Michael A. Berardi
Director
Service Engineering Operations
Ford Customer Service Division

Ford Motor Company
P. O. Box 1904
Dearborn, Michigan 48121

July 1, 2014

TO: All U.S. Ford and Lincoln Dealers

SUBJECT: Safety Recall 14S05
Certain 2008-2011 Model Year Escape and Mariner Vehicles
Electric Power Steering

AFFECTED VEHICLES

Certain 2008-2011 model year Escape and Mariner vehicles built at the Kansas City Assembly Plant from Job #1 2008 through September 11, 2010. Affected vehicles are identified in OASIS. In addition, for a list of vehicles assigned to your dealership, visit https://web.fsavinlists.dealerconnection.com. This information was available on May 29, 2014.

REASON FOR THIS SAFETY RECALL

In some of the affected vehicles, the power steering system may revert to manual steering mode due to an Electric Power Steering system fault related to the torque sensor. In manual steering mode there is still a mechanical linkage between the steering wheel and the road wheel, allowing steering control to be maintained. If this condition should occur, the steering effort may be greater at low speeds, which may increase the risk of accident.

SERVICE ACTION

Dealers are to check the Power Steering Control Module (PSCM) for Diagnostic Trouble Codes (DTCs).

- If DTC B1342, B2277, or B2278 are NOT present, reprogram the PSCM and the Instrument Cluster (IC) module.
- If only DTC B2278 is present, replace the torque sensor.
- If DTC B1342 or B2277 is present, replace the steering column assembly.

NOTE: The software to perform the repair is currently not available to support Safety Recall 14S05, but will be released on July 9, 2014. Until IDS release 91.02 is available, customer vehicles should be repaired only if the vehicle arrives at your dealership with a customer complaint of loss of steering assist accompanied by one of the DTCs noted above.

One of the above services must be performed on all affected vehicles at no charge to the vehicle owner.

Dealership service management must provide a copy of the Customer Information Sheet (posted with this bulletin) to the owners of all vehicles that had modules reprogrammed (did not receive a replacement torque sensor or steering column). This Customer Information Sheet provides information on the warnings that may now display on the instrument cluster message center.

OWNER NOTIFICATION MAILING SCHEDULE

Owner Letters are expected to be mailed the week of July 14, 2014. Dealers should repair any affected vehicles that arrive at their dealerships, whether or not the customer has received a letter.

ATTACHMENTS

Attachment I: Administrative Information
Attachment II: Labor Allowances and Parts Ordering Information
Attachment III: Technical Information
Attachment IV: Q & A
Customer Information Sheet
Owner Notification Letter
Recall Reimbursement Plan

QUESTIONS & ASSISTANCE

Special Service Support Center (Dealer Assistance Only) 1-800-325-5621

Sincerely,

Michael A. Berardi

Safety Recall 14S05
Certain 2008-2011 Model Year Escape and Mariner Vehicles
Electric Power Steering

OASIS ACTIVATED?

Yes, OASIS was activated on May 29, 2014.

FSA VIN LIST ACTIVATED?

Yes, FSA VIN list became available through https://web.fsavinlists.dealerconnection.com on May 29, 2014. Owner names and addresses will be available by July 25, 2014.

NOTE: Your FSA VIN list may contain owner names and addresses obtained from motor vehicle registration records. The use of such motor vehicle registration data for any purpose other than in connection with this recall is a violation of law in several states, provinces, and countries. Accordingly, you must limit the use of this listing to the follow-up necessary to complete this recall.

STOCK VEHICLES

Use OASIS to identify any affected vehicles in your used vehicle inventory.

SOLD VEHICLES

- Owners of affected vehicles will be directed to dealers for repairs.
- Immediately contact any of your affected customers whose vehicles are not on your VIN list but are identified in OASIS. Give the customer a copy of the Owner Notification Letter (when available) and schedule a service date.
- Correct other affected vehicles identified in OASIS which are brought to your dealership.

TITLE BRANDED / SALVAGED VEHICLES

Affected title branded and salvaged vehicles are eligible for this recall.

RELATED DAMAGE

If a related damage condition exists that you believe to be caused by the covered condition, call the Special Service Support Center to request approval **prior** to the repair of any related damage. Requests for approval after completion of the repair will not be granted. Ford Motor Company reserves the right to deny coverage for related damage in cases where the vehicle owner has not had this recall performed on a timely basis. Additional related damage parts are subject to random selection for return to the Ford Warranty Parts Analysis Center (WPAC).

ADDITIONAL LABOR TIME

- If a condition exists that requires additional labor to complete the repair, call the Special Service Support Center to request approval **prior** to performing any additional labor. Requests for approval after completion of the repair will not be granted.
- If you encounter aftermarket equipment or modifications to the vehicle which might prevent the repair of the covered condition, call the Special Service Support Center.

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OWNER REFUNDS

- **This safety recall must still be performed, even if the owner has paid for a previous repair. Claiming a refund will not close the recall on the vehicle.**
- Ford Motor Company is offering a refund for owner-paid repairs covered by this recall if the repair was performed prior to the date indicated in the reimbursement plan, which is posted with this bulletin. Owners are directed to seek reimbursement through authorized dealers or, at their option, directly through Ford Motor Company at P.O. Box 6251, Dearborn, MI 48121-6251.
- Dealers are also authorized to refund owner-paid emergency repairs that were performed away from an authorized servicing dealer after the end date specified in the reimbursement plan. Non-covered repairs, or those judged by Ford to be excessive, will not be reimbursed.
- Refunds will only be provided for the cost associated with steering column or torque sensor replacement for loss of steering assist.

RENTAL VEHICLES

If a customer's vehicle requires the replacement of the steering column or torque sensor and it is necessary to order parts, Ford Motor Company will pay for one day of vehicle rental. Follow Extended Service Plan (ESP) guidelines for dollar amounts. The daily rate can include applicable taxes but is not allowed to exceed the stated daily rate. Rentals will only be reimbursed for the day the vehicle is at the dealership for part replacement. Prior approval for more than one rental day is required from the Special Service Support Center (1-800-325-5621). The parts order must be an emergency order (unit down) to guarantee the shortest delivery time.

CLAIMS PREPARATION AND SUBMISSION

- Enter claims using Direct Warranty Entry (DWE).
- Refer to ACESII manual for claims preparation and submission information.
- Related damage must be claimed on a repair line that is separate from the repair line on which the FSA is claimed. Related damage requires prior approval from the Special Service Support Center.
- "MT" labor should be submitted on a separate repair line with the related damage flag checked. "MT" labor requires prior approval from the Special Service Support Center.
- Submit refunds on a separate repair line.
  - Program Code: 14S05
  - Misc. Expense: ADMIN
  - Misc. Expense: REFUND
  - Misc. Expense: 0.2 Hrs.
- Multiple refunds should be submitted on one repair line and the invoice details for each repair should be detailed in the comments section of the claim.
- For rental vehicle claiming, follow Extended Service Plan (ESP) guidelines for dollar amounts. Enter the total amount of the rental expense under Miscellaneous Expense code "Rental".

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LABOR ALLOWANCES

Description	Labor Operation	Labor Time
Check for DTCs and reprogram the PSCM and the IC module	14S05C	0.3 Hours
Check for DTCs and replace Torque Sensor	14S05D	1.6 Hours
Check for DTCs and replace Steering Column Assembly	14S05E	1.9 Hours

PARTS REQUIREMENTS / ORDERING INFORMATION (If applicable DTCs are present.)

Torque Sensor

Part Number	Description	Quantity
CL8Z-3F818-A	Torque Sensor	1
W712250–S437	Upper Column Bolt	2

Steering Column Assembly

Part Number	Description	Quantity
CL8Z-3C529-C	Steering Column Assembly	1
W713065-S439	Steering Column Coupling-to-Steering Gear Bolt	1
W712250–S437	Upper Column Bolt	2

The DOR/COR number for this recall is 50539.

Order your parts requirements through normal order processing channels.

Questions regarding parts should be directed to the Special Service Support Center (1-800-325-5621) or E-mailed to: Ford@Renkim.com.

DEALER PRICE

For latest prices, refer to DOES II.

PARTS RETENTION AND RETURN

Follow the provisions of the Warranty and Policy Manual, Section 1 “WARRANTY PARTS RETENTION AND RETURN POLICIES.”

EXCESS STOCK RETURN

Excess stock returned for credit must have been purchased from Ford Customer Service Division in accordance with Policy Procedure Bulletin 4000.

Safety Recall 14S05
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DEALER Q & A

Q1. What is the problem?

A. Ford is voluntarily recalling certain 2008-2011 model year Escape and Mariner vehicles to address concerns relating to power steering operation. In some of the affected vehicles, the power steering system may revert to manual steering mode due to an Electric Power Steering system fault related to the torque sensor. In manual steering mode there is still a mechanical linkage between the steering wheel and the road wheel, allowing steering control to be maintained. If this condition should occur, the steering effort may be greater at low speeds, which may increase the risk of accident.

Q2. Why are some vehicles repaired through part replacement and others repaired through module reprograming?

