



Technical Service Bulletin

GROUP

STEERING

NUMBER

20-ST-003H

DATE

AUGUST, 2020

MODEL(S)

Multiple

SUBJECT:

C-MDPS WORM SHAFT BEARING NOISE

Description: Certain vehicles may develop a bearing noise within the Motor Driven Power Steering (MDPS) column worm shaft assembly. If bearing noise is heard, follow the procedure in this bulletin to replace the worm shaft assembly.



Applicable Vehicles:

2017 – 2020 MY Elantra (AD, VIN beginning with “KMH”)

2017 – 2018 or 2020 MY Elantra (ADa, VIN beginning with “5NP”) with production dates between **January 01, 2017** and **February 28, 2018** or between **November 07, 2019** and **May 03, 2020**

2018 – 2019 MY Elantra GT (PD)

2017 – 2020 MY Ioniq Hybrid/Plug-In/Electric Vehicle (AE HEV/PHEV/EV)

2018 – 2020 MY Kona (OS)

2019 – 2020 MY Kona EV (OS EV)

2017 – 2019 MY Santa Fe/XL (NC)

2017 – 2019 MY Sonata (LFA)

2017 – 2019 MY Sonata Hybrid/Plug-In (LF HEV/PHEV)

2017 MY Veloster (FS)

2020 MY Palisade (LX2)

2020 MY Sonata (DN8a)

2020 MY Sonata Hybrid (DN8 HEV)

NOTICE

2018 – 2020 MY Elantra (ADa, VIN beginning with “5NP”), with production dates between **March 01, 2018** and **November 06, 2019**, please refer to TSB 20-ST-002H-1, C-MPDS Worm Shaft Assembly Bearing Noise.

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

SUBJECT:**C-MDPS WORM SHAFT BEARING NOISE****Parts Information:**

MODEL	C-MDPS COLUMN ASSY-STEERING P/N	WORM SHAFT ASSY P/N
ELANTRA (AD/ADa)	56310-F2200	56351-F2AAA FFF
	56310-F2201	56351-G3AAA FFF
	56310-F2210	
	56310-F2410	
	56310-F2500	56351-F2AAA FFF
	56310-F2501	56351-G3AAA FFF
	56310-F2510	
ELANTRA GT (PD)	56310-G3000	56351-G3AAA FFF
	56310-G3200	
	56310-G3300	
IONIQ EV (AE EV)	56310-G7500	56351-F2AAA FFF
	56310-G7501	56351-G3AAA FFF
	56310-G7510	
IONIQ HYBRID/PLUG-IN (AE HEV/PHEV)	56310-G2500	56351-F2AAA FFF
	56310-G2501	56351-G3AAA FFF
	56310-G2510	
KONA (OS)	56310-J9000	56351-G3AAA FFF
	56310-J9010	
	56310-J9030	
KONA EV (OS EV)	56310-K4000	56351-G3AAA FFF
PALISADE (LX2)	56310-S8000	56351-S1AAA FFF
	56310-S8020	
SANTA FE/XL (NC)	56310-2W830	56351-C5AAA FFF
	56310-2W840	
	56310-2W900	
	56310-2W910	
SONATA (LFa)	56310-C2500	56351-C1AAA FFF
	56310-C2510	56351-C1AAB FFF
	56310-C2700	56351-C1AAA FFF
	56310-C2710	56351-C1AAB FFF
SONATA HYBRID/PLUG-IN (LF HEV/PHEV)	56310-E6700	56351-C1AAA FFF
	56310-E6710	56351-C1AAB FFF
SONATA (DN8a)	56310-L0000	56351-L1AAA FFF
	56310-L0010	
SONATA HYBRID (DN8 HEV)	56310-L5500	56351-L1AAA FFF


SUBJECT:**C-MDPS WORM SHAFT BEARING NOISE**

MODEL	C-MDPS COLUMN ASSY-STEERING P/N	WORM SHAFT ASSY P/N
VELOSTER (FS)	56310-2V405	56351-B3AAA FFF
	56310-2V955	56351-B3AAA FFF
Lower Steering U-Joint Bolt P/N*		
All Except DN8a/DN8 HEV and LX2	56415-2H000	
LX2	56415-1M000	
DN8a/DN8 HEV	56415-L1000	

NOTE 1: Please refer to the online parts catalog to verify the C-MDPS Column Assy-Steering part number installed in the vehicle to order the correct Worm Shaft Assembly part number.

