

## TEST DE: EXHAUST BACKPRESSURE (EBP) SENSOR

**NOTE:** After each service or repair procedure has been completed, reconnect all components. Clear DTCs and repeat **QUICK TEST** procedures to ensure all electronic engine control systems are working properly and DTCs are no longer present.

Perform this test when directed by QUICK TEST. This test is intended to diagnose:

- Exhaust Backpressure (EBP) Sensor
- Wiring Harness Circuits (SIG RTN, VREF & EBP Signal)
- Powertrain Control Module (PCM)

### 1) DTC P0470

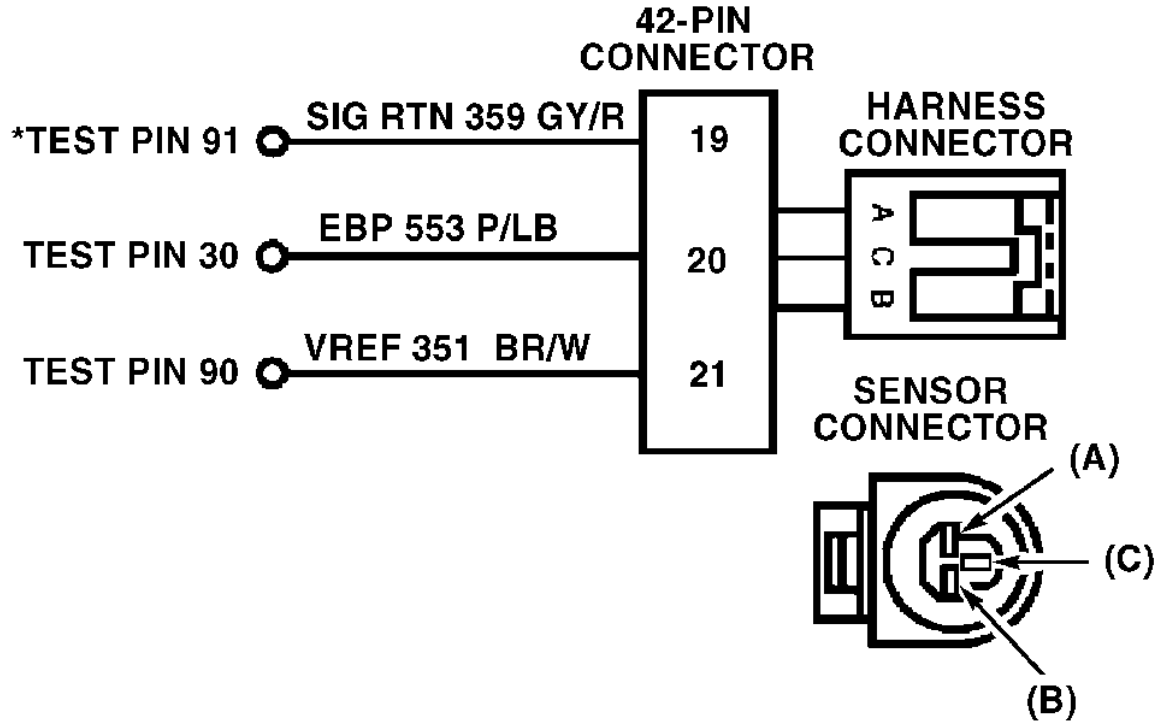
This DTC indicates PCM detected EBP sensor malfunction during KOEO ON-DEMAND SELF-TEST. Possible causes for this DTC are:

- Faulty EBP Sensor
- Open Or Shorted Circuit
- Faulty PCM

Ensure scan tool is connected to Data Link Connector (DLC). Using scan tool, select EBP PID from PID/DATA monitor menu. If EBP reading is less than 18.5 psi, clear DTCs. Repeat **KOEO ON-DEMAND SELF-TEST**. If DTC is still present, replace PCM. If EBP reading is 18.5 psi or more, go to next step.

### 2) Check Signal Ground Circuit

Turn ignition off. Disconnect EBP sensor connector. Sensor is located on top front of engine. Inspect for damaged pins, corrosion and loose wires. Repair as necessary. Measure resistance between ground and Gray/Red wire at EBP sensor wiring harness connector. See [Fig. 11](#). If resistance is less than 5 ohms, replace EBP sensor. If resistance is 5 ohms or more, locate and repair open circuit in Gray/Red wire.



**\*TEST PINS LOCATED ON BREAKOUT BOX.  
ALL HARNESS CONNECTORS VIEWED INTO MATING SURFACE.**

G95H35276

**Fig. 11: Identifying Exhaust Backpressure Sensor Circuit & Connector Terminals**

Courtesy of FORD MOTOR CO.

