

# ***SERVICE PROCEDURE***

22513R1  
August, 2025

**SUBJECT: SAFETY RECALL**  
Steering Gear on certain 2022 and 2023 IC Bus® CE, FE Chassis, SFC and TC commercial buses, International® WorkStar® and Prostar® model trucks and HV™, HX®, LT®, MV™, RH™, and Lonestar® series trucks built 06/01/2021 through 06/07/2022 built with R. H. Sheppard HD94E, M100P, M110P, HD94P, XD120P, MD83P, SD110P, M83P, M90P, or M80P model steering gears

## **CUSTOMER LETTER**

Print ready (PDF file) copy of the [Customer Letter](#)

## **DEFECT DESCRIPTION**

The steering gears may have been assembled with less than the required input shaft ball bearings and can result in a fracture of the input shaft and loss of steering. A loss of steering increases the risk of a vehicle crash.

## **REASON FOR REVISION**

An update has been made to the steering gear procedure to include an updated website hyperlink to the R.H. Sheppard steering gear identification website.

## **MODELS INVOLVED**

This safety recall involves certain 2022 and 2023 IC Bus® CE, FE Chassis, SFC and TC commercial buses, International® WorkStar® and Prostar® model trucks and HV™, HX®, LT®, MV™, RH™, and Lonestar® series trucks built 06/01/2021 thru 06/07/2022 built with R. H. Sheppard HD94E, M100P, M110P, HD94P, XD120P, MD83P, SD110P, M83P, M90P, or M80P model steering gears.

## **ELIGIBILITY**

This procedure applies ONLY to vehicles marked in the International® Service Portal<sup>SM</sup> with Safety Recall 22513. Also complete any other open campaigns listed on the Service Portal at this time.

## **PARTS INFORMATION**

**NOTE: New trucks in dealer inventory that are found to have a suspect steering gear, must be repaired using a steering gear for non - Delivered To User (DTU) vehicle and not a recall part number.**

**NOTE: If your location has any steering gears in inventory, please refer to the R.H. Sheppard link later in this procedure to determine inventory steering gear status.**

**NOTE: Do not pre-order steering gears for inventory as only 1,600 of the 45,000 vehicles will require a replacement. Some customers may experience a higher SUSPECT percentage result.**

**NOTE: Any suspect steering gear removed are required to be returned to Product Review Center per warranty standard procedures.**

See table at end of document for specific parts information.

## **SERVICE PROCEDURE**

**WARNING!** To prevent personal injury and / or death, or damage to property, park vehicle on hard flat surface, turn the engine off, set the parking brake and install wheel chocks to prevent the vehicle from moving in either direction.

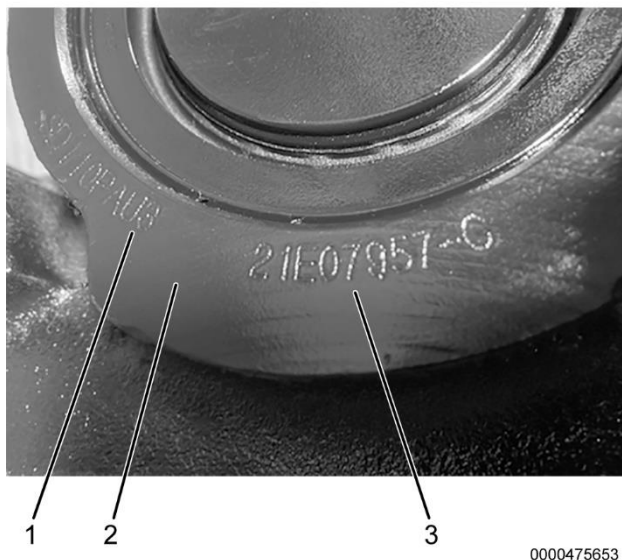
**WARNING!** To prevent personal injury and / or death, always wear safe eye protection when performing vehicle maintenance.

**WARNING!** To prevent personal injury and / or death, or damage to property, allow engine / vehicle components to cool before servicing.

