Practical Uses of Mode $06

Mode $06 has been and continues to be a hot topic with techs. Nevertheless, there are many techs who have not even heard of Mode $06 or do not even use the Global OBD2 side of the scan data.
Getting started using Mode $06 pick an areas that is easier to use and would really help in the day-to-day shop diagnostic problems.
I suggest using the Mode $06 on Ford vehicles in two areas.

Ford Misfires

I talking about finding Misfires before they set codes. Use test number 51 on older Ford and 53 on 1998 and newer.

J1979 Mode $06 Data			
Test ID	Comp ID	Description	Units
$50	$00	Total engine misfire rate and emission threshold misfire rate (updated every 1,000 revolutions)	percent
$51	$00 - $0A	Cylinder-specific misfire rate and malfunction threshold misfire rate (either cat damage or emission threshold) (updated when DTC set or clears)	percent
$56	$00	Cylinder events tested and number of events required for a 1000 rev test	events
Conversion for Test IDs $50 through $55: multiply by 0.000015 to get percent Conversion for Test ID $56: multiply by 1 to get ignition events			

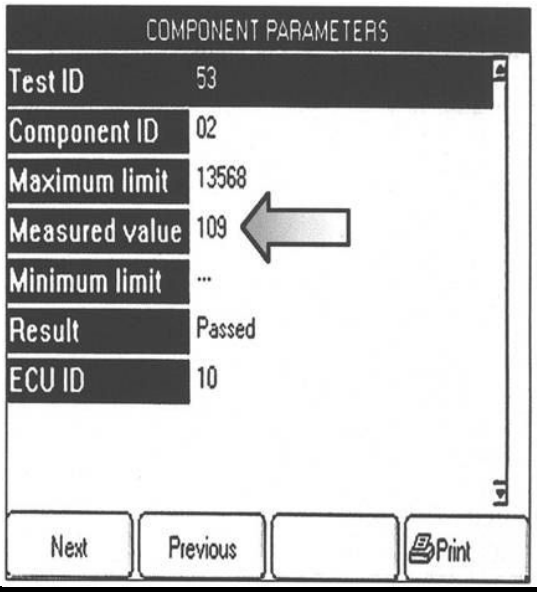
Figure 1 Test $51 Early OBD2 Fords

The formula is to take the numbers and multiply it by 0.000015 to get the percentage of a Misfire.

Typical misfire monitor malfunction thresholds:
Type A (catalyst damaging misfire rate): misfire rate is an rpm/load table ranging from 40% at idle to 4% at high rpm and loads
Type B (emission threshold rate): 1% to 3%

Figure 2 Ford Misfire Limits

The Type A Misfire is 40% at idle and a 4% at high rpm and load. Now can you see why a misfire can cause problem long before it sets a code?



J1979 Mode $06 Data			
Test ID	Comp ID	Description	Units
$50	$00	Total engine misfire rate and emission threshold misfire rate (updated every 1,000 revolutions)	percent
$53	$00 - $0A	Cylinder-specific misfire rate and malfunction threshold misfire rate (either cat damage or emission threshold) (updated when DTC set or clears)	percent
$54	$00	Highest catalyst-damage misfire and catalyst damage threshold misfire rate (updated when DTC set or clears)	percent
$55	$00	Highest emission-threshold misfire and emission threshold misfire rate (updated when DTC set or clears)	percent
$56	$00	Cylinder events tested and number of events required for a 1000 rev test	events
Conversion for Test IDs $50 through $55: multiply by 0.000015 to get percent Conversion for Test ID $56: multiply by 1 to get ignition events			

Profile Correction Operation	
DTCs	P1309 – AICE chip communication failure
Monitor Execution	once per KAM reset.
Monitor Sequence:	Profile must be learned before misfire monitor is active.
Sensors OK:	CKP, CMP, no AICE communication errors, CKP/CMP in synch
Monitoring Duration;	10 cumulative seconds in conditions (a maximum of three 60-40 mph defueled decels)

Figure 3 Test $53

Notice the information about the Profile Correction Operation we will cover this in the second part of the article.

