Upper Steering Shaft Replacement Procedure – 1998 Land Cruiser shown

Cautions:
- Sharp edges everywhere. Gloves recommended.
- For airbag safety: disconnect battery negative where instructed.

Parts required (for 1998 Land Cruiser):

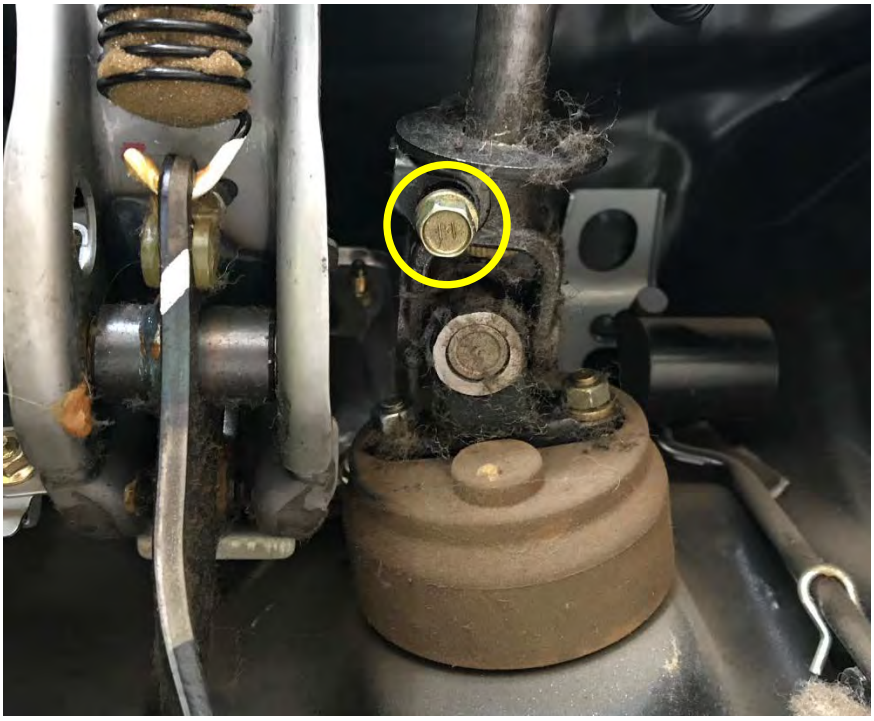
1x 45210-60091 – Steering shaft
1x 90520-17042 – Snap ring
1x 90501-40017 – Spring
1x 45215-12010 – Bearing collar
1x 90363-18005 – Bearing
1x 45273-33030 – Bushing

Tools required:

Philips & flat blade screwdrivers • Hammer • 6mm hex key w/ball end • Needle nose pliers • 10, 12, 19mm sockets • 14, 18mm deep sockets • Steering wheel puller • 10mm box wench • Torx 30 driver or bit • Small wood block • External lock ring pliers (like Craftsman 49273)

Step-by-step procedure:

☐ Start engine.
☐ Turn steering wheel so you can see & remove steering shaft coupling screw above brake pedal (12mm).



☐ Straighten steering wheel.
☐ Turn off engine.
☐ **Disconnect battery negative – important for airbag safety.**
☐ Tilt wheel down.

☐ Remove cluster trim panel by pulling rearward and unplugging connector.



☐ Tilt steering wheel up.

☐ Pry off two steering wheel side covers.



☐ Loosen two airbag screws (Torx 30). The screws remain captured within the steering wheel.





☐ Pull airbag away from steering wheel, unplug the two connectors, and set aside.



☐ Remove steering wheel nut (19mm).

☐ Unplug white steering column connector. Use a small flat blade screwdriver as shown to gently depress lock and lift connector at same time.





☐ Remove steering wheel using puller tool. Bolt threads are 5/16-18.



☐ Unscrew hood & fuel door release levers (two screws under each).



☐ Remove lower left trim black screw (above).

☐ Pull out lower trim to release the five push fasteners.

