

Networking

Newsletter



Analysis from the Sleuth (Michele Winn)

FLOW CHARTS.. . .BEWARE!!!

The vehicle: 1996 Chevy Monte Carlo with a 3.4L (I really don't want to work on this engine!) and an automatic transmission.

Customer complaint: service engine soon light is on with no driveability concerns. Vehicle has been to the dealer on two separate occasions for this problem and has had plugs, wires and one injector replaced.

The first thing I did was grab the mastertech and scan the vehicle for codes. The vehicle had only one code which was PO1406; EGR valve pintle position circuit. This is a linear EGR valve with a 5-wire connector. I had seen several EGR valves like this before but I wasn't exactly sure what each wire did and the exact value each should have. Since the vehicle did have a code, I decided to pull the flow chart for the PO1406 from Alldata and start there.

Step	Action	Value(s)	Yes	No
1	Was the Powertrain On-Board Diagnostic System Check performed?	—	Go to Step 2	Go to the Powertrain OBD System Check
2	With the engine idling, observe the EGR Actual Pos. display on the scan tool EGR data list. Is EGR Actual Pos. at the specified value?	0%	Go to Step 3	Go to Step 10
3	Select the scan tool Misc. Tests, EGR Control function and increment the EGR valve through the 25%, 50%, 75% and 100% positions while comparing EGR Desired Pos. to EGR Actual Pos. Does EGR Desired Pos. remain close to EGR Actual Pos. at all commanded positions?	—	Go to Step 4	Go to Step 5
4	1. Turn ON the ignition switch, engine OFF, review and record scan tool Fail Records data. 2. Operate vehicle within Fail Records conditions as noted. 3. Using a scan tool, monitor Specific DTC info for DTC P1406 until the DTC P1406 test runs. Note test result; does scan tool indicate DTC P1406 failed this ign?	—	Refer to Test Description for additional information	Refer to Diagnostic Aids

Step 2. Engine at idle, does actual position meet the specification of 0%? Yes. I read 0.03%.

Step 3. Command EGR thru different positions while observing the actual and desired values. Were the actual and desired values close at all positions? No. The actual EGR reading never changed from 0.03%.

On to step 5

DTC P1406 EGR Valve Pintle Position Circuit

Step	Action	Value(s)	Yes	No
5	1. Disconnect the EGR valve electrical connector. 2. Connect a DVM to measure voltage between the EGR valve ignition feed circuit and the EGR control circuit at the EGR valve harness connector. 3. Command the EGR to the 100% position with the scan tool while observing the voltage reading on the DVM Does the voltage measure near the specified value with the commanded EGR position at 100%?	5+	Go to Step 16	Go to Step 6

Step 5. Does the between the wires measure battery voltage? Yes. I had 14.25Volts. Ok, now we skip down to step 16.



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Step	Action	Value(s)	Yes	No
16	Connect a DVM to measure voltage between the EGR valve sensor ground circuit and the 5 volt reference A circuit at the EGR valve connector. Is the voltage at the specified value?	5V	Go to Step 17	Go to Step 22
17	Probe the pintle position circuit at the EGR valve harness connector with a test light connected to B+. Is the test light ON?	—	Go to Step 20	Go to Step 18
18	1. Connect a jumper between the 5 volt reference A circuit and the pintle position circuit at the EGR valve connector. 2. Observe EGR Actual Pos. on the scan tool. Is EGR Actual Pos. at the specified value?	100%	Go to Step 21	Go to Step 19
19	1. Turn OFF the ignition switch, disconnect the PCM. 2. Check the pintle position circuit for an open or for a poor terminal connection at the PCM. 3. If a problem is found, repair open in pintle position circuit or replace the faulty PCM terminal(s) as necessary. Refer to Repair Procedures in Diagrams. Was a problem found?	—	Go to Step 31	Go to Step 30
20	1. Turn OFF the ignition switch, disconnect the PCM. 2. Probe the EGR pintle position circuit with a test light to B+. Is the test light ON?	—	Go to Step 28	Go to Step 28

Step 16. Checking for 5volt reference to the EGR. Yes. I had 4.93volts.