NOTE 2: *Steering U-Joint Bolt **cannot** be reused during reassembly. Only one bolt is necessary for this repair.

SST Information: Worm Shaft Assembly Plug Tool

MODEL	DESCRIPTION	PART NUMBER	PICTURE
VELOSTER (FS)	C-SEG 1 (A: 34.9mm)	0K563-T9100 FFF	
ELANTRA (AD/ADa) ELANTRA GT (PD) IONIQ HYBRID/PLUG-IN (AE HEV/PHEV) IONIQ EV (AE EV) KONA (OS) KONA EV (OS EV)	C-SEG 2 (A: 42mm)	0K563-Q2100 FFF	
SONATA (LFa) SONATA HYBRID/PLUG-IN (LF HEV/PHEV) SANTA FE/XL (NC) PALISADE (LX2)	D-SEG (A: 44.9mm)	0K563-D6100 FFF	

NOTE 1: To re-order any of the SSTs, contact Bosch at 1-866-539-4248.

NOTE 2: Sonata and Sonata Hybrid (DN8a and DN8 HEV) requires the use of snap-ring pliers to access the worm shaft assembly.

SUBJECT:**C-MDPS WORM SHAFT BEARING NOISE****Warranty Information:**

MODEL	OP CODE	OPERATION	OP TIME	CAUSAL PART	NATURE CODE	CAUSE CODE
ELANTRA (AD/ADa) ELANTRA GT (PD) KONA (OS) KONA EV (OS EV)	56350F00	MDPS Worm Shaft Assembly Replacement	1.2 M/H	56390*	Q57	ZZ7
IONIQ (AE EV) IONIQ HYBRID/PLUG-IN (AE HEV/PHEV)	56350F01		1.0 M/H			
SANTA FE/XL (NC)	56350F02		1.6 M/H			
VELOSTER (FS)	56350F03		1.5 M/H			
SONATA (LFa) SONATA HYBRID/PLUG-IN (LF HEV/PHEV) SONATA (DN8a) SONATA HYBRID (DN8 HEV)	56350F04		1.4 M/H			
PALISADE (LX2)	56350F06		1.1 M/H			

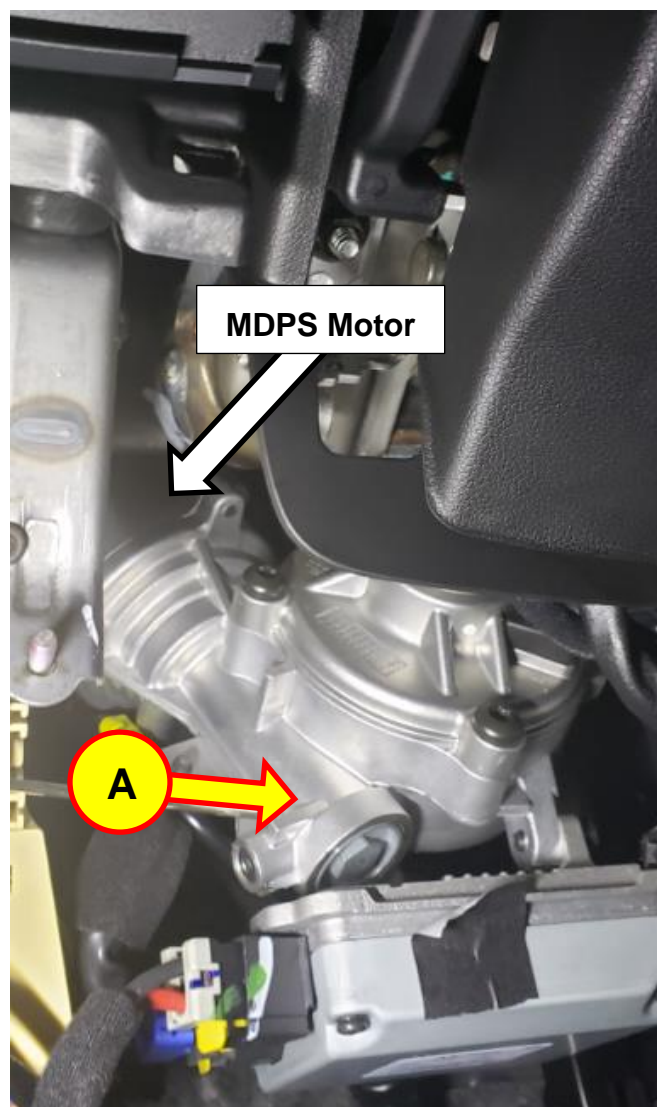
NOTE 1: If a part is found in need of replacement while performing the repair for this TSB and the affected part is still under warranty, submit a separate claim using the same Repair Order. If the affected part is out of warranty, submit a Prior Approval Request for goodwill consideration prior to performing the work.

