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Nissan Maxima Failure Mode 4



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A Problem Vehicle

Over the last few months, the ATRA Technical HotLine has been receiving calls related to *Failure Mode 4* on several Nissan vehicles. The calls have mostly been related to the Nissan Maxima equipped with a 3.5L engine and the RE5F22A transmission.

According to the technicians calling, the transmission goes into failsafe with no codes set in the TCM. The transmission only has reverse and 4th gear available. The manual shift mode feature is inoperative and indicates failsafe to 5th gear.

After several shops rebuilt or replaced the transmission and replaced the TCM, they gave up trying to repair the vehicle and took them to the local Nissan dealership for assistance. The only thing the dealership could tell them was "the problem is in the transmission," and recommended replacing the transmission as an assembly. With the increasing number of calls coming into the ATRA Technical HotLine and no fix in sight, it was time for ATRA to find an answer.

ATRA Gets Involved

We found a nearby shop that was working on a 2004 Nissan Maxima that was stuck in Failsafe Mode 4. We contacted the shop to check on the repair. According to the technician, the vehicle had been at their shop for a couple months, still stuck in Failsafe Mode 4.

The shop had checked the powers, grounds, and inputs to the TCM; verified the TCM connections; installed a used PNP (Park Neutral Position) switch; and replaced the TCM with a factory TCM from Nissan. Unfortunately, none of these checks or repairs identified or fixed the problem.

The shop sent the vehicle to the local Nissan dealership for a complete diagnosis of the transmission system. According to the dealership technician, the transmission needed to be replaced. The technician said that he was unable to clear Failure Mode 4.

