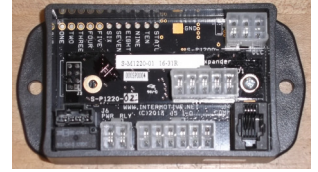


NFPA/Seat Belt Monitor NFPA501-B

2011-2016 Ford F250-550 Series Crew Cab 6.2L, 6.7L, 6.8L



Introduction

The NFPA501-B system provides both seat occupant sensing and belt buckle sensing along with replacement red seat belts for the driver, passenger, and rear seat positions. This allows compliance with NFPA1901 requirements. In addition, the NFPA501-B system provides a J1939 data stream which includes seat/buckle sensor and optical warning information for use with an optional Vehicle Data Recorder (VDR).

A dash mounted LED panel indicates which seats have an occupant, and whether or not the seat belt is properly buckled.

A seat "violation" occurs whenever the vehicle is driven when an occupant does not have the seat belt buckled. A violation is visually indicated by a Red LED on the dash panel, and audibly indicated by a beeper. The audible alarm sounds only when both the Park Brake is released **and** the vehicle is shifted out of Park with any seat violation. Audible violation alarms can be silenced by pushing the yellow silence button on the dash display.

The system will detect when a seat belt is buckled before an occupant is seated, and this will indicate a seat violation.

VDR Interface

Seat occupant status, belt buckle status, and an optional optical warning system status (roof mounted emergency flashing lights) are provided on the J1939 data stream for an optional Vehicle Data Recorder.

Installation Instructions

Disconnect vehicle battery before proceeding with the installation.



WARNING
Disconnect the battery to prevent setting a check engine light.

IMPORTANT—READ BEFORE INSTALLATION

It is the installer's responsibility to route and secure all wiring harnesses where they cannot be damaged by sharp objects, mechanical moving parts and high heat sources. Failure to do so could result in damage to the system or vehicle and create possible safety concerns for the operator and passengers. Avoid placing the module where it could encounter strong magnetic fields from high current cabling connected to motors, solenoids, etc. Avoid radio frequency energy from antennas or inverters next to the module. Avoid high voltage spikes in vehicle wiring by always using diode clamped relays when installing upfitter circuits.

NFPA501 Module

Remove the lower dash panel below the steering column area and find a suitable location to mount the NFPA501-B module. Locate the module in an area away from any external heat sources (engine heat, heater ducts, etc.). Do not mount the module until all post installation testing is complete and wire harnesses are routed and secure.

Data Link Harness (6-pin connector)

1. Locate the vehicle OBDII Data Link Connector. It will be mounted below the lower left dash panel.
2. Remove the mounting screws for the OBDII connector. Plug the red connector from the Data Link Harness into the vehicle's OBDII connector. Ensure the connection is fully seated and secured with the supplied wire tie.
3. Mount the black connector from the Data Link Harness in the former location of the vehicle's OBDII connector.
4. Leave the 6-pin "Data Link" connector unplugged from the 6-pin connector on the NFPA501-B module.

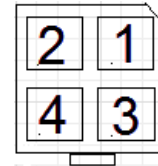


NFPA501-B Translator Connection Output

The NFPA501-B Data Link Harness has a 4-Pin White connector that provides J1939 CAN 1 High and CAN 1 Low signals for connecting the VDR J1939 inputs.

Pin 1 Green Wire - J1939 CAN 1 High Pin 2 Red Wire - Battery Voltage

Pin 3 Blue Wire - J1939 CAN 1 Low Pin 4 Gray Wire - Ground



Optional Optical Warning Input

The 12 Pin connector Pin #3 Gray wire can be wired to a 12 volt emergency vehicle warning light signal. The NFPA501 inserts the status of this signal into the J1939 data stream for access by a VDR. This is the preferred method of connecting this signal when using the Fire Research Corp (FRC) VDR. Some VDR's (including FRC) also have a discrete wire input for the optical warning signal. Either method of connection is acceptable. If a VDR is not being used, this wire does not need to be connected.

Vehicle Data Recorder Installation

Install the Vehicle Data Recorder per the manufacturer's instructions, connecting the Vehicle Data Recorder harness (J1939 signals and power) to the 4 pin Data Link Harness connector (see picture above).