A. Each of these repairs mitigates the safety risk associated with this recall. The replacement torque sensor and steering column have improved durability to prevent the condition that results in loss of steering assist. Reprograming the modules will prevent the sudden loss of steering assist while driving, will display a warning light or message, and a chime will sound to inform the driver.

Q3. What does the software updates do?

A. The software updates may extend the time steering assist is maintained. In addition, the update provides increased driver awareness by sounding a chime and displaying the wrench light or warning in the message center when a fault is detected.

Q4. What if a customer experiences loss of steering assist after the modules have been reprogrammed?

A. The modules were reprogrammed to prevent sudden loss of steering assist while driving. Additionally, the instrument cluster software update will provide audible and visual indications to the driver in the unlikely event of a torque sensor fault. Any subsequent loss of assist repairs experienced after completion of module reprogramming are not covered by this recall.

Q5. What should I tell a customer who experiences loss of steering assist after the recall has been performed?

A. The modules were reprogrammed to prevent sudden loss of steering assist while driving in the event of a torque sensor fault. Customers should be advised that the replacement of the steering column or torque sensor is at their expense.

Customer Information Sheet

Your vehicle received revised / updated Instrument Cluster Message Center Information

The instrument cluster module has been reprogramed to provide one of the following warnings:

THROTTLE CONTROL/POWERTRAIN 
Illuminates when a powertrain or steering system fault has been detected. Contact your authorized dealer as soon as possible.

POWER STEERING ASSIST FAULT (If vehicle is equipped with Message Center)
Displayed when the power steering system has disabled the power assist due to a system error. Contact your authorized dealer as soon as possible.

Please keep this letter in your glove box with your Owner Manual for future reference

Ford Motor Company
Recall Reimbursement Plan for 14S05

Ford and Lincoln Mercury dealers are in the best position to quickly and efficiently process reimbursement requests. However, federal legislation requires all motor vehicle manufacturers to establish processes through which customers may seek recall reimbursement directly from the manufacturer or from the dealers.

Regarding the specific reimbursement plan for Recall # 14S05, owners who have paid for service to remedy the defect or noncompliance must have had that service performed prior to July 25, 2014. After this date, if repairs related to this recall are performed by a non-Ford repair facility in an emergency situation, customers must submit any refund requests through their dealership. As required by this federal regulation, Ford Motor Company submitted the details of its latest General Recall Reimbursement Plan in a letter to the National Highway Traffic Safety Administration (NHTSA) in February 2009. The following is the text of that letter and the Plan:

General Recall Reimbursement Plan
(As submitted to the NHTSA)

Pursuant to the requirements set forth in 49 CFR Part 573 and Part 577 of the Code of Federal Regulations, Ford Motor Company (Ford) is submitting required information pertaining to our general reimbursement plan for the cost of remedies paid for by vehicle owners before they are notified of a related safety recall.

Set forth below is Ford's general plan to reimburse owners and purchasers for costs incurred for remedies in advance of notification of potential safely-related defects or noncompliances pursuant to Part 573.6 (c)(8)(i). This plan has not changed since our February 28, 2007 submission.

Reimbursement Notification

Ford's notice to a vehicle owner in accordance with 49 CFR Part 577 will indicate that Ford is offering a refund if the owner paid to have service to remedy the defect or noncompliance prior to a specified ending date. In accordance with Part 573.13 (c)(2), this ending date will be defined as a minimum of ten calendar days after the date on which Ford mailed the last of its Part 577 notifications to owners, and will be indicated in the specific reimbursement plan available to owners for an individual recall. This notice will direct owners to seek eligible reimbursement through authorized dealers or, at their option, directly through Ford at the following address:

Ford Motor Company
P.O. Box 6251
Dearborn, MI 48121-6251

Ford notes that this rule allows for the identification of a beginning date for reimbursement eligibility. Under the rule, an owner who paid to remedy the defect or noncompliance prior to the identified beginning date would not be eligible for reimbursement. Ford generally has not established such a beginning date for reimbursement eligibility and does not presently anticipate changing this general policy. However, in any case where Ford determines a beginning date is appropriate, Ford will indicate that date in the owner notice. As permitted by 577.11(e), Ford may not include a reimbursement notification when all vehicles are well within the warranty period, subject to approval by the agency.

Costs to be Reimbursed

For vehicles, reimbursement will not be less than the lesser of:

- The amount paid by the owner for the remedy that specifically addressed and was reasonably necessary to correct the defect or noncompliance that is the subject of the recall, or
- The cost of parts for the remedy (to be no more than the manufacturer's list retail price for authorized part(s), plus associated labor at local labor rates, miscellaneous fees (such as disposal of waste) and taxes.

For replacement equipment, reimbursement will be the amount paid by the owner for the replacement item (limited by the amount of the retail list price of the defective or noncompliant item that was replaced, plus taxes, where the brand or model purchased by the owner was different than the brand or model that was the subject of the recall). If the item of motor vehicle equipment was repaired, the reimbursement provisions identified above for vehicles will apply.

Ford notes that costs incurred by the owner within the period during which Ford's original or extended warranty would have provided for a free repair of the problem will not be eligible for reimbursement, as provided by Part 573.13 (d)(1).

Entities Authorized to Provide Reimbursement

Ford will continue to use authorized dealers to reimburse owners under the specific reimbursement plans for a particular recall, and will encourage owners to pursue requests for reimbursement directly through dealers to expedite reimbursement. Ford will also provide a mailing address to which customers can, at their option, send requests for reimbursement directly to Ford, as previously noted. Requests for reimbursement sent directly to Ford may take up to 60 days to process. Whether the owner chooses to pursue reimbursement requests through a dealer or directly through Ford, the owner will be directed to submit the required documentation, upon which reimbursement eligibility will be determined.

Required Documentation

The reimbursement determination will depend upon the information provided by the customer. Consistent with Part 573.13 (d)(4) the following information must be submitted:

- Claimant name and address
- Vehicle make, model, and model year
- Vehicle identification number (VIN) and, for replacement equipment, a description of such equipment or, for tires, the model, size and TIN (DOT code)
- Identification of the recall number (either the Ford recall number or the NHTSA recall number)
- Identification of the owner of the recalled vehicle at the time that the pre-notification remedy was obtained
- An original receipt for the pre-notification remedy that includes a breakdown of the amount for parts, labor, other costs and taxes, including costs for the replacement item. Where the receipt covers work other than to address the recall or noncompliance, Ford may require the claimant to separately identify costs that are eligible for reimbursement.
- If the remedy was obtained during the warranty period, documentation indicating that the warranty was not honored or the warranty repair did not correct the problem related to the recall.

Failure to submit all of the above information may result in denial of the reimbursement request.

Additional Information

The Part 577 required owner notice will provide a toll-free telephone number through which specific information about the reimbursement plan can be requested from Ford. This general reimbursement plan will be incorporated into notifications pursuant to Part 573.6 by reference. Information specific to an individual recall also may be incorporated into the Part 573.6 notification.

CERTAIN 2008-2011 MODEL YEAR ESCAPE AND MARINER VEHICLES — ELECTRIC POWER STEERING

OVERVIEW

In some of the affected vehicles, the power steering system may revert to manual steering mode due to an Electric Power Steering (EPS) system fault related to the torque sensor. In manual steering mode there is still a mechanical linkage between the steering wheel and the road wheel, allowing steering control to be maintained. If this condition should occur, the steering effort may be greater at low speeds, which may increase the risk of accident.

SERVICE PROCEDURE

1. Connect IDS and check for Diagnostic Trouble Codes (DTCs) in the Power Steering Control Module (PSCM).

    - If DTC B1342, B2277, or B2278 are NOT present, reprogram the PSCM and the Instrument Cluster (IC) module. Proceed to "Module Reprogramming" on Page 2.

    - If only DTC B2278 is present, replace the torque sensor. Proceed to "Torque Sensor Replacement" on Page 4.

    - If DTC codes B1342 or B2277 are present, replace the steering column. For additional information, refer to Workshop Manual (WSM) Section 211-04.

NOTE: None of the modules need to be reprogrammed if the torque sensor or the steering column is replaced.

Important Information for Module Programming

NOTE: When programming or reprogramming a module, use the following basic checks to ensure programming completes without errors.

- Make sure the 12V battery is fully charged before carrying out the programming steps and connect IDS/scan tool to a power source.
- Inspect Vehicle Communication Module (VCM) and cables for any damage. Make sure scan tool connections are not interrupted during programming.
- A hardwired internet connection is strongly recommended.
- Turn off all unnecessary accessories (radio, heated/cooled seats, head lamps, interior lamps, HVAC system, etc.) and close doors.
- Disconnect/depower any aftermarket accessories (remote start, alarm, power inverter, CB radio, etc.).
- Follow all scan tool on-screen instructions carefully.
- Disable IDS/scan tool sleep mode, screensaver, hibernation modes.
- Create all sessions Key On Engine Off (KOEO). Starting the vehicle before creating a session will cause errors within the programming inhale process.

Module Reprogramming

NOTE: Reprogram appropriate vehicle modules before performing diagnostics and clear all Diagnostic Trouble Codes (DTCs) after programming. For DTCs generated after reprogramming, follow normal diagnostic service procedures.

