



Technical Service Bulletin

GROUP

STEERING

NUMBER

20-ST-001H-1

DATE

AUGUST, 2020

MODEL(S)

See Below

SUBJECT: COLUMN-MOUNTED MDPS REPAIR INFORMATION

THIS TSB SUPERSEDES 20-ST-001H TO INCLUDE ADDITIONAL C-MDPS COMPONENTS, DIAGNOSTIC, AND REPAIR INFORMATION.

Description: This bulletin provides information regarding replacement of the column-mounted Motor Driven Power Steering (MDPS) system as separate components.



Applicable Vehicles: Accent (RB/HC), Azera (HG), Elantra (MD/UD/AD), Elantra Coupe (JK), Elantra GT (GD/PD), Ioniq Hybrid/Plug-In/Electric Vehicle (AE HEV/AE PHEV/AE EV), Kona (OS), Kona EV (OS EV), Palisade (LX2), Santa Fe (TMA), Santa Fe/XL (NC), Santa Fe Sport (AN), Sonata (YF/LF/DN8a), Sonata Hybrid/Plug-In (YF HEV/ LF HEV/LF PHEV/DN8 HEV), Tucson (LM/TL), Tucson Fuel Cell (LM FCEV), Veloster (FS/JS)

NOTICE

- **Refer to the applicable model shop manual for the detailed diagnostic and repair service procedures.**

Circulate To: General Manager, Service Manager, Parts Manager, Warranty Manager, Service Advisors, Technicians, Body Shop Manager, Fleet Repair

Parts Information:


Partial Parts of C-MDPS System	
<ol style="list-style-type: none"> 1. Column & Shaft Assembly (C-MDPS full assembly) 2. Column & Housing Assembly 3. C-MDPS Motor 4. C-MDPS ECU 5. Universal Joint Assembly 6. Electric Power Pack (C-MDPS Motor and C-MDPS ECU assembly. Applicable to Palisade (L X2) and Santa Fe (TMa). 7. Worm Gear Assembly 8. Steering Universal Joint Pinch Bolts (Upper and Lower) 	

NOTICE

- Refer to the applicable parts catalog for specific application part numbers.

Grease for Mando Systems	Remarks
	<p>For Mando C-MDPS vehicles below: <u>Santa Fe Sport (AN)</u> <u>Accent (RB/HC)</u> <u>Tucson (LM/TL)</u> <u>Tucson Fuel Cell (LM FCEV)</u></p> <p>The proper amount of grease is equivalent to a 50mm bead.</p> <p>*Each tube of grease can be used on approximately 15 vehicles.</p>
Part Number: YSBB0-91105-FFF	

Special Service Tools Information:

Tool Name	Image	SST Number
Chassis Ears		J-39570

NOTICE

- Chassis Ears are available for order through Bosch: 1-866-539-4248

SUBJECT: C-MDPS COMPONENT REPLACEMENT INFORMATION**Warranty Information:**

MODEL	OP CODE	OPERATION	OP TIME	CAUSAL PART	NATURE CODE	CAUSE CODE
Accent (RB/HC) Azera (HG) Elantra (MD/UD/AD) Elantra Coupe (JK) Elantra GT (GD/PD) Ioniq (AE HEV/PHEV/EV) Kona (OS/OS EV) Santa Fe / XL (NC) Santa Fe Sport (AN) Sonata (YF/LF) Sonata Hybrid (YF HEV/LF HEV/LF PHEV) Tucson (LM/TL) Tucson Fuel Cell (LM FCEV) Veloster (FS/JS)	56330R00	C-MDPS (EPS) Motor	Please see WEB LTS for current LTS time	56330*	I11	ZZ3
Accent (RB/HC) Elantra (MD/UD/AD) Elantra Coupe (JK) Elantra GT (GD/PD) Ioniq (AE HEV/PHEV/EV) Kona (OS/OS EV) Santa Fe / XL (NC) Santa Fe Sport (AN) Sonata (YF/LF) Sonata Hybrid (YF HEV/LF HEV/LF PHEV) Tucson (TL) Tucson Fuel Cell (LM FCEV) Veloster (FS/JS)	56345R00	C-MDPS-ECU Assy	Please see WEB LTS for current LTS time	56340*	I11	ZZ3
Azera (HG) Tucson (LM)	56345R00	C-MDPS-ECU Assy	Please see WEB LTS for current LTS time	56345*	I11	ZZ3
Palisade (LX2) Santa Fe (TMA) Sonata (DN8a) Sonata Hybrid (DN8 HEV)	56370R00	Electronic Power Pack Assy	Please see WEB LTS for current LTS time	56370*	I11	ZZ3

NOTE: Dealers may claim \$0.10 on sublet for reimbursement of grease.

