

Diagnosis and Testing

General Equipment

The Ford diagnostic equipment

Refer to Wiring Diagram Section 046-1 for schematic and connector information.

Principles of Operations

WARNINGS:



All safety belt components including retractors, buckles, child safety seat tether brackets and attaching hardware in use during a collision must be removed and new components installed. New safety belt components should also be installed where safety belts not in use during a collision, are inspected and found to be damaged or operate incorrectly. Failure to follow these instructions may result in personal injury.



All vehicles equipped with a passenger air bag have a WARNING sticker attached to the instrument panel PROHIBITING the use of rear facing child seats in the front seating positions. Failure to follow this instruction may result in personal injury.



NOTICE: Do not attempt to repair or lubricate the retractor / buckle mechanisms or modify the belts.

The safety belt system utilizes a combination of two point lap safety belts and three point lap and diagonal safety belts, depending on the individual vehicle specifications.

The driver front seat safety belt, and passenger front seat safety belt if also equipped with passenger air bag, incorporate retractor pretensioners. The safety belt pretensioners are controlled as part of the supplementary restraint system (SRS). When the ignition is turned on the RUN position the SRS warning indicator will illuminate for three seconds. If the SRS, including the safety belt electrical system, is operating correctly the SRS warning indicator will be extinguished. If a fault is detected the SRS warning indicator will illuminate the air bag warning indicator located in the instrument cluster.

REFER to: [Airbag and Seatbelt Pretensioner Supplemental Restraint System \(SRS\)](#) (501-20B Supplemental Restraint System, Diagnosis and Testing).

Emergency Locking Retractor (ELR)

The ELR is part of the safety belt system that in normal operation allows free movement of the belted occupant. In an emergency the ELR will lock, preventing webbing payout and hence forward movement of the occupant. Locking may be achieved by one of two mechanisms:

Vehicle Motion Sensor (VMS)

The VMS is operated by sudden deceleration of the vehicle or excessive tilt. Once operated, it causes a locking pawl to be engaged, thus locking the retractor, preventing webbing payout. When the vehicle is stationary the VMS stabilizes causing the pawl to disengage and unlock the retractor allowing webbing payout.

Webbing Motion Sensor (WMS)

The WMS is operated by rapid acceleration of the webbing. Once operated, it causes a locking pawl to be engaged thus locking the retractor. When the vehicle is stationary the VMS stabilizes causing the pawl to disengage and unlock the retractor allowing webbing payout.

Seatbelt Retractor Webbing does not Extract from Stowed Position

Some of the 2012 Transit and Transit Custom vehicles may have a concern where the seatbelt retractor webbing does not extract from the stowed position. This may be due to a

normal condition which happens when the seatbelt retracts at a high speed. To release the seat belt:

1. Lower the shoulder height adjuster, if available or slowly extract the seatbelt webbing to tighten the roll on the retractor. Only a few millimeters are required to release the locked retractor.
2. Allow the extracted webbing to retract and the locked condition will release. By following these instructions, the webbing will once again extract freely.

If a seatbelt concern still exists, refer to the normal diagnostics under Seatbelt Systems.

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

VISUAL INSPECTION CHART

Mechanical	Electrical
• Safety belt retractor • Safety belt buckle • Safety belt shoulder height adjuster	• Fuse(s) • Electrical connector(s) • Circuit(s) • Safety belt retractor pretensioner(s) • Restraints control module

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

Symptom	Possible Sources	Action
Normal mode - occupant restraint system inoperative	* Safety belt retractor.	* CARRY OUT the Safety Belt Component Test in this section.

Component Test

Poor Retraction

If a safety belt does not retract correctly, check that the anchor covers and trim are correctly installed and not rubbing against the safety belt webbing. Where necessary, check that the safety belt webbing is not rubbing at one end of the retractor cover slot and if so, correct by loosening the retaining bolt, aligning the retractor to centralize the safety belt webbing and tightening the bolt.

The safety belt retractors are dual sensitive, which means that they have:

- a vehicle motion sensor, which locks the safety belt webbing under braking, cornering, on steep hills and in adverse camber conditions.
- a webbing motion sensor, which locks when the safety belt webbing is quickly extracted.