**3) Continuous DTC P0470**

This DTC indicates PCM detected a EBP sensor malfunction during normal driving conditions. Possible causes for this DTC are:

- Faulty EBP Sensor
- Faulty Connection
- Faulty PCM

Ensure scan tool is connected to Data Link Connector (DLC). Using scan tool, select EBP PID from PID/DATA monitor menu. While observing EBP PID, wiggle and bend small sections of wiring harness starting at EBP sensor connector and working toward PCM. If EBP reading fluctuates, isolate fault and repair as necessary. If reading does not fluctuate, go to next step.

**4) Check Connector**

Disconnect EBP sensor connector. Sensor is located on top front of engine. Disconnect PCM 104-pin connector. Inspect connectors for damaged pins, corrosion and loose wires. Repair as

necessary. Clear DTCs and repeat **QUICK TEST**. If both connectors are okay, no problem is indicted at this time.

### **5) DTC P0471**

This DTC indicates PCM detected an EBP sensor malfunction during normal driving conditions and with EBP sensor enabled. Possible causes for this DTC are:

- Faulty EBP Sensor.
- Plugged Or Restricted Sensor Supply Tube
- Damaged Exhaust Pressure Regulator (EPR) Linkage Or Butterfly Damage
- Faulty PCM

Perform **KOER ON-DEMAND SELF-TEST**. If any DTCs are present, repair fault(s) before continuing with this test. Using scan tool, select EBP PID from PID/DATA monitor menu. Road test vehicle performing hard accelerations while monitoring EBP PID. If EBP reading increases to more than 25 psi with EBP sensor on, no problem is indicated at this time. If EBP reading does not increase to more than 25 psi, go to next step.

### **6) Check For Exhaust Leaks**

Inspect turbo pipe, crossover pipes and exhaust manifolds for leaks. Repair as necessary. Clear DTCs and repeat **QUICK TEST**. If no exhaust leaks are present, go to next step.

### **7) Check Sensor Supply Tube**

Inspect EBP sensor supply tube from exhaust manifold to sensor bracket. Ensure tube is not restricted or plugged. Replace tube as necessary. If tube is okay, go to next step.

### **8) Check EBP Sensor**

Disconnect EBP sensor connector. Install ICP/EBP Adapter Cable (D94T-50-A) between EBP sensor and sensor wiring harness connector. Start engine. Measure voltage between signal circuit and signal ground at ICP/EBP adapter cable. Briefly accelerate engine to Wide Open Throttle (WOT) several times. If voltage reading during acceleration is more than 1.35 volts, clear DTCs and retest. If DTC is still present, replace PCM. If voltage reading during acceleration is not more than 1.35 volts, replace EBP sensor.

### **9) DTC P0472: EBP Circuit Low Input**

This DTC indicates EBP sensor circuit low input was detected during KOEO ON-DEMAND SELF-TEST or during continuous diagnostic monitoring. Possible causes for this DTC are:

- Biased Sensor
- Open Or Shorted EBP Sensor Circuit
- EBP Sensor Circuit Shorted
- Faulty PCM

Turn ignition off. Disconnect EBP sensor connector. Sensor is located on top front of engine. Turn ignition on. Measure voltage between ground and Brown/White wire at EBP sensor wiring harness connector. See [Fig. 11](#). If voltage is 4.5-5.5 volts, go to next step. If voltage is not 4.5-5.5 volts, locate and repair open circuit in Brown/White wire (VREF circuit).

### 10) Check SIG RTN Circuit

Measure resistance between ground and Gray/Red wire at EBP sensor wiring harness connector. If resistance is less than 5 ohms, go to next step. If resistance is 5 ohms or more, locate and repair open circuit in Gray/Red wire.

### 11) Check EBP Signal Circuit

Turn ignition off. Disconnect PCM 104-pin connector and inspect for damaged pins, corrosion and loose wires. Repair as necessary. Install Breakout Box (014-00950), leaving PCM disconnected. Measure resistance between Purple/Light Blue wire at EBP sensor wiring harness connector and test pin No. 30 at breakout box. If resistance is less than 5 ohms, go to next step. If resistance is 5 ohms or more, locate and repair open circuit in Purple/Light Blue wire.

### 12) Check VREF Circuit

Measure resistance between Brown/White wire at EBP sensor wiring harness connector and test pin No. 90 at breakout box. If resistance is less than 5 ohms, go to next step. If resistance is 5 ohms or more, locate and repair open circuit in Brown/White wire.

### 13) Check For Grounded EBP Signal Circuit

Measure resistance between test pin No. 30 and test pins No. 25 (Excursion and Pickup), 51, 76 (Econoline), 77 and 103 at breakout box. If all readings are more than 10,000 ohms, go to next step. If any reading is less than 10,000 ohms, locate and repair short to ground in EBP signal circuit (Purple/Light Blue wire).