*** Refer to applicable parts catalog for full causal part numbers.**

SUBJECT: C-MDPS COMPONENT REPLACEMENT INFORMATION

MODEL	OP CODE	OPERATION	OP TIME	CAUSAL PART	NATURE CODE	CAUSE CODE
Accent (RB/HC) Azera (HG) Elantra (MD/UD/AD) Elantra Coupe (JK) Elantra GT (GD/PD) Ioniq (AE HEV/PHEV/EV) Kona (OS/OS EV) Palisade (LX2) Santa Fe (TMA) Santa Fe / XL (NC) Santa Fe Sport (AN) Sonata (YF/LF/DN8a) Sonata Hybrid (YF HEV/LF HEV/LF PHEV/DN8 HEV) Tucson (LM/TL) Tucson Fuel Cell (LM FCEV) Veloster (FS/JS)	56300R0S	Steering Column Shaft Assembly (C-MDPS)	Please see WEB LTS for current LTS time	56310*	I11	ZZ3
	56390R00	Steering Column & Housing Assy (C-MDPS)		56390*		
	56400R00	Joint And/Or Coupling Assy-Universal		56400*		
Elantra (AD/ADa) Elantra GT (PD) Ioniq (AE HEV/PHEV/EV) Kona (OS/OS EV) Palisade (LX2) Santa Fe / XL (NC) Sonata (LF/DN8a) Sonata Hybrid (LF HEV/LF PHEV/DN8 HEV) Veloster (FS/JS)	Please see applicable "MDPS Worm Gear Bearing Noise" TSB 20-ST-003H Or 20-ST-002H-1	MDPS Worm Gear Assembly Replacement	Please see applicable "MDPS Worm Gear Bearing Noise" TSB 20-ST-003H Or 20-ST-002H-1	56390*	Q57	ZZ7