We spoke with the technician and



Figure 1: Nissan Maxima arrives at ATRA

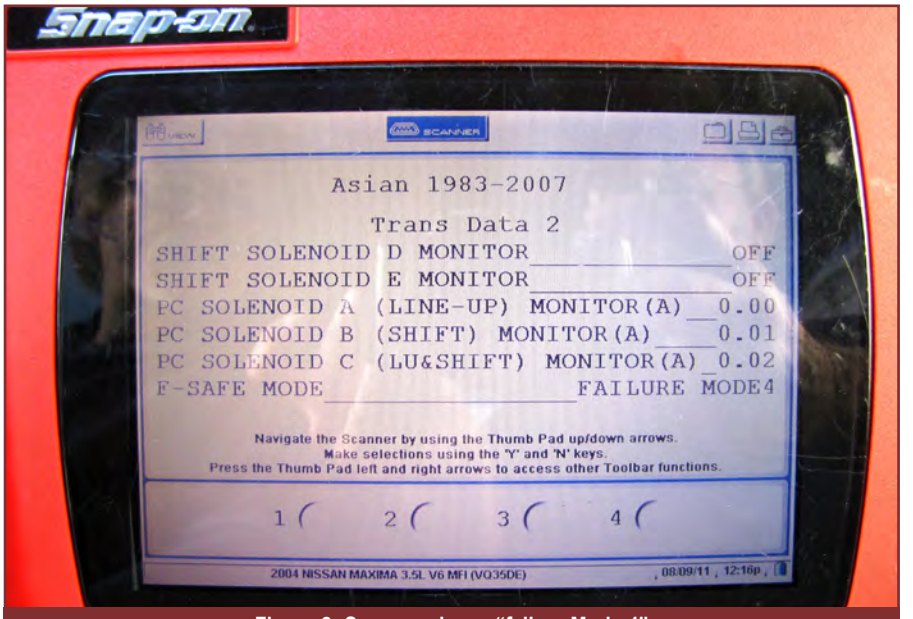
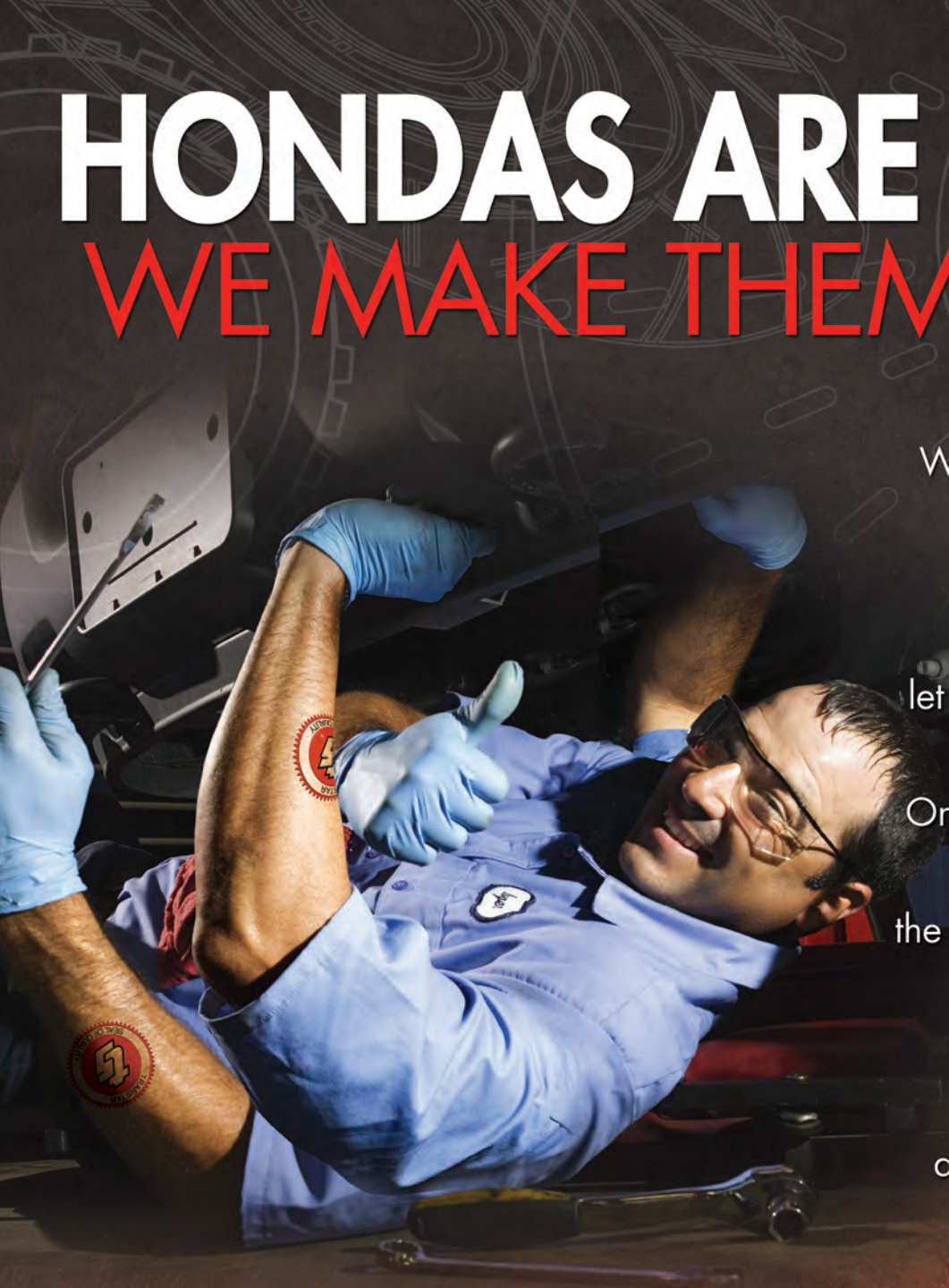


Figure 2: Scanner shows "failure Mode 4"

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the shop owner, and convinced them to let us take a look at the vehicle.