### 14) Check For Internal PCM Short

Connect PCM connector to breakout box. Measure resistance between test pin No. 30 and test pins No. 25 (Excursion and Pickup), 51, 76 (Econoline), 77 and 103 at breakout box. If all readings are more than 10,000 ohms, replace EBP sensor. If any reading is 10,000 ohms or less, replace PCM.

### 15) DTC P0473

This DTC indicates EBP sensor circuit high input was detected during KOEO ON-DEMAND SELF-TEST or during continuous diagnostic monitoring. Possible causes for this DTC are:

- Biased Sensor
- EBP Sensor Shorted To VREF Circuit
- Faulty PCM

Turn ignition on. Disconnect EBP sensor connector. Sensor is located on top of engine. Perform **KOEO ON-DEMAND SELF-TEST**. If DTC P0472 is present, replace EBP sensor. If DTC P0472 is not present, go to next step.

### 16) Check For Short To Power

Disconnect PCM 104-pin connector and inspect for damaged pins, corrosion and loose wires. Repair as necessary. Install Breakout Box (014-00950), leaving PCM disconnected. Measure resistance between test pin No. 30 and test pins No. 55, 71, 90 and 97 at breakout box. If all

readings are more than 10,000 ohms, replace PCM. If any reading is 10,000 ohms or less, locate and repair short to power in Purple/Light Blue wire.

### **17) DTC P0478**

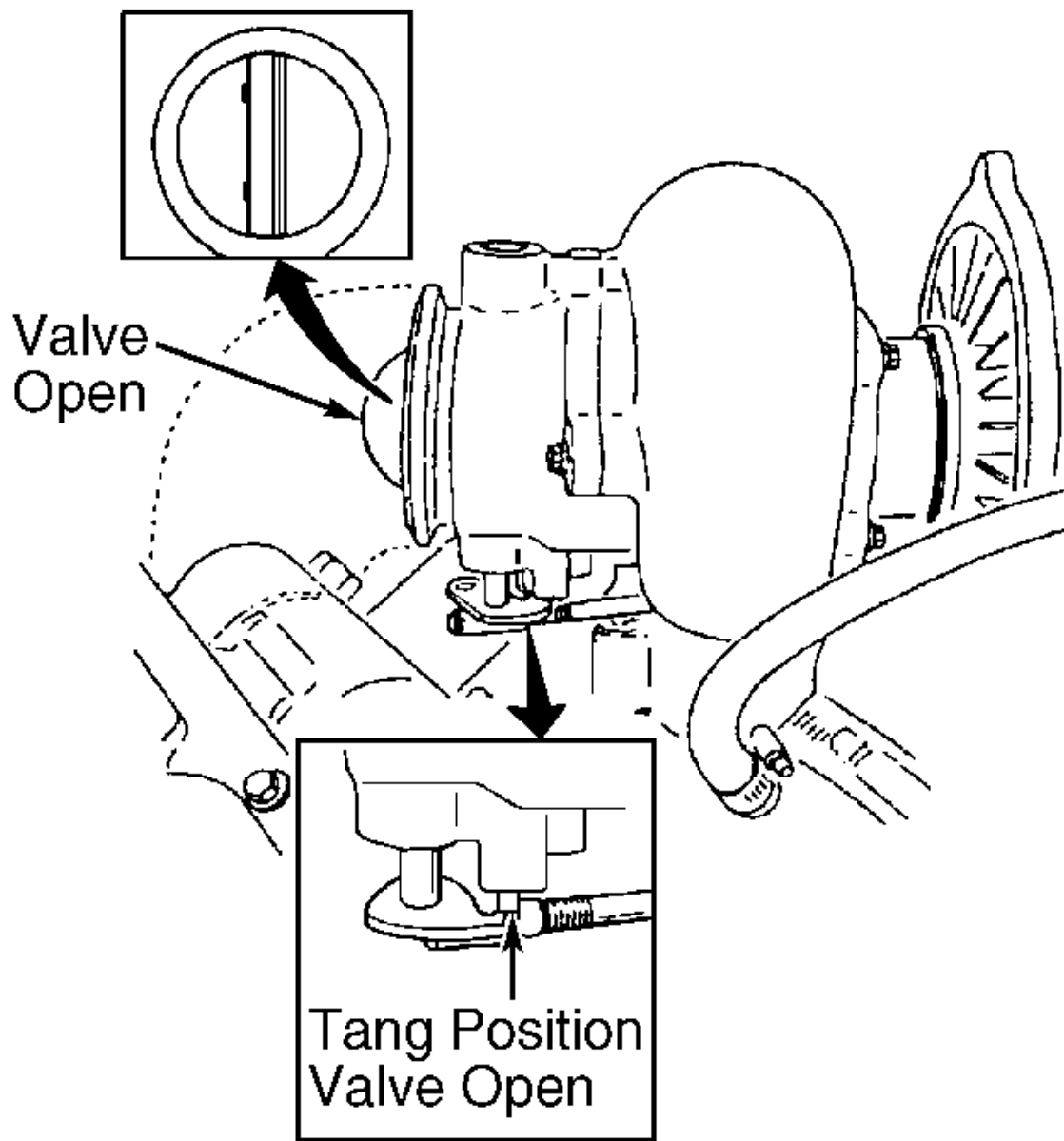
This DTC indicates excessive backpressure existed during normal driving. Possible causes for this DTC are:

