



GROUP
CHA

MODEL
All Applicable
Models with
C-MDPS

NUMBER
084 (Rev 5, 11/04/2020)

DATE
November 2018

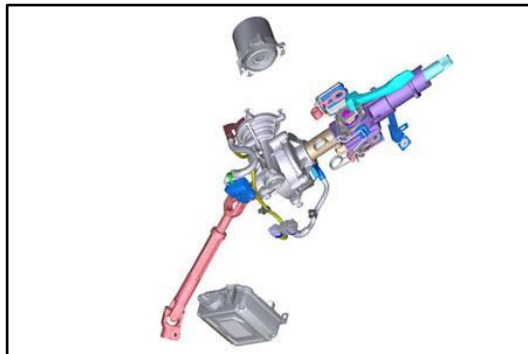
TECHNICAL SERVICE BULLETIN

SUBJECT: PARTIAL REPAIR OF C-MDPS MOTOR, ECU, WORM GEAR
AND/OR STEERING COLUMN HOUSING

* NOTICE

This bulletin has been revised to include additional information. New/revised sections of this bulletin are indicated by a black bar in the margin area.

This bulletin provides information regarding the partial repair of the Motor Driven Power Steering (MDPS) Motor, Electronic Control Unit (ECU), Worm Gear Assembly or Steering Column Housing on some 2010MY~ Kia models listed on page 8, equipped with a Column Motor Driven Power Steering (C-MDPS) unit. Follow the MDPS Flowchart (page 2) along with the MDPS