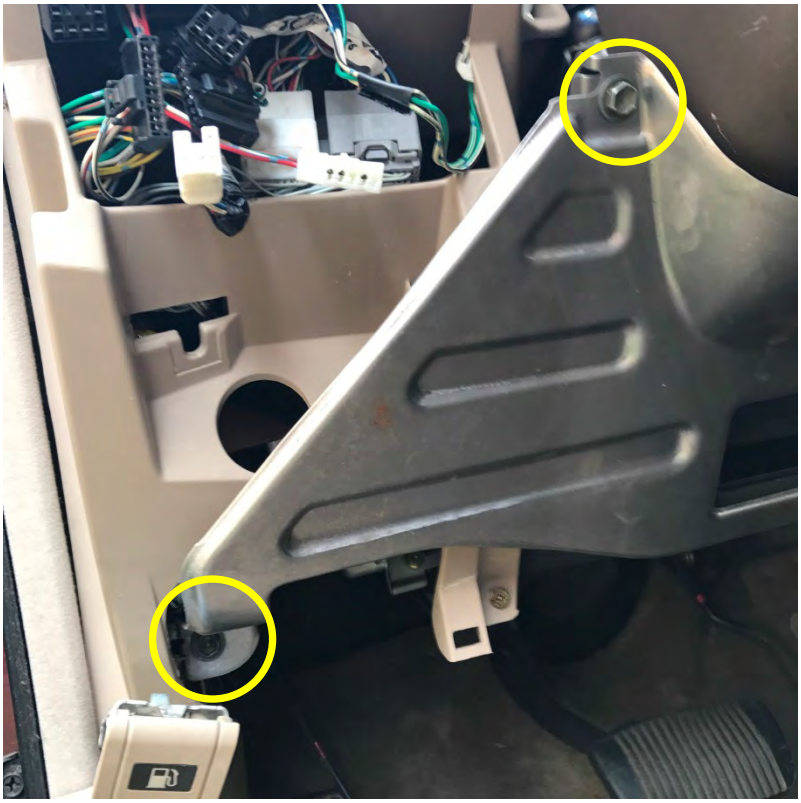
☐ Unplug all connectors from behind side mirror, vent window, & locker switches.



☐ Unscrew air temp sensor/hose to right of steering wheel. Set aside lower trim panel.



☐ Remove lower metal shroud. Caution, it has many sharp edges (four 10mm bolts, left two shown below).



☐ Remove lower black duct. Remove one gold screw, then disengage left side of duct. Pivot left side downward then disengage right side. It's pretty flexible and won't break.





☐ Remove plastic column shroud top & bottom: Remove two black screws facing driver, and one gold screw underneath.



