

REFERENCE:	Nova Bus Manuals
SECTION:	19 Kidde fire suppression system
RS N°:	MQR 7621-472
EFFECTIVE IN PROD.:	2013 FE

APPLICATION DEADLINE: 2015OC30
CLAIM REFERENCE NUMBER: WB-3148

SUBJECT:	Engine compartment ventilation
JUSTIFICATION:	Ventilate the engine compartment

LEVEL	DESCRIPTION	DIRECT CHARGES		TIME
		LABOUR	MATERIAL	
1	Install a ventilation fan in the engine compartment.	Nova Bus	Nova Bus	4 h
2	—	—	—	—

MATERIAL

QTY	PART N°	REV.	DESCRIPTION	REPLACES PART N°
LEVEL 1				
1	N78291		Grill louver	—
1	N80438		Electric fan	
5	N71491		Bolt	
5	N16646		Washer	
6	N44890		Nut	
1	N81876		Sensor support	
1	N78869		Sensor	
1	2394308		Harness bracket	
2	N44881-02		Bolt	
2	N57040		Tie cable mount hi-heat	
2	N56339		Tie wrap	
1	N76776		Electrical harness	
1	N76810	A	Electrical harness	
LEVEL 2				
—	—	—	—	—

REVISION HISTORY

REV.	DATE	CHANGE DESCRIPTION	WRITTEN BY
NR	2014JL15	Initial release	Wilder Galiano
R1	2015JL08	New fan design and installation	Wilder Galiano

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: 2015.07.09 14:45:28 -04'00'

Program the V-BEA system using the program and revision indicated in the client listing. See section 16: **V-BEA** (VOLVO BUS ELECTRONIC ARCHITECTURE) of the Nova LFS maintenance manual for the programming procedure.

MATERIAL

QTY	PART N°	REV.	DESCRIPTION	REPLACES PART N°
LEVEL 1				
1	FB_NY6DH__670 e	1.15B	Program	

Please contact your Nova Bus service representative to order V-bea program.

DISPOSAL OF PARTS

REMOVED PARTS ARE:	DISCARDED	RETAINED	
	—	—	

CLIENT	ORDER	ROAD NUMBER		VIN (2NVY/4RKY...)		QTY
		FROM	TO	FROM	TO	
New York City Transit - New York	L608	8000	8014	L82U6B4000047	L82U0B4000061	15
New York City Transit - New York	L620	8015	8074	L82U2B4000062	L82U7B4000123	60
New York City Transit - New York	L621	8075	8089	L82U9B4000124	L82U9B4000138	15
New York City Transit - New York	L643	5895	5895	S92U1B4000143	S92U1B4000143	1
New York City Transit - New York	L670	5770	5894	S92U4C4500024	S92U3B4000242	125
New York City Transit - New York	L681	5896	5283	S92U2C4500023	S92U9C4500195	122
New York City Transit - New York	L692	5284	5363	S92U3C4500158	S92U3D4500274	80

**WARNING**

Follow your internal safety procedures.

PROCEDURE

ENGINE FAN INSTALLATION

- 1.1. Install a protection blanket in the engine compartment before cutting the hole.
- 1.2. Turn off power switch in battery compartment. Disconnect the negative battery cable.
- 1.3. Install fan jig template. See Figure 2.

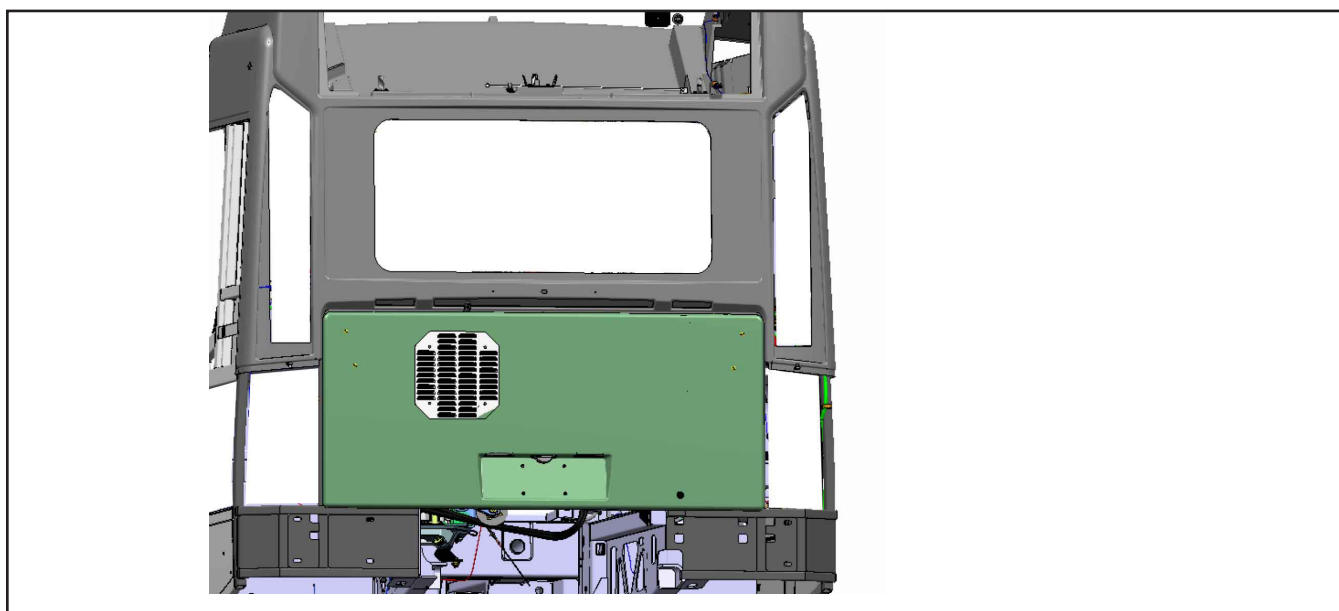


Figure 1 - Locate engine compartment door

- 1.4. Mark a circle and four holes. See Figure 2.
- 1.5. Drill the four holes 7.5 mm diameter near opening.
- 1.6. Drill a hole inside the marked and cut the opening. The use of a jig saw is recommended. See Figure 3.



Figure 2 - Jig template



Figure 3 - Cut opening

- 1.7. Remove sharp edge with sand paper or a file do clean both sides. See Figure 4.



Figure 4 - File opening two sides

- 1.8. Install onto the engine door, the N78291 grill louvers pointing down on the outside, with the N80438 electric fan, on the inside with four N71491 bolts, four N16646 washers and four N44890 nuts. Do not fasten upper curb side nut. See Figure 5.

