SS 1033628 New Cascadia Ground Strategy - Steering Wheel Clockspring Failures

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Applicable Vehicles

All New Cascadia models (P4).

Possible Symptoms

- Clockspring / Steering wheel switches - Inoperative or intermittent
- Left and / or Right Stalk Switch (SSL / SSR) - Inoperative or intermittent
- Windshield Wipers - Switch OFF, Wipers Always ON

This list will be updated if further behaviors are confirmed.

Issue

New Cascadia products have a new **separated ground strategy** that must be strictly adhered to. Incorrect mapping of the ground circuits may allow backfeed and overload an isolated portion of the grounds, possibly resulting in component damage (e.g. steering wheel clock spring, base part number 14-19090). Please see the DTTS Insider 1: New Cascadia - Separated Ground Strategy instructional material for additional information on this ground strategy.

Case Study

Units reporting symptoms like those above may find failure of the clockspring, with delamination of the internal ribbon, overheating, and shorting or fused circuits, as pictured here:

Solution

IMPORTANT: The following is a preliminary work instruction and is not intended to replace work instructions published in the manuals or other official instructions released. When in doubt, always refer to the official work instruction publications and contact your District Service Manager with any questions or corrections needed.

Prepare the vehicle.

Position the front tires straight ahead. If possible, drive the vehicle in a straight line for a short distance, stopping at the spot where service work will be done.

Apply the parking brakes and shut down the engine. Chock the tires.

Disconnect the batteries.

Remove the dash lower center console, the dash top cover, the footwell panel, and the dash switch panel. (Refer to Section 60.06, Subject 100 in the New Cascadia Workshop Manual for instructions.)

Open the hood.

NOTE: For a more in-depth look at the New Cascadia ground structure and drawings, read the DTTS Insider article "New Cascadia - Separated Ground Strategy".

Inspect vehicle frame rail GNDE and GNDP studs, and repair as necessary.

Use lacquer thinner, as needed, to clean off any excess paint on electrical connections throughout this solution.

Verify that the Electrical Ground (GNDE) and the Power Ground (GNDP) frame rail studs are clean and torqued correctly. Disassemble and inspect the studs for overspray on the flat surfaces, and in between the ring eyes. Torque these frame rail ground studs 14 lbf·ft (19 N·m). Repaint the connection, as necessary.

IMPORTANT:

Vehicles will have either a GNDE cable going directly to battery negative (back-of-cab battery box equipped units) or a ground cable to the left frame rail stud near the HDEP MCM (for undercab battery box equipped units), but not both. Service as required for your particular configuration.

Inspect the GNDP cab skin stud, and repair as necessary.

Verify that the GNDP skin stud on the underside of the cab is clean and torqued correctly. Disassemble and inspect the stud for overspray on the flat surfaces. Torque the stud 14 lbf·ft (19N·m). Repaint the connection, as necessary.

Inspect the GNDE pass-through stud on the engine side of the frontwall, and repair as necessary.

Verify that the GNDE pass-through stud on the engine side frontwall is clean and torqued correctly. Disassemble and inspect the stud for overspray on the flat surfaces. Torque the stud 14 lbf·ft (19 N·m). Repaint the connection, as necessary.


