SS 1023069 Cascadia - Engine Will Not Crank (No Starter Output from SAM Cab)

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Applicable Vehicles

All Cascadia

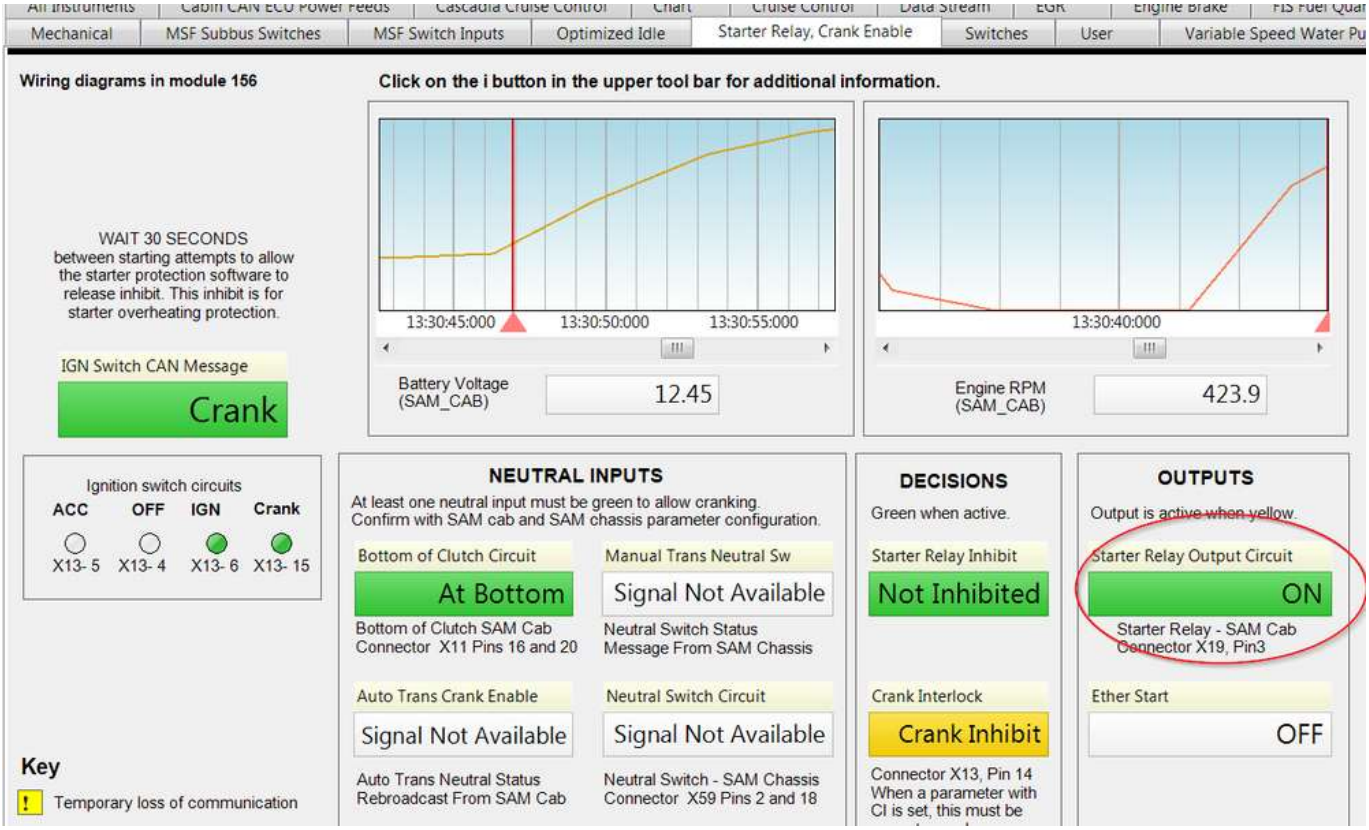
Issue

Engine will not crank

Case Study

Two sister trucks - one would not crank (SN HP4795), the other would crank (SN HP4796). When monitoring the "Starter Relay, Crank Enable" panel in Diagnosticlink, all inputs required for the SAM Cab to send the starter relay output on pin X19/3 appeared to be met for both trucks. We were able to see the bottom of clutch switch input, the correct ignition switch inputs, engine RPM was zero, etc. However, SN HP4795 would never provide the SAM Cab starter relay output on X19/3, while SN HP4796 would (as shown below):

Note, we ruled out the possibility of the SAM Cab hardware or parameter settings being the cause by temporarily installing the SAM Cab from HP4696 into HP4695. When we did that, HP4695 still would not crank.

