



Gateway Air Repair

A Newsletter for the Vehicle Repair Industry

Volume 8 Number 3 May 2006

One of the Usual Suspects – DTC P0401

One of the most common Diagnostic Trouble Codes (DTCs) to show up in On-Board Diagnostic (OBD) failures is P0401. The P0401 code means that OBD sensors detected an insufficient amount of EGR flow. The Exhaust Gas Recirculation (EGR) system is used to lower combustion temperatures to reduce the quantity of oxides of nitrogen (NOx) generated in the combustion process. The EGR system recirculates the exhaust gas by diverting a percentage of the exhaust back into the manifold. If the Powertrain Control Module (PCM) does not sense the opening of the EGR valve during the diagnostic test, it will conclude that there is insufficient flow and the DTC P0401 is set. The most common symptoms of this code are drivability problems such as rough running, lack of power, surge or poor fuel economy.

P0401 is one of the top DTCs found in Ford/Mercury vehicles in the Gateway Clean Air Program. Ford vehicles equipped with a Delta Pressure Feedback (DPFE) sensor may come in with the MIL illuminated and DTC P0401, P0402, P1400 or P1401 stored. The Ford Motor Company indicates that this may be a problem with the DPFE sensor on the EGR system. Ford has recognized a problem with these DPFE sensors and has written a technical service bulletin (TSB) in response. A redesigned sensor is available.

If the vehicle is equipped with a DPFE sensor, examine the hoses leading to and from the DPFE carefully. A quick check is to hook up a vacuum pump to one side and plug the other side to see if it can hold a vacuum. Also check the hoses for restrictions. Check to see if the DPFE hoses have been reversed. They come in different sizes and might have been installed incorrectly. The hoses should also not be crossed.

A clogged EGR passage is a common problem resulting in a P0401 code. Clean out the EGR tube, orifice

opening and the ports on the tube that connect to the EGR and remove deposits. Perform diagnostic tests to see if the DPFE sensor is functioning and replace as needed. Perform diagnostic tests to see if the EGR valve requires replacement.

COMMON CAUSES OF DTC P0401 AND POSSIBLE SOLUTIONS

DTC P0401 is for exhaust gas recirculation (EGR) insufficient flow detected. This most likely means one or more of the following has happened:

- The EGR valve may not be opening due to a lack of vacuum;
- There is a blockage in the EGR (most likely carbon buildup);
- The DPFE sensor is faulty and needs to be replaced;
- The EGR valve is faulty. In fixing this code, it is quite common for people to just replace the EGR valve only to have the OBD code return. However, just like many other DTCs, the problem is not always obvious and the EGR valve is not always the culprit.



DTC P0401

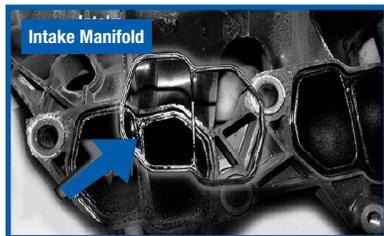
A portion of this article was reprinted by permission from the Wisconsin Vehicle Inspection Program newsletter, The Analyzer.

Case Study: DTCs P0171, P0174 – Ford Vehicles

DTCs Detected:	P0171 Lean Bank # 1 P0174 Lean Bank # 2
Vehicles Affected:	Ford Expedition 5.4 L, Ford Explorer 4.0L and other Ford Models
Symptoms:	MIL light "ON"



The Fix: By now you've either experienced this problem yourself, or at least read a few articles about it. The most common fix for this problem are the intake gaskets, or the rubber elbow on the EGR vacuum supply lines which are located in the back of the intake manifold just below the IAC motor. Your first step should be to perform a visual inspection, including checking TSBs and viewing Freeze Frame. On most intake gasket problems you will notice that the coolant temperature is low when Freeze Frame was stored. The opposite is true of the EGR elbow's temperature.



To fix the intake problem I use "Right Stuff" from Permatex. Alternatively, you can purchase new gaskets from Ford. To fix the PCV elbow problem, replace the elbow and any rubber lines.



If the quick fix described above doesn't work, you can always fall back on the following diagnostic approach. Remember, you want to prove whether a component is good or bad, not just change parts. Your first step should be to take a closer look at the PIDs (Parameters Identification) of the Freeze Frame. Here you notice LTFT Bank 1 and Bank 2 are much higher than the normal limits, and both sides are requesting or commanding more fuel as a result of a vacuum leak. When only one side of the LTFT is high, you need to concentrate your efforts on looking at only that bank of the engine. However, here you have high LTFT readings on both sides. This indicates a couple likely causes of the

problem. One is low fuel volume, perhaps caused by a clogged fuel filter, clogged pickup tube or sock, or possibly clogged fuel injectors. Other causes can be: a voltage drop on the feed B + or ground, a MAF sensor problem, vacuum leaks (including PCV, EGR and others), cracked exhaust manifolds near the HO2S sensors, Secondary Air problems or PCM reprogramming.

