



The Analyzer

THE WISCONSIN VEHICLE INSPECTION PROGRAM

WIVIP HELP LINE
(866)623-8378

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New Readiness Monitor Criteria—Catalyst Monitor

Vehicles that fail for catalyst codes (P0420, P0421, P0422, P0423, P0424, P0430, P0431, P0432, P0433 and P0434) must show catalyst monitor readiness during the subsequent inspection. The catalyst monitor will not be permitted to be one of the allowable “not ready” monitors during the reinspection.

One of the most common DTCs we see are the catalyst efficiency codes. The catalytic converter is the single most effective post-combustion emission control component on a vehicle. Therefore, addressing the cause of the catalyst failure is a very effective strategy for reducing vehicle emissions.

New Readiness Monitor Criteria:

If a vehicle fails for a catalyst efficiency DTC, the subsequent retest must have the catalyst readiness monitor completed. The readiness monitor criteria is as follows:

1996—2000 Model Year: 2 unset monitors

2001—Newer Model Year: 1 unset monitor

[Cost Waiver News]

Effective July 1, 2017 repair cost limit for all vehicles subject to testing increased from \$872 to \$879. This figure is adjusted annually by the DNR per NR 485.045.

Technicians Attend Seminar on Fuel Systems

Area repair technicians attended a seminar on Thursday, June 22nd that discussed successful diagnostic and readiness monitor strategies for evaporative control systems.

The seminar analyzed fuel trims and examined what causes differences between banks. There was also a discussion on diagnostic strategies using fuel trim information. When analyzed properly, fuel trims can be a great diagnostic tool to track down problems within the vehicle’s fuel control system. The seminar also presented information on vehicle’s with direct injection systems. Topics included how direct injection works and how to diagnose direct injection issues. This seminar is part of the ongoing repair technician outreach efforts of the Wisconsin Vehicle Inspection Program.

The seminar was presented by Linda Reinke, an instructor in the Automotive Technology Program (Ford Asset) at MATC-Mequon. Linda also worked for 13 years at WCTC in the Automotive Technology Program (GM ASEP) and has dealership experience.

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TECH TIPS

Understanding Fuel Trims Can Trim Your Diagnostic Time!

There are inefficiencies in all internal combustion engines that produce byproducts of the combustion process. These byproducts include hydrocarbons (HC), carbon monoxide, (CO) oxygen (O₂), carbon dioxide (CO₂) and nitrogen (NO). Some of these byproducts are harmful to our health and to the environment. When a vehicle is in fuel control, the optimum air fuel ratio is 14.7 To 1. In order to maintain that ratio, manufacturers designed a closed loop engine control system for vehicles. At this ratio, there are the least amount of byproducts (emissions) created during the combustion process.

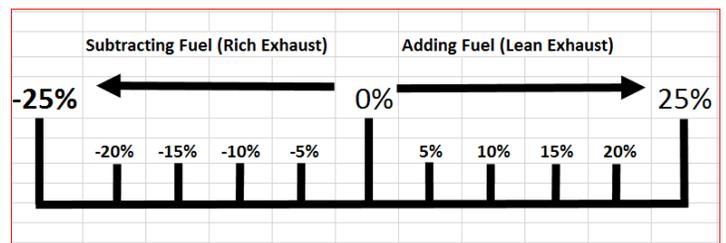
To handle the byproducts of internal combustion process, vehicle manufacturers added emission equipment such as catalytic converters that utilize processes of oxidation and reduction. During the oxidation process, oxygen is added to the HC and CO to convert it to less harmful water vapor and carbon dioxide. Conversely, reduction occurs when oxygen is removed from the nitrogen (NO) it reduces it to N₂ and O₂. In order for the catalytic converter to perform the correct function, the vehicle's PCM must utilize a fuel metering system which continuously switches from rich to lean.