1. Reprogram the PSCM and IC module using IDS release 91.02 or higher.

NOTE: All PSCMs require an update, but only some IC modules require an update.

NOTE: Calibration files may also be obtained at www.motorcraft.com.

NOTE: Follow the IDS on-screen instructions to complete the reprogramming procedure.

Recovering a module when programming has resulted in a blank module: NEVER DELETE THE ORIGINAL SESSION!

a. Obtain the original IDS that was used when the programming error occurred during Module Reprogramming (MR) or Programmable Module Installation (PMI).

b. Disconnect the VCM from the data link connector (DLC) and the IDS.

c. Reconnect the VCM to IDS and then connect to the DLC. Once reconnected, the VCM icon should appear in the corner of the IDS screen. If it does not, troubleshoot the IDS to VCM connection.

d. Locate the ORIGINAL vehicle session when programming failed. This should be the last session used in most cases. If not, use the session created on the date that the programming failed.

NOTE: If the original session is not listed in the previous session list, click the "Recycle Bin" icon at the lower right of the previous session screen. This loads any deleted sessions and allows you to look through them. Double-click the session to restore it.

e. Once the session is loaded, the failed process should resume automatically.

f. If programming does not resume automatically, proceed to the Module Programming menu and select the previously attempted process, PMI or MR.

g. Follow all on-screen prompts/instructions.

h. Near the end of programming, the IDS prompts you to select certain parameters. It is important to make a selection for ALL parameters listed. If the correct selection is already highlighted, you must still choose that selection before clicking the "Tick" mark to complete the configuration.

i. The last screen on the IDS may list additional steps required to complete the programming process. Make sure all applicable steps listed on the screen are followed in order.

Torque Sensor Replacement

NOTE: This procedure must take place in a clean environment to ensure no contamination enters the worm gear.

NOTE: For clarity, some illustrations show an orientation different from the actual work perspective.

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to WSM Section 100-02.

2. For ease of assembly, turn the steering wheel to the 11:00 o'clock position.

3. Hybrid vehicles: Depower the high-voltage traction battery. For additional information, refer to WSM Section 414-03.

4. Disconnect the 12V battery. For additional information, refer to WSM Section 414-01.

5. Remove the steering column opening trim. See Figure 1.

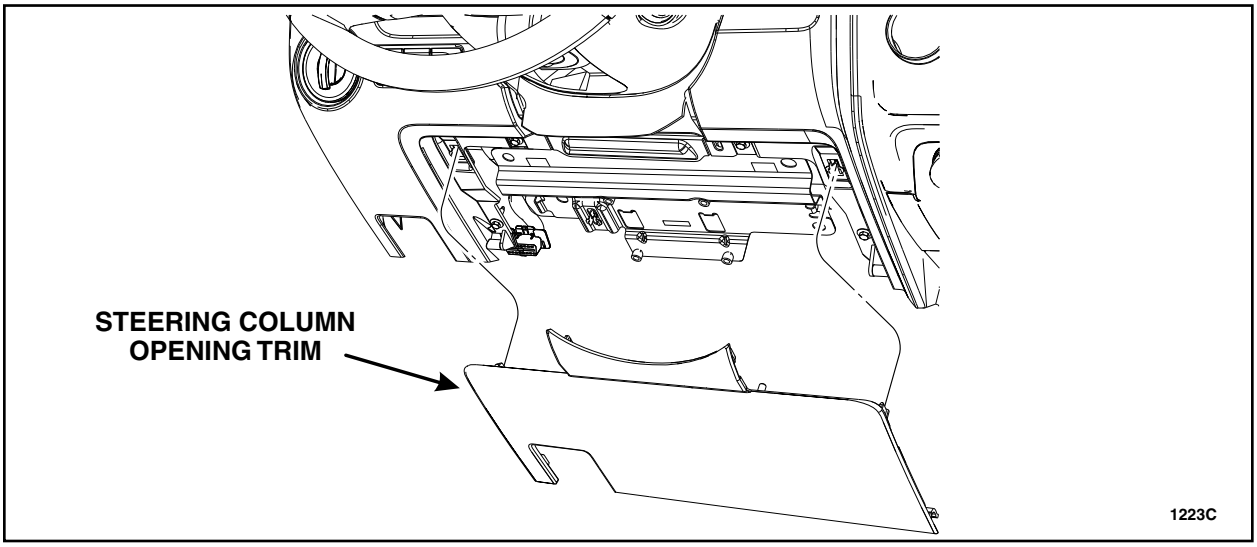

FIGURE 1

6. If present, use a suitable cutting tool to carefully cut through the two cutoff lines and discard the instrument panel cutout. See Figure 2.

NOTE: Steering column removed for clarity.

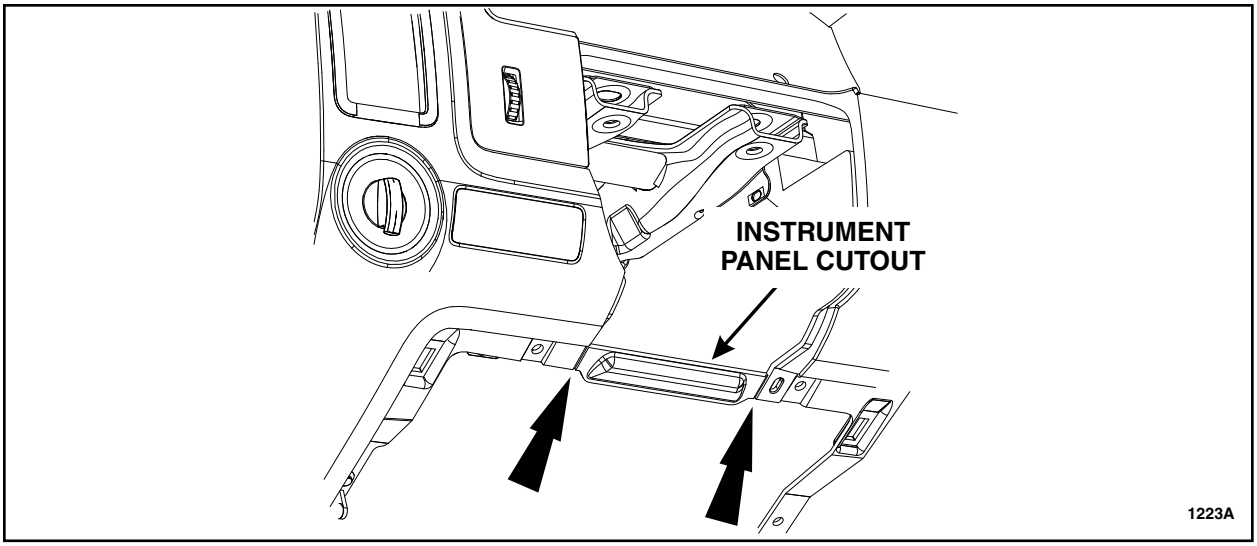

FIGURE 2

7. Remove the four bolts and the steering column opening panel. See Figure 3.

NOTE: Steering column removed for clarity.

