

REFERENCE:	Nova Bus Manuals
SECTION:	09: Engine and Cooling
RS N°:	MQR 7621-1695
EFFECTIVE IN PROD.:	LC32 (2019MR)
NHTSA RECALL N°:	19V274

APPLICATION DEADLINE: N/A
CLAIM REFERENCE NUMBER: SR-4595

SUBJECT:	Engine Door Fan Power Connector Installation.
JUSTIFICATION:	Replacement of the temporary production containment action with the HDSCS power connection solution.

LEVEL	DESCRIPTION	DIRECT CHARGES		TIME
		LABOUR	MATERIAL	
1	Replacement of the butt spliced hardwired connections on the fan power and ground wires.	Nova Bus	Nova Bus	0.75 hr

MATERIAL

QTY	NOVA PN	REV.	PREVOST PN	DESCRIPTION	REPLACES PART N°.
LEVEL 1					
1	N77235	-	N8910118	HDSCS Connector Plug - Power - Series 6.3	-
2	N97874-01	-	N8908509	HDSCS Terminal Socket	-
1	N77185	-	N8910119	HDSCS Connector Receptacle - Power - Series 6.3	-
2	N97874-02	-	N8908508	HDSCS Terminal Pin	-
2	N77238	-	993747	HDSCS Seal Green for 10 AWG	-
2	N77237	-	993749	HDSCS Seal Blue for 12 AWG	-
2	N67755	-	N67755	TEFZEL Blue Cable Ties	-
1	N56339	A	N56339	TEFZEL Blue Cable Ties	-
1	N38350	A	N38350	Anchor Heavy Duty Mount	-
1	N57040	B	N57040	Stud-Mounted Hi-Heat Tie Mount	-
7 in	N82227-04	-	N82227-04	Tubing Heat Shrink Dual Wall	-
3 in	N82227-13	-	N82227-13	Tubing Heat Shrink Dual Wall	-
20 in	N74787	A	N74787	Electrical Cloth Tape	-
LEVEL 2					
5%	N91996	-	N91996	Fan Axial BLDC	-
SPECIAL TOOLING					
1	-		N8910120	HDSCS 6.3 Crimping Hand Tool	-
1	-		N8910121	HDSCS 6.3 Die Set	-

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	2019-06-25	Initial release	Yuvaraj

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
New York City Transit - New York	LA73	8504	8507	L82J8J9776445	L82J8J9776476	4
New York City Transit - New York	LA76	8508	8633	L82J9J9776924	L82J8K9777144	125
New York City Transit - New York	LB99	5567	5602	S92J2J9776935	S92J5K9777000	36
New York City Transit - New York	LB78	8526	8526	L82J3K9776984	L82J3K9776984	1

**WARNING**

Follow your internal safety procedures.

PROCEDURE**VEHICLE PREPARATION**

- 1.1. Park the vehicle on an even surface with transmission on neutral (N) and apply the parking brake.
- 1.2. Before starting any work on the vehicle, make sure that the vehicle is completely and securely stationary.

ENGINE FAN TEST

- 1.3. Start the vehicle and confirm that the engine fan is working.
- 1.4. If the engine fan connector and/or terminals are too damaged to test the engine fan, replace the damaged fan with a spare known working fan PN N91996.

ENGINE FAN BUTT-SPLICES REPLACEMENT CONNECTORS INSTALLATION

- 1.5. Set the Master Control Switch in the STOP position (see figure 1).

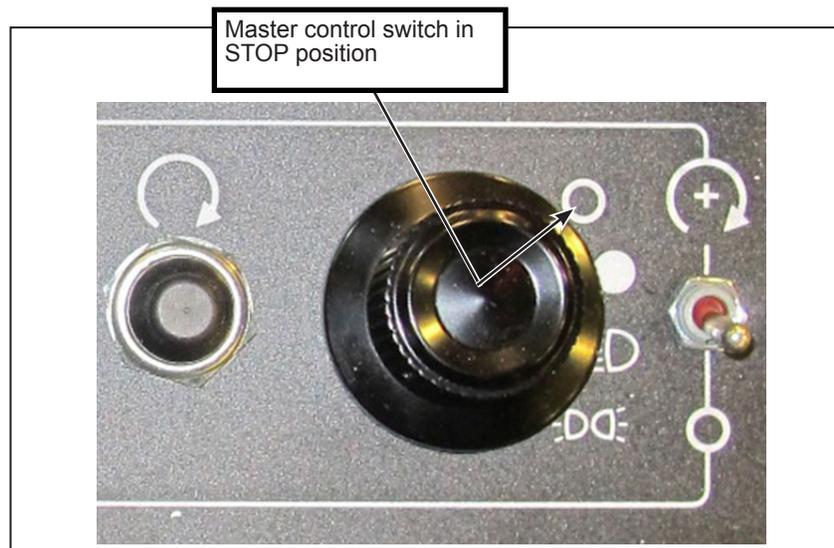


Figure 1 - Master Control Switch in STOP Position

- 1.6. Disconnect the starting circuit on the control box at the rear of the vehicle and place the battery disconnect switch in the OFF position.

