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Viewed:	20456		

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Coding Information

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Title: CPA Base Engine Analysis Module (BEAM): Test Descriptions and Detailed Information

Applies To: MaxxForce Engines

CHANGE LOG

10/06/2017- Revised MED and BB PDF instruction attachments
07/24/2017- Add IDLE & PPM Signal Diag. Documents. Formatted RCT+ and BBT tables
06/07/2017- Minor edits
06/02/2017- Structured Layout and added information
04/28/2017- Added common BBT error explanation

DESCRIPTION:

This document will serve as detailed descriptions to the CPA BEAM Tests

CPA BEAM Tests Apply To:

Engine Platform	Emission Year	Engine Model
V8	2007-2016	MaxxForce7
MED	2007-2009	MaxxForce DT/9/10
MED	2010-2013	MaxxForce DT/9/10
MED	2014-2017	N9/ N10
BB	2010-2012	MaxxForce 11/13L
BB	2013-2016	N13

SYMPTOM(s)/ FAULT CODE(s):

Follow Appropriate Manual

BEAM TESTS:

Engine Platform Application	BEAM Test	Notes
V8	IDLE Test	Utilize instead of Injector Misfire Detection
V8	CrankCase Pressure (CCP) Test	
V8	Relative Compression Test (RCT)	Utilize instead of Navistar Engine Diagnostics RCT
V8	Relative Compression Test (RCT+)	
V8	Blow-By Test (BBT)	

Engine Platform Application	BEAM Test	Notes
MED Duty (i6)	Relative Compression Test (RCT)	Utilize instead of Navistar Engine Diagnostics RCT
MED Duty (i6)	Relative Compression Test (RCT+)	
MED Duty (i6)	Blow-By Test (BBT)	

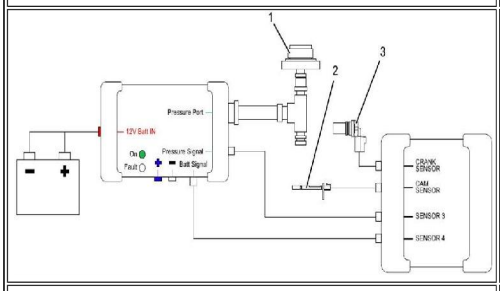
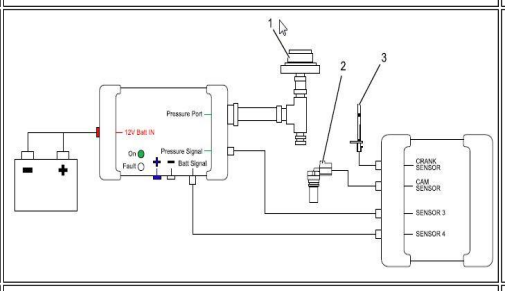
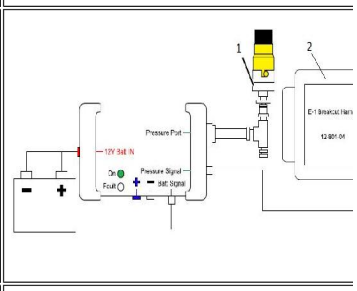
Engine Platform Application	BEAM Test	Notes
Big Bore (BB)	Relative Compression Test (RCT)	Utilize instead of Navistar Engine Diagnostics RCT
Big Bore (BB)	Relative Compression Test (RCT+)	
Big Bore (BB)	Blow-By Test (BBT)	
Big Bore (BB)	Full Load Blow-By Test (FL BBT)	Refer to IK 1201329

TEST DESCRIPTIONS:

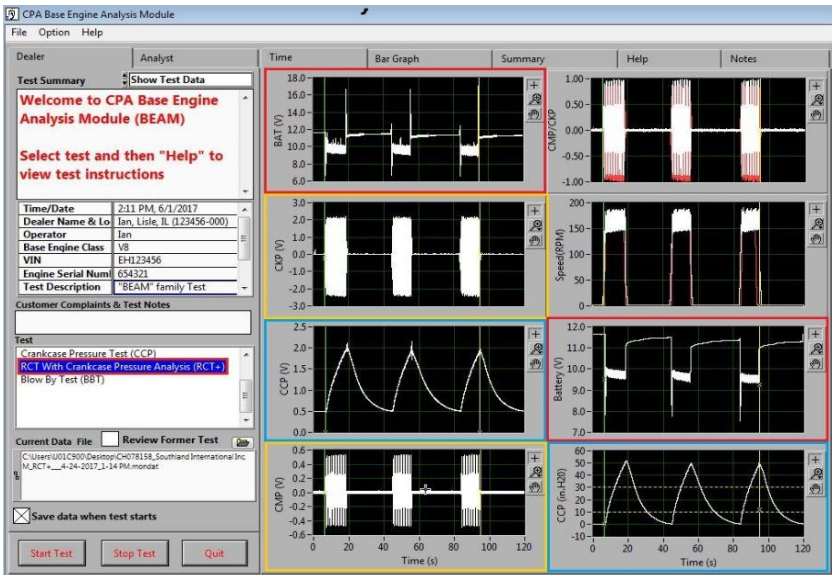
Relative Compression Test Plus (RCT+):

Below is the basic set up overview of BEAM RCT+. Review the appropriate engine diagnostic manual for proper step-by-step installation instructions.

RELATIVE COMPRESSION TEST PLUS (RCT+)

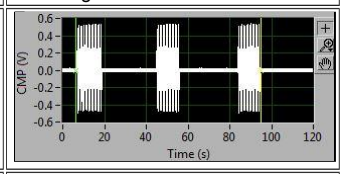
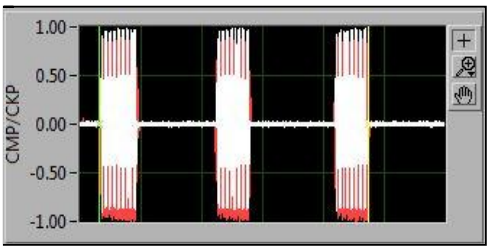
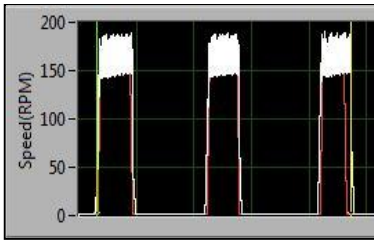
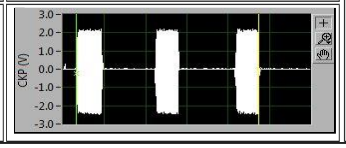
V8	MED Duty (i6)	Big Bore (BE
		
1. Cap Adapter 12-999-05-03 2. Camshaft Position (CMP) Sensor 3. Crankshaft Position (CKP) Sensor	1. CAP Adapter 12-999-05-04 2. Camshaft Position (CMP) Sensor 3. Crankshaft Position (CKP) Sensor	1. Oil Fill Adapter 12-999-05-05 2. E1 Harness 12-801-01

RCT+ User Interface:

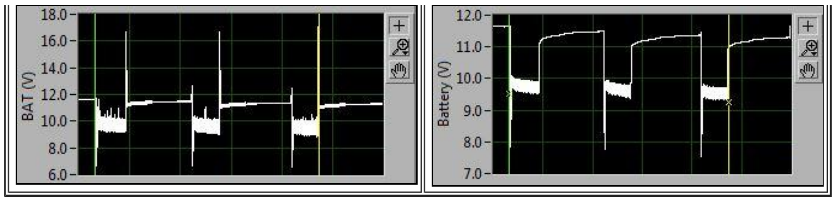


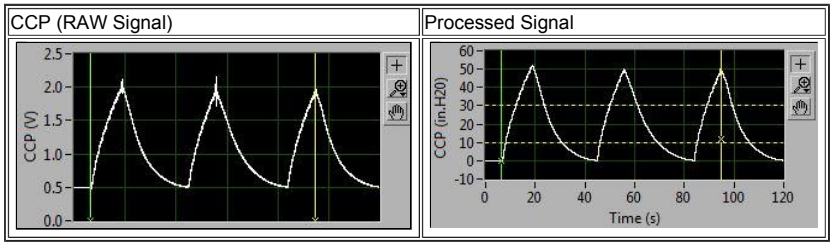
RCT+ Signals. Example of Good Signals

Graph analysis available in the diagnostic manual.