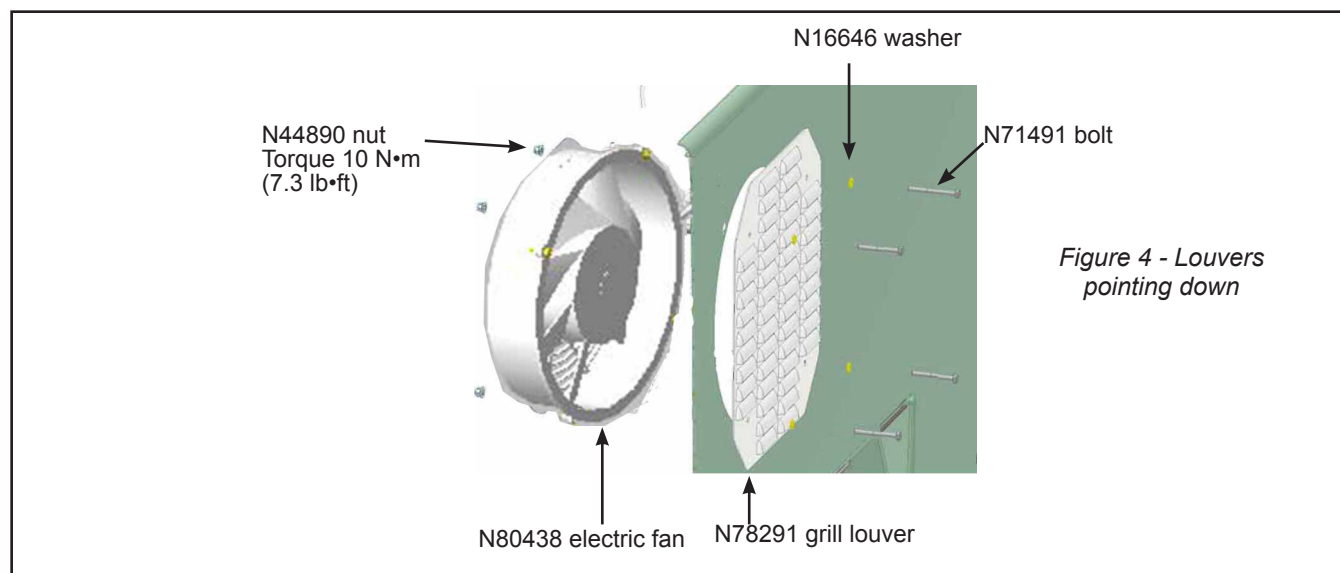


Figure 5 - Engine Fan Assembly

- 1.9. Install onto the upper curb side screw the N57040 cable tie mount with N16646 bolt and N44890 nut. See Figure 6.
- 1.10. Apply thread sealer of type blue loctite
- 1.11. Fasten to the specified torque in Figure 5.
- 1.12. Connect the electric fan connector to the N76776 electric harness connector.

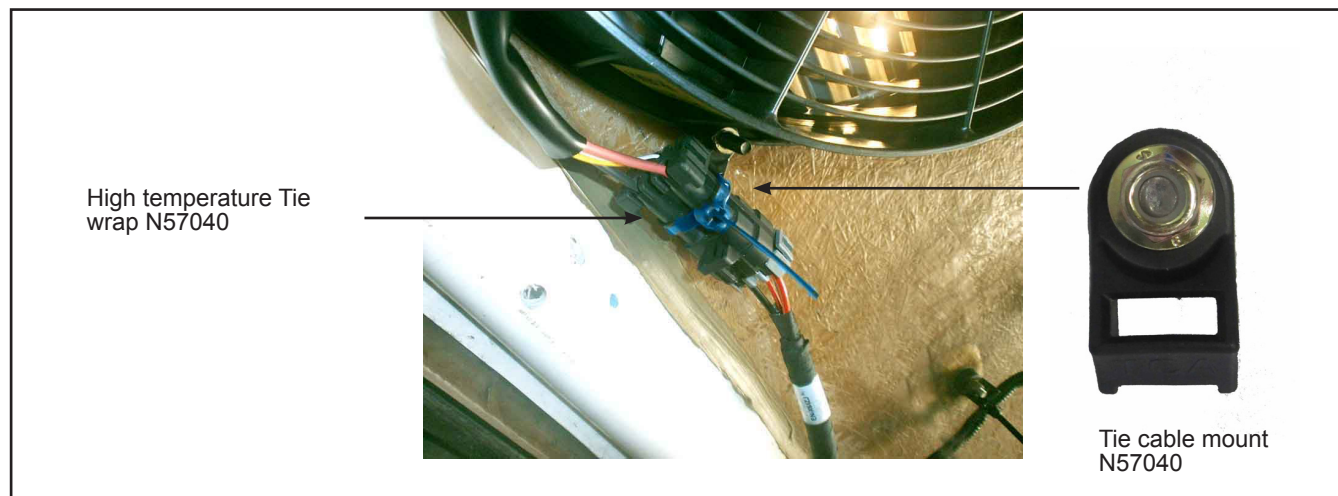
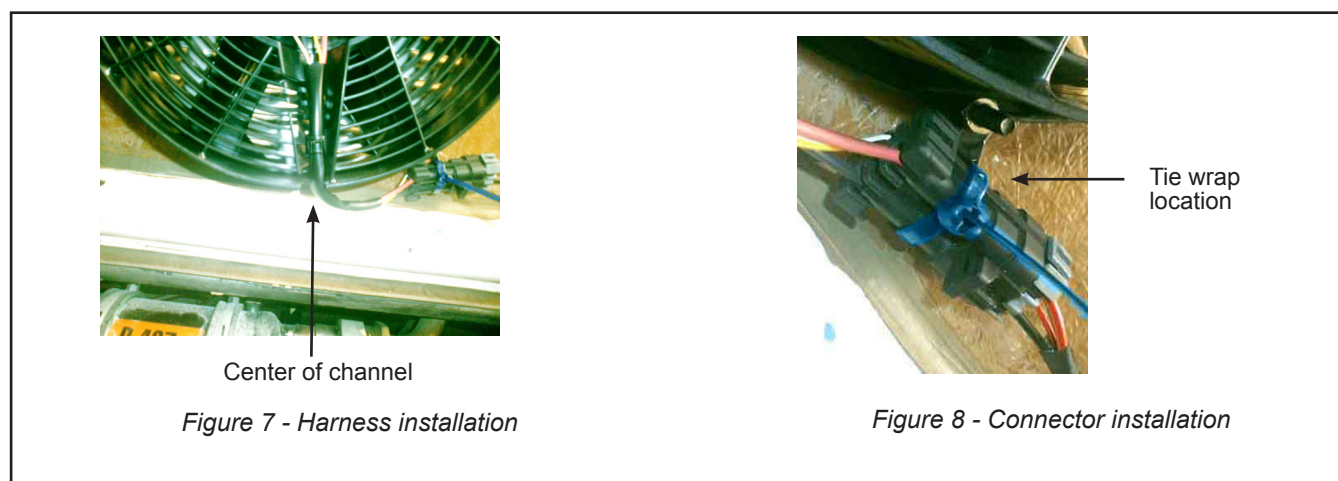


Figure 6 - Tie Cable Mount Hi-heat installation

- 1.13. Attach the fan connector with high temperature tie wrap N57040 to the tie cable mount. See Figure 8.
- 1.14. Ensure that the harness is centered into the built in fan channel and secure with tie wrap N56339. See Figure 7.