Failure Mode 4 Arrives at ATRA

The next morning, a tow truck showed up with the 2004 Nissan Maxima in tow (figure 1). We began with a visual inspection of the vehicle. The interior panels had been removed, and we were able to confirm that a used PNP switch and a new OEM TCM had been installed. After the visual inspection it was time to take the vehicle for a test drive to see what it was doing.

Failure Mode 4 Confirmed

During the test drive it was obvious the vehicle was having a problem. The Check Engine light was on, the reverse engagement was brutal, and the transmission was starting in what appeared to be 4th gear. The transmission wouldn't shift, the manual shift mode was inoperative, and it indicated 5th gear all the time.

After returning to the shop, we connected our scan tool and accessed the PCM and TCM to check for codes. Code P1800 (Variable Intake Air System [VIAS] solenoid circuit) was stored in the PCM; no codes were present in the TCM. With the scan tool connected, we checked the transmission data.

While viewing the transmission data screens, we noticed a PID entitled "f-safe mode" at the end of the PID list. The f-safe mode PID was reading Failure Mode 4 (figure 2). With no codes in the TCM and the TCM data indicating Failure Mode 4, it was time to find out what Failure Mode 4 was all about.

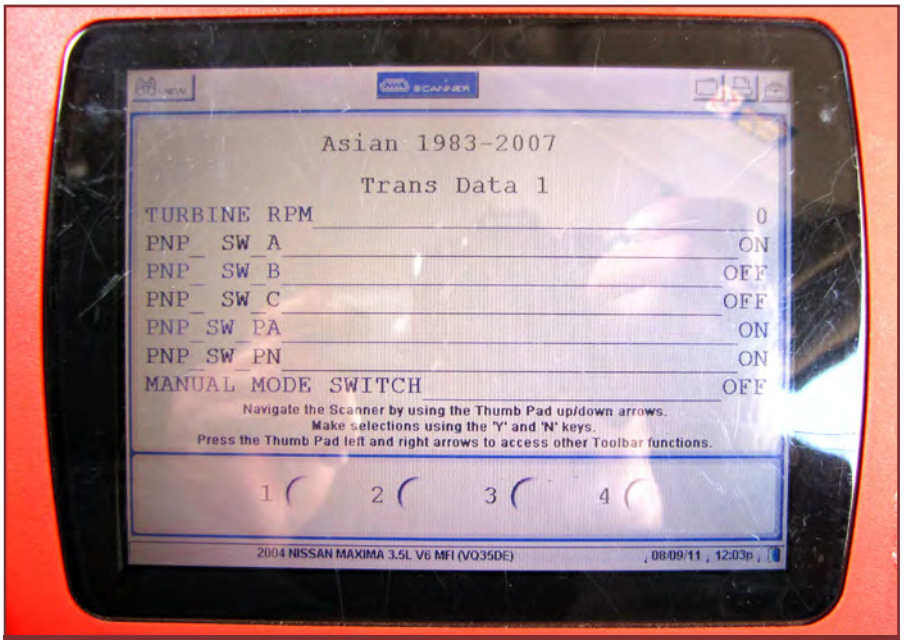


Figure 3: Monitoring PNP Inputs to TCM With Scan Tool

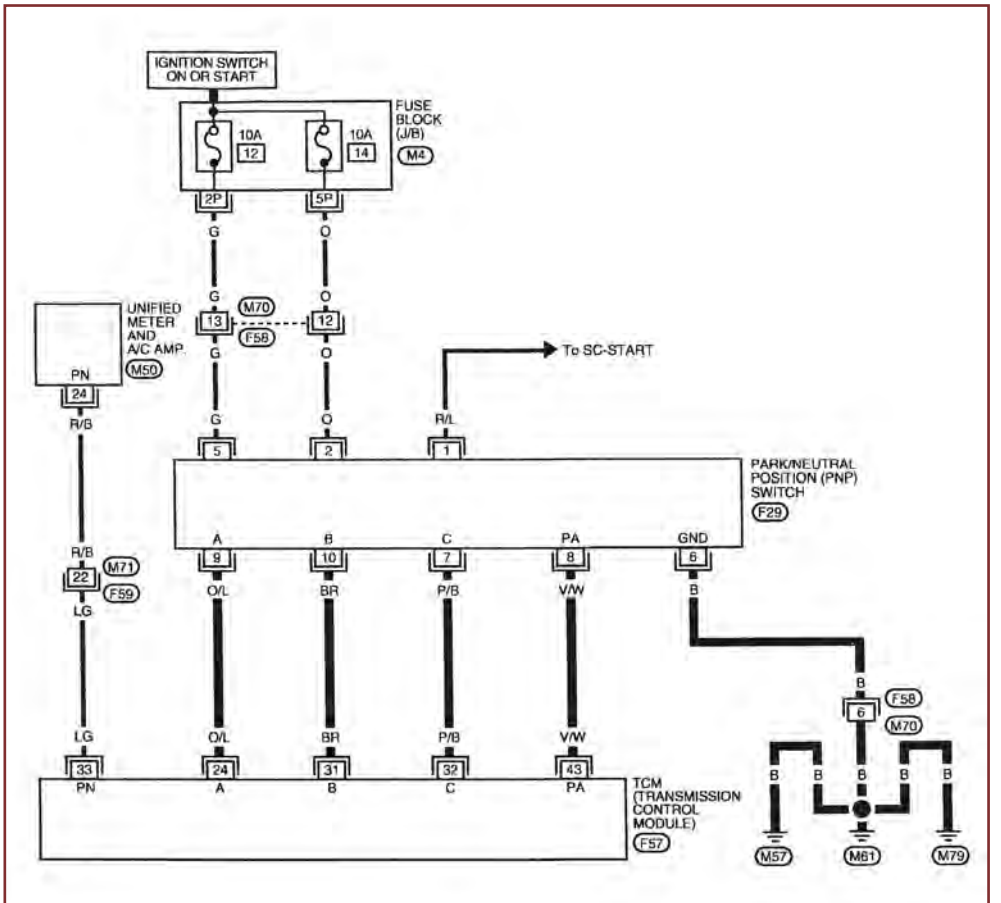


Figure 4: PNP Circuits

What Is Failure Mode 4?

