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## 2017 Ford Police Interceptor Utility Service and Repair Manual

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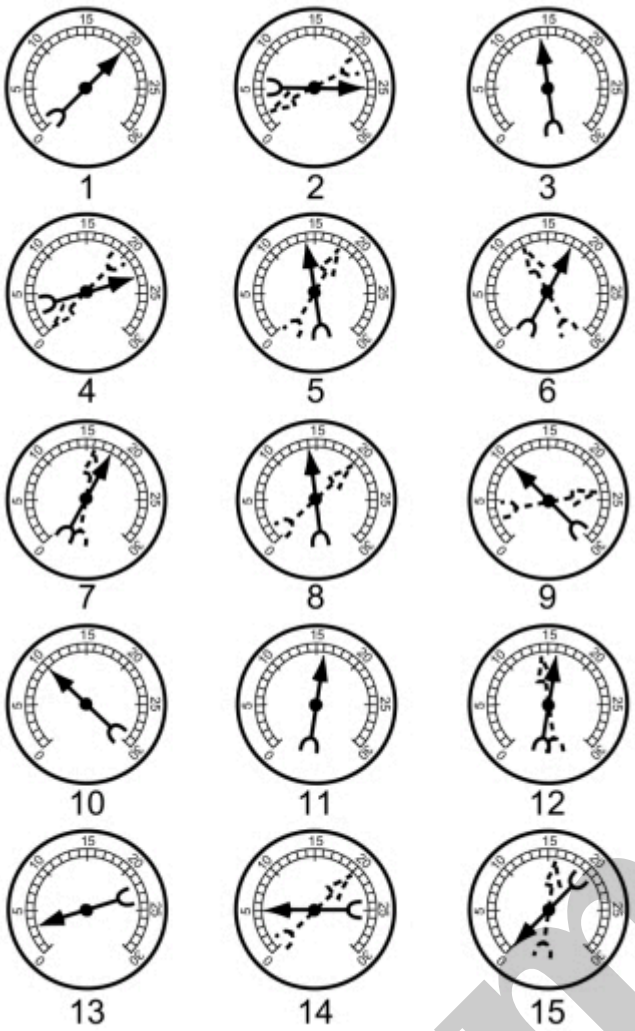


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Click here to learn about symbols, color coding, and icons used in this manual.

4. When vacuum leaks are indicated, search out and correct the cause. Excess air leaking into the system will upset the fuel mixture and cause concerns such as rough idle, missing on acceleration or burned valves. If the leak exists in an accessory unit, the unit will not function correctly. Always fix vacuum leaks.

followed. Make sure that the oil has been changed at the specified mileage intervals. If vehicle mileage is past the first recommended drain interval, the OEM (original equipment manufacturer) production filter should have been changed.

2. Ask how the most current mileage was accumulated. That is, determine whether the vehicle was driven under the following conditions:

   **Visual Inspection Chart**

| Mechanical |
| --- |
| • Extended idling or curbside engine operation<br>• Stop-and-go traffic or taxi operation<br>• Towing a trailer or vehicle loaded heavily<br>• Frequent short trips (engine not up to normal operating temperature)<br>• Excessive throttling or high engine-rpm driving |

3. Verify that there are no external leaks. If necessary, review the diagnostic procedure in this section.

   For additional information, refer to: Oil Leak Inspection - Flex Fuel – Ethanol/Full Hybrid Electric Vehicle (FHEV)/Gasoline(303-00 Engine System - General Information, General Procedures).

4. Inspect the crankcase ventilation system for:

   **Visual Inspection Chart**

| Mechanical |
| --- |
| • disconnected hoses at the valve cover or TB.<br>• loose or missing valve cover fill cap.<br>• missing or incorrectly seated engine oil level indicator.<br>• incorrect or dirty PCV (positive crankcase ventilation) valve.<br>• a PCV (positive crankcase ventilation) valve grommet unseated in the valve cover (if so equipped). |

5. Inspect for signs of sludge. Sludge affects PCV (positive crankcase ventilation) performance and can plug or restrict cylinder head drainback wells. It can also increase oil pressure by restricting passages and reducing the drainback capability of piston oil control rings. Sludge can result from either excessive water ingestion in the crankcase or operation at extremely high crankcase temperatures.

with the specified fill amount. Explain however, that this may vary slightly between MIN-MAX or the upper and lower holes on the oil level indicator.