- 1.15. Harness routing will be following existing license plate harnesss towards the main engine harness on the curbside IB-X6499A connector. See Figure 9.
- 1.16. Secure the harness to the main harness with high temperature tie wraps.
- 1.17. Continue routing and affixing harness to the main engine harness until temperature sensor location is reached. See Figure 11,12, 15.

N76776 harness

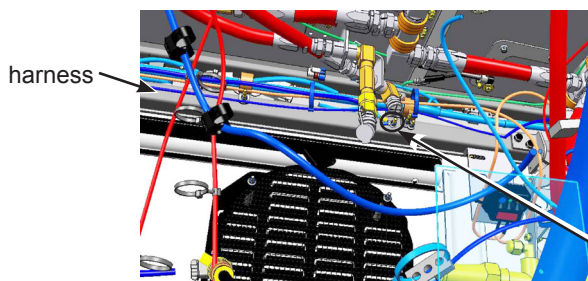


Figure 9 - Routing on Harness 64

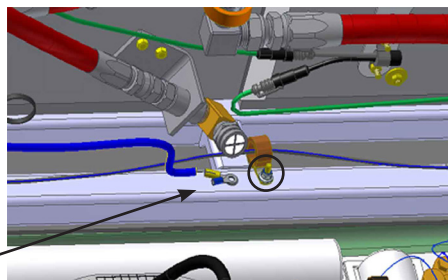


Figure 10 - Routing on Harness 61

N76776 harness

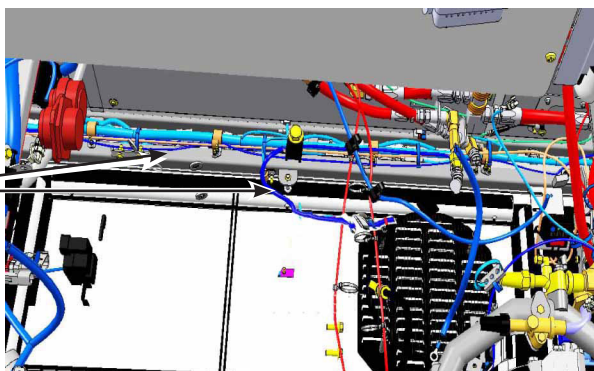


Figure 11 - Routing on Engine Door

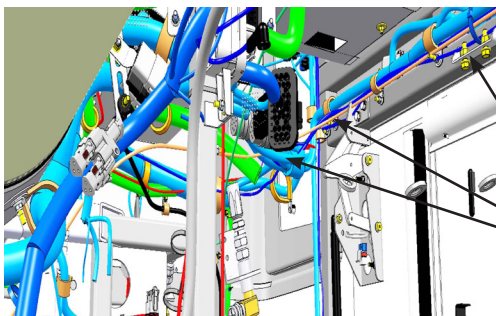


Figure 12 - Routing Near IB panel

N76776
harness

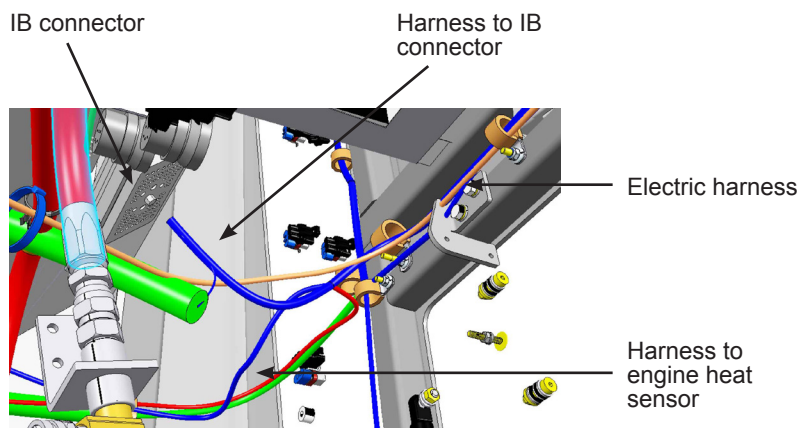


Figure 13 - Routing Near IB panel

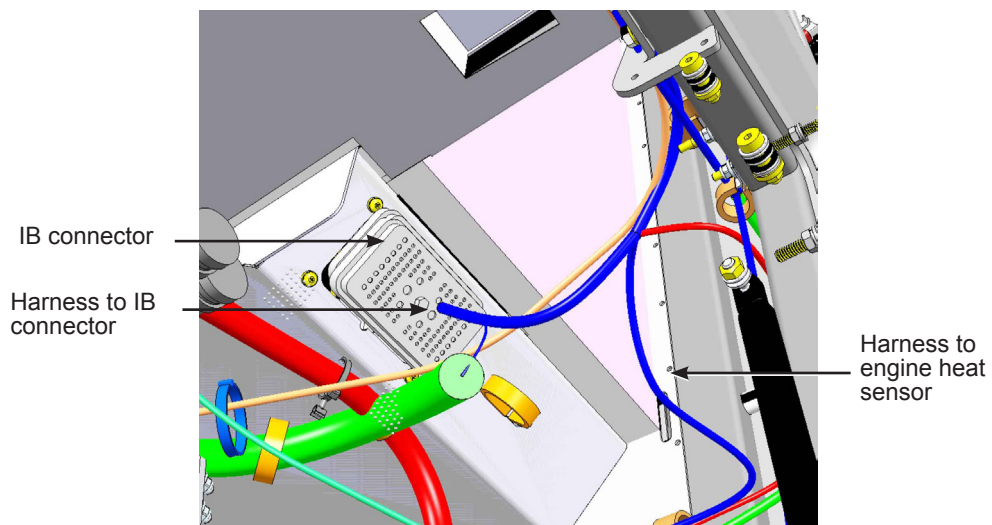


Figure 14 - Routing AT IB panel

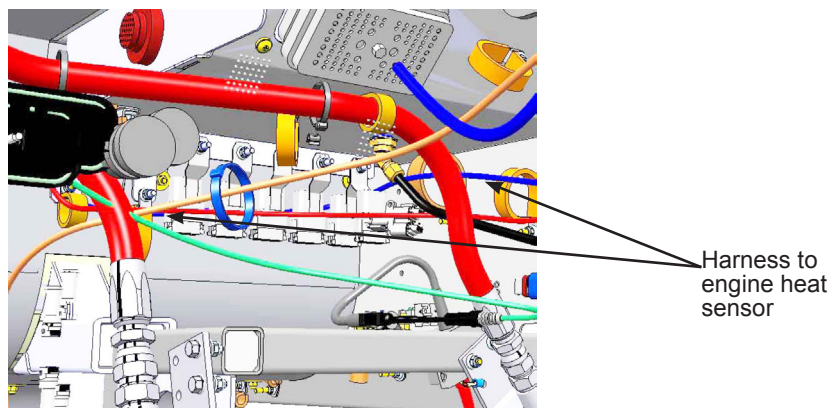


Figure 15 - Routing AT IB panel

- 1.18. Locate and install the 2394308 harness bracket. See Figure 17, 18.