Removal of Butt Splices

- 1.7. Open the engine compartment door and locate the engine fan butt spliced connections (see figure 2).

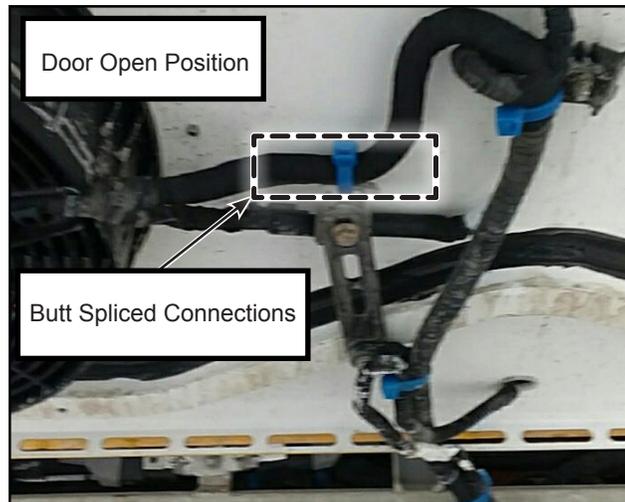


Figure 2 - Engine Fan Butt Spliced Connections

- 1.8. Cut the three blue cable ties (see figure 3).
- 1.9. Remove the Coroplast tape and pull the power wires from the convoluted tubing to expose the butt spliced connections. Then remove the heat shrink tubing over the butt spliced connections using a sharp cutting blade (X-ACTO tool or equivalent) while taking care of not damaging the wires insulation.

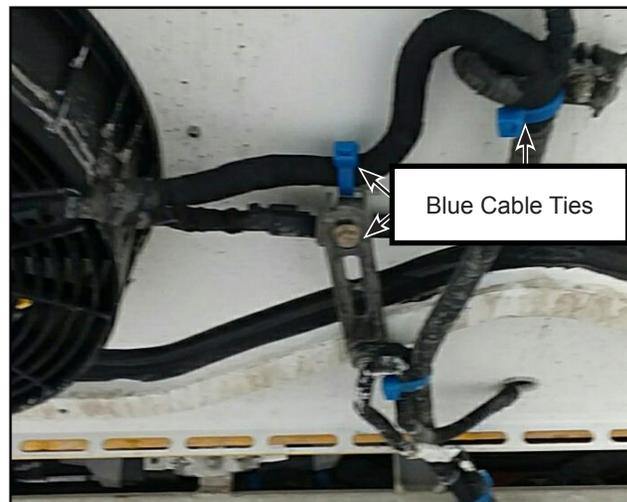


Figure 3 - Cable Ties Location

- 1.10. On both sides (engine fan and harness) cut the butt splices on both power wires (RED and BLACK) keeping the maximum wire length (see figure 4). Cut and remove the excess of convoluted tubing required to expose the wires for HDSCS terminals and connector housings installation. Clean the exposed wires with contact cleaner, if glue or dirt is present.

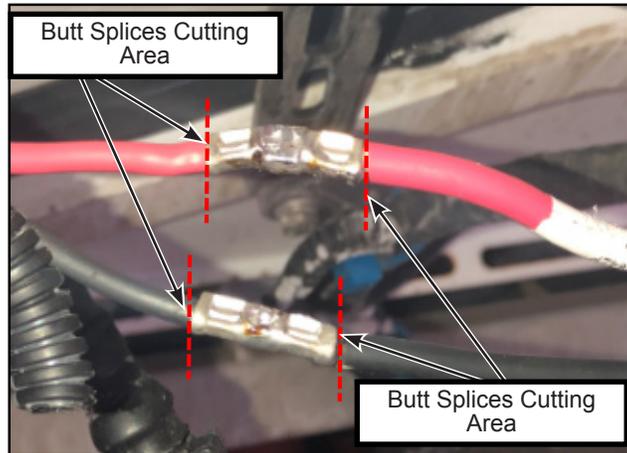


Figure 4 - Butt Splices Removal

Installation of HDSCS Connector at Fan Side

- 1.11. Using the HDSCS crimping tool (see figure 5), crimp the socket terminal PN N97874-01 with the blue seal PN N77237 on both RED and BLACK power wires (see figure 6). Refer to the figure below showing a typical HDSCS terminal crimp example and to Annex 1 for more information about the HDSCS connectors terminal crimping quality guidelines.



