

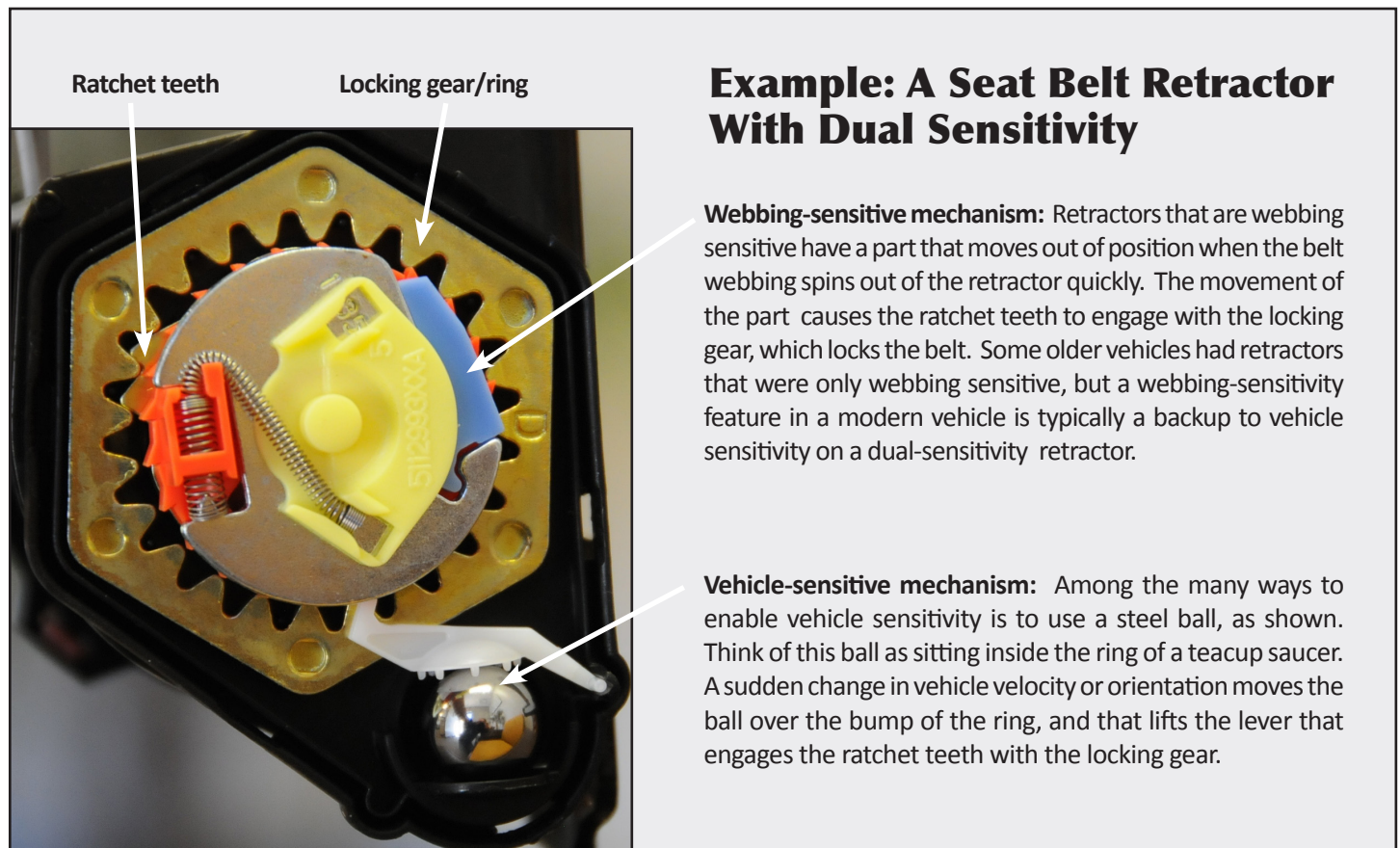
Does Your Seat Belt Have a Retractor?

Yes, almost certainly it does! These spools for seat belt webbing, typically hidden behind the wall, ceiling, or floor of the vehicle, are part of most seat belt systems. Owners may appreciate knowing the following basic information about these lifesaving devices.

What do seat belt retractors do?

All retractors have certain things in common. They all release webbing for seat belt use, and they all automatically respool webbing slack. Most importantly, all retractors will instantaneously lock webbing at a fixed length in a crash. Typically, retractors lock when ratchet

teeth (on the spooling mechanism) lodge into the retractor's fixed outer locking gear, or ring. When this happens, webbing cannot come out of the retractor, so the belt will be held at a fixed length on the occupant (or child restraint). The image below illustrates this.



