TECHNICAL SERVICE BULLETIN
4WD - Intermittent Grinding Noise While Driving

19-2252
22 August 2019

This bulletin supersedes 18-2273. Reason for update: New Part/Procedure For Same Condition

Model:

Ford 2013-2018 Expedition
2013-2018 F-150
Lincoln 2013-2018 Navigator

Summary

This article supersedes TSB 18-2273 to update the Parts List and Service Procedure.

Issue: Some 2013-2018 F-150/Expedition/Navigator vehicles equipped with four wheel drive (4WD) may exhibit an intermittent grinding noise while driving in two wheel drive (2WD) mode most commonly on acceleration. This may be due to a loss of vacuum to the integrated wheel end (IWE) actuators and/or wear of the IWE components. To correct the condition, follow the Service Procedure steps to replace the worn vacuum and/or IWE components.

Action: Follow the service procedure steps to correct the condition on vehicles that meet the following criteria:

- 2013-2018 F-150/Expedition/Navigator
- Equipped with 4WD
- Customer concern of intermittent grinding noise in 2WD mode.

Parts

Part Number	Description	Quantity
W714743-S439	Caliper Anchor Plate Bolt (2013-2014 F-150, 2013-2017 Expedition/Navigator)	1
W720613-S439	Caliper Anchor Plate Bolt (2015-2018 F-150, 2018 Expedition/Navigator)	1
N802827-S100	Front Half Shaft Nut (2013-2016 F-150 Built On Or Before 2-Aug-2016)	1
N802827-S100A	Front Half Shaft Nut (2016-2018 F-150 Built On Or After 3-Aug-2016, 2015-2018 Expedition/Navigator Built On Or After 14-Apr-2015)	1
N802827-S441	Front Half Shaft Nut (2013-2015 Expedition/Navigator Built On Or Before 14-Apr-2015)	1
W520215-S441	Tie Rod End Nut/Upper Ball Joint Nut (2013-2014 F-150, 2013-2017 Expedition/Navigator)	1
W520215-S440	Tie Rod End Nut (2015-2018 F-150, 2018 Expedition/Navigator)	1
W520214-S440	Upper Ball Joint Nut (2015-2018 F-150, 2018 Expedition/Navigator)	1

1104	Front Hub Bearing - Refer To The Parts Catalog For The VIN Specific Application	2
7L1Z-3C247-A	IWE Actuator (2013-2015 F-150 Built On Or Before 11-Oct-2015, 2013-2015 Expedition/Navigator)	2
HL1Z-3C247-A	IWE Actuator (2015-2018 F-150 Built On Or After 12-Oct-2015, 2016-2018 Expedition/Navigator)	2
W706890-S439	Front Hub Bearing Bolts	2
HL1Z-3C247-B	IWE Clutch Ring Kit	2
BL3Z-7A785-A	Vacuum Lines (2013-2014 F-150)	1
BL3Z-7A785-B	Vacuum Lines (2013-2014 Raptor)	1
FL3Z-7A785-A	Vacuum Lines (2015-2018 F-150)	1
HL3Z-7A785-A	Vacuum Lines (2017-2018 Raptor)	1
AL1Z-7A785-C	Vacuum Lines (2013-2014 Expedition/Navigator)	1
FL1Z-7A785-A	Vacuum Lines (2015-2017 Expedition/Navigator)	1
JL3Z-7A785-A	Vacuum Lines (2018 Expedition/Navigator)	1
HL3Z-3C125-A	Vacuum Hose to IWE (2017-2018 Raptor)	1
FL3Z-3C125-A	Vacuum Hose to IWE (2015-2018 F-150, 2018 Expedition/Navigator)	1
BL3Z-3A788-A	Check Valve (2013-2014 F-150)	1
FL3Z-3A788-B	Check Valve (2015-2018 F-150, 2018 Expedition/Navigator)	1
AL3Z-3A788-A	Check Vavle (2013-2017 Expedition/Navigator)	1
XG-1-E1	Motorcraft® Premium Long-Life Grease	1

Warranty Status: Eligible Under Provisions Of New Vehicle Limited Warranty Coverage Warranty/ESP coverage limits/policies/prior approvals are not altered by a TSB. Warranty/ESP coverage limits are determined by the identified causal part and verified using the OASIS part coverage tool.

