



Common OBDII Known Manufacturer Issues and Fixes

By Ken Beauvais, IEPA Outreach

Some vehicles have readiness monitors that are harder to set than others. You'll need to use all of your resources to find a Drive Cycle that will work. Communication issues may exist between your equipment and the vehicle. (See "When Vehicles Fail to Communicate..." on page 4.) A number of publications can be of help. *Motor* has a 600 page OBDII Drive Cycle Guide. The 2004 edition of the *Mitchell Emission Control Application Guide* has a very helpful section in the back on the more difficult-to-set vehicles. And if you attend the OBDII seminars sponsored by the Illinois EPA you will receive the Colorado State University Drive Cycle CD. For more information check the online services, OEMs and www.nastf.org. The USEPA also has a recall emissions website, which includes some but not all recalls, at www.epa.gov/otaq/recall.htm.

In addition, the following bulletins can be of help:

- ⊙ **Nissan 1996 and 1997** model monitors are difficult to set. NTB98-018c covers Drive Cycles for all models.
- ⊙ **Canadian built 1996 and 1997 GM products** bulletin #02-06-04-039 covers a Retrofit Kit that is available for vehicles that do not comply with US requirements.

There are **other vehicles**, including Volvo, Suzuki, Jaguar, BMW, Chrysler, Ford, Honda, Hyundai, Land Rover, Mazda, Mercedes Benz, Nissan, Porsche, SAAB, Subaru and Toyota, that do not comply with US certification. Check with the OEM to determine the exact conversion modification that must be made and if a program is available yet.

- ⊙ **2000 Mazda MPV** models need to be reflashed to establish communication with generic scan tools. The following website can be used to determine if the vehicle is included in the reflash bulletin:
<http://www.mazdausa.com/MusaWeb/displayPage.action?pageParameter=ownRecalls>
This reflash may also help with vehicles that are not included in the bulletin.
- ⊙ **1996 Hyundai Accent GT** models are missing pin #5 to establish communication. A Technical Service Bulletin (TBS) will be out shortly, but in the meantime dealerships will install the fix at no expense to the consumer.
- ⊙ **Ford/Mercury** recalibrations for an illuminated MIL with P0420 or P0430 codes. Powertrain Control Modules can be reprogrammed to the latest calibration using WDS release B31.4 or higher. Replacement of catalysts is no longer necessary to address the most common causes of this condition.
- ⊙ 1996 Explorer 4.0 L OHV TSB# 00-26-04
- ⊙ 1997 Crown Vic/Grand Marq/TownCar TSB# 03-24-05

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FREE

2004 Outreach Seminars

How to Fix an IM240 Failure

Moraine Valley (Palos Hills)

Part 1

Nov. 1 (Mon)

Part 2

Nov. 15 (Mon)

Part 3

Nov. 29 (Mon)



Al Santini answers questions during the break at a recent seminar.

A must for all technicians diagnosing and repairing IM240 failures. Focuses on what every vehicle must have to pass an IM240 test:

- ⊙ A functioning oxygen sensor
- ⊙ Fuel control with no misfires
- ⊙ An 80 percent efficient catalytic converter

Proven methods, techniques and proper testing of oxygen sensors and fuel control, lean and rich settings, the relationship of fuel trim to emissions testing and how to determine when a vehicle has been properly repaired is discussed, along with fuel injection and testing, using digital storage oscilloscopes and current probes. Also covered is compression and ignition problems, different methods of testing catalytic converters, and what causes hydrocarbon and carbon monoxide failures.

How to Fix an OBDII Failure

College of DuPage (Glen Ellyn)

Part 1

Nov. 3 (Wed)

Part 2

Nov. 4 (Thurs)

Two-night seminar devoted to the introduction and overview of the OBDII system, readiness monitors, DTC types and conditions, drive cycles and using freeze frame data and fuel trim diagnosis. It also covers diagnosis and repair of oxygen sensor, EGR, and EVAP systems. Misfire detection and catalytic converter monitors are also discussed (Repeat from 2003 with enhancements).

As an incentive to attend the FREE OBDII seminars, the Illinois EPA and Envirotest Illinois will provide one NCVESCS OBDII drive trace CD to techs that attend the two-night seminar.