RCT+ Signal	RAW Signal	CKP/CAM Superimposed	Processed into Speed trace
CMP			
CKP			

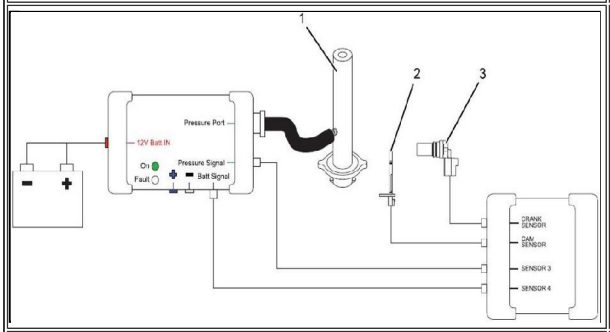
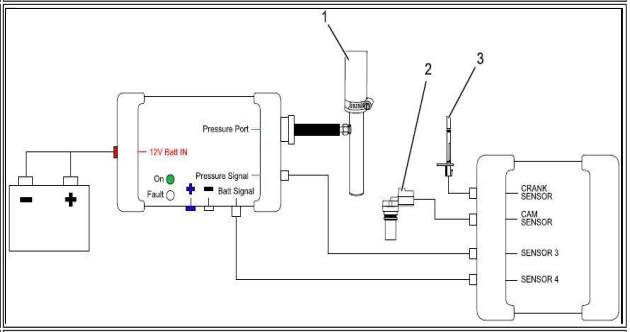
BATTERY (RAW Signal)	Processed Signal



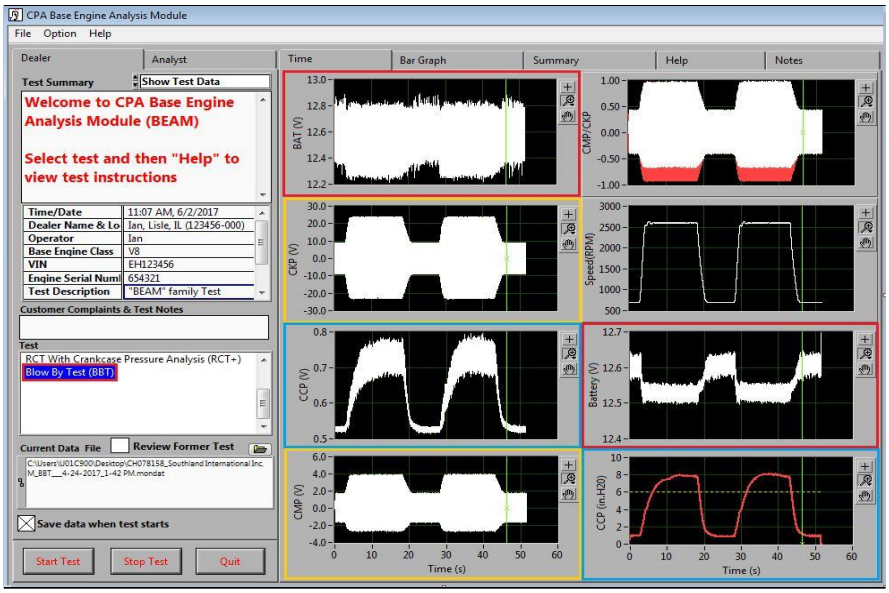


Blow-By Test (BBT):

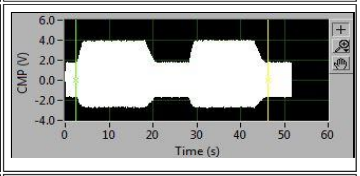
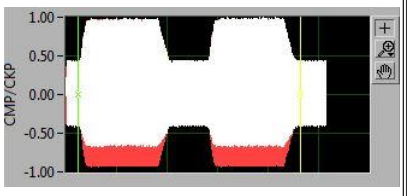
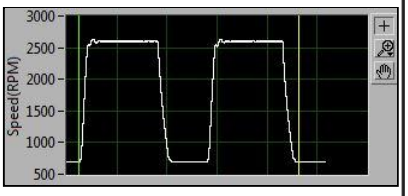
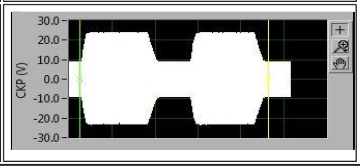
Below is the basic set up overview of BEAM BBT. Review the appropriate engine diagnostic manual for proper step-by-step installation instructions.