Seatbelt Replacement

The NFPA501 kit includes replacement Red seatbelts which are compatible with the stock OEM seats. These may not be appropriate for use with other seats, such as air ride seats. The following instructions are a guide to replacing the OEM seatbelts with the red ones in this kit. Per Ford Motor Co., front seat mounting bolts must be replaced when removed (not included in kit). Re-torque all mounting bolts to factory specifications.

	Driver	Front Center Passenger	Front Passenger	Rear Left Passenger	Rear Center Passenger	Rear Right Passenger
Belt Assembly	40Nm (30ft-lbs)	N/A	40Nm (30ft-lbs)	40Nm (30ft-lbs)	30Nm (22ft-lbs)	40Nm (30ft-lbs)
Buckle Assembly	N/A	N/A	35Nm (26ft-lbs)	40Nm (30ft-lbs)	40Nm (30ft-lbs)	40Nm (30ft-lbs)

Seatbelt Replacement (continued)

- Remove the driver's and passenger's front seats.
- Remove the front left scuff plate and rear left scuff plate. (Figure 1, detail 2 and 4)
- Remove the left B-pillar trim panel covering the front left seatbelt retractor. (Figure 1, detail 9)
- Remove the driver's safety belt retractor and pretension bolt. (Figure 1, detail 12)
- Remove the upper D-ring bolt. (Figure 1, detail 7)
- Remove the safety belt anchor bolt that secures the driver's (left) seatbelt. (Figure 1, detail 13).
- Replace it with the NFPA Red front left seatbelt. Torque these bolts to 40Nm (**30ft-lbs**).
- Reinstall the left B-pillar trim panels. Remove the right B-pillar trim panel covering the front right seatbelt retractor. (Figure 1, detail 9).
- Remove the passenger's safety belt retractor and pretension bolt. (Figure 1, detail 12)
- Remove the upper D-ring bolt. (Figure 1, detail 7)
- Remove the safety belt anchor bolt that secures the passenger's (right) seatbelt. (Figure 1, detail 13)
- Replace it with the NFPA red front right seatbelt. Torque these bolts to 40Nm (**30ft-lbs**).
- Reinstall the right B-pillar trim panels.
- Leave the front driver's (left) buckle in place. Remove the front passenger's (right) buckle.
- Replace it with the NFPA red sensor buckle. Torque this bolt to 35Nm (**26ft-lbs**).
- Remove the rear seat for easier seat sensor installation.
- Remove the rear left lower C-pillar trim panel covering the rear left seatbelt retractor. (Figure 2, detail 9)
- Remove the left rear safety belt retractor and pretension bolt. (Figure 2, detail 3)
- Remove the upper D-ring bolt. (Figure 2, detail 8)
- Remove the safety belt anchor bolt that secures the rear left seatbelt. (Figure 2, detail 7)
- Replace it with the NFPA red rear left seatbelt. Torque these bolts to 40Nm (**30ft-lbs**).
- Reinstall the rear left C-pillar trim panel.
- Remove the rear right lower C-pillar trim panel covering the rear right seatbelt retractor. (Figure 2, detail 9)
- Remove the right rear safety belt retractor and pretension bolt. (Figure 2, detail 3)
- Remove the upper D-ring bolt. (Figure 2, detail 8)
- Remove the safety belt anchor bolt that secures the rear right seatbelt. (Figure 2, detail 7)
- Replace it with the NFPA red rear right seatbelt. Torque these bolts to 40Nm (**30ft-lbs**).