Labor Times

Description	Operation No.	Time
2013-2018 F-150, Expedition/Navigator 4X4: Inspect, Replace Check Valve, Apply Vacuum To Both IWEs (Pass) Road Test (Pass) (Do Not Use With Any Other Labor Operations)	192252A	0.8 Hrs.
2013-2018 F-150, Expedition/Navigator 4X4: Inspect, Replace Check Valve, Apply Vacuum To Both IWEs (Fail) Apply Vacuum Directly To Each IWE (One Fail) Remove One IWE, Inspect Wheel Bearing Splines (Pass) Replace One (1) IWEs	192252B	1.1 Hrs.

(Can Be Claimed With Operations K, L And M) (Do Not Use With Any Other Labor Operations Outside Of This Article)		
2013-2018 F-150, Expedition/Navigator 4X4: Inspect, Replace Check Valve, Apply Vacuum To Both IWEs (Fail) Apply Vacuum Directly To Each IWE (Both Fail) Remove Both IWEs, Inspect Wheel Bearing Splines (Both Pass) Replace Both (2) IWEs (Can Be Claimed With Operations K, L And M) (Do Not Use With Any Other Labor Operations Outside Of This Article)	192252C	1.8 Hrs.
2013-2018 F-150, Expedition/Navigator 4X4: Inspect, Replace Check Valve, Apply Vacuum To Both IWEs (Fail) Apply Vacuum Directly To Each IWE (Both fail) Remove IWEs, Inspect Wheel Bearing Splines (One Fail) Replace One (1) Wheel Bearing And One (1) IWE (Can Be Claimed With Operations K, L And M) (Do Not Use With Any Other Labor Operations Outside Of This Article)	192252D	1.9 Hrs.
2013-2018 F-150, Expedition/Navigator 4X4: Inspect, Replace Check Valve, Apply Vacuum To Both IWEs (Fail) Apply Vacuum Directly To Each IWE (Both fail) Remove IWEs, Inspect Wheel Bearing Splines (Both Fail) Replace Both (2) Wheel Bearings And Both (2) IWEs (Can Be Claimed With Operations K, L And M) (Do Not Use With Any Other Labor Operations Outside Of This Article)	192252E	2.1 Hrs.
2013-2018 F-150, Expedition/Navigator 4X4: Inspect, Replace Check Valve, Apply Vacuum To Both IWEs (Both Pass) Apply Vacuum Directly To Each IWE, Road test (Fail One Side) Remove IWE, Inspect Wheel Bearing Splines (Pass) Replace One (1) IWE Clutch Ring (Can Be Claimed With Operations K, L And M) (Do Not Use With Any Other Labor Operations Outside Of This Article)	192252F	1.6 Hrs.
2013-2018 F-150, Expedition/Navigator 4X4: Inspect, Replace Check Valve, Apply Vacuum To Both IWEs (Both Pass) Apply Vacuum Directly To Each IWE, Road test (Fail Both Sides) Remove Both IWEs, Inspect Wheel Bearing Splines (Pass) Replace Both (2) IWE Clutch Rings (Can Be Claimed With Operations K, L And M) (Do Not Use With Any Other Labor Operations Outside Of This Article)	192252G	2.3 Hrs.
2013-2018 F-150, Expedition/Navigator 4X4: Inspect, Replace Check Valve, Apply Vacuum To Both (2) IWEs (Both Pass) Apply Vacuum Directly To Each IWE, Road Test (fail One Side) Remove IWE, Inspect Wheel Bearing Splines (Fail One Side) Replace One (1) Wheel Bearing And One (1) IWE Clutch Ring (Can Be Claimed With Operations K, L And M) (Do Not Use With Any Other Labor Operations Outside Of This Article)	192252H	1.8 Hrs.
2013-2018 F-150, Expedition/Navigator 4X4: Inspect, Replace Check Valve, Apply Vacuum To Both (2) IWEs (Both Pass) Apply Vacuum Directly To Each IWE, Road test (Fails Both Sides) Remove Both IWEs, Inspect Wheel Bearing Splines (Fail Both Sides) Replace Both (2) Wheel Bearing And Both (2) IWE Clutch Rings (Can Be Claimed With Operations K, L And M) (Do Not Use With Any Other Labor Operations Outside Of This Article)	192252J	2.6 Hrs.
2013-2018 F-150, Expedition/Navigator 4X4: Additional Time Use Scan Tool To Active Solenoid And Measure Vacuum At Both IWEs (Can Be Claimed With Operations A-J)	192252K	0.3 Hrs.
2013-2018 F-150, Expedition/Navigator 4X4: Additional Time To Be Used When Vacuum Harness Replacement Is Necessary (Can Be Claimed With Operations A-J)	192252L	0.5 Hrs.
2017-2018 F-150, Expedition/Navigator 4X4: Additional Time To Be Used When TCCM Reprogramming Is Necessary (Can Be Claimed With Operations A-J)	192252M	0.2 Hrs.