DTC Table (page 3) procedure outlined in this bulletin before replacing the C-MDPS Motor, ECU, Worm Gear Assembly or Steering Column Housing.



* NOTICE

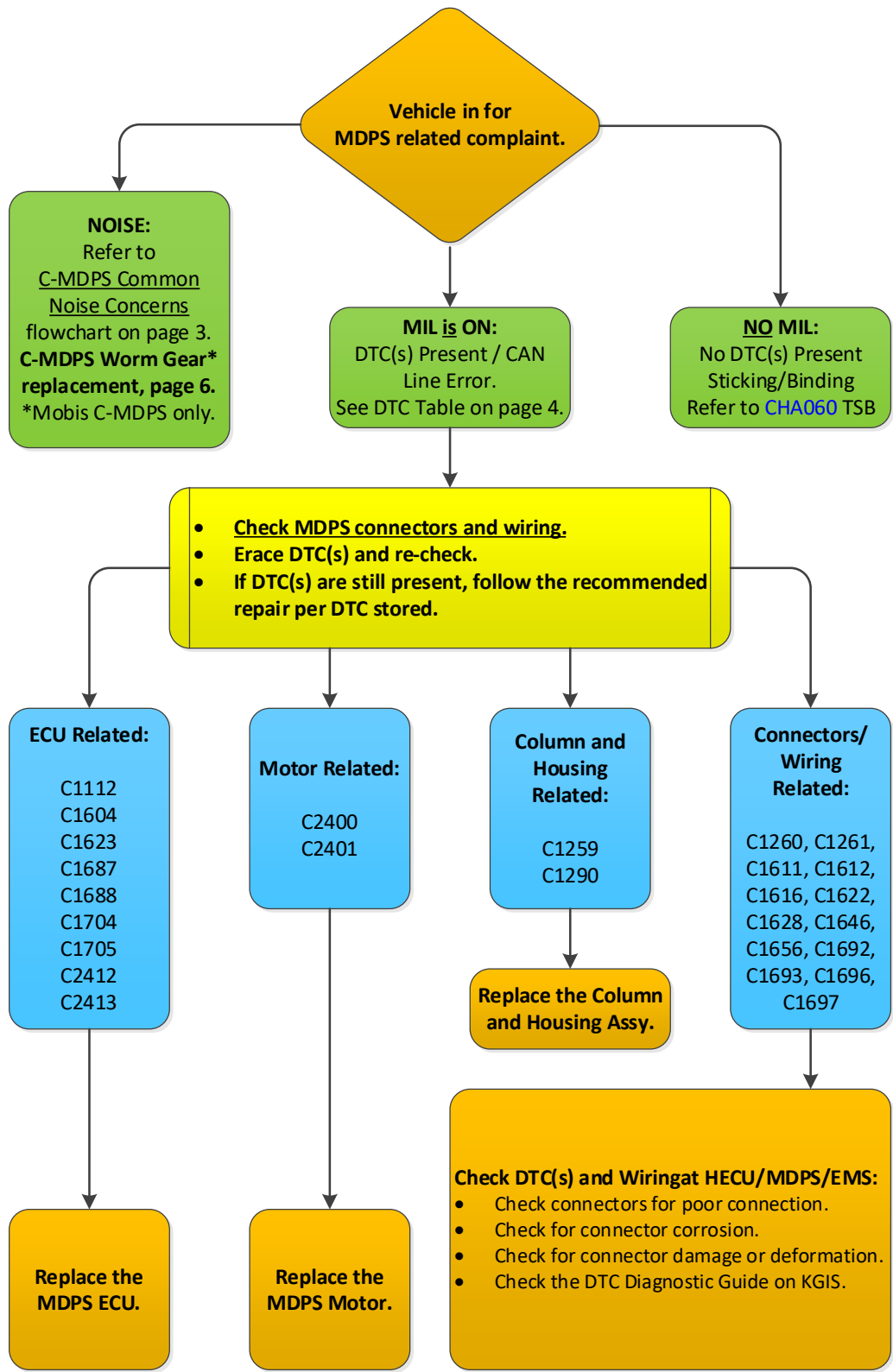
- MDPS Repair Flowchart and Common Noise Flowchart are meant to be used as a reference guide only. See MDPS DTC table for more details.
- Note that some DTC(s) may be found in systems other than Electric Power Steering (EPS) in KDS. They may be found in the Brake/ABS/ESC system. Check all systems for DTC(s).
- Replacing the complete C-MDPS Steering Column Assembly is NOT allowed when the components failure is identified in the flowchart. In addition, replacing the Steering Column Housing is NOT allowed when the problem source is the C-MDPS Worm Gear Assembly (for applicable models).