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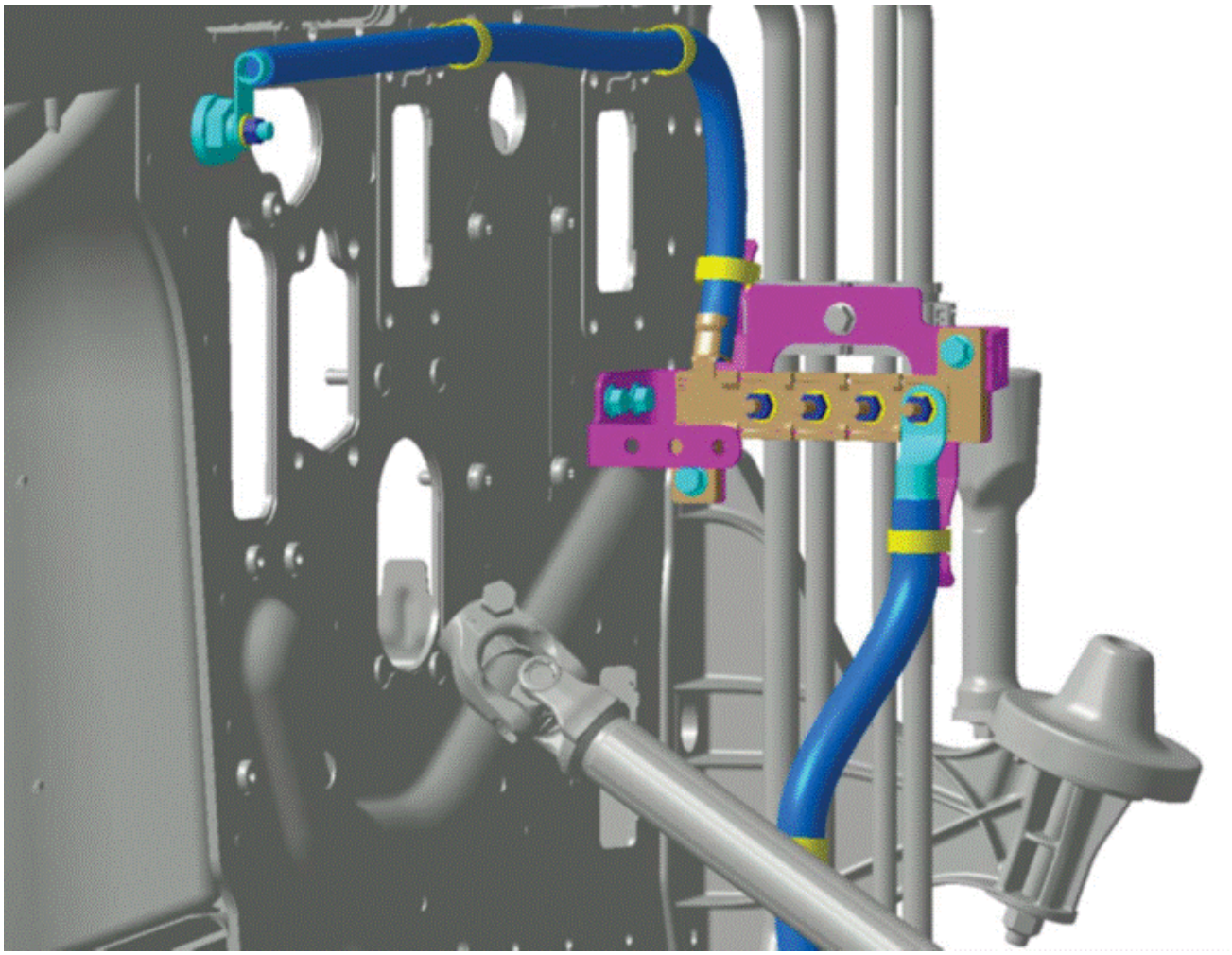
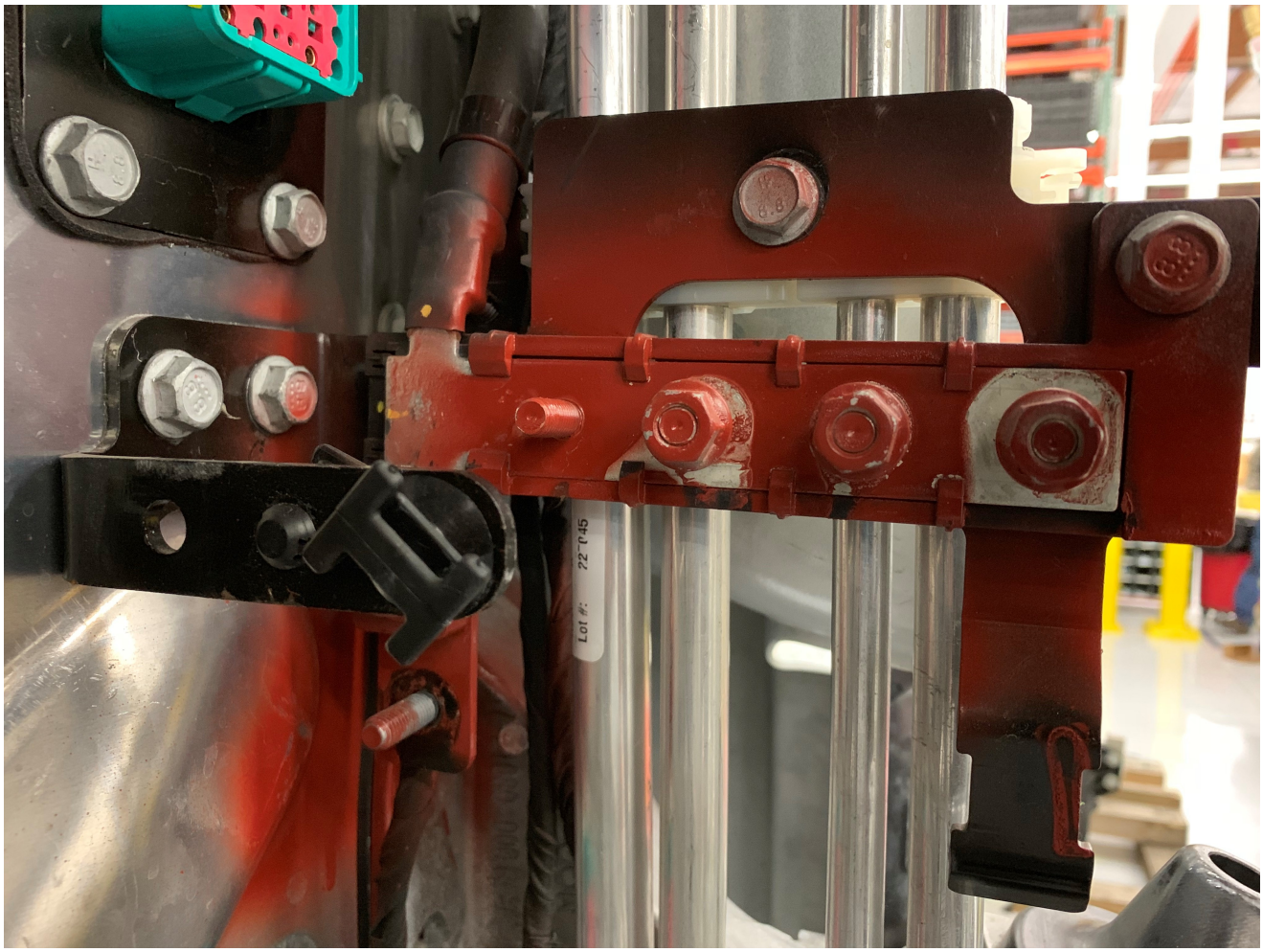