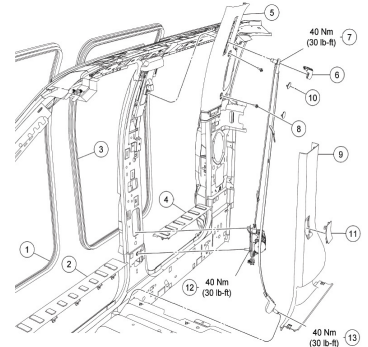


Figure #1

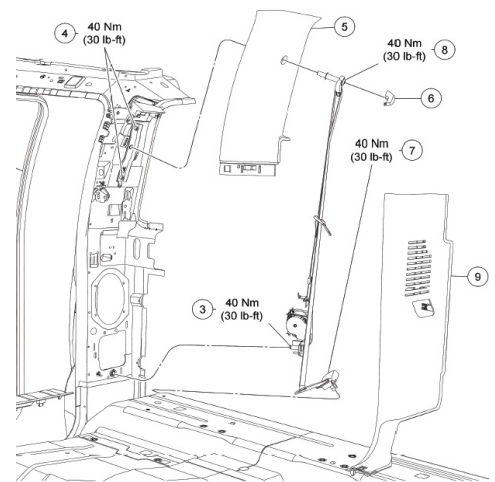


Figure #2

Seatbelt Replacement (continued)

- Reinstall the rear right C-pillar trim panel.
- Release the rear center seatbelt anchor by pushing in the latch using a straightened paper clip. (Figure 3)
- Remove the rear center retractor cover covering the rear center seatbelt retractor. (Figure 4, detail 4)
- Remove the rear center safety belt retractor and pretension bolt. (Figure 4, detail 3)
- Remove the upper D-ring nuts that secures the rear center seatbelt. (Figure 4, detail 1)
- Replace it with the NFPA Red rear center seatbelt. Torque these nuts and bolts to 30Nm (**22ft-lbs**).
- Reinstall the rear center retractor cover.
- Remove rear buckles. (Figure 5, detail 1 and 3)
- Replace with the NFPA Red sensor buckles. Torque bolts to 40Nm (**30 ft-lbs**).
- Reattach center seatbelt anchor end (Figure 4, detail 6) into buckle (Figure 5, detail 3, left buckle).

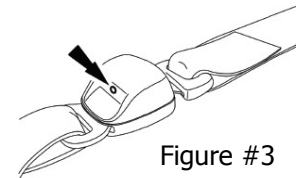


Figure #3

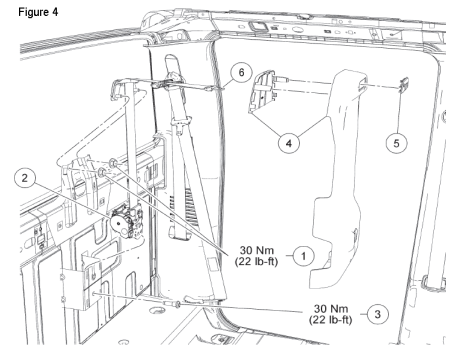


Figure #4

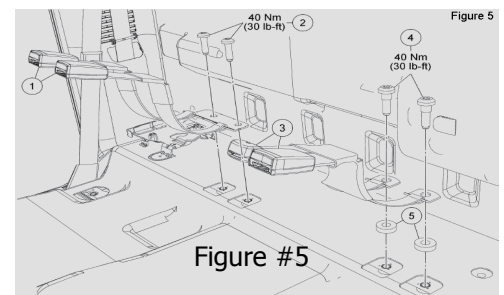


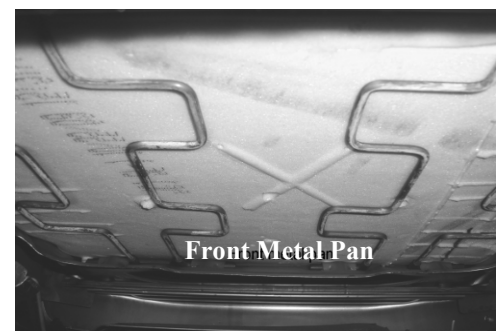
Figure #5

Seat Sensor Installation

Caution—some seats may have integral Supplemental Restraint System airbags incorporated into the seat. Extreme caution must be taken to prevent air bag activation. Do not probe any under seat wiring with an energized test probe. Air bag connectors are usually yellow. Use caution when dealing with these harnesses. Great bodily harm and expense can result from an inadvertent air bag deployment.