Figure 5 - TE Connectivity HDSCS Crimping Hand Tool

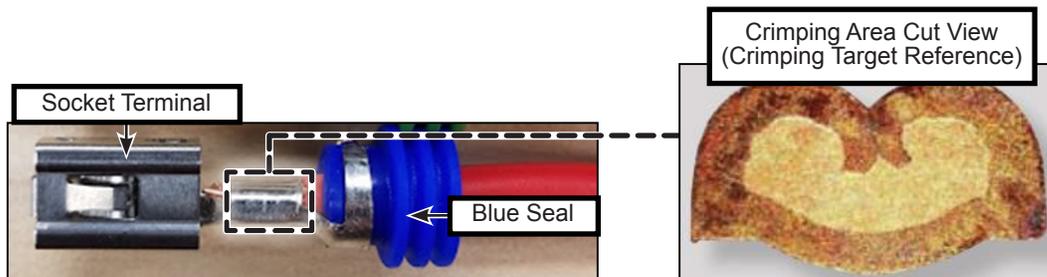


Figure 6 - TE Connectivity HDSCS Socket Terminal and Blue Seal

- 1.12. Insert 1.75 in (total of 3.5 in) of heat shrink tubing PN N82227-04 over both RED and BLACK power wires. Then, using a heat gun, apply the small heat shrink tubing PN N82227-04 over the power wires while leaving a 1/8 in gap with respect to each seal in order to avoid any interference with the terminal wire seals.
- 1.13. Insert 1.5 in of large heat shrink tubing PN N82227-13 over the power wires bundle but do not shrink immediately.
- 1.14. Insert the RED wire terminal into position 1 and the BLACK wire terminal into position 2 of the HDSCS plug connector PN N77235 (see figure 7). Make sure that the yellow secondary lock of the plug connector is completely pressed (to move it from the unlocked to the locked position) after inserting both terminals. Refer to Annex 2 for detailed instructions about terminals insertion and secondary lock.
- 1.15. Using a heat gun, apply the large heat shrink tubing PN N82227-13 starting from the boot adapter of HDSCS plug connector finishing directly over the smaller heat shrink tubes previously installed on the power wires (see figure 7). Make sure to fill any gap between the two power wires with the inner adhesive liner glue (do not apply heatshrink tubing over tape or loom).

