightly pull on the wire to be sure it is held in the connector by the terminal lock finger.
9. Install connector cap (Figure E–5B, View A) onto front of connector body.
10. Close the convolute capture over the convolute until both locks are engaged.
11. Push the convolute capture into the connector body until both locks are engaged. Install the CPA lock onto the connector body.

D. Terminal Crimping Using Alternate Tool J 38125-6 and J 38125-7

1. Use J 38125-7 to crimp the wire core. Place core crimp portion of terminal onto bed of anvil "E" and squeeze crimper enough to keep terminal from dropping.
2. Position wire core in terminal and squeeze crimper tool to complete the core crimp. **Be sure to orient the terminal so that it is properly aligned with the terminal cavity in the connector.** The terminal should be positioned so that the notch on top of the terminal is aligned with the locking finger in the connector cavity.
3. Position the wire seal between the two insulation crimping tabs (Figure E–5B, View D).
4. Use J 38125-6 to crimp the insulation over the wire seal. Position insulation crimp of terminal on anvil "1" so that the entire insulation crimp area and a portion of the terminal between the core and insulation crimp areas are supported by the anvil. Complete the insulation crimp.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

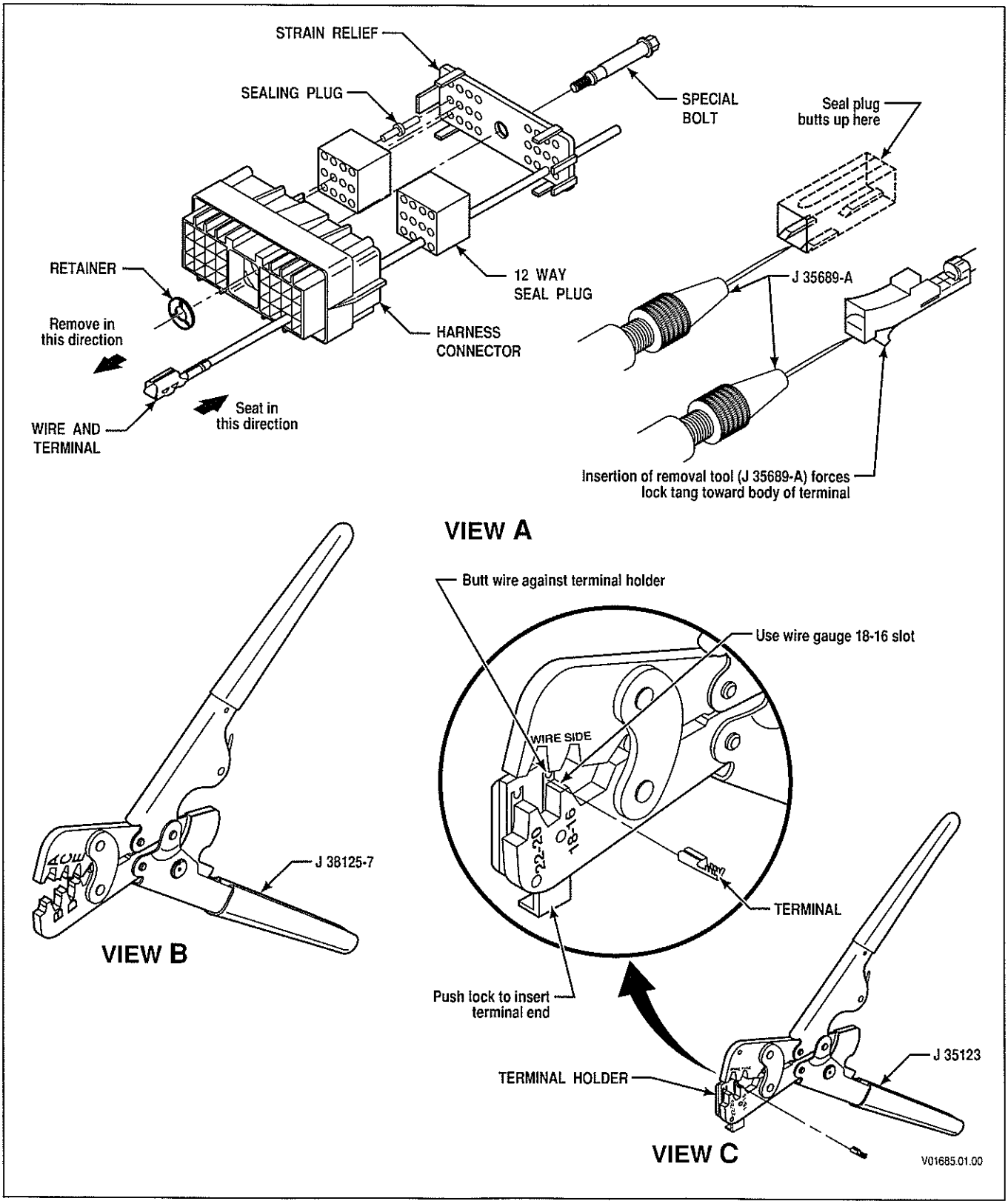


Figure E–6. Delphi-Packard Metri-Pack 150 Series connectors Pull-To-Seat (Turbine Speed Sensor: 30-Way and 18-Way VIM; Retarder Temperature Sensor; Retarder Accumulator Solenoid)

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–6. DELPHI-PACKARD METRI-PACK 150 SERIES CONNECTORS—PULL-TO-SEAT (TURBINE SPEED SENSOR; 30-WAY AND 18-WAY VIM; RETARDER TEMPERATURE SENSOR; RETARDER ACCUMULATOR SOLENOID)

A. Connector/Terminal Repairs

Wire Stripper	J 35615
Crimping Tool	J 38125-7
Wire Crimp	Anvil "E"
Insulation Crimp	Anvil "C"
Alternate Crimping Tool	J 35123
Remover Tool	J 35689-A

Use	Description	Manufacturers P/N
Turbine Speed (Nt) Sensor (3000 Product Family)	Connector	15490953
	Terminal	12110236
Vehicle Interface Module (VIM)	Connector (VIM)	
	Connector Body	12040920
	9-Way Seal (x2)	12040936
	30-Way Strain Relief	12110545
	Special Bolt	12129426
	Bolt Retainer	12034236
	Sealing Ring	12034413
	Terminal	12103881
Vehicle Interface Module (Vehicle)	Connector (VIM)	
	Connector Body	12034397
	15-Way Seal (x2)	12040879
	18-Way Strain Relief	12110546
	Special Bolt	12129426
	Bolt Retainer	12034236
	Sealing Ring	12034413
	Terminal	12103881
Vehicle Interface Module (Vehicle)	Connector (OEM)	
	Connector Body	12034397
	15-Way Seal (x2)	12040879
	30-Way Strain Relief	12110546
	Special Bolt	12129426
	Bolt Retainer	12034236
	Sealing Plug	12034413
	Terminal	12103881
Retarder Temperature Sensor	Connector Assembly, 2F M/P 150	12162852
	Connector Body, Black	12162734
	Connector Seal	12110513
	Cable Seal	12110514
	Terminal	12124075
Retarder Accumulator Solenoid	Connector Assembly, 2F M/P 150	15326143
	Connector Body, Black	15326141
	Connector Seal	12040751
	Cable Seal	12110514
	Terminal	12124075

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

B. Terminal Removal

NOTE: Do not solder crimps.

1. Insert needle end of terminal remover J 35689-A into the small notch between the connector and the terminal to be removed (Figure E–6, View A). Push the lock tang toward the terminal.
2. Push the wire and terminal out of the connector—this is a "pull-to-seat" terminal.
3. Pull terminal as far as necessary from the connector. This will be limited by the number of other wires inserted into the connector and by the distance between the back side of the connector and the beginning of the harness covering.
4. If terminal is to be replaced, cut the terminal between the core and insulation crimp to minimize wire loss.

C. Terminal Crimping—VIM, Speed Sensor, Retarder Temperature Sensor, and Retarder Accumulator Solenoid Terminals (Standard Crimping Tool)

1. If a spare wire is used, the wire should be pushed through the proper hole in the strain relief (if used), through the wire seal, and out the other side of the connector before stripping.
2. Carefully strip insulation 4.5 mm ± 0.5 mm (0.18 ± 0.02 inch). Unless insulation crimp is overtight, Automatic Wire Stripper J 35615 will remove insulation and crimp from old terminal without damaging wire.
3. Place core crimp portion of terminal on bed of anvil "E" and squeeze crimper enough to keep terminal from dropping (Figure E–6, View B).
4. Position wire core in terminal and squeeze crimper tool to complete the core crimp. **Be sure to orient the terminal so that it is properly aligned with the terminal cavity in the connector.** The terminal should be positioned so that the lock tang is on the side of the cavity which has the notch in the middle (for the remover tool).
5. Position insulation crimp of terminal on anvil "C" so that the entire insulation crimp area and a portion of the terminal between the core and insulation crimp areas are supported by the anvil. Complete the insulation crimp.
6. Be sure lock tang is lifted to allow proper reseating of the terminal.
7. Pull on the wire to pull the terminal completely into the cavity. A click will be heard and the terminal should stay in place if the wire is pushed.

D. Terminal Crimping Using Alternate Tool J 35123

1. If a spare wire is used, the wire should be pushed through the proper hole in the strain relief (if used) and the wire seal, and out the other side of the connector prior to stripping.
2. Insert remover tool in front side of connector to release locktab and push terminal out front of connector. Pull the terminal and wire out the front of the connector to complete Steps (3) through (7).
3. Push open the terminal holder on the crimper tool J 35123 and insert a terminal into the opening marked 18–16 (Figure E–6, View C) so that the crimp ends point up. Release the terminal holder.
4. Slightly close the crimping tool (close until one click is heard) but do not start to crimp the terminal. Place the terminal on the wire so it is in the same position as it will be when pulled back into the connector. The terminal should be positioned so that the lock tang is on the side of the cavity which has the notch in the middle (for the remover tool).

