Your Ultimate Source for OEM Repair Manuals

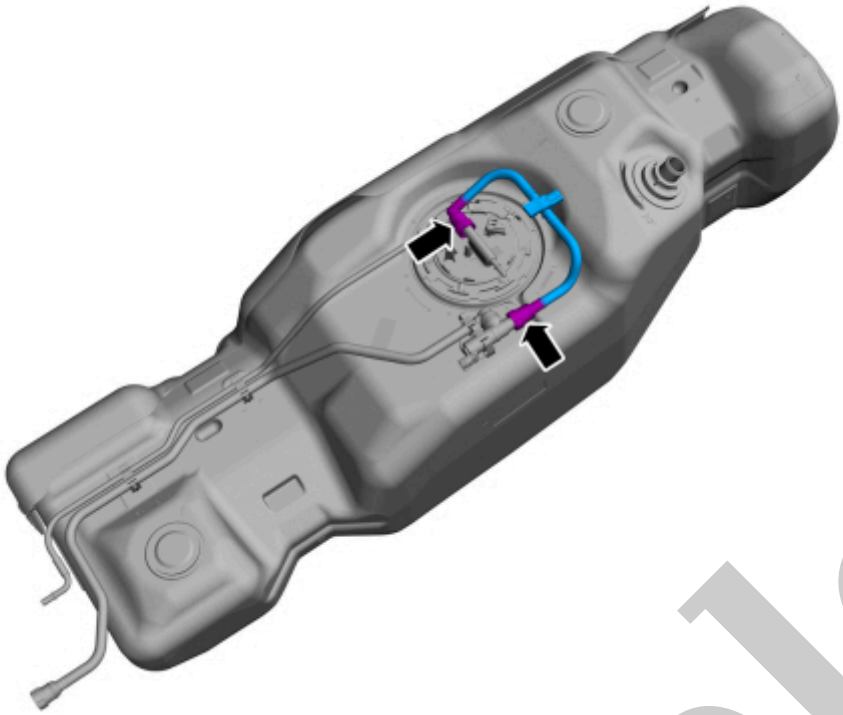
FactoryManuals.net is a great resource for anyone who wants to save money on repairs by doing their own work. The manuals provide detailed instructions and diagrams that make it easy to understand how to fix a vehicle.

2022 Ford Ranger Service and Repair Manual

Go to manual page

Sample

© FactoryManuals.



E333699

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

Type - 2

3. Disconnect the quick release couplings and remove the fuel tank pressure sensor and tube.

   Refer to: Quick Release Coupling(310-00B Fuel System - General Information - 3.3L Duratec-V6, General Procedures).

Sample

Evaporative Emissions - Overview

303-13C Evaporative Emissions - 3.5L EcoBoost (BM)	*2022 F-150*
Description and Operation	***Procedure revision date: 05/10/2021***

Evaporative Emissions - Overview

The EVAP (evaporative emission) system prevents hydrocarbon emissions from entering the atmosphere by storing fuel vapors and routing the vapors to the engine to be consumed during normal engine operation.

Vehicles with 23 Gal and 26 Gal fuel tank

The EVAP (evaporative emission) system consists of:

- EVAP (evaporative emission) canister
- EVAP (evaporative emission) canister purge valve
- EVAP (evaporative emission) canister ventilation solenoid
- EVAP (evaporative emission) canister ventilation filter
- EVAP (evaporative emission) blocking valve
- Fuel Tank Pressure (FTP) sensor and tube
- Easy Fuel (capless) fuel tank filler pipe

Vehicles with 36 Gal fuel tank

The EVAP (evaporative emission) system consists of:

- EVAP (evaporative emission) canister
- EVAP (evaporative emission) canister purge valve
- EVAP (evaporative emission) canister ventilation filter

Sample

Evaporative Emissions - Raptor - Overview

303-13C Evaporative Emissions - 3.5L EcoBoost (BM)	***2022 F-150***
Description and Operation	***Procedure revision date: 06/17/2021***

Sample

Evaporative Emissions - Raptor - Overview

Overview

The EVAP (evaporative emission) system prevents hydrocarbon emissions from entering the atmosphere by storing fuel vapors and routing the vapors to the engine to be consumed during normal engine operation.