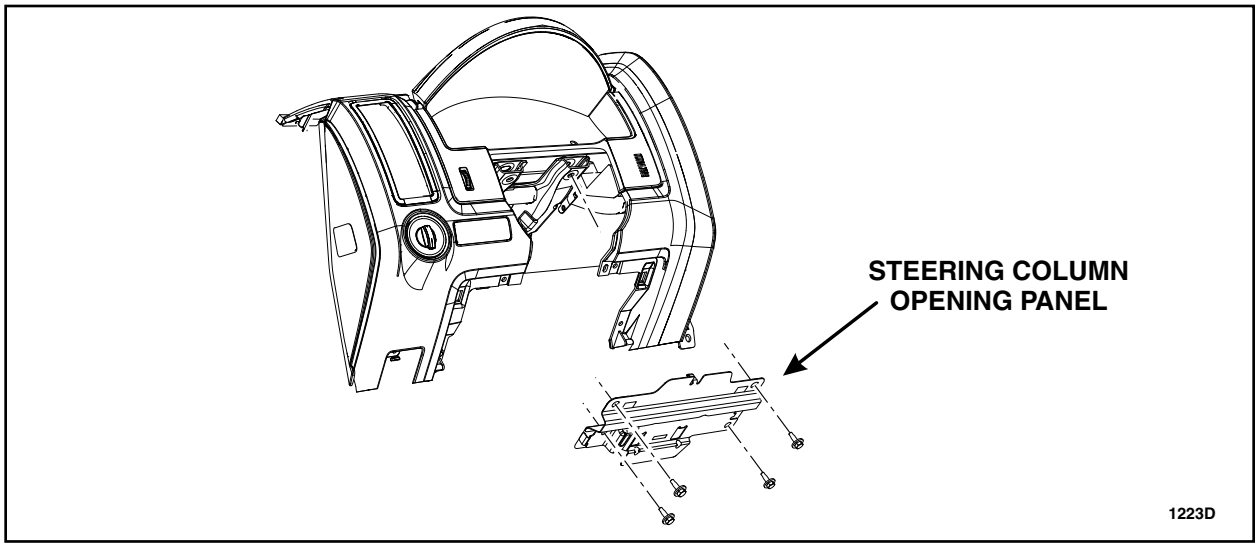

FIGURE 3

8. Pull up and remove the upper column shroud. See Figure 4.

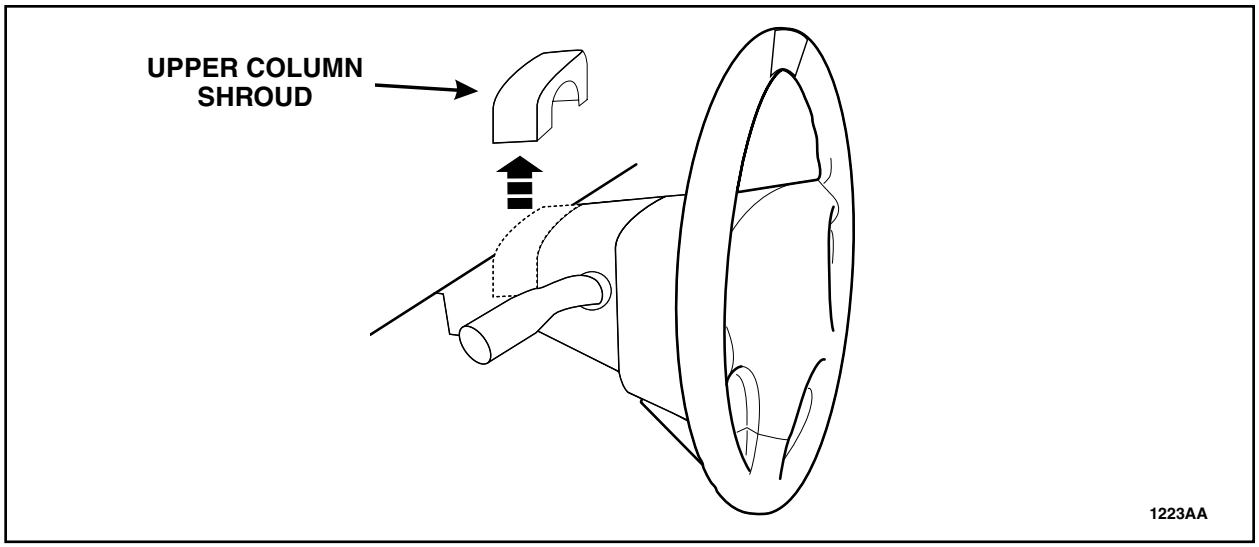

FIGURE 4

9. Remove the three machine screws and the lower column shroud. See Figure 5.

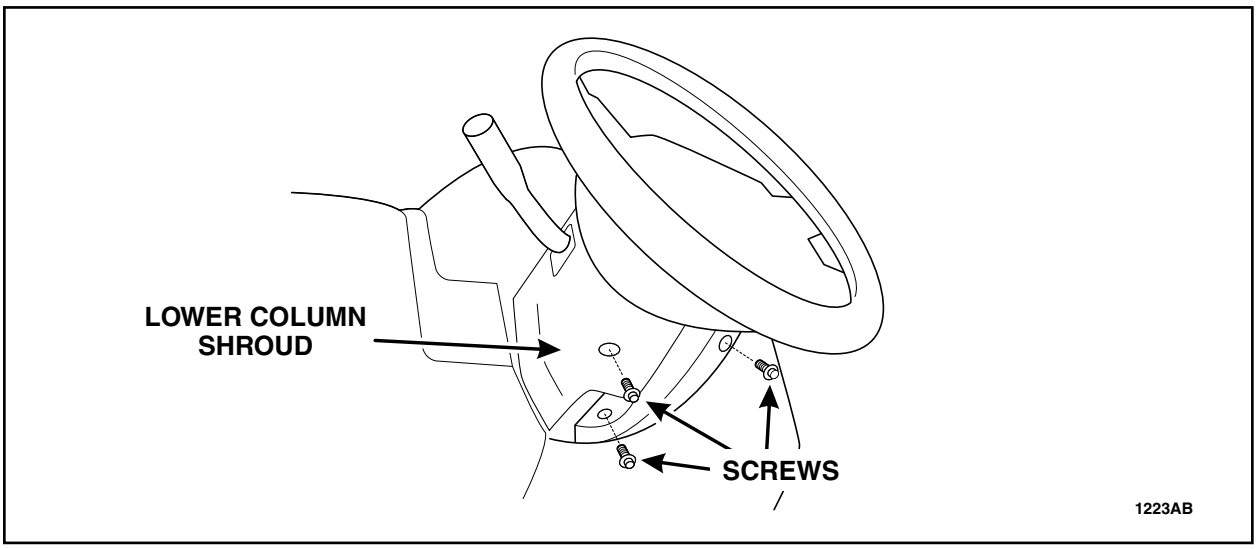

FIGURE 5

10. Disconnect the three connectors on the left side of the column. Remove the two harness pin-type retainers. See Figure 6.

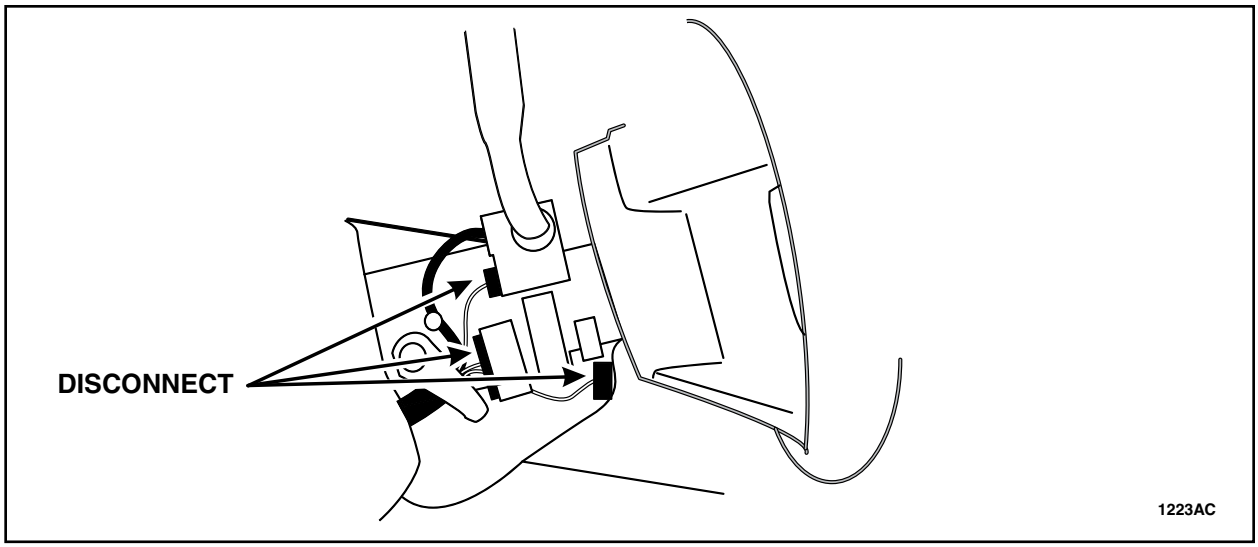

FIGURE 6

11. If equipped, disconnect the Passive Anti-Theft System (PATS) transceiver electrical connector. Remove the harness pin-type retainer and position the harness aside. See Figure 7.