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

D. Terminal Crimping Using Alternate Tool J 35123 *(cont'd)*

5. Insert the wire into the terminal until the wire contacts the holder. By doing this, the core and insulation should be properly positioned for the core and insulation crimp wings.
6. Squeeze the crimper fully until it opens when released.
7. Open the terminal holder and remove the wire and terminal from the crimping tool.
8. Pull on the terminal to assure a tight crimp.
9. Be sure lock tang is lifted to allow proper reseating of the terminal.
10. Pull on the wire to pull the terminal completely into the cavity. A click will be heard and the terminal should stay in place if the wire is pushed.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

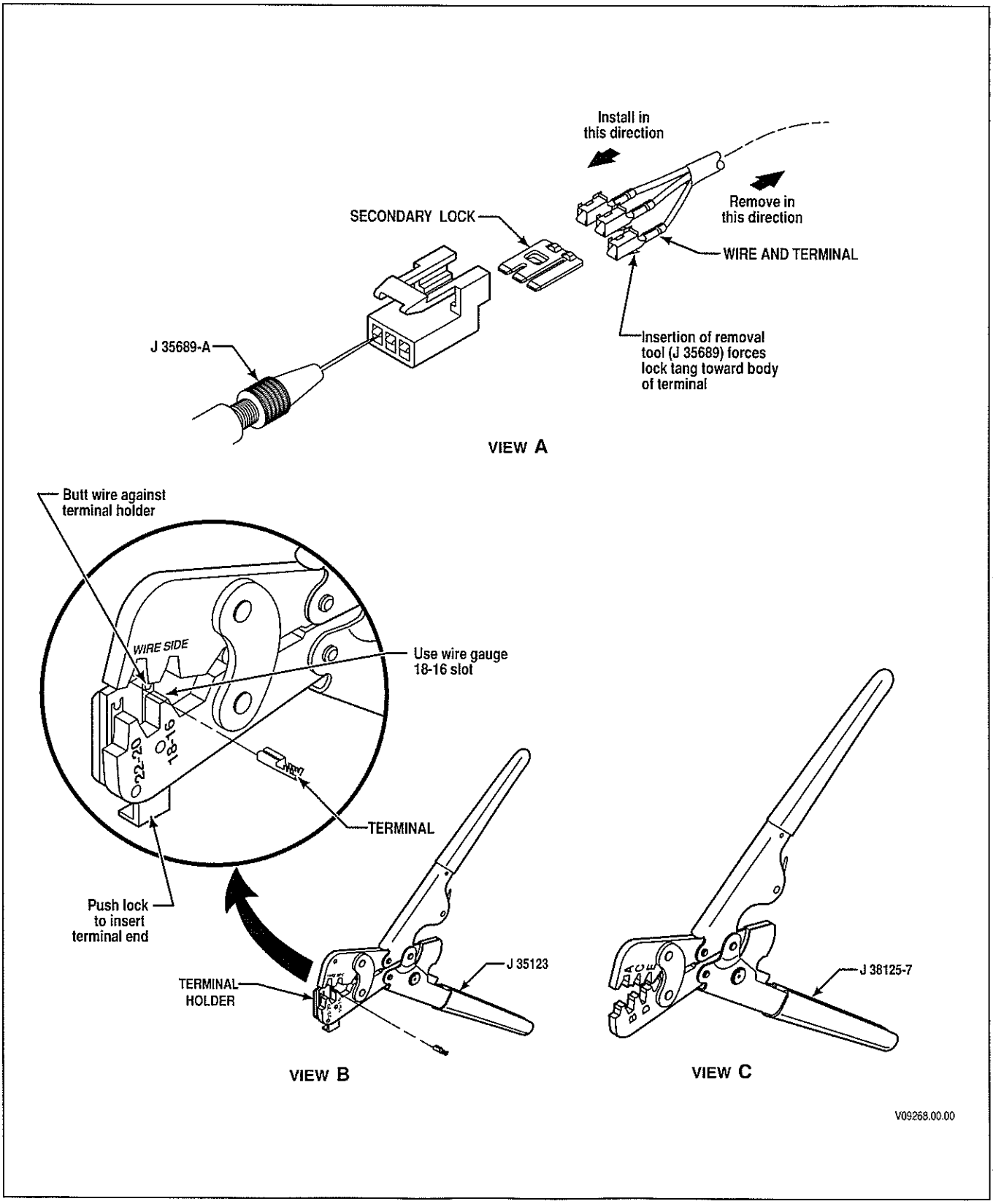


Figure E–7. Delphi-Packard Metri-Pack 150 Series Connectors Push-To-Seat (Oil Level Sensor)

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–7. DELPHI-PACKARD METRI-PACK 150 SERIES CONNECTORS—PUSH-TO-SEAT (OIL LEVEL SENSOR)

A. Connector/Terminal Repairs

Wire Stripper	J 35615
Crimping Tool	J 38125–7
Wire Crimp	Anvil "E"
Insulation Crimp	Anvil "C"
Alternate Crimping Tool	J 35123
Remover Tool	J 35689–A

Use	Description	Manufacturers P/N
Oil Level Sensor	3-Pin Plug	12064758
	Terminal (Socket)	12047767
	Secondary Lock, TPA	12047783

B. Terminal Removal

NOTE: Do not solder crimps.

1. Remove the secondary lock.
2. Insert needle end of terminal remover J 35689-A into the small notch between the connector and the terminal to be removed (Figure E–7, View A). Push the lock tang toward the terminal.
3. Pull the wire and terminal out the rear of the connector—this is a "push-to-seat" terminal.
4. Pull terminal as far as necessary from the connector. This will be limited by the number of other wires inserted into the connector and by the distance between the back side of the connector and the beginning of the harness covering.
5. If terminal is to be replaced, cut the terminal between the core and insulation crimp to minimize wire loss.

C. Terminal Crimping

1. Carefully strip insulation 4.5 mm ± 0.5 mm (0.18 ± 0.02 inch). Unless insulation crimp is overtight, Automatic Wire Stripper J 35615 will remove insulation and crimp from old terminal without damaging wire.
2. Place core crimp portion of terminal on bed of anvil "E" and squeeze crimper enough to keep terminal from dropping (Figure E–7, View C).
3. Position wire core in terminal and squeeze crimper tool to complete the core crimp. **Be sure to orient the terminal so that it is properly aligned with the terminal cavity in the connector.** The terminal should be positioned so that the lock tang is on the side of the cavity which has the notch in the middle (for the remover tool).
4. Position insulation crimp of terminal on anvil "C" so that the entire insulation crimp area and a portion of the terminal between the core and insulation crimp areas are supported by the anvil. Complete the insulation crimp.
5. Be sure lock tang is lifted to allow proper reseating of the terminal.
6. Push on the wire until the terminal is completely into the cavity. A click will be heard and the terminal should stay in place when the wire is lightly pulled.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

D. Terminal Crimping Using Alternate Tool J 35123

1. Insert remover tool in front side of connector to release locktab and pull terminal out rear of connector. Pull the terminal and wire out the rear of the connector to complete Steps (3) through (7).
2. Push open the terminal holder on the crimper tool J 35123 and insert a terminal into the opening marked 18–16 (Figure E–7, View B) so that the crimp ends point up. Release the terminal holder.
3. Slightly close the crimping tool (close until one click is heard) but do not start to crimp the terminal. Place the terminal on the wire so it is in the same position as it will be when pulled back into the connector. The terminal should be positioned so that the lock tang is on the side of the cavity which has the notch in the middle (for the remover tool).
4. Insert the wire into the terminal until the wire contacts the holder. By doing this, the core and insulation should be properly positioned for the core and insulation crimp wings.
5. Squeeze the crimper fully until it opens when released.
6. Open the terminal holder and remove the wire and terminal from the crimping tool.
7. Pull on the terminal to assure a tight crimp.
8. Be sure lock tang is lifted to allow proper reseating of the terminal.
9. Push on the wire until the terminal is completely into the cavity. A click will be heard and the terminal should stay in place if the wire is lightly pulled.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

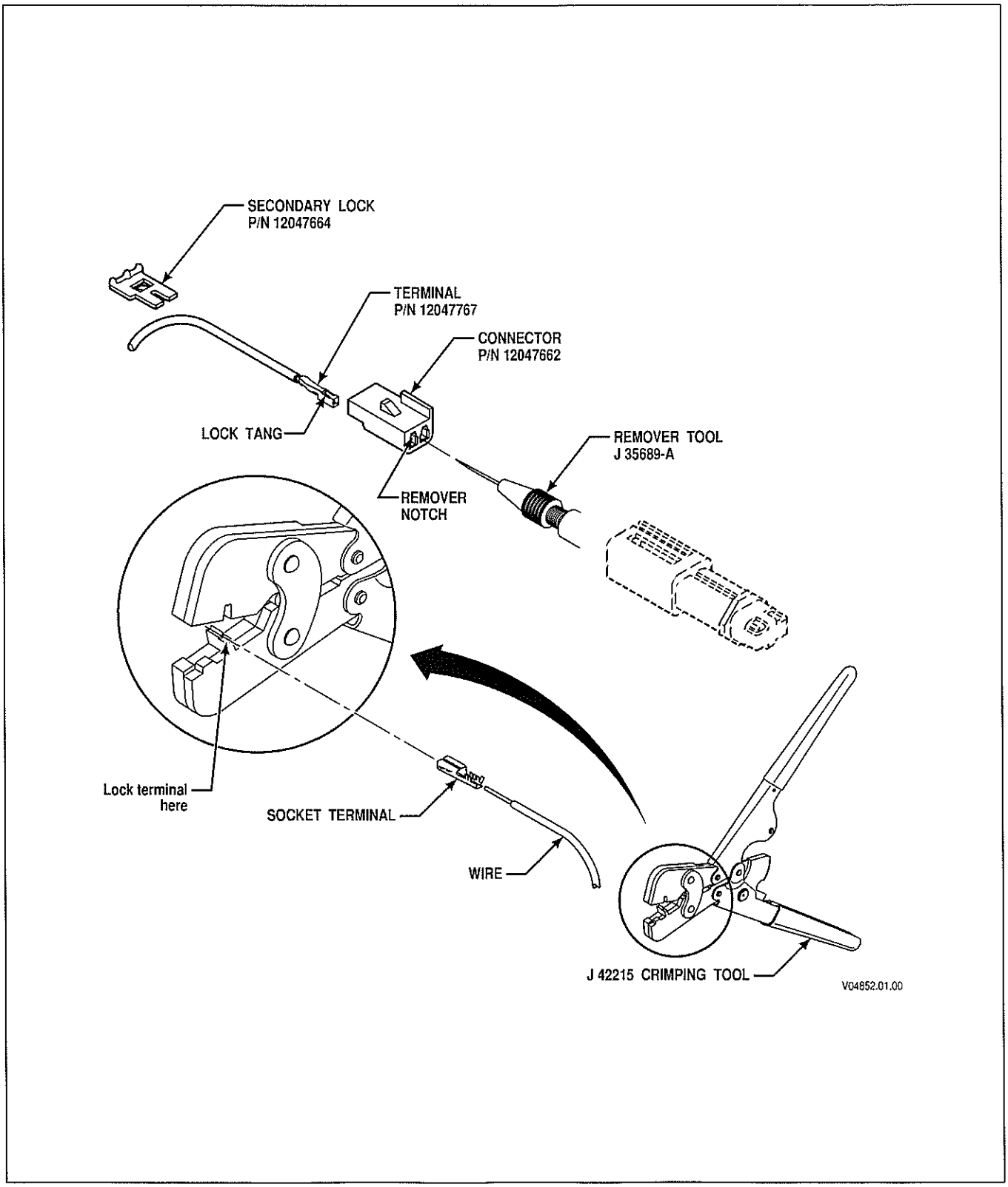


Figure E–8. Delphi-Packard Metri-Pack 150 Series Connector—Push-To-Seat (All Models, Sump Temperature Thermistor)

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–8. DELPHI-PACKARD METRI-PACK 150 SERIES CONNECTORS—PUSH-TO-SEAT (ALL MODELS, SUMP TEMPERATURE THERMISTOR)

A. Connector/Terminal Repairs

Crimping Tool	J 42215 (with terminal positioner removed)
Remover Tool	J 35689-A

Use	Description	Manufacturers P/N
All Models, TransID 2 and Later	Sump Temperature Sensor	12129691
Sump Temperature Thermistor	Connector, Black	12047662
	Terminal	12047767
	Secondary Lock	12047664

B. Terminal Removal

1. Remove the secondary lock from the connector.
2. Insert needle end of terminal remover J 35689-A into the small notch in the front of the connector cavity of the terminal to be removed (Figure E–8).
3. Push the lock tang toward the terminal.
4. Pull the wire and terminal out of the connector.
5. Cut the terminal between the core and insulation crimp to minimize wire loss.