**WARNING!** To prevent personal injury and / or death, or damage to property, keep flames or sparks away from vehicle and do not smoke while servicing the vehicle's batteries. Batteries expel explosive gases.

## **STEERING GEAR INSPECTION**

1. Park vehicle on flat surface.
2. Shift transmission to Park or Neutral and set parking brake.
3. Turn vehicle ignition to Key OFF position.
4. Install wheel chocks.
5. Unlatch and open hood to access steering gear.



**Figure 1. Gear Housing Sector Shaft Output**

1. Part number
2. Gear housing sector shaft output
3. Serial number

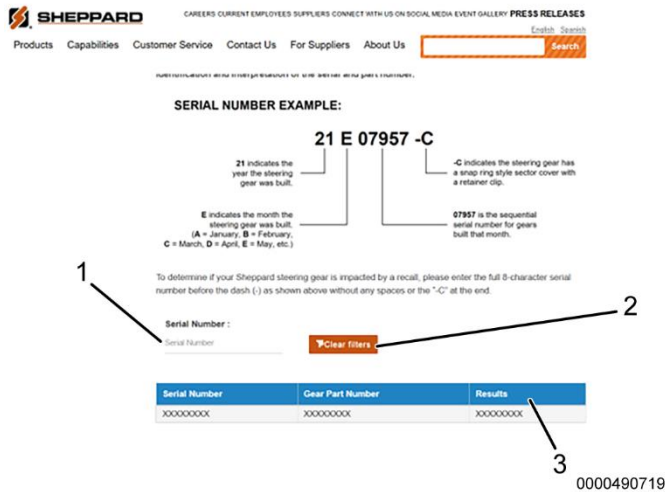
**NOTE:** The steering gear serial number is located on the steering gear housing at the bottom of the sector shaft outlet. The wheels may need to be turned for proper viewing. Additionally, a small portion of gears may have the serial number at the top of the sector shaft outlet.

**NOTE:** The steering gear serial number is a two-digit year followed by an alpha numeric month – Example: 21E (2021 May).

**NOTE:** If the serial number and / or part number are illegible due to paint, a flat head screwdriver, wire brush, or emery cloth may be used to lightly remove paint where the numbers are located.

6. Record the entire steering gear serial number. Use the R.H. Sheppard link below to determine if the gear needs to be replaced.

[Sheppard Steering Gear Classification Tool \(rhsheppard.com\)](http://rhsheppard.com)



**Figure 2. Steering Gear Classification Tool**

1. Serial number field
  2. Clear filters
  3. Results
7. Referring to Figure 2 for suspected steering gear, type the serial number of the suspected steering gear in the serial number field (Figure 2, Item 1).
    - a. If the result (Figure 2, Item 3) is **Good** or **Serial Number Entered Is Outside The Date Range**, replacement is not required.
    - b. If the result (Figure 2, Item 3) is **Not Found**, follow instructions on R.H. Sheppard website.
    - c. If the result (Figure 2, Item 3) is **Suspect**, the steering gear will require replacement. Advise the customer of the need to replace. Proceed to Step 8.
    - d. If a different serial number needs to be checked, click **Clear Filters** (Figure 2, Item 2) and submit the new number.

## **STEERING GEAR REPLACEMENT**

**NOTE: Because the steering gear is suspect and has not failed, filter change and fluid flush are NOT included in steering gear replacement.**

For further reference, please refer to the link below:

[R.H. Sheppard Instructions for Installing Steering Gears](#)

8. Place drain pan under vehicle.
9. Remove power steering return line from steering gear and drain fluid.
10. Disconnect power steering pressure line from steering gear.

**NOTE: Do not rotate steering wheel once the intermediate shaft has been disconnected from the steering gear.**

11. Remove pinch bolt and nut from steering gear input shaft and disconnect steering column. Discard pinch bolt, nut, and washers.
12. Remove cotter pin and castellated nut from drag link and disconnect drag link from pitman arm. Discard cotter pin.
13. Support steering gear and remove steering gear mounting bolts and nuts. Save bolts and nuts for reuse.