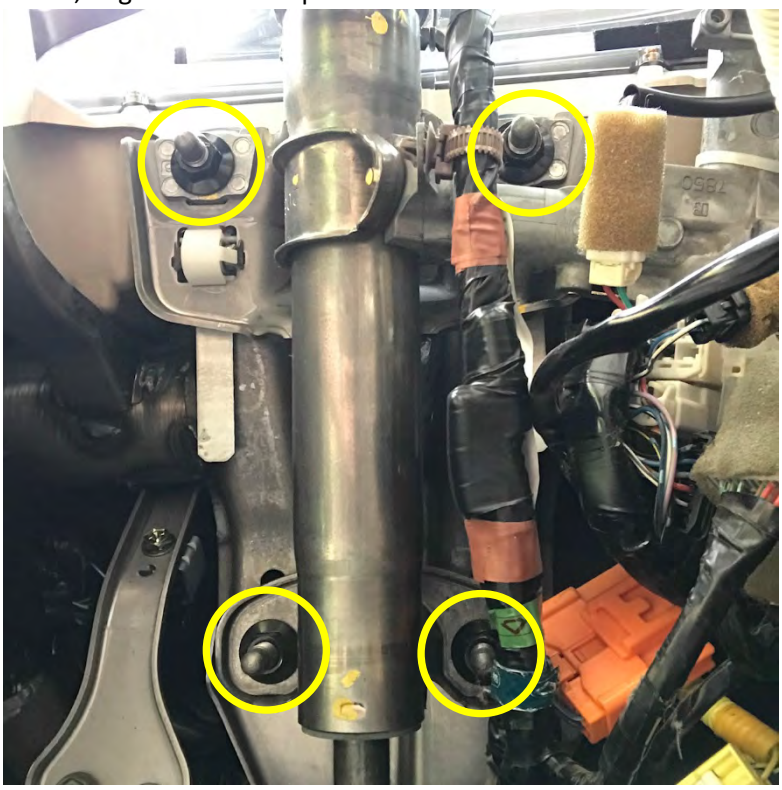


☐ Unplug 10 column connectors under the dash: 1x orange, 2x black, 1x yellow, and 5x white. No need to label them, they all reconnect only one way.





☐ Remove four steering column nuts (14mm deep socket). Catch steering column with gloved hands, edges can be sharp.

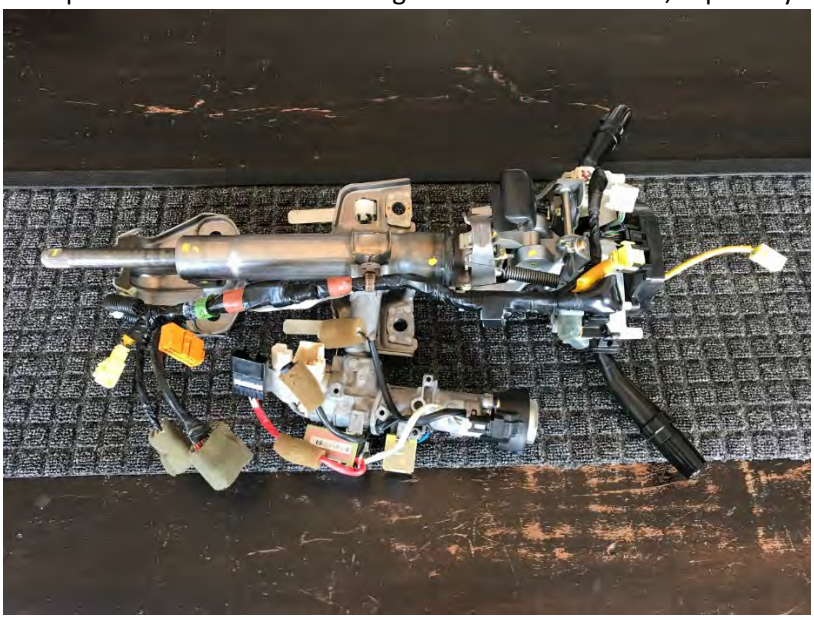


☐ Lower steering column downward and pull to disengage steering shaft from the coupler. The Thrust washer will fall off, that's ok.