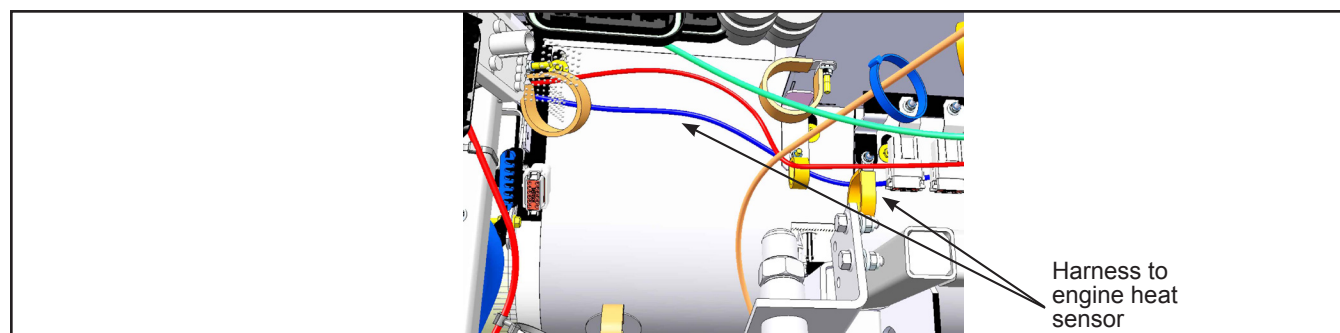


Figure 16 - Routing to engine heat sensor

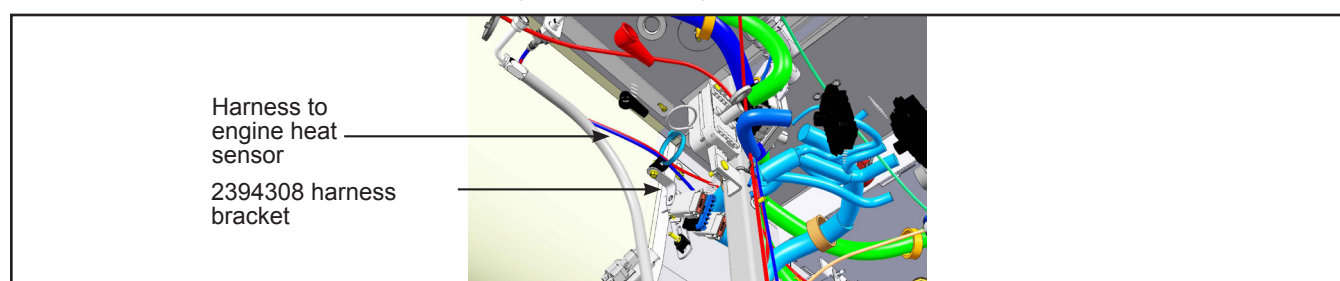


Figure 17 - Routing to engine heat sensor

- 1.19. Install the N57040 tie cable mount onto 2394308 harness bracket with N44881-02 bolt and N44890 nut. See Figure 18.
- 1.20. Affix the electric harness with N56339 tie wrap.

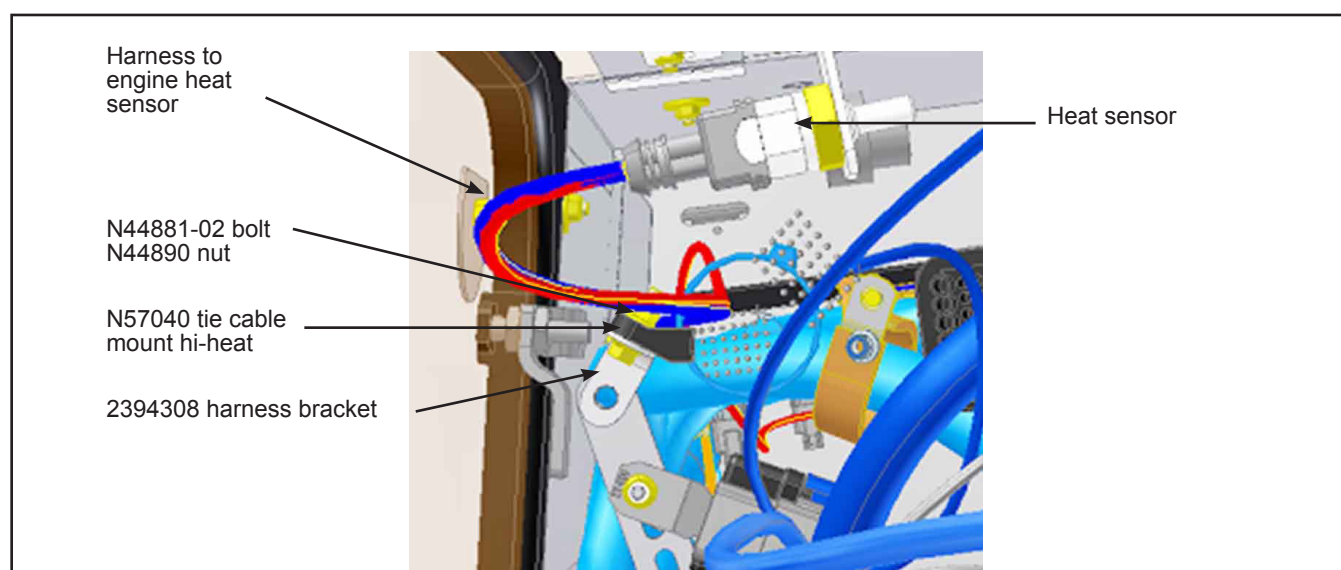


Figure 18 - Connecting to Heat Sensor

- 1.21. Route the electric harness following main harness #64 (61 on some vehicles).
- 1.22. Connect the heat sensor to the electric harness.
- 1.23. Install the electrical kit as shown in the electric wiring circuit.

The sensor support installation can be facilitated if the interior engine access door is use

- 1.24. Locate the two threaded studs to fasten the sensor support. See Figure 19.
- 1.25. Remove and retain existing nuts.
- 1.26. Fasten the N81876 sensor support to the vehicle using existing threaded studs and retained nuts.