NOTE 2: *Refer to applicable parts catalog for full causal part numbers.

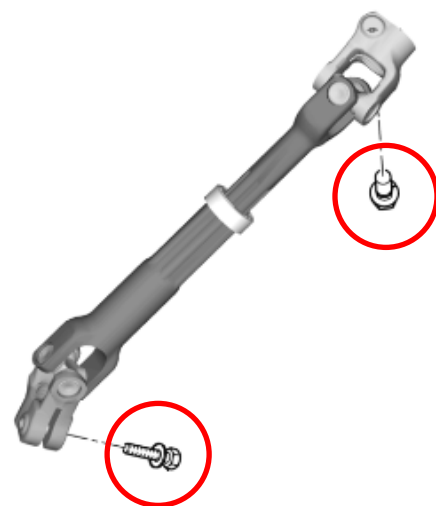
Service Procedure:

1. Determine if bearing noise comes from the MDPS column and housing.
 - Start the engine and turn the steering wheel left and right.
 - Listen for the bearing noise occurring from the worm shaft housing (A). This noise will be located near the C-MDPS motor on the steering column.
 - To hear an example of the bearing noise, refer to the link below.
<https://youtu.be/ZCxFsSkN-Rg>
2. Replace the worm shaft assembly if noise is heard.

If noise is not heard in this location, refer to the shop manual for detailed diagnostic and repair service procedures or refer to TSB 20-ST-001H-1, Column-Mounted MDPS Repair Information (or current TSB related to partial C-MDPS Repairs) for additional information.

**NOTICE**

If the pinch bolts on either end of the steering universal joint assembly are removed, the bolts **cannot** be reused during reassembly.

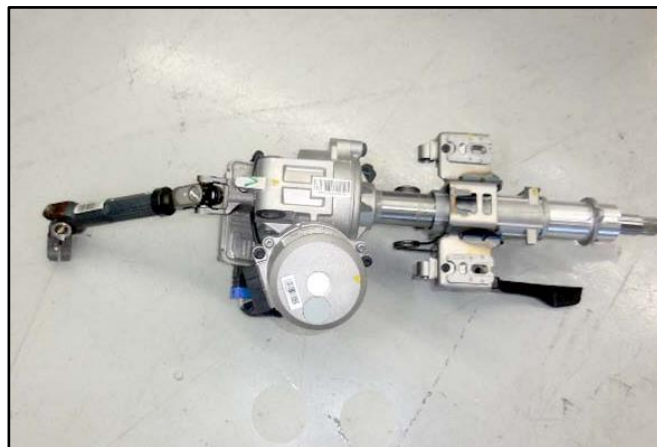


3. Remove the C-MDPS assembly and universal joint according to the applicable vehicle shop manual.

*Steering System > Motor Driven Power Steering > MDPS Assembly > Repair Procedures

NOTICE

Before removing the C-MDPS assembly, ensure the wheels are straight and the steering wheel is level.



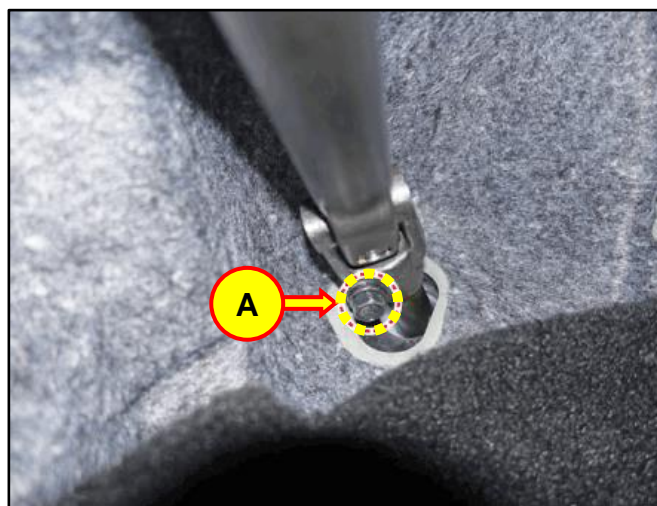
4. Only remove the lower pinch bolt (A) on the steering universal joint assembly to remove the C-MDPS assembly.