Inspect the GNDP non-isolated stud, located on the lower aft portion of the MGJB bracket, and repair as necessary.

NOTE: There should always be FOUR ring eyes attached to this stud.

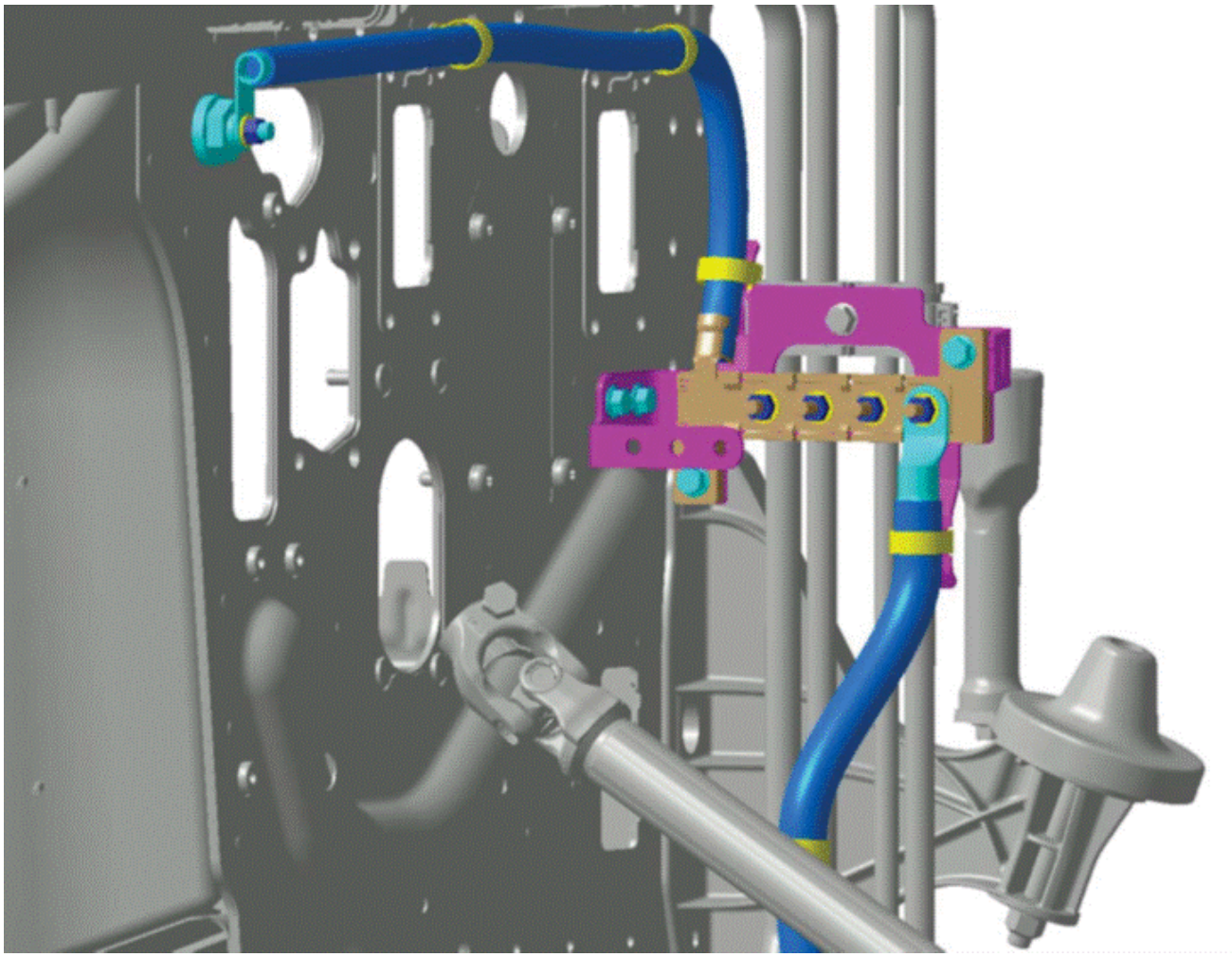
Verify that the GNDP non-isolated stud is clean, configured properly, and torqued correctly. Disassemble and inspect the stud for overspray on the flat surfaces, and in between the ring eyes. Verify there are EXACTLY a total of four (4) circuits on ring eye terminals that attach to the GNDP non-isolated stud on every vehicle. If more or less are found on this stud, combine this inspection step with the next one for GNDE MGJB, separate and group the cables until FOUR GNDP connections are confirmed, then fan these GNDP ring eyes properly on the non-isolated stud and then torque. Repaint the connection, as necessary.



Inspect the GNDE MGJB, and repair as necessary.