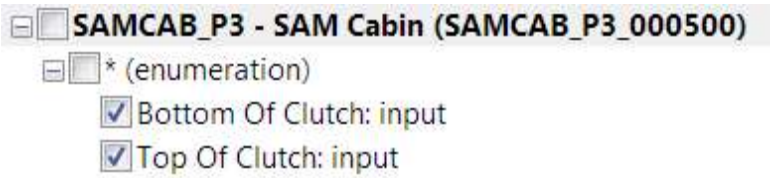


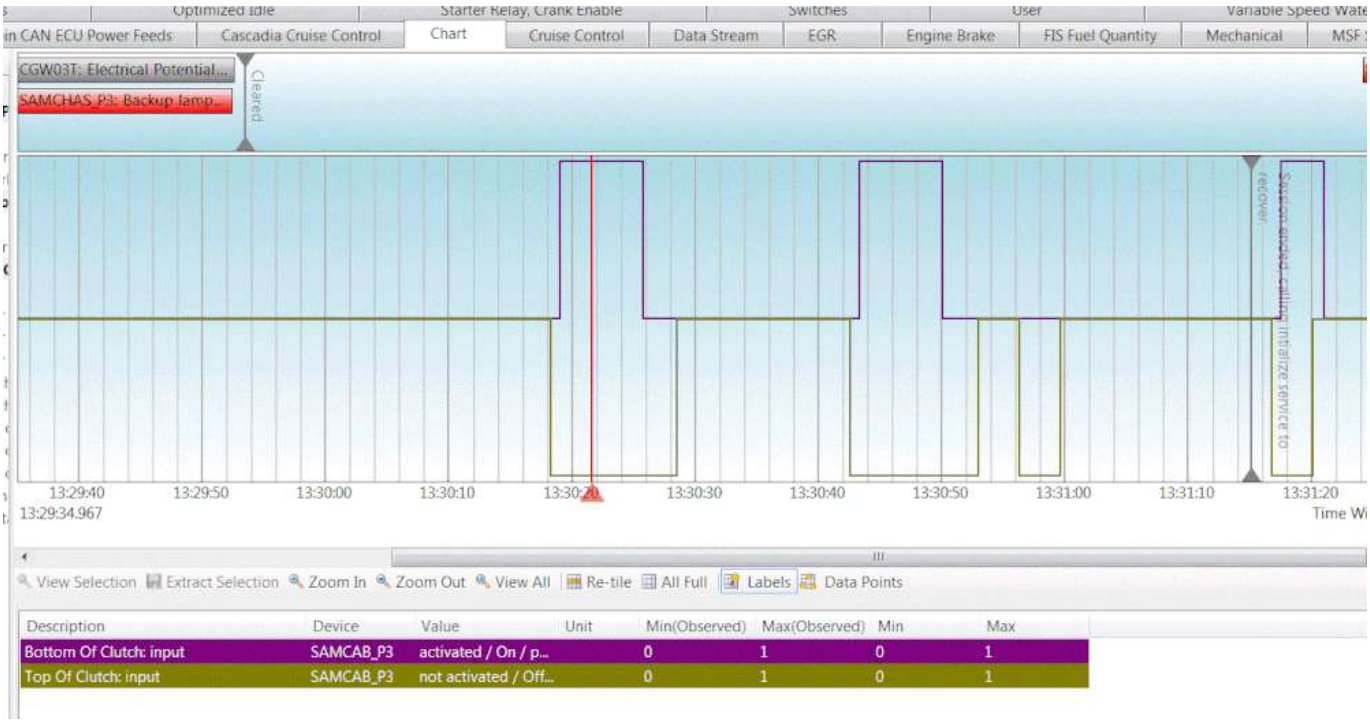
Upon further investigation, we found the issue was with the clutch switch. Under normal circumstances, the clutch switch should function per the table below:

	Clutch Pedal Position & Clutch Switch States		
	Not depressed	Partially depressed (Not to floor)	Fully depressed (To the floor)
Bottom of Clutch Switch	open	open	closed
Top of Clutch Switch	closed	open	open

When we monitored the clutch switch states (both top and bottom of clutch), we noticed a difference between the two vehicles. Here is the trace for the truck that would crank (SN HP4796):