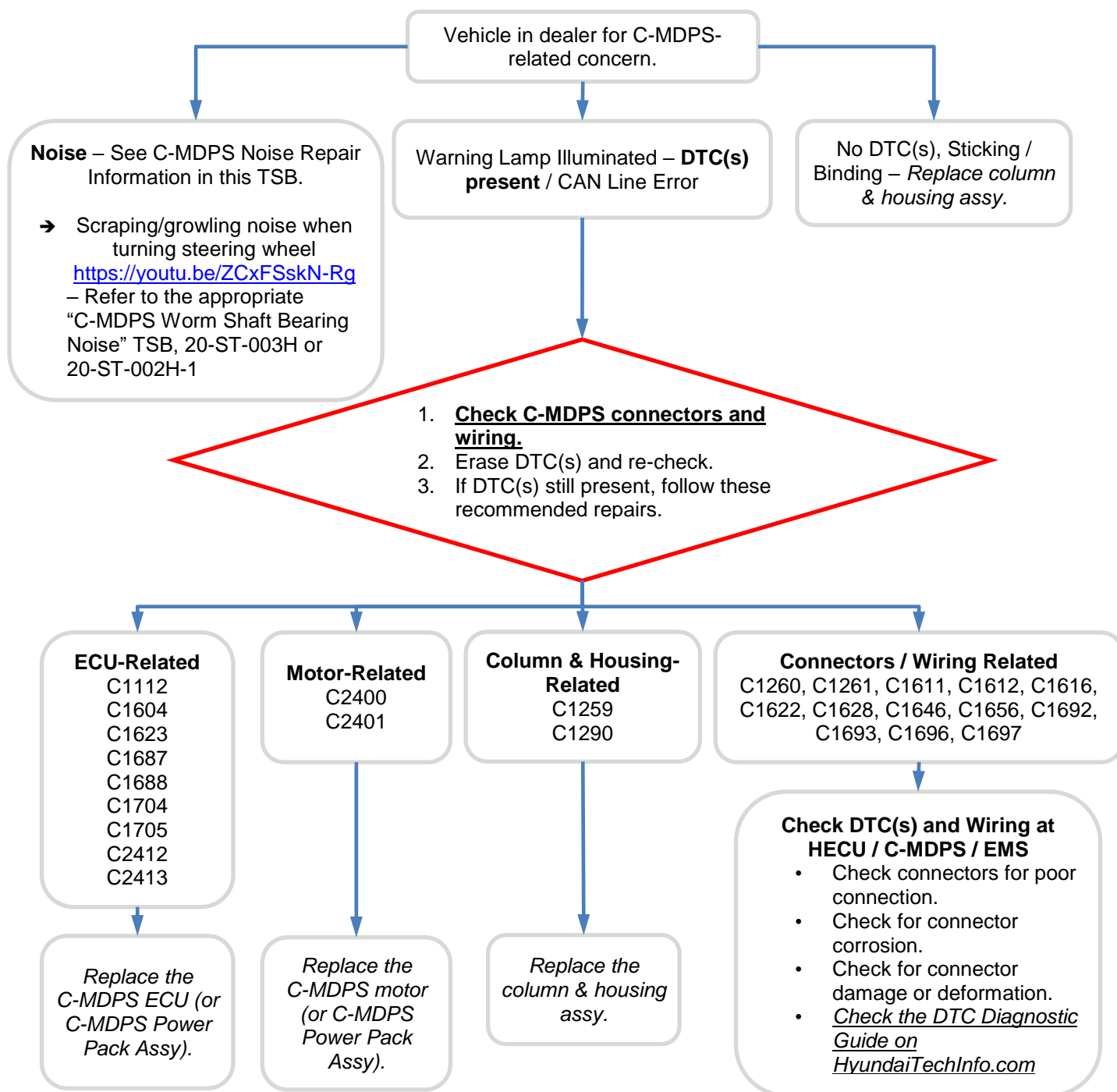
NOTE: Dealers may claim \$0.10 on sublet for reimbursement of grease.

*** Refer to applicable parts catalog for full causal part numbers.**

Service Procedure:

NOTICE

- C-MDPS Repair Flowchart is meant to be used as reference guide only. See C-MDPS DTC table for more details.
- It is recommended to replace the column & housing assembly,
 - In cases of no DTC(s) with symptoms of binding/sticking steering feel.
 - Noise diagnosed to be coming from column & housing assembly.
 - However, if the noise is diagnosed to be coming from the worm shaft bearing, refer to the applicable “C-MDPS Worm Shaft Bearing Noise” TSB 20-ST-003H or 20-ST-002H-1
- If the pinch bolts on either ends of the steering universal joint assembly are removed, the bolts **cannot** be reused during reassembly.
- Refer to the shop manual for other common C-MDPS noise repairs.
- If a C-MDPS component is replaced, but the concern is not resolved, please contact the Hyundai Technical Assistance Hotline at 1-800-325-6604 for further assistance.
- Note that some DTCs may be found in systems other than EPS (electric power steering) in GDS. They may be found in the Brake/ABS/ESC system. Check all systems for DTCs.
- Always refer to the applicable model shop manual for detailed information regarding DTC diagnosis and component replacement procedures.

C-MDPS Repair Flowchart**NOTICE**

- **For cases with multiple DTCs:**
 - If the DTCs relate to more than a single C-MDPS component, it is recommended to replace the full C-MDPS assembly (56310).
 - If the DTCs relate only to a single C-MDPS component, it is recommended to replace only the suspect component.
- DTCs shown are based on the 5-digit DTC system. For vehicles showing 7-digit DTCs, refer to the DTC that matches only the first 5-digits.