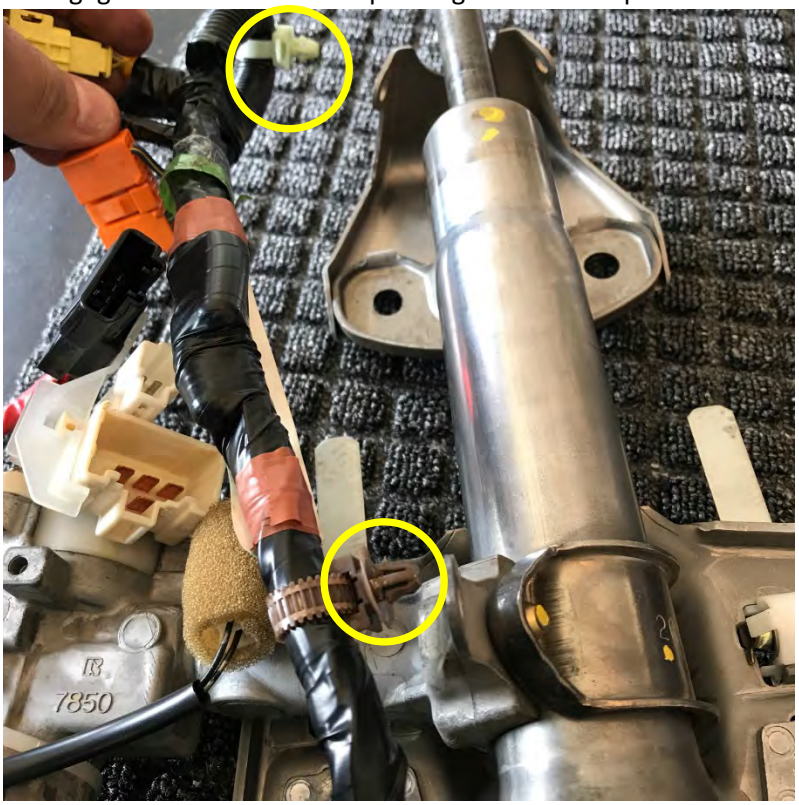


☐ Move steering column to work area.

☐ Take pics of both sides of steering column for reference, especially where/how springs attach.



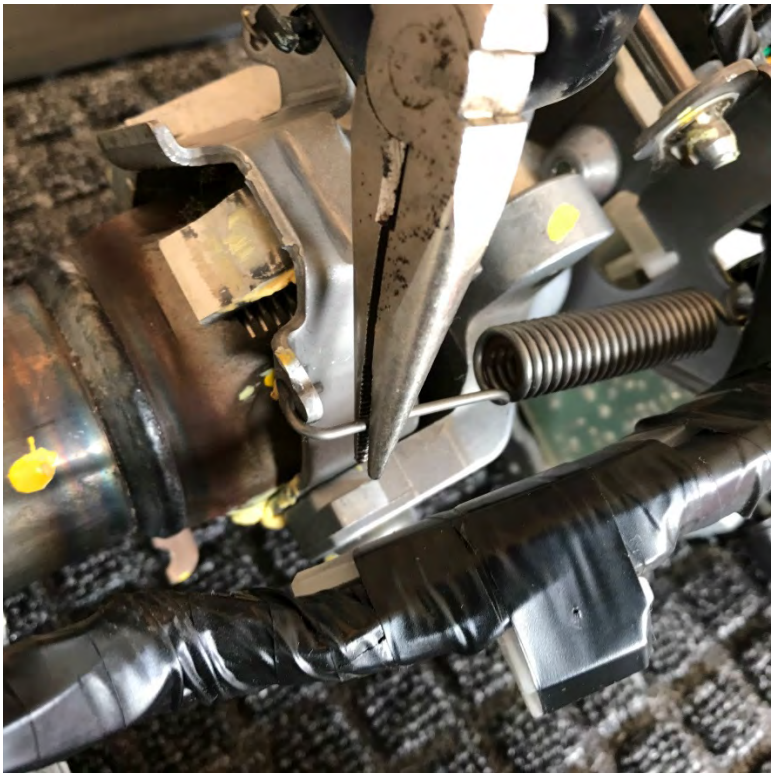
☐ Disengage two wire harness clips using needle nose pliers.



☐ Remove two large tilt springs using needle nose pliers.



☐ Turn over and remove the medium tilt lever spring with needle nose pliers.



☐ Remove small tilt arm spring with needle nose pliers.



☐ Remove the small tilt arm with ball ends. Finagle & wiggle it out, don't force it.