5. Record the vehicle mileage.

6. Advise the customer that oil level indicator readings must be taken every 320 km (200 mi) or weekly, using the revised marks as drawn. Remind the customer that the engine needs a minimum 15 minute drainback for an accurate reading and that the oil level indicator must be firmly seated in the tube prior to taking the reading.

7. **NOTE**

   High performance vehicles can be driven in such a way that may lead to higher engine oil consumption (this includes extended time at higher engine speeds, high loads, engine braking, hard cornering maneuvers, and track use). Under these conditions, oil consumption of approximately 1 liter per 800 km (1 quart per 500 miles) is possible.

   When the subsequent indicator readings demonstrate a full liter (quart) has been used, record the vehicle mileage. The mileage driven should not be less than 4,800 km (3,000 mi) for regular vehicles and 800 km (500 mi) for Ford Performance vehicles. The drive cycle the vehicle has been operated under must be considered when making this calculation. It may be necessary to have the customer bring the vehicle in for a periodic oil level indicator reading to closely monitor oil usage.

**Post Checks, Evaluation and Corrective Action**

1. If test results indicate excessive oil consumption, carry out a cylinder compression test. The cylinder compression test should be carried out with a fully charged battery and all spark plugs removed. See the Compression Test Chart in this section for pressure range limits.

2. Compression should be consistent across all cylinders. If compression is within the specifications found in this section, the excessive oil consumption may be due to wear on the valve guides, valves or valve seals.

   For additional information, refer to: Compression and Cylinder Leakage Test - Flex Fuel – Ethanol/Full Hybrid Electric Vehicle (FHEV)/Gasoline(303-00 Engine System - General Information, General Procedures).

3. A cylinder leak detection test can be carried out using a cylinder leakage detector. This can help identify valves, piston rings, or worn valve guides/valve stems, inoperative valve stem seals or other related areas as the source of oil consumption.

   For additional information, refer to: Compression and Cylinder Leakage Test - Flex Fuel – Ethanol/Full Hybrid Electric Vehicle (FHEV)/Gasoline(303-00 Engine System - General Information, General Procedures).

# Oil Leak Inspection - Flex Fuel - Ethanol/Full Hybrid Electric Vehicle (FHEV)/Gasoline

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| ***303-00 Engine System - General Information*** | ***2022 F-150*** |
| ***General Procedures*** | ***Procedure revision date: 10/2/2020*** |

**Oil Leak Inspection - Flex Fuel – Ethanol/Full Hybrid Electric Vehicle (FHEV)/Gasoline**

**NOTE**

If an overnight drive is done, the fan air or road air blast can cause erroneous readings.

**NOTE**

When diagnosing engine oil leaks, the source and location of the leak must be positively identified prior to repair.

1. Prior to carrying out this procedure, clean the cylinder block, cylinder heads, valve covers, oil pan and flywheel/flexplate with a suitable solvent to remove all traces of oil.