Front Seat

- Invert front seats to expose serpentine springs and foam.
- Remove springs from their retainers and lay forward (Figure 5a).
- Place the 8.0 inch by 5.5 inch seat sensor and protective plastic shield between the seat springs and foam, with the plastic shield against the springs. Position it forward so the long side of the sensor meets the front metal pan. Exit sensor wires toward the rear of the seat.
- Place four cable ties through the plastic sheet holes and secure to the springs.
- Leave front seats for reinstallation later.



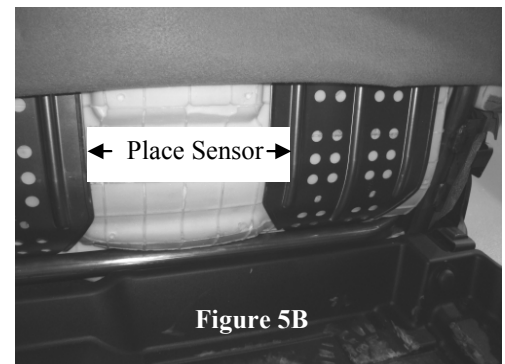
Front Metal Pan



Figure 5A

Rear Seats

- Fold rear seat bases up.
- Open the rear seat upholstery hook and loop at back to expose metal pan and foam.
- Place the 8.0 inch by 3.0 inch seat sensor between the foam and metal pan, and the long side in line with seat, as indicated in (Figure 5B), for each of the 3 rear seat positions.
- Exit sensor wires toward the rear of the seat.
- Close and reattach upholstery.



Sensor Harness Installation

- Remove the front left kick panel below the left A-pillar.
- Starting from the rear right seat position, lay the rear seat portion of the sensor harness along the back wall toward the left side of the vehicle so the connector pairs are centered at each seat position.
- Connect each rear seat sensor and seat buckle sensor to the harness.
- Open the left side plastic cable enclosure that resides under the scuff panel.
- Continue laying the sensor harness forward in the plastic cable enclosure to beyond the B-pillar.
- Feed the front seat portion of the sensor harness under the carpet just behind the front seats toward the right of the vehicle.
- Feed the left front connector pair out of the carpet opening for the left floorboard vent under the driver seat.
- Feed the right front connector pair out of the carpet opening for the right floorboard vent under the passenger seat.
- Leave the center front connector pair under the carpet near the center console. (Not Used)
- Connect the respective sensor connectors to the harness.
- Continue laying the sensor harness forward in the plastic cable enclosure to the A-pillar.
- Feed the sensor harness upward, either along the A-pillar or forward of the park brake, to the left side vent panel. (Figure 6, detail 2).
- If the park brake route is selected, ensure the harness does not interfere or entangle in the park brake mechanism.
- Finish harness placement so the two end connectors are accessible at opening below the vent at the left side vent panel.
- Adjust the harness as necessary to ensure the wires are not pulled too tight.

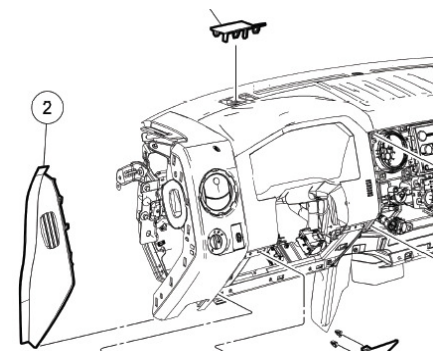


Figure #6

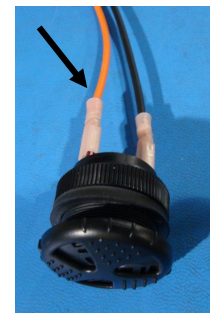
Sensor Harness Installation (Continued)

- Tuck the harness into the floor at the rear wall (behind the rear seat).
- Close the plastic enclosures under the scuff panels.
- Reinstall the front seats. Torque seat mounting bolts to 70Nm (52 ft-lbs). **Front seat bolts must be replaced when removed, per Ford Motor Company Technical Information.**
- Connect the front seat sensors and seat belt switches to the NFPA501-B Sensor Harness.
- Reinstall the front left kick plate. Reinstall scuff plates

Warning Beeper Installation

Choose an appropriate location, usually under the dash, to mount the warning beeper. If a hole needs to be drilled, the hole size is 1-1/8 inch.