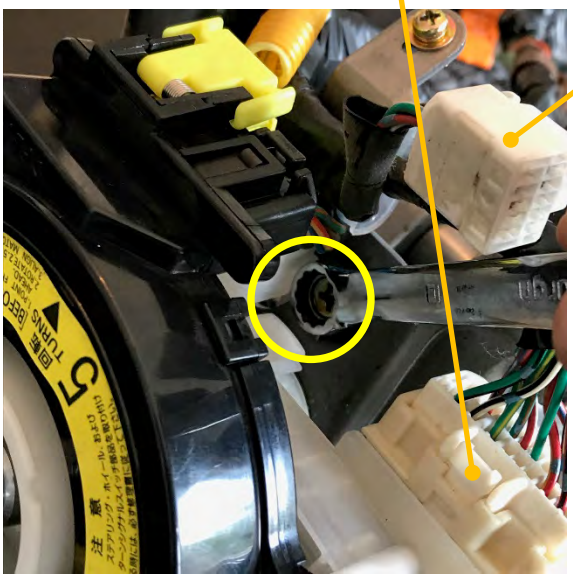


- ☐ Remove two hex pivot bolts (6mm hex key).
- ☐ Insert ignition key and turn to ACC.
- ☐ Separate upper assembly from lower housing. Set aside lower housing.



☐ Remove ignition key.

☐ Remove two screws holding switch assembly (10mm box wrench). Set aside switch assembly. Disconnect large white connector if you need more room. Small white connector is unused.





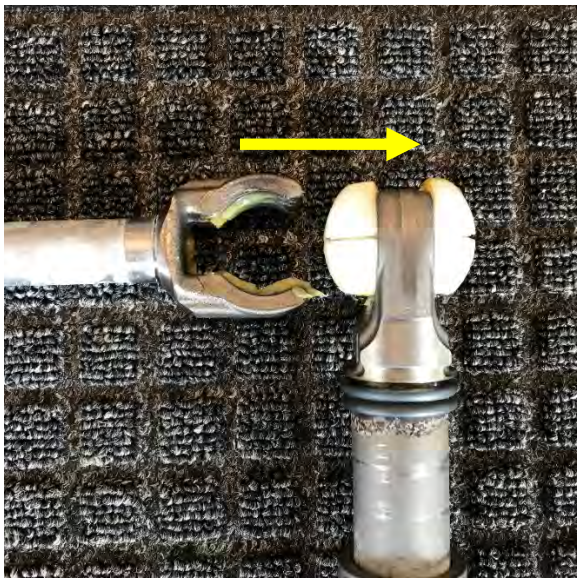
☐ Remove snap ring from shaft using external lock ring pliers.



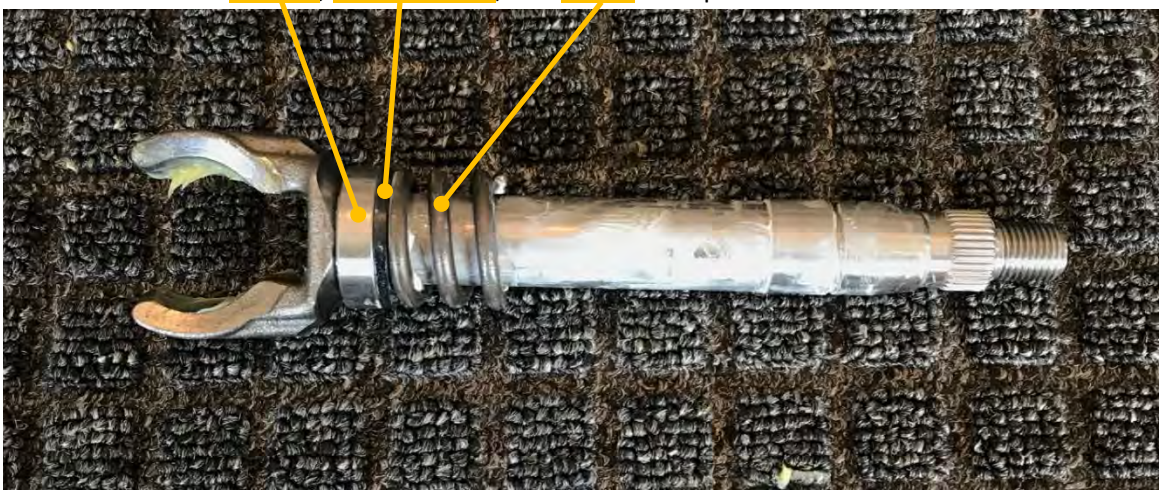
☐ Remove & discard old shaft, spring, bearing collar, & bearing.