Printed TSB copy is for reference only; information may be updated at any time.
Always refer to KGIS for the latest information.

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

SUBJECT: **REPLACEMENT OF C-MDPS MOTOR, ECU, WORM GEAR ASSEMBLY AND/OR STEERING COLUMN HOUSING**

MDPS Repair Flowchart



SUBJECT:

REPLACEMENT OF C-MDPS MOTOR, ECU, WORM GEAR ASSEMBLY AND/OR STEERING COLUMN HOUSING

**C-MDPS
Common Noise Concerns Flowchart**

**C-MDPS
Noise Inspection Steps**

1. Check Steering Wheel
Inspect the condition of the (Driver's Air bag) DAB wiring (ex. DAB, clock spring, multifunction switch-MFS)

Problem Found

Replace defective part

No problem found

2. Check the C-MDPS Mounting Position
Inspect cowl mounting and cross member bolt
Inspect C-MDPS mounting bolts

Problem Found

Retighten bolt

No problem found

3. Check U-Joint Mounting Bolt
Inspect U-joint retaining bolt, check for noise after disassembling/re-assemble.

Problem Found

Retighten U-joint bolt

No problem found

4. Check Tire-Rod End Joint for Free Play

Problem Found

Replace defective part

No problem found

5. Check Steering Gear box Mounting Bolt

Problem Found

Retighten bolt

No problem found

6. Check Steering Gear Box Noise

Problem Found

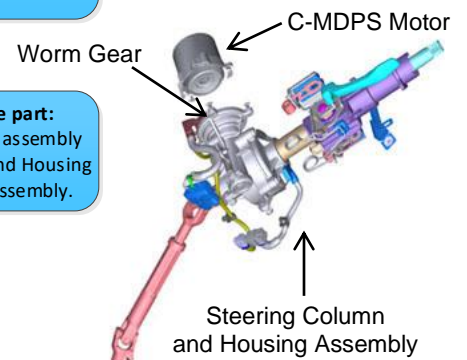
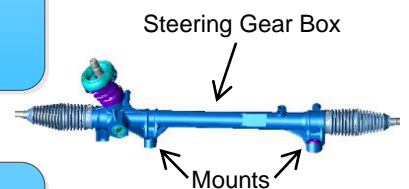
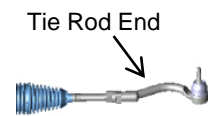
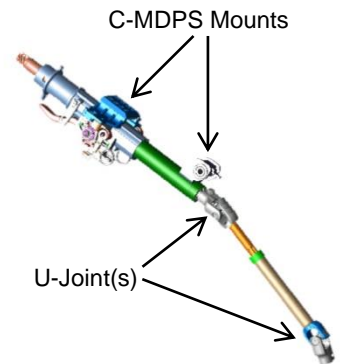
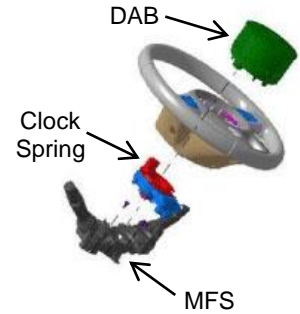
Replace defective part

No problem found

7. Check C-MDPS
Noise present from the column and housing
Noise present from C-MDPS motor
Noise from C-MDPS Worm Shaft Bearing

Problem Found

Replace defective part:
C-MDPS Worm Gear assembly
or Steering Column and Housing
or C-MDPS Motor assembly.



Video: Worm Shaft Bearing Noise

Applicable Models Only: Mobis C-MDPS



SUBJECT:

REPLACEMENT OF C-MDPS MOTOR, ECU, WORM GEAR ASSEMBLY AND/OR STEERING COLUMN HOUSING

MDPS DTC TABLE			
DTC	Concern	Inspection Procedure	Recommendation
C1102	Battery Voltage Problem	Check battery voltage condition.	Recharge battery voltage.
C1603	MDPS Thermal Protection	Investigate driving conditions if DTC is set. This DTC protects the motor from overheating.	No replacement necessary.
C1611	CAN Time Out EMS	Check GDS condition.	Check EMS Can line.
C1616	CAN BUS OFF	Check wiring and connector condition. Check ECU CAN line.	Check the chassis CAN line.
C1622	Vehicle Speed Signal Error	Check MDPS ground.	Check the EMS
C1696 C1697	SPAS Signal Error	Check SPAS and associated wiring.	Repair as necessary. Erase DTC(s). MDPS Assy is <u>not</u> to be replaced.
C1612 C1646	TCU Signal Error	Check TCU and associated wiring.	
C1628 C1656	Instrument Cluster Signal Error	Check instrument cluster and Associated wiring.	
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 and connector condition.	If DTC returns, replace column and housing assembly.
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 Error	First, erase DTC, then check wiring And connector condition.	If DTC returns, replace column And housing assembly.
C1112	Torque Sensor Voltage Error	Check wiring and connector condition Between torque sensor and ECU.	If DTC returns, replace the MDPS ECU.
C1704	ECU Fail-Safe Relay Fault	First, erase DTC. Then check the wiring and connector at the 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. Then check the wiring and connector between the ECU and motor.	First replace MDPS ECU. If DTC returns, replace the MDPS motor.
C1623	CAN Time Out SAS	<ol style="list-style-type: none"> 1. Check MDPS power connector and fuse. 2. Check MDPS ground line. 3. Check MDPS ECU/VSM CAN line. 4. Check communication status with GDS. 5. Check for DTC C1259. If present, replace the column and housing assembly. 	If DTC returns, replace the MDPS ECU.
C1687	CAN Time Out VSM		
C1688	VSM Signal Error		If DTC returns and MDPS is inoperable, replace MDPS ECU. If DTC returns and MDPS operation is normal, continue investigation into wiring issues.