Pinch Bolt Torque

Check the applicable shop manual.

NOTICE

If the pinch bolts on either end of the steering universal joint assembly are removed, the bolts **cannot** be reused during reassembly.



5. Loosen the motor mounting bolts (B).

Motor Mount Tightening Torque

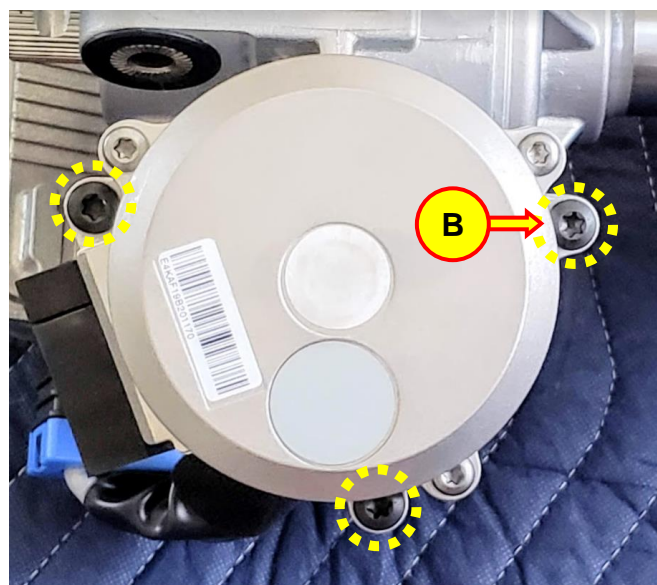
lb-ft	• 5.8-8.7
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kgf.m	• 0.8-1.2
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N.m	• 7.8-11.8
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NOTICE

Wear clean gloves and perform the procedure on a clean work bench to prevent contamination of internal components.



6. Remove the motor assembly (C).

NOTICE

Reuse the flexible coupling.



7. Remove the worm shaft plug (D) using the appropriate worm shaft assembly plug tool or snap-ring pliers for the snap-ring (E).

Reuse the snap-ring during reassembly.

Worm Shaft Plug Tightening Torque**C-SEG 1**

lb-ft	• 27.5-34.7
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kgf.m	• 3.8-4.8
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N.m	• 37.3-47.1
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C-SEG 2

lb-ft	• 51.4-59.3
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kgf.m	• 7.1-8.2
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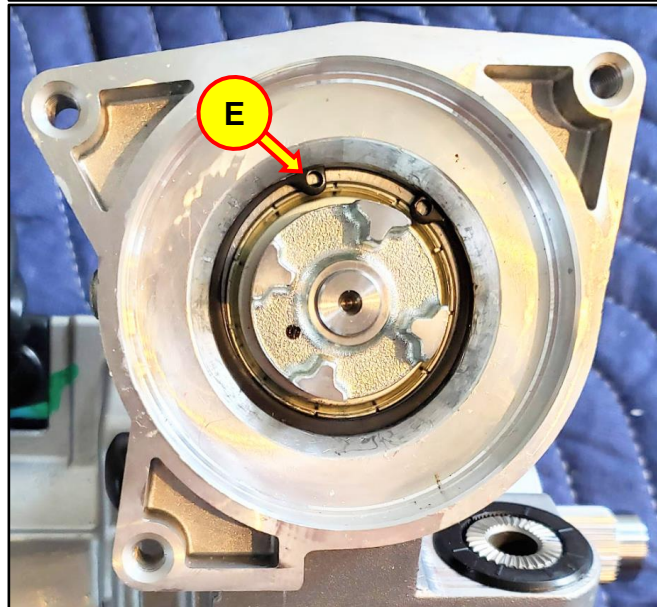
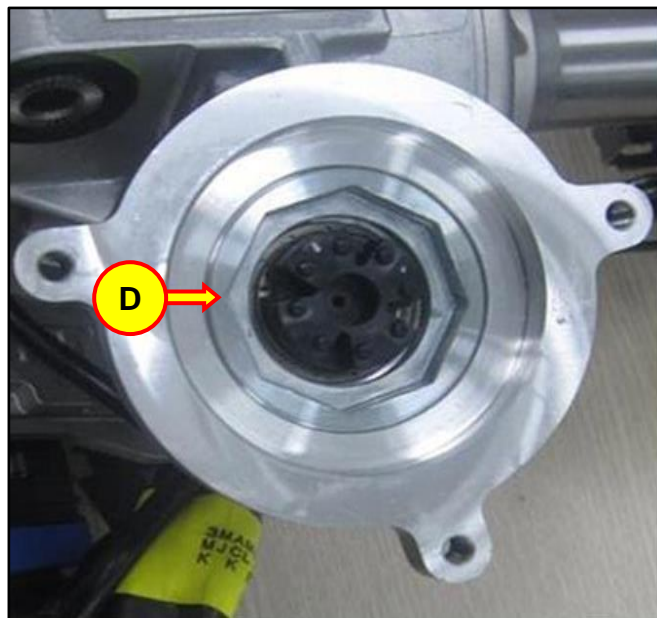
N.m	• 69.7-80.4
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D-SEG