Repair/Claim Coding

Causal Part:	3C247
Condition Code:	D4

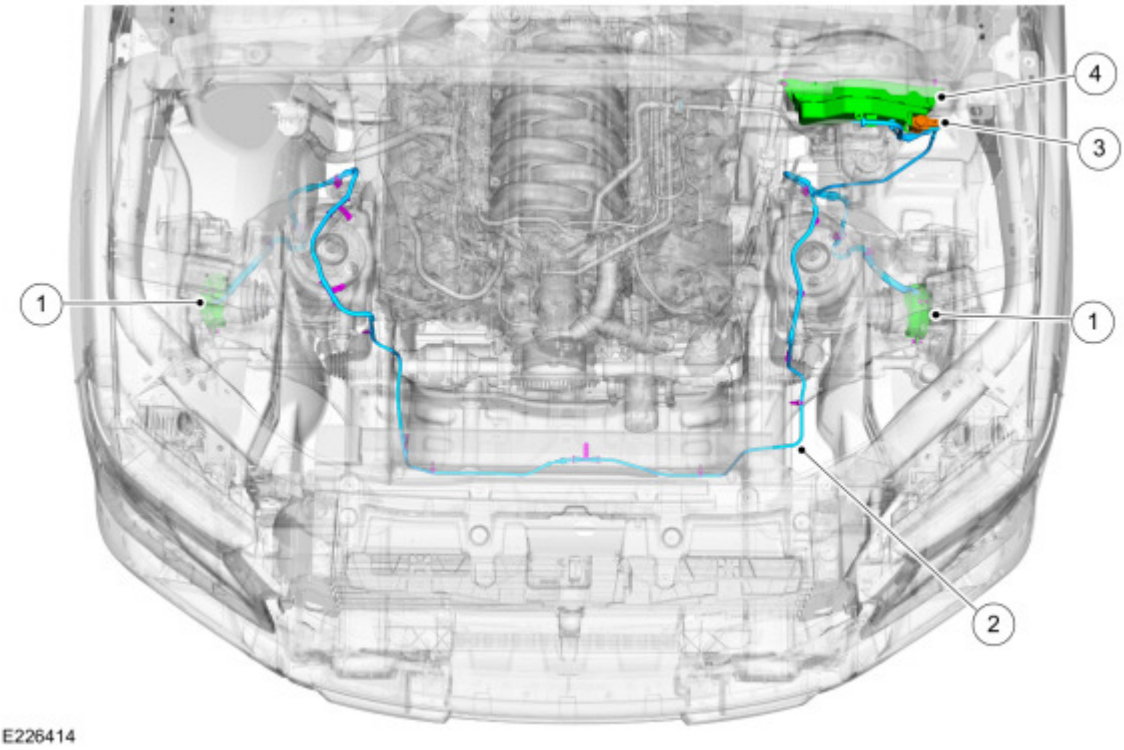
Service Procedure

1. Inspect the IWE vacuum hoses. Refer to Workshop Manual (WSM), Section 308-07A. Are there any disconnected or damaged vacuum hoses? (Figure 1)

(1). Yes - this article does not apply. Refer to WSM, Section 308-07A for normal diagnostics.