Both systems should be fully operational and can be checked by the tests below:

Vehicle Motion Sensor Test

Either of the following two procedures may be used to check correct operation of the vehicle motion sensor. Both methods require two technicians, but note that technicians of larger than normal build should not be asked to conduct these tests. This is to avoid the possibility of a fully unrolled safety belt webbing being mistaken for a correctly locked safety belt retractor.

Test Method 1 (braking)



WARNING: It is important that during this test, the wearers allow the safety belt to provide the restraint and do not attempt to anticipate the sudden deceleration. The steering wheel should not be used as a brace. However, both driver and passenger should prepare themselves for the possibility that the safety belts will not lock. The passenger should hold their hands in front of them, just clear of the instrument panel or front seat backrest, depending on which safety belt is being tested. Failure to follow these instructions may result in personal injury.

This method requires a quiet or private stretch of road.

- Make sure that the road is clear and that full visibility is maintained at all times.
- Both driver and passenger should adopt a normal, comfortable seating position. Both occupants should wear the safety belts and the safety belt webbing must be correctly adjusted, with no slack.
- Proceed at a speed of 10 km/h (6 mph). Do not exceed 10 km/h (6 mph) for this test.
- Apply the foot brake sharply to stop the vehicle. If the vehicle motion sensor lock mechanism is operating correctly, the safety belt webbing will lock and restrain the wearer.
- Conduct the test twice in each passenger seat position.
- Any safety belt retractor which does not restrain the wearer must not be used. A new safety belt must be installed. REFER to: (501-20A Seatbelt Systems)

[Front Seatbelt Retractor](#) (Removal and Installation),

[Front Center Seatbelt Retractor - Vehicles With: Double Passenger Seat](#) (Removal and Installation),

[Second Row Double Seat Outer Seatbelt Retractor](#) (Removal and Installation),

[Second Row Double Seat Center Seatbelt Retractor](#) (Removal and Installation),

[Second Row Double Seat Outer Seatbelt Retractor](#) (Removal and Installation),

[Second Row Double Seat Center Seatbelt Retractor](#) (Removal and Installation),

[Second Row Double Seat Outer Seatbelt Retractor](#) (Removal and Installation).

Test Method 2 (turning circle)

This method requires a flat open area of private road, sufficient for the vehicle to be driven in a continuous circle on full steering lock.

- The driver should wear the safety belt provided and the belt webbing must be correctly adjusted, with no slack.
- The passenger should occupy a rear seat with the safety belt correctly adjusted.
- Start the engine and, with the steering on full right-hand lock, drive the vehicle in a continuous circle at 16 km/h (10 mph). Do not exceed 16 km/h (10 mph) for this test.
- When the speed is stable, the passenger should attempt to slowly extract the safety belt webbing from the safety belt retractor. If the vehicle motion sensor lock mechanism is operating correctly, it will not be possible to extract the webbing. This test should be repeated for each passenger seating position.
- Any safety belt retractor from which it is possible to extract the webbing during this test must not be used, a new safety belt must be installed. REFER to: (501-20A Seatbelt Systems)

[Front Seatbelt Retractor](#) (Removal and Installation),

[Front Center Seatbelt Retractor - Vehicles With: Double Passenger Seat](#) (Removal and Installation),

[Second Row Double Seat Outer Seatbelt Retractor](#) (Removal and Installation),

[Second Row Double Seat Center Seatbelt Retractor](#) (Removal and Installation),

[Second Row Double Seat Outer Seatbelt Retractor](#) (Removal and Installation),

[Second Row Double Seat Center Seatbelt Retractor](#) (Removal and Installation),

[Second Row Double Seat Outer Seatbelt Retractor](#) (Removal and Installation).

Static Test

With the vehicle stationary and on level ground, take firm hold of the safety belt webbing (on the tongue side of the upper safety belt anchor) and pull quickly. The retractor should lock within 0.25 meters (10 inches), preventing further webbing payout. Any safety belt retractor from which it is possible to extract further webbing must not be used. A new safety belt must be installed. REFER to: (501-20A Seatbelt Systems)

[Front Seatbelt Retractor](#) (Removal and Installation),
[Front Center Seatbelt Retractor - Vehicles With: Double Passenger Seat](#) (Removal and Installation),
[Second Row Double Seat Outer Seatbelt Retractor](#) (Removal and Installation),
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