C. Terminal Crimping

1. Strip insulation approximately 4.5 mm (0.18 inch).
2. Remove the spring-loaded terminal positioner from the J 42215 crimping tool.
3. Insert the new terminal to be crimped in the J 42215 crimping tool. Squeeze the crimper handles a couple clicks to start the crimping process but leave room to insert the wire end.
4. Insert the bare wire end into the terminal. Squeeze the crimper handles to complete the crimping process and until the crimper handles open when released to remove the terminal/wire from the tool.
5. Be sure the lock tang is positioned to allow proper retention of the terminal in the connector.
6. Push the terminal completely into the cavity. A click will be heard and the terminal should stay in place if the wire is pulled.
7. Install the secondary lock in the connector.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

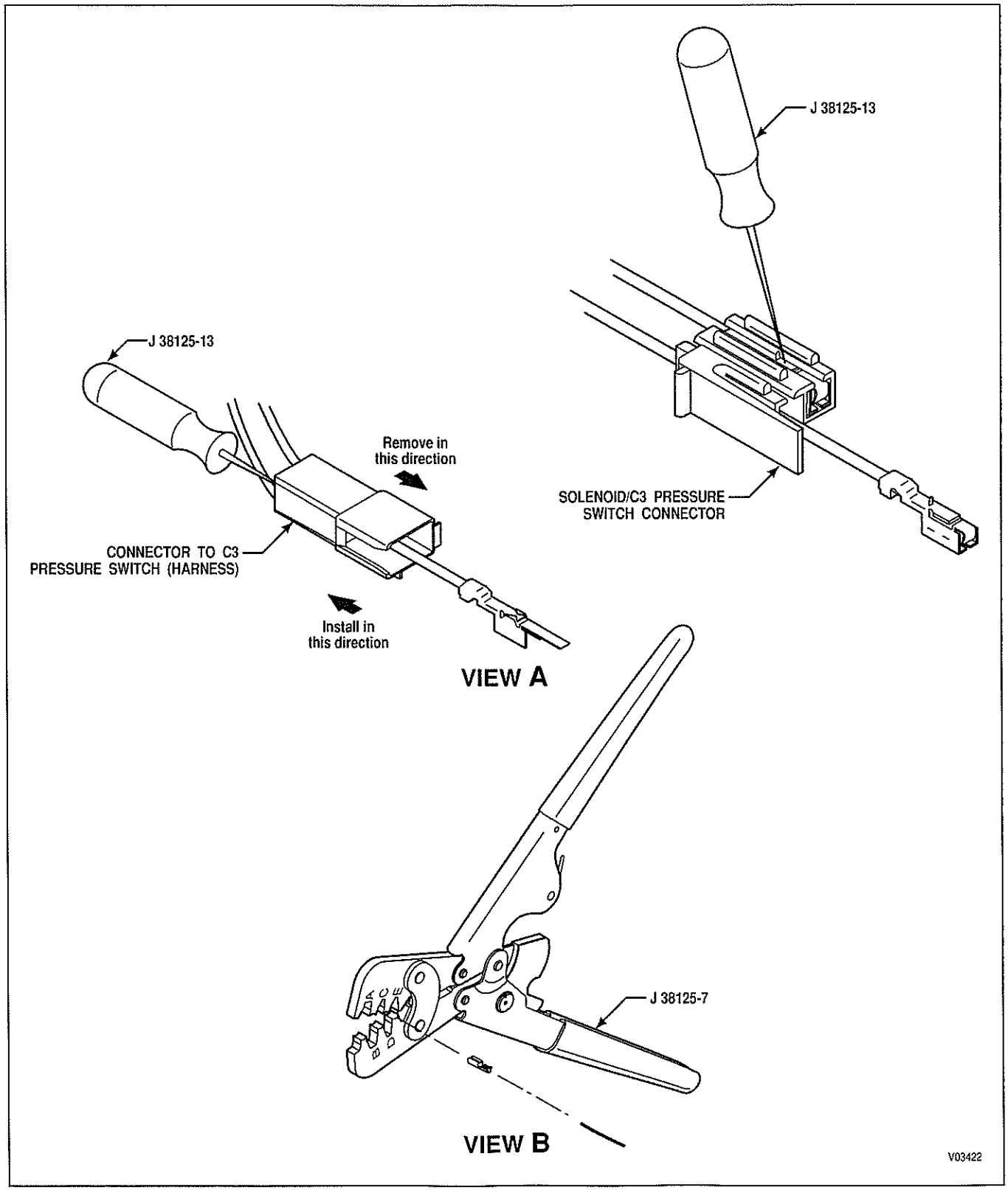


Figure E–9. Delphi-Packard Metri-Pack 280 Series Connectors—Pull-to-Seat (Internal Harness On/Off Solenoid and PS1 Pressure Switch)

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–9. DELPHI-PACKARD METRI-PACK 280 SERIES CONNECTORS—PULL-TO-SEAT (INTERNAL HARNESS ON/OFF SOLENOID AND PS1 PRESSURE SWITCH)

A. Connector/Terminal Repairs

Wire Stripper	J 35615
Crimping Tool	J 38125-7

NOTE: Crimping anvils will be listed following the terminal part numbers for the various connectors in this section. The anvil for the core crimp is always listed first.

Remover Tool	J 38125-13

Use	Description	Manufacturers P/N
Shift Solenoid/PS1 Pressure Switch (Switch)	Connector	29541590
PS1 Pressure Switch (Harness)	Connector	12110139
Shift Solenoid/PS1 Pressure Switch (Switch)	Terminal (Use crimping anvils "C" and "D")	12124639
PS1 Pressure Switch (Harness)	Terminal (Use crimping anvils "C" and "D")	12066337

B. Terminal Removal

1. Depress locktab on terminal (accessible in slot of connector) and push terminal out front of connector (Figure E–9, View A).
2. If replacing terminal, cut terminal between core and insulation crimp (to minimize wire loss).

C. Terminal Crimping

1. Carefully strip insulation 6.5 mm ± 0.5 (0.26 ± 0.02 inch). Unless insulation crimp is overtight, Automatic Wire Stripper J 35615 will remove insulation and crimp from old terminal without damaging wire.
2. Place core crimp portion of terminal on bed of anvil indicated and squeeze crimper enough to hold terminal from dropping (Figure E–9, View B).
3. Position wire core in terminal and squeeze crimper tool to complete the core crimp. Be sure to orient the terminal so that it is properly aligned with the terminal cavity in the connector.
4. Position insulation crimp of terminal on anvil indicated so that the entire insulation crimp area and a portion of the terminal between the core and insulation crimp areas are supported by the anvil. Complete the insulation crimp.
5. Slip the wire through the slot in the connector and pull to fully seat the terminal(s).

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

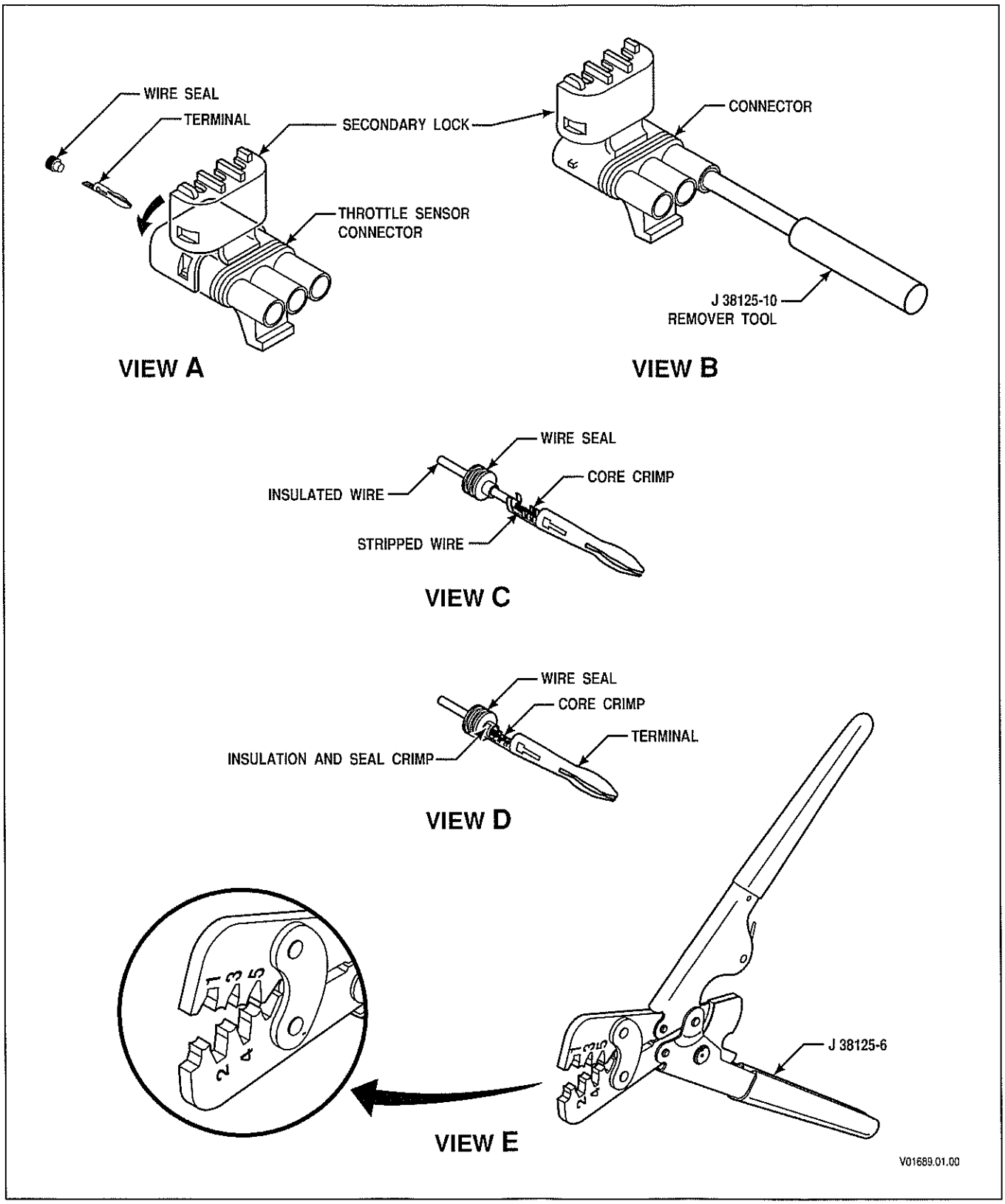


Figure E–10. Delphi-Packard WeatherPack Connectors (TPS; 3-Way RMR Sensor; Type 3; 3-Way RMR Device (Dedicated Pedal))