1. Attach the 4 Pin Warning Beeper harness to the NFPA501-B Module's 4-Pin White connector.
2. Attach the 12-Pin connector Pin #12 Orange wire to the Positive side (red painted terminal) of the Warning Beeper.
3. Secure the Warning Beeper under the dash.



The bezel on the beeper can be rotated for volume control.

LED Display Panel Installation

Note: It is recommended to mount the LED Panel after all upfitting is complete (radios, computer, electronics etc.).



The NFPA system requires *either* the InterMotive LED panel (shown) or the FRC panel (VDR) to be installed. The FRC panel is included in the FRC kit if specifically ordered, and should be installed in lieu of the InterMotive LED panel.

To install the InterMotive LED panel, locate a suitable position on the dashboard within view of both the driver and passenger (fire captain) for mounting the LED Display Panel. The passenger (captain) must be able to see the LED panel should a laptop or additional equipment is placed on or at the center console. The length of the display harness is 40". This is the maximum distance the display can be mounted from the NFPA501 module.

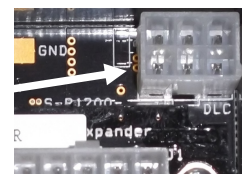
1. Drill a 5/8" hole in the dashboard where the center of the display will be located, being careful not to damage anything behind the dashboard.
2. Attach the 4 Pin LED display harness to the NFPA501-B Module's 4-Pin Black connector.
3. Run the free end of the display harness behind the dash and out through the 5/8" hole.
4. Attach the end of the display harness to the LED Display Panel.
5. Ensure panel is level, and secure using the supplied screws.

Reconnect vehicle battery

Initial Installation Power-Up

Note: Do not mount module until post installation is complete.

- Seat belts are NOT buckled.
- With the key ON and engine OFF, plug in the 6-pin Data Link harness connector into the white 6-pin connector on the NFPA501 module. This will "Hard Boot" the module and cause it to go into a special "Installation Routine" to configure the module properly for the vehicle.



CAN Detect

First, the module auto-detects the vehicle CAN communication bus to verify it can read vehicle data. If the module fails to detect the CAN bus, **module** LED6 will turn ON and LEDs 1-4 will scroll. In addition, the far right two sets of LEDs (top & bottom row) on the NFPA dash display will "rotate". The module will not function if this occurs.

In this case there is something wrong with either the vehicle OBDII connection or in the harness connecting to the module. It's unlikely the vehicle itself has a problem.

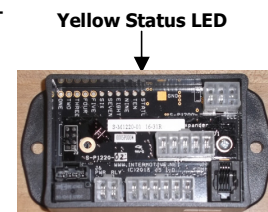
At a later date, an Installation Routine can be forced to re-run, by unplugging and plugging the data link connector while grounding the silver test pad on the module. This will re-run the active seat detection routine.

Seat Selection

The module is designed to handle a variable number of seat positions. During this installation routine, it will establish which seat positions are active in the vehicle. It does this by reading seat belt sensors. The driver's seat is always active by default, but the other positions can be active or inactive. If inactive, the module will not display LED panel status nor report status to the VDR. In order for a specific position to be sensed and deemed "active", it needs a proper harness connection to the module, and the seat belt must be unbuckled (this is true with the passenger buckle provided in this NFPA kit).

Once the seat selection is complete, the module will "flash out" the seat configuration using module LEDs 1-5. The LEDs will blink several times indicating (by being ON) which positions are active.

LED1—Driver	LED3—Rear Left	LED5—Rear Right
LED2—Front Right	LED4—Rear Middle	



As stated above, the seat selection routine runs automatically the first time (from the factory) power is applied to the module. If seat selection is ever needed at a later time, a "special hard boot" needs to be run. To do this, make and hold a ground connection to the module silver test pad while plugging it in. The module will "see" this and run the seat selection routine.

If seat selection fails, module LED7 will turn ON and LEDs 1-4 will scroll. If this occurs, the problem is most likely the module. Contact Intermotive Technical Support 530-823-1048.

