NOVA BUS

INFORMATION LETTER LI4388ER1

REFERENCE:	Nova Bus Manuals
SECTION:	16: Electrical system
RS Nº:	MQR 7621-1331
EFFECTIVE IN PROD.:	LB45 (2018AL)

APPLICATION DEADLINE: N/A

SUBJECT:	Throttle pedal sensors (TPS) cable replacement for 40-ft buses
JUSTIFICATION:	Cummins code 1242 for throttle pedal sensor circuit

LEVEL	DESCRIPTION	DIRECT CHARGES		TIME
		LABOUR	MATERIAL	
1	Install the throttle pedal sensor bypass cable.	Client	Client	2.75 h
2	Install the complete throttle pedal sensor front to back cable.	Client	Client	8.0 h

MATERIAL

QTY	PART Nº	REV.	DESCRIPTION	REPLACES PART N°
LEVEL 1				
1	N632000435	B	Bypass cable (wire kit)	–
5	G5007995	-	Black tie wrap	–
8	G5007996	-	Black tie wrap	–
0.8m	N27548-18	-	Heat-shrink tubing	–
3	N37749	-	Dual clamp tie	–
4	N56836	-	Spacer dual swivel	–
0.05	N74787	-	Electrical cloth tape	–
LEVEL 2				
1	N632000594	A	Front-to-back cable wire kit (40 ft)	–
85	G5007995	-	Tie wrap	–
0.05	N74787	-	Electrical cloth tape	–
1	N93457-03	-	Solder sleeve (N8906891)	–
8	G5007996	-	Black tie wrap	–
3	N37749	-	Dual clamp tie	–
4	N56836	-	Spacer dual swivel	–
0.8m	N27548-18	-	Heat-shrink tubing	–

To order, please contact Prevost Parts by phone at 1-800-771-6682, by fax at 1-888-668-2555 or by email at prevostparts.commandes@volvo.com. Specify document number, quantity of parts required and shipping address.

DISPOSAL OF PARTS

REMOVED PARTS ARE:	DISCARDED *	RETAINED	* Dispose of the unused parts and the defective parts in accordance with local environmental standards in effect.
	Yes	–	

REVISION HISTORY

REV.	DATE	CHANGE DESCRIPTION	WRITTEN BY
NR	2019MR01	Initial release	Marc Rougeau
R1	2019MA23	Added TTC orders (L859, L860, L937)	Marc Rougeau

APPROVED BY: Daniel Theriault

Digitally signed by Daniel Theriault
DN: cn=Daniel Theriault, o=Nova Bus, ou, email=daniel.theriault@volvo.com, c=CA
Date: 2019.06.10 20:49:05 -04'00'

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
Airdrie Transit Alberta	LB10	3718	3718	L82J1J9776464	L82J1J9776464	1
Austin - CMTA - Texas	LA18	5151	5158	L82J0H9775770	L82J3H9775777	8
Barrie Ontario - Metrolinx	L955	1601	1604	L82J7G9775408	L82J9G9775412	4
Barrie Ontario - Metrolinx	LA31	1701	1705	L82J0H9775817	L82J2H9775821	5
Barrie Ontario - Metrolinx	LA49	1706	1713	L82J7H3750855	L82J4H3750862	8
BC Transit - BCT - British Columbia	LA16	6000	6029	L82J3H9776217	L82J4H9776307	30
Bow Valley Transit - Alberta	L993	-	-	L82JXG3750329	L82J6G3750330	2
Bow Valley Transit - Alberta	LA26	—	—	L82J4H3750473	L82J4H3750473	1
Bow Valley Transit - Alberta	LA28	—	—	L82J6H9776308	L82J4H9776310	3
Brampton - Ontario	LA20	1707	1713	L82J5H3750532	L82J6H3750538	7
Brampton - Ontario	LA21	1701	1706	L82J8H3750539	L82J1H3750544	6
Brampton - Ontario	LB01	1801	1817	L82J3H3750948	L82J6J3750982	17
Brampton - Ontario	LB02	1818	1823	L82J3J3751121	L82J2J3751126	6
Brantford - Ontario	LA03	10161	10612	L82J0G3750369	L82J7G3750370	2
Cape Breton Nova Scotia	LA12	7092	7093	L82J8H3750587	L82JXH3750588	2
Cold Lake	LA99	5013	5014	L82J7J3751302	L82J9J3751303	2
Cornwall Ontario - Metrolinx	LA53	—	—	L82J2H3750892	L82J6H3750894	3
Démo US	LA13	—	—	L82J4G9775611	L82J5G9775620	10
Démo-2017	L980	—	—	L82J1G9775565	L82J9G9775569	3
Durham Region Transit Ontario - Metrolinx	L996	8560	8563	L82J1G3750414	L82J7G3750417	4
Durham Region Transit Ontario - Metrolinx	LA19	8564	8565	L82J9G3750418	L82J0G3750419	2
Durham Region Transit Ontario - Metrolinx	LA50	8566	8578	L82JXH3750901	L82J1H3750916	13
Durham Region Transit Ontario - Metrolinx	LB11	8579	8589	L82J2H9776354	L82J0H9776367	11
Fredericton - New Brunswick	LA15	8171	8174	L82J1H3750589	L82J1H3750592	4
Fredericton - New Brunswick	LA33	8181	8184	L82J6H3750944	L82J1H3750947	4
Guelph - Ontario	L985	248	251	L82J7G3750255	L82J2G3750258	4
Guelph - Ontario	LA54	252	275	L82J1H3750849	L82J0H3750891	24
Halifax - Nova Scotia	LA11	1208	1236	L82J1G9775579	L82J4G9775608	29
Halifax - Nova Scotia	LA14	1237	1237	L82J1G9775596	L82J1G9775596	1
Halifax - Nova Scotia	LA27	1238	1276	L82J5H9775778	L82J9H9775816	39
Halifax - Nova Scotia	LB61	1277	1284	L82J9J9776664	L82J6J9776671	8
Houston - Texas	L981	1916	1994	L82J8G9775434	L82J4G9775513	79
Kingston - Ontario Metrolinx	L889	1687	1689	L82J1G3750252	L82J5G3750254	3
Kingston - Ontario Metrolinx	L954	1683	1686	L82J4G3750259	L82J4G3750262	4
Kingston - Ontario Metrolinx	LA59	1803	1818	L82JXH3750932	L82J4H3750943	11
Kingston - Ontario Metrolinx	LA60	1825	1837	L82J7H3750922	L82J8H3750931	6
Lethbridge - Alberta	L997	181	186	L82J5G9775570	L82JXG9775578	6
Lethbridge - Alberta	LA91	189	192	L82J3J9776580	L82J9J9776583	4
Milton - Ontario - Metrolinx	L884	1701	1702	L82J0G3750338	L82J2G3750339	2
Milton - Ontario - Metrolinx	LA51	1801	1803	L82J3H3750917	L82J7H3750919	3
Mississauga Ontario	LA64	1730	1766	L82J2H9776077	L82J7H9776253	37

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Mississauga Ontario	LA65	1770	1799	S92J8H9776254	S92J2H9776315	30
Mississauga Ontario	LB12	1801	1812	L82J9J9776714	L82J3J9776725	12
Moncton (Codiac) - New Brunswick	LA06	—	—	L82J3G9775552	L82JXG9775564	9
Moncton (Codiac) - New Brunswick	LA42	—	—	L82J8H9776066	L82J0H9776076	11
Moncton (Codiac) - New Brunswick	LA58	—	—	L82J2J9776389	L82J2J9776389	1
NFTA - Buffalo, New York	LA30	1717	1724	L82J8H9775838	L82J5H9775845	8
NFTA - Buffalo, New York	LB21	1817	1824	L82J9J9776518	L82J8J9776526	8
Niagara Falls - Ontario	L987	1601	1604	L82J6G3750344	L82J1G3750347	4
Niagara Falls Ontario - Metrolinx	LA97	1805	1808	L82J0J3750993	L82J6J3750996	4
Niagara Falls Ontario - Metrolinx	LB13	1811	1811	L82J8J3750997	L82J8J3750997	1
North Bay - Ontario	L979	786	787	L82J4G3750312	L82J6G3750313	2
Oakville Ontario - Metrolinx	LA55	—	—	L82J6H3750880	L82J5H3750885	6
Orillia Ontario - Metrolinx	L965	1722	1724	L82J3G3750320	L82J7G3750322	3
Orillia Ontario - Metrolinx	LA61	1825	1826	L82J2J3751031	L82J4J3751032	2
Peterborough - Ontario	LA41	7217	7617	L82J1H3750706	L82J3H3750710	5
Regina - Saskatchewan	L992	-	-	L82J6G3750294	L82J3G3750298	5
Regina - Saskatchewan	LA44	814	829	L82J0H3750776	L82J7H3750791	16
Regina - Saskatchewan	LB16	830	830	L82J0H3750793	L82J0H3750793	1
Regina - Saskatchewan	LB17	831	831	L82J2H3750794	L82J2H3750794	1
Regina - Saskatchewan	LB18	832	832	L82J4H3750795	L82J4H3750795	1
Sarnia Ontario	L963	162	162	L82J7G3750305	L82J7G3750305	1
Sarnia Ontario	LA36	171	172	L82J8H3750752	L82JXH3750753	2
Saskatoon - Saskatchewan	LA29	1701	1711	L82J7H9775846	L82JXH9775856	11
Saskatoon - Saskatchewan	LA92	1718	1732	L82J0H9776319	L82J8H9776343	15
St. Catharines Ontario - Metrolinx	LA62	1801	1813	L82J8J3751034	L82J4J3751046	13
St. Catharines Ontario - Metrolinx	LB09	1740	1740	L82J6J3751033	L82J6J3751033	1
St. John - New Brunswick	LB05	38888	38899	L82J8J3750983	L82J1J3750999	12
Stratford - Ontario	LB19	—	—	L82J3J3751183	L82J5J3751184	2
Sudbury - Ontario	L994	861	865	L82J1G3750364	L82J9G3750368	5
Sudbury - Ontario	LA46	871	873	L82J1H3750821	L82J5H3750823	3
Thunder Bay Ontario - Metrolinx	LA01	—	—	L82J5H3750448	L82J7H3750449	2
Thunder Bay Ontario - Metrolinx	LA57	—	—	L82J8H3750895	L82J8H3750928	12
Timmins - Ontario	L995	-	-	L82JXG3750377	L82JXG3750377	1
Timmins Ontario	LB07	—	—	L82J1J3751005	L82J3J3751006	2
Toronto Transit Commission - TTC - Ontario	L859	8400	8400	L82J5F3001405	L82J5F3001405	1
Toronto Transit Commission - TTC - Ontario	L860	8401	8504	L82J0F3001554	L82JXF3001805	104
Toronto Transit Commission - TTC - Ontario	L937	8510	8617	L82J9G3750001	L82J3G3750401	108
Toronto Transit Commission - TTC - Ontario	L998	8620	8716	L82J3H3750545	L82J4H3750683	97
Toronto Transit Commission - TTC - Ontario	LA67	8720	8919	L82J4H9775996	L82J3H9776248	200
Toronto Transit Commission - TTC - Ontario	LA68	8920	8964	L82J6H3750796	L82JXH3750848	45
Toronto Transit Commission - TTC - Ontario	LA69	9200	9239	L82J9J9776390	L82JXJ9776429	40
University of Alabama - Alabama	LA02	7034	7037	L82J8G9775546	L82JXG9775550	4

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
Welland Ontario - Metrolinx	L991	-	-	L82J9G3750287	L82J9G3750287	1
Welland Ontario - Metrolinx	LA52	—	—	L82J2H3750911	L82J4H3750912	2
Welland Ontario - Metrolinx	LA93	—	—	L82J6H3750913	L82J6H3750913	1
Whitehorse - Yukon	LA04	—	—	L82J2G3750390	L82J4G3750391	2
Whitehorse - Yukon	LB03	—	—	L82J9H9776352	L82J0H9776353	2
Windsor Ontario - Metrolinx	LA56	578	601	L82J5J3751007	L82J0J3751030	24
Woodstock - Ontario	LA08	17-08	17-08	L82J3H3750514	L82J3H3750514	1
Woodstock - Ontario	LB04	18-04	18-14	L82J3H9776363	L82J5H9776364	2
York Regional Transit - Ontario	L967	1601	1621	L82J2G9775414	L82J8G9775627	21
York Regional Transit - Ontario	LA07	1701	1715	L82J9G3750340	L82JXG3750363	15

WARNING

FOLLOW YOUR INTERNAL SAFETY PROCEDURES.

PROCEDURE

LEVEL 1 - BYPASS CABLE WIRE KIT INSTALLATION

NOTE

Level 1 involves the installation of a bypass cable wire kit in the engine compartment. If this solution fails, level 2 involves the installation of a one-piece cable wire kit from the throttle pedal to the engine ECM.

Read and understand Appendix 1. 2 and 3 at the end of this document before beginning.