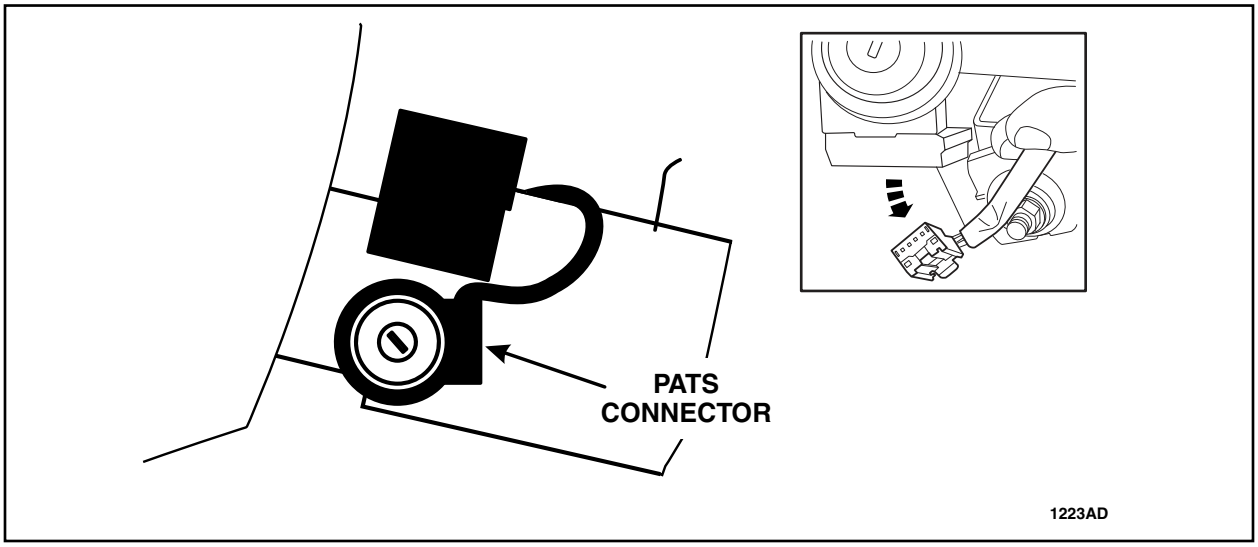

FIGURE 7

12. Remove and discard the two upper column bolts. See Figure 8.

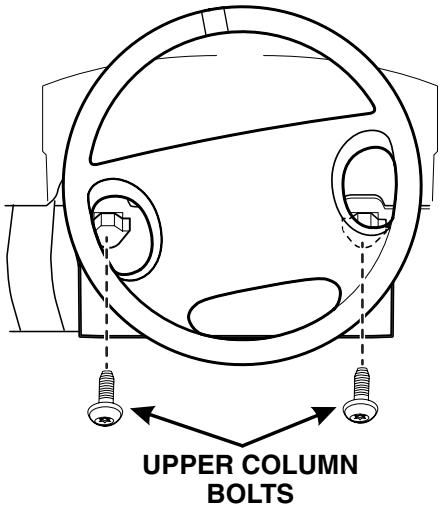

FIGURE 8

13. Tape the wheel to the Multifunction Switch (MFS) to prevent rotation of the wheel. Pull out and remove the steering wheel and upper column assembly as a single unit. See Figure 9.

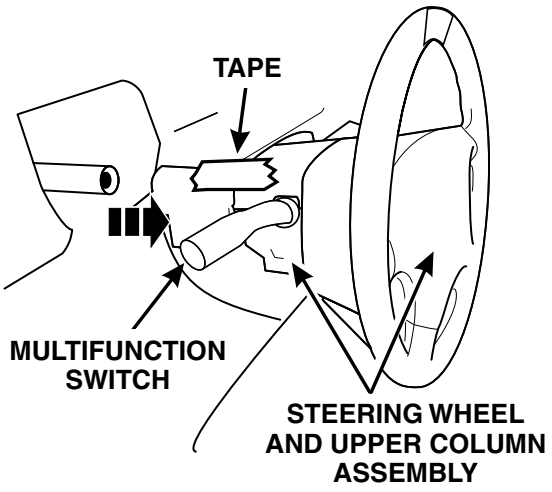

FIGURE 9

14. Remove the snap ring using Rotor Clip® RP-900 ratchet and grip ring pliers or equivalent. Remove the lower jacket. See Figure 10.

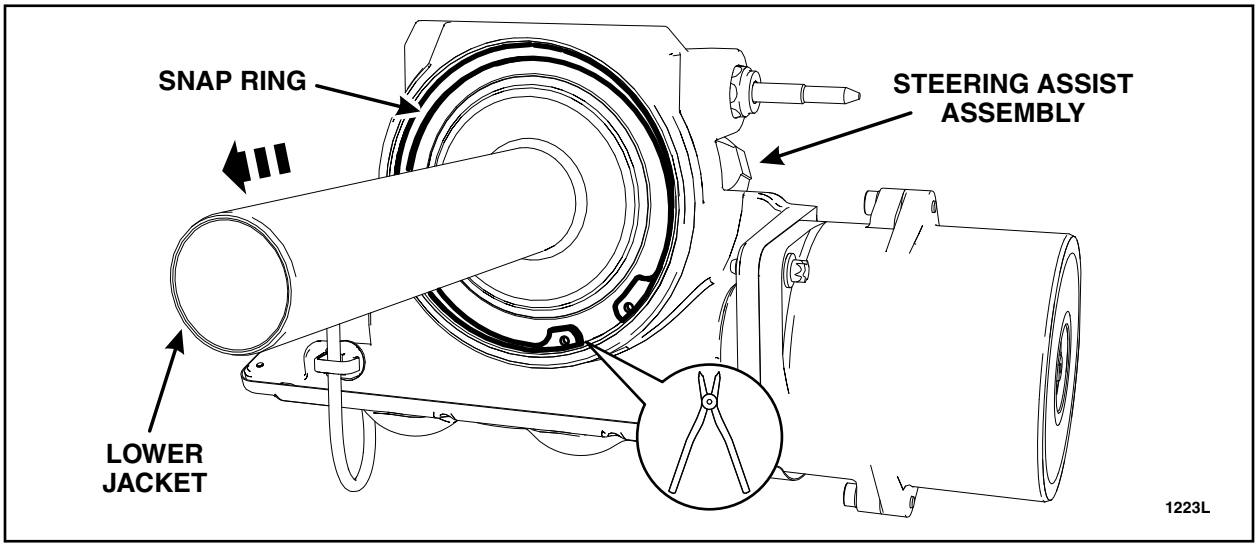

FIGURE 10

15. Remove the sensor seal from the steering assist assembly. See Figure 11.

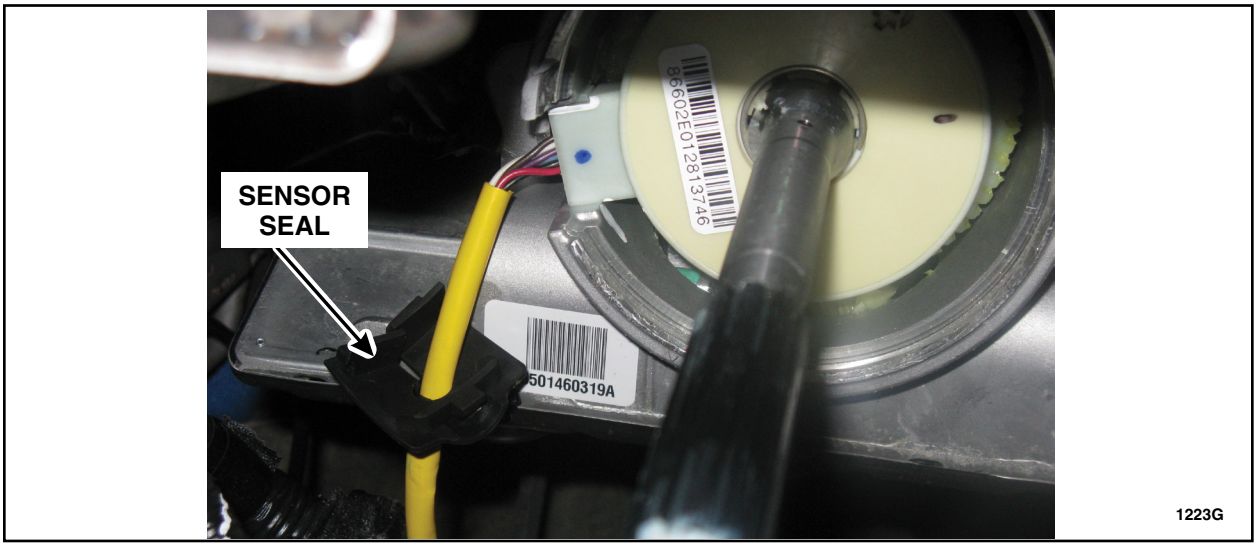

FIGURE 11

16. Disconnect the torque sensor electrical connector and remove the harness pin-type retainer. See Figure 12.

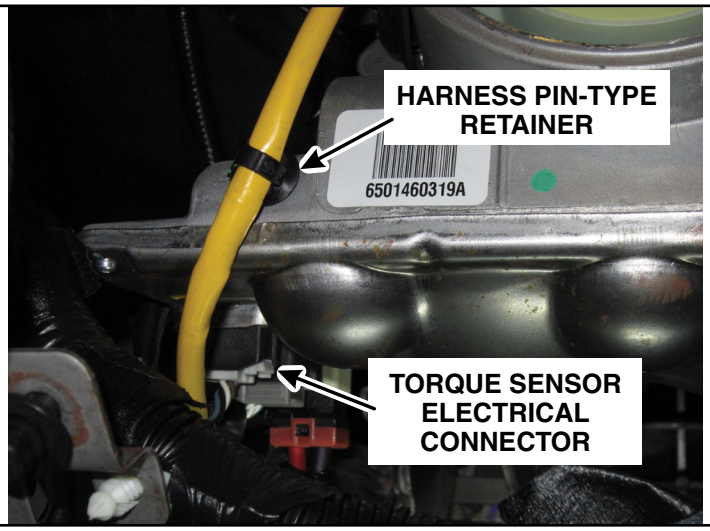

FIGURE 12

17. Raise the front of the vehicle high enough to remove the load off the front tires. For additional information, refer to WSM Section 100-02.

To see a short video of the torque sensor installation, click "Here".

IMPORTANT: Do not use pliers or locking pliers to turn the steering shaft or damage will occur. Two people are required to properly align the torque sensor.

18. Before removing the old torque sensor assembly, verify the steering shaft keyway is aligned with the sensor alignment mark. This will ensure that the steering input shaft is in the correct position for installation of the sensor alignment tool. (If necessary, have an assistant bump the front tires left or right until the sensor is perfectly aligned.) See Figure 13.