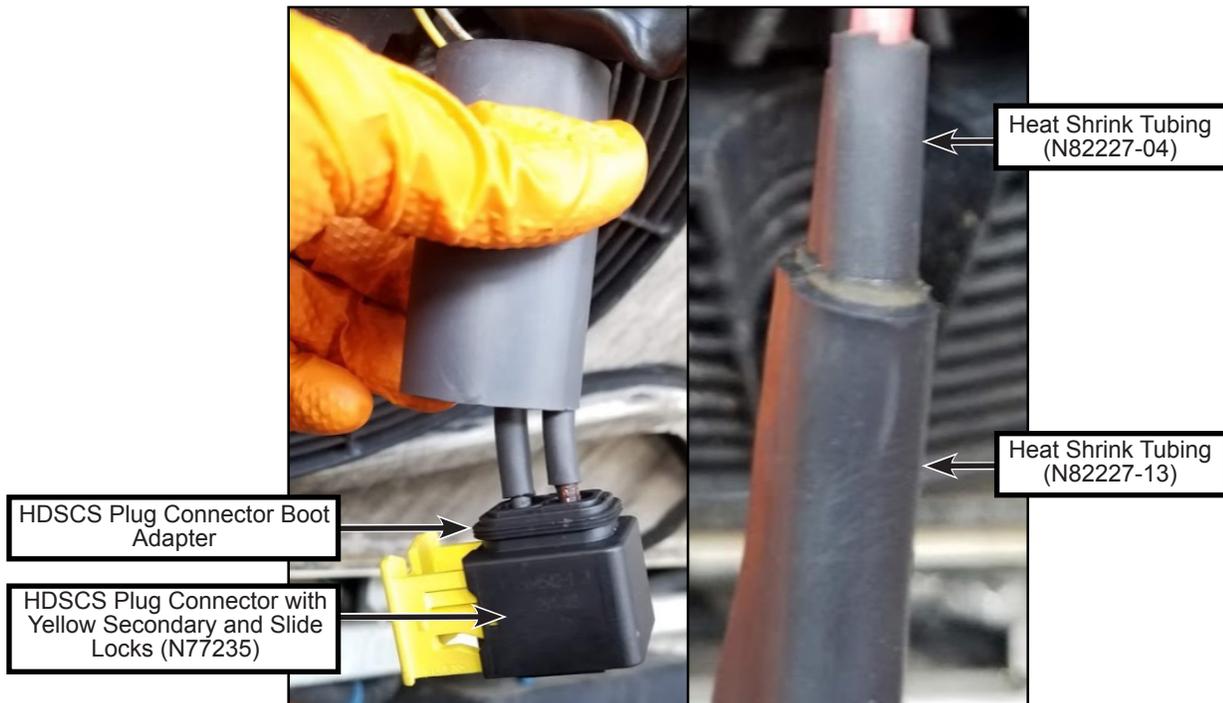


Figure 7 - Heat Shrink Tubing Installation on HDSCS Plug Connector Wiring at Fan Side

- 1.16. Apply Coroplast tape PN N74787 over the exposed wiring / heat shrink tubing of the fan side HDSCS plug.

Installation of HDSCS Connector at Harness Side

- 1.17. Using the HDSCS crimping tool (see figure 5), crimp the pin terminal PN N97874-02 with the green seal PN N77238 on both RED and BLACK power wires (see figure 8). Refer to the figure below showing a typical HDSCS terminal crimp example and to Annex 1 for more information about the HDSCS connectors terminal crimping quality guidelines

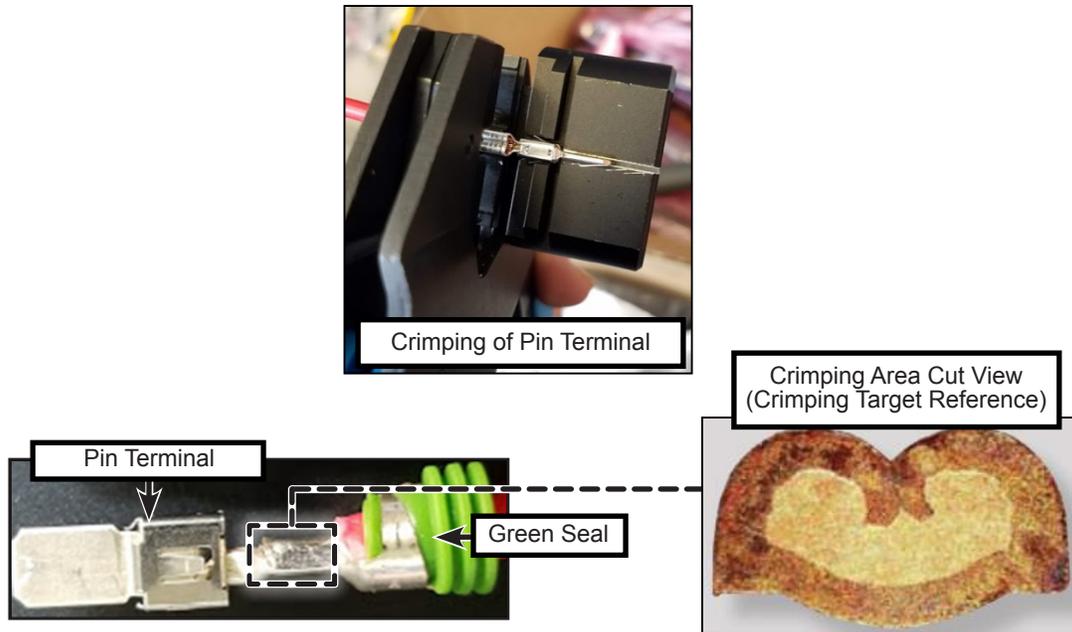


Figure 8 - TE Connectivity HDSCS Pin Terminal and Green Seal

- 1.18. Insert 1.75 in (total of 3.5 in) of heat shrink tubing PN N82227-04 over both RED and BLACK power wires. Then, using a heat gun, apply the small heat shrink tubing PN N82227-04 over the power wires while leaving a 1/8 in gap with respect to each seal in order to avoid any interference with terminal wire seals.
- 1.19. Insert 1.5 in of large heat shrink tubing PN N82227-13 over the power wires bundle but do not shrink immediately.
- 1.20. Insert the RED wire into position 1 and the BLACK wire into position 2 of the HDSCS receptacle connector PN N77185. Make sure that the yellow secondary lock of the receptacle connector is completely pressed (to move it from the unlocked to the locked position) after inserting both terminals (see Figure 9). Refer to Annex 2 for detailed instructions about terminals insertion and secondary lock.