☐ Separate top & bottom section of new shaft by bending 90-deg, then sliding out ball joint. Set lower section aside.





☐ Lube & install new bearing, bearing collar, and spring on top section of new shaft.



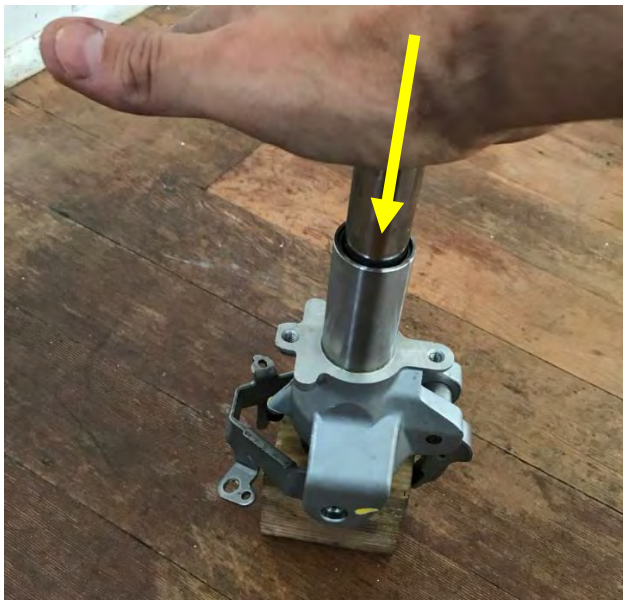
☐ Install new shaft into upper housing.

☐ Slide snap ring onto shaft, followed by 18mm deep socket.

☐ Working on the floor, position the shaft so the two fork legs rest on a small wooden block and the housing is free to move downward when spring is compressed. Be sure tilt pawl and swinging bracket are clear of block.

☐ Push down hard on the socket to simultaneously compress the spring and push the snap ring downward until it snaps into its groove. It takes a lot of force, almost full body weight. That's why you're working on the floor.





☐ Reassemble top & bottom shaft sections while ball joint is rotated 90-deg. Be sure to keep swinging bracket on same side of shaft as toothed pawl.



☐ Slide the switch assembly back onto shaft and install the two mounting screws (10mm box wrench). Reconnect the large white connector if it was unplugged. Small white connector remains unplugged.



☐ Reinsert small tilt arm with ball ends. Finagle, don't force.



☐ Install small tilt arm spring.

☐ On lower column assembly: Knock out old plastic bushing from lower housing using long pipe from inside the tube, or screwdriver from outside the tube.



☐ Press in new plastic bushing using a screwdriver & hammer.

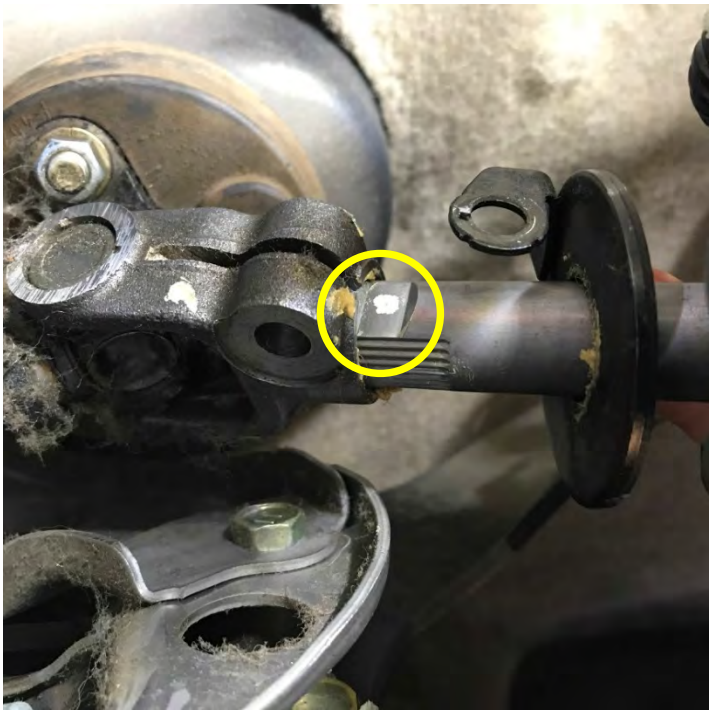


☐ Lube inside of plastic bushing.
☐ Slide upper shaft assembly into lower housing. Tilt teeth go on same side as tilt pawl.
☐ Lube pivot points and install two hex pivot screws (6mm hex key, 15 ft·lb).