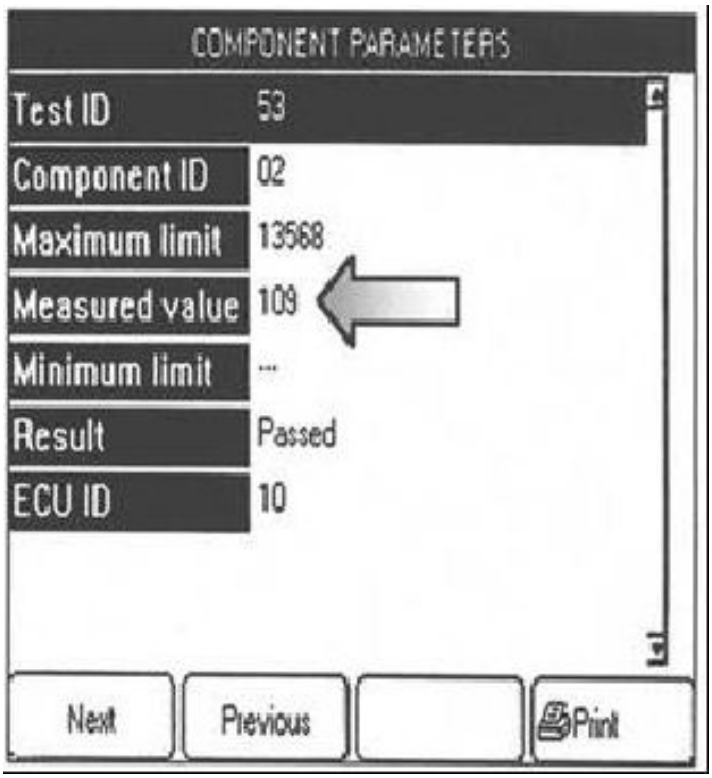


Figure 4 Ford Misfire Test Results Cly 2

The Test is 53 and Component 02 that is for cylinder 2.
Use the conversion formula to check the test.

109 x .000015 =.001635

This is not enough to cause a code to set, but it might still be a concern.

Check these to find the problems before they turn into codes.

Ford O2 Testing

Ford test for O2 sensors and will pass the O2 sensors for amplitude reading that are above minimum limit of 563. The normal ranges for a good operating O2 sensor is 800 mV or above, guess they do not want codes on this sensor.

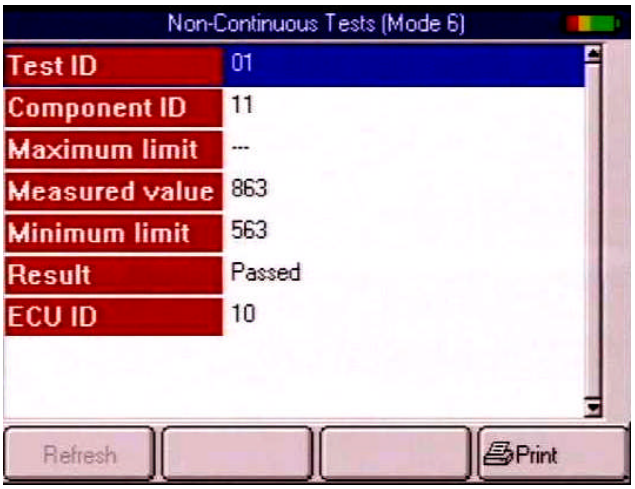


Figure 5 O2 Test for Amplitude

Global OBD2 readings converted to Decimal from Hexadecimal.

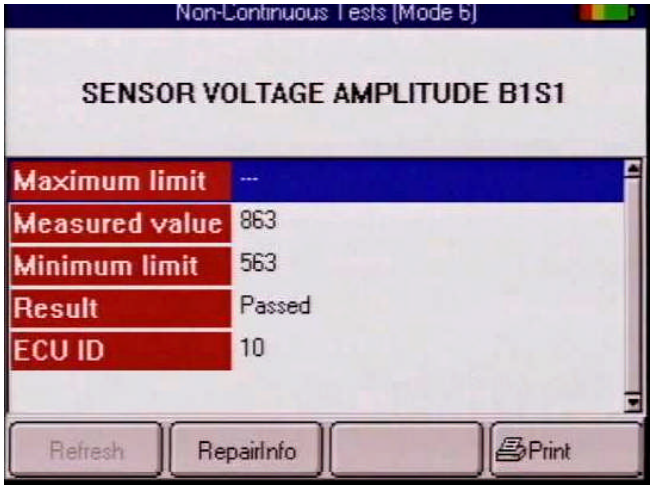


Figure 6 Enhanced Side Descriptions

The enhanced side of the Genisys gives a text description of the information.

Typical HO2Sresponse rate malfunction thresholds:
Voltage amplitude: < 0.5 volts

J1979 Mode $06 Data			
Test ID	Comp ID	Description	Units
$01	$11	HO2S11 voltage amplitude and voltage threshold	volts
$01	$21	HO2S21 voltage amplitude and voltage threshold	volts
$03	$01	Upstream O2 sensor switch-point voltage	volts
Conversion for Test IDs $01 through $03: multiply by 0.00098 to get volts			

The conversion factor is the measured reading times 0.00098.
Example
863 x 0.00098=.84574 or .846 Volts

The test is for a O2 sensor amplitude it needs to go above .5 volts but need to look a little further into how the monitor runs.
The test is ran by using a special 1.5 Hz square wave fuel routine to drive the fuel mixture around stoichiometry and produces a predictable O2 Sensor signal amplitude. It will set a code for slow response like a P0133 for Bank 1 or P0153 for Bank 2 if it does not reach the minimum amplitude of .5 Volts.
You need a proper switching O2 sensor to control the mixture; this monitor test lists amplitude, but really test for speed.
Now can you see the problems like a P0420 Catalytic Efficiency because we have a slow O2 that does not feed the Cat the proper Mixture?

New to Mode $06, then start with these tests and get comfortable with using the data. Then move on to other selection in Mode $06, before long it will a part of your diagnostic strategy.
More in the new part see you later.