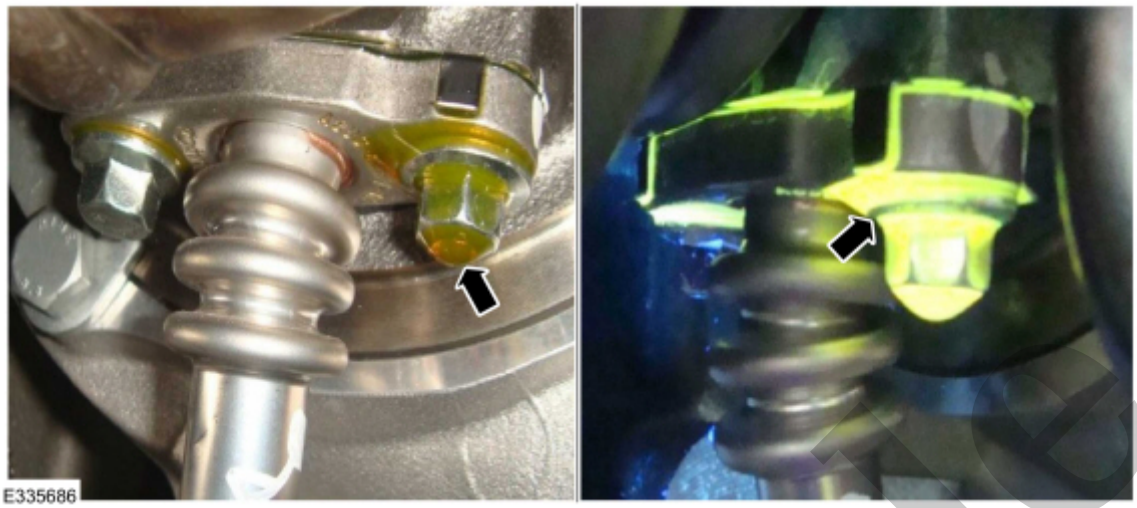
**Engine Oil Leaks - Fluorescent Oil Additive Method**

**NOTE**

If the factory fill engine oil with dye is present, change the engine oil and the oil filter prior to using the Dye-Lite® Oil-Based Fluid Dye (164-TP33200601).

1. Some fluid leaks are acceptable and considered characteristic of the component seal depending on the component, system or fluid it seals. These are called a weep or a seep.

4. Leak(s): A leak is oil detected under black light inspection and characterized by oil detection under white light inspection resulting in accumulation of oil drops and/or pooling. All leaks are considered unacceptable




Click here to learn about symbols, color coding, and icons used in this manual.

5. Use the UV Long-Wave W/12-foot Cord & Alligator Clips (164-R3748) or Leak Tracker UV-LED Leak Detection Flashlight (164-TP8695) to carry out the following procedure for oil leak diagnosis.

6. Add 29.6 ml (1 oz) of Dye-Lite® Oil-Based Fluid Dye (164-TP33200601) to a minimum of 0.47L (1/2 qt) and a maximum of 0.95L (1 qt) engine oil. Thoroughly premix the oil based fluid dye or it will not have enough time to reach the crankcase, oil galleries and seal surfaces during this particular 15 minute test. The additive must be added through the oil fill. Check the level on the oil level indicator to determine what amount of oil to premix. If it is in the middle of the crosshatch area or below the full mark, use 0.95L (1 qt). If it is at the full mark, use 0.47L (1/2 qt).