**NOTE: Record the clocking of both hydraulic fittings and pitman arm necessary for them to be correctly installed on new steering gear.**

14. With the steering gear on a clean work bench, transfer the hydraulic fittings and align the timing marks when installing the pitman arm to new steering gear.

**Table 1 - Gear to Frame Bolt Torque**

<b>Gear to Frame Mounting Bolt Size</b>	<b>Socket Size</b>	<b>Lb-ft</b>	<b>N·m</b>
M12	19 mm	95 - 105 lb-ft	129 - 142 N·m
M16	24 mm	217 - 240 lb-ft	294 - 325 N·m
M20	30 mm	413 - 461 lb-ft	560 - 625 N·m
15/16 in	15/16 in	220 - 240 lb-ft	298 - 325 N·m
3/4 in	1 1/8 in	330 - 370 lb-ft	447 - 502 N·m

15. Position new steering gear into place and install mounting bolts. Using a torque wrench, tighten bolts to proper torque specification listed in Table 1.

16. Reconnect drag link to pitman arm; install castellated nut and tighten nut to 120 - 170 lb-ft (163 - 230 N·m), and install new cotter pin.

**NOTE: The pitman arm to steering gear bolt should be tightened to torque value stamped on face of retainer.**

17. Torque pitman arm retainer to torque value stamped onto face of retainer. If two notches of locking washer do not align with notches in the retainer continue tightening the retainer until they align. Bend retaining tabs into the notches of the retainer.
18. Reconnect steering column shaft to steering gear input shaft, install new pinch bolt, washers, and nut. Using a torque wrench, tighten bolt to 68 - 76 lb-ft (92 - 103 N·m).
19. Install power steering pressure and return lines. Tighten pressure line fitting and return line hose clamp.
20. Fill power steering reservoir.
21. Start engine, bleed system, and inspect for leaks.

**CAUTION! Failure to set the adjust of the relief plungers may result in damage to the steering system. Plunger must be set or adjusted whenever a steering gear is replaced.**

22. Set the AUTO relief plungers or adjust the manual relief plungers to obtain the proper wheel cut.
23. Turn vehicle ignition to Key OFF position.
24. Top off power steering fluid.
25. Close and latch hood.
26. Remove wheel chocks.

## **END OF SERVICE PROCEDURE**

## **LABOR INFORMATION**

<b>Operation Number</b>	<b>Description</b>	<b>Time</b>
A40-22513-1	Inspection Only; Replacement Not Required	0.3 hrs
A40-22513-2	Inspect Gear; Gear is <b>SUSPECT</b>	0.3 hrs
A40-22513-3	Replace Steering Gear; HV, MV, and TC	1.4 hrs
A40-22513-4	Replace Steering Gear; LoneStar and ProStar	1.3 hrs
A40-22513-5	Replace Steering Gear; HX, LT, RH, CE, FE Chassis, and SFC	1.1 hrs
A40-22513-6	Replace Module; Only Vehicles Equipped with Lane Keep Assist (LKA)	0.6 hrs

## **PARTS INFORMATION**

<b>Part Number</b>	<b>Part Description</b>	<b>Quantity</b>
Appropriate Fluid P/N by Vehicle	Fluid; Power Steering	As needed if gear is replaced
4065729C1	Bolt, Hex HD, 7/16-20 UNF Grade 8	1 if gear is replaced
4066697C1	Nut, Hex Lock, 7/16-20, Grade 8	1 if gear is replaced
25846R1	Washer; 7/16 Hardened	2 if gear is replaced
137214	Pin; Cotter 1/8 X 1 3/4 Inch Lg.	1 if gear is replaced

**NOTE: Using the International Parts System, verify the steering gear part number that the vehicle was built with. Using the correct part number refer to the table below to determine the correct steering gear part number to order.**