Step 17. Probe pintle position circuit wire with a test light. I had to deviate slightly from the instructions here. Any of you who have sat through a class with either Jim or Randy have heard them preach the woes of using a test light. Since Randy and Jim were both in the building, I decided to check this with my DMM. I had 14.25volts here, which would obviously light a test light, so yes. This sends us to step 20.

Step 20. Disconnect PCM and probe the pintle position circuit with a test light (just say no!) to battery positive. I would love to tell you I did this test, but just like reading a good book, I had to skip to the end and see what happened! At this point I would go to either step 28 or step 29. So, let's look at those.

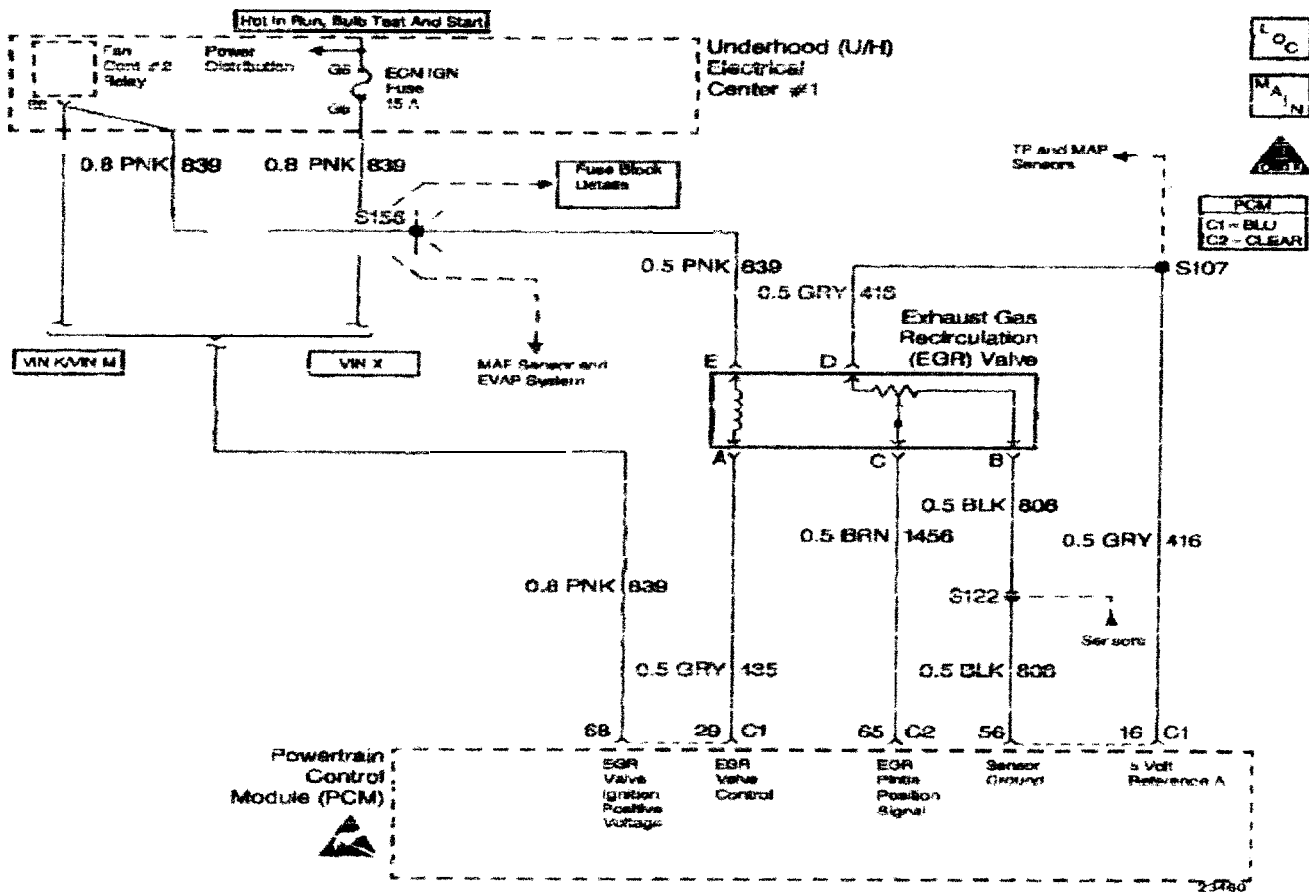
Step	Action	Value(s)	Yes	No
28	Locate and correct the short to ground in the pintle position circuit. Refer to Repair Procedures in Diagrams. Is action complete?	—	Go to Step 31	—
29	Check the pintle position circuit or EGR control circuit for a short to the sensor ground circuit. If a problem is found, repair as necessary. Refer to Repair Procedures in Diagrams. Was a problem found?	—	Go to Step 31	Go to Step 30
30	Replace the PCM. Important: Replacement PCM must be programmed. Refer to Powertrain Control Module Replacement/Programming. Is action complete?	—	Go to Step 31	—
31	1. Review and record scan tool Fail Records data. 2. Clear DTCs. 3. Operate vehicle within Fail Records conditions as noted. 4. Using a scan tool, monitor Specific DTC info for DTC P1406 until the DTC P1406 test runs. Note test result; does scan tool indicate DTC P1406 failed this time?	—	Go to Step 2	System OK