1.1. Bypass cable kit N632000435 (see Figure 1).

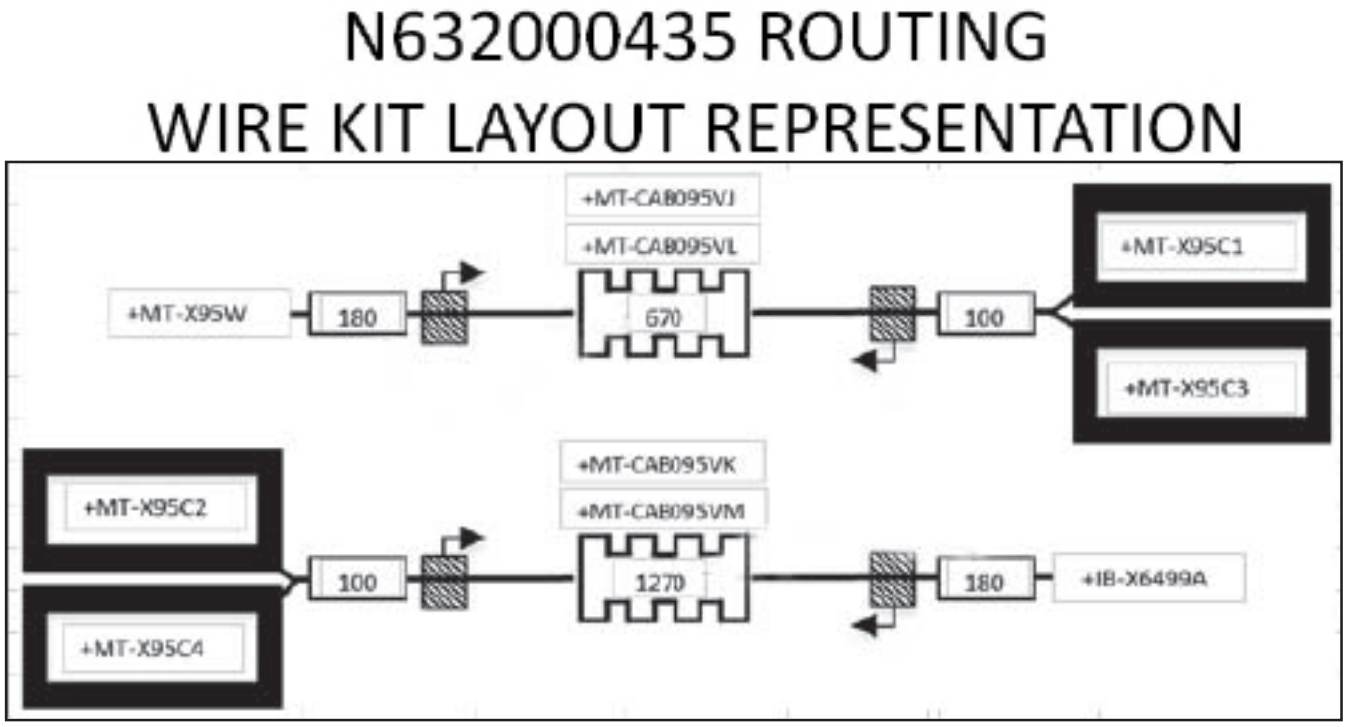


Figure 1 - Bypass Cable Wire Kit

1.2. Open the battery compartment access door, and ensure that the vehicle's power supply has been deactivated by turning off the battery cut-off switch (see Figure 2).



Figure 2 - Deactivate the Vehicle's Power Supply

1.3. Remove the two screws that secure the strain relief for the engine harness and disconnect the ECM connector (see Figure 3).

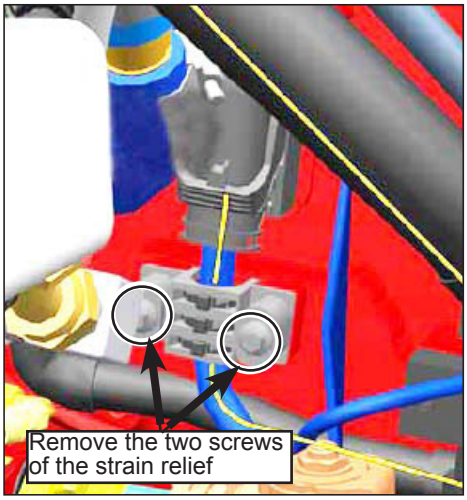


Figure 3 - Remove the Engine Harness Strain Relief and Disconnect

1.4. Raise the bus, open the ECM connector back shell, remove the red lock and extract the terminals and wires from the ECM connector for APS 1 and APS 2 using the Cummins 4918921 extraction tool. Avoid pulling on the wires before pushing the lip locks with the Cummins extraction tool. Insert the Cummins extraction tool avoiding a rotation movement. Pull on the wire once the wedge of the extraction tool has unlocked the pin (see Figure 4).

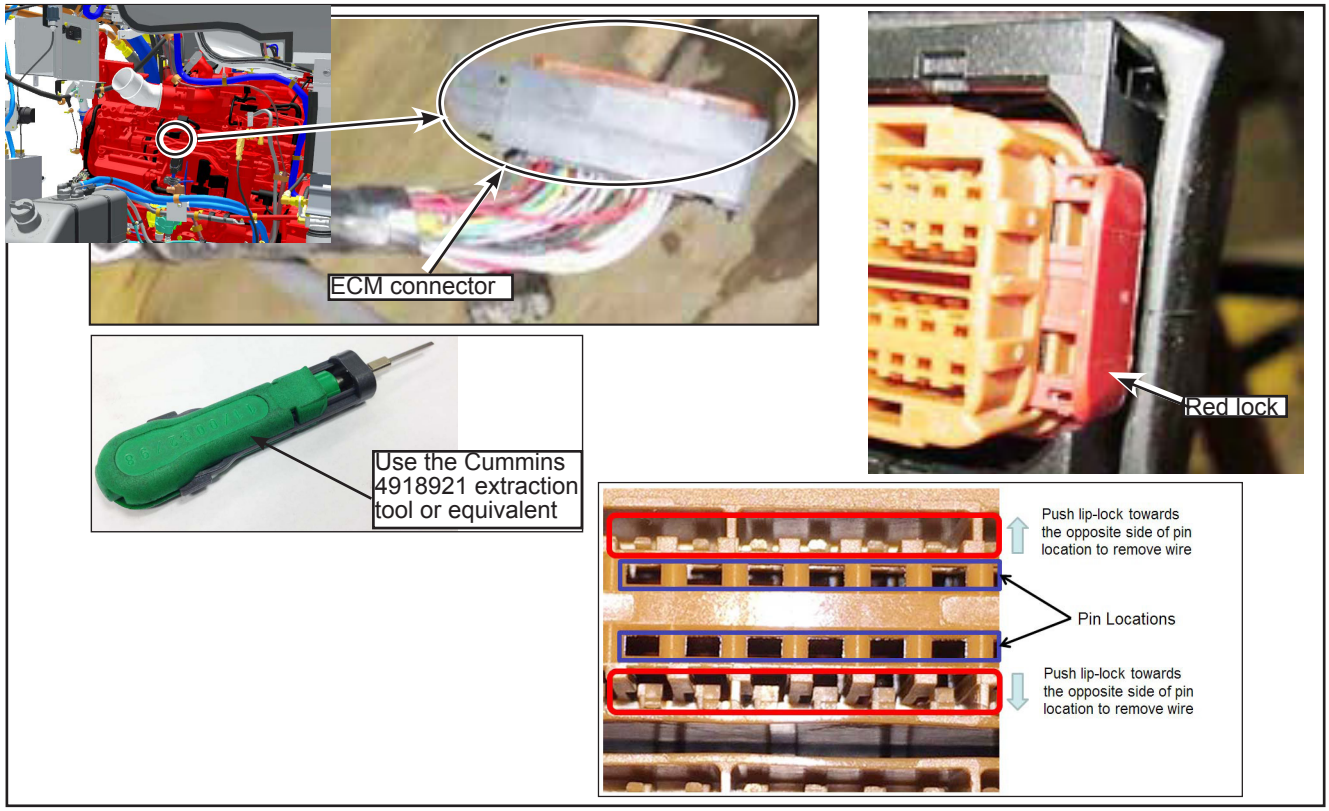
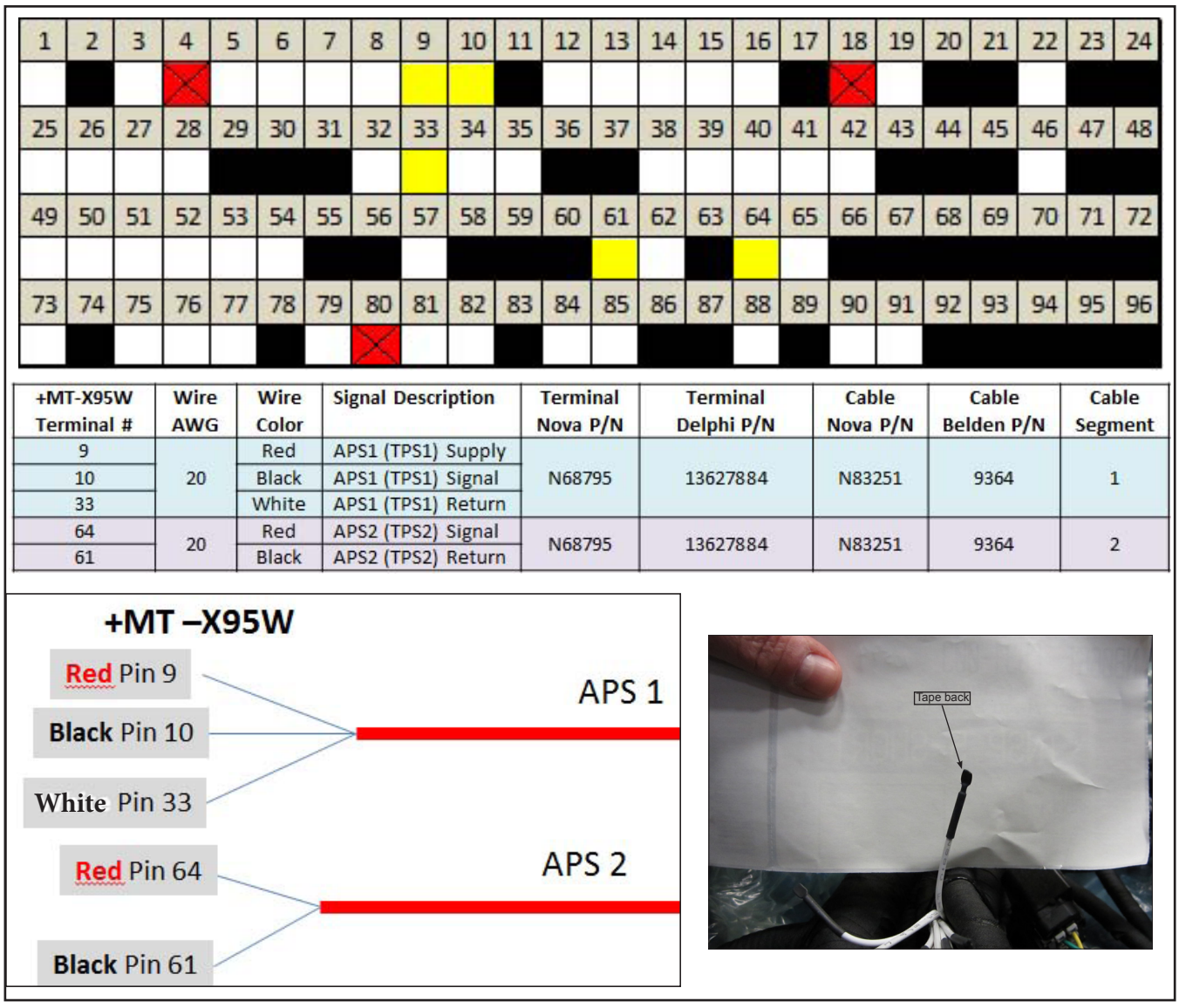


Figure 4 - Extract the Wires From the ECM Connector

1.5. Cut and tape back using N27548-18 all wires that were disconnected. For APS 1 use positions 9, 10 and 33. For APS 2 use positions 61 and 64. Install the five new wires of the bypass cable wire kit. Reassemble the ECM connector and lower the vehicle (see Figure 5).



+MT-X95W Terminal #	Wire AWG	Wire Color	Signal Description	Terminal Nova P/N	Terminal Delphi P/N	Cable Nova P/N	Cable Belden P/N	Cable Segment
9	20	Red	APS1 (TPS1) Supply	N68795	13627884	N83251	9364	1
10		Black	APS1 (TPS1) Signal					
33		White	APS1 (TPS1) Return					
64	20	Red	APS2 (TPS2) Signal	N68795	13627884	N83251	9364	2
61		Black	APS2 (TPS2) Return					

Figure 5 - Extract the Wires From the ECM Connector

1.6. Reconnect the ECM connector, secure the strain relief, fasten the bypass cable wire kit with three tie wraps (G5007995), and route the wire kit from the ECM connector (+MT-X95W) as shown below (see Figure 6).

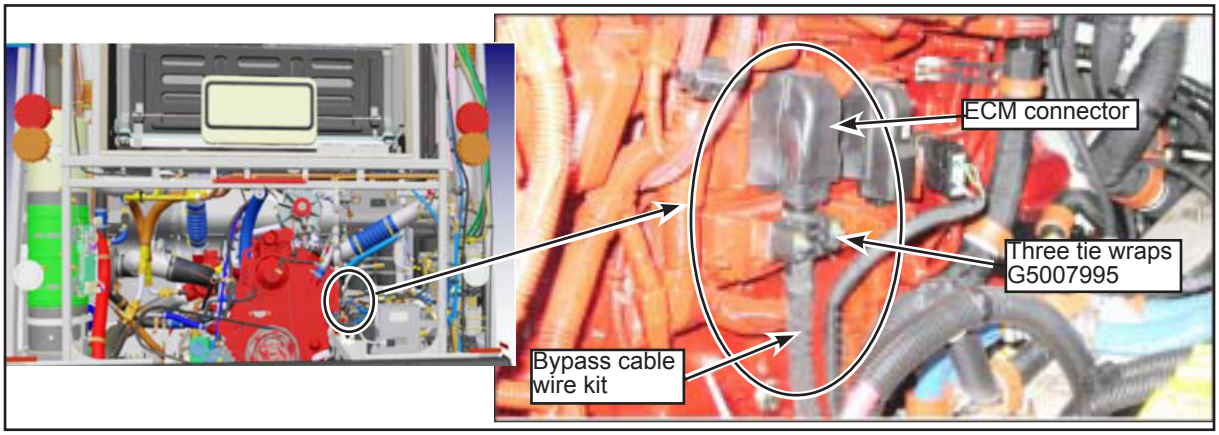


Figure 6 - Reconnect, Secure and Fasten the Bypass Cable Wire Kit

1.7. From the ECM connector, route the wire kit upwards and install the first N56836 dual swivel spacer with two G5007995 tie wraps (see Figure 7).