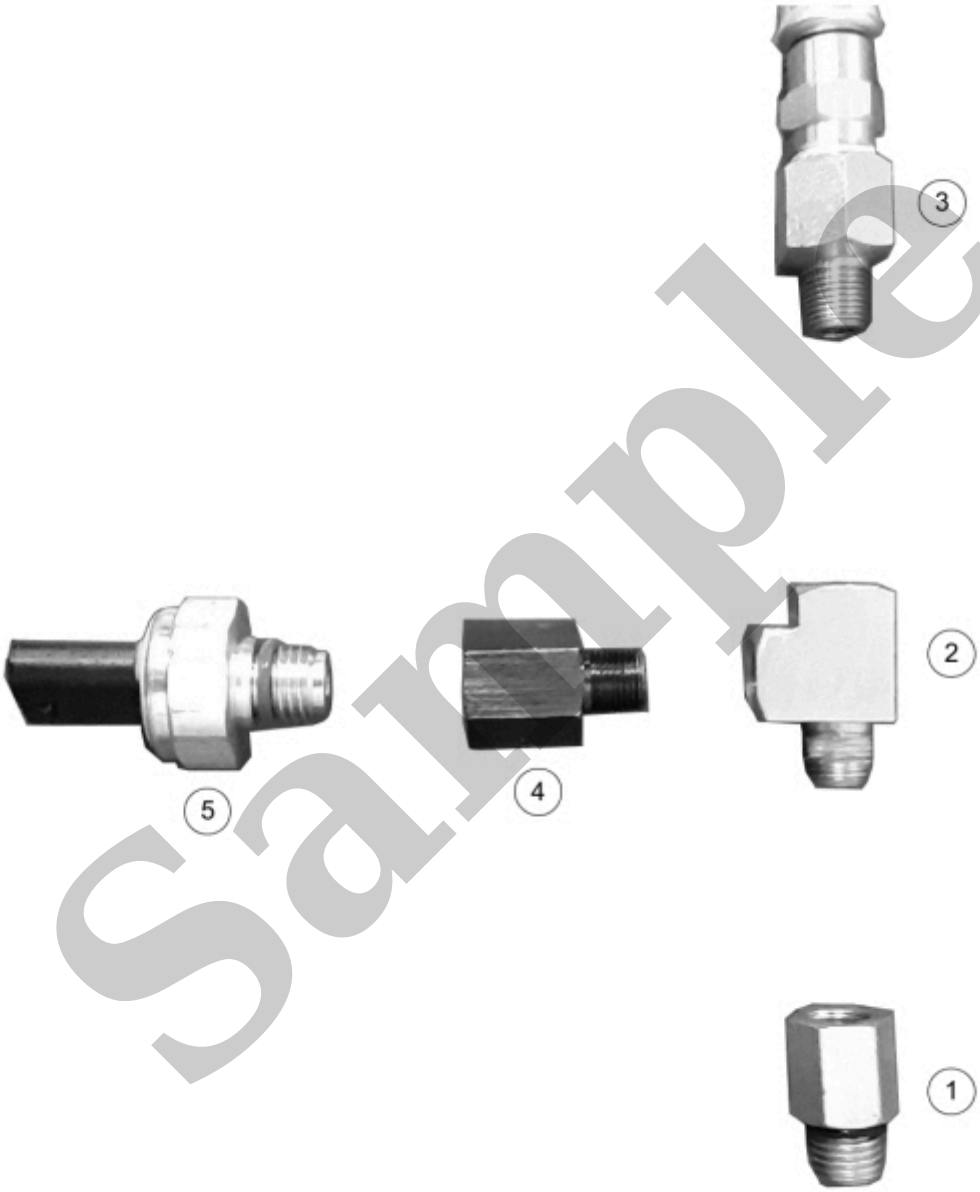
7. **NOTE**

   For best results allow the customer to drive the vehicle for a day.

   Run the engine for 15 minutes. Stop the engine and inspect all seal and gasket areas for leaks using the UV Leak Detector Kit. A fluoresces white area will identify the leak. For extremely small leaks, several hours may be required for the leak to appear.

8. At the end of test, make sure the oil level is within the upper and lower oil indicator marks. Remove oil as necessary if it registers above the full mark.

- 1. M12x1.5 Male to 1/8 NPT Female adaptor
- 2. 1/8 NPT Male to two 1/8 NPT Female T-fitting
- 3. Commercially available oil pressure gauge
- 4. 1/8 NPT Male to M12x1.5 Female adaptor
- 5. Oil pressure sensor

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Click here to learn about symbols, color coding, and icons used in this manual.

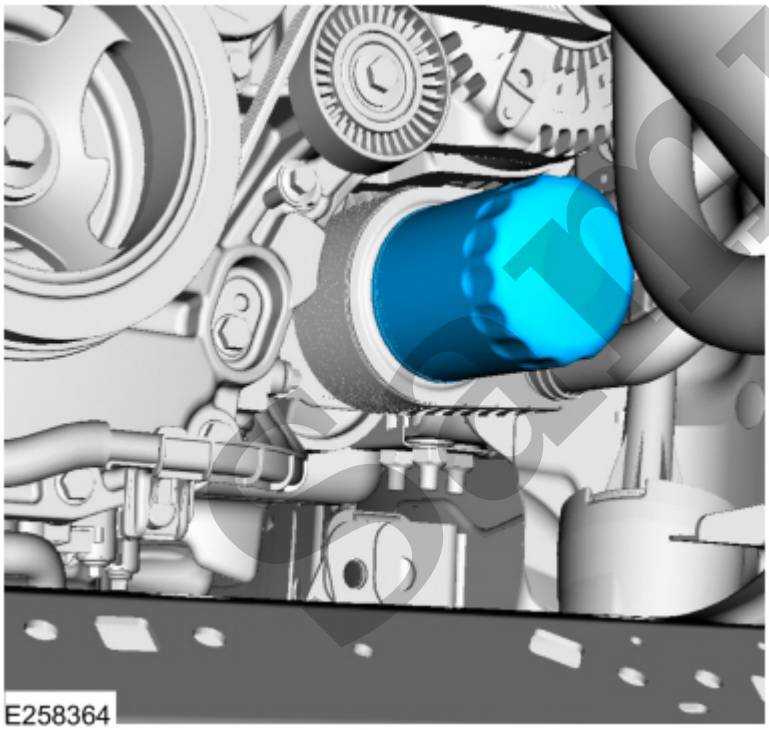
4. Connect the EOP (engine oil pressure)  sensor electrical connector.