"G" Jerry Truglia is an experienced automotive instructor with Automotive Technician Training Services, Inc. He and Ralph Birnbaum provide training programs and materials on OBD II and many other topics, for automotive technicians, twelve state programs and various associations. You can reach G at gt@ATTStraining.com or (845) 628-1062.

EXAMPLE:

Fuel System 1 – Close Loop
 Fuel System 2 – Close Loop
 Calculated Load Value (%) 27.8
 Engine Coolant Temp (F) 142
 Short Term Fuel Trimbank 1 (%) 16.8

Long Term Fuel Trimbank 1 (%) 8.2
 Short Term Fuel Trimbank 2 (%) 14.2
 Long Term Fuel Trimbank 2 (%) 6.9
 Engine Speed 1125 RPM



Technical Service Providers Needed

The Department of Natural Resources' Air Pollution Control Program (APCP) is seeking repair shops which employ Missouri Recognized Repair Technicians to provide investigative and/or diagnostic services to motorists on behalf of the APCP. The potential work runs the gamut from verifying the repairs made to a vehicle (either by an individual or another repair facility) to performing a complete diagnosis regarding

the cause of a continued emissions test failure. If you feel your shop has the interest, the diagnostic equipment and the technical capabilities to accurately diagnose IM240 and/or OBDII emissions test failures, assist citizens in acquiring effective repairs, and to be compensated by the state for your time and effort, please call Barbara Lee at 314-416-2115 and request a Technical Service Providers contract be sent to you.

Technician Reminder!!

You will not receive notification from the Missouri Department of Natural Resources that your ASE certification is expiring. So, please keep them current.

If your A6, A8, or L1 certificate expires you will lose your MRRT/MQRT status. If you are the only technician at a repair facility, that facility will become inactive and removed from the Repair Facility Performance Report (RFPR). Go to www.ase.com to learn when the next testing / recertification dates are.

Please mail copies of your renewed ASE certification(s) to:

**Missouri Department of Natural Resource,
Inspection/Maintenance Section
7545 S. Lindbergh, Suite 210
St. Louis, MO 63125**

Or you may fax them to (314) 416-2970, Attention: Inspection/Maintenance Section. Call (314) 416-2115 if you have questions regarding these or other requirements.



OBDII Drive Cycle Information Available

Effectively repairing and retesting an OBDII system can be complicated. Clearing all the codes also resets the readiness monitors to "Not Ready." Before retesting can occur, these monitors will require resetting to "Ready," a possibly time consuming process for you or your customer.

The National Center for Vehicle Emissions Control Systems (NCVECS) has available a handy CD that provides NCVECS developed OBDII drive cycles for the majority of vehicles. Completing the drive cycle will allow you to reset the monitor(s) and verify the effectiveness of the repair. Having all the readiness monitors set before you return it to your customer enhances their ability to acquire a retest and, hopefully, a "Pass."

The cost for the Drive Trace CD is \$39.95 (plus \$4.50 S/H). To order call **(970) 491-7240** or visit **www.ncvecs.colostate.edu**

MOTOR Information Systems also has an OBDII Drive Cycle Guide available. For information regarding this product, please call 1-800-426-6867.

Help is a Phone Call (or Click) Away

The following resources are presented for informational purposes only and are not necessarily official productions of the Missouri Department of Natural Resources or the Gateway Clean Air Program. No one affiliated with the Gateway Clean Air Program is responsible for the content or accuracy of any unofficial site listed below:

EMISSIONS TESTING INFORMATION

www.gatewaycleanair.com
Gateway Clean Air Program repair industry
hotline: 1-888-748-0377
Gateway Clean Air Program general information
hotline: 1-888-748-1247
Missouri Department of Natural Resources:
(314) 416-2115 - information about Missouri
Recognized/Qualified Repair Technicians
(MRRT/MQRT) status and technical assistance.

