Technician Question and Answer Document for Inferred EBP

Question:
I have flashed the vehicle with the new calibration and am now experiencing a lacks power condition on the vehicle?

Answer:
There are a number of things that could be contributing to a lacks power condition:

⇒ Aftermarket parts
- o *Aftermarket Air Intake Systems including MAF sensors, aftermarket turbocharger modifications and aftermarket exhaust systems that remove the catalyst.*

⇒ Failure to complete a learning process for the adaptive turbocharger feature
- o *The turbocharger has not learned if VGTVP_LE ≤ 5 and VGTVP_OK = no*

⇒ Sticking or stuck turbocharger
- o *This would be caught by a P132B, P0299, or P2262, all turbocharger issues must be verified with a KA test prior to turbocharger change.*

⇒ Intake manifold leaks
- o *Review of the typical intake manifold leak points including clamp connections, CAC tubes, turbocharger connections and the CAC itself.*
- o *We found that the smoke test was particularly useful for determining the location of a leak, especially one that was not present in the typical locations, like a CAC seal, etc.*
- o *Leaks on the low pressure side from the MAF sensor to the compressor are needed to be checked now that the MAF sensor is required for drive-ability. (air cleaner, filter minder, zip tube or EGR concern(follow ERG diagnostic))*

⇒ Exhaust manifold leaks
- o *Review of the typical exhaust manifold leak points including connections, Y-pipe and bellows. Smoke test exhaust sys per KA pin point test.*
- o *We found that the smoke test was particularly useful for determining a leak location.*

⇒ Insufficient or Excessive EGR flow
- o *Run the pinpoint test for the EGR system and visibly verify if the EGR system is fouled and or stuck.*

⇒ Sensor faults/failures
- o *MAF, MAP, BARO, IAT2 and EOT codes,*
- o *If one of the sensors critical to Inferred EBP operation is in a failure mode and has set a P-code, the PID, "EBP_INF_F will be true. (no → False, yes → True)*

Question:
I have a 04MY vehicle with a carry over '03.25 MY engine, I am unable to access the new diagnostic PIDs in WDS, how can I get to those PIDs?

Answer:
The WDS is currently not able to distinguish between the '04MY vehicles with '03.25MY engines and '04MY vehicles with '04.25MY engines. If you have a 04 vehicle with a 03.25 engine, you have to go into WDS and select the 03MY vehicle to be able to see and use the new diagnostic PIDs added for Inferred EBP.

Question:
What does the turbocharger learn process look like?

Answer:
The turbocharger learning process looks like this: The picture shows a single learn cycle for the VGT duty cycle with the turbocharger cycling through required duty cycles
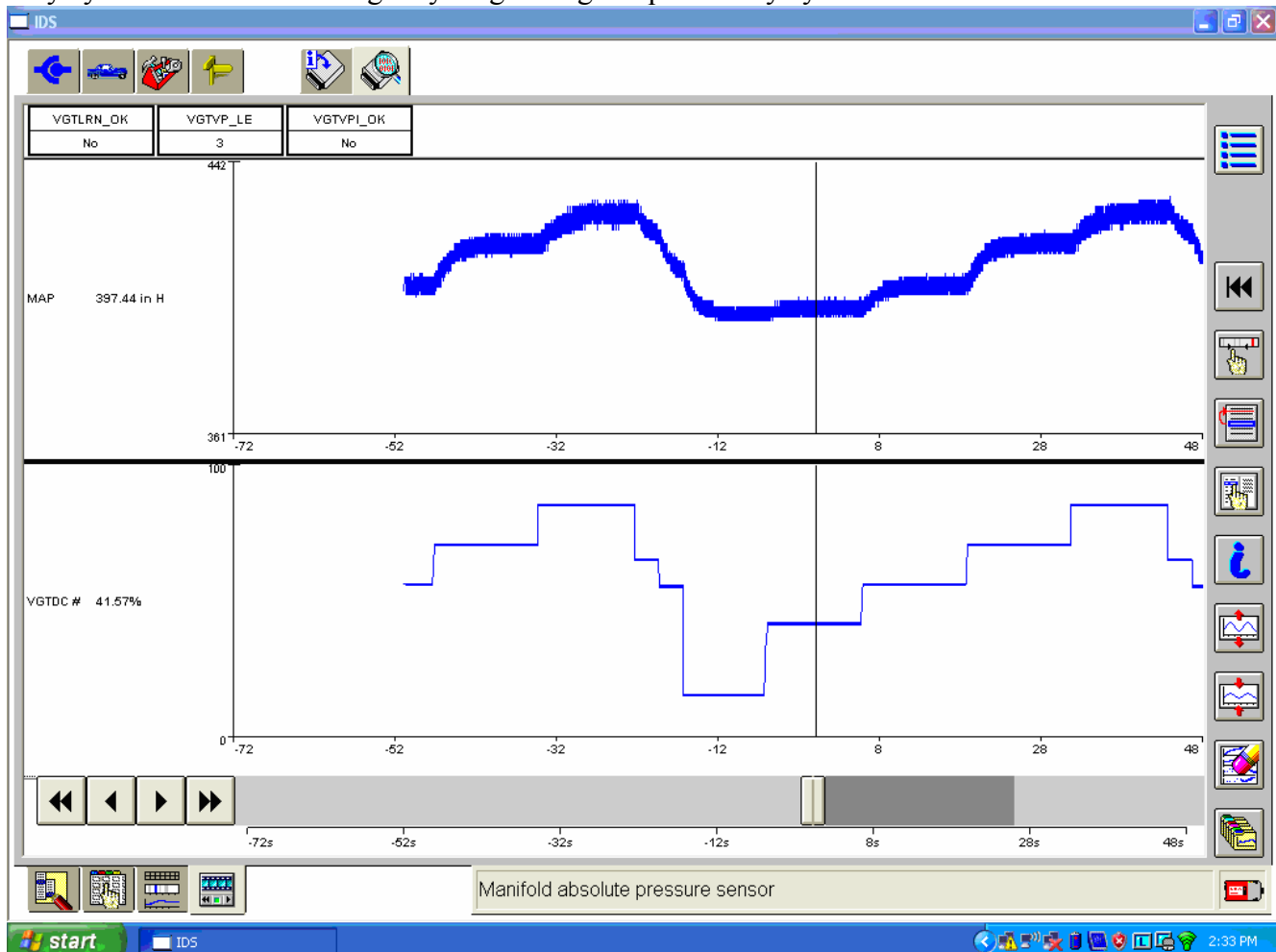
⇒ When one of these completes, the PID "VGTVP_LE will increment by one
⇒ When the module has done 5 complete cycles (VGTVP_LE > 5), the learn process will be considered mature (VGTVP_OK = yes)
⇒ This individual cycle takes ~ 40 – 50 seconds, 5 cycles take ~ 5 minutes to complete, monitor VGTVP_LE and VGTVP_OK to determine if the adaptive has completed