VIN Capture

The first time (from the factory) the module is plugged in, it will attempt to read the vehicle VIN, to ensure that vehicle data will be correctly received and interpreted. If it cannot acquire the VIN or if the acquired VIN is invalid, the yellow Status LED on the module will flash, and the Intermotive dash panel LEDs will "dance". If VIN acquisition was successful, the module stores and uses it for future reference. If VIN cannot be acquired, the module will not function; contact Intermotive Technical Support 530-823-1048.

Post Installation Test

With vehicle in Park, Parking Brake applied, and Key OFF (module asleep)

1. Turn Key ON. Verify all Display Panel LEDs prove out (illuminate, then follow seat status).
2. Sit in each seat location, and verify respective red LED illuminates on the panel.
3. While sitting in the seat, buckle seatbelt, and verify red LED goes out and the green LED illuminates.

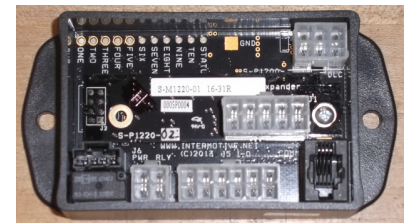
While sitting in a seat (seat belt unbuckled, vehicle in Park, and Park Brake applied):

1. Move transmission selector out of Park position and disengage the Park Brake. Verify audible beeper activates.
2. Press the Silence button (on Display Panel), and verify beeper stops. Shift back into Park position and depress the Park Brake.
3. Leave the seat for 3 seconds, then sit back down again. This resets the alarm function.

If the NFPA501-B fails any step in the Post Installation Test, review the installation instructions and check all connections. If necessary, call InterMotive Technical Support at (530) 823-1048.

NFPA501 Module Mounting

Ensure all harnesses are properly connected and routed, and are not hanging below the dash area, Mount the NFPA501-B module as described on page one and secure using supplied screws or double sided tape. Torque the seats in position, restore all panels, etc.



NFPA501 Module

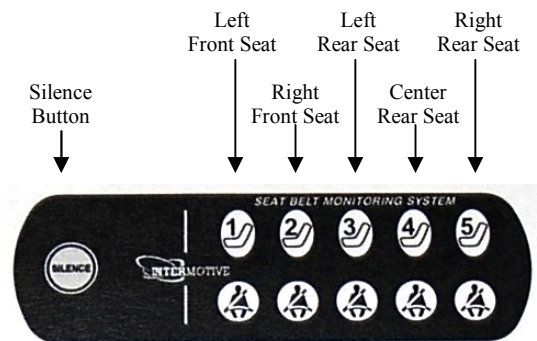
Leave in vehicle
Operating Instructions NFPA/Seat Belt Monitor NFPA501-B
2011-2016 Ford F250-550 Series Crew Cab 6.2L, 6.7L, 6.8L

The NFPA501-B system meets the NFPA1901 requirements for a seat belt monitoring system. It indicates if someone is sitting in a seat, and if they have their seat belt buckled. It sounds a beeper if the vehicle is driven when a seat belt is not buckled. The volume of the beeper may be adjusted by rotating the bezel on the beeper.

The system also provides this seat information to an optional Vehicle Data Recorder. The system will have a status display panel—either the one shown, or one provided by the VDR manufacturer (which will include separate instructions, if equipped).

The system operates as follows:

- When the vehicle is keyed on, all LED's on the Display Panel will briefly illuminate.
- Sitting in each seat location will illuminate the respective **Red** LED on the panel. Only the first two positions are active for the Regular Cab truck. All five will be illuminated for Crew Cab if all 5 seats are active.
- When sitting in an unbelted seat, moving the transmission selector out of the Park/Neutral position **and** releasing the Park Brake will sound the beeper.
- Pressing the Silence button anytime the beeper is sounding will stop the beeper for that seat.
- Inserting the seatbelt into the buckle while sitting in each seat will illuminate the respective **Green** LED and the extinguish the **Red** LED.
- Inserting the seatbelt into the buckle without sitting in the seat will flash the respective **Red** LED, indicating an improper condition.



If the NFPA501-B fails any step in the Operating Instructions, contact
InterMotive Technical Support at (530) 823-1048