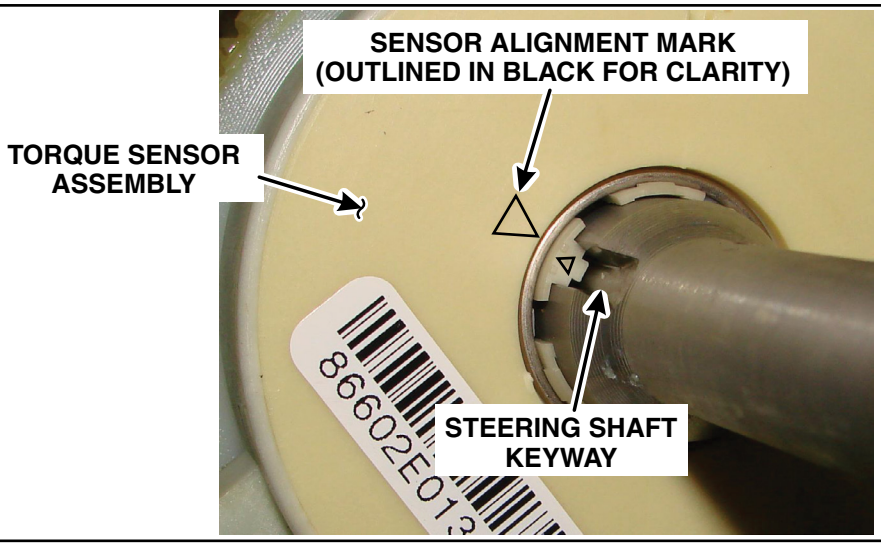

FIGURE 13

19. Prying gently from the back, remove the torque sensor assembly. Remove the sensor by gently pulling up on the sensor wires while using a hooked pick tool to lift the opposite side of the sensor. See Figure 14.

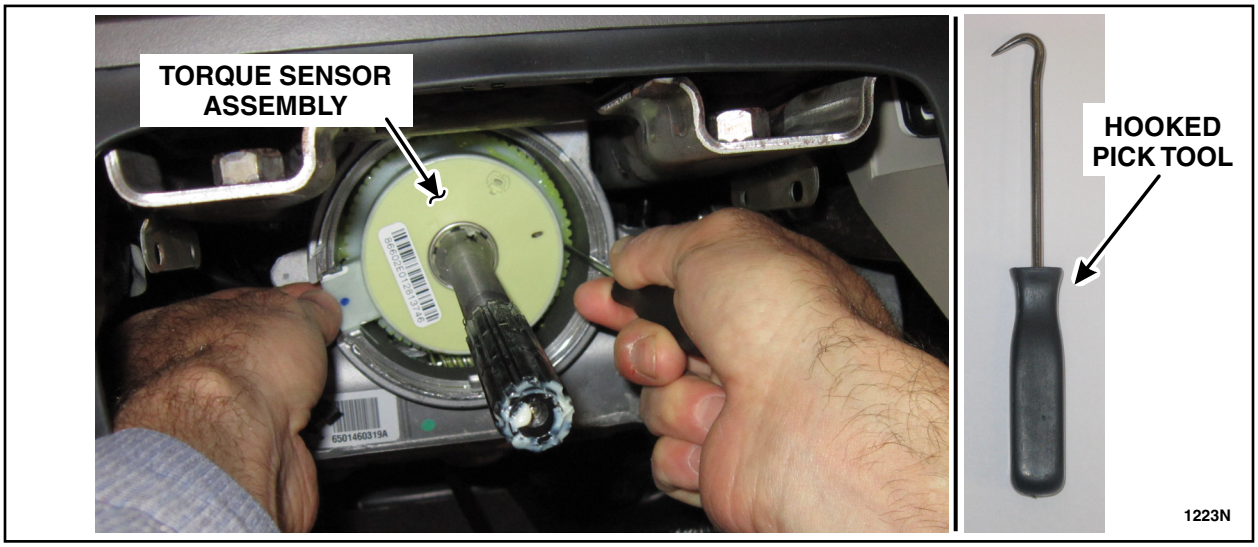

FIGURE 14

20. Inspect the underside of the sensor for damage. In case of breakage or damage, replace the steering column. For additional information, refer to WSM Section 211-04.

21. Vacuum the surface of the gear face to remove any contamination. Thoroughly vacuum the worm gear. See Figure 15.

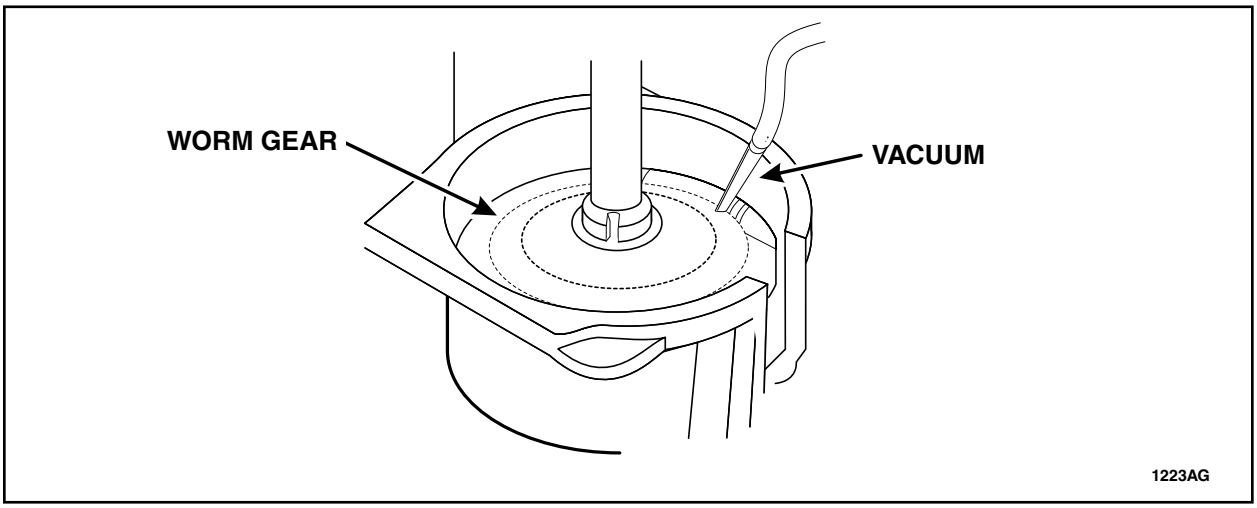

FIGURE 15

IMPORTANT: Up and down movement of the steering gear assembly in the vehicle will cause the steering shaft to rotate slightly. When you begin the next step, you MUST keep the steering gear assembly "locked" in the same position. Up and down movement of the steering gear during alignment and installation process will result in a misaligned torque sensor.

IMPORTANT: The following steps (22 through 28) are CRITICAL for the proper installation of the torque sensor assembly.

NOTICE: The *new* torque sensor will come with a locking pin that ensures the steering angle sensor and the steering torque sensor are "locked" in the proper position. DO NOT remove this pin until the sensor assembly is completely installed.

NOTE: Do not force tool into place, the tool must feel loose when in proper position.

22. Install the alignment tool. During installation of the tool, the tool key on the alignment tool should slide easily into the steering shaft key way. If there is any binding, have an assistant bump the tires slightly to the right or left again until the alignment tool falls into place. See Figure 16.

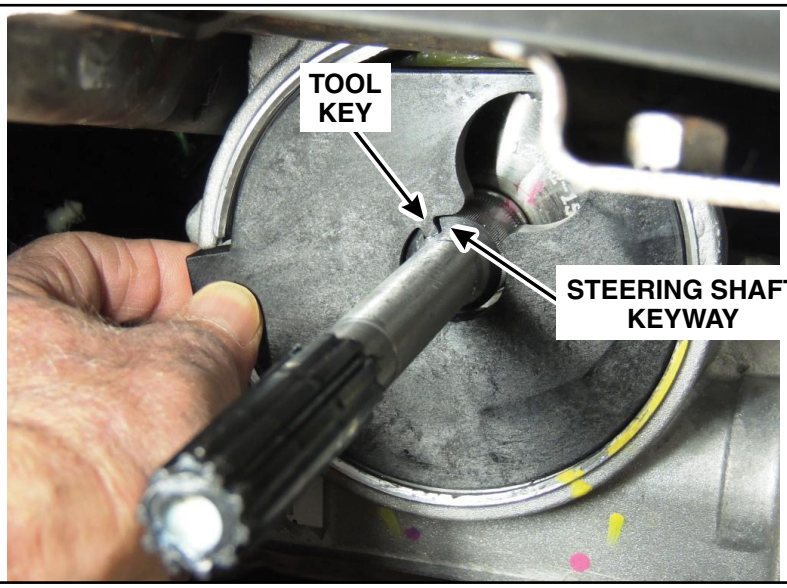

FIGURE 16

23. While the alignment tool is in place, attempt to rotate the tool in the clockwise and counter-clockwise direction.

    - If the alignment tool can freely rotate slightly in the clockwise and counter-clockwise direction, the tool is properly aligned. Proceed to Step 24. See Figure 17.
    - If the alignment tool cannot freely rotate, the steering shaft **is not** aligned. Have an assistant bump the tires slightly until the alignment tool can be rotated slightly.