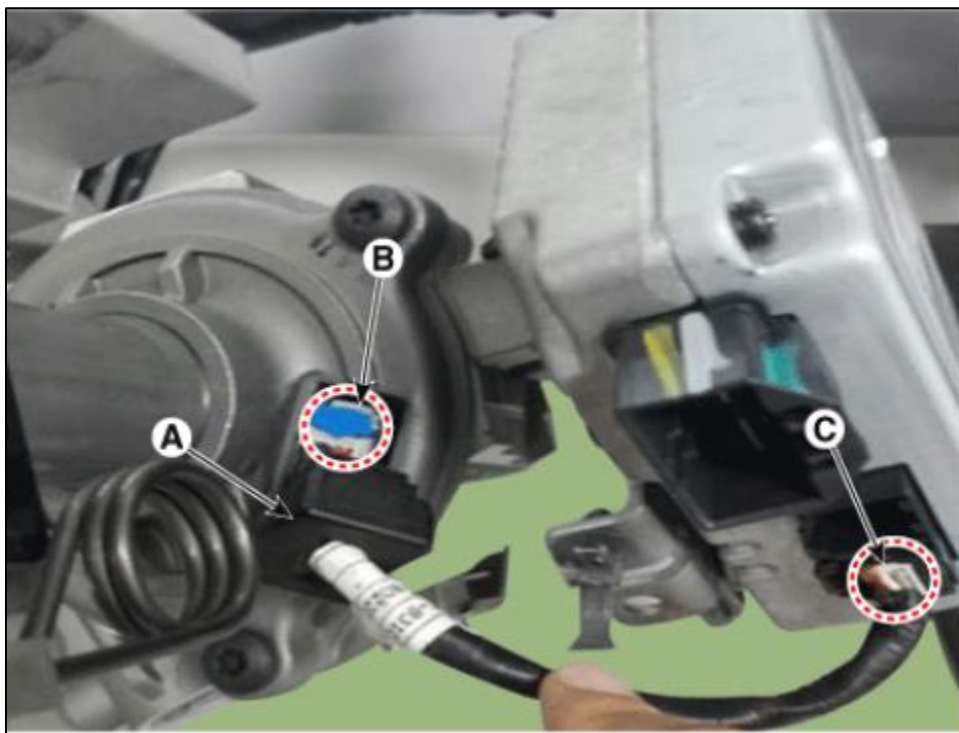
C-MDPS DTC Table

DTC	Description	First Inspection Method	Repair Recommendations
C1102	Battery voltage problem	Check battery voltage condition.	Recharge battery voltage.
C1603	MDPS thermal protection	Investigate driving conditions DTC is set. This DTC protects motor from overheating.	No replacement necessary.
C1611	CAN time out EMS	1. Check GDS condition. 2. Check wiring and connector condition. 3. Check ECU CAN line. 4. Check C-MDPS ground.	Check EMS CAN line.
C1616	CAN BUS OFF		Check the chassis CAN line.
C1622	Vehicle speed signal error		Check the EMS (Engine ECU).
C1696, C1697	SPAS signal error	Check SPAS and associated wiring.	Repair as necessary. Erase DTC(s).
C1612, C1646	TCU signal error	Check TCU and associated wiring.	
C1628, C1656	Instrument cluster signal error	Check instrument cluster and associated wiring.	Full C-MDPS assy is not to be replaced.
C1692, C1693	VSM signal error	Check VSM and associated wiring.	
C1259	Steering angle sensor signal error	Reset steering angle sensor calibration and erase DTC(s). Check wiring (torque angle sensor TAS, see below for details) and connector condition.	If DTC returns, replace column & housing assembly. If a problem is found with TAS wiring, replace full C-MDPS assy.
C1260	Steering angle sensor signal error	Reset steering angle sensor calibration.	If DTC returns, inspect wiring and connector condition.
C1261	Zero-setting error		
C1290	Torque sensor signal error	First erase DTC, then check wiring (torque angle sensor (TAS), see below for details) and connector condition.	If DTC returns, replace column & ho using assembly. If a problem is found with TAS wiring, replace full C-MDPS assy
C1112	Torque sensor voltage error	Check wiring and connector condition between torque sensor and ECU.	If DTC returns, replace C-MDPS ECU (or Power Pack Assy). If DTC returns, replace MDPS motor (or Power Pack Assy).
C1704	ECU fail-safe relay fault	First erase DTC, then check wiring and connector at ECU.	
C1705	ECU hardware error		
C1604	ECU over/discharge error		
C2413	ECU hardware error		
C2400	Motor signal error		
C2401	Motor circuit error		
C2412	Motor voltage supply error	First erase DTC, check wiring and connector between ECU and motor.	First replace C-MDPS ECU (or Power Pack Assy). If DTC returns, replace C-MDPS motor (if applicable).
C1623	CAN time out SAS	1. Check C-MDPS power connector and fuse. 2. Check C-MDPS ground line. 3. Check C-MDPS ECU / VSM CAN line. 4. Communication status with GDS. 5. Check for C1259 -> if present with these DTCs, replace column and housing assembly.	If DTC returns, replace MDPS ECU (or Power Pack Assy).
C1687	CAN time out VSM		
C1688	VSM signal error		If DTC returns and MDPS is inoperable, replace C-MDPS ECU (or Power Pack Assy). If DTC returns and MDPS operation is normal, continue investigation into wiring issues. For TMa , if C1688 occurs along with C1700, replace Power Pack Assy.