(2). No – proceed to Step 2.

Figure 1



2. Replace the vacuum check valve located near the vacuum reservoir. Refer to WSM, Section 308-07A.

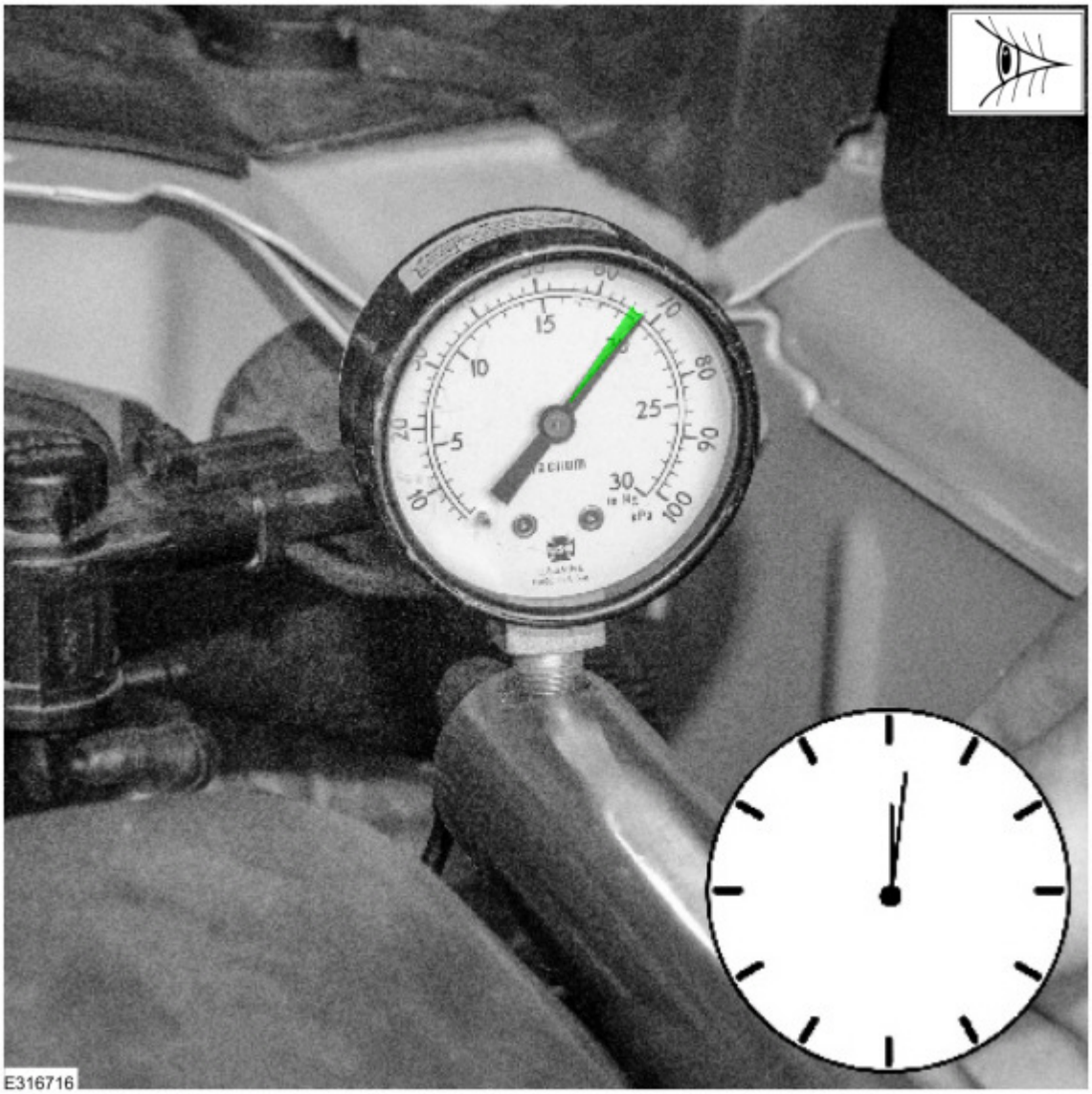
3. Disconnect the vacuum line to the IWEs at the vacuum solenoid.