NOTE: The alignment tool should not feel stiff while rotating. If it does, the steering shaft is not aligned.

FIGURE 17

24. After the steering shaft is **perfectly** aligned with the spline on the alignment tool, remove the alignment tool and carefully install the torque sensor assembly with the locking pin still in place. When seating the torque sensor assembly, apply gentle but even force on both sides of the sensor (DO NOT REMOVE THE LOCKING PIN YET). See Figure 18.

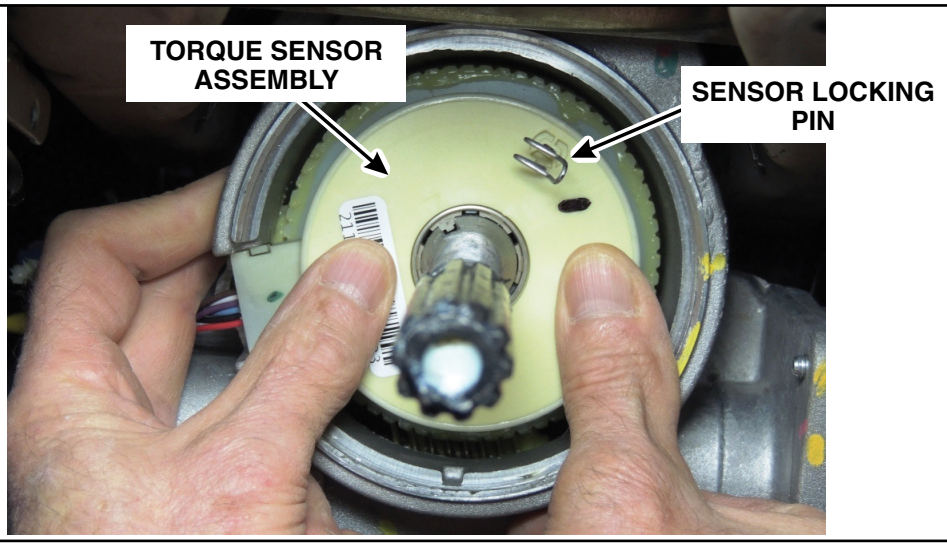

FIGURE 18

25. Ensure the locking pin is not shifted to one side of the sensor viewing window. The optimal position for the locking pin is centered in the viewing window. See Figure 19.

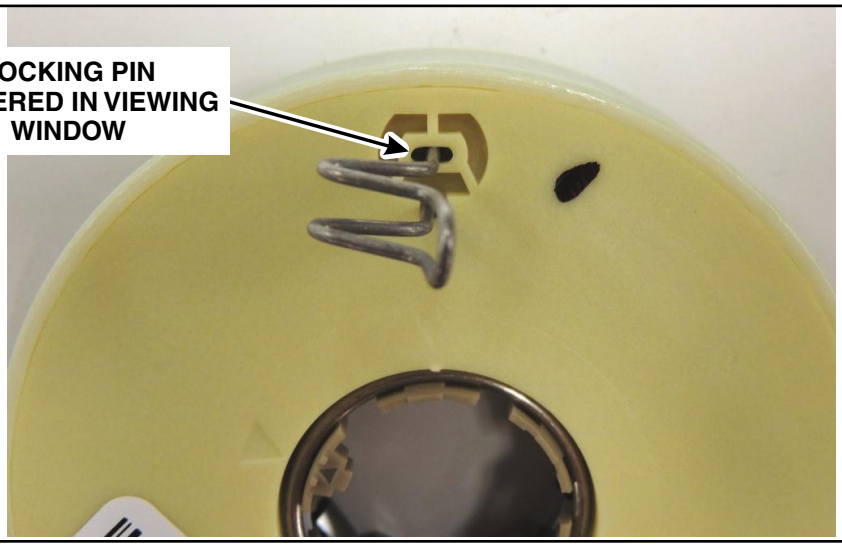

FIGURE 19

26. **Fully Seating the Torque Sensor Assembly**:

NOTICE: <u>DO NOT</u> push the torque sensor assembly past flush with the gear housing rim or damage to the sensor will occur.

Use the alignment tool to verify the torque sensor assembly is seated properly. The top of the alignment tool should be flush with gear housing rim. See Figure 20.

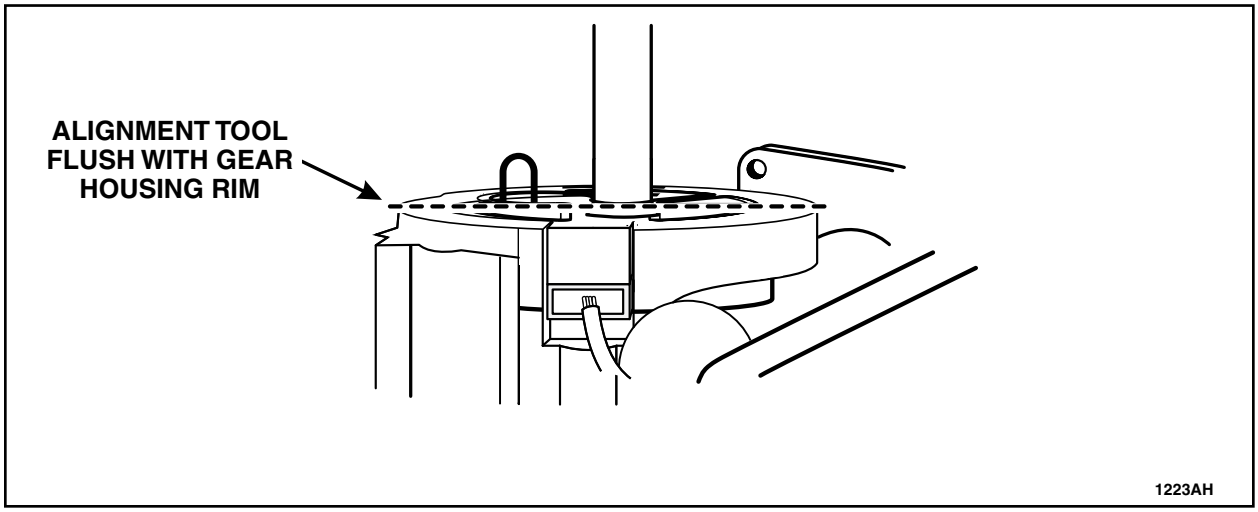

FIGURE 20

NOTICE: Do not drop the locking pin into the steering gear housing or damage may occur.

27. While the alignment tool is still in place, remove the locking pin, then remove the alignment tool. See Figure 21.

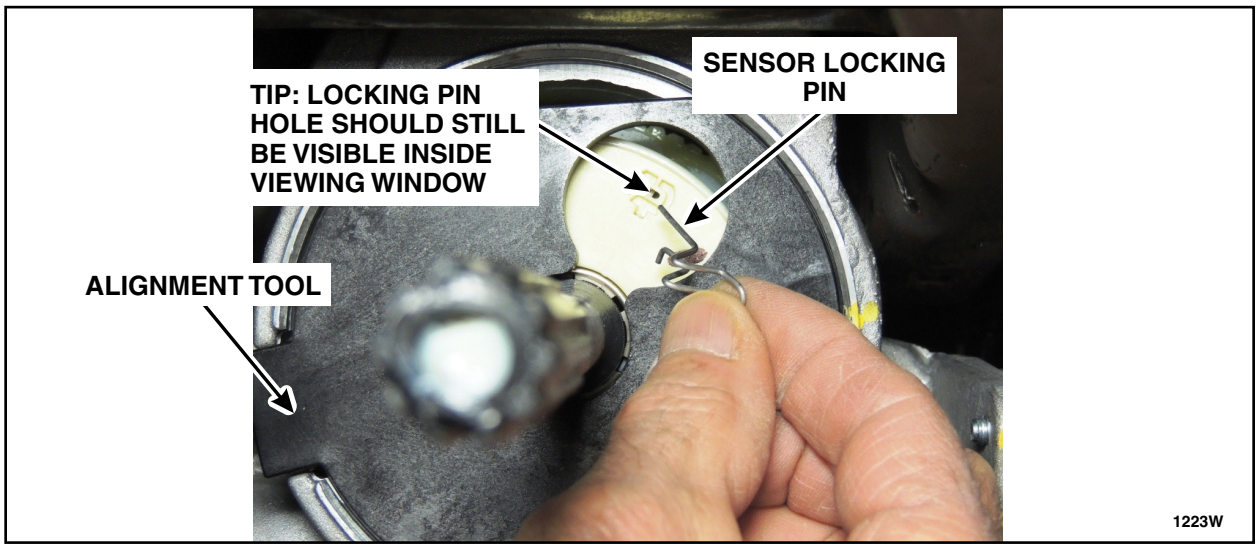

FIGURE 21

TIP: When the locking pin is removed, the locking pin hole should still be visible inside the sensor viewing window. If the sensor was not properly aligned during installation, the locking pin hole will move out of view when the locking pin is removed.