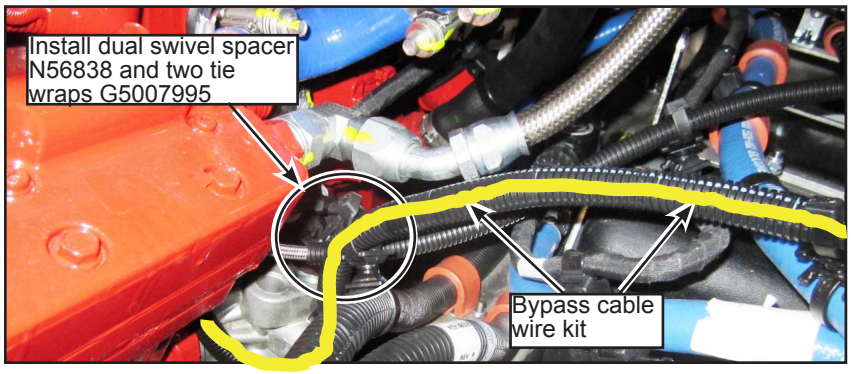


Figure 7 - Install the Dual Swivel Spacer with Two Tie Wraps

1.8. Install the second N56836 dual swivel spacer with two G5007995 tie wraps (see Figure 8).

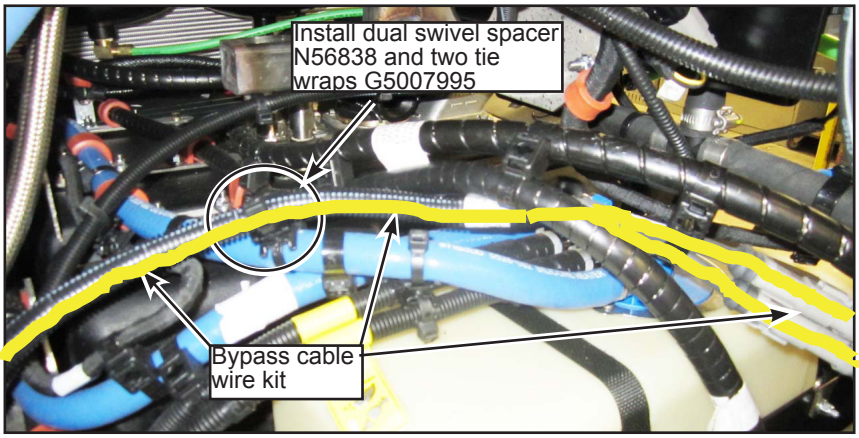


Figure 8 - Install the Dual Swivel Spacer with Two Tie Wraps

1.9. Install dual clamp ties N37749 on both sides of the bypass cable wire kit maintenance connectors (see Figure 9).

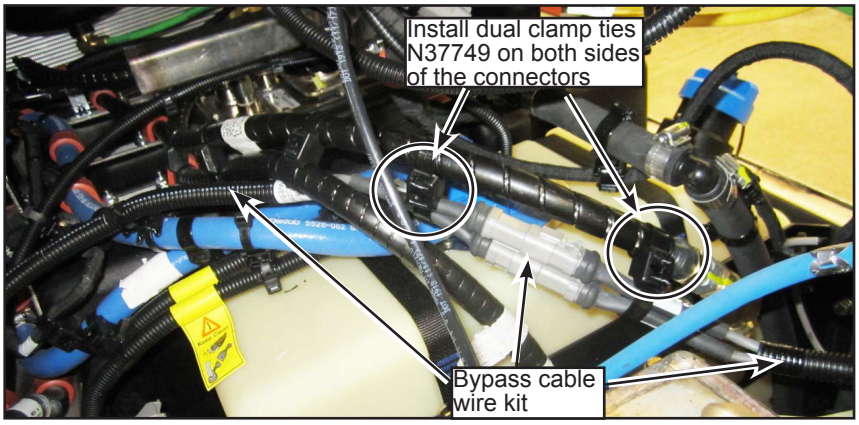


Figure 9 - Install Two Dual Clamp Ties

1.10. Route the bypass cable wire kit upwards (see Figure 10).

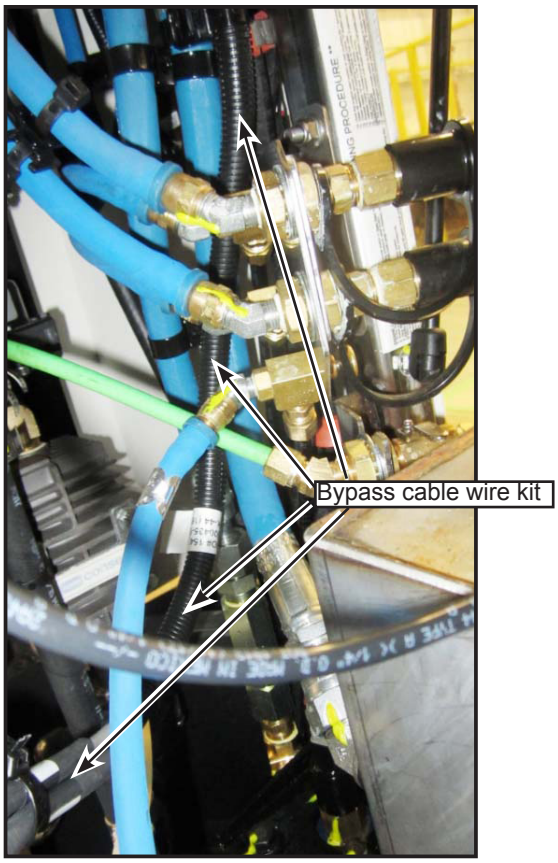


Figure 10 - Route the Bypass Cable Wire Kit Upwards

1.11. Install the dual clamp tie (see Figure 11).

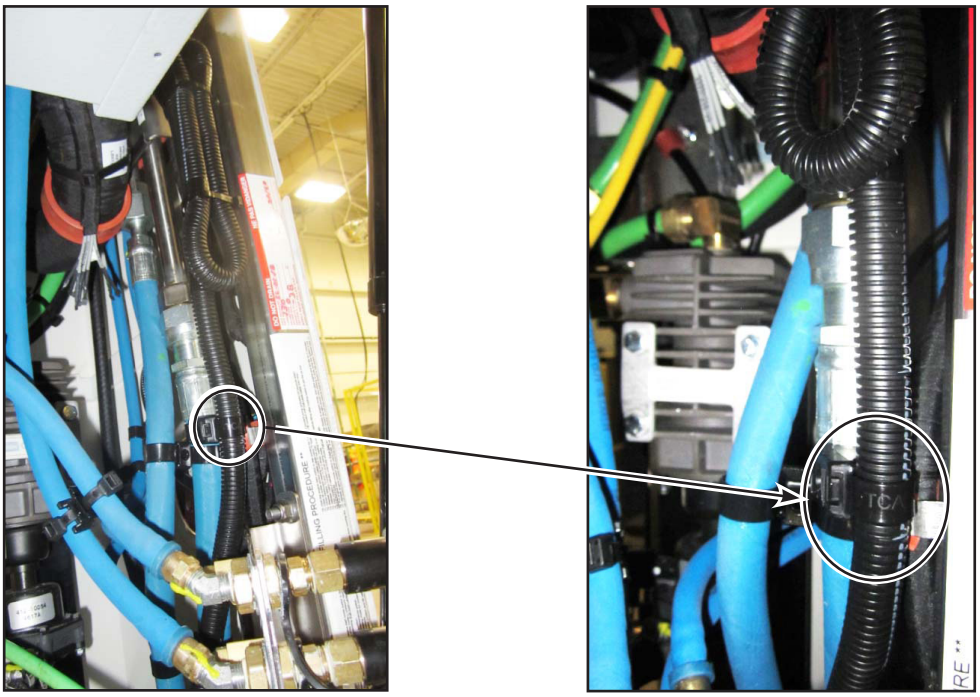


Figure 11 - Install the Dual Clamp Tie

1.12. Install two N56836 dual spacer swivels and four G5007995 tie wraps (see Figure 12).

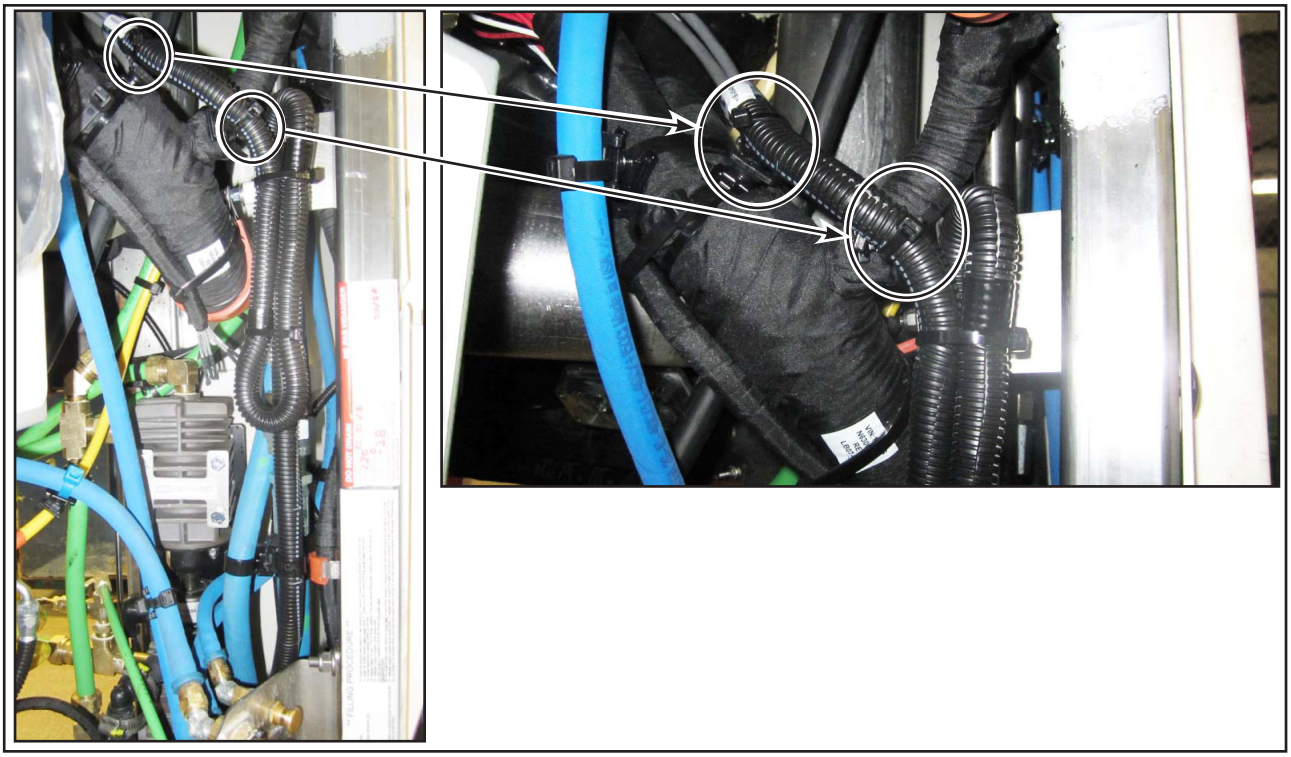
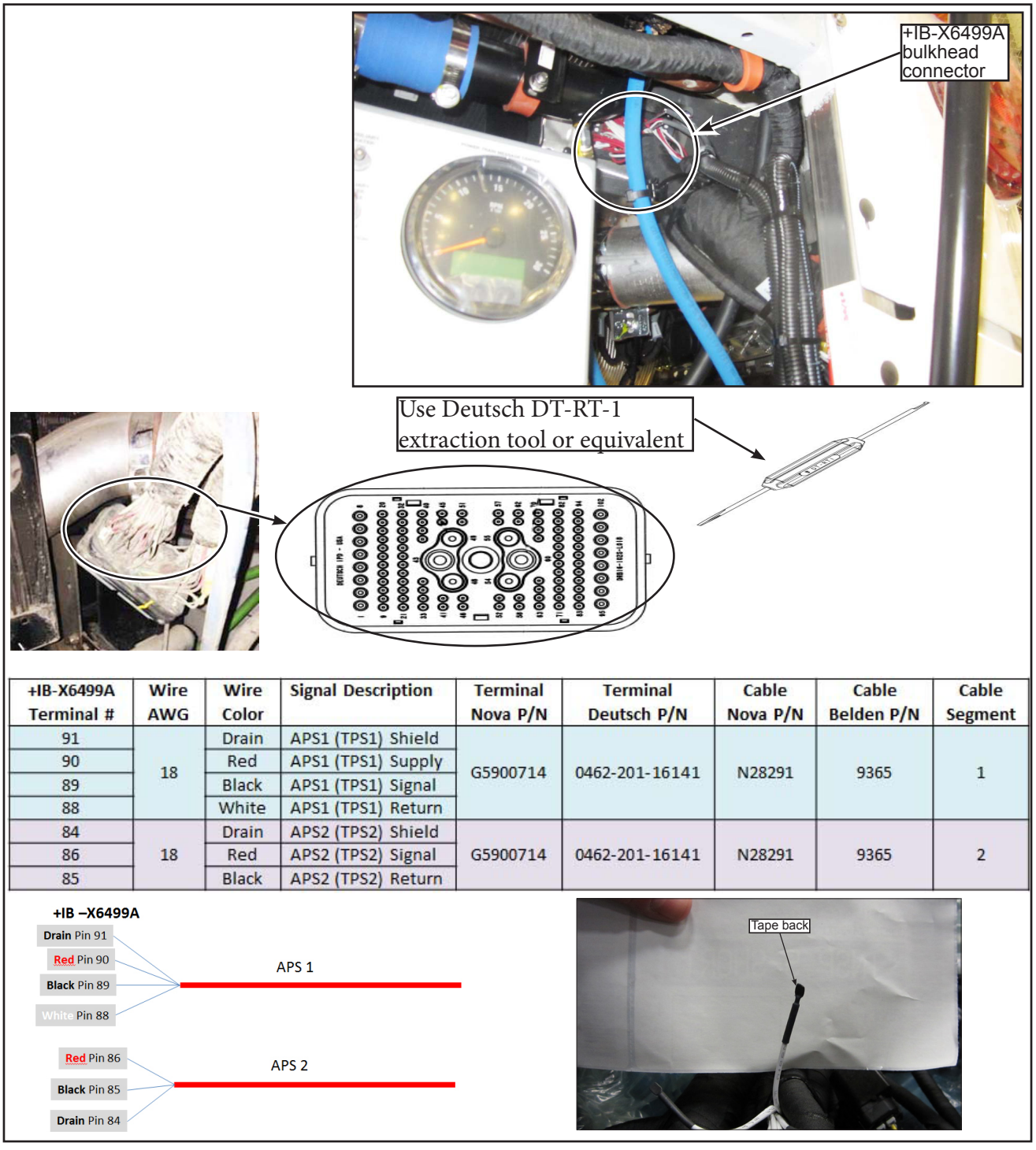