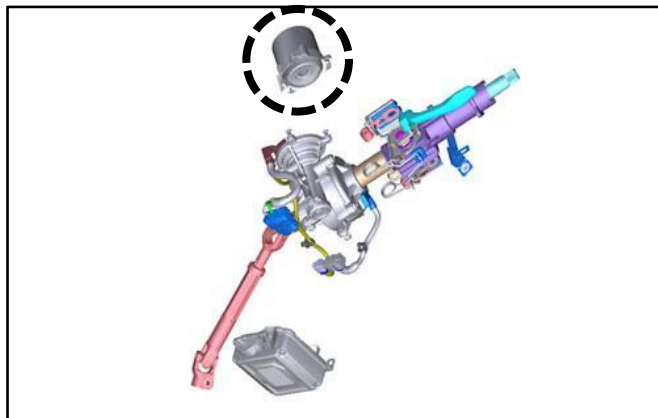
SUBJECT:

REPLACEMENT OF C-MDPS MOTOR, ECU, WORM GEAR ASSEMBLY AND/OR STEERING COLUMN HOUSING

Replacement Procedure for MDPS Motor:

1. Replace the MDPS motor by referring to the “Steering System → Motor Driven Power Steering → MDPS Motor → Repair Procedures” chapter in the applicable Shop Manual on KGIS.

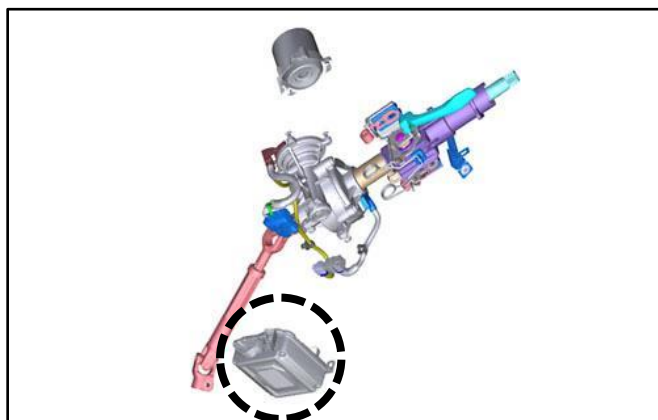
Note: Be sure mark the steering column shaft to the intermediate shaft for re-assembly purposes if removing the steering column and housing assembly.



Replacement Procedure for MDPS ECU:

1. Replace the MDPS ECU by referring to the “Steering System → Motor Driven Power Steering → MDPS ECU → Repair Procedures” chapter in the applicable Shop Manual on KGIS.

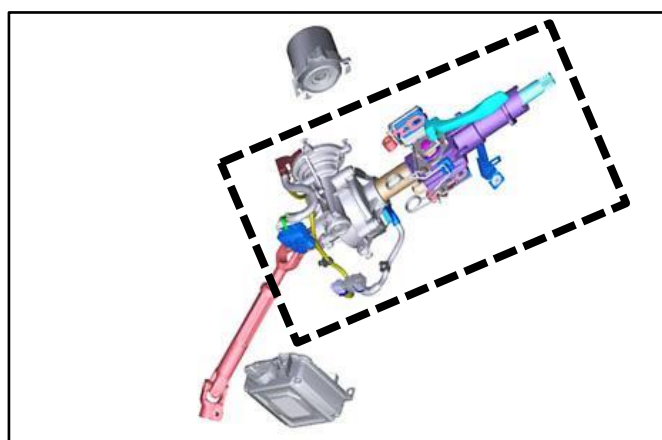
Note: Be sure mark the steering column shaft to the intermediate shaft for re-assembly purposes if removing the steering column and housing assembly.



Replacement Procedure for Steering Column & Housing:

1. Replace the MDPS column and housing by referring to the “Steering System → Motor Driven Power Steering → MDPS Column and Housing → Repair Procedures” chapter in the applicable Shop Manual on KGIS.

Note: Be sure mark the steering column shaft to the intermediate shaft for re-assembly purposes.



★ IMPORTANT

Ensure all steps are closely followed within the Service information as additional KDS-related procedures are required. Ensure the Steering Angle Sensor (SAS) is calibrated and there are no DTCs after replacement of the MDPS Motor and/or ECU. Verify proper operation of the steering system and vehicle.