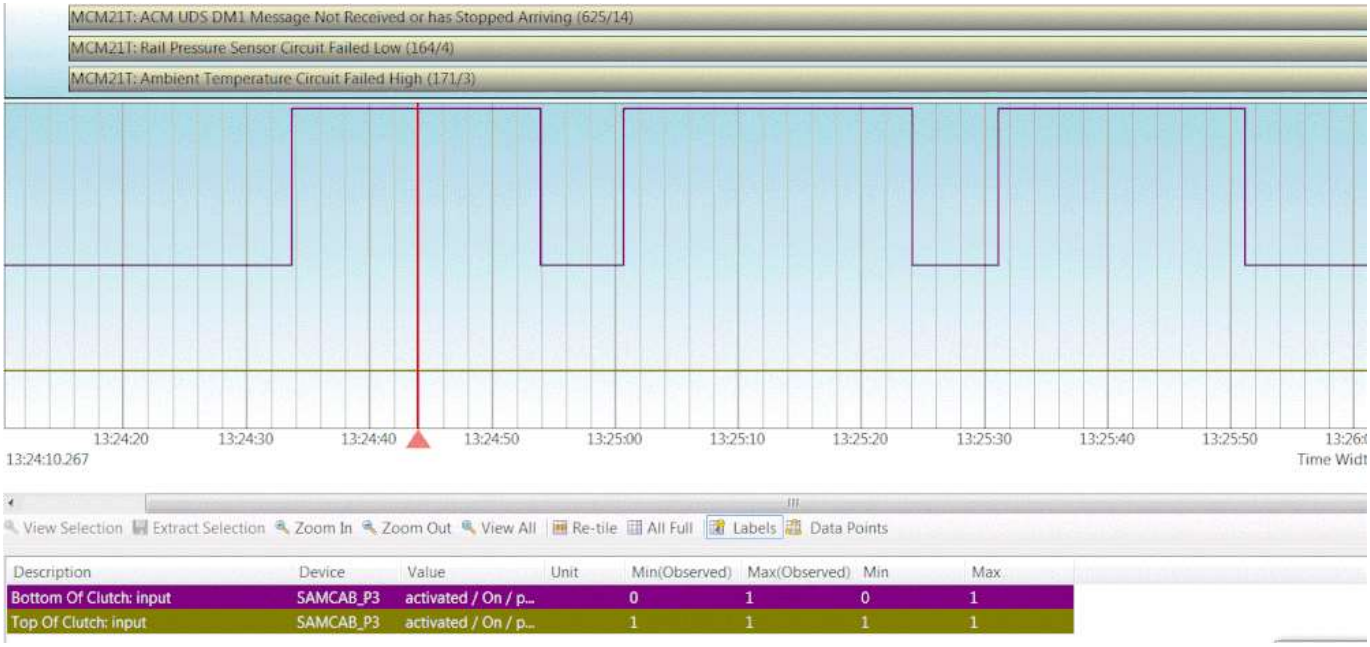
NOTE: To monitor these, in Diagnosticlink select the Chart tab under Instrumentation, then search for the following two messages:





Notice in the above trace that when the clutch pedal was depressed to the floor, the trace for the bottom of clutch switch was ON (closed), while at nearly the same time the top of clutch switch was OFF (open). This is what is expected based on the Clutch Pedal Position and Clutch Switch State table above.

Now, take a look at the same trace for the vehicle that would not crank (SN HP4795):



Notice in the above trace that when the clutch pedal was depressed to the floor, the trace for the bottom of clutch switch was ON (closed), but the top of clutch switch was always ON (closed). This is an error condition that doesn't match the set of expected clutch switch states as defined in the table above. This was the reason SN HP4795 would not crank. In the end, it turns out the top of clutch switch circuit was shorted to ground causing the top of clutch input to be ON (closed) all the time regardless of clutch position. This error condition did not set a clutch switch fault in the SAM Cab.

Solution

When troubleshooting a no crank situation on a Cascadia, be sure to check both bottom of clutch and top of clutch switch function. If you only pay attention to the bottom of clutch switch input as depicted on the "Starter Relay, Crank Enable" panel, you'd have no indication something is wrong causing the SAM Cab not to provide the starter relay output on pin X19/3. If the two clutch switch inputs are in a state other than shown in the above table, this will inhibit the SAM from providing the starter relay output.

Labels :

Cascadia Freightliner

cascadia no crank no start

clutch switch cruise control inop will not start

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17 Kudos

Comments

Gerald_Tocher 02-25-2016 09:28 AM

Very nicely laid out and explained Joe, Thank you!

Doug_Farver 02-26-2016 07:31 AM

Good info will need to remember this.

Kyle_Siebert 01-11-2017 04:47 AM

not sure what you changed in this solution. but I figured it's good to mention that if replacing the clutch switch under warranty you have to call Meritor and have resistance readings of the switch from both colored circuits to black at pedal down and pedal up positions. You should have 4 measurements.

A to C xx ohms at pedal up

A to C xx ohms at pedal down

and so on

Penske_Salt_Lak 02-21-2017 06:10 AM

good info

Kyle_Siebert 02-22-2017 02:31 PM

you should give him a S/N. Not all Cascadias have the same Parameter for starter control

Jay_Duca 09-25-2017 09:57 AM

We have a 2013 Cascadia in the shop right now with a no crank issue, there is no power to the starter solenoid. Tried connecting unit to Diagnostic link and have no connection to the mcm, cpc, or acm, it does connect to the cgw though. It does have active codes for

J1939 so we tested it at the diagnostic connector and it ohms out 60 ohms and voltage on each wire is good. Any suggestions on a cause?

Talbert_Simonia 09-25-2017 01:47 PM

You are not seeing the PT can. You need to find out why. If you leave a VIN. When I get to our shop. I may be able to assist. I would check the fuses first in the PT PDM. To se if there is 12 volts there.

Chaz_Trimble 09-25-2017 04:15 PM

I agree with Talbert, check the 5 amp ignition fuse in the PTPDM for the CPC, ACM, and MCM. CPC broadcasts PT CAN data over J1939 to CGW for other modules to communicate with the PT CAN.