

Mass Air Flow Meter testing

graph, and a good understanding of how fuel trims work and relate to the engine system at hand. In this case I am using a 1995 Ford Windstar that is OBD2 compliant.

<http://www.aatechtraining.com/showimage.php?ID=25> Here is a link to a graph that I will use as an example. You need to watch the TPS PID, as it relates to the engine load, and then watch how the fuel trims both long and short term follow the load PID. The load PID on this Ford is calculated from MAF, TPS and engine RPM. You need data at engine idle, 2500 RPM and at cruise, with at least one wide open throttle during the test drive. Now notice what the fuel trims are with the engine idling. In this case, the idle portion of the graph is on the right side,, at the end. Notice that the fuel trims are If you are going to use scan data to analyze a MAF ,, or any other engine problem you need to have a good scanner that will in the negative at idle. This vehicle has no drivability problems and there is no check engine light, but the MAF is failing, it's not bad enough to set the light yet!. So at slow engine RPM, the MAF is over reporting the air moving through it. There is less air going through the MAF than is being reported. Thus the fuel trims in the negative. Now with high engine loads, the MAF under reports = more air going through than is being reported. So you notice that the fuel trims go into the positive. You should also notice that the bank 2 total fuel trims are 25 and the bank 1 total trims are where the cursors are set. Total fuel trims are found by adding the short term and long term trims together. In the case where an engine has trims from the rear O2 sensor, these should also be added. Now back to the trims, Bank one is a total of 22, and bank 3 is a total of 25. This tells me that there are no fueling issues between the banks, so whatever is causing the trim problem has to be something that would effect both banks equally. If we had one cat plugged, we would see the trims lopsided, possibly one bank in the negative and the other bank in the positive. So our banks are almost equal, so we can toss out the plugged cat thing since this uses two cats, one for each bank. Notice that the load PID at the cursor only went to 51% and that was at wide open throttle at 2700 RPM,, that is where the trans shifted from 2nd gear. So you can see by sitting and analyzing the graph, we are able to pick out a lot of information about how the system is working. Also notice what the baro is. I am at 1000 feet at the shop and baro is most usually at 156 to 158. This one is at 153 and hasn't moved since I reset KAM. So the bottom line is, to analyze a bad MAF, you need more than one test to make sure it is bad. In this case we have used load, fuel trims, baro, and before I condemn it, I will pull the air filter and inspect. test the exhaust back pressure, then install a MAF if need be.