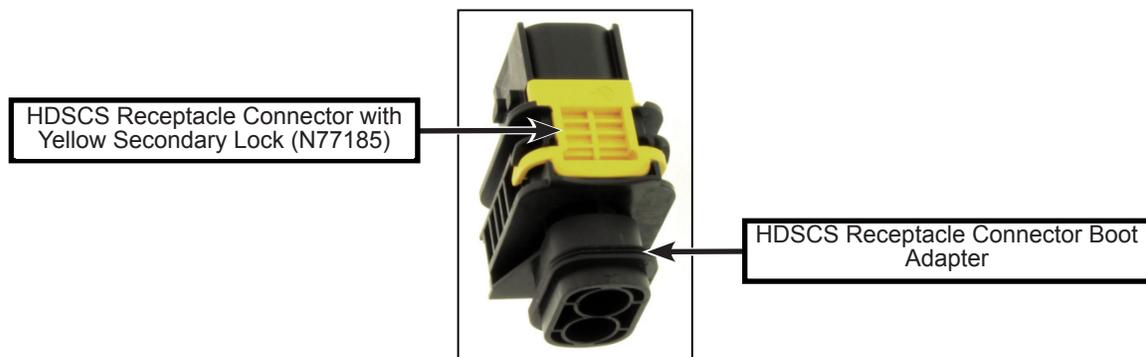


Figure 9 - TE Connectivity HDSCS Receptacle Connector

- 1.21. Using a heat gun, apply the large heat shrink tubing PN N82227-13 starting from the boot adapter of HDSCS receptacle connector finishing directly over the smaller heat shrink tubes previously installed on the power wires (see figure 7). Make sure to fill any gap between the two power wires with the inner adhesive liner glue (do not apply heatshrink tubing over tape or loom).
- 1.22. Apply Coroplast tape PN N74787 over the exposed wiring / heat shrink tubing on the harness side HDSCS receptacle.

Final Preparation

- 1.23. Remove and discard the dual tie-mount installed on the straight bracket and retain the mounting hardware (bolt and nut).
- 1.24. Install the two tie-mounts PN N57040 (1x) and PN N38350 (1x) on the straight bracket using the same mounting hardware (see figure 10).

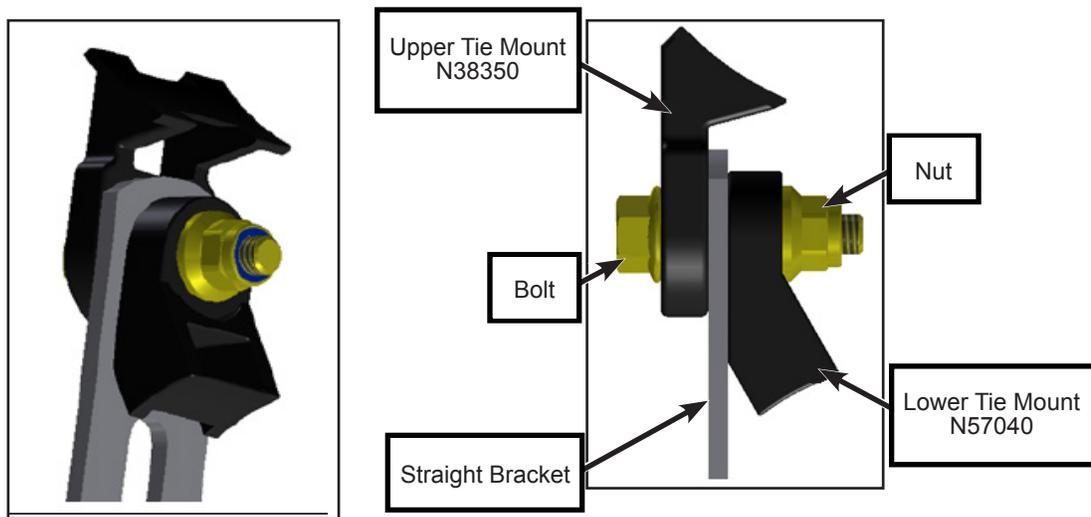


Figure 10 - Tie Mounts Installation

- 1.25. Secure the HDSCS receptacle connector on the harness side with the upper tie-mount (door open) using a blue cable tie PN N67755 (1x) (see figure 11 and 12) and connect it to the HDSCS plug connector on the fan side. While mating both connectors, press the yellow slide lock of the plug connector to latch and lock both connectors together.
- 1.26. Secure the DT receptacle connector with the lower tie-mount (door open) using a blue cable tie PN N67755 (1x) (see figure 11 and 12).