4. Connect a hand vacuum pump to the IWE vacuum supply line and apply 508 mm-Hg (20 in-Hg) of vacuum. Does the vacuum drop more than 12.5 mm-Hg (0.5 in-Hg) per minute? (Figure 2)

(1). Yes - proceed to Step 5.

(2). No - connect the IWE vacuum supply line to the solenoid and proceed to Step 9.

Figure 2

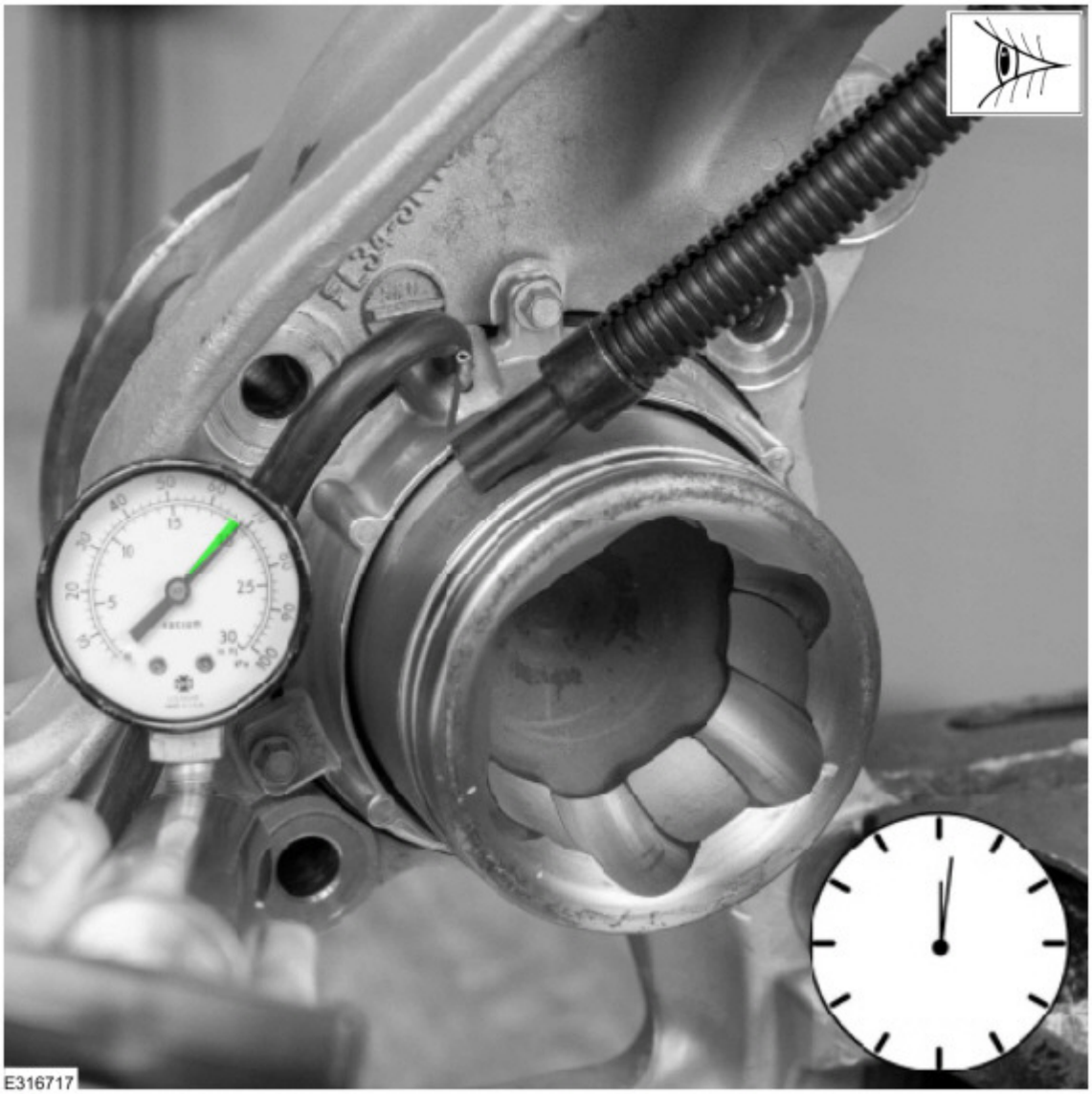


5. Using a hand vacuum pump, apply 508 mm-Hg (20 in-Hg) of vacuum to each IWE, one at a time, and monitor the vacuum gauge. Does the vacuum drop more than 12 mm-Hg (0.5 in-Hg) per minute? (Figure 3)

(1). Yes - proceed to Step 7.

(2). No – proceed to Step 6.

Figure 3



6. Replace the vacuum lines between the solenoid and IWEs. Refer to the WSM, Section 308-07A. Proceed to Step 11.

7. Remove the IWE assembly from the affected wheel. Refer to WSM, Section 308-07A.

8. Inspect the wheel bearing splines for damage or excessive wear. Is wheel bearing spline damage or excessive wear present?

(1). Yes - replace the IWE assembly and wheel bearing. Refer to WSM, Section 308-07A and 204-01B. Proceed to Step 11.

(2). No - replace the IWE assembly. Refer to WSM, Section 308-07A. Proceed to Step 11.

9. Test the IWE vacuum supply lines.

(1). Disconnect the vacuum supply line at the left or right IWE and connect a vacuum gauge to the supply line as shown in Figure 4.

(2). Start the engine and allow it to idle for 5 minutes to build vacuum.

(3). Connect the appropriate Ford scan tool and enter transfer case control module (TCCM) data logger.