According to Nissan, Failure Mode 4 indicates a possible internal problem in the TCM or a problem in the PNP switch circuit. When Failure Mode 4 sets, the TCM freezes all adapts, raises line pressure to protect the transmission, locks the transmission into 4th gear, and disables manual shift mode. With a better understanding of Failure Mode 4, it was time to get down to diagnosing the problem.

Diagnosing Failure Mode 4

Knowing that Failure Mode 4 indicates a possible problem in the TCM or the PNP switch circuit, we started our diagnosis by checking battery voltage and connections. The battery voltage was 12.5 VDC and the connections were clean and tight.

Next we checked the TCM power and ground circuits; both checked good. We had 12.5 VDC at the TCM, and the TCM ground circuits had a voltage

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drop of less than 0.01 VDC, indicating that the TCM power and ground circuits were intact.

The next step was to check the PNP switch inputs to the TCM. We connected our scan tool and started monitoring the inputs to the TCM from the PNP switch. While monitoring the PNP switch inputs, we noticed that the PNP switch PIDs were erratic and flashed at times (figure 3).

This erratic reading on the PNP switch PIDs indicated a problem with the PNP switch circuit. After verifying erratic PNP switch PIDs, it was time to take a closer look at the PNP switch circuit.

PNP Switch Circuit

The TCM uses four input signals from the PNP switch and one input signal from the Unified Meter and A/C Amplifier (figure 4). The PNP switch inputs to the TCM are identified as circuits A, B, C and PA. The Unified Meter and A/C Amplifier input to the TCM is identified as circuit PN. The TCM is looking for a 12VDC (Off) and 0VDC (On) combination from the PNP switch.