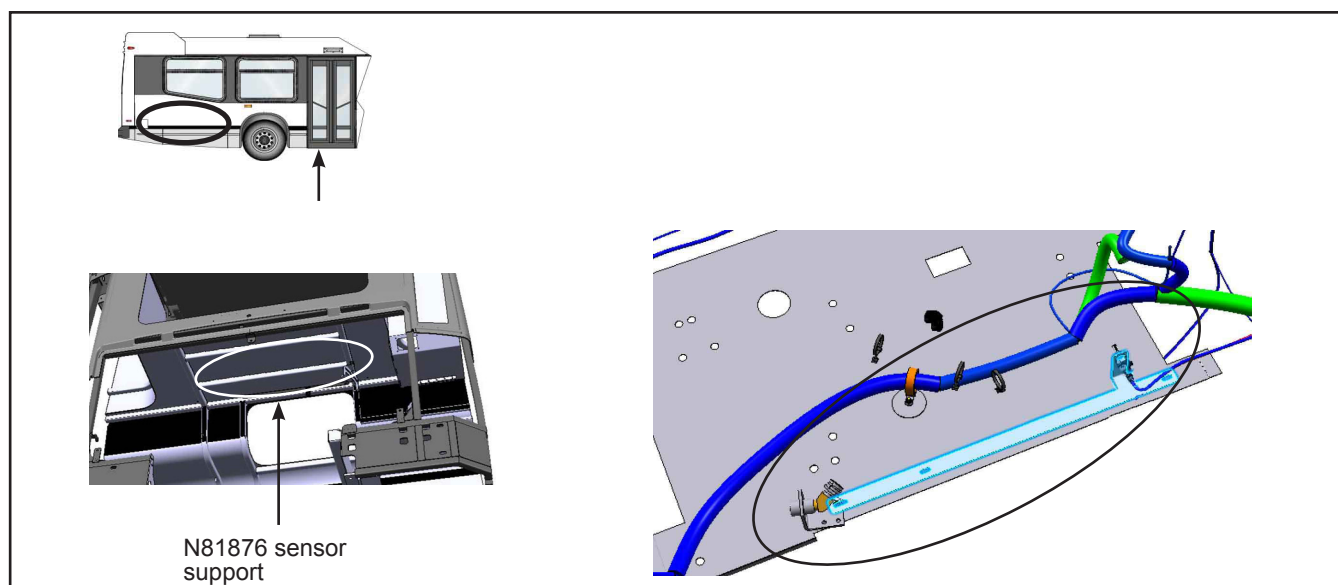


Figure 19 - Locate the Engine Compartment Ceiling

- 1.27. Install the N78869 heat sensor on the sensor support. See Figure 20.

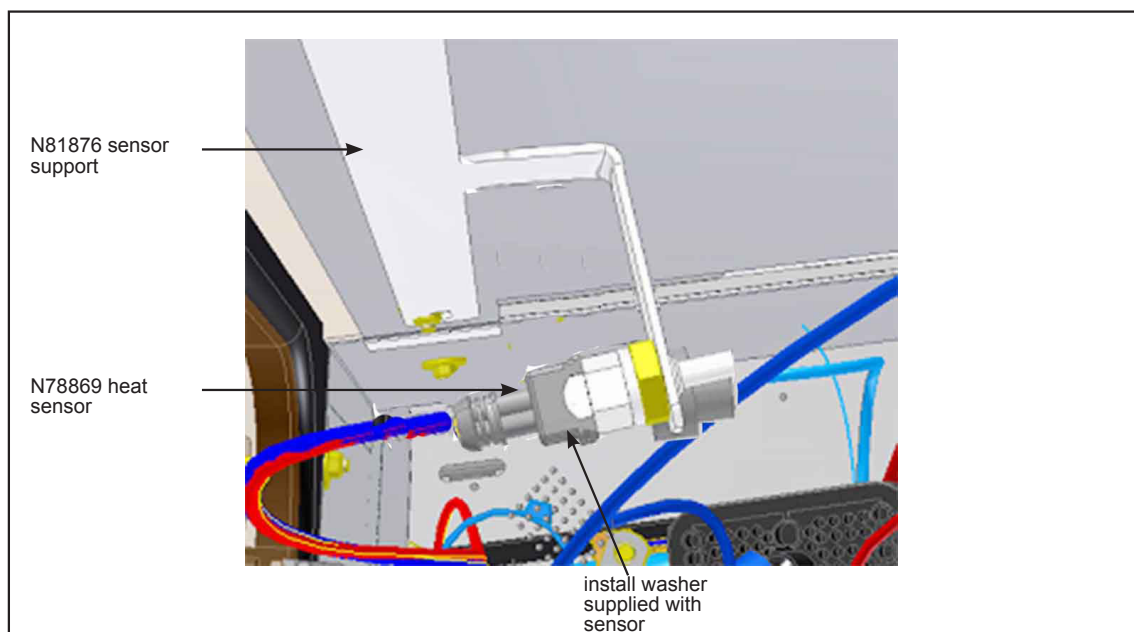


Figure 20 - Heat Sensor Installation

Install electric kits N76776 (engine compartment) and N76810 (IB panel) as shown in the electric wiring circuit. See Figure 21.

open the ib connector IB-X6499A/IBX6199A, keep it open.

LOCATION: ENGINE COMPARTMENT IB CONNECTOR IB -X6499A (IB -X6199A).

- 1.28. Connect one end of wire 64-1820(10 BK) to the vehicle structure threaded stud. See Figure 22 and 23.
- 1.29. Connect the end of wire 64-1816(16 RD) to connector +IB -X6499A (or +IB -6199A) at position 53.
- 1.30. Connect the end of wire 64-1817(16 WH) to connector +IB -X6499A (or +IB -6199A) at position 69.
- 1.31. Connect the end of wire 64-1819(10 RD) to connector +IB -X6499A (or +IB -6199A) at position 49.
- 1.32. Connect the end of wire 64-1821(16 WH) to connector +IB -X6499A (or +IB -6199A) at position 70.
- 1.33. Connect one end of wire 64-1822(16 BK) to the connector +IB -X6499A (or +IB -6199A) at position 67.