- Stuck Butterfly
- Plugged EBP Sensor Tube
- Restricted Exhaust
- Misadjusted Exhaust Pressure Regulator (EPR) Linkage
- Faulty PCM

Using scan tool, access MGP and RPM PID. Road test vehicle accelerating at 2500-3000 RPM. Note highest boost pressure. Highest boost pressure will be achieved while climbing a hill loaded. If MGP PID reading is not more than 18 psi for more than 5 seconds, go to next step. If MGP PID reading is 18 psi or more for more than 5 seconds, go to TEST KH, step [5](#).

### **18) Inspect Butterfly Tang**

Visually inspect exhaust backpressure control valve (note tang position). See [Fig. 12](#). If valve is in open position, go to next step. If valve is not in open position, repair damaged linkage or butterfly as necessary.



G95I35277

**Fig. 12: Identifying Open Exhaust Backpressure Control Valve Position**  
Courtesy of FORD MOTOR CO.

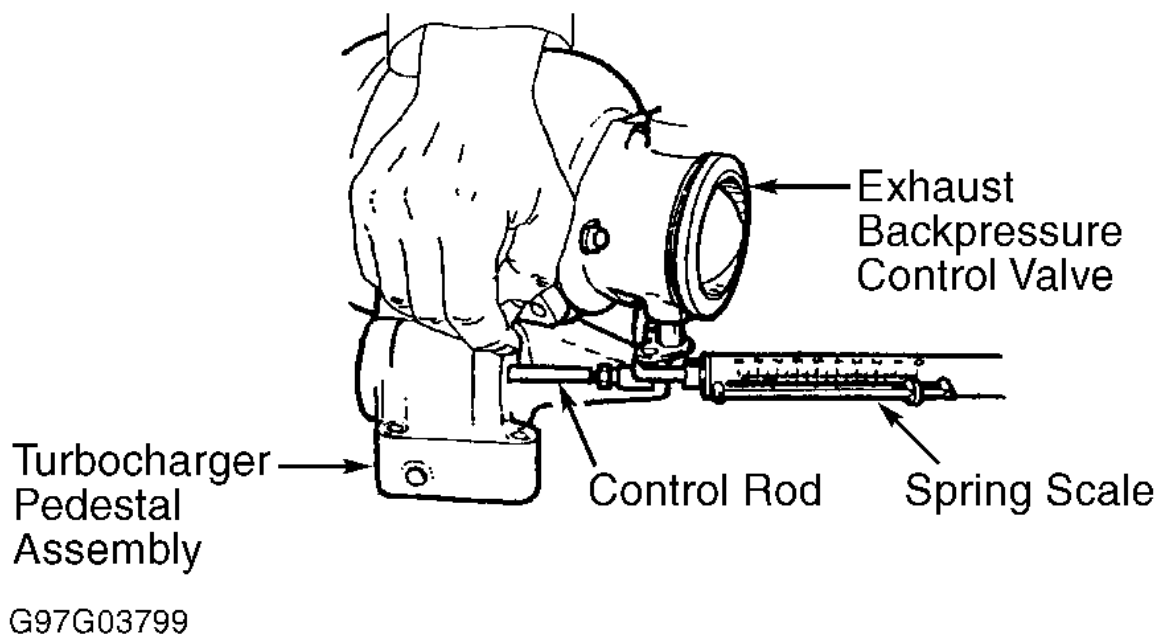
#### 19) Check For Exhaust Restriction

Using scan tool, select EBP PID from PID/DATA monitor menu. Start engine. Briefly

accelerate engine speed to Wide Open Throttle (WOT) while monitoring EBP PID. If EBP PID reading is less than 28 psi, go to next step. If EBP PID reading is 28 psi or more, repair restricted exhaust system.

## 20) Check EBP System

Ensure engine is cold and Engine Oil Temperature (EOT) is less than 70°F (21°C). Road test vehicle while monitoring EBP PID reading on scan tool. With EBP sensor on, if EBP reading stays at less than 50 psi, replace PCM. With EBP sensor on, if EBP reading does not stay at less than 50 psi, check and adjust turbocharger control rod as necessary. Spring scale reading should be 10 lbs. (4.5 kg). See [Fig. 13](#).



**Fig. 13: Adjusting Control Rod Tension**

Courtesy of FORD MOTOR CO.