Step	Action	Value(s)	Yes	No
28	Locate and correct the short to ground in the pintle position circuit. Refer to Repair Procedures in Diagrams. Is action complete?	—	Go to Step 31	—
29	Check the pintle position circuit or EGR control circuit for a short to the sensor ground circuit. If a problem is found, repair as necessary. Refer to Repair Procedures in Diagrams. Was a problem found?	—	Go to Step 31	Go to Step 30
30	Replace the PCM. Important: Replacement PCM must be programmed. Refer to Powertrain Control Module Replacement/Programming. Is action complete?	—	Go to Step 31	—
31	1. Review and record scan tool Fail Records data. 2. Clear DTCs. 3. Operate vehicle within Fail Records conditions as noted. 4. Using a scan tool, monitor Specific DTC info for DTC P1406 until the DTC P1406 test runs. Note test result; does scan tool indicate DTC P1406 failed this ign?	—	Go to Step 2	System OK

Both steps said I had a short somewhere. I was really down in the dumps now. Randy, Jim and Doug were leaving for a few days and I would be stuck here tracking down a wiring problem. It really wasn't looking forward to that. So, I looked ahead one more time. If you don't have a short, go to step 30.

Step 30. Replace PCM!! What?

At this point I had to stop. The last page of the flow chart was a wiring diagram of the EGR system. I will admit, this is where I should have started.

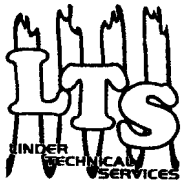


EGR System Flow Insufficient

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(Cont'd)

Let's see... Ckt. 4 16 is 5 volt reference. I know I have that because I confirmed that in step 16. Ckt. 839 is ignition voltage to the valve. Well, I know that's ok, because I checked that in step 5. I checked the sensor ground (Ckt. 808) in step 17 and it was ok. Now I really doubt that there's a wiring problem. I also didn't want to spend a few hundred \$\$\$ on a new PCM and not fix the vehicle.

So, what was the fix for this vehicle??? Randy Dillman from LTS North happened to be in the building when this car was in. I told him my dilemma regarding the flow chart and this is what he told me: Smack it, slam it, & ship it. Smack the EGR with a hammer to unstick the carboned-up pintle, slam a new one on one the car & ship it back to the customer. Many of you would have known how to fix the vehicle from the beginning. But, for those of us who don't have a lot of knowledge about how a certain circuit functions, sometimes we refer to a flow chart to help us out. Here's where I say: BEWARE! First, read through the flow chart and try to understand what each step is really testing. Second, look at a wiring diagram for the circuit to help you better understand its function. Lastly, follow the flow chart cautiously.. sometimes it can lead you astray!