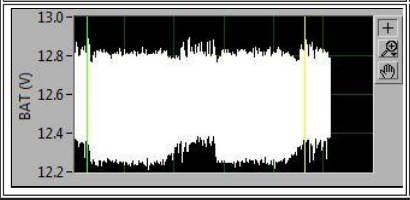
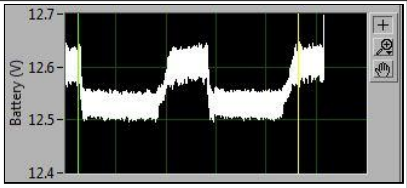
BLOW- BY TEST		
V8	MED Duty (i6)	Big Bore
		Pic Coming
1. Crankcase Pressure Test Orifice Tool ZTSE4146A 2. Camshaft Position (CMP) Sensor 3. Crankshaft Position (CKP) Sensor	1. CrankCase Pressure Test Orifice Tool ZTSE4039 2. Camshaft Position (CMP) Sensor 3. Crankshaft Position (CKP) Sensor	

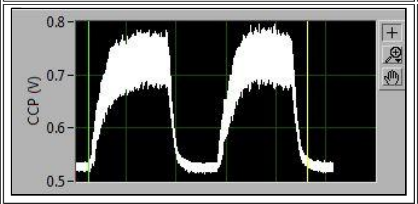
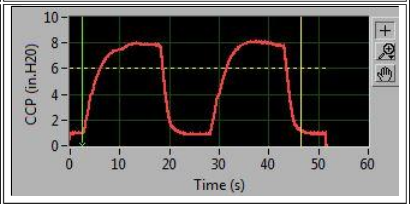
BBT User Interface:



BBT Signals. Example of Good Signals:

RCT+ Signal	RAW Signal	CKP/CAM Superimposed	Processed into Speed trace
CMP			
CKP			

BATTERY (RAW Signal)	Processed Signal
	

CCP (RAW Signal)	Processed Signal
	

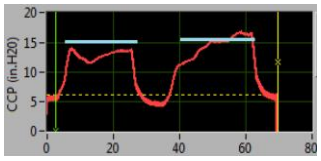
QUICK NOTES:

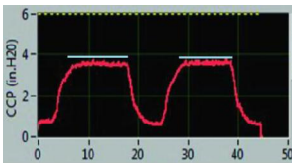
RCT+:

- Poor Battery Health while performing RCT+: Press "Stop Test" when the CPA prompts 3rd cranking event. RCT+ will process the data and issue a conclusion
- If Engine can Idle: For improved accuracy, warm the engine *Prior* to performing RCT+

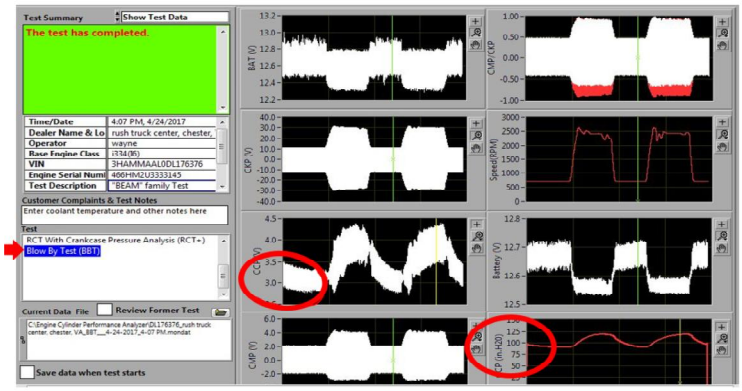
BLOW BY TEST:

- Blow-By Test (BBT) utilizes the PressurePlus module instead of a water manometer or magnahelic gauge
- The fan must be OFF in order to achieve accurate results. The software is analyzing STABILITY within the data

Instability Result (FAN engaged): 

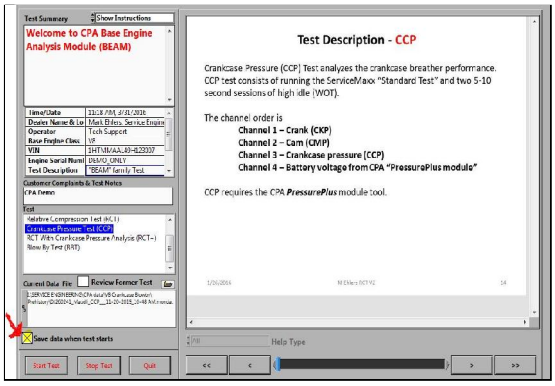
Stable Result (FAN not engaged): 