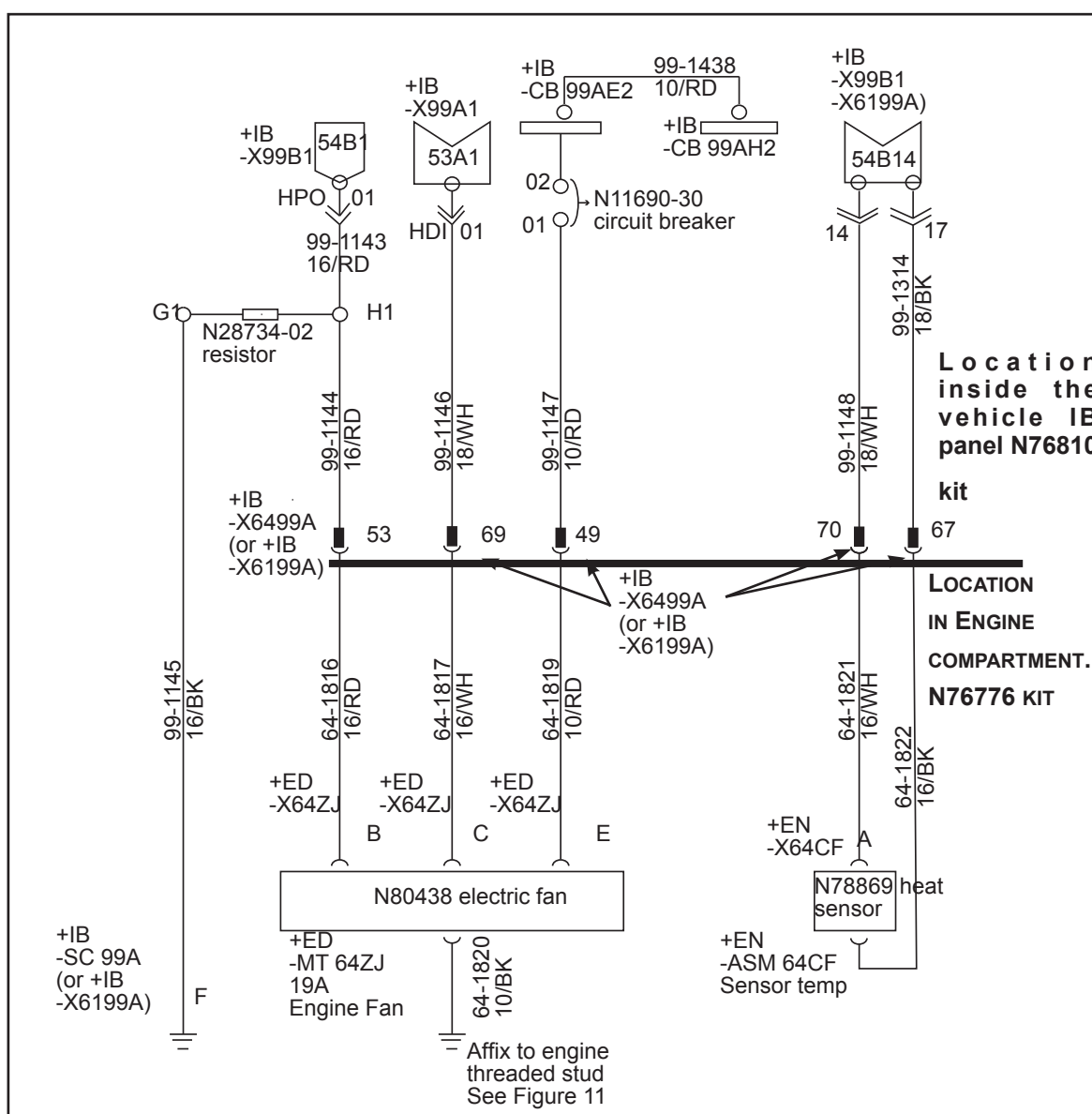


Figure 21 - Heat Sensor Installation

N76776 harness

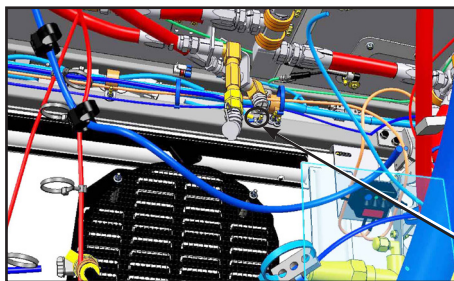


Figure 22 - harness 64 routing

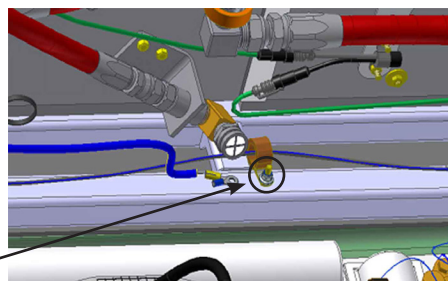


Figure 23 - harness 61 routing

LOCATION: AT THE REAR INSIDE OF THE VEHICLE IN THE IB ELECTRICAL PANEL.

Connector IB-X6499A. Pinning wires. See Figure 21.

- 1.34. Connect one end of wire 99-1144(16 RD) to connector +IB -X6499A (or to +IB -6199A) to position 53.
- 1.35. Connect the other end of wire 99-1146(18 WH) to connector +IB -X6499A (or to +IB -6199A) to position 69.
- 1.36. Connect the other end of wire 99-1314(18 BK) to connector +IB-X 6499A (or +IB -6199A) to position 67.
- 1.37. Connect the other end of wire 99-1148(18 WH) to connector +IB-X 6499A (or to +IB -6199A) to position 70.
- 1.38. Connect the other end of wire 99-1147(18 RD) to connector +IB -X6499A (or to +IB -6199A) to position 49.

Module 54B1. See Figure 24.

- 1.39. Connect the other end of wire 99-1143(16 RD) to module 54 connector +IB -X99B1 HPO to position 01.

Module 53A1. See Figure 24.

- 1.40. Connect one end of wire 99-1146(18 WH) to module 53 connector +IB -X99A1 HDI to position 01.

Module 54b14. See Figure 24.

- 1.41. Connect one end of wire 99-1314 (18 BK) to module 54 connector +IB-X99B1 to position17.

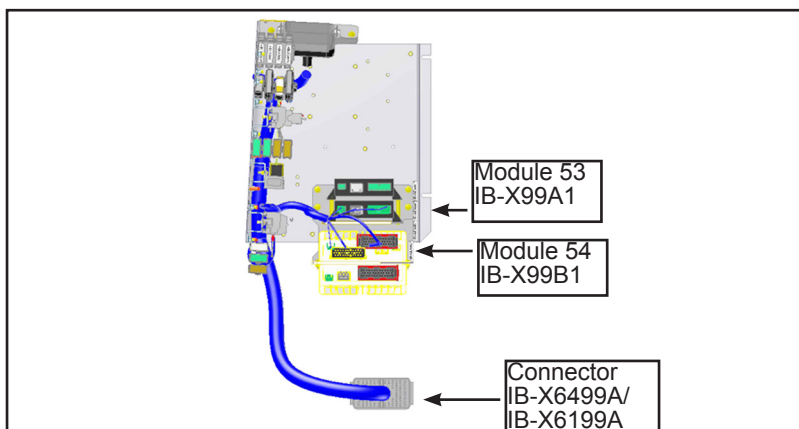


Figure 24 - IB compartment

1.42. Connect one end of wire 99-1148(18 WH) to module 54 connector +IB-X99B1 to position14.

Circuit Breaker See Figure 25 and 27.