Example: A Seat Belt Retractor With Dual Sensitivity

Webbing-sensitive mechanism: Retractors that are webbing sensitive have a part that moves out of position when the belt webbing spins out of the retractor quickly. The movement of the part causes the ratchet teeth to engage with the locking gear, which locks the belt. Some older vehicles had retractors that were only webbing sensitive, but a webbing-sensitivity feature in a modern vehicle is typically a backup to vehicle sensitivity on a dual-sensitivity retractor.

Vehicle-sensitive mechanism: Among the many ways to enable vehicle sensitivity is to use a steel ball, as shown. Think of this ball as sitting inside the ring of a teacup saucer. A sudden change in vehicle velocity or orientation moves the ball over the bump of the ring, and that lifts the lever that engages the ratchet teeth with the locking gear.

What triggers a retractor to lock?

A couple of mechanisms have been developed to lock retractors. One type is "webbing sensitive." This means the retractor will lock whenever webbing is withdrawn quickly from the retractor. The other type is "vehicle sensitive," which means the retractor locks when it senses abrupt vehicle motion (crash deceleration, sudden maneuvers, etc.) or a change in the orientation of the ve-

hicle (and, correspondingly, the retractor) at any speed.

Some retractors have just one type of locking mechanism, while others are "dual sensitive" (shown above), locking due to both webbing and vehicle sensitivity. On dual-sensitivity retractors, the vehicle-sensitive mechanism is primary, meaning it is the only one that must meet federal motor vehicle safety standards.

See other side for more information.

What type of retractor do you have?

If you have a belt-sensitive retractor, it is pretty easy to tell. If you pull webbing out of the retractor quickly, it will lock up, preventing more webbing from spooling out.

However, most modern cars do not have retractors that are only webbing sensitive. More often, retractors are vehicle sensitive, or they have dual sensitivity. An owner will not feel a vehicle-sensitive belt lock up unless the vehicle has a sudden change in velocity or orientation (such as would occur in a crash or sudden stop).

Do owners need to confirm that their retractors are working?

Some owners worry when they cannot make their retractor lock when they yank on the belt webbing. However, remember: Some belts have only vehicle-sensitive mechanisms, so test failure does not necessarily reveal a faulty locking mechanism. Automotive engineers say that the best way to know if a vehicle-sensitive retractor is working properly is to uninstall the seatbelt, tilt it at least 15 degrees and up to 40 degrees from its installation angle, and see if it

locks (a design requirement for vehicle-sensitive retractors). Of course, vehicle owners *should not* uninstall seat belts. It is better to understand the way that seat belts are meant to work, as described here, and accept that locking may not be demonstrable. It is entirely normal not to be able to engage the locking feature of some retractors in a noncrash situation. If you are truly worried, however, have the car inspected by a qualified mechanic.

Some new vehicles might also feature locking mechanisms that go beyond purely mechanical design, incorporating electronic and/or computer-aided locking triggers.

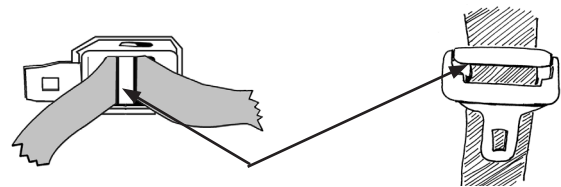
How do retractors work for child restraints?

A retractor will lock to hold a child restraint (CR) in a crash in the same way described on this sheet for passengers wearing the belt. However, when a seat belt is used to install a CR, the webbing must stay at a fixed length at all times—not just in a crash—so that the CR installation remains tight. Since the 1996 vehicle model year, all seat belts (other than in the driver’s position) have been required to be car-seat friendly in this way.

To meet the regulations, most vehicles (and virtually all current models) are equipped with seat belts with retractors that can be switched to car-seat mode. These types, called “switchable retractors,” function as they typically would for a passenger, but can additionally be switched to a locked mode by slowly pulling all the webbing out of the retractor. When released, the belt can retract (shorten), but cannot be lengthened again until it is unbuckled and fully retracted.

When switched in this way after the seat belt has been threaded through a CR’s belt path and buckled, the caregiver can follow directions for tightly installing the CR. This usually involves pushing down on the CR while moving webbing slack toward the retractor so that the spool will accept more webbing.

In some model year 1996 and newer vehicles, the requirement for the seat belt to hold a car seat tight is met by the seat belt’s latchplate (as illustrated below), rather than the retractor. If the retractor cannot be switched to car-seat mode as described, then a caregiver is not required to make any adjustment to the retractor when installing a CR. Following instructions, the latchplate will hold the webbing to maintain a tight CR installation during noncrash conditions, and the retractor will lock to hold the belt webbing in the event of a crash.



Movable bars on two styles of locking latchplates keep webbing from slipping. This locking mechanism is present if the retractor is a nonswitchable type and the vehicle is model year 1996 or newer.

Always check the vehicle and CR owner’s manuals to learn about proper CR installation. For vehicles made before 1996, it is likely that instructions will say to use a locking clip to hold the belt tight when used for CR installation.