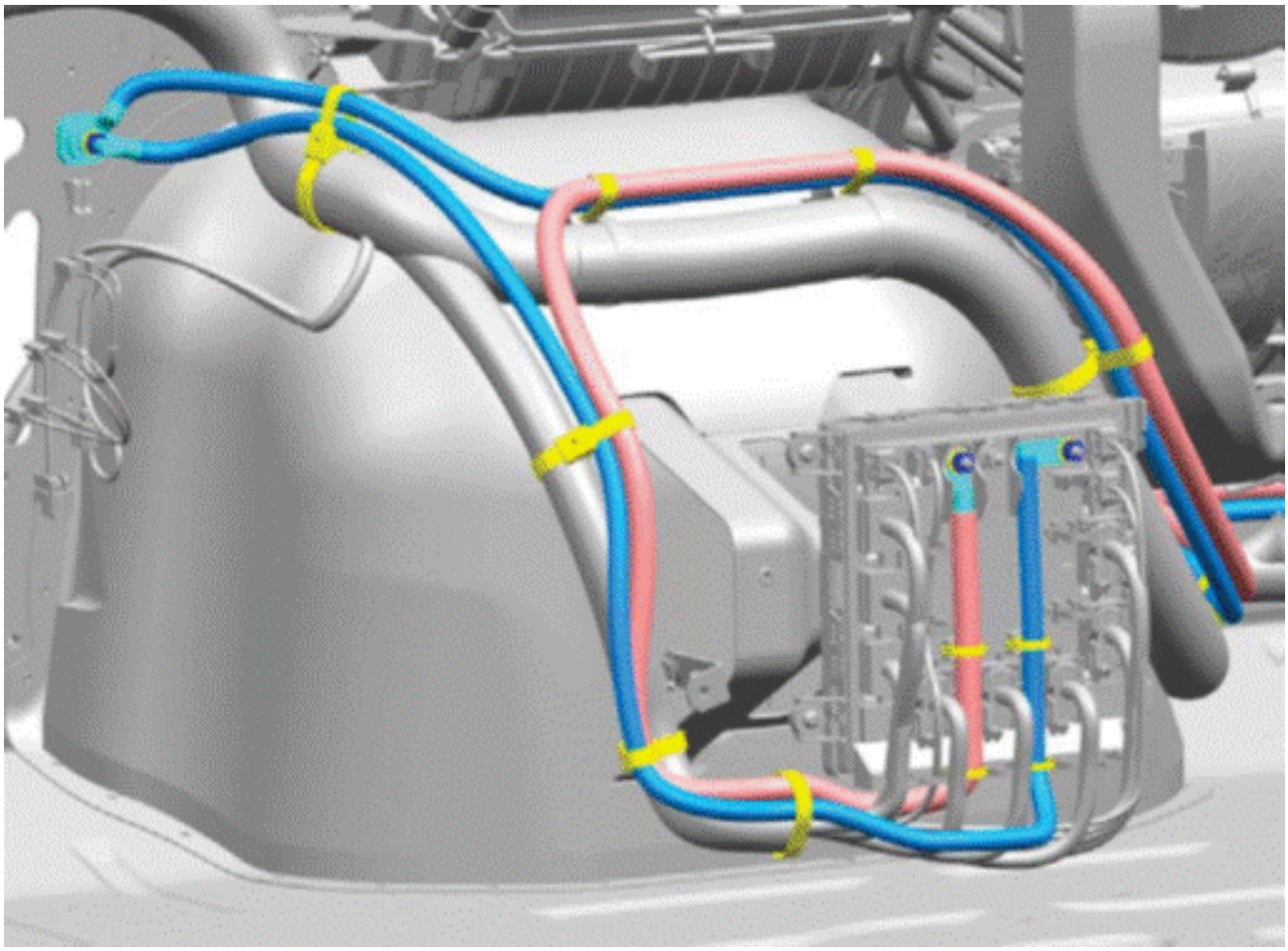
Verify that the GNDE Main Ground Junction Block (MGJB) is clean, configured properly, and torqued correctly. Disassemble and inspect the studs for overspray on the flat surfaces, and in between the ring eyes, then fan the ring eyes properly and torque the studs 16 lbf·ft (21 N·m). Repaint the connection as necessary.

NOTE: No particular location or order is needed for the GNDE terminals, other than ensuring that ONLY GNDE terminals are located on the MGJB studs.



Inspect the sSAM / ASAM power and ground connections, and repair as necessary.

Check the torque at the sSAM power and ground connections. Torque them 9 lbf·ft (12 N·m).



Inspect the GNDE pass-through stud on the cab side of the frontwall, and repair as necessary.

Inspect the GNDE pass-through stud inside the cab, wiggle the cable to check for movement, and service if loose. Torque the stud 14 lbf·ft (19 N·m).

Replace the steering wheel clockspring.

NOTE: Steps involving a steering wheel airbag need not be performed on units not equipped with an airbag.

DANGER

The components and chemicals used in the air bag system are hazardous. The system contains components that use combustible chemicals; care must be taken when replacing or handling system components.

Damaged or deployed air bag systems should be inspected for leaking propellant chemicals before any attempt is made to remove, replace, or handle the components. If a leak is found, contact LifeGuard Technologies (1-866-765-5835) for handling instructions.

The surface of the deployed air bag may contain small amounts of sodium hydroxide (which is a byproduct of the gas generant combustion) and metallic sodium. Sodium hydroxide may be irritating to the skin and eyes. Always wear rubber gloves and safety glasses when handling a deployed air bag.

Immediately wash your hands and exposed skin areas with water and a mild soap. Flush your eyes immediately if exposed to sodium hydroxide.

Consider undeployed air bags to be dangerous and capable of deploying at any time. Before performing any work on these systems, review all service literature and comply with the following warnings and precautions. Unintentional or improper deployment of the air bag system can result in injury or death.