Figure 12 - Install Two Dual Spacer Swivels and Four Tie Wraps

1.13. Remove the +IB-X6499A bulkhead connector and extract the seven specified terminals for the APS 1 and APS 2 cables. Cut and tape back using N27548-18 all wires that were disconnected. For APS 1, use positions 88, 89, 90 and 91. For APS 2 use positions 84, 85 and 86. Install the seven wires from the bypass cable wire kit. Reassemble the bulkhead connector (see Figure 13).



+IB-X6499A Terminal #	Wire AWG	Wire Color	Signal Description	Terminal Nova P/N	Terminal Deutsch P/N	Cable Nova P/N	Cable Belden P/N	Cable Segment
91	18	Drain	APS1 (TPS1) Shield	G5900714	0462-201-16141	N28291	9365	1
90		Red	APS1 (TPS1) Supply					
89		Black	APS1 (TPS1) Signal					
88		White	APS1 (TPS1) Return					
84	18	Drain	APS2 (TPS2) Shield	G5900714	0462-201-16141	N28291	9365	2
86		Red	APS2 (TPS2) Signal					
85		Black	APS2 (TPS2) Return					

Figure 13 - Install the Seven Wires From the Bypass Cable Wire Kit

1.14. Secure the excess length of the bypass cable wire kit onto the existing wire harness with two G5007996 tie wraps (see Figure 14).

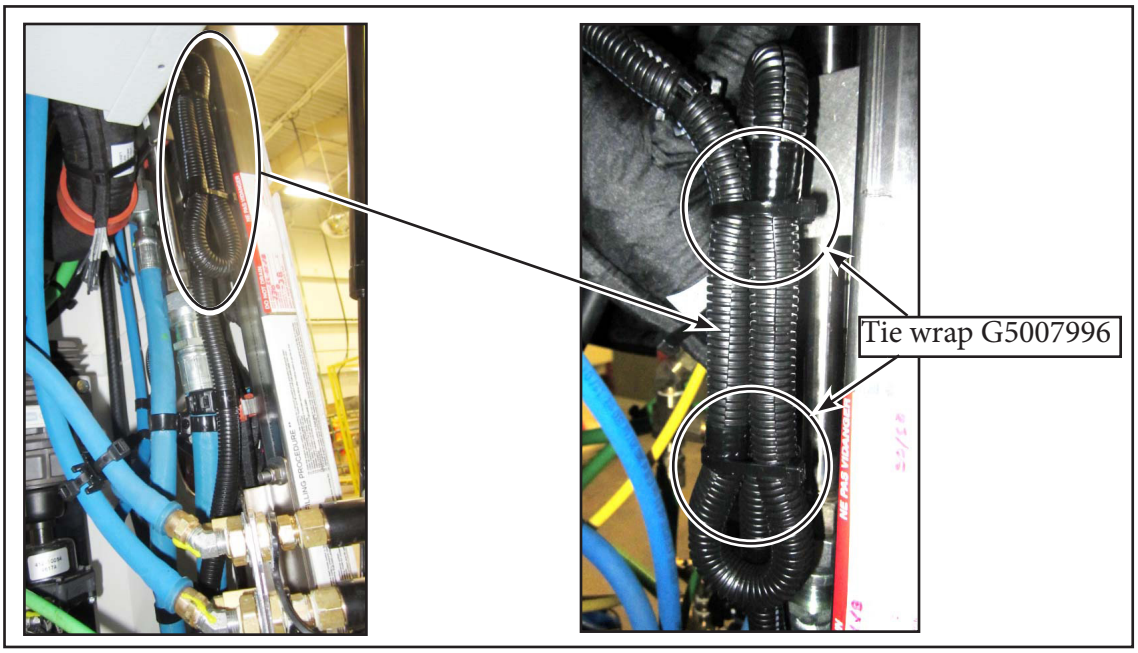


Figure 14 - Secure Excess Length of the Bypass Cable Wire Kit

1.15. Activate the vehicle's power supply.

1.16. Close the battery compartment access door.

1.17. Make sure that the engine starts properly.

1.18. Make sure that the throttle pedal operates properly.

1.19. Make sure that no active fault codes are present. If the Cummins 1242 fault codes return go to level 2 step 2.1.

1.20. Stop the engine.

1.21. Return the bus to service.

LEVEL 2 - FRONT-TO-BACK CABLE WIRE KIT INSTALLATION

NOTE

Level 1 involves the installation of a bypass cable wire kit in the engine compartment, if this solution fails, level 2 involves the installation of a one piece cable wire kit from the throttle pedal to the engine ECM.

2.1. Prepare to install the 40-foot front-to-back cable wire kit (N632000594), by performing step 1.2.

2.2. Remove the rear panel to access the Fire Suppression System (FSS) area (see Figure 15).

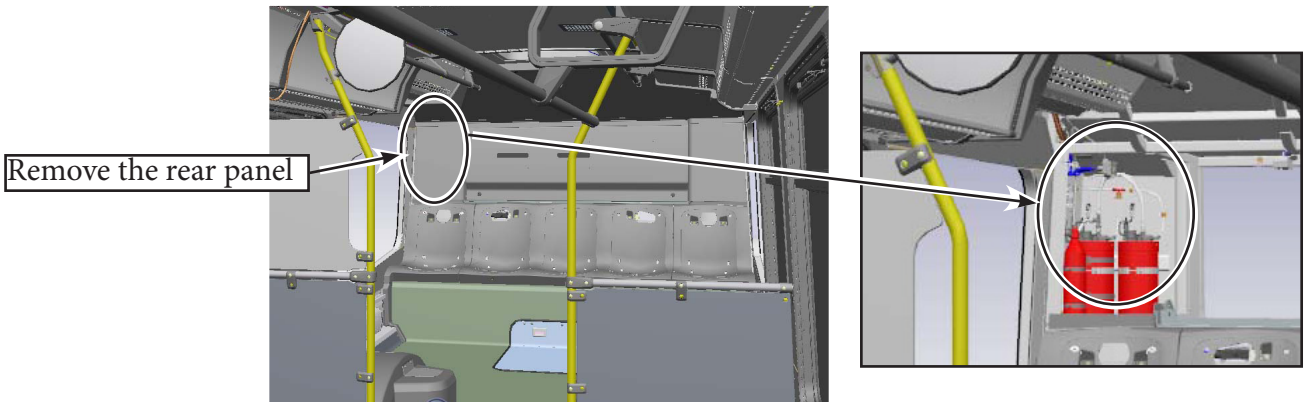


Figure 15 - Remove the Rear Panel

2.3. Drill two 12 mm holes to the left of the +IB-X6499A bulkhead connector located in the lower part of the FSS area. Align the first hole vertically with the center of the connector and 63 mm to the left. Align the second hole vertically with the center of the connector and 133 mm to the left (see Figure 16).

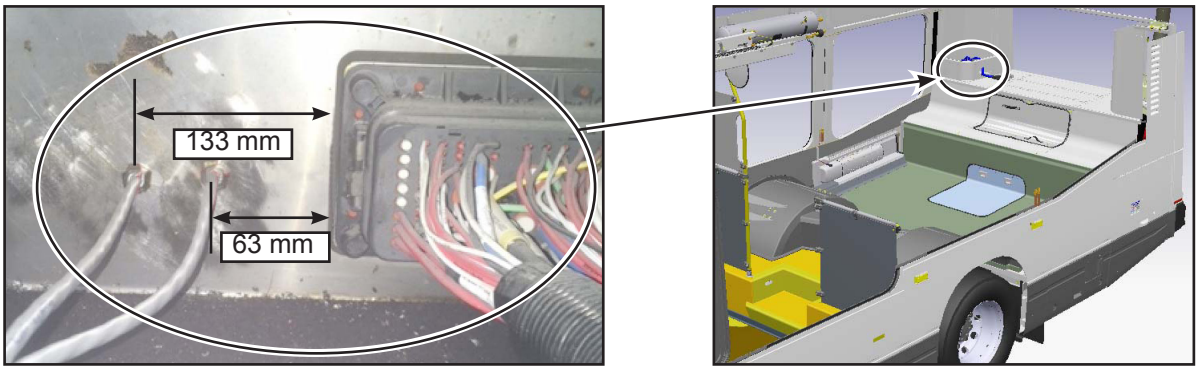


Figure 16 - Drill Two Holes for Later Installation of Cable Glands

2.4. Remove the following panels for access prior to routing the front-to-back cable wire kit: lateral console panel, foot guard panel, front console panel, driver partition panel, and all curbside baselight panels. Open the front ceiling RF0 panel (see Figure 17).

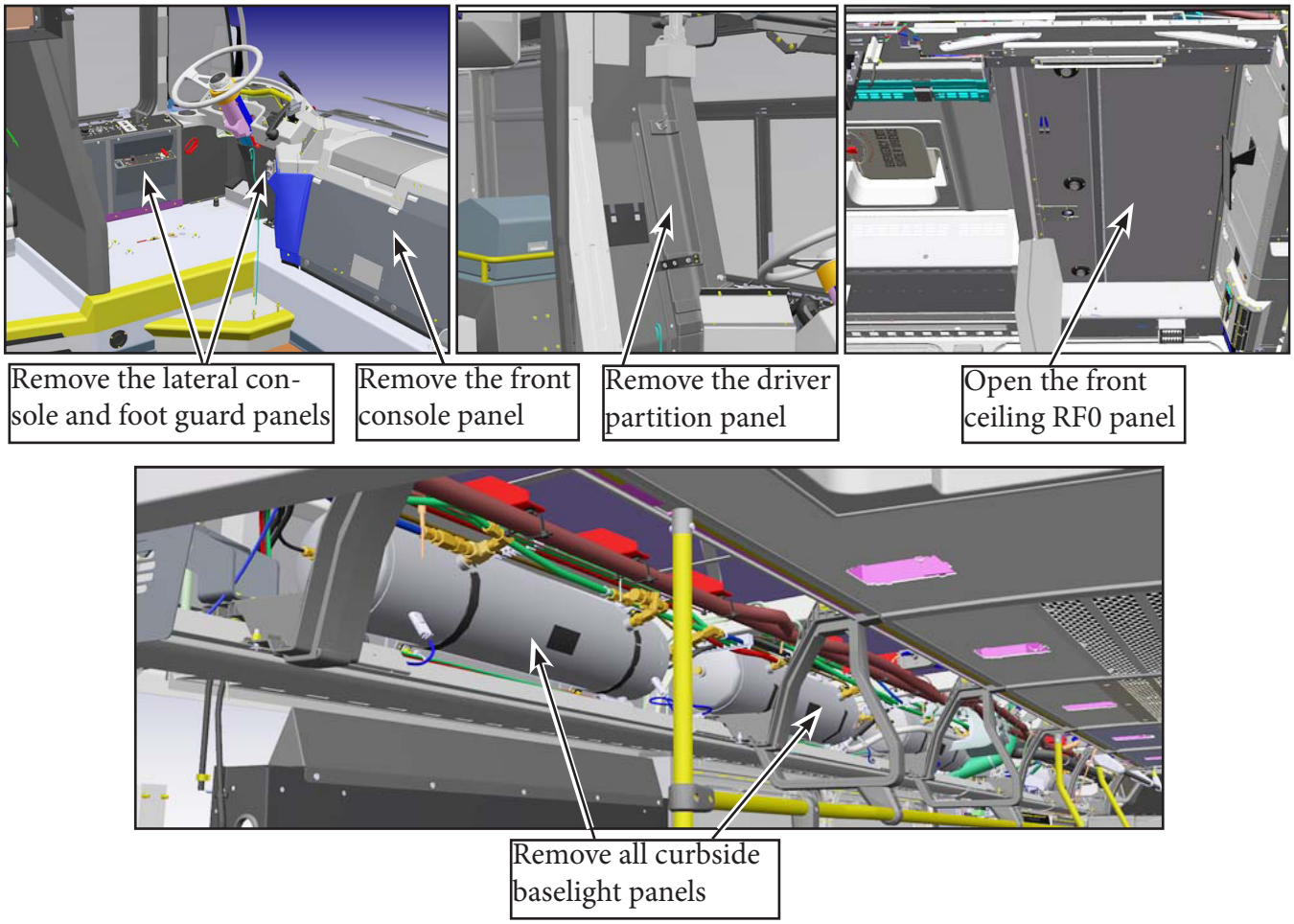


Figure 17 - Remove Panels

2.5. Begin the routing of the front-to-back cable wire kit at baselight #1. Route the cable behind the main harness in the RF0 panel (see Figure 18)