Fuel trim is the internal mechanism within the PCM that switches the fuel mixture from rich to lean. Oxygen sensors measure whether the fuel mixture is too rich or lean for optimum combustion (14.7 to 1). Short Term Fuel Trim (STFT) is an immediate reaction to the O₂ sensor and is only used in closed loop. It should average 0%. Long Term Fuel Trim (LTFT) is a learned value based upon the short term fuel trim and is used in open and closed loop. It is only updated during closed loop. STFT and LTFT are expressed as a percentage, and the ideal range should be within $\pm 5\%$. 0% is ideal and -10% to $+10\%$ are acceptable.

Positive fuel trim percentages indicate that the PCM is attempting to richen the fuel mixture to compensate for a lean condition. Negative fuel trim percentages indicate that the PCM is attempting to lean out the fuel mixture to compensate for a rich fuel mixture. The STFT and LTFT percentages are adjustments made by the PCM to maintain the 14.7:1 air fuel ratio.

Fuel Trim Diagnostics

Using fuel trim information as part of your diagnostic strategy can help you identify issues quicker. For example, when the fuel trim is indicating a lean condition, it could be a vacuum leak, misfire or low fuel pressure. Under load, this could indicate low fuel pressure, fuel injector concerns, lack of fuel flow, contaminated MAF or incorrect fuel (E85). If the fuel trim is indicating a rich exhaust, there could be a contaminated MAF sensor, excessive fuel pressure, leaking or incorrect fuel injector(s), canister purge valve stuck open, fuel in oil, or an air inlet restriction (plugged air filter).



If one bank reading rich or lean, than any concerns that are common to both banks can be ruled out, such as faulty MAF sensors, fuel delivery system concerns, fuel concerns, EGR and air intake system concerns such as vacuum leaks. Items that should be looked at would be specific to that bank, such as individual injectors, vacuum leak on one bank, plugs and/or coils.

Whether you are tracking down a drivability issue or emission failure, it is always a good idea to start with the STFT and LTFT. Using the information provided by the vehicle's PCM will point you in the right direction. There is also a lot of good information provided by the individual manufacturer through OEM and third party databases to find specific fuel trim diagnostic information.

Resources for this article included: Linda Reinke's Fuel Control Seminar July 2017, Pattengale, Bob "Fuel Trim (MING) Diagnostic Time", Motor Magazine, September 2006; "The Purpose of Fuel Trim" Smog Tech Institute, <https://www.smogtechinstitute.com/smogtech/>.

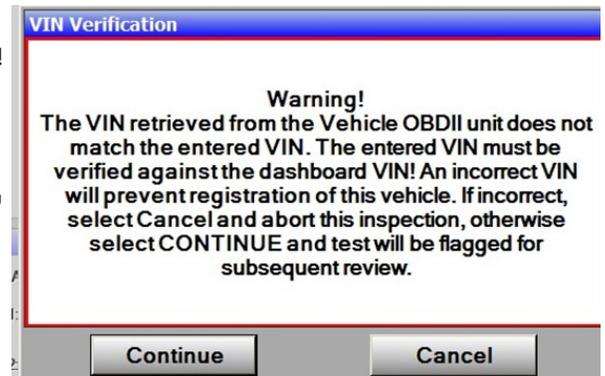
VIN Mismatches

While entering the vehicle data (either by barcode scanner, OBD download, or manual data entry) you may occasionally encounter a warning screen indicating a VIN Mismatch has been detected. Don't panic! The instructions on the screen explain what the warning means and what action should be taken. When you see this screen, take the time to verify the data entry VIN with the vehicle's dashboard VIN.

If you verify the VIN you have entered matches the VIN on the vehicle, you may continue on with the test. If you made a mistake while entering the VIN, you will need to abort the test and start over.

There are a number of reasons why there would be a mismatch, such as the wrong registration was scanned, numbers were transposed during data entry or the vehicle's computer was replaced with a used one.

If a vehicle's VIN is not corrected, the motorist will be unable to complete the registration process. The VIN on the test report must match the vehicle's dashboard VIN in order for the test to be valid for registration renewal purposes. The customer will need to repeat the inspection process to proceed with registration renewal.