Torque Angle Sensor (TAS) Wiring Inspection

In the presence of DTC C1259 (steering angle sensor signal error) and/or C1290 (torque sensor signal error), inspect the condition of the TAS wiring.

Remove the grommet (A) and check the wiring on both TAS side (B) and ECU side (C). Check for damage, push-back, or improper connection.



If any issues are found in this harness, replace the full C-MDPS (part number starting with 56310) assembly.

Steering Noise Repair Information

Vehicle in dealer for C-MDPS noise-related concern.

1. Check steering wheel area
 - Check correct condition of driver air bag wiring (DAB, clock spring, multifunction switch).
 - *Repair as appropriate.*

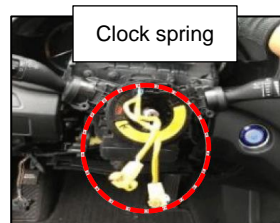
2. Check C-MDPS mounting area
 - Check cowl mounting bolts (check below C-MDPS mounting bolts)
 - Check cowl cross member mounting bolts.
 - *Tighten bolts to the specified torque in the shop manual.*

3. Check steering intermediate shaft U-joint bolts.
 - Remove and check U-joint assembly for noise.
 - *Replace shaft or tighten bolts to the specified torque in the shop manual.*
 - **NOTICE: If the pinch bolts on either ends of the steering universal joint assembly are removed, the bolts cannot be reused during reassembly.**

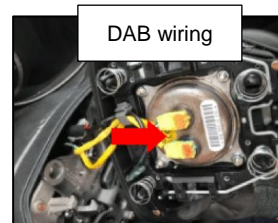
4. Check steering gear box
 - Check mounting bolts
 - Check steering gear assembly for noise.
 - *Tighten bolts to the specified torque in the shop manual; replace parts as necessary.*

5. Check tie-rod end ball joint free play.
 - *Replace parts as necessary.*

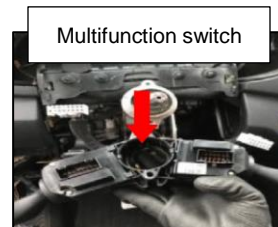
6. Check C-MDPS assembly.
 - Locate source of noise using chassis ears.
 - **Refer to C-MDPS Assembly Noise Information.**
 - *Replace part with noise as necessary.*