EMISSIONS REPAIR INFORMATION

Assistance Finding Emissions Parts:
HELP Smog Parts: 1-800-544-4357
Brown Recycling: 1-800-367-9271 – for
information on certified used catalytic converters.
www.tomco-inc.com or (314) 815-6944

EMISSIONS-RELATED HEALTH INFORMATION

www.lungusa.org
www.envirosafeshop.com

INDUSTRY SUPPORT

www.iatn.com
www.asecert.com
www.acc-online.org
www.sts.sae.org
www.theautomotivetechshop.com
www.carcarecouncil.org

OBDII INFORMATION

www.obdclearinghouse.com
www.obdiicsu.com
www.obdii.com
www.autotap.com
bob@servicemycar.com (for free OBDII software)

OBDII OEM TECHNICAL WEB SITES

Below is a list of Original Equipment Manufacturer's Technical Web sites that can possibly provide useful information. The information on these Web sites can help increase your successful OBDII repair rate and should be part of your toolbox. Please note that there is a **fee** required to visit the majority of these sites.

ACURA – www.ServiceExpress.Honda.com – \$500 per year, \$20 per 72 hours, \$50 per 30 days (the 30 day option will automatically renew)

BAVARIAN MOTOR WORKS (BMW) –
www.bmwtechinfo.com – \$2,500 per year, \$300 per month, \$25 per day

CHRYSLER GROUP – <http://www.techauthority.com> – \$1500 per year, \$200 per 300 days, \$20 per day

FORD – <http://motorcraftservice.com> – \$2,499.95 per year, \$19.95 per 72 hour – *OBDII Theory and Operation* – **FREE OF CHARGE**

GENERAL MOTORS – www.acdelcotechconnect.com – \$1,200 per year, \$20 per day

HYUNDAI - www.hmaservice.com – FREE

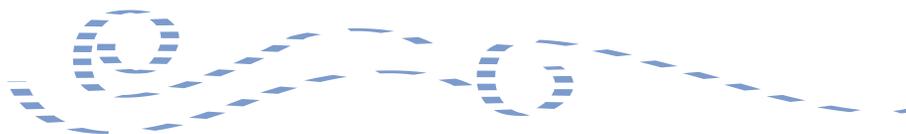
INFINITI – www.nissantechinfo.com – \$2,499.98 per year, \$299.98 per 30 day, \$19.99 per day

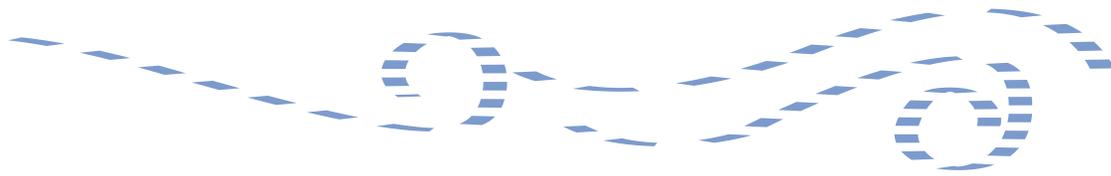
ISUZU – www.isuzutechinfo.com – \$1,650 per year, \$150 per 30 day, \$20 per day

KIA – www.kiatechinfo.com – \$299 per year, \$29 per month, \$19 per week, \$10 for three days

LEXUS – <http://techinfo.toyota.com> – \$350 per year, \$50 per month, \$10 per day

MAZDA – www.mazdatechinfo.com – \$1,500 per year, \$900 per six months, \$199.95 per 30 day, \$19.95 per day





OBDDI OEM TECHNICAL WEB SITES (cont.)

MINI – www.minitechinfo.com – \$2,500 per year, \$300 per 30 days, \$25 per day

NISSAN – www.nissantechinfo.com – \$2,499.98 per year, \$299.98 per 30 days, \$19.99 per day

PORSCHE – http://techinfo.porsche.com – \$5,200 per year, \$110 per day , document search is free

SAAB – www.saabtechinfo.com - \$500 per year, \$180 per three months, \$175 per month, \$10 per day

SUBARU – http://saabtechinfo.com - \$2,499.95 per year, \$19.95 per day

TOYOTA – http://techinfo.toyota.com – \$350 per year, \$50 per month, \$10 per day

VOLVO – www.volvotechinfo.com - \$3,225 per year, \$322.50 per 31 days, \$49.50 per 72 hours

TRAINNG and RESOURCES

www.theautochannel.com
www.aspireinc.com or 1-800-247-1099
www.caat.org
www.ccar-greenlink.org
www.sts.sae.org
www.secondchancegarage.com
www.autoed.com
www.beyondparts.com
www.fuelline.com
www.fedworld.gov/pub/auto/auto.htm
www.aera.org
www.apra.org
www.autoshop101.com
www.toolsforeducation.com
www.bergwall.com
www.diagnostichotline.com
www.learntofixcars.com
www.asetestprep.com
www.asecert.org
www.allexperts.com
www.asld.com
www.smogfree.com
www.car-sound.com
www.mad-mechanic.com
www.carleysoftware.com
www.aecc.be



Articles Wanted...