The EVAP (evaporative emission) system consists of:

- EVAP (evaporative emission) canister
- EVAP (evaporative emission) canister purge valve
- EVAP (evaporative emission) canister ventilation filter
- Fuel Tank Pressure (FTP) sensor and tube
- Easy Fuel (capless) fuel tank filler pipe
- EVAP (evaporative emission) blocking valve
- External EVAP (evaporative emission) bleed valve and filter assembly

Copyright © Ford Motor Company

1	LH (left-hand) air cleaner outlet pipe
2	Vapor ejector
3	LH (left-hand) valve cover
4	EVAP (evaporative emission) canister purge valve
5	Upper intake manifold
6	CAC (charge air cooler) outlet tube
7	Throttle Body
8	PCV (positive crankcase ventilation) Valve
9	RH (right-hand) valve cover
10	EVAP (evaporative emission) canister
11	EVAP (evaporative emission) canister ventilation filter
12	External EVAP (evaporative emission) bleed valve and Filter Assembly
13	Fresh air hose
14	EVAP (evaporative emission) blocking valve
15	Fuel Tank Pressure (FTP) sensor and tube
16	Fuel pump and sender unit.
17	Fuel tank
18	Fuel tank filler pipe

Sample

Evaporative Emission (EVAP) Systems

The EVAP (evaporative emission) system prevents fuel vapor build up in the sealed fuel tank. Fuel vapors trapped in the sealed tank are vented through the vapor valve assembly on top of the tank. The vapors leave the valve assembly through a single vapor line and continue to the EVAP (evaporative emission) canister for storage until the vapors are purged to the engine for burning.

The normally open VBV (vapor blocking valve) is a PCM (powertrain control module) controlled valve that blocks the flow of vapors from the fuel tank to the EVAP (evaporative emission) canister during engine operation. Closing the VBV (vapor blocking valve) during engine operation allows the EVAP (evaporative emission) system to purge the EVAP (evaporative emission) canister without purging the fuel tank. The VBV (vapor blocking valve) will open to relieve excess fuel tank pressure if the fuel tank pressure reaches a maximum calibrated value.

Evaporative Emission (EVAP) Leak Check Monitor

The EVAP (evaporative emission) leak check monitor is an on board strategy designed to detect a leak from an opening equal to or greater than 0.5 mm (0.020 inch) in the EVAP (evaporative emission) system. The correct function of the individual components of the EVAP (evaporative emission) system, as well as its ability to flow fuel vapor to the engine, is also examined. The EVAP (evaporative emission) leak check monitor relies on the individual components of the EVAP (evaporative emission) system to either allow a natural vacuum to occur in the fuel tank or apply engine vacuum to the fuel tank and then seal the entire EVAP (evaporative emission) system from the atmosphere. The fuel tank pressure is then monitored to determine the total vacuum lost (bleed up) for a calibrated period of time. Inputs from the CHT (cylinder head temperature) sensor or the ECT (engine coolant temperature) sensor, IAT (intake air temperature) sensor, MAF (mass air flow) sensor (if equipped), vehicle speed, fuel level input (FLI) and fuel tank pressure (FTP) sensor, are required to enable the EVAP (evaporative emission) leak check monitor.

During the EVAP (evaporative emission) leak check monitor repair verification drive cycle, clearing the continuous diagnostic trouble codes (DTCs) and resetting the emission monitors information in the PCM (powertrain control module) , bypasses the minimum soak time required to complete the monitor. The EVAP (evaporative emission) leak check monitor does not run if the ignition is turned OFF after clearing the continuous DTCs and resetting the emission monitors information in the PCM (powertrain control module) . The EVAP (evaporative emission) leak check monitor does not initiate until the HO2S (heated oxygen sensor) monitor is complete.

If the vapor generation is high, where the monitor does not pass, the result is treated as a no test. Therefore, the test is complete for the day.