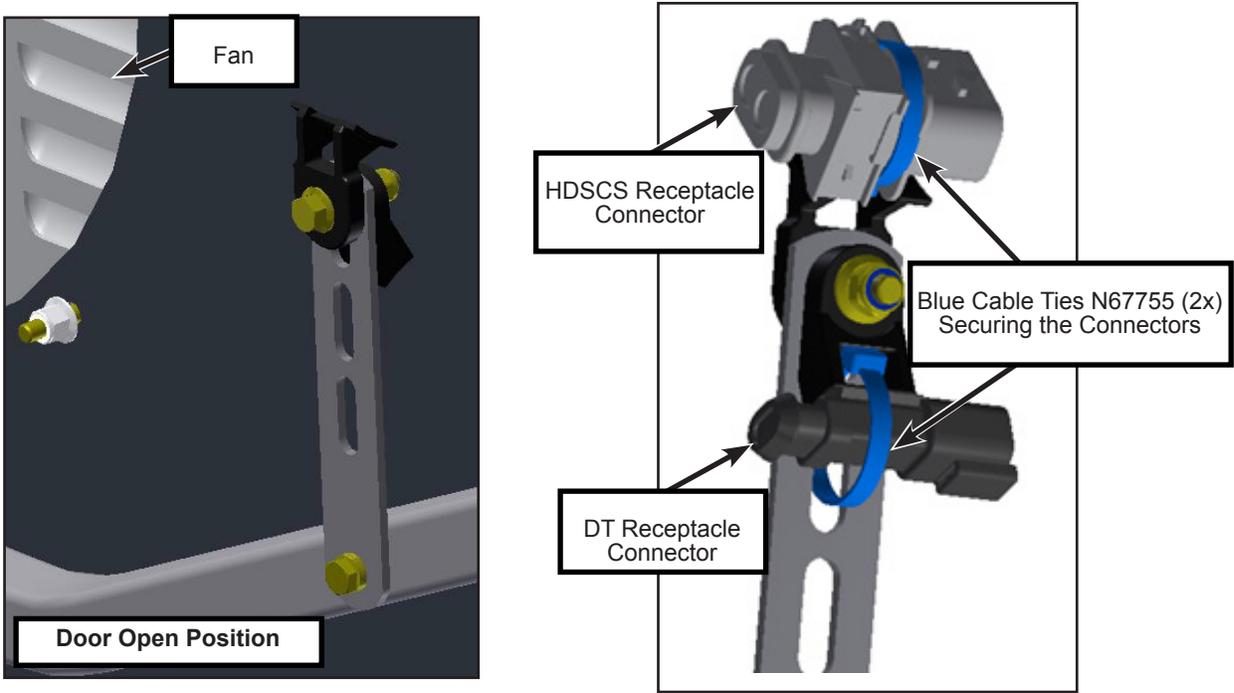


Figure 11 - Securing the HDSCS and DT Receptacle Connectors of the Harness Side

- 1.27. Secure the wiring at harness side with the middle door tie-mount using a blue cable tie PN N56339 (1x) (see figure 12).