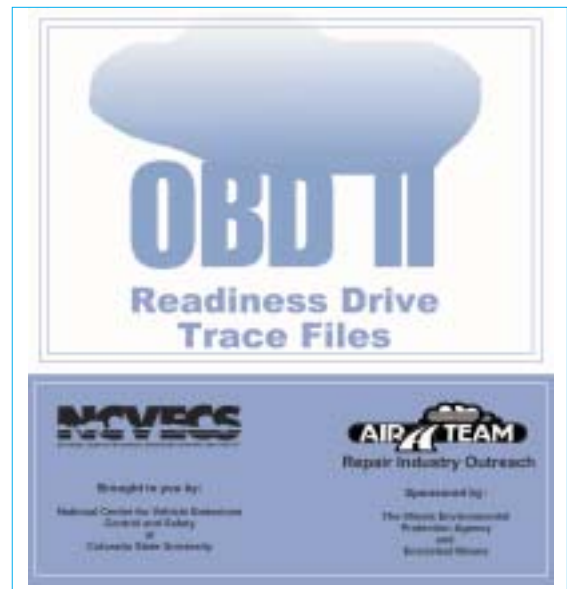
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e-mail: AR@il.etest.com
phone: 630-993-6250
fax: 630-993-6205

Jim Woodard, Editor
Ken Beauvais, Editor
Jim Wellman, Technical Editor

www.epa.state.il.us
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847-758-3434





How to Diagnose and Repair OBDII P0300 Codes

Joliet Junior College (Joliet)
Elgin Community College (Elgin)

Oct. 21 (Thurs)
Dec. 1 (Wed)

One-night seminar devoted to understanding the misfire detection monitor, using the oxygen sensor, fuel trim and scanner data as a baseline for misfire repairs. Using a DSO to monitor compression, ignition and fuel is also discussed. **P03xx codes account for approximately 45 percent of all codes.**



Al Santini discusses the Repair Diagnostic Report.

An Introduction to the Digital Storage Oscilloscope (DSO) with Emissions Applications

Morton College (Cicero)
Joliet Junior College (Joliet)

Oct. 19 (Tues)
Dec. 9 (Thurs)



One-night seminar devoted to the introduction to using a DSO. It includes setting up, capturing & interpreting patterns, using multi-trace capability, current probes, vacuum testing and using a vacuum transducer.

Shop Management for Emissions Success (New for 2004)

College of Lake County (Grayslake) Dec. 7 (Tues)

One-night devoted to everyone behind the counter that comes in contact with customers. Shop Owners, Service Managers and Service Writers are given helpful suggestions on managing/ taking control of emission failures.

This seminar focuses on:

- ⊗ The emissions tests and what it takes to pass each one
- ⊗ Reading the results
- ⊗ Talking with customers
- ⊗ CATs and the test
- ⊗ Why repair emission failures
- ⊗ Estimating repair costs
- ⊗ Tools that make the job easier and more profitable
- ⊗ Illinois success
- ⊗ Other shop successes



Information and training are key ingredients for successfully fixing today's modern vehicles, so be sure to take advantage of training opportunities that come your way. In Illinois, a lot of time and effort has gone into providing seminars that the technicians can use the next day in their shops to fix emission failures.

Seminars are sponsored by the Illinois EPA and Envirotest Illinois and are FREE! Advance registration is required by calling (847) 758-3434.

When Vehicles Fail to Communicate With the Emission Test Lanes

By Jim Wellman, Repair Industry Liaison


When a vehicle's On Board Diagnostics system (OBDII) won't communicate with the emissions test lane computer, there are several things you may want to try to ensure that the proper communication can take place.

- ⊗ Check for power on pin #16. There should be full system voltage with the vehicle running.
- ⊗ Verify the ground. To check the ground circuit, disable the vehicle so that it will not start. Do a volt drop check on Pin #5 (which is the signal ground) to the battery negative terminal with the engine cranking. This will give you a good dynamic test. There should be less than 0.2 volts. Pin #5 may not be used on all vehicles. Check the wiring diagram for conformation. If there is no Pin in position #5 this may be the problem. The emissions lane uses Pin #5 for ground.
- ⊗ Check for proper emission test communication. There are two sides to an OBDII system, the manufacturer/vehicle specific side and the generic/global side. The OBDII tests performed at the test station must communicate and comply with the generic/global side.
- ⊗ Don't let your scanner fool you. If your scanner is not self-powered with its own internal battery, you may or may not be able to read the data coming from the computer. Most scanners rely on power and ground from the vehicle to operate. If your scanner is self-powered, you will probably be able to read the data coming from the vehicle and think that nothing is wrong.