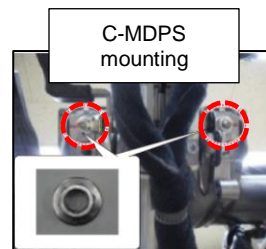
Clock spring



DAB wiring



Multifunction switch

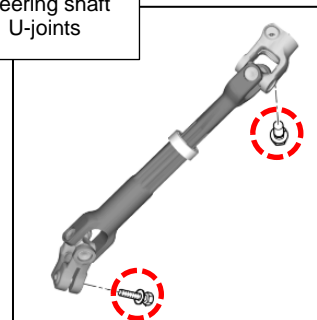


C-MDPS mounting

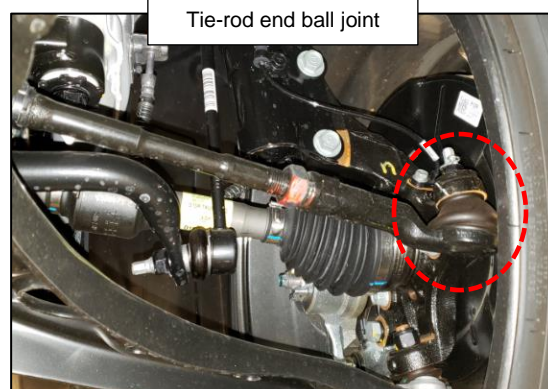


Cowl mounting

Steering shaft U-joints



Steering gear box



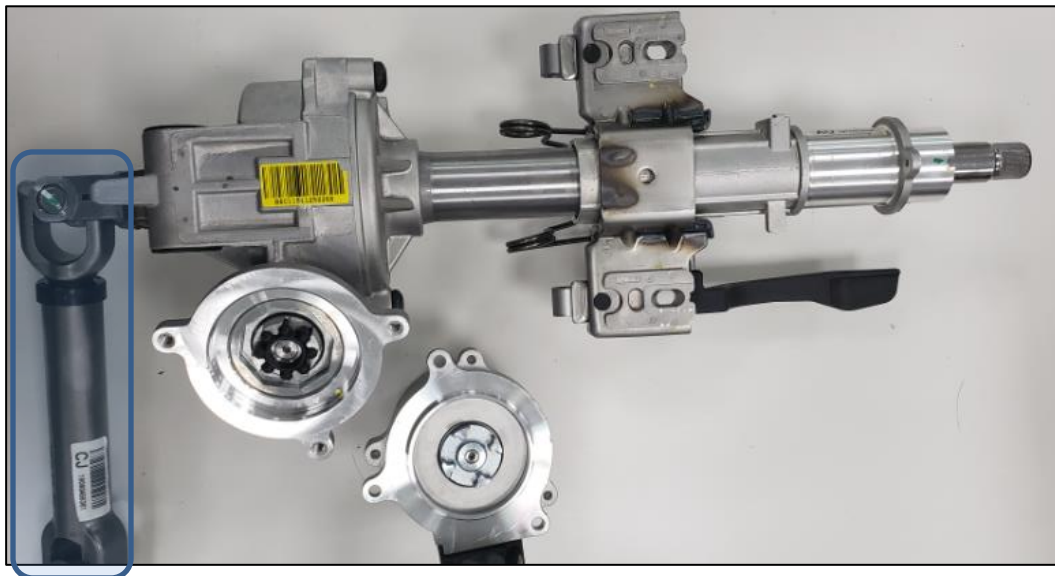
Tie-rod end ball joint

C-MDPS Assembly Noise Information**NOTICE**

- Use Chassis Ears (SST #J-39570) attached to the areas shown below to isolate source of noise within C-MDPS assembly.
- One way to verify that the source of noise is the column & housing assembly is to remove the part, and turn the assembly with the C-MDPS motor removed, as shown below.

Method #1

Use intermediate shaft to turn steering column.

**Method #2**

Use pliers with a shop towel to turn steering column.



1. Small bearing noise –
Growling/grinding/bearing noise

<https://www.youtube.com/watch?v=ZCxFsSkN-Rg>

Check for this noise at the worm gear area, as shown.

If the noise source is confirmed from this location:

Replace the *worm gear assembly*.

Refer to the appropriate “C-MDPS Worm Shaft Bearing Noise” TSB, 20-ST-003H or 20-ST-002H-1



2. Ticking noise –

Check for this noise on the column & housing as shown.

If the noise source is confirmed from this location:

➔ Replace the *column & housing assembly*.



3. Motor noise –

Check the motor for noise.

If the noise source is confirmed from this location:

- ➔ Replace the *C-MDPS motor* or *C-MDPS Electric Power Pack* (as appropriate).