Resources for DTCs and TSBs

There are a few resources that we would like to share with you that provide more information that can help identify manufacturer specific codes and known problem issues with vehicles.

DTC Definitions

Here are two websites we use that provides generic and manufacturer specific DTCs. Most manufacturer codes can be found on either of these two sites:

OBDIICSU: <http://www.obdiicsu.com/>

DTC SEARCH: <http://dtcsearch.com/>

Wide-Ranging Resource Including TSBs, Recalls and Diagnostic Information

The second website is available to you if you have a library card. Once registered, you are able to have access to [Badger Link](https://badgerlink.dpi.wi.gov/login) (<https://badgerlink.dpi.wi.gov/login>). The free resource includes a variety of resources and databases including the **Auto Repair Reference Center**. This resource covers more than 37,000 vehicles from 1954 to present with all content created by ASE certified technicians. There is detailed information on specific vehicles including:

- Repair Info: Step-by-step, repair orientated information for all areas of a vehicle.
- Bulletins: Technical Service Bulletins and Recall Information
- Diagrams: Electrical Wiring Diagrams
- Specifications: A full list of specifications for a vehicle
- Labor Times: Determine the time it takes to do a repair and estimate the repair cost
- Diagnostic Information: Diagnostic troubleshooting based on symptoms and OBDII codes
- Maintenance

Check out the free resources available on the internet!

Gross Vehicle Weight Rating (GVWR)

If you are unable to determine the GVWR on a vehicle, you may call the Opus office at 262.641.5217 for assistance.

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Need Help Finding Technicians?



[Wisconsin TechConnect](https://www.wisconsin-techconnect.com/) is a statewide online employment information system for recruiting Wisconsin Technical College System students and graduates for all types of employment. If you are an employer seeking technicians, you can use this site to post employment positions. The “single entry” is for statewide access and can be viewed by all technical college students within 72 hours. It is also directly emailed to job seekers who match program/skills criteria. In return, you have access to student/alumni resumes within the 72 hour posting of your job. To register for this free service, visit <https://www.wisconsin-techconnect.com/>

Another great resource to find candidates for employment is through the Wisconsin Department of Workforce Development. Registration is a one-time process that is required in order to access any of [Job Center of Wisconsin's](https://www.jobcenterofwisconsin.com/) Employer features. After clicking on 'Post Jobs' or 'Search Résumés' on the JCW Homepage, you will be prompted to create an account and register. Job Center of Wisconsin Call Center staff will call you (usually within 24 hours) to complete the process. You will then be able to enter, manage, update and remove job postings, and search our résumé database for qualified candidates. To start the process: you can access their website at: <https://jobcenterofwisconsin.com/>

There is no charge for either of these services.

Testing Tips

Here are a few reminders to perform the testing process properly:

- Perform the KOEO/KOER test prior to plugging into the vehicle's OBD port. The vehicle must be turned to the accessory position to perform the Key-On-Engine-Off (KOEO) test. The vehicle must be started to perform the Key-On-Engine-Running (KOER) test.
- Make sure the vehicle's engine is running prior to plugging into the vehicle's OBD port
- Verify the vehicle information entered into the analyzer matches the vehicle and paperwork. This includes the VIN, Make, Model, Model Year, Plate, Odometer and GVWR (if SUV, truck or van). If there are errors, abort the test prior to completing the process. If the test has been completed, immediately retest the vehicle.
- If you're looking at a SUV, truck or van and you weren't asked to input the GVWR, make sure that the vehicle type is not “Passenger Vehicle”. If it is, change it to the appropriate vehicle type and enter the GVWR. The analyzer will tell you if it should be tested or issued a weight waiver.
- Provide the motorist with all the printed materials before they leave. For a reject, there should be 5 pages, for a failed test, there should be 7 pages handed to motorist.
- Offer the motorist a temporary plate or vehicle registration, if eligible, before they leave.
- Never team test. Only the inspector who fingerprinted in can perform all parts of the inspection.