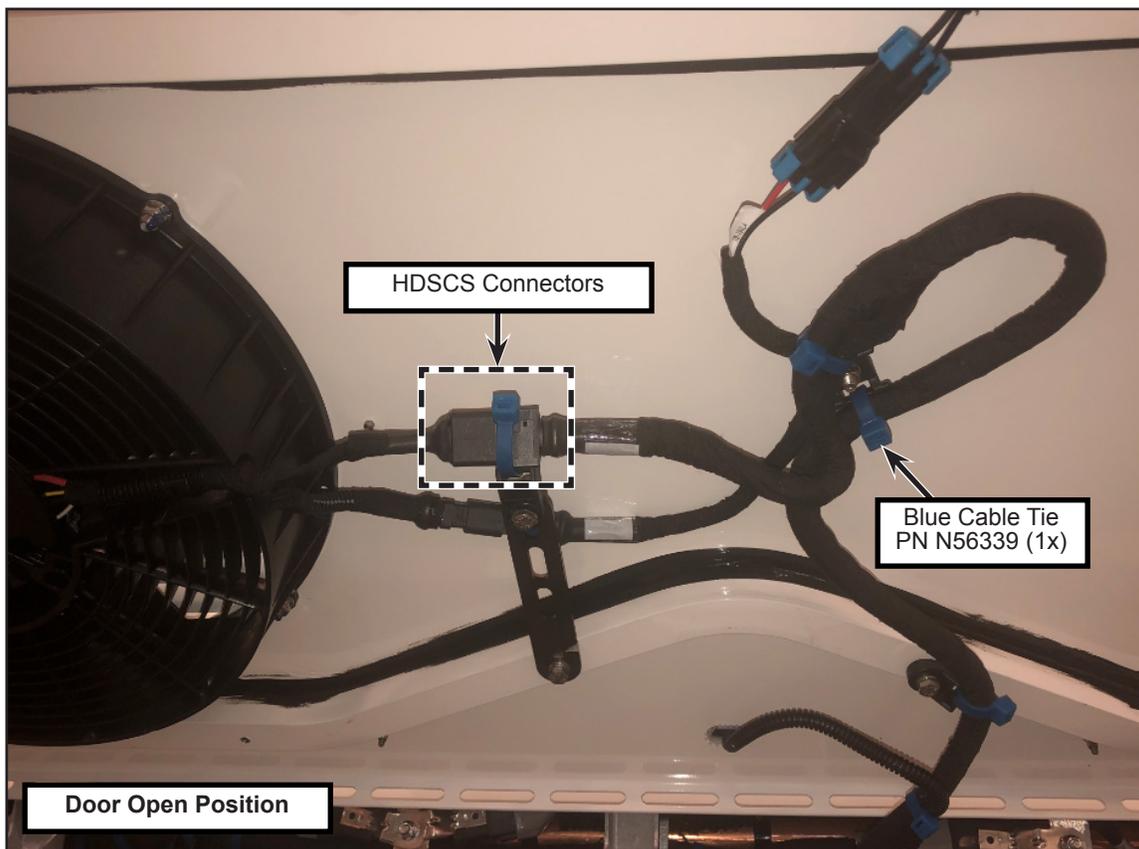


Figure 12 - Final Installation Showing HDSCS Connectors Replacing DTP Connectors

**NOTE**

The HDSCS and DT connectors should be both installed towards the door to avoid any interference with the belt guard.

- 1.28. Test the fan with the final configuration.
 - 1.28.1. Set the Master Control Switch in the START position.
 - 1.28.2. Reconnect the starting circuit on the control box at the rear of the vehicle and place the battery disconnect switch in the ON position.
 - 1.28.3. Start the vehicle and confirm that the engine fan is working.
- 1.29. If no issues are found, bus is ready for service.

Annex 1 - HDSCS Connectors Terminal Crimping Quality Guidelines



NOTE

The following procedure is provided by (TE Connectivity). Nova Bus cannot be held responsible for its content.

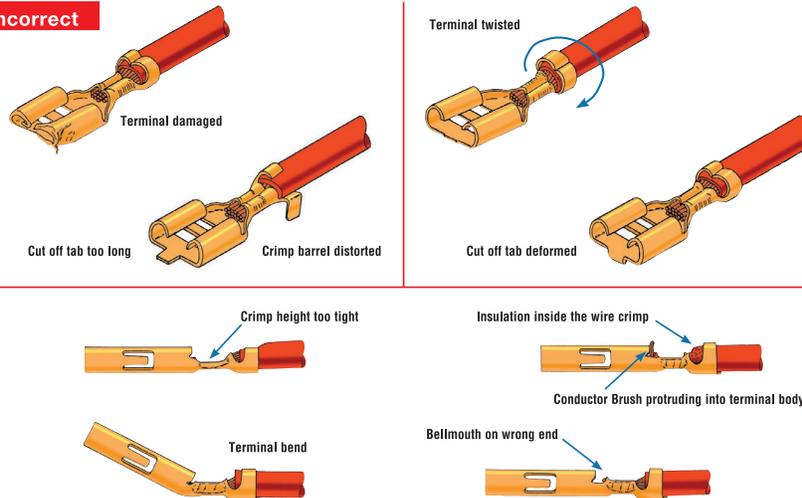


Heavy Duty Sealed Connector Series (HDSCS)