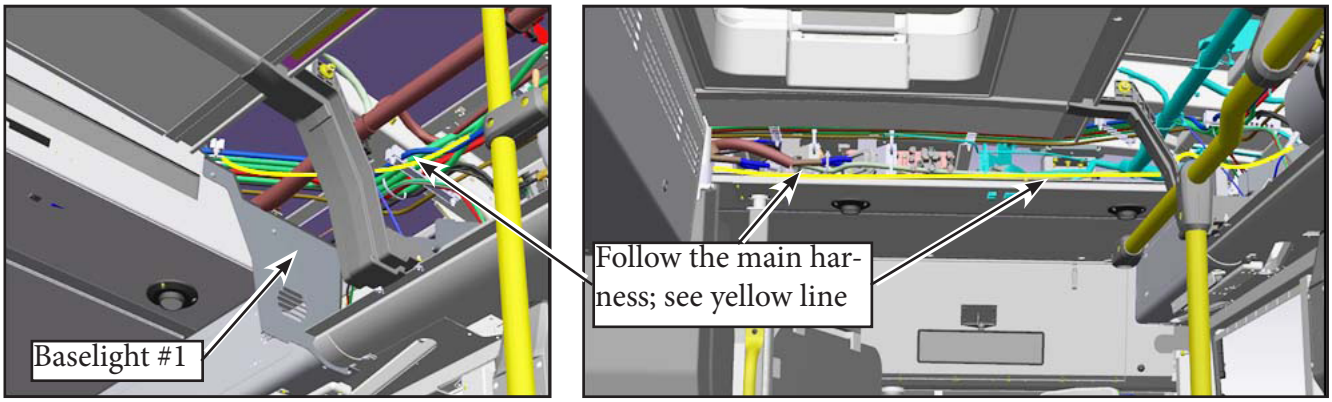


Figure 18 - Front-to-Back Cable Routing

2.6. Continue the front to back cable wire kit routing down inside the driver partition along the existing wiring and through the interior of the lateral console towards the throttle pedal (see Figure 19).

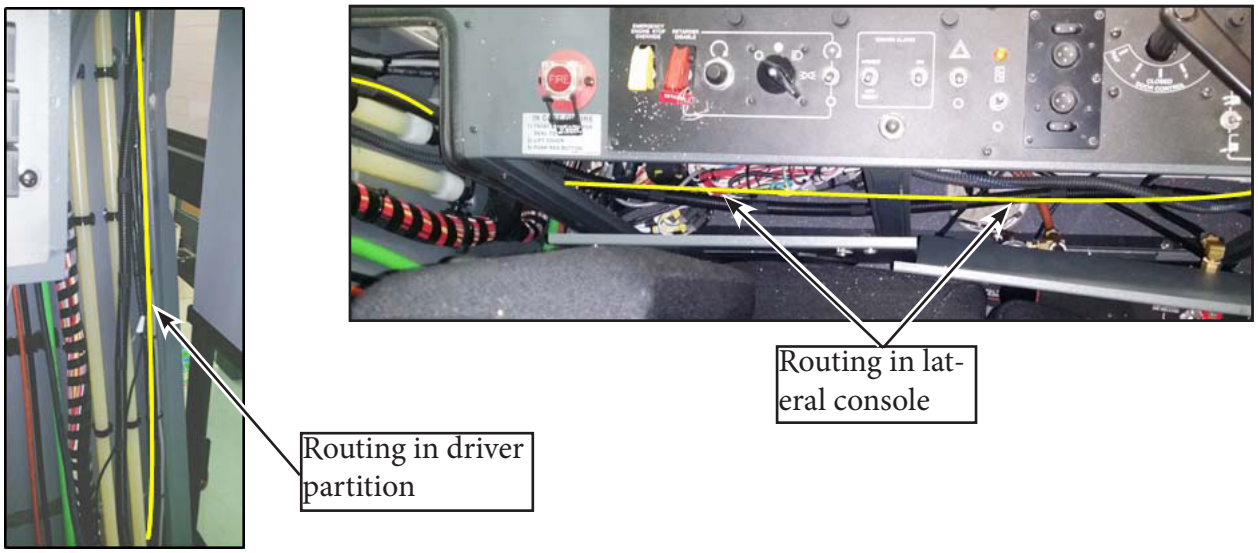


Figure 19 - Front-to-Back Cable Routing

2.7. Route the front to back cable wire kit past the throttle pedal towards throttle pedal connectors (see Figure 20).

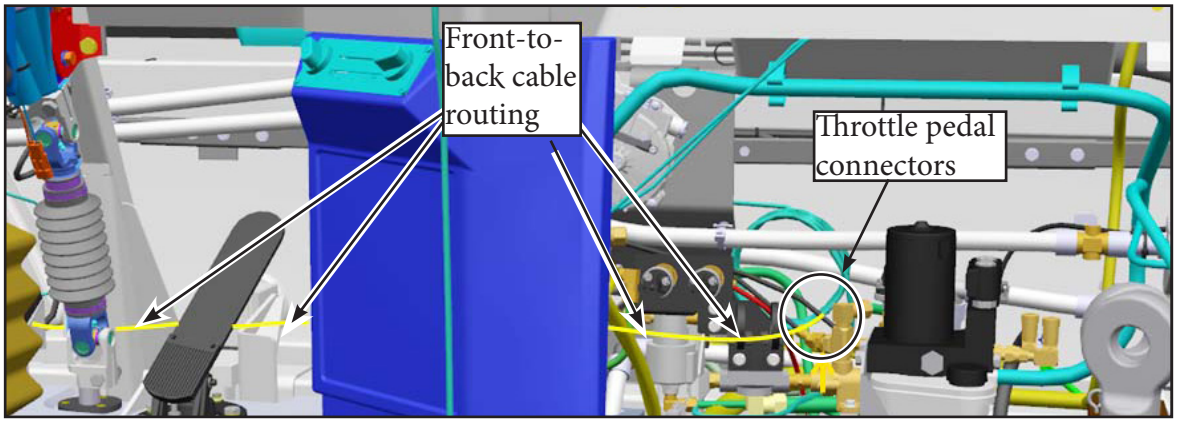


Figure 20 - Front-to-Back Cable Routing

2.8. Cut the original throttle pedal connectors on the main harness side and tape back the original breakout wires. Connect the throttle pedal connectors to the front to back cable connectors (+DH-X01D and +DH-X01E) and secure with tie wraps from the throttle pedal connectors to the ITS compartment (see Figure 21).

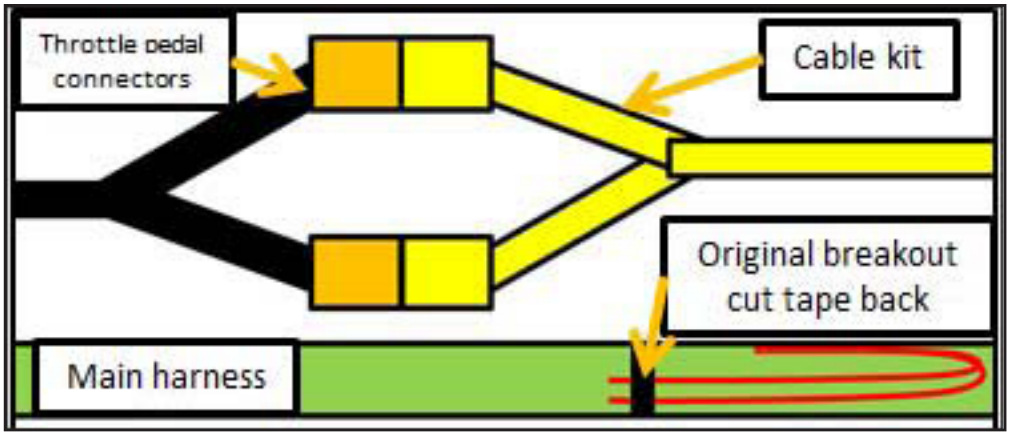


Figure 21 - Front-to-Back Cable Connection

2.9. From baselight #1, route and tie wrap the front-to-back wire kit along the main harness all the way to the last baselight (see Figure 22).



Figure 22 - Front-to-Back Cable Routing

2.10. Continue routing and tie-wrapping the front to back cable behind the Fire Suppression System (FSS) (see Figure 23).

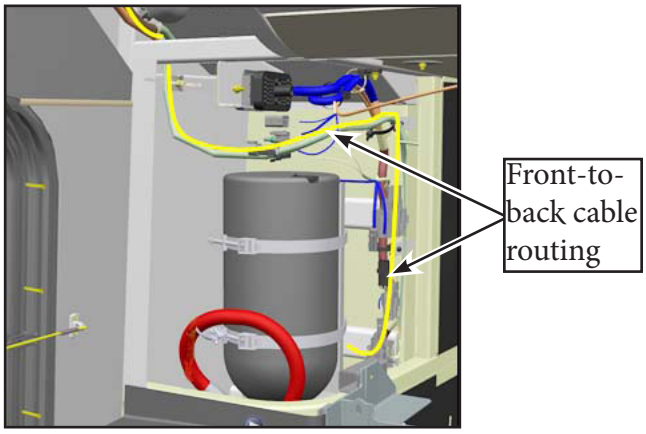


Figure 23 - Front-to-Back Cable Routing in the +IB-X6499A Area (FSS Side)

2.11. Insert the two wires with the cable glands seperately into the two holes previously drilled in step 2.3. Torque the cable glands to 3-4.5 N●m (see Figure 24).

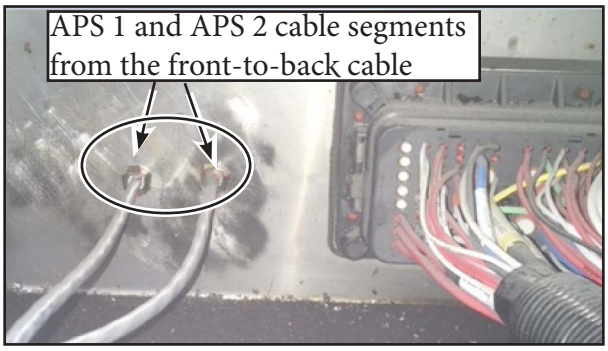


Figure 24 - Insert Both Wires in the +IB-X6499A Area (FSS Side)

2.12. Rejoin the two APS cable segments within the convoluted tubing provided with the front to back cable wire kit. Continue routing and tie wrapping the front-to-back cable along harness 64 inside the engine compartment (see Figure 25).

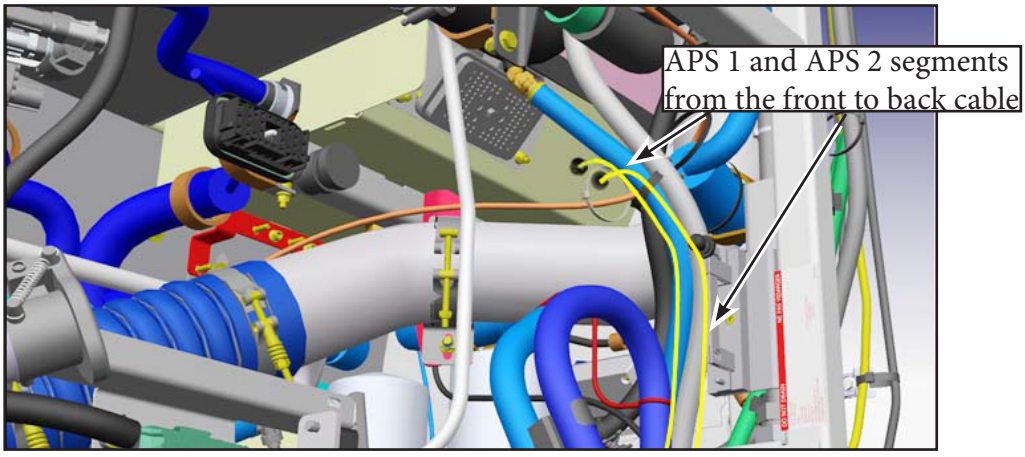


Figure 25 - Front-to-Back Cable Routing in the +IB-X6499A Area (Engine Compartment)

2.13. Continue routing and tie-wrapping towards the second blue hydraulic hose behind the hydraulic reservoir (see Figure 26).