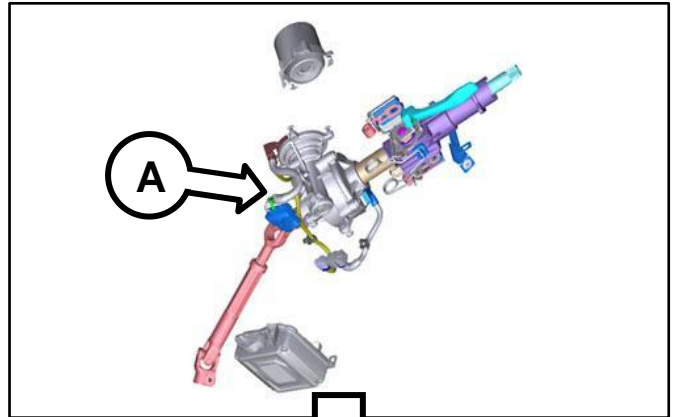
SUBJECT:

REPLACEMENT OF C-MDPS MOTOR, ECU, WORM GEAR ASSEMBLY AND/OR STEERING COLUMN HOUSING

Replacement Procedure for Worm Gear Assembly (Mobis Only):

1. Replace the MDPS column and housing by referring to the "Steering System → Motor Driven Power Steering → MDPS Column and Housing → Repair Procedures" chapter in the applicable Shop Manual on KGIS.

Note: Be sure mark the steering column shaft to the intermediate shaft for re-assembly purposes.



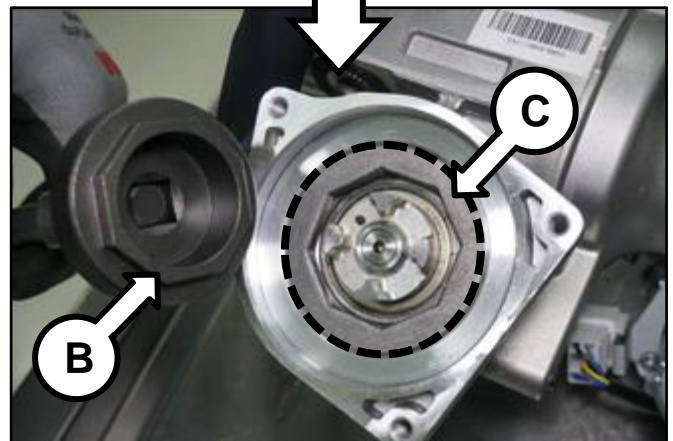
2. Using the worm shaft plug SST (B) loosen the worm shaft nut (C) and remove the worm shaft.

Torque Specifications for nut (C) Refer to page 8 for applicable model:

C SEG 1: 27.5 – 34.7 lb.ft (37.2 – 47.0 N.m (3.8 – 4.8 kgf.m)

C SEG 2: 51.7 – 59.0 lb.ft (70.0 – 80.0 N.m (7.2 – 8.2 kgf.m)

D SEG: 81.2 – 103.2 lb.ft (110.0 – 140.0 N.m (11.3 – 14.3 kgf.m)



3. Loosen the 5mm hex plug (D) and then remove the anti-rattle plug assembly.

Torque Specifications for plug (D):
7.3 - 9.4 lb.ft (9.8 - 12.8 N.m,
1.0 - 1.3 kgf.m)

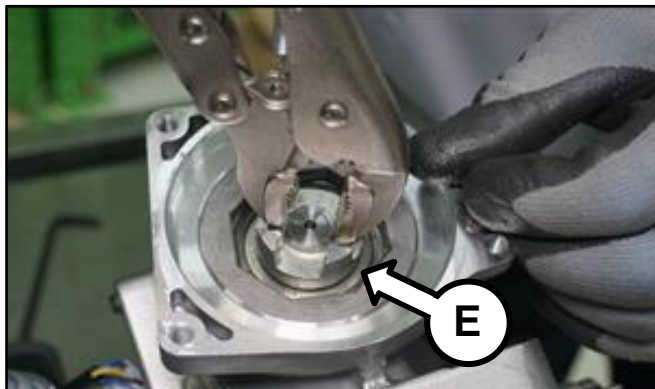


SUBJECT:

REPLACEMENT OF C-MDPS MOTOR, ECU, WORM GEAR ASSEMBLY AND/OR STEERING COLUMN HOUSING

4. Using a set of vise grips, remove the worm shaft assembly (E).

Note: Reuse the flexible coupling.