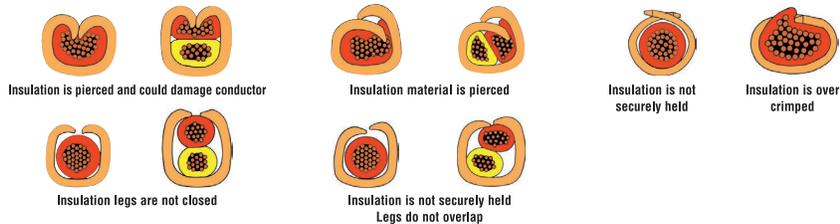
Catalog 1654326-1
Issued 11-2013

Quality Guidelines

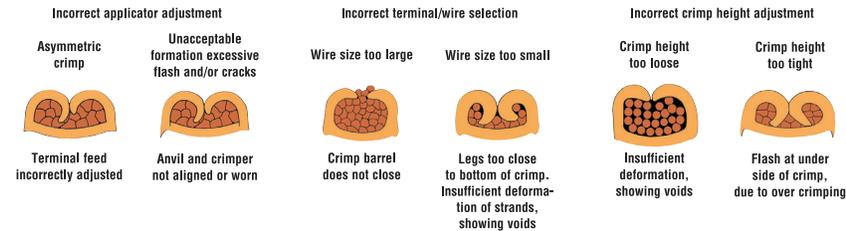
Incorrect



INSULATION CRIMP



WIRE CRIMP



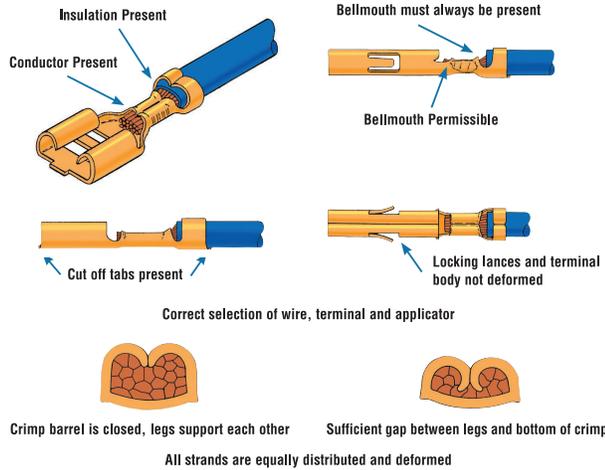


Heavy Duty Sealed Connector Series (HDSCS)

Catalog 1654326-1
Issued 11-2013

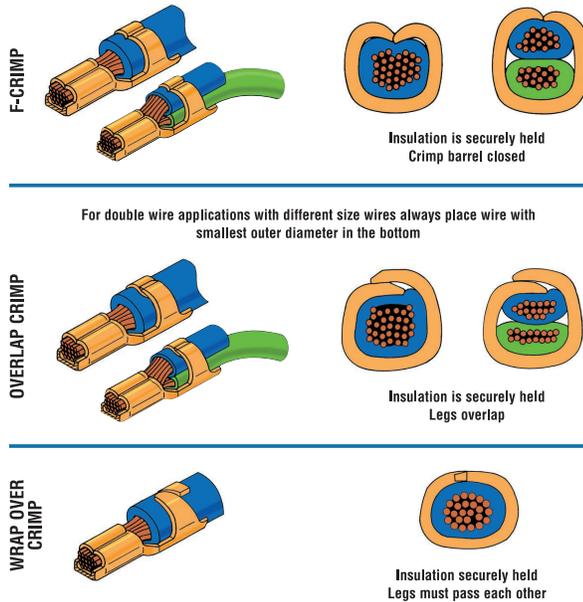
Quality Guidelines

Correct



INSULATION CRIMP

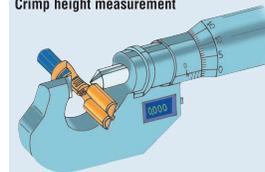
Correct Insulation Diameter, Applicator and Terminal



Test

WIRE CRIMP

Crimp height measurement



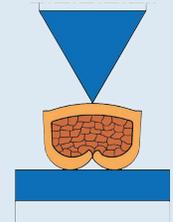
Crimp heights and tolerances

For crimp height tolerances for any given contact, please refer to the relevant application specification.

Examples:

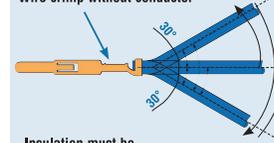
Contact	Part No.	Wire Range (mm ²)	Tolerance (mm)	Application Spec.
MQS	962885 962886	0.2-0.5	±0.03	114-18025
JPT	927775	0.5-1.0	±0.05	114-18050
JPT	927773	1.5-2.5	±0.05	114-18050

Digital Crimp Height Micrometer
(0.001 mm increments) acc. to DIN ISO 9001
Part No. 547203-1



INSULATION CRIMP

Wire crimp without conductor



Insulation must be securely held after bend test

All specifications subject to change. Consult TE Connectivity for latest specifications.

Annex 2 - HDSCS Connectors How-To Instructions



HDSCS CONNECTORS

HOW-TO INSTRUCTIONS

CONTACT INSERTION



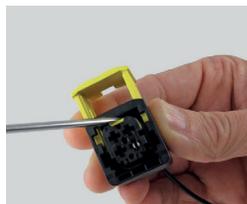
STEP 1:
Grasp crimped contact approximately one inch behind the contact barrel.



STEP 2:
Make sure the contact is in the correct orientation. Verify the integrated secondary lock is in the unlocked position.



STEP 3:
Push contact straight into connector grommet until a click is felt. A slight tug will confirm that it is properly locked in place.



STEP 4:
Push the integrated secondary lock into the locked position with a DT-RT1 or a screwdriver.

CONTACT REMOVAL



STEP 1:
Using a DT-RT1 or a screwdriver, unlock the integrated secondary lock.



STEP 2:
Using the appropriate extraction tool, insert the blades into the contact cavity until they stop.



STEP 3:
Pull contact wire assembly out of connector.

HDSCS CONNECTORS