Engine On EVAP Leak Check Monitor

The engine on EVAP (evaporative emission) leak check monitor is executed by the individual components of the EVAP (evaporative emission) system as follows:

- The EVAP (evaporative emission) purge valve controls the flow of vacuum from the engine and creates a target vacuum on the fuel tank.
- The EVAP (evaporative emission) canister vent valve seals the EVAP (evaporative emission) system from the atmosphere. It is closed by the PCM (powertrain control module) (100% duty cycle) to allow the EVAP (evaporative emission) purge valve to achieve the target vacuum on the fuel tank.

Sample

is sealed and evacuated for the first 10 minutes of operation. If the appropriate conditions are met, a 0.5 mm (0.020 inch) leak check is conducted at idle. If the test at idle fails, DTC P0456 sets. There is no vapor generation test with the idle test.

- The MIL (malfunction indicator lamp) is activated for any EVAP (evaporative emission) system component DTCs.

Engine Off Natural Vacuum (EONV) EVAP Leak Check Monitor

The EONV EVAP (evaporative emission) leak check monitor is executed during ignition OFF, after the engine on EVAP (evaporative emission) leak check monitor is completed. The EONV EVAP (evaporative emission) leak check monitor determines a leak is present when the naturally occurring change in fuel tank pressure or vacuum does not exceed a calibrated limit during a calibrated amount of time. A separate, low power consuming, microprocessor in the PCM (powertrain control module) manages the EONV leak check. The engine OFF EVAP (evaporative emission) leak check monitor is executed by the individual components of the EVAP (evaporative emission) system as follows:

- The EVAP (evaporative emission) purge valve is normally closed at ignition OFF.
- The normally open EVAP (evaporative emission) canister vent valve remains open for a calibrated amount of time to allow the fuel tank pressure to stabilize with the atmosphere. During this time period the FTP sensor is monitored for an increase in pressure. If pressure remains below a calibrated limit the EVAP (evaporative emission) canister vent valve is closed by the PCM (powertrain control module) (100% duty cycle) and seals the EVAP (evaporative emission) system from the atmosphere.
- The EONV EVAP (evaporative emission) leak check monitor uses the FTP sensor to determine if the target pressure or vacuum necessary to complete the EONV EVAP (evaporative emission) leak check monitor on the fuel tank is reached. If the target pressure or vacuum on the fuel tank is achieved within the calibrated amount of time, the test is complete.
- The EONV EVAP (evaporative emission) leak check monitor uses the naturally occurring change in fuel tank pressure as a means to detect a leak in the EVAP (evaporative emission) system. At ignition OFF, a target pressure and vacuum is determined by the PCM (powertrain control module) . These target values are based on the fuel level and the ambient temperature at ignition OFF. As the fuel tank temperature increases, the pressure in the tank increases and as the temperature decreases a vacuum develops. If a leak is present in the EVAP (evaporative emission) system the fuel tank pressure or vacuum does not exceed the target value during the testing time period. The EONV EVAP (evaporative emission) leak check monitor begins at ignition OFF. After ignition OFF the normally open EVAP (evaporative emission) canister vent valve remains open for a calibrated amount of time to allow the fuel tank pressure to stabilize with the atmosphere. During this time period the FTP sensor is monitored for an increase in pressure. If pressure remains below a calibrated limit the EVAP (evaporative emission) canister vent valve is closed by the PCM (powertrain control module) (100% duty cycle) and seals the EVAP (evaporative emission) system from the atmosphere.

Sample

Component Description

Evaporative Emission (EVAP) Canister Vent Valve

The EVAP (evaporative emission) canister vent valve (located in the EVAP (evaporative emission) canister dust box) is part of the EVAP (evaporative emission) system controlled by the PCM (powertrain control module) . During the EVAP (evaporative emission) leak check monitor, the EVAP (evaporative emission) canister vent valve seals the EVAP (evaporative emission) canister from the atmospheric pressure. This allows the EVAP (evaporative emission) purge valve to achieve the target vacuum in the fuel tank during the EVAP (evaporative emission) leak check monitor.