Introducing the Repair Book

Fast, Easy and Good For Business

It is now easier for your facility to receive credit for repair activity of vehicles that failed their emissions inspection. Once registered, repair technicians can access the Repair Book reporting website and log emission-related repairs. Your success rate in repairing vehicles will be posted on the www.wisconsinvip.org website. It is a great way to inform past, current and future customers about your success in performing emission-related repairs.

STEP 1: IS YOUR BUSINESS ALREADY REGISTERED WITH THE WISCONSIN VEHICLE INSPECTION PROGRAM?

- a) Verify if your business is already registered with the program. The easiest way to check is to look at the Inspection Facility, Recognized Repair Facility or Non-Recognized Repair Facility listings on the program website at www.wisconsinvip.org.
- b) If your facility is already registered, go to step 2.
- c) If your facility has not registered with the program, complete the profile form found on the program website in the "Recognized Repair Facilities" section.
- d) Once registered, your facility's repair activity can be reported on www.wisconsinvip.org, which is the official program website. The more effective you are at repairing vehicles that had failed the emission test, the better your repair score!

Repair Grade: 100%

Sample listing:

Facility Name	Address	City	Phone	Zip Code	REI	Web Site
YOUR GARAGE NAME	123 MAIN ST	ANYTOWN	(XXX) XXX-XXXX	53XXX	100.0	url hyperlink

STEP 2: TECHNICIAN REGISTRATION FOR THE REPAIR BOOK?

- a) At the sign-in screen, select register.
- b) Choose the station you are currently employed and select continue.

NOTE: If you change locations, please complete an updated Emission Repair Facility profile and submit it to Opus.

- c) Complete the registration information.



Wisconsin Repair Book

Tuesday, Dec 30, 2014



First Name Middle Name Last Name
 Job Title Email Verify Email
 User ID Password Re-enter Password

Password must be between 6 and 10 characters

Do you own an ASE L1 (or Higher) or WISETECH certification?

Register

Introducing the Repair Book

STEP 3: DATA ENTRY PROCESS FOR EMISSION RELATED REPAIRS

Certified Repair Info			
Owner Repair?	Yes <input type="radio"/> No <input type="radio"/>	Total Parts Cost	Total Labor Cost
For three dollars and thirty cents enter 3.30. For three hundred and thirty dollars enter 330			
The following should be completed only if NOT repaired by owner:			
Work Order #	Facility of Person Performing Repair	Apply to REI? <input type="checkbox"/>	
Phone#			
City	State	Zip	
Repair Date			

- Complete the information requested.
- Select whether it is an owner repair.
- Enter parts and labor cost. (Example: For three dollars and thirty cents, enter 3.30. For three hundred and thirty dollars, enter 330.)
- If not the owner, complete the section requesting more information on repairs.
- Indicate whether you want the repair record applied to your Repair Book (REI) Score.
- Select the repairs performed on the vehicle.

Vehicle Repair Data							
For reinspection or waiver qualification, the person performing the repairs must complete this form. Please place one "X" per item in the box to indicate which component has been (A) repaired, (B) replaced, or (C) repairs were recommended but not performed.							
1. Air Filter Element	A <input type="radio"/>	B <input type="radio"/>	C <input type="radio"/>	None <input type="radio"/>	15. Air Injection System	A <input type="radio"/>	B <input type="radio"/>
2. Thermostatic Air Cleaner System	A <input type="radio"/>	B <input type="radio"/>	C <input type="radio"/>	None <input type="radio"/>	16. Positive Crankcase Ventilation System	A <input type="radio"/>	B <input type="radio"/>
	C <input type="radio"/>	None <input type="radio"/>				C <input type="radio"/>	None <input type="radio"/>

- Once the data is entered, select continue.
- If you see the screen below, you have successfully entered the data.

Success
Congratulations! The repair data has been saved! This data may be used in the determination of your facilities REI. Continue

QUESTIONS? 262-641-5217