The Gateway Clean Air Program wants to continue to bring readers pertinent repair information.

If you have an idea for an article, or have a topic you would like discussed in a future issue, please contact the Gateway Air Repair editor by fax at (314) 739-2901.

Gateway Air Repair is published by ESP Missouri Inc. e-mail: gcap@esph.com, phone: 314-739-8500, fax: 314-739-2901. Send all address changes, mailing requests and letters to the Gateway Air Repair editor at:
Gateway Air Repair
PO Box 1034
St. Charles, MO 63302-1034



Special Delivery

If you would like to receive the Gateway Air Repair at your home address instead of your workplace, please complete the information sheet on the back of this issue. Check the “new address” box and mail to: **Gateway Air Repair Editor, PO Box 1034, St. Charles, MO 63302** or e-mail information directly to gcap@esph.com. If you would like to receive future Gateway Air Repairs electronically by e-mail, contact the Gateway Air Repair editor with your request and e-mail address.

Training and Special Events

The following is a list of known training available in the St. Louis area. This information is for reference only and is neither endorsed nor sponsored by the Gateway Clean Air Program. To find out what training is currently being offered, please contact any of the training providers listed below. Training providers that accept the \$50 MRRT Training Voucher are noted. Please contact trainers to confirm dates, course costs, and to arrange payment.

CARQUEST

The trainer is Lou Nelson. For more information, contact Chris Chesney at (919) 573-3342 or Mike Mulcahy at (314) 566-4303. Courses are held at 800 N. 17th St., St. Louis, MO 63106. The MRRT Training Voucher is accepted. Verify course desired is MRRT Approved.

Design Technology, Inc. (DTI)

The trainer is Lou Craven. For information on training offered by DTI, call (636) 939-5670 or fax (636) 477-9093. The MRRT Training Voucher is accepted. Verify course desired is MRRT Approved.

MUST Level 1-Daytime Series

- | | |
|-------------------------------------------|--------------|
| • Automotive Electronics Part 1 | May 25 |
| • Applied Electronics/
Semi-Conductors | June 15 |
| • Intro to Digital Storage Scopes | July 27 |
| • DI Ignition Systems | August 24 |
| • EI Ignition Systems | September 21 |
| • Compression/Thermodynamics | October 26 |
| • Fuel Systems | November 16 |
| • Automotive Computer Technology | December 21 |
| • O2 Waveform Analysis | January 25 |

- Tuition per tech \$188 per month/Total Cost \$1,692
- This is a nine month series of classes!

The following three classes will be held from 6 p.m. to 10 p.m.

- | | |
|----------------------------------------|--------------|
| • Advanced No Code Drivability | July 25 |
| • Most Common OBD II DTC
(Domestic) | August 22 |
| • Advanced Ignition Systems | September 12 |

- Cost = \$79 per technician
- Training Vouchers Accepted

L1 Prep Class

This 3.5 hours can make all the difference

- May 2nd (Tuesday)
- 6 p.m. to 9:30 p.m.
- \$75 per tech

Federal Mogul

Training Course Information: 1-888-771-6005

Web site: www.federal-mogul.com/training

Contact: Thomas Martin at (314) 977-0798; or send a fax to (314) 512-8398

Diagnostic Line: 1-900-486-0400 or 1-866-265-4170 (\$3.95/min.)

- The MRRT Training Voucher is accepted.

- Courses TEC301, TEC304, TEC306 & TEC307 are MRRT Approved
- Technical Information / Bulletins: 1-888-819-5681 (no charge)

TEC301 Automotive Electronics

This workshop will familiarize the technician with electricity and electronics, from the fundamentals to complex automotive circuits.

Dates (contact trainer for times):

- Session 604 – July 17-19
 - Session 606 – August 28-30
 - Session 607 – November 6-8
- Workshop Length: 2 1/2 days (20 hours)
- 2 CEU's Awarded-\$479 (with hotel room)
- \$330 (without hotel)

TEC304 Domestic Drivability

Designed specifically to keep technicians current on changing vehicle management systems for domestic vehicles. Engine controls and components are reviewed as they relate to OBD I and II.

Dates (contact trainer for times):

- Session 603 – May 3-5
 - Session 604 – July 19-21
 - Session 605 – August 7-9
 - Session 606 – September 20-22
 - Session 608 – November 8-10
 - Session 610 – December 18-20
- Workshop Length: 2 1/2 days (20 hours),
- 2 CEU's Awarded -\$549 (with hotel room),
- \$400 (without hotel)

TEC306 Fuel and Ignition Systems Diagnostics

This workshop is designed for technicians servicing drivability, emission and tune-up repair on today's vehicles. Practical instruction focuses on the fuel delivery and ignition systems that are essential knowledge for technicians.

