

Hickory Dickery Dock:

Steve and Bob Repaired a Clock

The last warm day of October, Steve and I visited the Durham U-Pick It salvage yard intent on harvesting a clock spring. Steve's XC90 displayed a DSTC disabled message and the culprit was the clock spring.

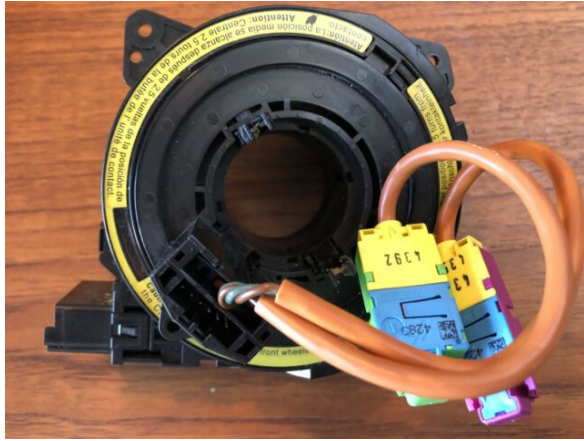
The stability and traction control system (DSTC - Dynamic Stability & Traction Control) helps the driver avoid skidding and improves traction by transferring power from the spinning wheel to the wheel with traction. Traction control is designed to prevent drive wheels from spinning while the vehicle is accelerating (under power).

When driving with snow chains, in deep snow or loose sand, it may be useful to temporarily switch DSTC off for maximum energy transfer to the wheels. Is this always necessary? Yes and no! Driving requires sensing how the vehicle is responding to changing road conditions; then switching between DSTC and no-DSTC as necessary. That's why it's called "driving," otherwise it'd be called pointing the vehicle.

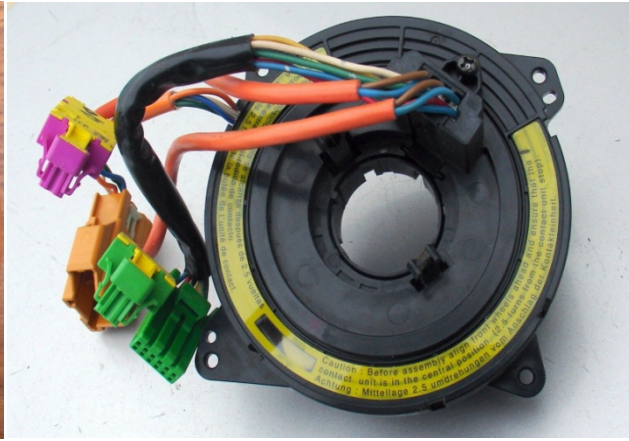
Steering angle clock springs (a/k/a "clock spring") are part of the vehicle steering system. It's a coiled electrical ribbon connector which permits the steering wheel to turn, yet maintain an electrical connection between the steering wheel airbag, horn and other devices with the computer management system. The clock spring is located between the steering wheel, behind the airbag and the steering column shaft.

The rotational movement of the steering wheel winds and unwinds the ribbon cable coil. Eventually the wire breaks due to bending related metal fatigue and one of the systems (DSTC, airbag, horn or info-management controls) fails. Failure of the DSTC or airbag is accompanied by a message or illuminated icon in the instrument cluster.

After market new clock springs are available for \$250 (up) while a used assembly can be purchased for as little as \$25 online or much less at the U-Pick It salvage yard.



2-wire



3-wire (courtesy eBay)

Two wire and three wire clock springs are used in Volvos. The three wire style is for vehicles with DSTC. Since Steve's XC90 had DSTC, we needed a donor vehicle with DSTC be it an XC90 or something else. Upon finding a vehicle with a telltale DSTC switch, disassembly of the steering wheel commenced.

Clock Spring Removal:

1. Find the ignition key and unlock the steering wheel. Access to the airbag release clips cannot be accomplished unless the steering wheel can be rotated. If the airbag has been activated, then hack the bag remnants off to gain access to the clock spring otherwise you'll have to remove the gear shift selector cover and cut the steering wheel/ignition lock cable to release the steering wheel.

If the airbag is intact, someone else may need it; destroying a perfectly good component is both rude and it violates the salvage ethic. Regrettably, some people only think of themselves.