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

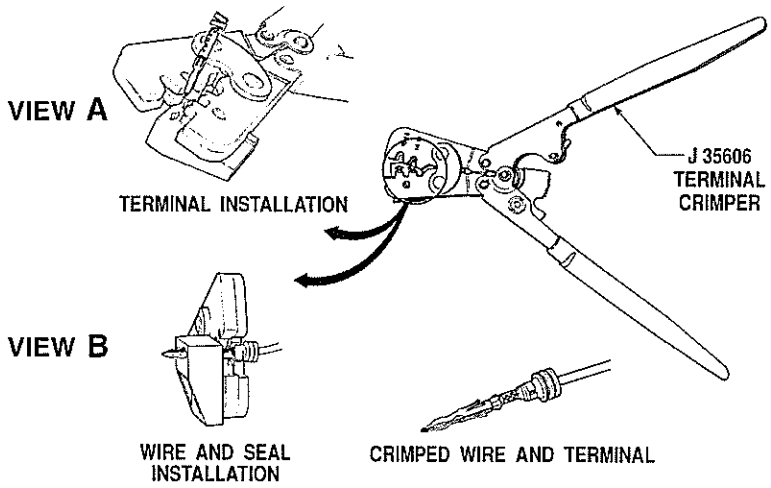


Figure E–11. Terminal Crimping With Tool J 35606

E–10. DELPHI-PACKARD WEATHERPACK CONNECTORS (TPS; 3-WAY RMR SENSOR; 3-WAY RMR DEVICE (DEDICATED PEDAL))

A. Connector/Terminal Repairs

Crimping Tool	J 38125-6
Wire Crimp	Anvil "2"
Insulation Crimp	Anvil "5"
Alternate Crimping Tool	J 35606 or J 38852
Remover Tool	J 38125-10

Use	Description	Manufacturers P/N
Throttle Position (TPS)	Connector	12015793
	Terminal	12089040
	Wire Seal	12089444
RMR Device	Connector	12015795
	Terminal	12089040
	Wire Seal	12089444
Retarder Temperature Sensor	Connector	12010973
	Terminal (Socket)	12089188
	Wire Seal	12089444

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

B. Terminal Removal

1. Unlatch and open the secondary lock on the connector (Figure E–10, View A).
2. On the front of the connector, insert remover tool J 38125-10 over the terminal. Push the tool over the terminal and pull the terminal out of the back end of the connector (Figure E–10, View B).
3. If terminal is to be replaced, cut terminal between core and insulation crimp (this minimizes wire loss).

NOTE: Two special tools are available for this operation: tool J 38125-6 (Paragraph C); tool J 35606 (Figure E–11) or J 38852 (Paragraph D).

C. Terminal Crimping Using Crimping Tool J 38125-6

1. Place the wire seal onto the wire before stripping the wire (Figure E–10, View C).
2. Strip wire to 6.0 ± 0.25 mm (0.24 ± 0.01 inch).
3. Place terminal onto crimping tool J 38125-6 (Figure E–10, View E), anvil "2."
4. Slightly close crimping tool to hold terminal steady.
5. Insert wire so that the stripped portion of wire is in the core crimp area and the insulated portion of the wire is in the insulation crimping area (Figure E–10, View C).
6. Crimp the stripped section of the wire.
7. Remove the terminal from the crimping tool.
8. Push the wire seal into the terminal (Figure E–10, View D). The second crimp will wrap around the wire seal. This will seal the insulated area of wire.
9. Use a pair of needle nose pliers, if necessary, to squeeze the terminal wings together to fit in anvil "5."
10. Crimp wire seal in anvil "5."
11. Tug on terminal and be sure the crimp is tight.
12. Insert the terminal into the connector. The terminal will "click" into place and should not pull out.
13. Secure the secondary lock. Both sides of the connector must be latched.

D. Terminal Crimping Using Alternate Crimper Pliers J 35606 or J 38852

1. Place the wire seal onto the wire before stripping the wire (Figure E–10, View C).
2. Strip wire to 6.0 ± 0.25 mm (0.24 ± 0.01 inch).
3. Insert terminal into crimping tool J 35606 (Figure E–11, View A), opening marked 18–20.
4. Position the terminal so the crimp wings are pointing up from the bottom jaw of the crimper and are properly positioned.
5. Slightly close the crimping tool to hold the terminal steady.
6. Slide the wire seal to the edge of the insulation and insert the wire and seal into the terminal (Figure E–11, View B).

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

D. Terminal Crimping Using Alternate Crimper Pliers J 35606 or J 38852 *(cont'd)*

7. Position the wire and seal and squeeze the crimping tool until it opens when released.
8. Tug on terminal to be sure the crimp is tight.
9. Insert terminal into connector. The terminal will "click" into place and should not pull out.
10. Relatch the secondary lock. Both sides of the connector must be latched.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

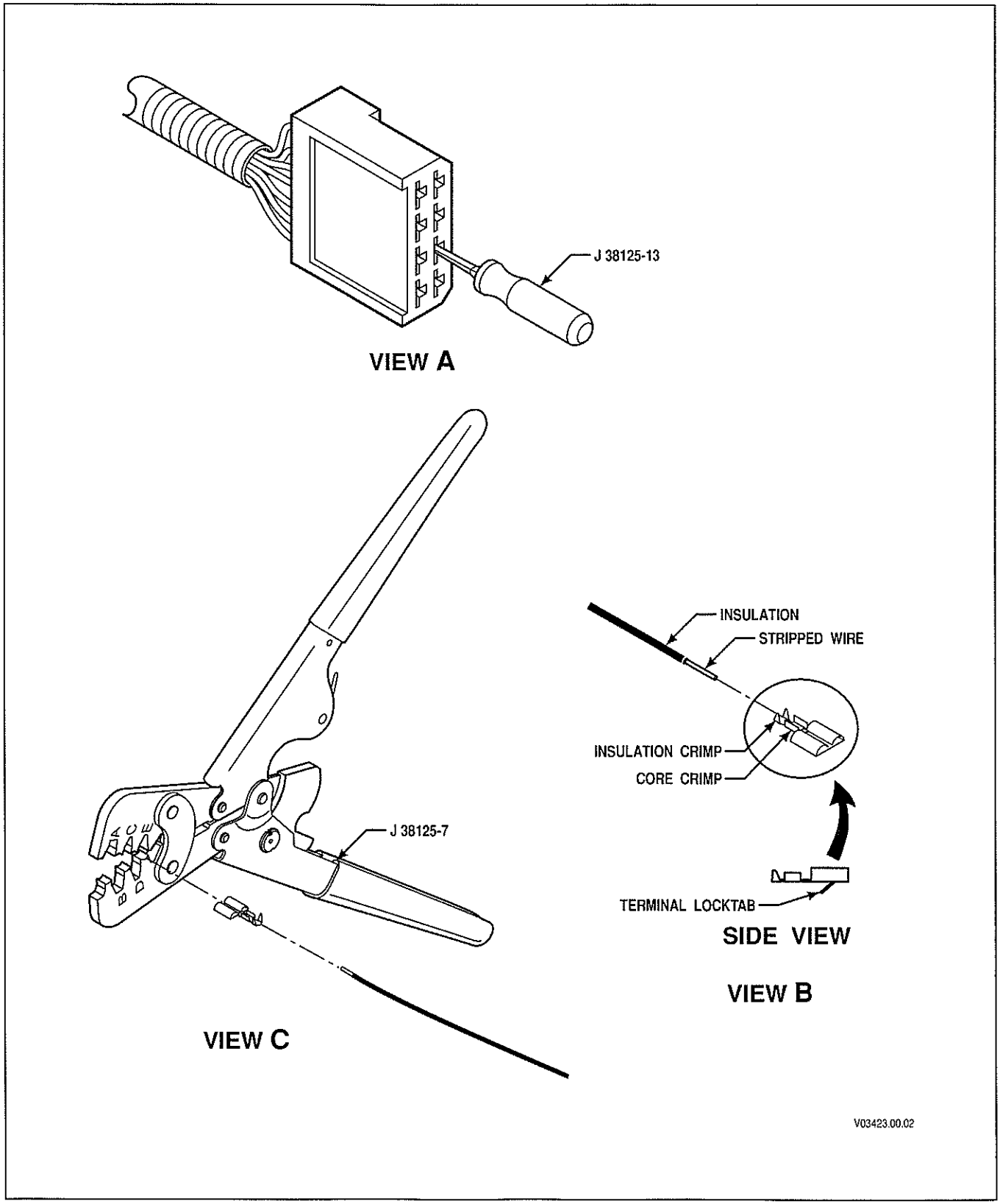


Figure E–12. Amp Products Connectors (8-Way RMR Device (Hand Lever))

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–11. AMP PRODUCTS CONNECTORS (8-WAY RMR DEVICE (HAND LEVER))

A. Connector/Terminal Repairs

Crimping Tool	J 38125-7
Wire Crimp	Anvil "E"
Insulation Crimp	Anvil "A"
Remover Tool	J 38125-13

Use	Description	Manufacturers P/N
8-Way RMR Device (Hand Lever)	8-Way Receptacle	163007-0
	Terminal (Socket)	42100-2

B. Terminal Removal

1. Insert removal tool J 38125-13 into the small notch at the front of the connector to release the terminal locktab (Figure E–12, View A).
2. Pull the terminal and wire out the back of the connector.
3. If replacing terminal, cut terminal between core and insulation crimp (this minimizes wire loss).