28. Check locking pin hole location.

- If the locking pin hole is completely visible (Figure 22a), the sensor is installed correctly. Proceed to Step 29.
- If the locking pin is not completely visible (Figure 22b), remove and discard the torque sensor. Obtain a new torque sensor and repeat Steps 22 through 28. See Figure 22a and 22b.

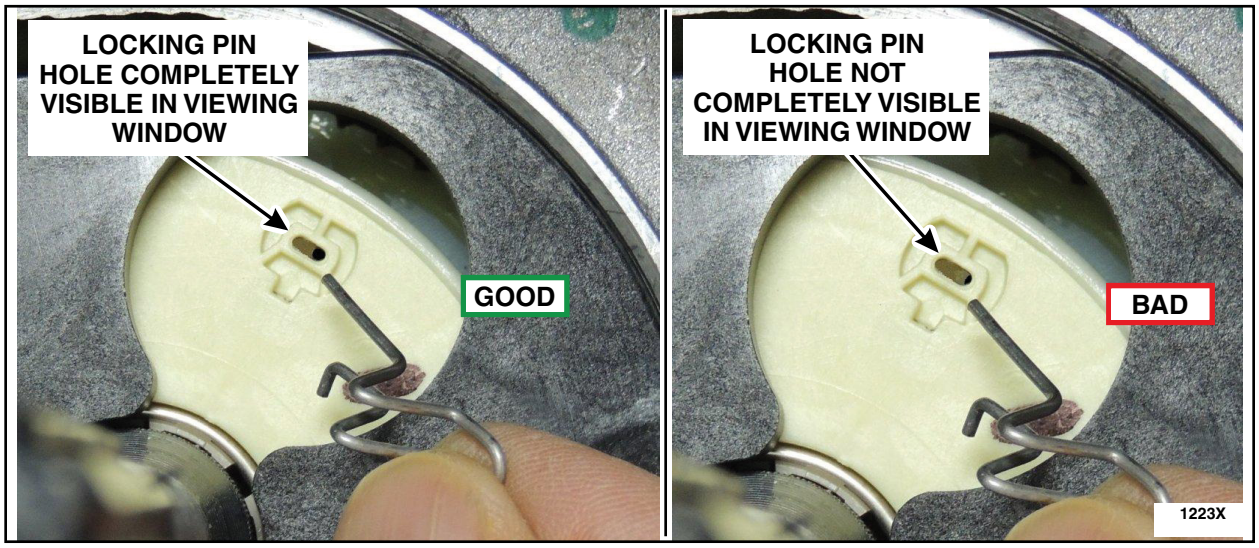

FIGURE 22a **FIGURE 22b**

29. Connect the torque sensor electrical connector and install the harness pin-type retainer. See Figure 12.

30. Reinstall the sensor seal onto the steering assist assembly. See Figure 11.

31. Install the lower jacket and the original snap ring bevel side up. See Figure 23.

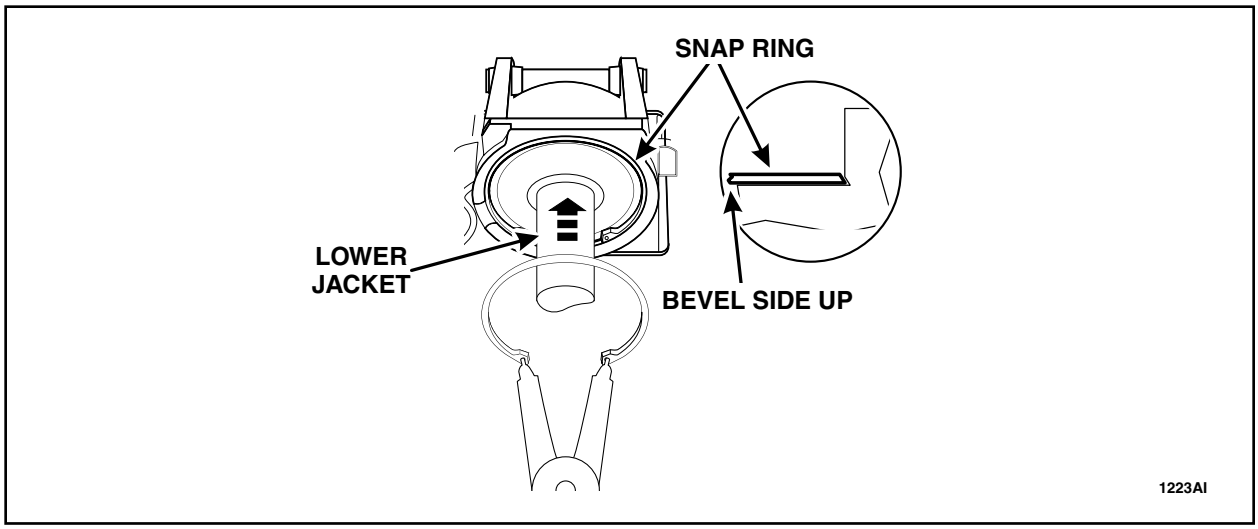

FIGURE 23

32. Ensure snap ring gap is positioned 90 degrees from sensor seal. Measure the gap between snap ring ears. Gap must be 18 - 20mm (3/4 in) to ensure snap ring is seated correctly. See Figure 24.

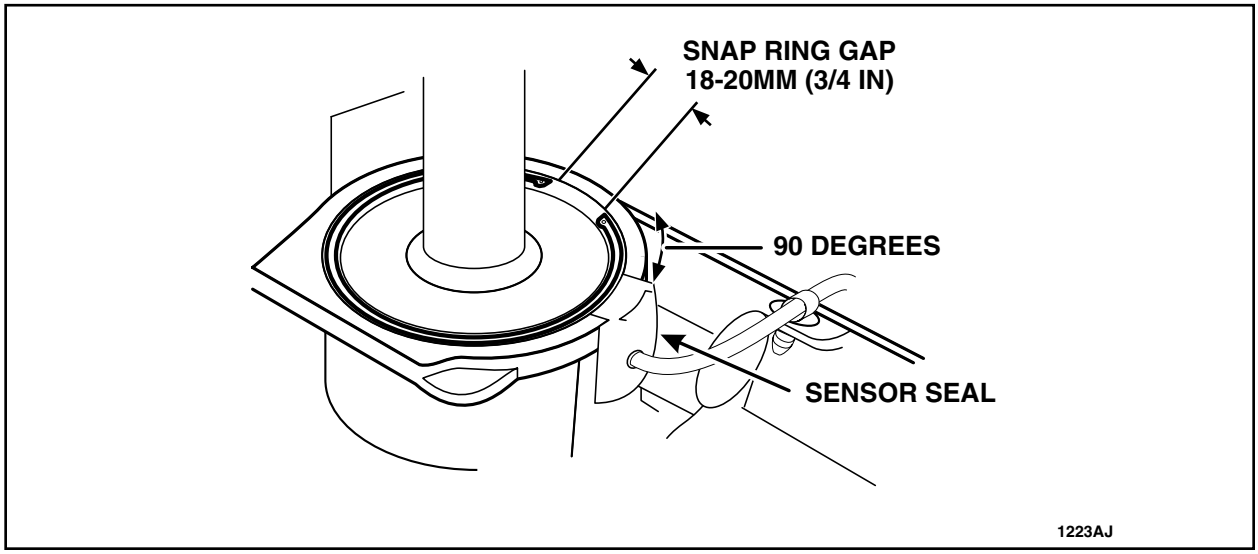

FIGURE 24

NOTE: The steering wheel and upper steering column assembly should slide on easily. Significant resistance means the upper column assembly is not properly aligned. If necessary, rotate the upper column assembly for proper alignment. All rotating parts must be properly aligned during assembly. Position tolerance ± 5 degrees.

33. Install the steering wheel and upper column assembly and remove the tape. Rotate the upper column assembly as necessary to align with block tooth on shaft.

34. Install two (2) new upper column bolts. See Figure 8.

    - Tighten bolts to 28 Nm (21 lb-ft).

35. If equipped, connect the PATS transceiver electrical connector. Reposition the harness and install the pin-type retainer. See Figure 7.

36. Connect the three connectors on the left side of the column. Install the two harness pin-type retainers. See Figure 6.

37. Install the lower column shroud and tighten the three machine screws. See Figure 5.

38. Install the upper column shroud. See Figure 4.

39. Install the four bolts and the steering column opening panel. See Figure 3.

    - Tighten to 8 Nm (71 lb-in).

40. Install the steering column opening trim. See Figure 1.

41. Connect the 12V battery. For additional information, refer to WSM Section 414-01.

42. Hybrid vehicles: Repower the high-voltage traction battery. For additional information, refer to WSM Section 414-03.

43. Lower the vehicle and start the engine. With the engine running and a properly installed sensor, the steering wheel should stay centered. If the torque sensor is **NOT** installed properly (i.e. not centered during installation), the steering wheel will move all the way to the right or left. The torque sensor only needs to be off center a small amount to cause this type of problem. During normal operation, the torque sensor only moves a maximum -5 degree to +5 degrees.

44. Perform Steering Wheel Position Sensor Calibration. For additional information, refer to WSM Section 211-00.