Dates (contact trainer for times):

- Session 603 – May 1-3
 - Session 605 – September 18-20
 - Session 607 – November 13-15
- Workshop Length: 2 1/2 days (20 hours)
- 2 CEU's Awarded -\$549 (with hotel room)
- \$400 (without hotel)



TEC307 Advanced Drivability

This workshop will concentrate on advanced drivability problems encountered on late model vehicles. Students will learn the function and purpose of engine management systems.

Dates (contact trainer for times):

- Session 603 – August 9-11
 - Session 604 – November 15-17
 - Session 607 – December 20-22
- *Workshop Length: 2 days (16 hours)*
- *1.6 CEU's Awarded – \$439 (with hotel room)*
- *\$340 (without hotel)*

St. Louis Community College at Forest Park

The trainers are Angelo Vitullo and Bob Weil. Contact Angelo at (314) 951-9420 for additional details. To register by phone or for payment by credit card, call Andrea at (314) 539-5341 or (314) 644-9287. All courses are held at St. Louis Community College at Forest Park at 5600 Oakland Ave., St. Louis, MO. MRRT Training Vouchers are not accepted but may be submitted by a shop directly to the Department of Natural Resources per the instructions on the voucher.

Automotive Service Excellence (ASE) Test Prep L1 Crash Course:

4-hour course/one night. All nights 6 p.m. to 10 p.m. This course is not approved for MRRT continuing education. Cost = \$75.

- May 1

Automotive Oscilloscopes and Emissions Diagnostics: 9-hour course/three nights. All nights 6 p.m. to 9 p.m. This course is approved for MRRT continuing education. Cost = \$100.

- May 18, 23 and 25
- June 19, 21 and 26
- July 19, 24 and 26

Carbureted Vehicle I/M Failures and Current Topics Dealing with GCAP Program:

4-hour course/one night. All nights 6 p.m. to 10 p.m. This course is approved for MRRT continuing education. Cost = \$50.

- May 22
- June 15
- July 13

Evaporative Emissions System Course: 6-hour course/two nights:

6-hour course/two nights. All nights 6 p.m. to 9 p.m. This course is approved for MRRT continuing education. Cost = \$75.

- June 20 and 22
- July 25 and 27

Internet Resources, Electronic Information Systems, Computer Reprogramming:

4-hour course/one night. All nights 6 p.m. to 10 p.m. This course is approved for MRRT continuing education. Investigate three areas of interest: Electronic Information Systems, usage of popular PC software and the Internet to facilitate organization and communication of technical information and Reprogramming of Vehicle Computers. Cost = \$50.

- May 17
- June 14
- July 18

MRRT/GCAP Course: 4-hour course/one night. All nights 6 p.m. to 10 p.m. This course is not approved for MRRT continuing education. Cost = \$50.

- May 3
- May 24
- June 7
- June 28
- July 12

OBDII and 5 Gas Exhaust Analysis:

4-hour course/one night. All nights 6 p.m. to 10 p.m. This course is approved for MRRT continuing education. Cost = \$50.

- May 10
- May 30
- June 12
- June 29

Area Trainers!

Are you currently offering automotive repair training in the St. Louis area? If so, please contact the Gateway Clean Air Program to be included in future issues of the Gateway Air Repair. Please include a detailed description of your course, including topics covered, dates, costs and location. Notices may be sent to the Gateway Air Repair Editor at gcap@esph.com or faxed to (314) 739-2901. If the training is emissions-related and you would like it evaluated as a continuing education course offered to all Missouri Recognized Repair Technicians, please contact the Missouri Department of Natural Resources at (314) 416-2115.

Gateway Air Repair
PO Box 1034
St. Charles, MO 63302-1034

PLEASE POST. Please pass on to any Missouri Recognized/Qualified Repair Technicians working at this address.



Count Me In!

I'd like more information about the Gateway Clean Air Program!

Please Print

Name _____ Technician ID Number _____

Company Name _____ Facility ID Number _____

Address _____

City, State, Zip _____

Phone _____ E-mail Address _____

I'd like to receive the *Gateway Air Repair* electronically.

I'd like to receive future issues at home.

Please change or correct my address.

I am interested in:

Send me OBDII brochures

Training opportunities

More information on becoming a Missouri Recognized Repair Technician or a Missouri Qualified Repair Technician