lb-ft	• 81-103.5
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kgf.m	• 11.2-14.3
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N.m	• 109.9-140.3
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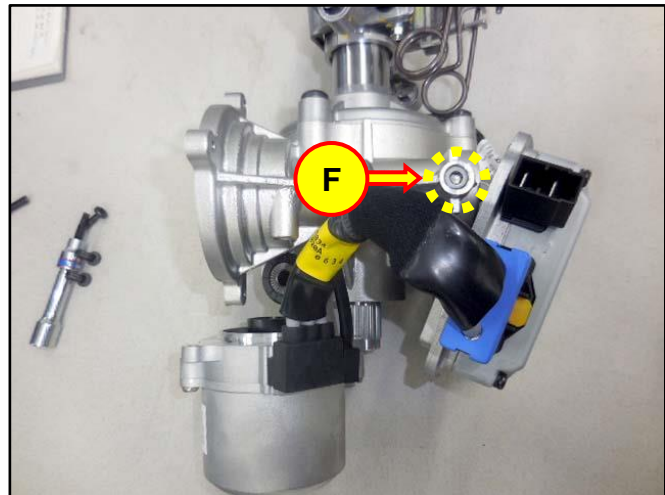
8. Remove the anti-rattle plug (F).

Anti-Rattle Plug Tightening Torque

lb-ft	• 7.2-9.4
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kgf.m	• 1.0-1.3
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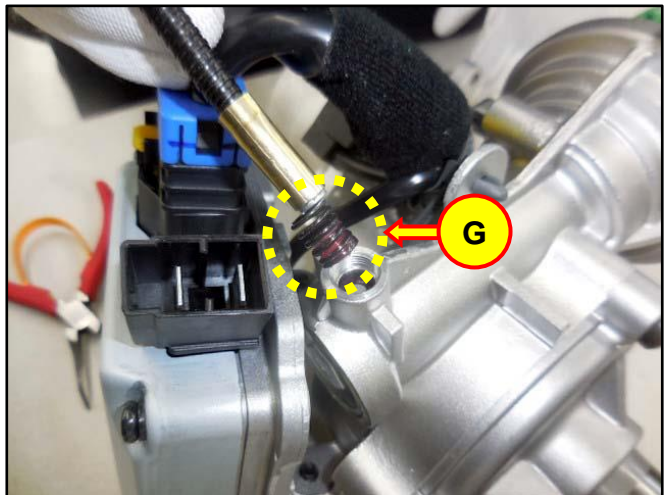
N.m	• 9.8-12.8
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9. Remove the anti-rattle spring (G).