Evaporative Emission (EVAP) Check Valve

The EVAP (evaporative emission) check valve is used on turbocharged engines to prevent boost pressure from forcing open the EVAP (evaporative emission) purge valve and entering the EVAP (evaporative emission) system. The valve is open under normal engine vacuum. The valve closes during boost conditions to prevent the fuel tank from being pressurized and hydrocarbons forced out of the EVAP (evaporative emission) system into the atmosphere through the EVAP (evaporative emission) canister vent valve. When the engine is OFF, or at atmospheric pressure, the EVAP (evaporative emission) check valve is in an indeterminate state. The EVAP (evaporative emission) check valve is an integral part of the EVAP (evaporative emission) purge valve assembly.

The EVAP (evaporative emission) dual check valve allows purge flow during boost conditions. Fuel vapors flow through the EVAP (evaporative emission) dual check valve to the intake air system upstream of the turbocharger before entering the intake manifold. When the engine is OFF, or at atmospheric pressure, the EVAP (evaporative emission) dual check valve is in an indeterminate state.

Evaporative Emission (EVAP) Ejector

The EVAP (evaporative emission) ejector is used on turbocharged engines to create a vacuum in the EVAP (evaporative emission) purge line from the EVAP (evaporative emission) purge valve to the intake air system. During boost conditions, boost pressure flows through a venturi inside the EVAP (evaporative emission) ejector creating a vacuum in the EVAP (evaporative emission) purge line to the intake air inlet to the turbocharger. When the second EVAP (evaporative emission) check valve is open, the purge vapor is drawn through the EVAP (evaporative emission) ejector into the intake air tube, through the turbocharger and charge air cooler, to the intake manifold.

Evaporative Emission (EVAP) Purge Valve

The EVAP (evaporative emission) purge valve (located near the engine) is part of the EVAP (evaporative emission) system controlled by the PCM (powertrain control module) . This valve controls the flow of vapors (purging) from the EVAP (evaporative emission) canister to the intake manifold during various engine operating modes. The EVAP (evaporative emission) purge valve is a normally closed valve. The PCM (powertrain control module) outputs a duty cycle between 0% and 100% to control the EVAP (evaporative emission) purge valve.

Sample

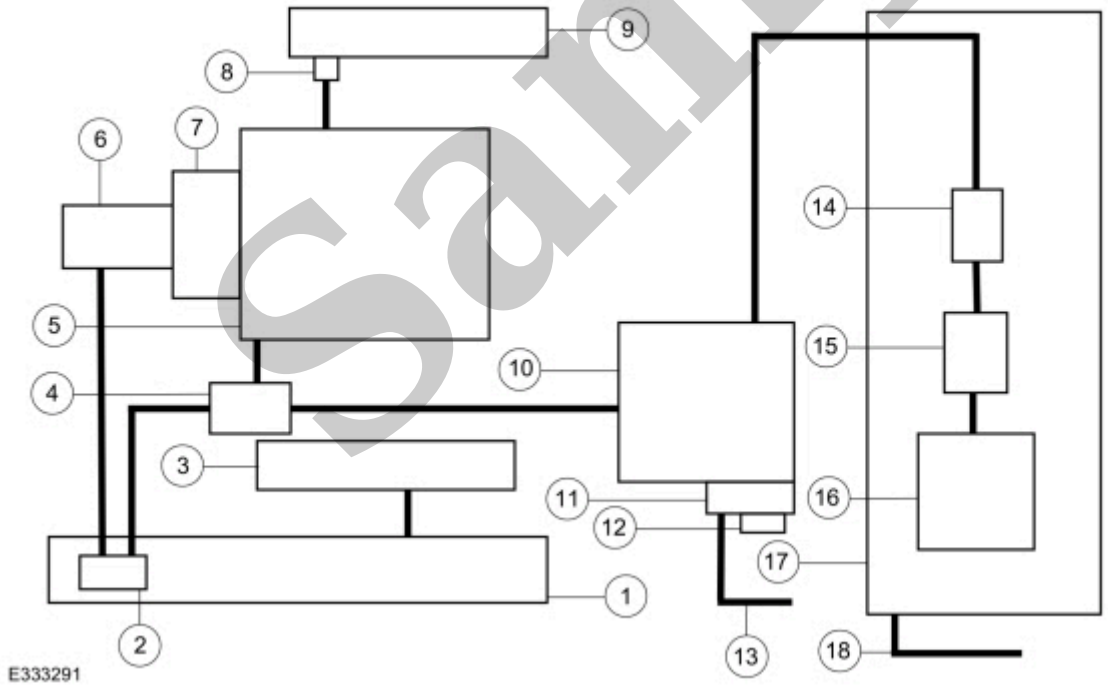
Evaporative Emissions - System Operation and Component Description