5. Connect the battery ground cable.

| Mechanical |
| --- |
| • Insufficient oil<br>• Oil leakage<br>• Worn or damaged oil pump<br>• Oil pump screen cover and tube<br>• Excessive main bearing clearance<br>• Excessive connecting rod bearing clearance<br>• Chain tensioner leak |

**Oil Pressure Test 3.5L EcoBoost & 3.5L PowerBoost**

1. Remove the commercially available oil pressure gauge.
2. Install a new manufacturer-specified oil filter.






3. Check and refill the oil as needed, using new manufacturer-specified oil. Refer to the Specifications in the appropriate 303-01 section.

# Piston Diameter - 5.0L 32V Ti-VCT

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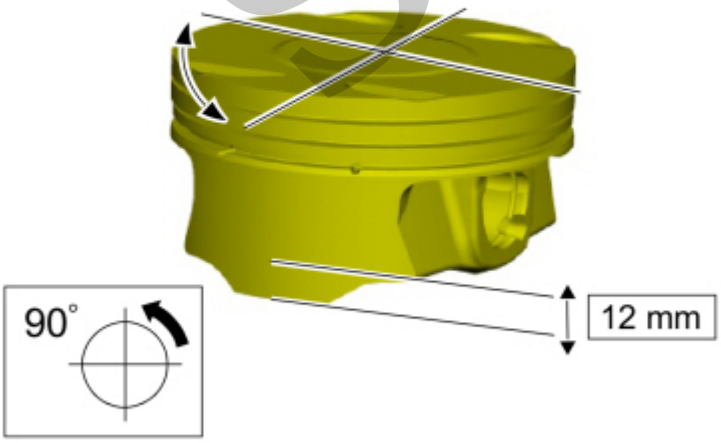
| ***303-00 Engine System - General Information*** | ***2022 F-150*** |
| ***General Procedures*** | ***Procedure revision date: 11/26/2019*** |

**Piston Diameter - 5.0L 32V Ti-VCT**

**Check**

1. - Measure the piston diameter 90 degrees from the piston pin and piston diameter (DN) height up from the bottom of the piston at the point indicated.
   - Refer to specifications for the piston diameter (DN).

     Refer to: Specifications(303-01E Engine - 5.0L 32V Ti-VCT, Specifications).

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# Piston Diameter

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| ***303-00 Engine System - General Information*** | ***2022 F-150*** |
| ***General Procedures*** | ***Procedure revision date: 11/3/2020*** |

## Piston Diameter

**Check**

1. - Measure the piston diameter 90 degrees from the piston pin and piston diameter (DN) height down from the top of the piston at the point indicated.
   - Refer to specifications for the piston diameter (DN) height.

     Refer to: Specifications(303-01A Engine - 2.7L EcoBoost (238kW/324PS), Specifications).

     Refer to: Specifications(303-01B Engine - 3.3L Duratec-V6, Specifications).

     Refer to: Specifications(303-01C Engine - 3.5L EcoBoost (BM), Specifications).

     Refer to: Specifications(303-01D Engine - 3.5L V6 PowerBoost (CN), Specifications).