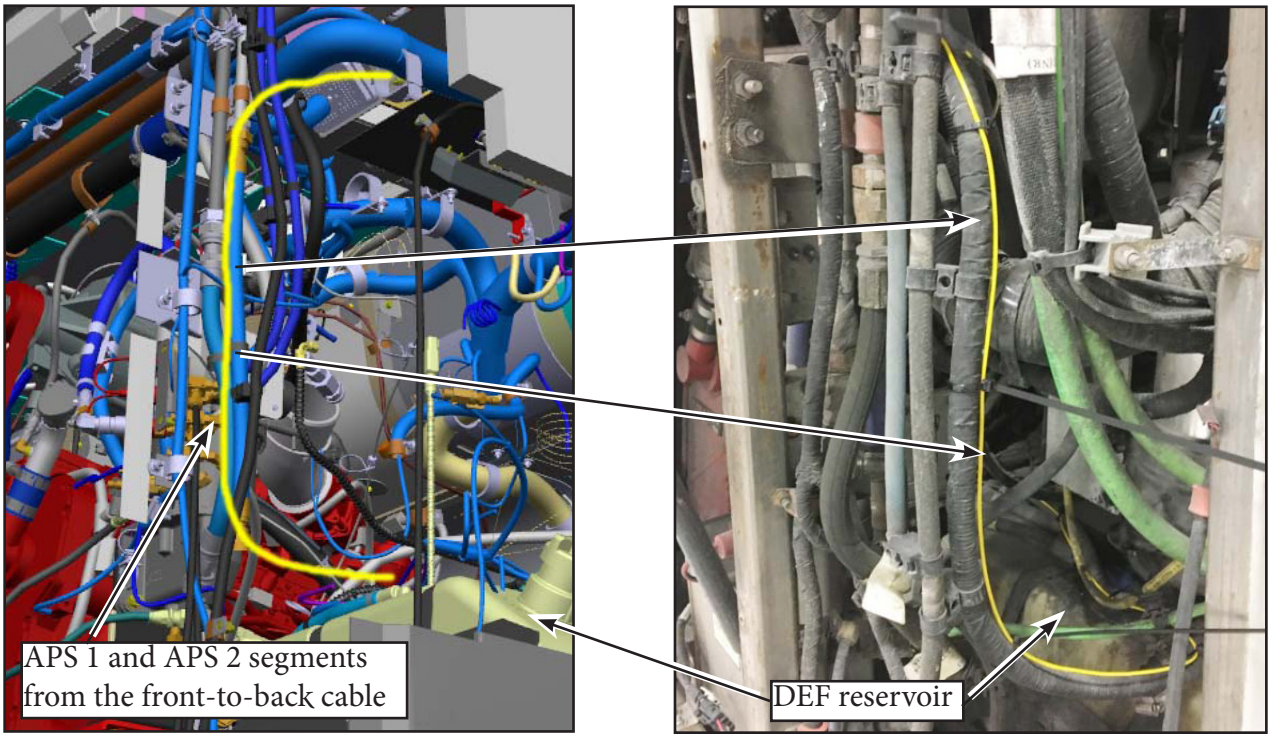


Figure 26 - Front-to-Back Cable Routing in the Hydraulic Oil Tank Area

2.14. Continue routing and tie-wrapping the front-to-back cable down over the DEF reservoir towards the ECM connector (see Figure 27).

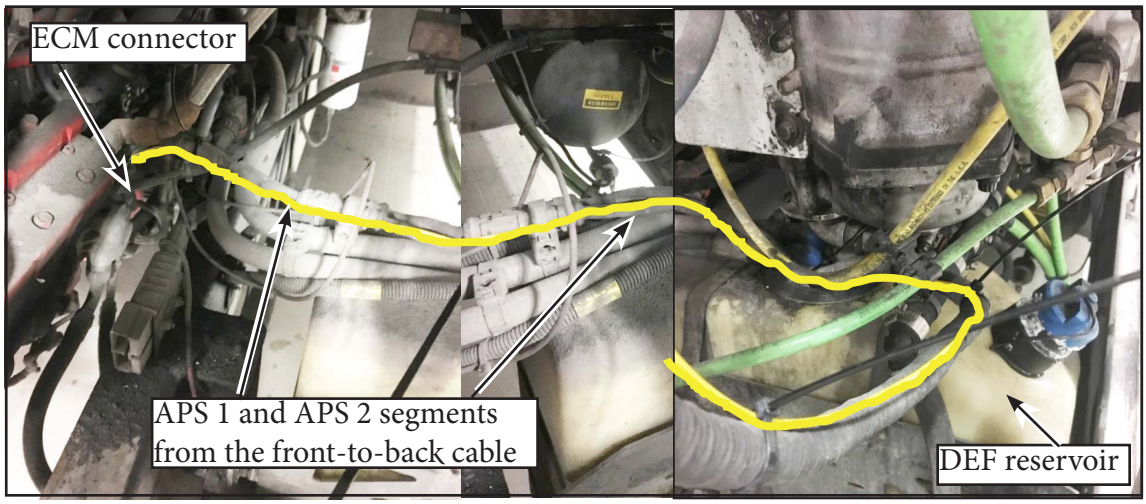


Figure 27 - Front-to-Back Cable Routing to the ECM Connector

2.15. Remove the two ECM connector strain relief screws, disconnect the ground splice connector and cut the 3 cable ties (see Figure 28).

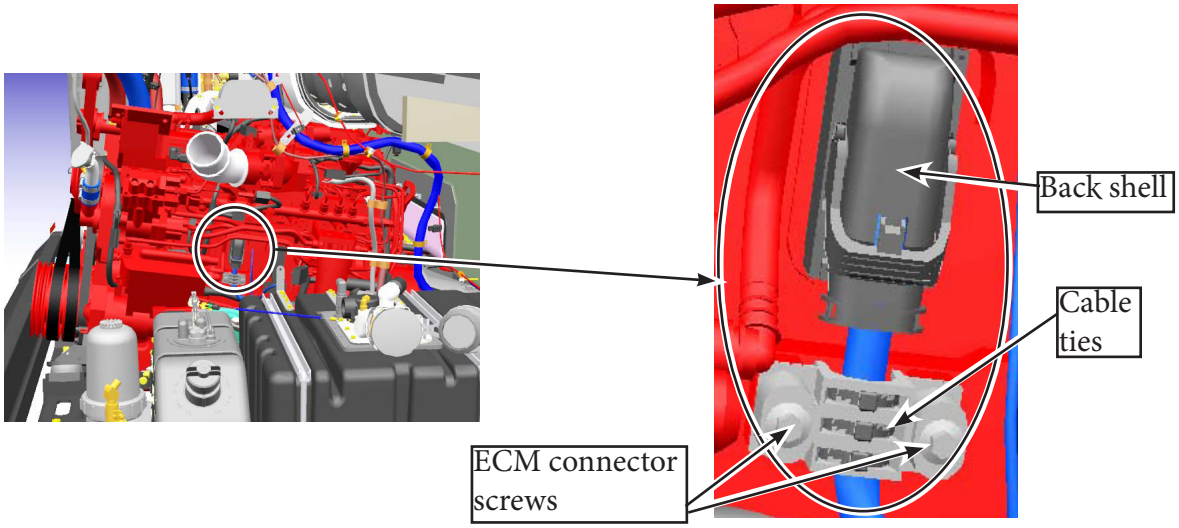


Figure 28 - Disassemble the ECM Connector

2.16. Remove the rear shell of the ECM connector and route the front-to-back cable towards the connector (see Figure 29).

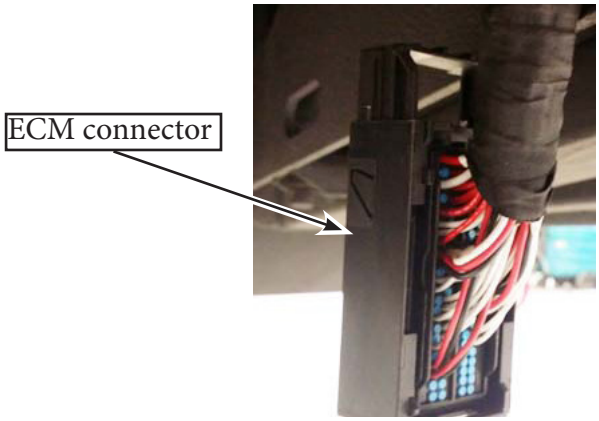


Figure 29 - Front to Back Cable Routing to the ECM Connector

2.17. Remove the electric cloth tape covering the wires entering the ECM connector. Disconnect wires at positions 9, 10, 33, 61 and 64 from the previously-installed bypass cable kit, then cut and tape back (see Figure 30).

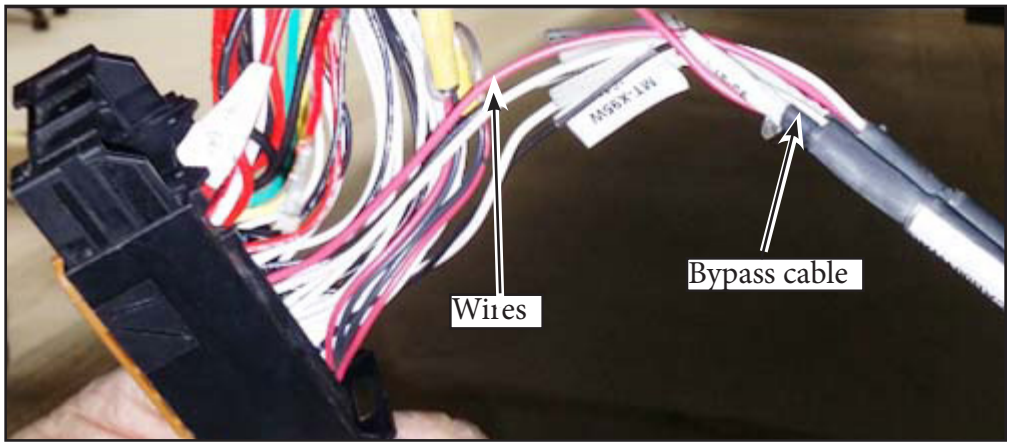
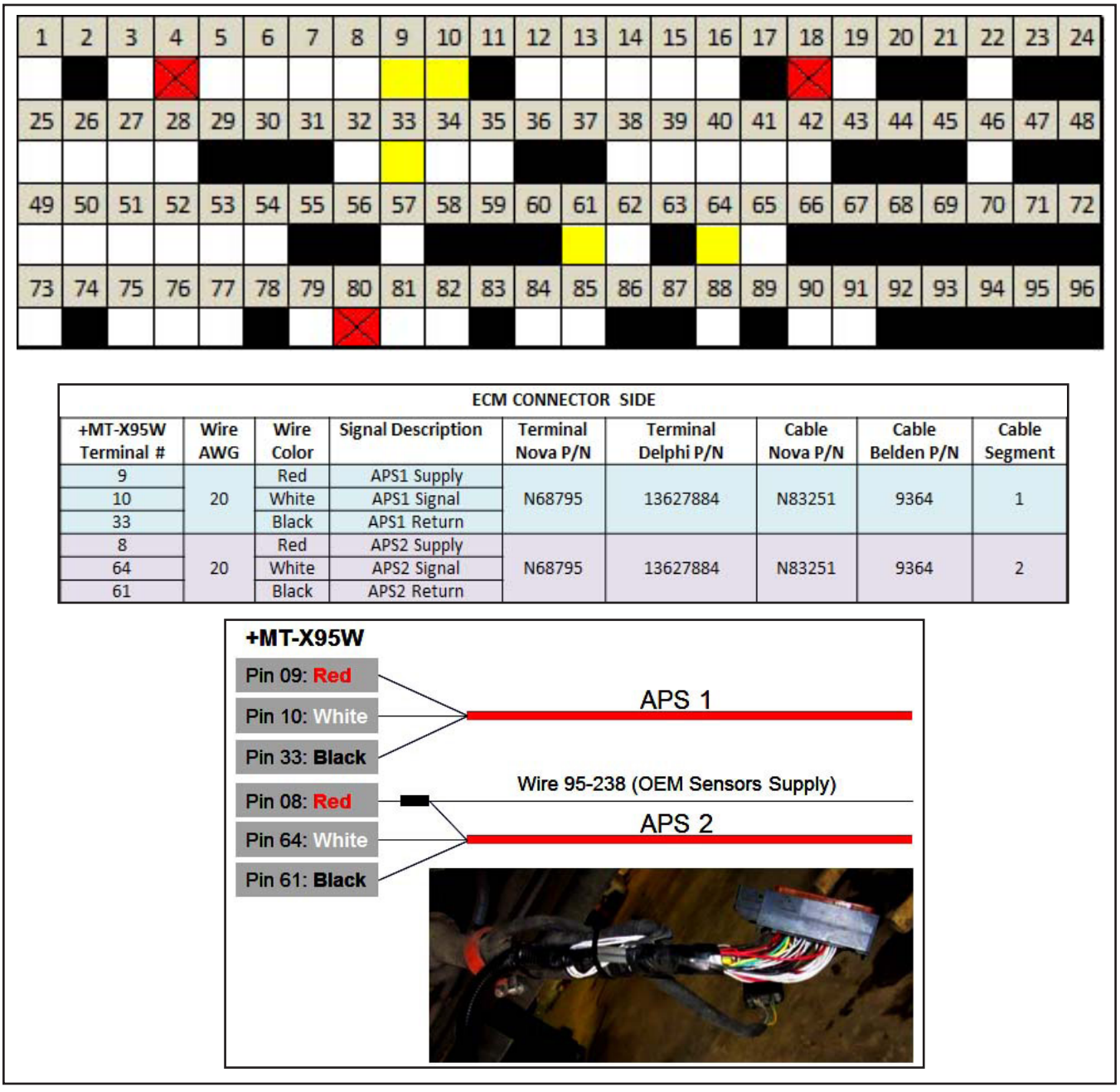


Figure 30 - Disconnect the Bypass Cable Terminals From the ECM Connector

2.18. Slide in the two heat shrink tubing segments provided with the front to back cable wire kit over the end of each APS cable segment. Use a heat gun to shrink the tubing at the extremity of each APS cable segment. Insert the terminals from the front-to-back cable into the correct ECM connector positions. Use the wire color and wire label as identification. For APS 1, use positions 9, 10 and 33. For APS 2, use positions 61 and 64 to install five of the six new wires of the front to back cable (see Figure 31).