C. Terminal Crimping

1. Strip wire to approximately 4.0 ± 0.25 mm (0.16 ± 0.01 inch) (Figure E–12, View B).
2. Place new terminal onto crimping tool J 38125-7, anvil "E" (Figure E–12, View C).
3. Slightly close the crimping tool to hold the terminal steady.
4. Insert the wire so that the stripped portion of the wire is in the core crimp area and the insulated portion of the wire is in the insulation crimping area.
5. Crimp the stripped section of the wire (Figure E–12, View B).
6. Remove the terminal from the crimping tool.
7. Use a pair of needle nose pliers, if necessary, to start the bend on the insulation crimp wings.
8. Crimp the insulated section of the wire using anvil "A" of the crimpers (Figure E–9, View C).
9. Remove the terminal from the crimping tool.
10. Tug on the terminal to make sure the crimp is tight.
11. Insert the terminal into the connector. The terminal will "click" into place and should not pull out.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

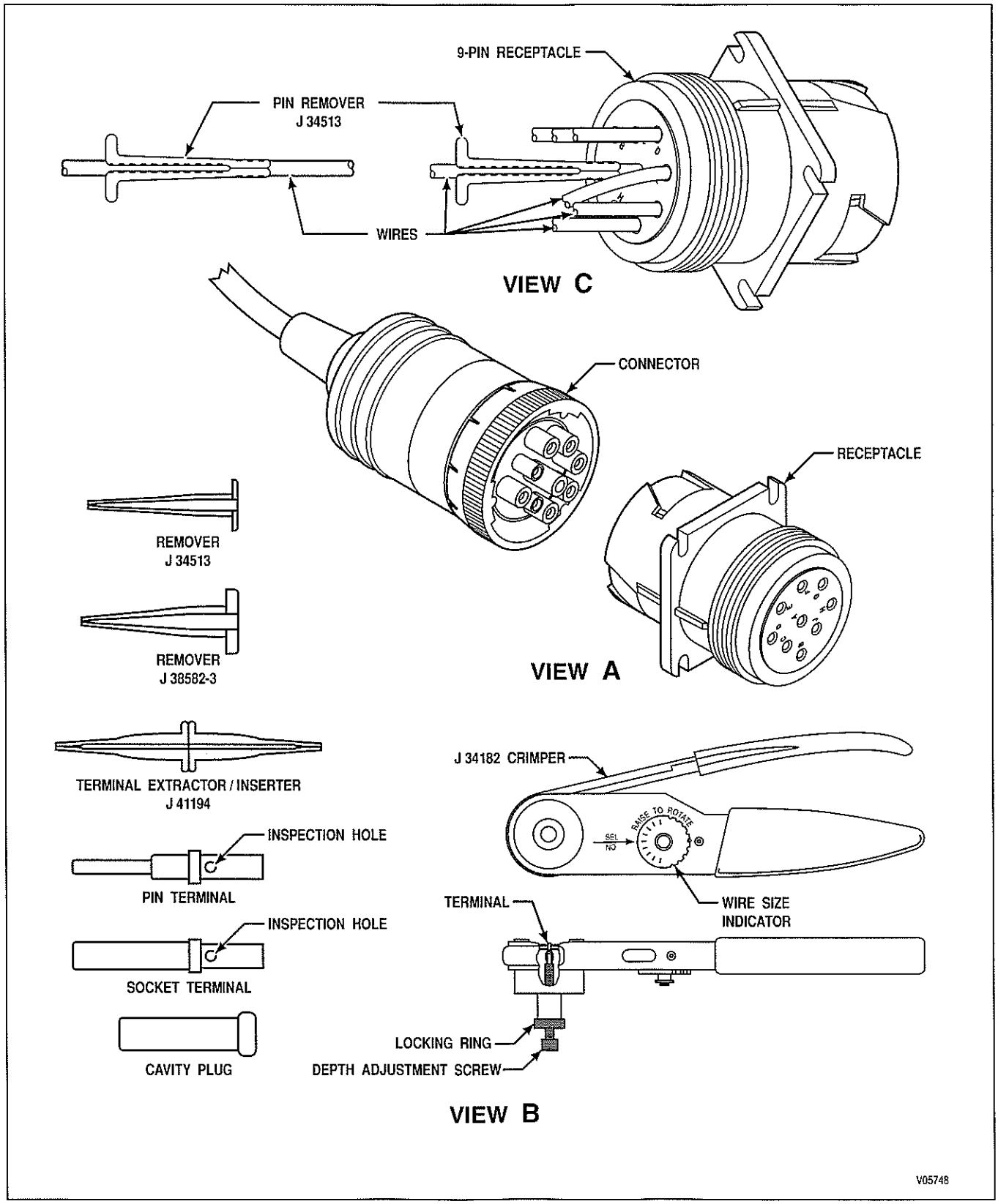


Figure E–13. Deutsch IPD/ECD Connectors (9-Way Optional Diagnostic Tool Connector)

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–12. DEUTSCH IPD/ECD CONNECTORS (J1939 DIAGNOSTIC DATA LINK 9-WAY DIAGNOSTIC TOOL CONNECTOR)

A. Connector/Terminal Repairs

Required Tools

Crimper Tool	J 34182
Extractor/Inserter Tool	J 41194 (18 GA ECD Bulkhead)
Remover Tool Set	J 34513
Remover Tool (Diagnostic Tool Connector)	J 38528-3 (12–14 GA)

Use	Description	St. Clair P/N	Manufacturers P/N
J1939 Diagnostic Link (9-way Diagnostic Tool Connector)	Kit, J1939 9-Way Diagnostic Link Receptacle	300217	
	Connector, 9-Way	300267	HD10-9-1939P
	Contact, Pin	300007	0460-202-1631
	Contact, Pin Extract	300273	0460-247-1631
	Seal Plug	300000	114017
	Strain Relief	300269	HD18
	Cap, Connector	300268	HDC16-6

NOTE: If difficulty is encountered in removing or installing the plug backshell, insert the plug into the receptacle, but do not lock it into place, and loosen the backshell.

B. Terminal Removal (Figure E–13, View A)

NOTE: When using remover/inserter tool J 41194, take care not to break the tip of the tool. Lay the wire in the widest part of the wire slot and work toward the tool tip.

1. Loosen and slide the backshell along the convolute conduit.
2. Remove the convolute conduit from the base of the backshell follower. Peel enough conduit from the harness to allow working access.
3. Slide the backshell follower clear of the connector housing.
4. Remove as much tape wrap as necessary to allow working access.
5. Fully insert the proper remover/extractor tool into the back of the connector until it releases the terminal.
6. Pull the terminal, wire, and tool out the back of the connector.
7. If replacing the terminal, cut the wire through the middle of the terminal crimp (this minimizes wire loss).

C. Terminal Crimping (Figure E–13, View B)

1. Strip approximately 6–8 mm (0.236–0.315 inch) of insulation from the wire.
2. Set the crimping tool wire size to number 18. Tot set the wire size, remove the retainer pin. Lift and rotate the indicator until the number 12 is aligned with the SEL NO arrow. Reinstall the retainer pin.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

C. Terminal Crimping (Figure E–9, View B) *(cont'd)*

3. Insert the contact end of the terminal into crimping tool J 34182. To adjust the crimping tool depth, loosen the locking ring until the depth adjusting screw is free. Turn the adjusting screw until the top of the terminal is just above flush with the top of the crimping hole (the crimp jaws will contact the middle of the terminal barrel). Tighten the locking ring to retain the adjustment.
4. Fully insert the wire into the terminal so that the stripped portion of the wire is in the crimp area. A small section (0.5-1.0 mm or 0.02-0.04 inch) of wire will be visible above the terminal barrel.
5. Squeeze the crimping tool handle until it releases. The terminal is now crimped onto the wire.
6. Remove the terminal and wire from the crimping tool.
7. Tug on the terminal to ensure the crimp is tight.
8. Install a 25 mm (one inch) long piece of heat shrink tubing over the wire insulation just behind the terminal. Apply heat to shrink and lock tubing to the insulation.

D. Terminal Insertion (ECD Bulkhead)

1. Insert the terminal and attached wire through the proper hole in the grommet.
2. Push on the terminal and wire until the terminal clicks into position. Pull gently on the wire to be sure that the terminal is fully seated.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

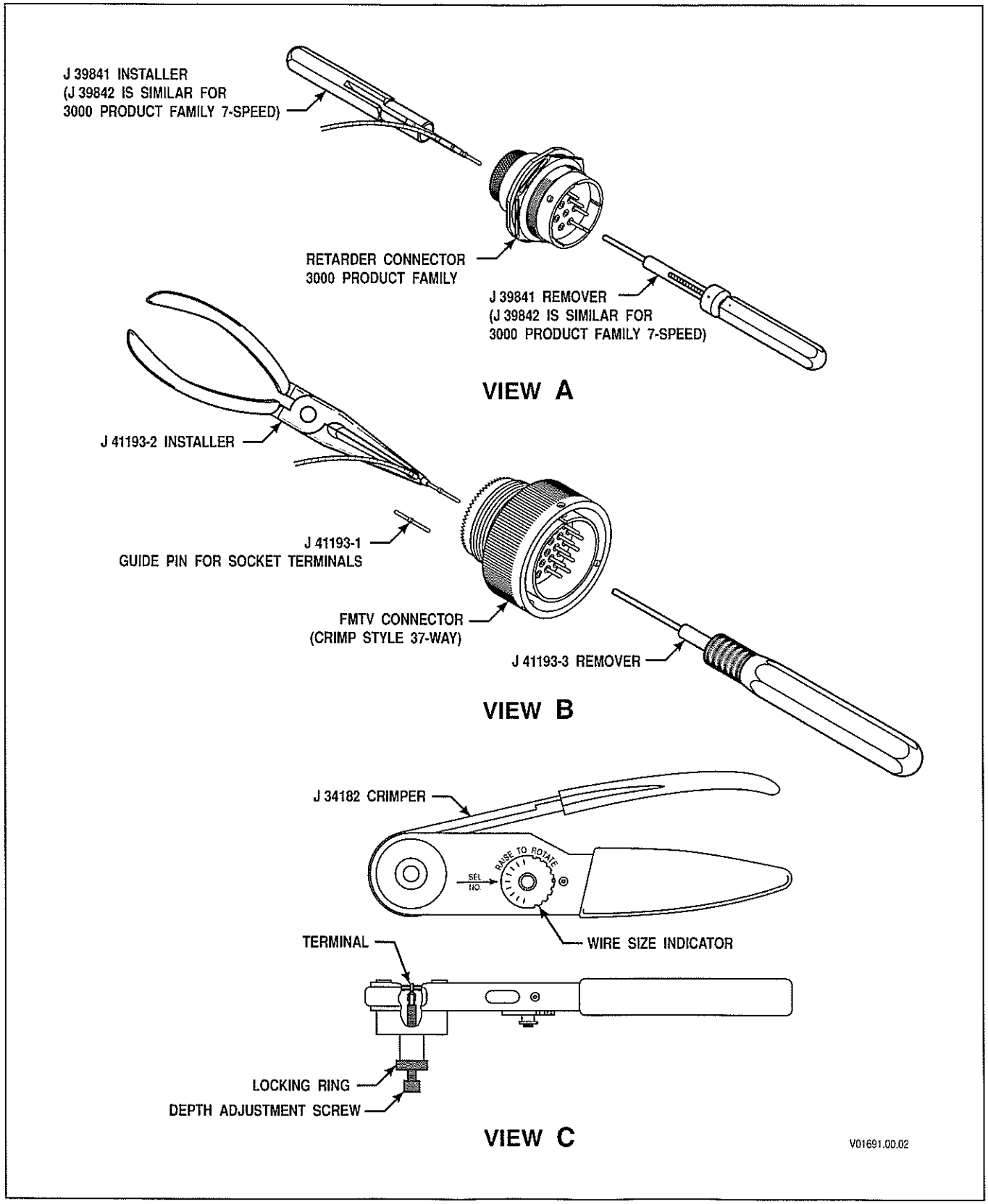


Figure E–14. ITT Cannon Connectors—Crimped (Bulkhead; 6-Way Transfer Case)

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–13. ITT CANNON CONNECTORS — CRIMPED (BULKHEAD 6-WAY TRANSFER CASE)

A. Connector/Terminal Repair

Crimping Tool	
Connector Repair Kit (FMTV)	J 34182
Guide Pin	J 41193-1
Insertion Tool	J 41193-2
Terminal Remover	J 41193-3
Terminal Remover/Installer (3000 7-Speed T-Case Connector)	J 39842

Use	Description	Manufacturers P/N
3000 Product Family FMTV	37-Way Plug Assembly	CA3106E28-21P-B
	37-Way Receptacle Assembly	CA3100E28-21S-B
3000 Product Family Transfer Case	6-Way Plug Assembly	KPSE06E10-6S
	Terminal (Socket)	031-9174-004
	Cavity Plug	225-0070-000
	6-Way Receptacle Assembly	KPSE07E10-6P
	Terminal (Pin)	030-9173-006
	Cavity Plug	225-0070-000

B. Terminal Removal (Figure E–14, View A and B)

1. Select the remover tool for the plug or receptacle that is being repaired.
2. For the FMTV connector, choose either the pin or socket terminal remover tip and lock it into the handle.
3. Place the tip of the remover tool over the pin or into the socket and push the contact/terminal out the rear of the connector using slow, even pressure.
4. Pull the wire and terminal out the back of the connector.
5. If replacing the terminal, cut the wire through the middle of the terminal crimp to minimize wire loss.