1.43. Locate buss bar CB99AA -CB99AE.

1.44. Remove and retain screws.

1.45. remove red wire from Buss bar. Tape terminal ring. Position CB99AC2.

1.46. Move 3 Breakers and wires one space to the right. See Figure 25

1.47. Remove buss bar and brake flush at position AD. See Figure 26

1.48. Before installing the buss bar, install retained screws. do not install the screw at position CB99AC2.

1.49. Affix the cut buss bar.

1.50. Remove tape from terminal ring and affix the red wire at it's original position. CB99AC2.

1.51. Affix one end of wire 99-1438 10 RD to position CB99AH.

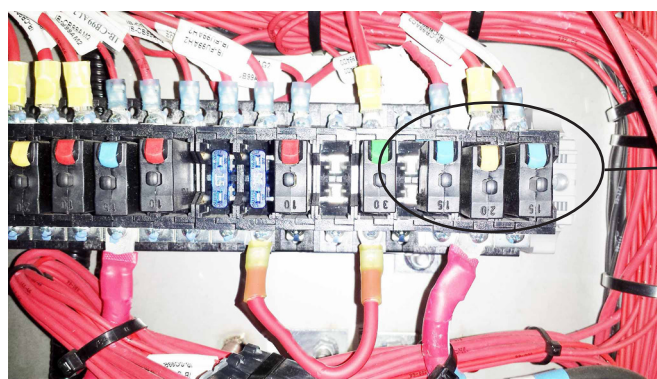


Figure 25 - Circuit Breaker

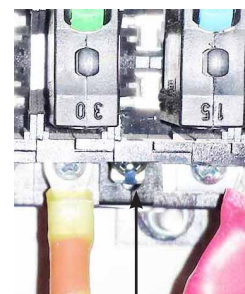


Figure 26 - Remove Buss bar tab at this position

1.52. Affix the other end of wire 99-1438 to the position CB99AE.

1.53. Connect one end of wire 99-1147(18 RD) to +IB -CB99AY2 to position 01.

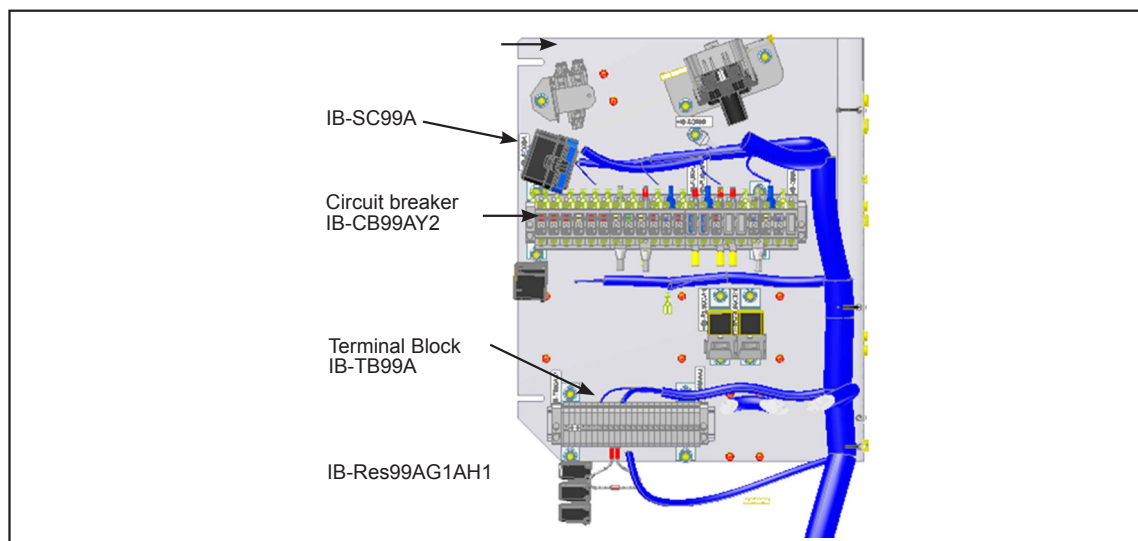


Figure 27 - IB pannel

Terminal block. See Figure 27.

- 1.54. Connect the other end of wire 99-1144(16 RD) to IB-TB 99A position H1.
- 1.55. Connect one end of wire 99-1145(16RD) to IB -TB 99A position G1.
- 1.56. Install the N28734-02 resistor at location IB-TB99A H1 and G1.
- 1.57. Connect one end of wire 99-1143(16 RD) to IB-TB99A position H1.

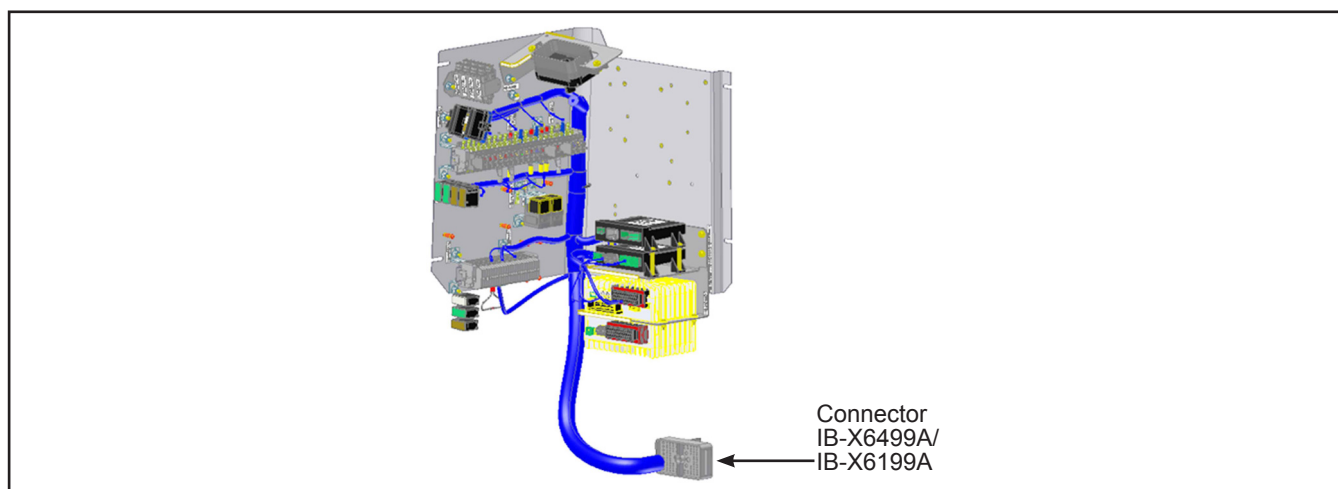


Figure 28 - IB compartment

Splice connector or Connector. See Figure 27.