- Carry undeployed air bags with the bag and the trim cover pointed away from your body.
- Place undeployed air bags face up on a surface in an enclosed area.
- Do not place objects near or on top of an undeployed air bag.
- Store undeployed and undamaged air bag modules in a cool, dry, enclosed area.
- Keep all liquids, acids, halogens, heavy metals, and heavy salts away from the air bag system. Do not allow system chemicals to contact other liquids, combustibles, and flammable materials. Doing so could cause chemical burns or personal injury.
- Do not attempt to disassemble the air bag inflator unit or breach the integrity of the sealed metallic inflator case.
- Do not cut, drill, braze, solder, weld, probe, or strike any part of the air bag system.
- Do not expose the air bag module to electricity. Never probe a circuit on the air bag side of a connector unless the harness or air bag is disconnected between the test point and the air bag.
- Do not attempt to adapt, reuse, or install an air bag system in any vehicle other than the specific vehicle for which it is designed.
- Do not cut wires or tamper with the connector between the vehicle wiring harness and the air bag module unless the troubleshooting diagnostics specifically direct you to do so. Cutting or removing the connector from the system will disable the safety shunt and could cause unintentional deployment.
- Allow deployed air bag systems to cool after deployment.
- Air bag systems should be deployed in an open area or outdoors to prevent accidental fires.
- Wear rubber gloves and safety glasses when handling a deployed air bag.
- Store, transport, dispose of, and recycle air bag system components in accordance with all applicable federal, state, and local regulations.

- When reactivating the system for the first time after repairs have been made, stand outside of the cab and away from the front of the air bag while turning on the ignition. Check that the SRS indicator comes on for a few seconds and then goes out. Make sure there are no active fault codes.
- Keep all heavy objects in the cab secured.

Remove the fasteners that attach the airbag to the steering wheel.
Remove the airbag.

Disconnect the clockspring connector from the right hand (RH) switch pod.
Use a 10 mm hex driver to remove the steering wheel bolt. Retain the bolt.

Remove the steering wheel.

Remove the clockspring capscrews.

Remove the clockspring.

Install the new clockspring.

Tighten the clockspring capscrews to 10 lbf·in (113 N·cm) +/- 1 lbf·in (11 N·cm).

Thread clockspring wire through steering wheel, but do not connect the clockspring connector.

Thread the switch, airbag, and horn connectors through the hole above the center of the steering wheel, and set the steering wheel on the steering column.

Install the airbag, torque the steering wheel airbag fasteners to 53 lbf·in (600 N·cm) +/- 9 lbf·in (100 N·cm).

Make sure that the steering wheel is oriented as straight as possible.

Apply Loctite® 242 to the steering wheel bolt, then install the bolt and tighten 52 to 66 lbf·ft (70 to 90 N·m).

Install the airbag, torque the steering wheel airbag fasteners to 53 lbf·in (600 N·cm) +/- 9 lbf·in (100 N·cm).

Install a ground diode jumper (part number A66-16268-000).

Before installing the diode harness, make sure that the harness wrapped with fiber wrap.
Disconnect connector X4 on the sSAM.
Connect the diode circuit to connector X4, pin 6.

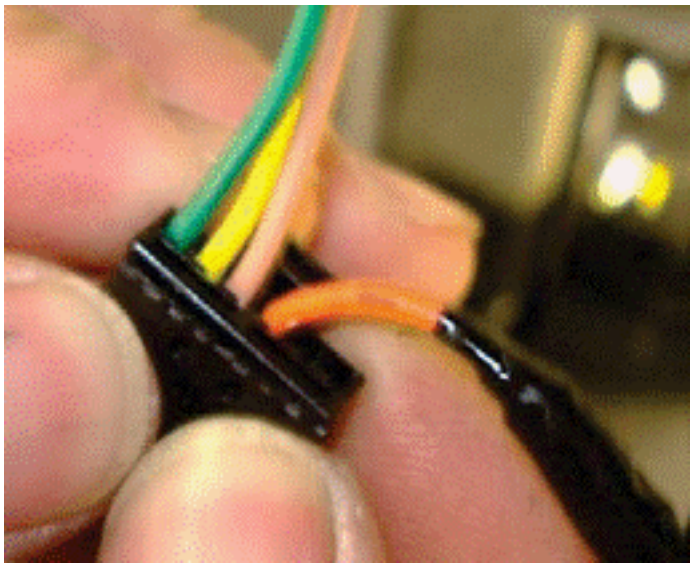
IMPORTANT: Use electrical tape, NOT TIE STRAPS to secure the harness.

Route the jumper between ASAM and steering wheel, following the dash harness and securing using electrical tape to the existing harness.