Question:
Why does the vehicle have a lack of power now, or run poorly, when it was operating normally before I performed the recalibration? Why do some vehicles need a part replacement now?

Answer:
The recalibration contains an inferred exhaust pressure (EP) strategy which eliminated the use of the EP sensor. Because the new control system now relies on MAF, MAP, turbo, intake integrity and exhaust integrity, it is possible that drivability issues may arise or be more pronounced following the inferred EP update.

Question:
What are the engine entry conditions required to get in to the adaptive learn mode (other than sensor P-codes)?

Answer:
- $\Rightarrow$ Operating at idle ($570 < \text{rpm} < 780$)
- $\Rightarrow$ Engine Oil Temp. ($122^{o}\text{F} < \text{EOT} < 248^{o}\text{F}$)
- $\Rightarrow$ Vehicle stopped
- $\Rightarrow$ Pedal Position ($< 1.5\%$ or 15 counts)
- $\Rightarrow$ No malfunctions for the required sensors
    - ▪ MAP, EOT, MAF, Turbocharger

Question:
Why do aftermarket air intake systems have an adverse effect on vehicle performance with Inferred EBP?

Answer:
The Inferred EBP algorithm <u>now</u> uses the MAF sensor to control the VGT and EGR systems. If an aftermarket air intake system is installed in the vehicle, it may adversely affect the performance of the MAF sensor output and the performance of the vehicle.

> ***Note:***
> *Vehicles that operated on the EBP sensor and still operate with the EBP sensor only use the MAF sensor to monitor EGR system performance. It was not used for any aspect of vehicle control, meaning any modifications to the AIS system including the MAF sensor would have limited to no effect on vehicle performance and in most instances would cause false EGR codes.*

Question:
What is the new P132B code?

Answer:
P132B is a new P-code that was added to monitor turbocharger performance. There are 3 new PIDs that indicate what operating mode the code was set in, these are:
- $\Rightarrow$ P132B_STK sets during the learn mode
    - o *Verify that the turbocharger learn has successfully completed VGTVP_LE > 5 and VGTVP_OK = yes and check the learned values to make sure that they are within a correct range*
    - o *Run through the normal KA test to verify the turbocharger is actually sticking*
- $\Rightarrow$ P132B_CM is a continuous monitor

o *Verify that the turbocharger learn has successfully completed VGTVP_LE > 5 and VGTVP_OK = yes and check the learned values to make sure that they are within a correct range*
o *Run through the normal KA test to verify the turbocharger is actually sticking*
⇒ P132B_VAR sets if the turbocharger does not converge

All turbochargers must be tested through the KA test to verify improper operation.

Question:
What is the new P006A code?

Answer:
P006A is a new P-code that was added to the vehicle control parameters that monitors MAF sensor performance against the MAP sensor.

If there are no MAF and/or MAP codes present, then look at the parameter and compare to the levels below:

⇒ Check the intake system for leaks from the compressor outlet to the intake manifold including the CAC ducts, connectors and seals, check the intake system for leaks from the MAF sensor to the inlet of the compressor including the PCV hose, air cleaner, filter minder and Zip tube clamps. Smoke test through MAP hose for intake leaks
⇒ Check the EGR system for insufficient/excessive flow or fouling (stuck closed/open condition)
Perform EGR diagnostic

Question:
Why do MAF codes P0101 and P0102 now have to be fixed to make the vehicle run properly?

Answer:
The MAF sensor is now an important part of the Turbocharger and EGR control system, a P0101 or P0102 code needs to be diagnosed and repaired for proper operation of the Inferred EBP algorithm.

Question:
What happens to EGR during the learn cycle?

Answer:
EGR is shut-off during the learn process because it can affect the turbocharger learn, the EGR system is turned back on after the turbocharger learn has been completed.