5. Apply grease evenly to the new worm shaft assembly (E).

Note: Grease is included (20g) with worm gear assembly.



6. Install the new worm shaft assembly (E) in the reverse order of removal.



7. Using a torque wrench and SST (B), tighten the shaft nut (C).

Refer to torque specifications on step 2.

8. Re-install all removed parts in the reverse order of removal.

Note: Be sure to follow the SAS Calibration, EPS Type Recognition as outlined on KGIS.







SUBJECT: REPLACEMENT OF C-MDPS MOTOR, ECU, WORM GEAR ASSEMBLY AND/OR STEERING COLUMN HOUSING

AFFECTED VEHICLE RANGE:

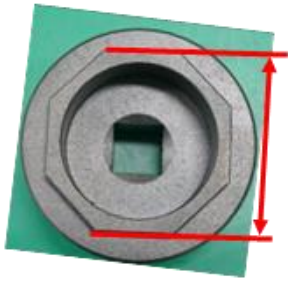
Model	MDPS Supplier	Model Year Range
Soul (AM), Optima (QF, TF, TF HEV), Cadenza (VG), and Forte (YD, YDm)	Mobis	All Applicable Models 2010MY~ with C-MDPS
Forte (BD, BDm, YD, YDm), Niro (DE, DE HEV/PHEV/ EV), Optima (JF/JFa, JF HEV/PHEV) Soul (PS, PS EV), Sorento (UMa) and Cadenza (YG)		
Rio (UB, SC), Sportage (SL, QL) and Sorento (XMa)	Mando	

REQUIRED PART:

Part Name	Part Number	Figure
C-MDPS Motor	Refer to EPC	
C-MDPS ECU	Refer to EPC	
Steering Column Housing	Refer to EPC	
Worm Gear Assembly (PS, PS EV, YD)	56351 B3AAAAFFF*	
Worm Gear Assembly (JF, JF HEV, JFa, UMa)	56351 C5AAAAFFF*	
Worm Gear Assembly (DE - integrated)	56351 F2AAAAFFF*	
Worm Gear Assembly (JF, JF HEV, JFa, UMa, YG)	56351 F6AAAAFFF*	
Worm Gear Assembly (BD, BDm, DE, DE PHEV, DE EV)	56351 G3AAAAFFF*	

***Note: Mobis supplier applications only. Grease is included with Worm Gear Assembly.**

REQUIRED TOOL:

Tool Name	SST P/N	Figure	Comments
Wrench (Worm Gear Replacement)	0K563 T9100FFF		C - SEG 1 (34.9mm)
	0K563 Q2100FFF		C - SEG 2 (42mm)
	0K563 D6100FFF		D - SEG (44.9mm)



SUBJECT:

REPLACEMENT OF C-MDPS MOTOR, ECU, WORM GEAR ASSEMBLY AND/OR STEERING COLUMN HOUSING

WARRANTY INFORMATION:

N Code: D61 C Code: ZZ4

Model	Claim Type	Causal P/N	Qty.	Repair Description	Labor Op Code	Op Time	Replacement P/N	Qty.
All Models Listed	W	Refer to EPC	1	C-MDPS Motor Replacement	56330R00 56331R00	Refer to LTS	N/A	0
				C-MDPS ECU Replacement	56345R00	Refer to LTS		
				Steering Column Housing Replacement	56391R00	Refer to LTS		

WARRANTY INFORMATION (WORM GEAR):

N Code: Q55 C Code: ZZ1

Model	Claim Type	Causal P/N	Qty.	Repair Description	Labor Op Code	Op Time	Replacement P/N	Qty.
PS, PS EV, YD	W	*Refer to EPC	0	C-MDPS Worm Gear Replacement (for applicable models only)	56351F01	1.4 M/H	56351 B3AAFF	1
JF, JF HEV, JFa, UMa						1.3 M/H	56351 C5AAFF	
DE						1.1 M/H	56351 F2AAFF	
JF, JF HEV, JFa, UMa, YG						1.3 M/H	56351 F6AAFF	
BD, BDm, DE, DE PHEV, DE EV						1.1 M/H	56351 G3AAFF	

***Note: Refer to EPC for Steering Column and Housing Assembly.**