303-13C Evaporative Emissions - 3.5L EcoBoost (BM)	***2022 F-150***
Description and Operation	***Procedure revision date: 05/10/2021***

Evaporative Emissions - System Operation and Component Description

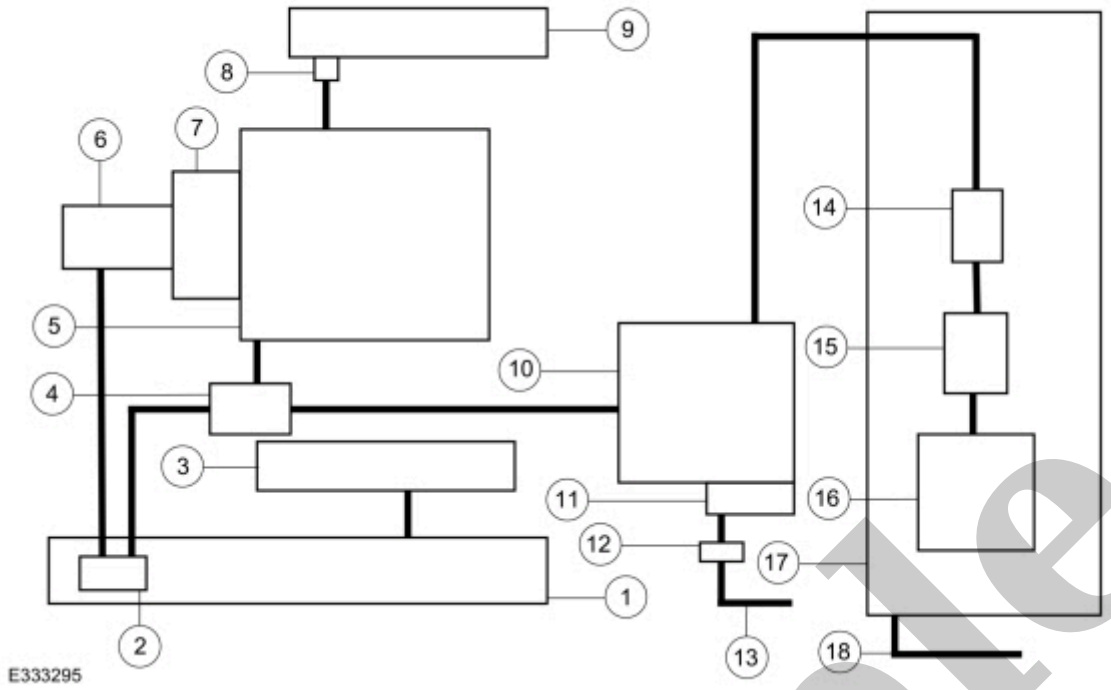
System Operation

Vehicles with 23 Gal and 26 Gal fuel tank



Item	Description
1	LH (left-hand) air cleaner outlet pipe

Sample



Item	Description
1	LH (left-hand) air cleaner outlet pipe
2	Vapor ejector
3	LH (left-hand) valve cover
4	EVAP (evaporative emission) canister purge valve
5	Upper intake manifold
6	CAC (charge air cooler) outlet tube
7	Throttle Body
8	PCV (positive crankcase ventilation) Valve
9	RH (right-hand) valve cover
10	EVAP (evaporative emission) canister
11	EVAP (evaporative emission) canister ventilation filter

Sample