C. Terminal Crimping (Figure E–14, View C)

1. Strip approximately 6–8 mm (0.24–0.31 inch) of insulation from the wire.
2. Set the crimping tool wire size to number 18. To set the wire size, remove the retainer pin. Lift and rotate the indicator until 18 is aligned with the SEL NO. arrow. Reinstall the retainer pin.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

C. Terminal Crimping (Figure E–14, View C) *(cont'd)*

3. Insert the contact end of the terminal down into crimping tool J 34182. Adjust the crimping tool depth by loosening the locking ring until the depth adjusting screw is free and turning the adjusting screw until the wire end of the terminal is just above flush with the top of the crimping hole. The crimp jaws will now contact the middle of the terminal barrel. Tighten the lock ring to retain the adjustment.
4. Fully insert the wire into the terminal so that the stripped portion of the wire is in the crimp area. A small section (0.5–1.0 mm (0.020–0.040 inch)) of wire will be visible above the terminal barrel.
5. Squeeze the crimping tool handle until it releases. The terminal is now crimped onto the wire.
6. Remove the terminal and wire from the crimping tool.
7. Tug on the terminal to ensure the crimp is tight.

D. Terminal Insertion

1. Select the proper insertion tool for the connector or receptacle that is being reassembled.
2. Place the terminal and wire in the insertion tool (Figure E–14, View A and B).

*NOTE: **When installing a socket terminal for the FMTV plug, use the J 41193-1 guide pin.***

3. Insert the terminal through the correct hole in the back of the connector and push until the terminal is seated. Remove the insertion tool. Check to see that the terminal is at the same height as other terminals. Tug on the wire at the rear of the connector to ensure that the terminal is locked in place.
4. Insert cavity plugs into all unused cavities.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

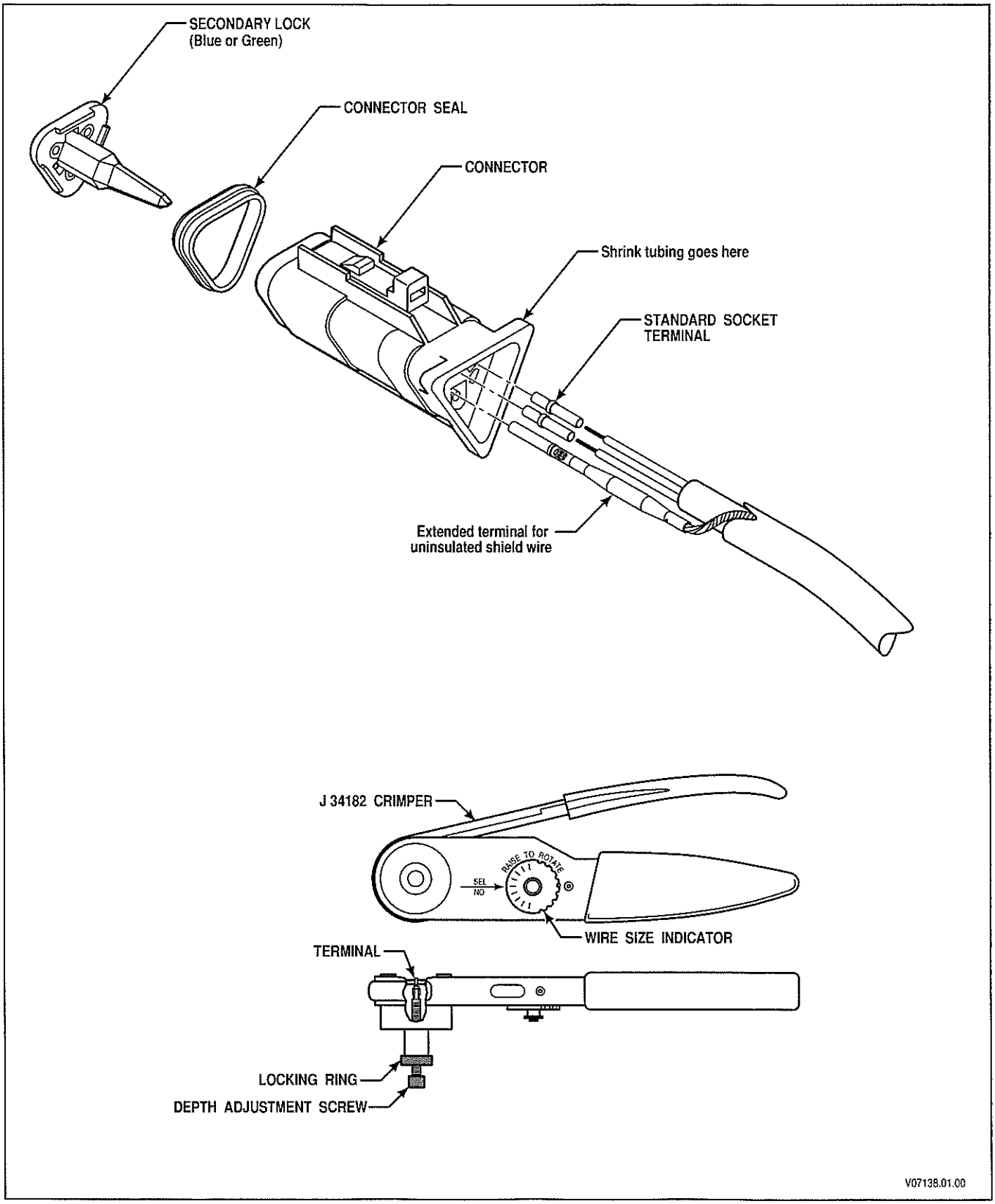


Figure E–15. Deutsch DT Series Connector (3-Way J1939 Interface)

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–14. DEUTSCH DT SERIES CONNECTORS (3-WAY J 1939 INTERFACE)

A. Connector/Terminal Repairs

Crimping Tool J 34182

Use	Description	St. Clair P/N	Manufacturers P/N
J1939 Interface, Plug (Typically on backbone side)	Kit, J1939, 3-way Plug	300283	
	Connector, Plug, 3-way	300206	DT06-3S-EP11
	Wedgelock, Plug	300275	W3S-P012
	Contact, Socket #16	300005	0462-201-1631
	Contact, Extended Socket	300035	0462-221-1631
	Heat Shrink	300274	ATUM-3/4-0
J1939 Interface, Receptacle (Typically on module side)	Kit, J1939, 3-way Receptacle	300282	
	Connector, Recpt, 3-way	300270	DT06-3P-EE01
	Wedgelock, Receptacle	300271	W3P
	Contact, Pin #16	300007	0462-202-1631
	Contact, Extended Pin	300273	0462-247-1631
	Heat Shrink	300274	ATUM-3/4-0
	Resistor (optional)	300272	DT06-3S-P006

B. Terminal Removal (Figure E–15)

1. Use a small-bladed screwdriver to remove the secondary lock that holds the terminals in place.
2. Use a sharp knife to carefully remove the shrink tubing from the rear of the connector plug.
3. Use a small screwdriver to release the locking lever from all of the terminals. Pull the wire and terminal out of the rear of the connector.
4. Slide a new piece of shrink tubing over the removed terminals an onto the cable.
5. If replacing the terminal, cut the wire through the middle of the terminal. Pull the wire and terminal out the rear of the connector.

C. Terminal Crimping (Figure E–15)

1. Stripe 6–8 mm (0.24–0.31 inch) of insulation from the wire. There is no insulation on the shield wire.
2. Set the crimping tool wire size to number 18. To set the wire size, remove the retainer pin. Lift and rotate the indicator until 18 is aligned with the SEL NO. arrow. Reinstall the retainer pin.
3. Insert the contact end of the terminal into crimping tool J 34182. Adjust the crimping tool depth by loosening the locking ring until the depth adjusting screw is free. Turn the adjusting screw until the wire end of the terminal is just above flush with the top of the crimping hole. The depth adjustment screw will have to be backed out enough to accept the extended shield terminal. The crimp jaws will now contact the middle of the terminal barrel. Tighten the locking ring to maintain the adjustment.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

C. Terminal Crimping (Figure E–15) *(cont'd)*

4. Fully insert the wire into the terminal so that the stripped portion of the wire is in the crimp area. A small section (0.5–1.0 mm or 0.02–0.04 inch) of wire will be visible above the terminal barrel.
5. Squeeze the crimping tool until it releases. The terminal is now crimped onto the wire.
6. Remove the terminal and wire from the crimping tool.
7. Tug on the terminal to be sure the crimp is tight.

D. Terminal Insertion

1. Slide the wire with the crimped terminal attached into the rear of the connector.
2. Push the terminal and wire into the connector until it locks into position. (Figure E–15). Check the front of the connector to see that the terminal is at the same height as the other terminals. Tug on the wire at the rear of the connector to be sure that the terminal is locked in place.
3. Insert the wedge lock to hold the terminal in place. Slide the sealing plug back into place at the rear of the connector.
4. Slide the shrink tubing over the raised area at the rear of the connector. Use a heat gun to shrink the tubing into position over the connector and cable.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–15. REPAIR OF A BROKEN WIRE WITH IN-LINE BUTT SPLICE

A. Connector Check Before Repair

*NOTE: **Before repairing or replacing wiring harness, sensor, solenoid, switch, or TCM as indicated for a diagnosed problem, follow the procedure below:***

1. Disconnect the connector or connectors associated with the problem and inspect for:
   - Bent terminals
   - Broken terminals
   - Dirty terminals
   - Pushed back terminals
   - Missing terminals
   - Condition of mating tabs
   - Condition of mating terminals

   Ensure that terminals are secure in the connector. Clean, straighten, or replace parts as required.
2. Reconnect all previous unmated connectors. Ensure connectors are fully inserted or twisted until they lock in place. Connectors with locking tabs make an audible "click" when the lock is engaged.
3. If trouble recurs after starting the vehicle, follow proper repair procedures for trouble code or complaint.
4. If trouble does not recur, or if the correct repairs and/or replacements have been made, the problem should be corrected.