NOTICE

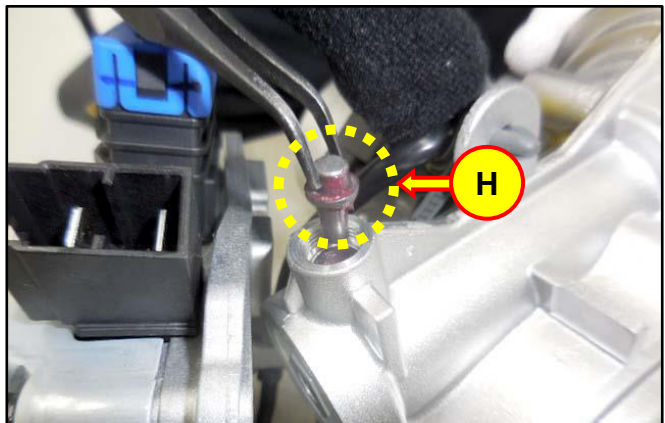
Keep the anti-rattle spring free of debris after removal. Reuse the spring during reassembly.



10. Remove the slide pin (H).

NOTICE

Keep the slide pin free of debris after removal. Reuse the slide pin during reassembly.



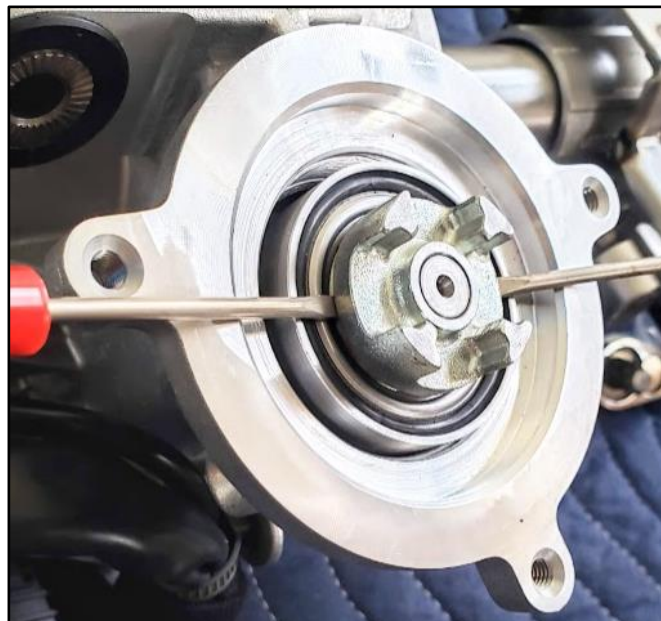
11. There are a few methods to remove the worm shaft assembly.
- Use locking pliers or similar tool to grip the coupler and pull out the assembly.
After the worm shaft assembly is freed, move to step 12. (Page 13)

OR

- Place two flat-head screwdrivers under the coupler, 180 degrees apart, to pry out the assembly.
After the worm shaft assembly is freed, move to step 12. (Page 13)

OR

- All EXCEPT DN8a and DN8 HEV:** If either of the above methods are unsuccessful, move to step 11c (Page 10) for an alternate method of removal.
- DN8a and DN8 HEV:** If either of the above methods are unsuccessful, move to step 11d (Page 12) for an alternate method of removal.



11c. Alternate Method to Remove Worm Shaft Assembly (All EXCEPT DN8a and DN8 HEV)

- 11c-1. Remove the ECU mounting bolts (I) and set aside the ECU assembly.

ECU Mounting Bolts Tightening Torque

lb-ft	• 14.5-17.4
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kgf.m	• 2.0-2.4
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N.m	• 19.6-23.5
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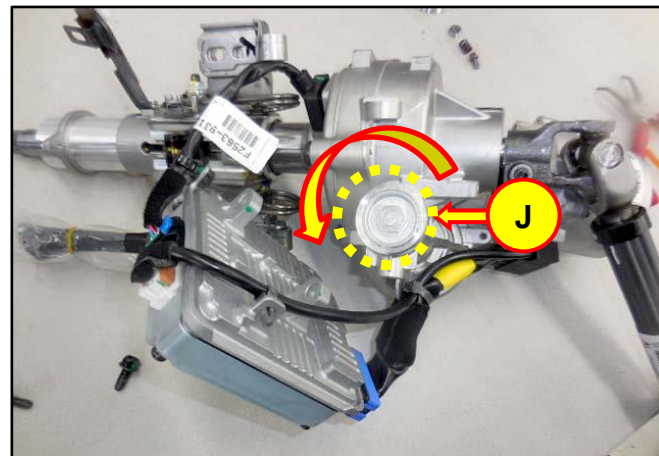
- 11c-2. Remove the plug (J).