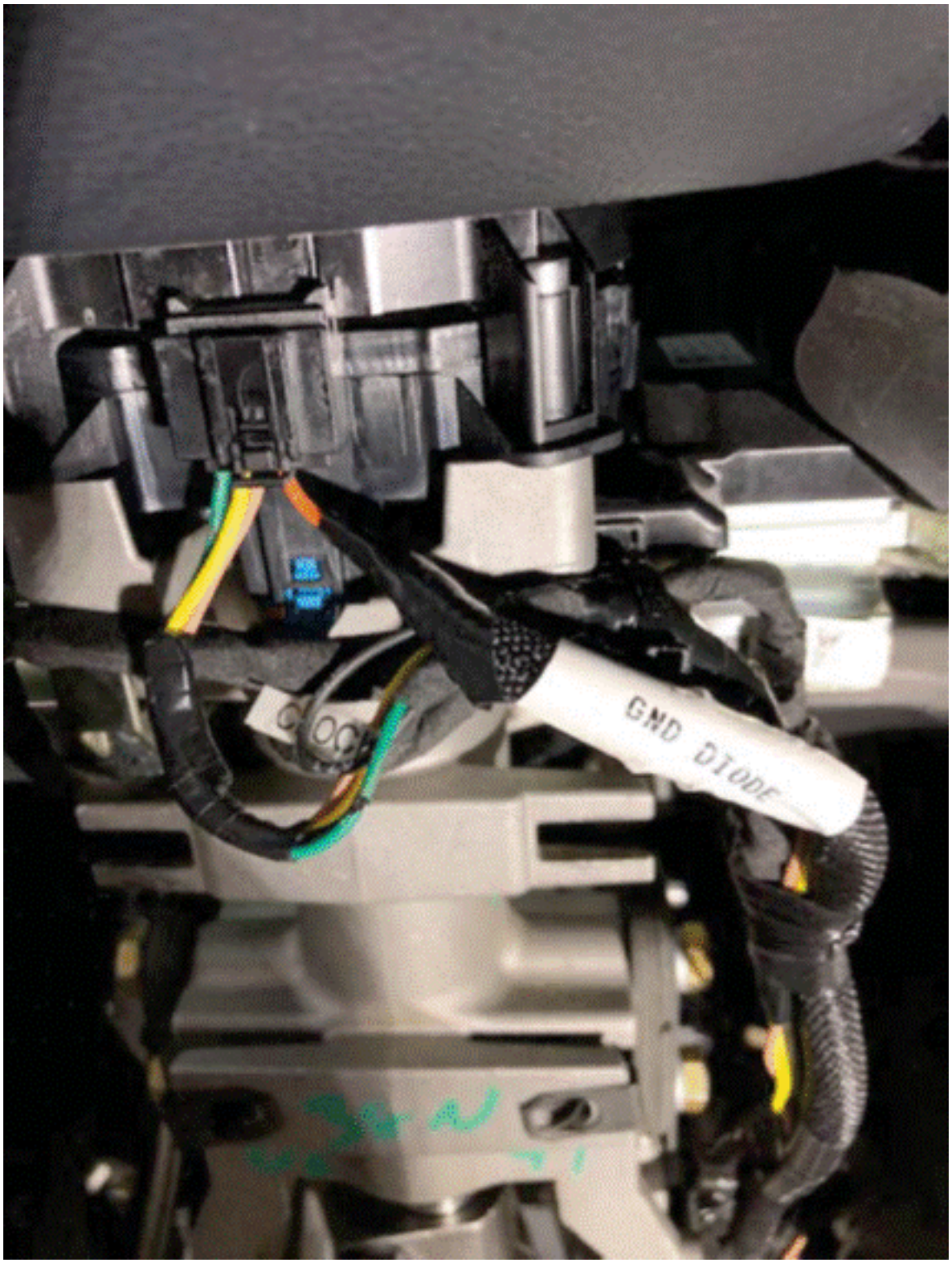
Remove the connector lock from the clockspring connector, then disconnect the horn ground circuit (black) from pin 4.

Cut the terminal and discard it, then fold the wire back and tape it to the harness.

Plug the diode harness into cavity 4 of the clockspring connector.



Connect the clockspring connector.



Install the dash panels. (Refer to Section 60.06, Subject 100 in the New Cascadia Workshop Manual for instructions.)

Close the hood.

Connect the batteries.

Verify proper operation of the vehicle and systems before releasing unit.