B. Special Tools

- Heat Gun, J 25070 or equivalent
- Crimping Tool for Pre-insulated Crimp J 38125-8 (Figure E–16)

*NOTE: **Use crimping anvils "F" and "G."***

- Wire Stripper, J 35615
- Splices P/N 23046604 14–16 AWG
- Splices P/N 23046605 18–22 AWG

*NOTE: **Each splice must be properly crimped and then heated to shrink the covering to protect and insulate the splice. Insulation piercing splice clips should not be used.***

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

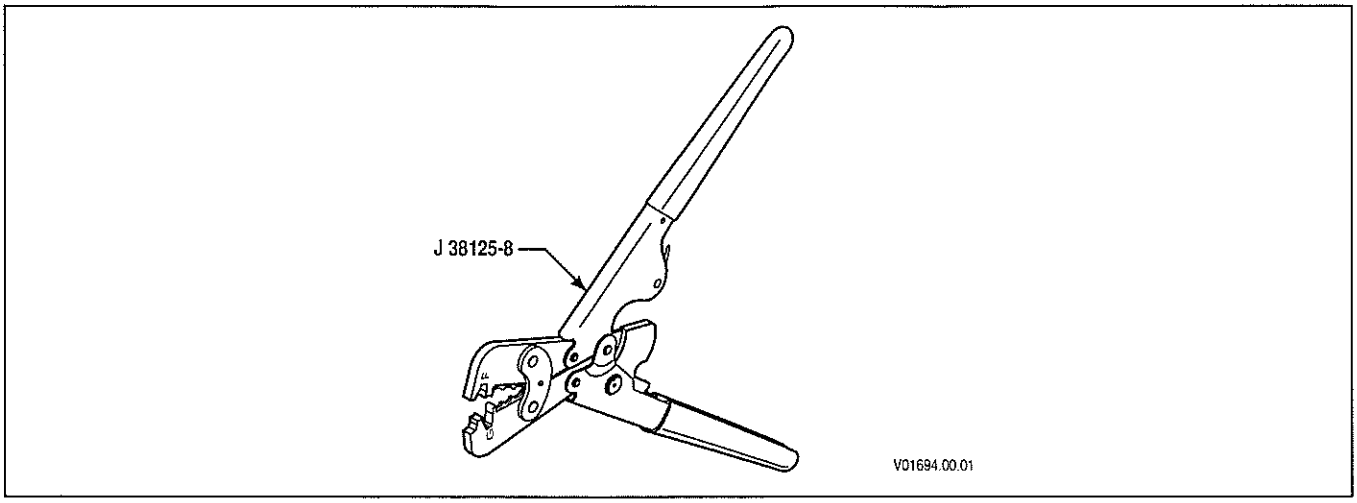


Figure E–16. Crimper J 38125-8

C. Straight Lead Repair Procedure

1. Locate damaged wire.
2. Remove insulation 8.0 mm (0.3 inch).
3. Insert one wire into crimp barrel and crimp.
4. Insert other wire into crimp barrel and crimp.
5. Pull on connection to ensure crimping integrity.
6. Heat splice with heat gun until covering shrinks and adhesive flows from under the covering.
7. The splice is now sealed and insulated. Electrical tape should not be used and is not necessary.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

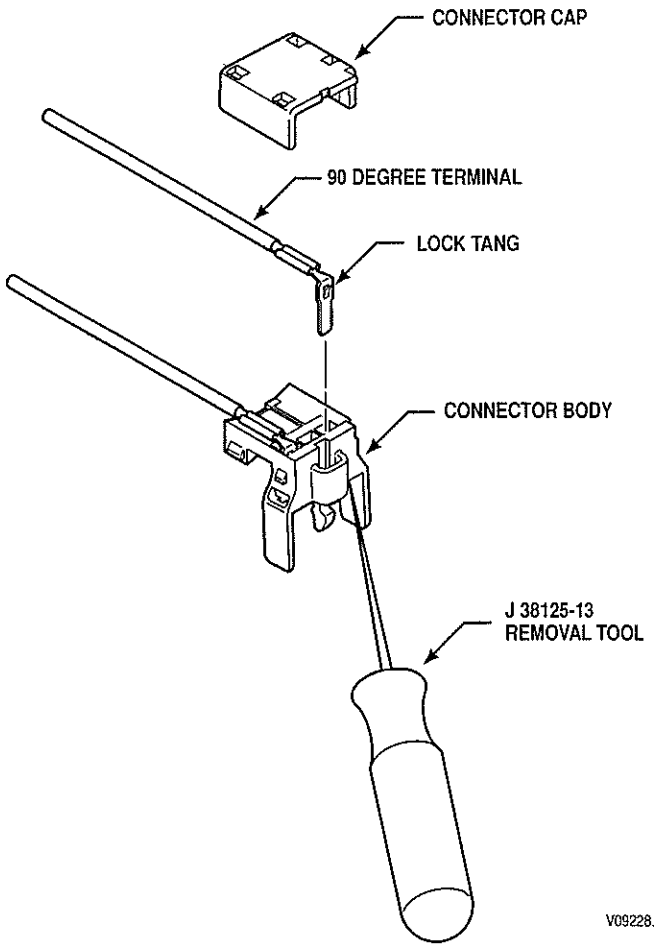


Figure E–17. AFL Automotive 2-Way, 90 Degrees Solenoid Connector

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

E–16. AFL AUTOMOTIVE 2-WAY, 90 DEGREE SOLENOID CONNECTOR

A. Connector/Terminal Repairs

Crimping Tool	J 38125-8
Remover Tool	J 38125-13
Alternate Remover Tool	J 38125-12A

Use	Description	Manufacturers P/N
PCS Solenoid Connector	Connector, 2-Way	R-61992-001
	Cap, Connector	R-62189-001
	Terminal with 0.5 m (20 inches) wire	R-61970-001
	In-Line Splice Connector	23046605

Read disassembly process/procedure thoroughly before beginning disassembly.

B. Terminal Removal

1. Separate the 2-way connector from the solenoid (Figure E–17).
2. Remove the connector cap from the connector body.
3. Make a note for reassembly purposes of which wire (number) goes into which terminal cavity in the connector body.
4. Insert the metal blade of J 38125-13 or J 38125-12A remover into the bottom of the connector where terminal blade protrudes from the connector body.
5. Apply pressure to the terminal blade. Lift selected terminal from connector body when lock tang releases.
6. Repeat Steps 4 and 5 for the remaining terminal leads.

C. Terminal Crimping

Crimping of AFL 2-way, 90 degree terminals is not permitted. Perform repairs using a pre-crimped, 90 degree terminal and wire assembly. New terminal/wire leads are serviced as follows:

1. Locate damaged wire in terminal wiring harness.
2. Identify a location to cut the damaged wire where the butt splice connector(s) will not interfere with re-assembly and re-installation of the hydraulic control module.
3. Cut wire and strip 8.0 mm (0.3 inch) of insulation from the end. Be careful not to nick or cut wire strands.
4. Insert the stripped end of the wire into the crimp barrel and crimp.
5. Cut the 90 degree terminal and wire assembly to an appropriate length that will allow the crimped wire to securely fit into the plastic channel of the internal wiring harness. Strip 8.0 mm (0.3 inch) of installation from the end of wire, being careful no to nick or cut wire strands.
6. Insert the stripped end of the wire into the other end of the crimp barrel and crimp.
7. Pull on connector to be sure crimp is tight.
8. Heat splice with heat gun until covering shrinks and adhesive flows from under the covering.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

C. **Terminal Crimping** *(cont'd)*

9. The splice is now sealed and insulated. Electrical tape **should not be used** and is not necessary.
10. Complete terminal installation of the 2-way connector as follows:
    a. Position proper terminal into the correct location in connector body. Push terminal and wire into connector until it locks in place. Push lightly on the terminal blade to be sure the terminal is seated.
    b. After both terminals have been inserted, install connector cap onto connector body and push lightly on cap until it locks in place.
    c. Reconnect the solenoid connector to the appropriate solenoid.

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

CONNECTOR	MFG. P/N	PART NAME	SCT Part #	SCT Kit #	MANUFACTURER	CONFIG	MATING P/N	MFG. P/N	MATING PART NAME
TCM, 80-Way, Bolt Assist	R-61991-001	Spacer, 80F	300243	300276	AFL Automotive	1-PC/TCM			TCM Header
		Seal, Industrial							
		Connector Body, 80F Bolt							
		Bolt							
		Seal, Bolt							
		Retainer, Bolt							
		Grommet, Wire Seal							
	E-4542	Grommet, Retainer	300244						
	E-4550	Cover A, Wire Dress	300245						
	E-4551	Cover B, Wire Dress	300246						
	33001-0004	Terminal	300247		Molex				
	12034413	Plug, Cavity Seal	300008		Delphi				
TCM, 80-Way, Bolt-Assist, Dir "A" 90 Degree Wire Dress	R-61991-001	Spacer, 80F	300243	300276	AFL Automotive	1-PC/TCM			TCM Header
		Seal, Industrial							
		Connector Body, 80F Bolt							
		Bolt							
		Seal, Bolt							
		Retainer, Bolt							
		Grommet, Wire Seal							
	E-4542	Grommet, Retainer	300244						
	E-6206-002	Cover, Wire Dress, Dir A							
	E-4555	Cover, Bottom							
	33001-0004	Terminal	300247		Molex				
	12034413	Plug, Cavity Seal	300008		Delphi				
TCM, 80-Way, Bolt-Assist, Dir "B" 90 Degree Wire Dress	R-61991-001	Spacer, 80F	300243	300276	AFL Automotive	1-PC/TCM			TCM Header
		Seal, Industrial							
		Connector Body, 80F Bolt							
		Bolt							
		Seal, Bolt							
		Retainer, Bolt							
		Grommet, Wire Seal							
	E-4542	Grommet, Retainer	300244						
	E-6206-001	Cover, Wire Dress, Dir B							
	E-4555	Cover, Bottom							
	33001-0004	Terminal	300247		Molex				
	12034413	Plug, Cavity Seal	300008		Delphi				