Plug Tightening Torque

lb-ft	• 28.2-35.5
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kgf.m	• 3.9-4.9
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N.m	• 38.3-48.1
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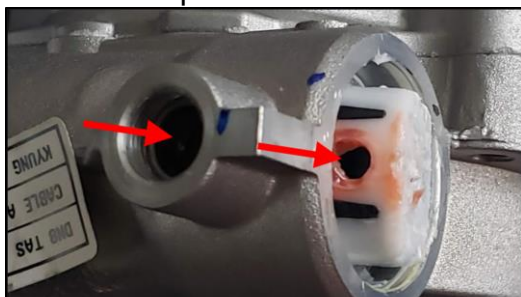


- 11c-3. Remove the grease plug (K).

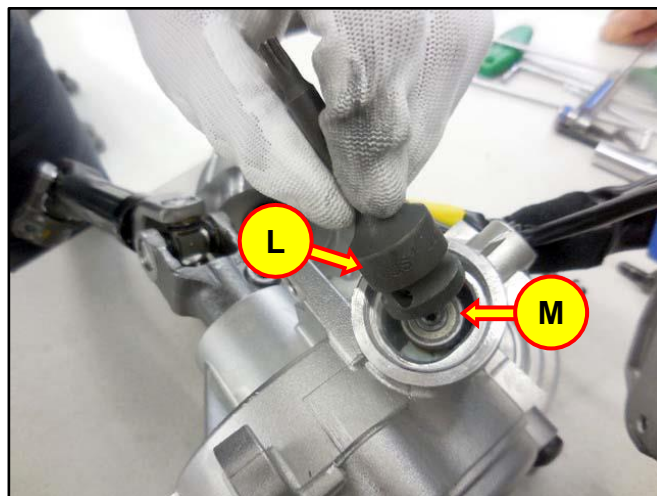
NOTICE

Keep the grease plug free of debris after removal. Reuse the plug during reassembly.

During reassembly, align the hole on the side of the grease plug with the boss to insert the slide pin.



- 11c-4. Place a short 3/8-inch socket extension or similar tool (L) onto the small bearing (M) as shown.



- 11c-5. Using a plastic hammer or rubber mallet, lightly tap the extension to free the worm shaft assembly.

After the worm shaft assembly is freed, move to step 12. (Page 13)



11d. Alternate Method to Remove Worm Shaft Assembly (DN8a and DN8 HEV)

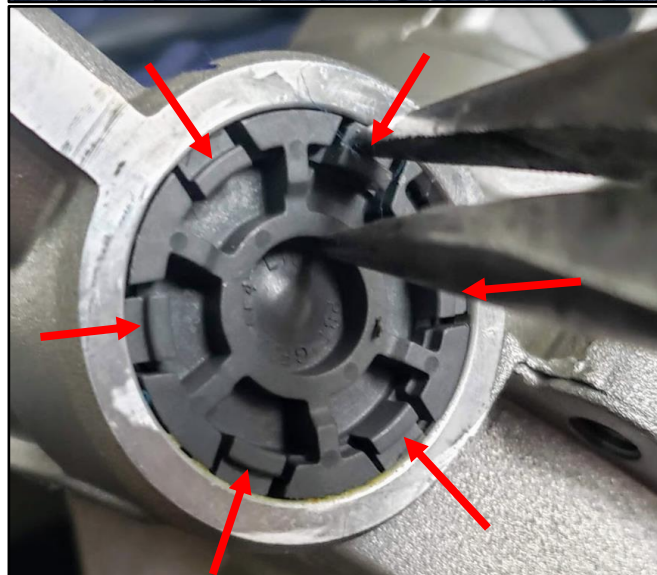
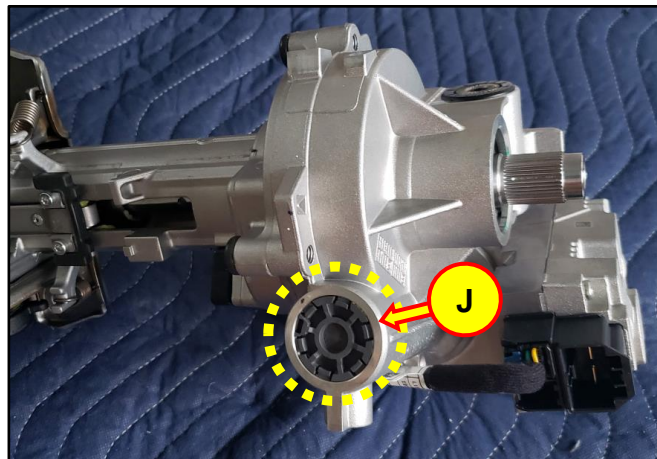
- 11d-1. Remove the plastic cover (J) by breaking the six cover tabs with pliers.