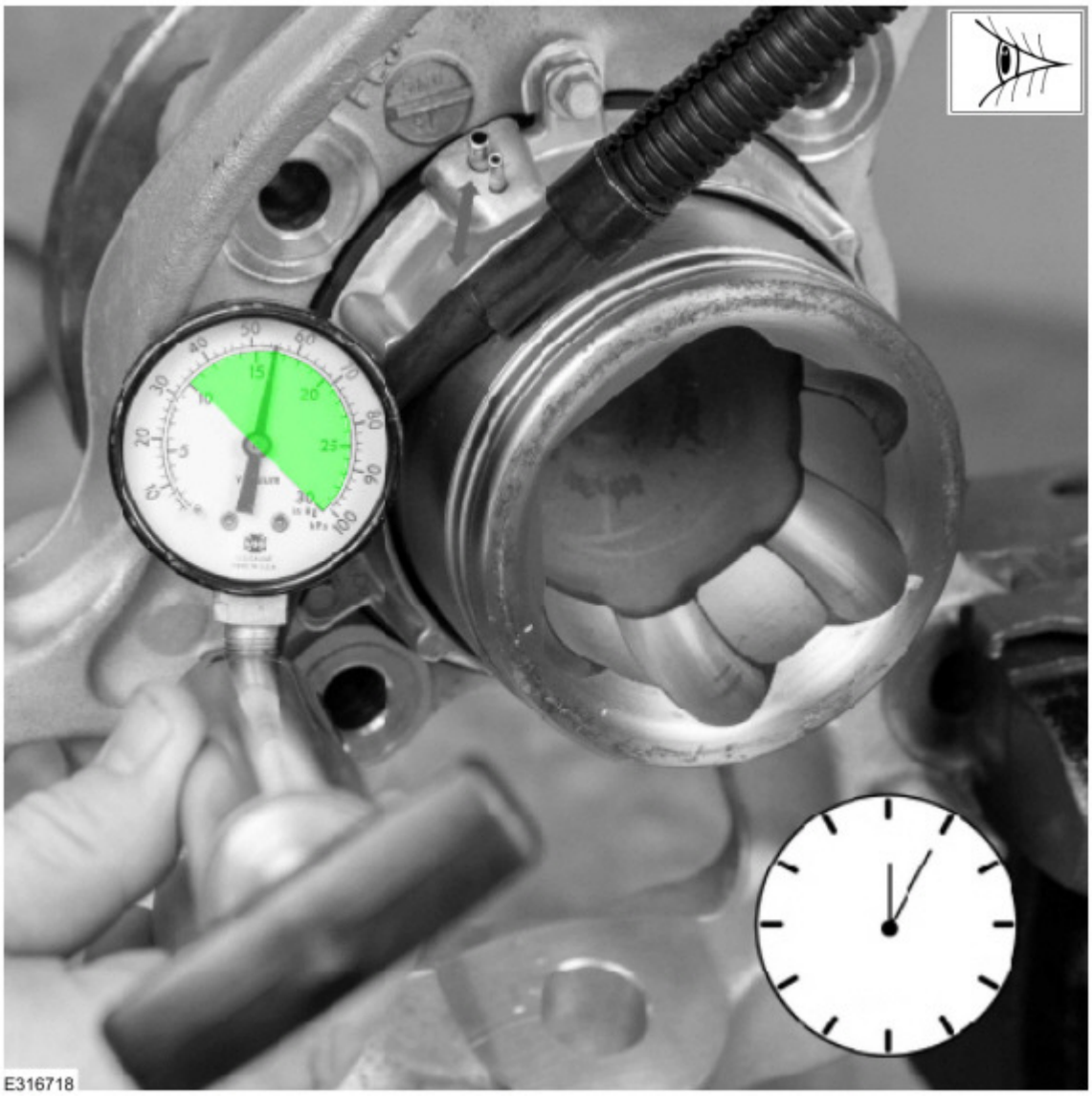
(4). Active command the vacuum solenoid.

- IDS Vehicles: Command IWE_OS # to No.

• FDRS Vehicles: Command IWE_OUT_ENGAGED = No (False)

(5). Repeat this test on the opposite IWE vacuum supply line.

Figure 4



10. Is the vacuum at both left and right supply lines greater than 254 mm-Hg (10 in-Hg)?

(1). Yes - proceed to step 11.

(2). No - replace the vacuum lines between the solenoid and IWEs. Refer to the WSM, Section 308-07A. Proceed to Step 11.

11. Is the vehicle a 2017 or 2018 built on or before 17-Sept-2018?

(1). Yes - reprogram the TCCM using the latest version of the appropriate Ford scan tool.

• Note: The new TCCM calibration changes IWE operation at start up. When ambient temperature is above 0°C (32°F) the IWEs stay engaged regardless of a 4WD mode change for approximately 0.8 km (0.5 miles). Engagement only occurs once per key cycle and is not reset when shifting between PARK and DRIVE. The TCCM uses this strategy to delay vacuum use until vacuum-intensive engine startup has completed and sufficient vacuum is available to fully disengage IWEs.

(2). No – proceed to Step 12.

12. Road test the vehicle for noise by performing heavy accelerations in 2WD. Engage the 4WD system to verify proper engagement/disengagement quality. Is a grinding noise present in 2WD mode that is not present in 4WD mode?

(1). Yes – proceed to Step 13.

(2). No – repair is complete.

13. Remove the IWE assembly from the affected wheel. Refer to WSM, Section 308-07A.

14. Inspect the wheel bearing splines. Is wheel bearing spline damage present?

(1). Yes - replace the IWE clutch ring and wheel bearing. Refer to WSM, Section 308-07A and 204-01B.

(2). No - replace the IWE clutch ring. Refer to WSM, Section 308-07A.