For complete information about checking OBDII vehicles, see the article on page 9 of the July 2004 issue of AIR REPAIR, available on the website at www.epa.state.il.us. 

Top 10 Reasons Your Vehicle Won't Pass an OBD Test

(Believe it or not!)

10. I decided to change the engine after my vehicle was in an accident.
9. The Data Link Connector (DLC) was in the way so I removed it.
8. I hooked up my new security system using the handy DLC
7. The Malfunction Indicator Light (MIL) was blinding my night driving, so I removed it.
6. My MIL has only been on for two years.
5. My neighbor said disconnecting the battery would make my car pass the test!
4. What do you mean my vehicle can't communicate?
3. The dealership can communicate with my vehicle, why can't you?
2. What does city/highway driving have to do with setting monitors?
1. And, by the way – what is a monitor? 

Stubborn Monitors

By Scott Kendall

With this article I will revisit a couple of issues that I covered in previous articles. The first being the difficulty in getting OBDII monitors to set on 1996 and 1997 vehicles. The second, using Mode 6 data to spot a potential problem.

I got a call from the owner of a 1996 Ford Explorer, which was repaired at a nearby shop. After the repair, the Explorer was repeatedly rejected for the OBDII emissions test because of three monitors not being run. It had failed the initial test because the MIL was illuminated with a code P0153 for Bank Two, O2 sensor one circuit slow response. Replacing the upstream O2 sensor on Bank Two kept the MIL off, and there were no further codes or pending codes.

I told the man on the phone with full confidence that I could definitely fix the Explorer, figuring that the previous shop had just failed to use the correct drive trace. The previous shop as it turns out had gone so far as to replace the PCM not once but twice, in its month-long effort to get the monitors to run. The shop also, as I would find out later, burned up \$36.00 worth of gas in the process of driving it in every possible manner.

When the owner dropped the Explorer off at our shop and I looked at the VIR, I realized that the only non-continuous monitor that had run in the month since the initial repair was for the Catalytic Converter! The O2 Heater and O2 monitors along with the EVAP had not set. It is not very common to see a Cat monitor run before the O2 monitors are set.

All attempts by us to run the monitors failed like the previous shop's efforts. I even tried the little known trick on Ford products, where you activate the Key On, Engine Off, quick test and at the conclusion, instead of turning the key off, you start the engine and drive the vehicle. Doing this speeds up the self-test process and forces the Monitors to run more quickly. It didn't work in this case.

While I was driving the Explorer with my scanner hooked up, I was looking at not only

the monitors but also the engine data. When I would setup the screen to show only the four O2 Sensors, they all appeared to be switching at an acceptable rate. When I checked the Mode 6 data, all of the sensor as well other tests showed **Pass**.

On a hunch I highlighted and compared the data for the two upstream O2 sensors. The numeric value for the Bank Two sensor was lower than the one for the Bank One sensor: 1024 for Bank One sensor one versus 787 for Bank Two, sensor one. This was important because the Bank Two sensor was new and the Bank One sensor was original to the vehicle.

So at this point I had a perfectly running sport utility vehicle with no codes or pending codes. All of the data viewed through my scanner appeared normal except the differential in the Mode 6 numbers for the two upstream O2 sensors, but the PCM gave both of them a **Pass**. I had to fix this thing after shooting my mouth off on the phone to the Explorer's owner. With the confidence of Ralph Kramden on the old Honeymooner's TV show, I had told him, "I can fix any emissions failure sir, bring it in".

I made some calls to some of the contacts I have found in the industry and none of them had seen this problem themselves. This is not surprising because if you think about it, the Explorer was actually fixed from the perspective that the MIL light, which had illuminated because of a bad O2 sensor, was now off and there were no Codes in memory. Were it not for the retesting issue, no Tech would consider the Explorer to have a problem. The monitors needing to be set have only been an issue in Illinois since January 2, 2004, so it is unlikely that any Tech would have any significant experience at setting them.