NOTICE

Use the supplied plastic cover during reassembly.



Ensure cover snaps into place and is flush with the housing.

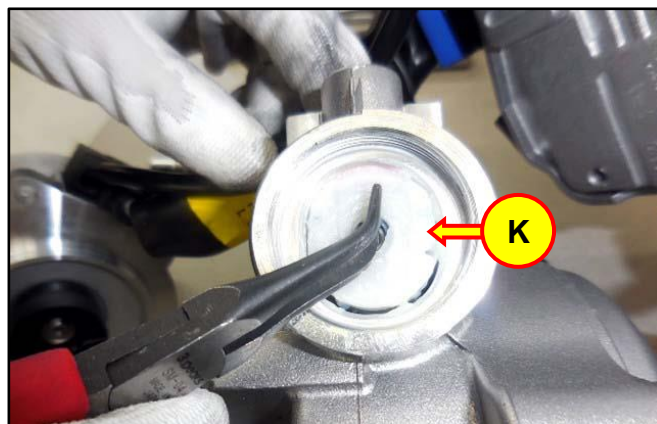
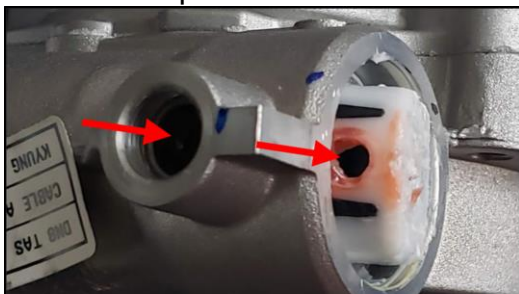


- 11d-2. Remove the grease plug (K).

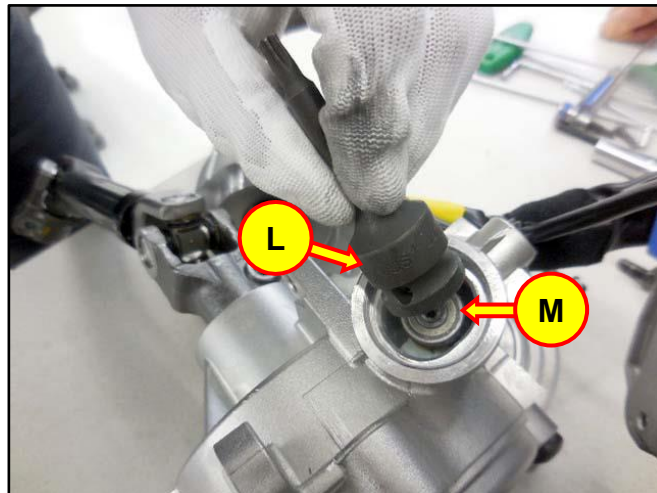
NOTICE

Keep the grease plug free of debris after removal. Reuse the plug during reassembly.

During reassembly, align the hole on the side of the grease plug with the boss to insert the slide pin.



- 11d-3. Place a short 3/8-inch socket extension or similar tool (L) onto the small bearing (M) as shown.



- 11d-4. Using a plastic hammer or rubber mallet, lightly tap the extension to free the worm shaft assembly.

After the worm shaft assembly is freed, move to step 12.



12. Pull the worm shaft assembly out of the MDPS assembly and discard the assembly.

NOTICE

Keep the housing opening free and clear of debris.



13. Apply the entire contents of the supplied grease evenly onto the new worm gear (N).



14. Carefully reinstall the new worm shaft assembly.

Slide the assembly straight into the housing. Light thumb pressure on either side of the large bearing/coupler should be sufficient to seat the assembly. If the assembly does not slide into place, remove the assembly and try again.

NOTICE

Do not force or tap the worm shaft assembly into the housing.



15. Reinstall the removed parts in reverse order of removal.

NOTICE

Ensure the steering wheel is level during reinstallation.

16. Connect the GDS and perform the ASP calibration and EPS type recognition according to the applicable vehicle shop manual.