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

CONNECTOR	MFG. P/N	PART NAME	SCT Part #	SCT Kit #	MANUFACTURER	CONFIG	MATING P/N	MFG. P/N	MATING PART NAME
TCM, 80-Way, Cam-Assist "A" Dir	R-62004-001	Spacer, 80F			AFL Automotive	1-PC/TCM			TCM Header
		Seal, Industrial							
		Connector Body, 80F Bolt							
		Cam-Left							
		Cam, Right							
		Handle, Cam							
		Grommet, Wire Seal							
	E-4542	Grommet, Retainer	300244						
	E-4555	Cover, Bottom							
	E-4589	Cover, Wire Dress							
		CPA							
TCM, 80-Way, Cam-Assist "B" Dir	R-62004-002	Spacer, 80F			AFL Automotive	1-PC/TCM			TCM Header
		Seal, Industrial							
		Connector Body, 80F Bolt							
		Cam-Left							
		Cam, Right							
		Handle, Cam							
		Grommet, Wire Seal							
	E-4542	Grommet, Retainer	300244						
	E-4555	Cover, Bottom							
	E-4588	Cover, Wire Dress							
		CPA							
TCM, 80-Way, 80W, All	E-4540	Spacer, 80F			St. Clair	1-PC/TCM			TCM Header
	E-4539	Seal, Interfacial							
Bolt Kit, TCM, 80W, All		Bolt	300234	300234	St. Clair	1-PC/TCM			TCM Header
		Seal, Bolt							
		Retainer, Bolt							
Wire Cover Kit, 80W Bolt		Cover A, Wire Dress	300235	300235	St. Clair	1-PC/TCM			TCM Header
		Cover B, Wire Dress							
Wire Cover Kit, 80W Bolt, Dir "A" 90 Degree		Cover, Wire Dress, Dir A	300236	300236	St. Clair	1-PC/TCM			TCM Header
		Cover, Bottom							
Wire Cover Kit, 80W Bolt, Dir "A" Dir		Cover, Wire Dress, Dir A	300237	300237	St. Clair	1-PC/TCM			TCM Header
		Cover, Bottom							
Wire Cover Kit, 80W CAM "A" Dir		Cover, Bottom	300238	300238	St. Clair	1-PC/TCM			TCM Header
		Cover, Wire Dress							
		CPA							

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

CONNECTOR	MFG. P/N	PART NAME	SCT Part #	SCT Kit #	MANUFACTURER	CONFIG	MATING P/N	MFG. P/N	MATING PART NAME
Wire Cover Kit, 80W Cam "B" Dir		Cover, Bottom	300239	300239	St. Clair	1-PC/TCM			
		Cover, Wire Dress							
		CPA							
TRANS, 20F, Bolt-Assist	R-62183-001	Spacer, 20F	300252	300278	AFL Automotive	1-PC/TCM	R-62000-001-D	R-62000-001-D	Connector Assy, 20M, Pass-Thru
		Seal, Industrial							
		Connector Body, 20F							
		Bolt							
		Seal, Bolt							
		Retainer, Bolt							
		Grommet, Wire Seal							
	E-4566	Grommet, Retainer	300253						
	E-4569	Cover, Wire Dress	300254						
	E-4570	Clip, Convolute	300251						
TRANS, 20F, Bolt-Assist	E-4564	Spacer, 20F			St. Clair	1-PC/TCM			Connector Assy, 20M, Pass-Thru
	E-4562	Seal, INterfacial							
Bolt Kit, TRANS, 20W		Bolt		300241	St. Clair	1-PC/TCM			Connector Assy, 20M, Pass-Thru
		Seal, Bolt							
		Retainer, Bolt							
Wire Cover Kit, 20W		Cover, Wire Dress		300242	St. Clair	1-PC/TCM			Connector Assy, 20M, Pass-Thru
		Clip, Convolute							
NE, NO, NT	15490464	Connector Assy, GT150, Half Shroud	300260	300227	Delphi	1-PC/COMP			Speed Sensors Engine, Turbine, Output
	15496486	CPA Lock, Beige/Natural	300261						
	15326267	Terminal, F GT150	300262						
	15305351	Seal Assy, Cable 1-Way, Yellow	300263						
	15358890	Convolute Capture/TPA Lock, Black	300264						
TPS	12015793	Connector, 3-Way			Delphi	1-PC/COMP			TPS Header
	12089040	Terminal, Pin							
	12089444	Seal- Wire Type, Silicone							
CAN Shift Sel, 90-Degree	12191065	Connector, 16F	300255	300278	Delphi	1-PC/COMP			CAN Shift Selector
	12191066	Seal, 16-Way Connector, Orange	300256						
	12191067	TPA Retainer, 16F	300257						
	12191068	Strain Relief, 16F 90-Degree	300258						
	12084912	Terminal, 0.8mm Wire	300087						
	12129557	Cavity Plug	300105						
	12177289	CPA Lock M/P, Red	300114						

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

CONNECTOR	MFG. P/N	PART NAME	SCT Part #	SCT Kit #	MANUFACTURER	CONFIG	MATING P/N	MFG. P/N	MATING PART NAME
CAN Shift Sel. 180-Degree	12191065	Connector, 16F	300255	300280	Delphi	1-PC/COMP			CAN Shift Selector
	12191066	Seal, 16-Way Connector, Orange	300256						
	12191067	TPA Retainer, 16F	300257						
	15460298	Strain Relief, 16F 180-Degree	300259						
	12084912	Terminal, 0.8mm Wire	300087						
	12129557	Cavity Plug	300105						
	12177289	CPA Lock M/P, Red	300114						
Strip SS	12160280	Conn 20F Mic/P 100W Gray			Delphi	1-PC/COMP	12160542	12160542	Conn 20M Mic/P 100W Gray
	15304882	Cable Seal, 14F Gray					12110693	12110693	Cable Assist/Seal, 20M Green
	12160494	Lock, Secondary 20F Green					12191176	12191176	Lock Assist/Seal, 20M Green
	12084912	Terminal, Socket 100W					12060551	12060551	Terminal, Pin 100W
	12129557	Cavity Plug, 100W					12129557	12129557	Cavity Plug, 100W
	12176394	Conduit Clip, 13mm Black					12176394	12176394	Conduit Clip, 13mm Black
DTC, 9-Pin	HD10-9-1939P	Connector, Rec., 9-Way	300267	300217	Delphi	1-PC/COMP			Diagnostic Tool
	0460-202-1631	Contact, Pin	300007						
	0460-247-1631	Contact, Pin Extended	300273						
	114017	Sealing Plug	300000						
	HD18	Strain Relief	300269						
	HDC16-6	Cap, Connector	300268						
J1939	0462-201-1631	Contact, Socket #16	300005	300283	Deutsch IPD	1-PC/COMP	29511369	0460-202-1631	Contact, Pin #18
	0462-221-1631	Contact, Extended Socket	300035					0460-247-1631	Contact, Pin Extended
	23-000-13	Cable, J1939 Data Bus							
	DT06-3S-EP11	Connector, Plug, 3-Way	300206		Deutsch IPD			DT04-3P-EE01	Connector, Rec., 3-Way
	W3S-P012	Wedgelock, Plug (Green)	300275					W3P	Wedgelock, Receptacle
RFT	13513314	Connector Assy, 2F GT150 Half Shroud			Delphi	1-PC/COMP	29542490	R-62184-001-A	Retarder Solenoid
	15326267	Terminal, F GT150	300262						
	15496486	CPA Lock, Beige/Natural	300261						
	15305351	Seal Assy, Cable 1-Way Yellow	300263						
	15358890	Convolute Capture/TPA Lock, Black	300264						
RMR	12015795	Connector, 3-Way			Delphi	1-PC/COMP	12015092	12015092	Connector, Shroud 3-Way
	12089040	Terminal, Pin					12089188	12089188	Terminal, Socket
	12089444	Seal, Wire Type, Silicone					12089444	12089444	Seal, Wire Type, Silicone

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

CONNECTOR	MFG. P/N	PART NAME	SCT Part #	SCT Kit #	MANUFACTURER	CONFIG	MATING P/N	MFG. P/N	MATING PART NAME
RMRX	12015092	Connector, Shroud 3-Way			Delphi	Resist Mod	12015795	12015795	Connector, 3-Way
	12089188	Terminal, Socket					12089040	12089040	Terminal, Pin
	12089444	Seal, Wire Type, Silicone					12089444	12089444	Seal, Wire Type, Silicone
RTEMP	12162852	Connector, 2F M/P 150.2, Black			Delphi	1-PC/COMP	12015792	12015792	Retarder Temp Sensor
	12124075	Terminal, F M/P 150.2							
RTDR Air Sol	15326143	Connector Assy, 2F M/P 150.2, Black			Delphi	1-PC/COMP	12084669		Accumulator Solenoid
	12124075	Terminal, F GT160							
STANDOFF					AFL Automotive	Internal			Control Module
	19134000	Seal, Interfacial			Minnesota				
	12092125	O-ring Seal			Parker Seal				
PCS Sol	R-61992-001	Connector, 2F			AFL Automotive	Internal			PCS Solenoid
	R-62189-001	Cap, Connector							
Connector Assembly, 2M, 90 Sol Kit	29544184	Connector, 2F			Allison Transmission PDC	Internal			PCS Solenoid
		Cap, Connector							
		Terminal with 0.5 meter wire							
		In-line Splice connection							
SS1 Sol	29541590	Connector, 2W Solenoid			Delphi	Internal			Solenoid SS1
	12124639	Terminal, 280 Series Socket							
SS2 Sol, 7-Speed	29541590	Connector, 2W Solenoid			Delphi	Internal			Solenoid SS2, 7-Speed
	12124639	Terminal, 280 Series Socket							
PS1	12110139	Connector, 2-Way, PS1			Delphi	Internal			Pressure Switch PS1
	12066337	Terminal, 280 Series Pin							
OLS	12064758	3-Pin Plug			Delphi	Internal			OiL Level Sensor
	12047767	Terminal, Socket							
	12047783	Secondary Lock, TPA							
NT1	15490953	Connector, 2-Way			Delphi	Internal			Turbine Speed Sensor (3000)
	12110236	Terminal, 150F							
OILT	12129691	Sump Temp Sensor			Phillips	Internal			Sump Temp Connector
TEMP	12047662	Connector, 2-Way			Delphi	Internal			Sensor, Temperature, Sump
	12047664	Lock, Secondary 20F Green							
	12047767	Terminal, Socket							
VIM, 18-Way	12040920	Connector Body, 18-Way			Delphi	1-PC/COMP			VIM Header Assy
	12040936	Seal, 15-Way							
	12110545	Strain Relief,308-Way							
	12129426	Bolt, 7mm Head Ext.							
	12034236	Retainer Clip, Bolt							
	12103881	Terminal, 150F							
	12034413	Cavity Plug, Metri-pack							

APPENDIX E—CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

CONNECTOR	MFG. P/N	PART NAME	SCT Part #	SCT Kit #	MANUFACTURER	CONFIG	MATING P/N	MFG. P/N	MATING PART NAME
VIM, 30-Way	12034397	Connector Body, 30-Way			Delphi	1-PC/COMP			VIM Header Assy
	12040879	Seal, 9-Way							
	12110546	Strain Relief, 18-Way							
	12129426	Bolt, 7mm Head Ext.							
	12034236	Retainer Clip, Bolt							
	12103881	Terminal, 150F							
	12034413	Cavity Plug, Metri-Pack							
XFER	KPSE06E10-6S	Connector Assy, Metri-Pack			ITT Cannon	1-PC/COMP		KPSE07E10-6P	Transfer Case