☐ Position tilt pawl pin above pivoting bracket



☐ Install medium tilt lever spring.
☐ Turn column over and use tilt release lever to tilt column as far up as possible.
☐ Install two large tilt springs.
☐ Reinstall two wire harness clips.
☐ Insert ignition key and turn to ACC to unlock shaft.
☐ Carry column assembly back to car.
☐ Slide thrust washer onto shaft with screw tab towards firewall
☐ Wearing gloves (column assembly is sharp, greasy, & heavy) insert steering shaft into firewall coupling. The shaft flat must line up with the screw holes.



☐ Thread the coupling screw through the thrust washer's tab and into coupling. Don't tighten yet.
☐ Lift steering column assembly upwards and onto four threaded studs.
☐ Install four nuts (14mm deep socket, 19 ft·lb)
☐ Reconnect 10 connectors: 1x orange, 2x black, 1x yellow, and 5x white.
☐ Install top column shroud. There's an alignment pin on the top, be sure to line it up first.



☐ Align bottom column shroud and push together with top. Install three screws, two black facing you and one gold underneath





☐ Reinstall black duct by positioning left side low and engaging right side first. Then tilt duct up and engage left side. It's pretty flexible and won't break. Be sure air temp sensor/hose is above duct. Install one gold screw.





- ☐ Reinstall lower metal shield, being careful of sharp edges. Pass the air temp sensor/hose through hole on right side (four 10mm bolts).
- ☐ Position lower trim. Reattach air temp sensor/hose with one gold screw.
- ☐ Plug in mirror/vent window switch/locker connectors.
- ☐ Install lower trim: Line up the five push-in fasteners and tab on left side of dash. Be sure cluster trim panel connector is sticking out above trim. Secure with one black screw at lower left.
- ☐ Reattach hood & fuel door levers with four black screws.
- ☐ Gently rotate yellow-labeled clock spring *counter-clockwise* until you feel slight resistance. Connector should be near the bottom.
- ☐ Rotate clock spring *clockwise* 2-1/2 turns until connector is up top.



- ☐ Slide on steering wheel as straight as it can be.
- ☐ Thread on steering wheel nut and finger tighten with 19mm socket. White connector (cruise control) does not need to be plugged in yet.
- ☐ Reconnect battery negative.
- ☐ Start engine.
- ☐ Turn steering wheel to make shaft coupler screw accessible above brake pedal.
- ☐ Tighten shaft coupling screw (12mm, 25 ft·lb).
- ☐ Gently test drive to verify steering wheel is centered. If not:
    - o Pull over
    - o Straighten wheel
    - o Remove steering wheel nut with 19mm socket
    - o Pull steering wheel off with a good tug
    - o Rotate steering wheel the required direction/amount & reinstall
    - o Replace nut finger-tight
    - o Re-check by gently driving
- ☐ When you're sure the steering wheel is positioned correctly, tighten down steering wheel nut (19mm, 37 ft·lb).

- ☐ Turn off engine.
- ☐ **Disconnect battery negative – important for airbag safety.**
- ☐ Plug in white cruise control connector.
- ☐ Plug yellow and white connectors into Airbag module.



- ☐ Position airbag on steering wheel and tighten two side screws (Torx 30, 78 in·lb)
- ☐ Install left & right steering wheel trim
- ☐ Tilt wheel down
- ☐ Reinstall lower gauge trim: Plug in connector and push trim on.
- ☐ Reconnect battery negative.