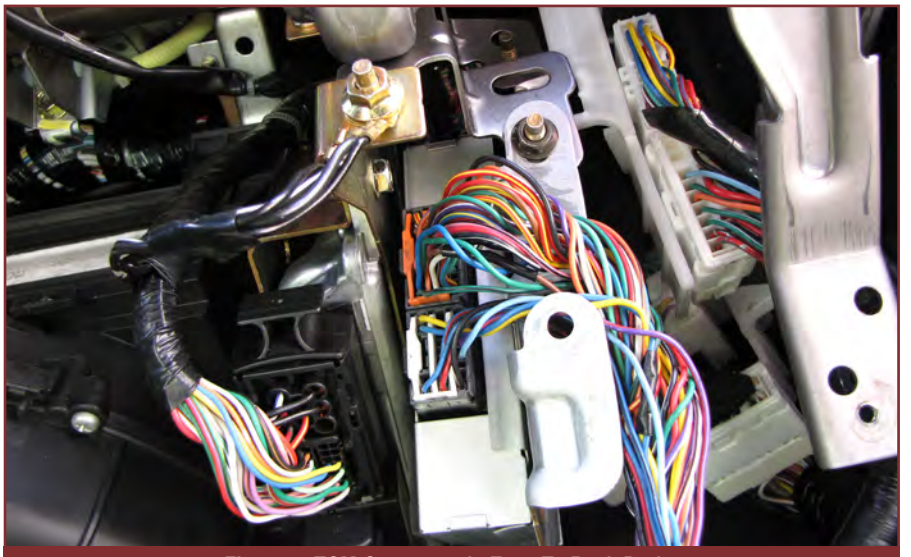


Figure 5: TCM Connector Is Easy To Back Probe

If the TCM receives an improbable combination of signals from the PNP switch, the TCM sets code P0705 (PNP circuits). It was time to monitor the PNP inputs to the TCM.

Monitoring PNP inputs

Monitoring the PNP switch inputs to the TCM is actually pretty easy. You can easily backprobe into the TCM connector (figure 5) and monitor the PNP switch signal to the TCM. While checking the PNP inputs to the TCM, we could see that the signal to the TCM was erratic.

Next, we performed a continuity and amperage check of the circuits between the PNP switch and the TCM. The wiring and connections were okay. The only thing left in the circuit was the PNP switch.

We replaced the used PNP switch with a new, OEM PNP switch and rechecked the PNP switch inputs to the TCM. Now the PNP switch inputs to the TCM were steady and there were no signs of flickering. With the PNP switch inputs reading steady at the TCM, it was time to try to clear the Failure Mode 4 from the TCM.

Clearing Failure Mode 4

While trying to access the TCM with the scan tool, we noticed that the scan tool was having problems accessing the TCM. The scan tool would intermittently come up with a communication error and not access the TCM. We also noticed a rattling noise from the right kick panel that occurred while we were having those communication problems with the TCM.

After several attempts, the scan tool gained access to the TCM, and we were able to read the data streams and clear codes from the TCM. We cleared all codes, but the transmission was still in failsafe. We accessed the data information and discovered Failure Mode 4 was still stored in the TCM.

After several attempts to clear Failure Mode 4, we moved the shifter lever from park to neutral and tried to clear it again. This time we were able to clear Failure Mode 4 from the TCM data list. The TCM data list now displayed "f-safe mode" as normal. Nowhere in the factory manual does it have a procedure to clear Mode 4. The dealership couldn't clear Mode 4. We even contacted Nissan of North America and there hotline, they had no answer. So we figured out what causes it and now we figured out how to clear it.

Test Drive to Verify

After several test drives around town and on the freeway, the transmis-



sion seemed to shift properly. We continued to drive the vehicle for the next couple days and everything seemed to be okay.

But just as we were getting ready to call the shop and let them know the Maxima was fixed, the problem returned. I had jumped into the car to move it to the other side of the parking lot for an early morning pickup, the TCM went into Failure Mode 4 again (I hate when that happens!) while trying to start the vehicle. With Failure Mode 4 returning, it was time to take another look at TCM.

