

**FIGURE 26-1** Nitrogen oxides (NO<sub>x</sub>) create a red-brown haze that often hangs over major cities.




---

---

---

---

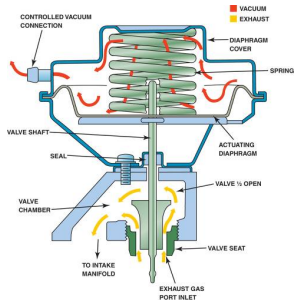
---

---

---

---

**FIGURE 26-2** When the EGR valve opens, the exhaust gases flow through the valve and into passages in the intake manifold.




---

---

---

---

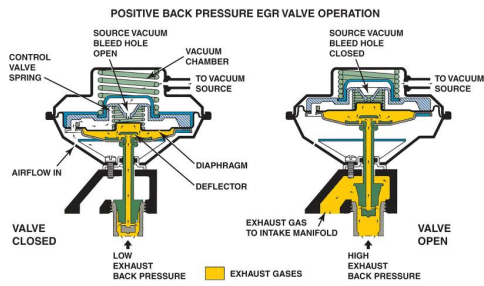
---

---

---

---

**FIGURE 26-3** Back pressure in the exhaust system is used to close the control valve, allowing engine vacuum to open the EGR valve.




---

---

---

---

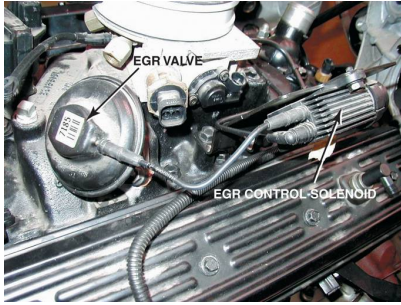
---

---

---

---

**FIGURE 26-4** Typical vacuum-operated EGR valve. The operation of the valve is controlled by the PCM by pulsing the EGR control solenoid on and off.



PEARSON Automotive Fuel and Emissions Control Systems 3e  
By James D. Halderman

Copyright © 2012, 2009, 2005 Pearson Education, Inc.  
Upper Saddle River, NJ 07458 • All rights reserved.

---

---

---

---

---

---

---

---

**FIGURE 26-5** An EGR valve position sensor on top of an EGR valve.



PEARSON Automotive Fuel and Emissions Control Systems 3e  
By James D. Halderman

Copyright © 2012, 2009, 2005 Pearson Education, Inc.  
Upper Saddle River, NJ 07458 • All rights reserved.

---

---

---

---

---

---

---

---

**FIGURE 26-6** Digital EGR valve as used on some older General Motors engines.



PEARSON Automotive Fuel and Emissions Control Systems 3e  
By James D. Halderman

Copyright © 2012, 2009, 2005 Pearson Education, Inc.  
Upper Saddle River, NJ 07458 • All rights reserved.

---

---

---

---

---

---

---

---

FIGURE 26-7 A General Motors linear EGR valve.




---

---

---

---

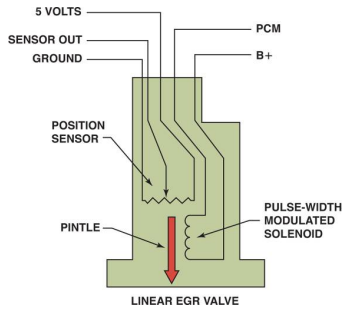
---

---

---

---

FIGURE 26-8 The EGR valve pintle is pulse-width modulated and a three-wire potentiometer provides pintle-position information back to the PCM.




---

---

---

---

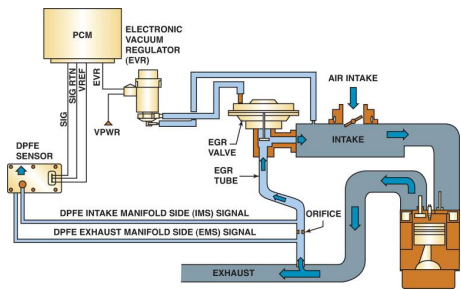
---

---

---

---

FIGURE 26-9 A typical Ford DPFE sensor and related components.




---

---

---

---

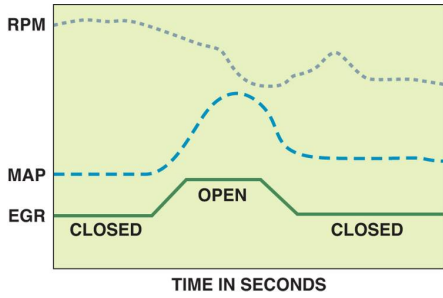
---

---

---

---

**FIGURE 26-10** An OBD-II active test. The PCM opens the EGR valve and then monitors the MAP sensor and/or engine speed (RPM) to verify that it meets acceptable values.



PEARSON Automotive Fuel and Emissions Control Systems 3e By James D. Halderman Copyright © 2012, 2009, 2005 Pearson Education, Inc. Upper Saddle River, NJ 07458 • All rights reserved. 10

---

---

---

---

---

---

---

---

**FIGURE 26-11** Removing the EGR passage plugs from the intake manifold on a Honda.



PEARSON Automotive Fuel and Emissions Control Systems 3e By James D. Halderman Copyright © 2012, 2009, 2005 Pearson Education, Inc. Upper Saddle River, NJ 07458 • All rights reserved. 11

---

---

---

---

---

---

---

---