ECM CONNECTOR SIDE

+MT-X95W Terminal #	Wire AWG	Wire Color	Signal Description	Terminal Nova P/N	Terminal Delphi P/N	Cable Nova P/N	Cable Belden P/N	Cable Segment
9	20	Red	APS1 Supply	N68795	13627884	N83251	9364	1
10		White	APS1 Signal					
33		Black	APS1 Return					
8	20	Red	APS2 Supply	N68795	13627884	N83251	9364	2
64		White	APS2 Signal					
61		Black	APS2 Return					

Figure 31 - Positions to be Used for APS 1 and APS 2 Cable Segment Connections

2.19. Locate the wire 95-238 (5V OEM sensor supply red wire) at position 8 of the ECM connector, measure 5 inches and cut the wire. Remove 1/2 inch of insulation at both ends of wire 95-238 and at the end of the remaining red wire of the front-to-back cable and insulation on both the wire from postion 8 and the remaining wire of the new wire kit. Install a solder sleeve (N93457-03) over the 3 wires and heat evenly until the solder penetrates into the wires (see Figure 32).

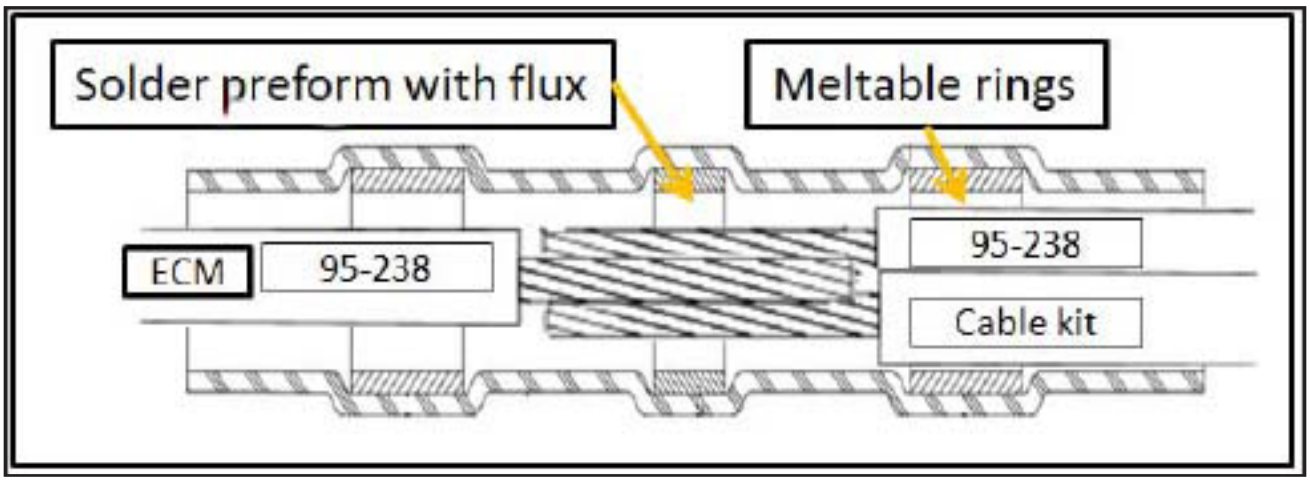


Figure 32 - Install a Solder Sleeve for 5V OEM Sensor Supply Splicing

2.20. Apply electric cloth tape over the front-to-back cable and the exposed wiring at the ECM connector. Install the ECM connector back shell and the 3 cable ties. Connect the ECM connector to the ECM and install both strain relief screws. Reconnect any splice connector disconnected earlier (see Figure 33).

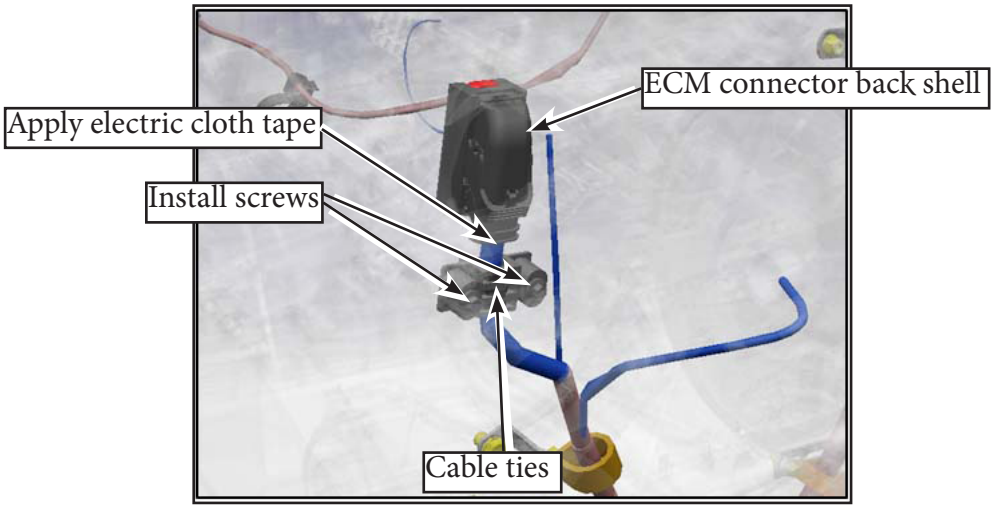


Figure 33 - Reassemble the ECM Connector

2.21. Activate the vehicle's power supply.
2.22. Close the battery compartment access door.
2.23. Make sure that the engine starts properly.
2.24. Make sure that the throttle pedal operates properly.
2.25. Make sure that no active fault codes are present.
2.26. Stop the engine.
2.27. Close all panels (rear panel, baselight panels, lateral console panel, front console panel, foot guard panel, driver partition panel and RF0 main panel).
2.28. Return the bus to service. ❖

APPENDIX 1 - GENERAL TROUBLESHOOTING PROCEDURE (ENGINE FAULT CODE 1242)

This troubleshooting procedure applies to Cummins Engine Fault Code 1242 (Accelerator Pedal or Lever Position Sensor 1 - Data Erratic, Intermittent, or Incorrect).

There are several Fault Codes (FC) referring to Throttle Pedal Sensor issues. Whenever other TPS FCs are logged along with 1242 FC, these other FCs should be troubleshot first. These other FCs correspond to TPS wiring faults, such as open- and short-circuit, and are also likely to generate a 1242 FC. Detailed information about these other TPS FCs can be found in the Cummins INSITE documentation.

Systematically proceed according to the following troubleshooting steps to identify what is causing the engine 1242 FC and to eventually eliminate this FC.

1. First connect to the Engine Control Module (ECM) with the Cummins INSITE diagnostic software tool to check for the presence of FCs (verify if any 1242 fault code has been recorded in the ECM log). If one or more 1242 FCs were logged, create a work order and save the ECM image.
2. Perform wiggle/pull tests on the TPS cables running in the bus cabin (check all interior locations) and in the engine compartment to see if any FC occurs. Also carefully check every TPS cable connector along the routing path (from throttle pedal to ECM) for any missing/damaged seal or terminal corrosion.
   - Remain logged onto Cummins INSITE and try to generate the 1242 FC or any other TPS FC.
   - Correct/repair if any wiring and/or terminal integrity issues are found. Then test drive the bus and return it to service if the 1242 FC does not return.
3. Inspect to check if DCP-504300 was properly applied (see Appendix 2 for DCP-504300 instructions).
   - Production Change Order DCP-504300 was applicable to a large number of diesel buses built after the BS3626E service document release (from lot L998 to lot LB32) but its application must be confirmed.
   - If DCP-504300 was not properly implemented, relocate the two TPS cable connectors further away from the alternator by following the instructions provided.
4. Test the throttle pedal operation (see Appendix 3 for the throttle pedal testing procedure).
   - If the throttle pedal test fails with the 1242 FC, then replace the throttle pedal with a new or spare unit (previously tested / known-good unit), test drive the bus and finally return it to service if the 1242 FC does not return.
   - Otherwise, if all of the above troubleshooting steps have successfully passed and the 1242 FC still returns, systematically proceed to check each of the following scenarios.

A. Check whether the original campaign BS3626E has been performed on the bus.
   - ➢ If YES, double-check that the BYPASS CABLE wire kit (Nova p/n N632000435) has been installed according to BS3626E instructions and thoroughly inspect it for moisture intrusion (missing/leaking connector seal or wire entry seal), connector damage or terminal corrosion.
   - ➢ If YES, the BYPASS CABLE wire kit has been on bus for a long period and 1242 FC still occurs, install a new BYPASS CABLE wire kit and route it according to the LEVEL 1 INSTRUCTIONS specified in this Information Letter.
   - ➢ If NO, install the BYPASS CABLE wire kit and route it according to the LEVEL 1 INSTRUCTIONS specified in this Information Letter.
   - ➢ Test-drive the bus and return it to service if passing.
   - ➢ If the 1242 FC still returns in service, proceed to check scenario B.

B. Check whether the BS3626E BYPASS CABLE wire kit has been installed AND routed according to the LEVEL 1 INSTRUCTIONS specified in this Information Letter.

- If YES, double-check the BYPASS CABLE wire kit installation and thoroughly inspect it for moisture intrusion (missing/leaking connector seal or wire entry seal), connector damage or terminal corrosion.
- Test drive the bus and return it to service if passing.
- If the 1242 FC still returns in service, proceed to check scenario C.

C. If, and only if, all of the above troubleshooting, testing (all tests pass and no 1242 FC can be generated) and BYPASS CABLE wire kit LEVEL 1 installation work have been performed but 1242 FC still returns, proceed to the following ultimate troubleshooting step and action.

- Install a FRONT-TO-BACK CABLE wire kit (continuous TPS cable running from the throttle pedal to the engine ECM) and route it according to the LEVEL 2 INSTRUCTIONS specified in this Information Letter.
  - Use the Nova Bus p/n N632000**594** FRONT-TO-BACK CABLE wire kit for installation on a **40**-ft bus.
  - Use the Nova Bus p/n N632000**652** FRONT-TO-BACK CABLE wire kit for installation on a **60**-ft bus.

APPENDIX 2 - DCP-504300 PRODUCTION CHANGE ORDER

NOVA BUS

DCP-504300

FUEL PEDAL – EMI interference close to Alternator

DCP-504300
Operation:C0095D





Instructions Spéciales/ Special Instruction		
#	Action	Commentaires / Comments
	Déplacer	Les x2 connecteurs (MT-X9564E) sont situé trop près de l'alternateur, ce qui altère le signal acceleration de la pédal à fuel (EMI). Déplacer les connecteurs de la location A à la location B. The 2 connectors (MT-X9564E) are located too close to the alternator and create EMI to Accel pedal signal. Need to move connector from location A to location B (see picture)

Page 2

NOVA BUS

APPENDIX 3 - THROTTLE PEDAL TESTING PROCEDURE (ENGINE FAULT CODE 1242)

This troubleshooting procedure applies to Cummins Engine Fault Code 1242 (Accelerator Pedal or Lever Position Sensor 1 - Data Erratic, Intermittent, or Incorrect).

Perform the following throttle pedal tests with the bus ignition on, the engine stopped, and finally with the engine running.

- Check several throttle pedal angular positions.
- Hold throttle pedal for 30 seconds.
- Try to replicate several scenarios that might occur in service.

When the engine is running, the throttle can be disabled by activating rear doors to engage throttle interlock. This will prevent running the engine at full throttle in neutral for 30 seconds.

Conditions Required to Trigger the Cummins 1242 Fault Code

The Engine Control Module (ECM) detects that readings from Accelerator Position Sensor APS 1 and APS 2 differ by more than 2%.

Note: Even though the APS 1 and APS 2 throttle pedal sensors are both powered by regulated 5 V voltage sources supplied by the ECM, the APS 1 output signal range is twice that one of APS 2. This is why a full throttle condition corresponds to an APS 1 reading of 4.25 V and to APS 2 reading of 2.13 V in the following figures.

Throttle Pedal Testing Procedure

After the following two preliminary steps, proceed with the test sequence presented on the next page while applying the specified pass/fail criteria and referring to the key observations detailed.

- Log onto INSITE to test the throttle pedal.
- Pull up APS 1 & APS 2 data readings from the INSITE log.