Taking Another Look

One of the first things we noticed was the elusive rattle from the right kick panel would occur during startup. We discovered the rattle was coming from the A/T PV IGN relay (figure 6), located in the right kick panel. Each time we started the engine, the relay would rattle and the TCM would go into Failure Mode 4.

We contacted our local Nissan dealership parts department, and, sure enough, they had the relay in stock. The Nissan parts computer lists the A/T PV IGN relay as just a relay. You'll need to provide the part number (stamped on the relay cover) to the parts person to get the right relay.

We installed the relay, cleared Failure Mode 4, and rechecked TCM operation. The rattle during startup was gone, and the TCM didn't enter Failure Mode 4 during startup. We went for a test drive to recheck the transmission operation, and the transmission shifted and seemed to work well. We continued to drive the vehicle over the next few days, starting and stopping the vehicle numerous times, and the transmission worked flawlessly ever since.

Conclusion

What are the chances of having multiple problems on one vehicle. In this case both PNP and the Relay can cause a Mode 4 failsafe. Two simple fixes that can save you time and money. A Failure Mode 4 condition may be caused by an erratic PNP switch input to the TCM, a power (the A/T relay) or ground problem with the TCM, or an internal problem in the TCM itself.

If you run into Failure Mode 4 on a Nissan and can't seem to get it to clear, try clearing the TCM in neutral. If that doesn't work, check your TCM power and grounds, replace the A/T PV IGN relay ($30), check the PNP switch inputs to the TCM (replace PNP if erratic, $100), and if everything else is okay, you probably have an internal TCM failure ($600).

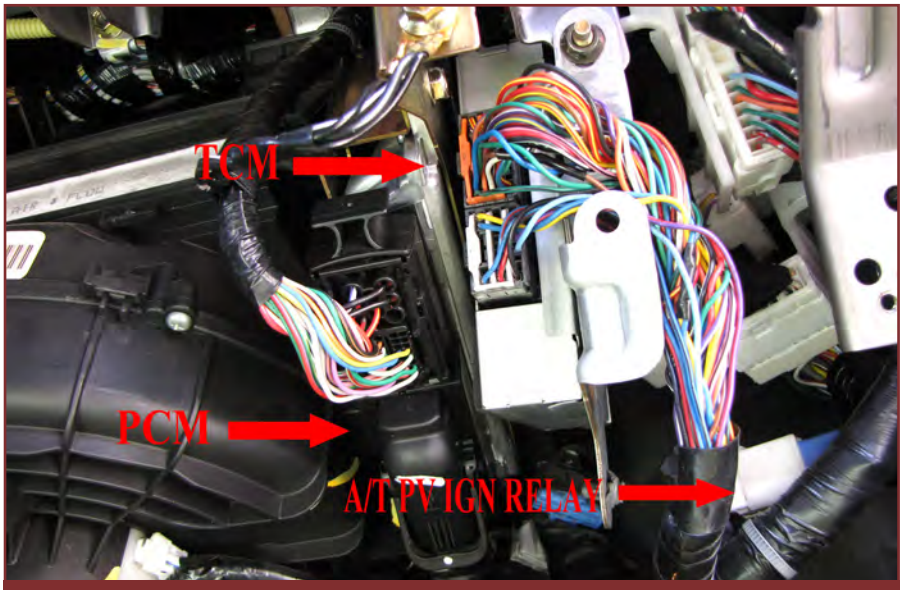


Figure 6: A/T PV IGN Relay Located In Right Kick Panel

The diagnosis and final repair of this 2004 Nissan Maxima was a team effort. Every technician in the ATRA Technical Department, from the top down, was involved in the diagnosis and repair.

With a little bit of persistence and the resources of ATRA behind you, you, too, can conquer Nissan's Failure Mode 4, and *keep those trannies rolling.*

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