**NOTE: Submit all steering gear orders as a Critical Order – Unit Down with VIN number.**

**NOTE: If a Steering Gear for vehicles without a DTU date is used on a vehicle with a DTU date, the parts cost will be adjusted to the Recall Part Number.**

<b>Production Steering Gear PN</b>	<b>Steering Gear Description</b>	<b>Steering Gear for Non DTU'd Vehicles</b>	<b>Navistar Recall Part Number</b>
4200662C92	HD94EC3	4200662C92 and 4218673C5	4200662C92 and 4218673C5
3844903C92	HD94PAH3	3844903C92	8900302R91
3596197C92	HD94PD3	3596197C92	8900315R91
3830944C91	HD94PG3	3830944C91	8900324R91
3804386C92	HD94PQ3	3804386C92	8900304R91
3537280C91	M100PKH3	3537280C91	8900316R91

3554374C91	M100PMR3	3554374C91	8900308R91
3554373C91	M100PMT3	3554373C91	8900303R91
3558088C91	M100PMX3	3558088C91	8900307R91
3606529C91	M100PQM3	3606529C91	8900310R91
3812815C91	M100PRL3	3812815C91	8900317R91
3858121C91	M100PSY3	3858121C91	8900319R91
3885826C91	M100PTD3	3885826C91	8900305R94
3886363C91	M100PTH3	3886363C91	8900311R91
3900547C91	M100PTQ3	3900547C91	8900323R91
4041605C91	M100PUS3	4041605C91	8900313R91
3602517C91	M110PJE3	3602517C91	8900312R91
3846858C91	M110PMV3	3846858C91	8900309R91
3846865C91	M110PMW3	3846865C91	8900314R91
3679944C92	M110PRR3	3679944C92	8900318R91
1664770C91	M90PAE1	1664770C91	8900320R91
3919567C93	MD83PAD3	3919567C93	8900321R91
3867486C92	MD83PT3	3867486C92	8900322R91

## **CAMPAIGN IDENTIFICATION LABEL**

Each vehicle corrected in accordance with this campaign must be marked with a CTS-1075 Campaign Identification Label.

Complete the label and attach on a clean surface next to the vehicle identification number (VIN) plate.



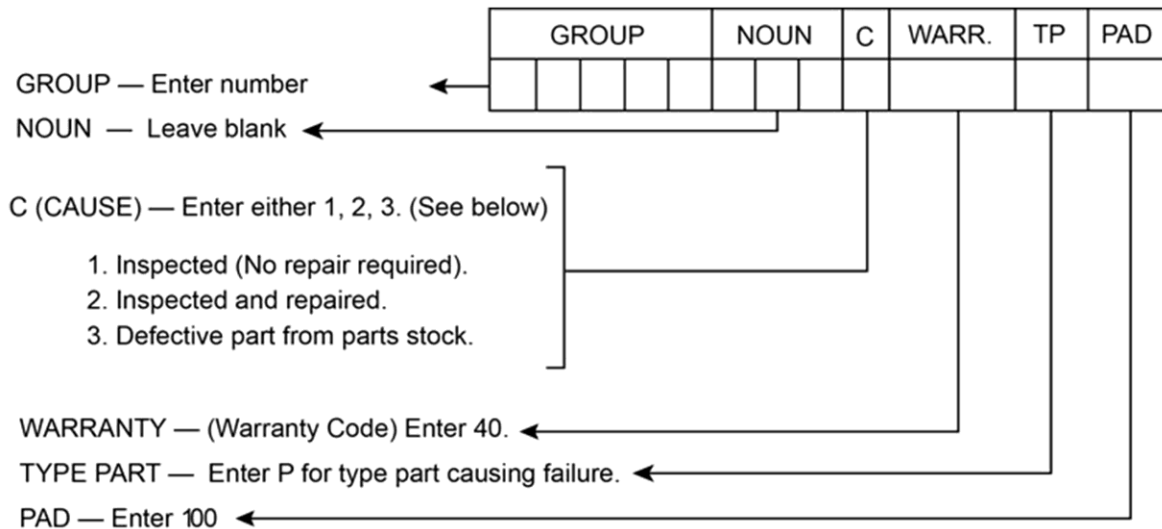
## **ADMINISTRATIVE / DEALER RESPONSIBILITIES**

### **WARRANTY CLAIMS**

Warranty claim expense is to be charged to Warranty. Claims are to be submitted in the normal manner, making reference to Safety Recall 22513.