- 1.58. Connect the other end of wire 99-1145(16RD) to +IB -SC99A position F or to position +IB -X6199A.

Circuit Breaker

- 1.59. Install the N11690-30 circuit breaker at location +IB -CB99AE2 to position 01 and 02.
- 1.60. Route the wires through the existing harness. Use high heat tie wraps to secure the wires.
- 1.61. Turn on power switch in battery compartment. Connect the negative battery cable.
- 1.62. when the vehicle is started, the fan will turn for 10 sec.

Install the program

Program the V-BEA system using the program and revision indicated in the client listing. See section 16: **V-BEA** (VOLVO BUS ELECTRONIC ARCHITECTURE) of the Nova LFS maintenance manual for the programming procedure.

Validation of fan functions

- 1.63. Raise sensor temperature above 135 ° F, the use of a heat gun and thermometer gun is suggested.
- 1.64. Under this conditions fan will turn at low speed (20%).
- 1.65. Raise temperature to 150° F, the engine fan will function at maximum speed (100%).
- 1.66. The vehicle may be returned to service.

Conditions of fan operation.**At ambient cold temperature Below 55° F (13° C). Engine running.**

- 1.67. Engine compartment temperature below 135° F (57° C), the fan does not operate.
- 1.68. Engine compartment temperature at 135° F (57° C) the fan operates at 20% rpm.
- 1.69. Engine compartment temperature between 135° F (57° C) and 150° F (65° C) . the speed of operation will increase gradually.
- 1.70. With an engine compartment temperature at and above 150° F the fan speed will be operating at maximum speed. 100%

- 1.71. Use cold air to the ambient sensor for temperature below 55° F (13° C) .
- 1.72. Use heat gun on the engine compartment sensor to raise temp to 95° F and 150° F,

At ambient hot temperature, above 55° F (13° C). Engine running

- 1.73. Engine compartment temperature below 95° F the fan does not operate.
- 1.74. Engine compartment temperature at 95° F the fan operates at 20% rpm.
- 1.75. Engine compartment temperature between 95° F and 150° F. the speed of operation will increase gradually.
- 1.76. With an engine compartment temperature at and above 150° F the fan speed will be operating at maximum speed. 100% RPM

- 1.77. Use heat gun to raise temperature to 135° F and 150° F.
- 1.78. Read % of fan speed on the multiplex at two temp. At temperature 135° F, the fan operates at 20% rpm. At 150° F, the fan operates at 100% rpm.

Master run switch on an engine is not running

- 1.79. Engine compartment above 110° F (43° C), the fan operates at minimum speed, 20% RPM
- 1.80. Engine compartment temperature below 110° F, the fan does not operate.
- 1.81. Read % of fan speed on the multiplex at two temp.❖

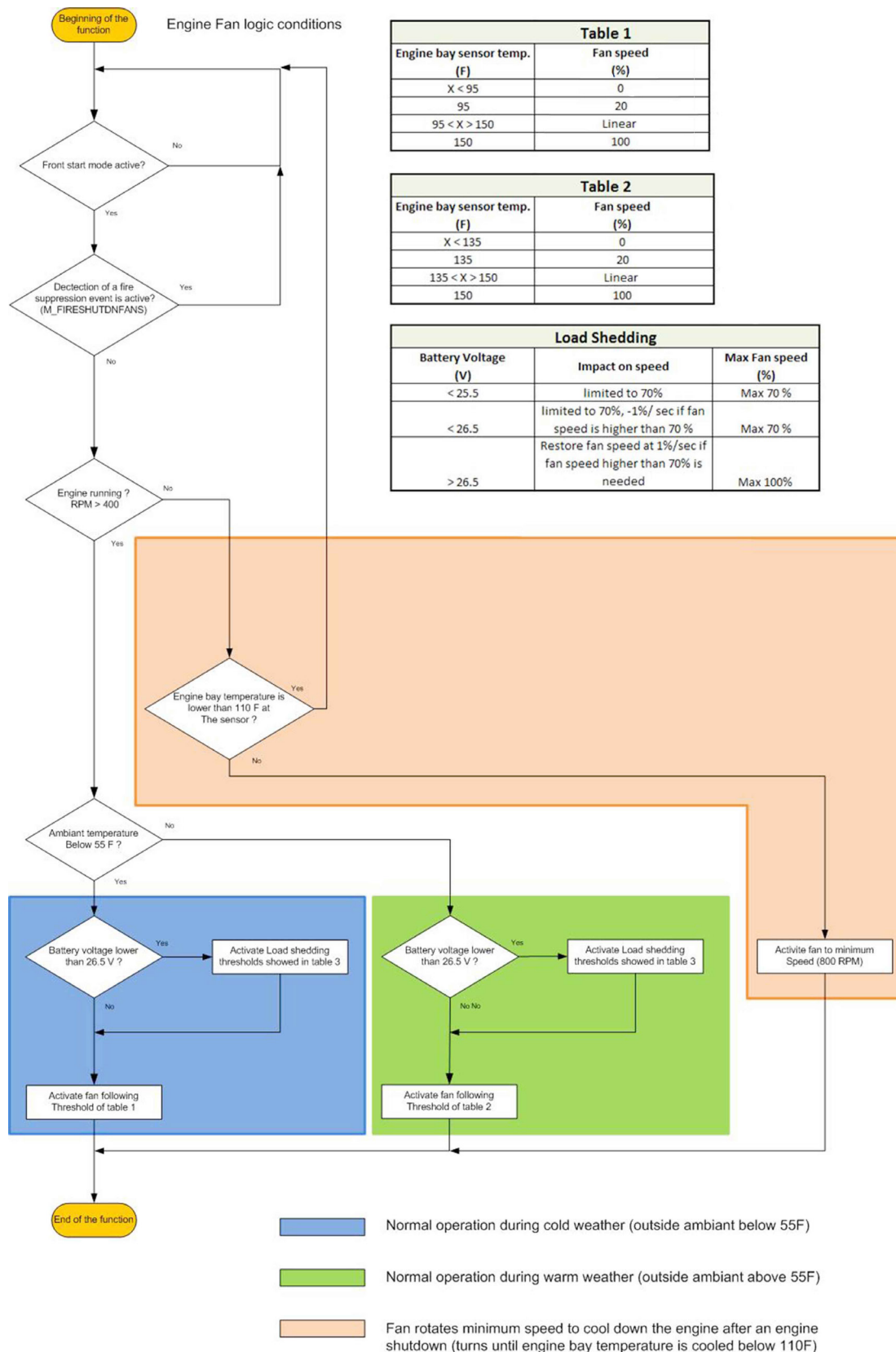


Figure 29 - Logic of Fan Operation