Fortunately for Steve, I found the ignition key on the floor in front of the passenger seat; he promptly unlocked the steering wheel and commenced removal.

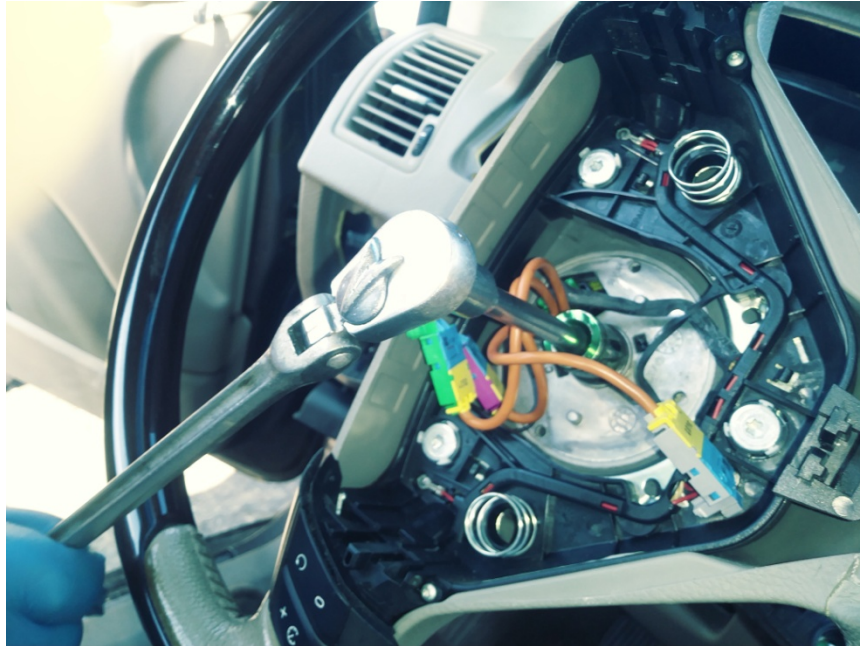
2. Turn the steering wheel so the spokes are in the 12 and 6 o'clock positions.



3. Locate the access hole on the rear of the steering wheel, insert a flat blade screwdriver into the hole and flick it up and down against the airbag retaining clip while gently tugging on the airbag. Release both retaining clips and remove the airbag taking to carefully separate the three electrical connectors.



4. Remove the 18mm bolt fastening the steering wheel to the steering post; then remove the wheel by forcefully tugging and rocking it side to side.



5. Unscrew the four small retaining screws fastening the clock spring to the cradle. Then carefully lift the clock spring from its cradle.

Now examine the prize as a fisherman inspects a trophy bass for flaws. If satisfied, pat yourself on the back and smile because you've accomplished a feat few Volvo owners have.



Installation:

Warning!!!!

Pay attention or you risk being severely injured or blinded.

First the airbag must be disabled because it may explode causing blunt force trauma and/or objects (tools) may penetrate your body.

Absent access to a Volvo scan tool to disable the airbag, disconnecting the battery is the alternate safe method. Lift the positive and negative battery cables, turn on the parking lights, and let the vehicle sit for 30 minutes. This allows the computer control module storage capacitors to drain. Remove any USB appliances, like cell phones, from the power outlets, especially the rear outlet in the XC series vehicles because these can back feed the vehicle electrical system and ignite the airbag.

Some vehicles have two batteries, one for accessories plus a smaller battery for the automatic start/stop system. Automatic stop/start technology allows the engine to shut off (at red light or traffic) instead of idling; then restart upon lifting your foot from the brake and depressing the accelerator pedal. You must disconnect both batteries in vehicles equipped with stop/start systems. And don't try disabling airbags in EVs or hybrid vehicles, you'll never do it. Wrenching on EVs or hybrids is akin to having a pet cobra, you never know if it'll bite, but when it does it's fatal.

Having safely disarmed the Volvo airbag, follow the removal steps to excise the defective clock spring and replace it with the donor unit.



Bob lives in Cary, NC and is co-chairman of the Blue Ridge Chapter of VCOA.

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He'll respond pleasantly to questions about your Volvo.