Section 7 of the Warranty Policy and Procedures Manual contains further information related to the submission and processing of AFC / Recall claims.

As with all claim submissions, items acquired locally must be submitted in the “Other Charges” tab. The cost of any bulk items (such as a bag of cable tie straps, roll of wire, barrel of oil, or tube of silicone) should be prorated for the cost of the individual pieces / amount used during each repair.



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## UNITED STATES AND POSSESSIONS

The National Traffic and Motor Vehicle Safety Act, as amended, provides that each vehicle that is subject to a vehicle recall campaign must be adequately repaired within a reasonable time after the owner has tendered it for repair. A failure to adequately repair within 60 days after a tender of a vehicle is prima facie evidence of failure to repair within a reasonable time. If the condition is not adequately repaired within 60 days, the owner may be entitled to replacement with an identical or reasonable equivalent vehicle at no charge, or to a refund of the purchase price less a reasonable allowance for depreciation.

Dealers must correct all vehicles subject to this campaign at no charge to the owner, regardless of mileage, age of vehicle, or ownership, from this time forward.

Dealers should proceed immediately to make necessary correction to units in inventory. All inventory vehicles subject to this recall campaign must be corrected prior to sale, transfer or delivery. If vehicles have been sold or transferred and you are in receipt of Customer Notification Letters and Authorization for Recall Service cards for those vehicles, the transfer location or customer must be notified immediately from your dealer location.

Dealers must make every effort to promptly schedule an appointment with each owner to repair his or her vehicle as soon as possible. However, consistent with the customer notification, dealers are expected to complete the repairs on the mutually agreed upon service date.

Dealers involved in the recall process will be furnished a listing of owner names and addresses to enable them to follow up with owners and have the vehicles corrected. Use of this listing must be limited to this campaign because the list may contain information obtained from state motor vehicle registration records, and the use of such motor vehicle registration data for purposes other than this campaign is a violation of law in several states.

## **CANADA**

Dealers must correct all vehicles subject to this campaign at no charge to the owner, regardless of mileage, age of vehicle, or ownership, from this time forward.

Dealers should proceed immediately to make necessary correction to units in inventory. All inventory vehicles subject to this recall campaign must be corrected prior to sale, transfer or delivery. If vehicles have been sold or transferred and you are in receipt of Customer Notification Letters and Authorization for Recall Service cards for those vehicles, the transfer location or customer must be notified immediately from your dealer location.

Dealers must make every effort to promptly schedule an appointment with each owner to repair his or her vehicle as soon as possible. However, consistent with the customer notification, dealers are expected to complete the repairs on the mutually agreed upon service date.

Dealers involved in the recall process will be furnished a listing of owner names and addresses to enable them to follow up with owners and have the vehicles corrected. Use of this listing must be limited to this campaign because the list may contain information obtained from state motor vehicle registration records, and the use of such motor vehicle registration data for purposes other than this campaign is a violation of law in several states.

## **EXPORT**

Export Distributors should proceed immediately to make necessary correction to units in inventory. All inventory vehicles subject to this recall campaign must be corrected prior to sale, transfer or delivery. If vehicles have been sold or transferred and you are in receipt of Customer Notification Letters and Authorization for Recall Service cards for those vehicles, the transfer location or customer must be notified immediately from your distributor location. Export Distributors are to submit warranty claims in the usual manner making reference to this recall number.

Export Distributors are expected to provide full cooperation and follow-up with respect to this important subject matter. If you have any questions or need further assistance, please contact the Regional Service Manager at your regional office.

**International Motors, LLC\***  
**International Motors, LLC d/b/a International**  
**Motors USA LLC in Illinois and Ohio.**