It was time to break out my DSO and further test the only suspicious sensor I could find, the other upstream O2 sensor. The only reasonable way to do this on the Explorer is at

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Stubborn Monitors

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the PCM, which is located at the center of the firewall. It was obvious on my scope that the Bank One sensor was slow and lazy (as determined by using propane enrichment tool “blipped” propane while pattern was still lean, voltage rise from lean to rich in less than 100 mS from 300 mV to 600 mV). If this were an IM240 failure I would recommend replacing the Bank One sensor. That is exactly what I did in this case and after doing so (not an easy task on this baby), the Explorer set both of the O2 monitors after driving it only two blocks from the shop. The Mode 6 numbers quickly evened out as well, 787 for B2S1 verses 804 for B1S1.

I don't know why the PCM didn't flag the Bank One upstream O2 sensor and turn on the MIL light. It obviously thought there was a problem so it didn't run the monitors.

The two lessons that I will remember from this experience are, first, if the monitors won't run, there is a problem in the OBDII system and all of the fancy drive traces in the world probably won't set those monitors. The second lesson is that despite what I suspect a lot of us learned in our OBDII training, the OBDII system will not recognize every problem by illuminating the MIL light. If the monitors will not set, after a reasonable amount of driving, even if there are no codes, I am going to diagnose the vehicle as if it is an IM240 failure and start scoping the individual sensors with my DSO.

If anyone has any input on this issue, please feel free to contact me, Scott Kendall at (847) 394-3030.

Scott Kendall is Co-Owner Tahoe Automotive. He is a Certified Master Auto Tech and L1 Advanced Engine Performance Certified 

Monitors Continue to Challenge the Industry

This article illustrates that some problems in the OBDII system can be solved by going far beyond the documented methods for setting monitors. The majority of rejected vehicles for readiness are for the early OBDII vehicles, in particular 1996 and 1997 model years. There are various strategies for setting readiness. There are strategies of clearing codes, thus erasing all readiness and then driving to set drive trace supplied by most manufacturers (As an incentive to attend the FREE OBDII seminar, the Illinois EPA and Envirotech Illinois will provide a NCVECS OBDII drive trace CD for those in attendance.). Some shops choose not to clear codes


and drive the vehicle until the MIL goes out, which indicates that readiness has been achieved. Illinois is also experiencing vehicles that are rejected upon their initial test for readiness. Some have recently had their vehicles repaired; others have had batteries disconnected or replaced recently; but many have been rejected for the test for several months. It is safe to assume that if a vehicle hasn't been serviced recently and you have made several attempts to set its monitors with city and highway driving, something else is causing the monitors not to be set to ready.

Common OBDII Known Manufacturer Issues and Fixes

Continued from page 1.

- ⊙ 1998 Explorer/Mountaineer V8 only TSB# 04-07-05
- ⊙ 1999 and 2000 Contour/Cougar/Mystique 2.5L V6 TSB# 04-10-04

Ford is working on releases for additional models/years.

- ⊙ **1996-2002 Audi/Volkswagens** that have an aftermarket replacement stereo may not communicate with the analyzer and/or OBD scanner and may cause damage to the analyzer/scanner. Refer to VW TSB 02-03 dated June 10, 2002. 

1996 Chrysler Sebrings have been added to the list of vehicles that will not be rejected at Illinois vehicle emissions test stations for having an intermittent readiness status when the required numbers of monitors are not ready.

Technical Tip

In the future if you get a call from a motorist stating that he/she is being rejected for monitors, be sure to ask a few questions such those listed below. You may be speaking with a potential customer whose vehicle needs a repair to achieve readiness.

- What are the vehicle's year, make, and model?
- When was the vehicle last serviced?
- Has the battery recently been disconnected or changed?
- When was the vehicle rejected at the test station?
- How many times has the vehicle been rejected at the test station?
- How many miles have been put on the vehicle since it was rejected?
- Has the vehicle experienced both city and highway driving conditions?
- What driving conditions has the vehicle experienced?

You may also want to check Technical Service Bulletins to see if issues exist on achieving readiness for a particular model.



The Best of Air Repair Newsletters



From the Editor's Desk:
This publication has been assembled for the benefit of repair shop personnel who specialize in vehicle emission repairs. It is a compilation of articles that have appeared in *Air Repair* to help technicians better understand particular aspects of the vehicle emission program and the repair process. The editors of *Air Repair* hope technicians find this publication a useful and ready resource to add to their technical libraries.

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130 E. Hill Street
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phone: 630-993-6250
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Jim Woodard, Editor
Ken Beauvais, Editor
Jim Wellman, Technical Editor
www.epa.state.il.us
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130 E. Hill Street
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