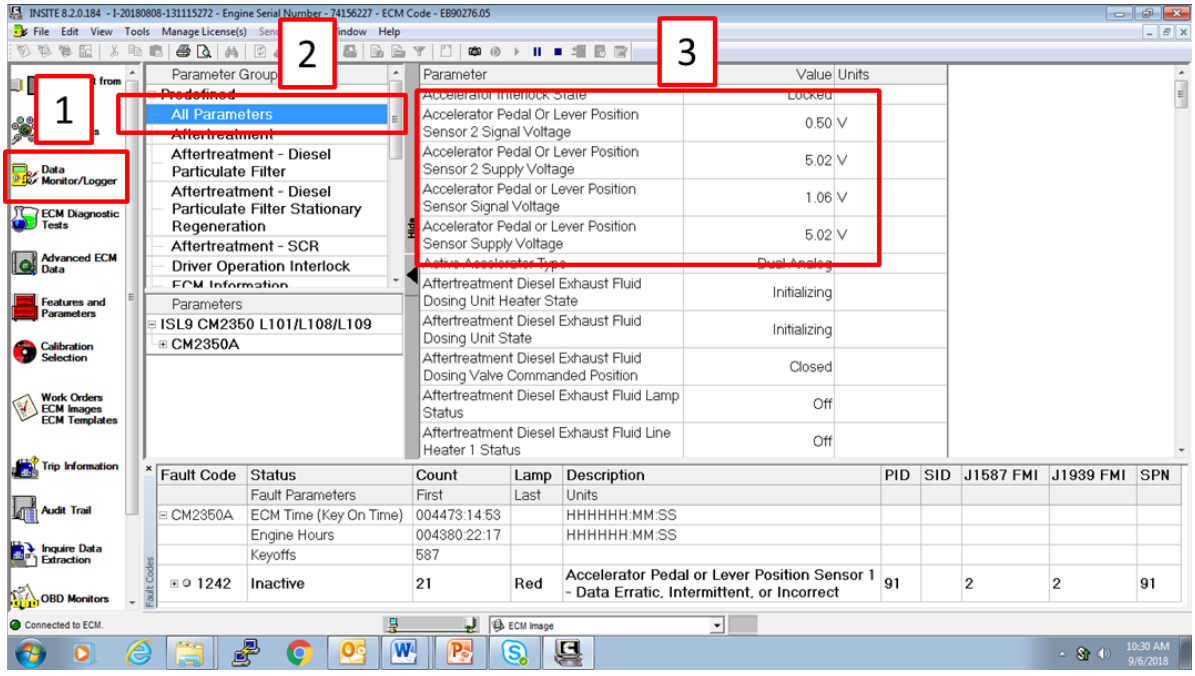


Figure A3.1. Log onto INSITE to Test the Throttle Pedal

Throttle Pedal Test Pass/Fail Criteria

- APS 1 and APS 2 signal readings should vary smoothly according to the throttle pedal angular position.
- APS 1 and APS 2 signal readings should be stable when the throttle pedal position does not change.
- The APS 1 signal reading should always be twice as much as the APS 2 signal reading.

Throttle Pedal Test Sequence

1. Test the bus with engine OFF.
   - Exercise the throttle pedal.
     - Observe the INSITE throttle pedal readings, especially the APS 1 and APS 2 voltage readings.
     - **Depress the throttle pedal and hold for 30 seconds**.
       - APS 1 and APS 2 voltage readings should remain stable.
2. Test the bus with engine ON.
   - Open back door to enable the throttle interlock in order to disable the engine throttle.
   - Exercise the throttle pedal.
     - Observe the INSITE throttle pedal readings, especially the APS 1 and APS 2 voltage readings.
     - **Depress the throttle pedal and hold for 30 seconds**.
       - APS 1 and APS 2 voltage readings should remain stable.

Key Observations at Full Throttle Position

- Good APS 1 (PASS condition):
  ☑ Reading is 4.25 V and steady when throttle pedal fully depressed.
- Bad APS 1 (FAIL condition):
  ☒ Reading is unstable with throttle pedal being held steady.
- Bad APS 1 (FAIL condition):
  ☒ Reading is around 4.19 V (low).
- Good APS 2 (PASS condition):
  ☑ Reading is 2.13 V and steady when throttle pedal fully depressed.
- Bad APS 2 (FAIL condition):
  ☒ Reading is unstable with throttle pedal being held steady.
- Bad APS 2 (FAIL condition):
  ☒ Signal 2 is about 2.03 V (low).

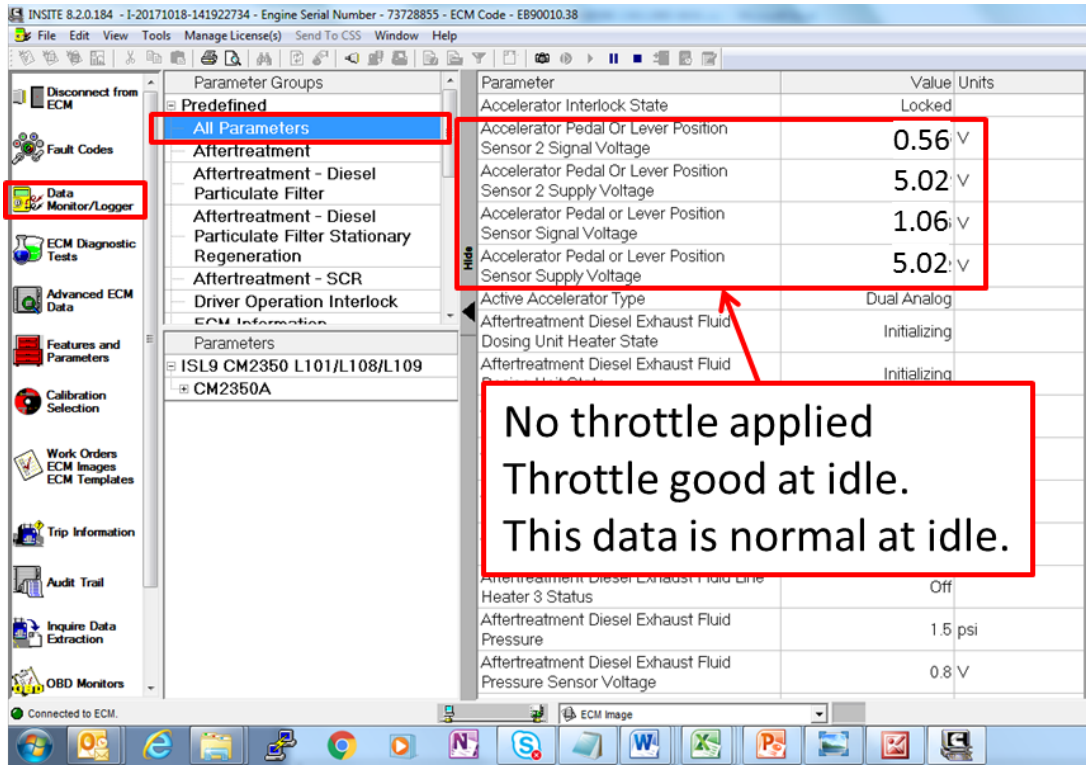
Note: Any of the abovementioned bad APS readings (FAIL condition) should normally lead to 1242 FC activation.

Throttle Pedal Testing Procedure Background

- The TPS readings specified above have been collected through several throttle pedal sensor 1242 FC investigations.
- This testing procedure might not be 100% accurate but many field tests have shown it to be dependable.
- This testing procedure is an efficient first step towards permanently resolving 1242 FC issues.

Throttle Pedal Test Records

- Capture and save screenshots of any failing APS readings.
- Examples of typical APS 1 and APS 2 good and bad reading values are presented in the following figures.



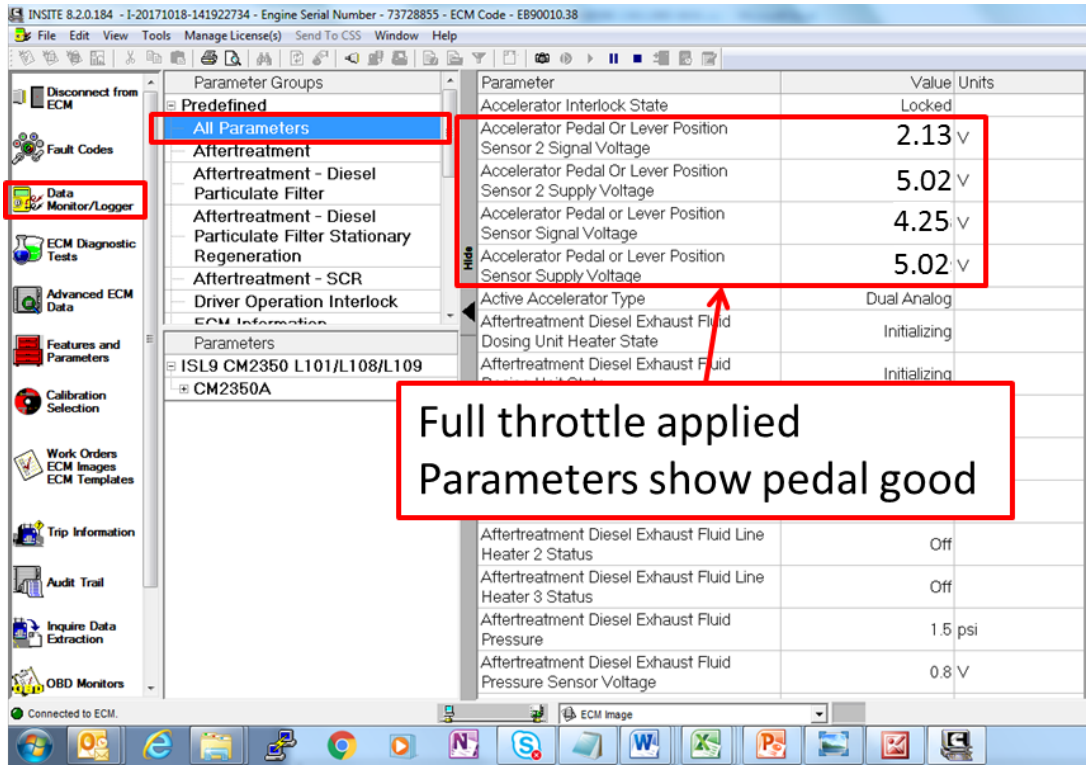


Figure A3.2. Example of INSITE Normal (PASS) Readings at Idle and Full Throttle Positions

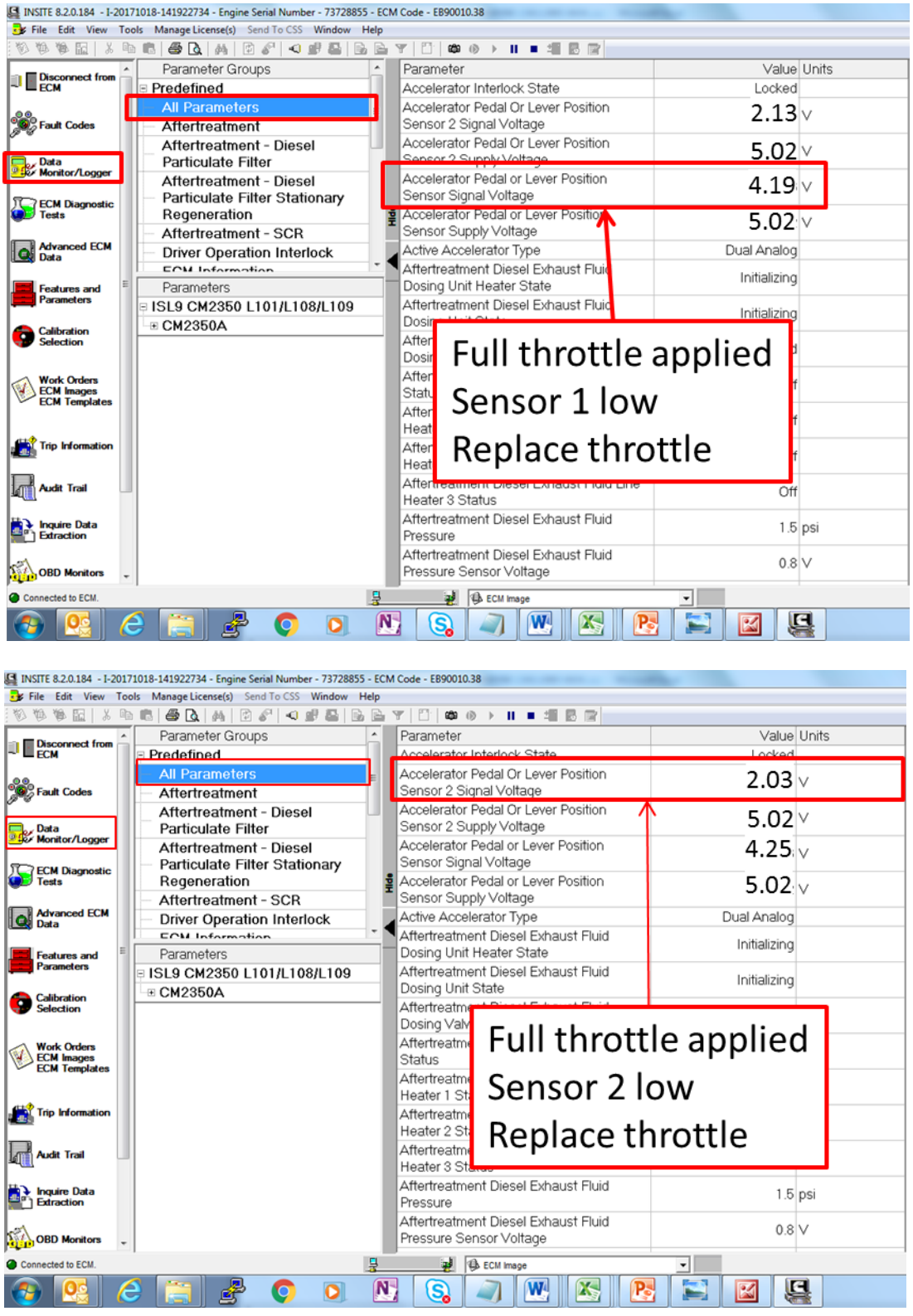


Figure A3.3. Example of INSITE Abnormal (FAIL) Readings at Full Throttle Pedal Position