- Ensure PressurePlus Module is *NOT* connected to the oil fill adaptor when performing BBT. The PressurePlus Module hose connects to the the orifice tool (Crankcase Breather Outlet)
- Ensure proper channel set-up. BBT signals may OFFSET and look like the example below if connected incorrectly



Crankcase Pressure (CCP) Test (MF7 ONLY):

- The crankcase breather is functioning normally for this test.
- If the engine cannot run the Navistar Engine Diagnostics™ *Standard Test* (as requested in BBT and CCP test):
  - Check "Save data when test starts" box

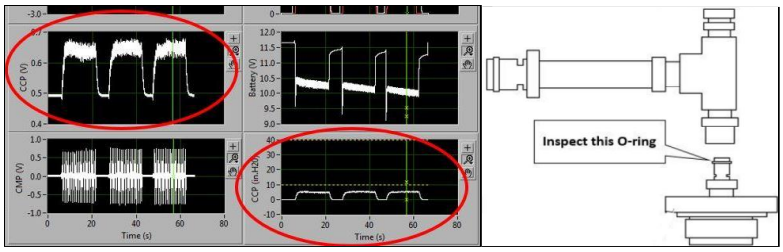


  - When Standard Test is requested: Hold Wide Open Throttle (WOT) for 5 seconds w/ FAN OFF
  - Idle for 4 seconds
  - WOT for 5 seconds (FAN OFF)
  - Press "Stop Test"
  - CPA will process the test and create the Results Graph

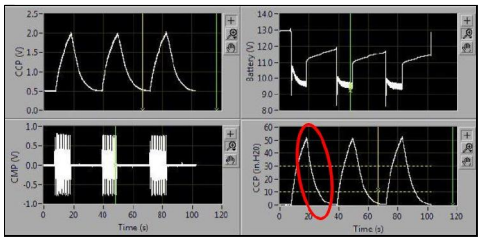
Crankcase Leak Detected Result:

This message occurs when crankcase is NOT properly sealed

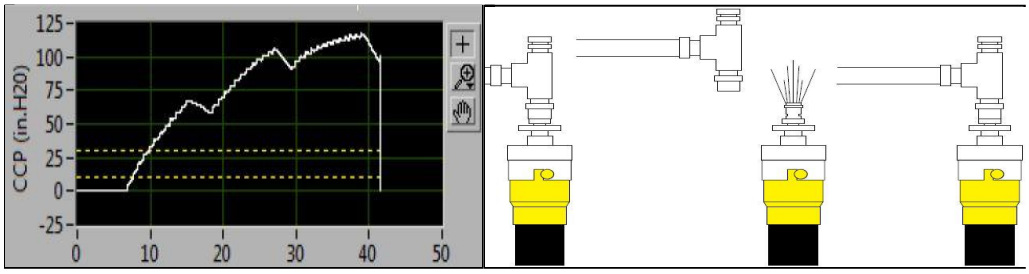
- **Example 1 (RCT+): CCP not meeting minimum pressure threshold of 10"H2O (PIC Below)**
  - Confirm Crankcase Breather Outlet is properly plugged
  - Confirm Oil Dipstick (MF7 and MF11/13L ONLY) is correctly seated and properly sealed
  - Confirm oring on fill cap is NOT damaged (PIC Below)



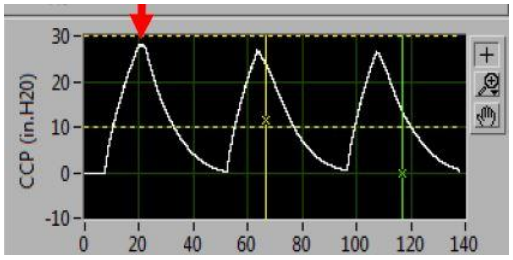
- **Example 2: CCP has rapid pressure decay**



- **Example 3: CCP NOT allowed to decay between cranking events**
  - Ensure the cranking prompt is correctly followed
  - If removing cap (Applies to BB ONLY), ensure correct operation



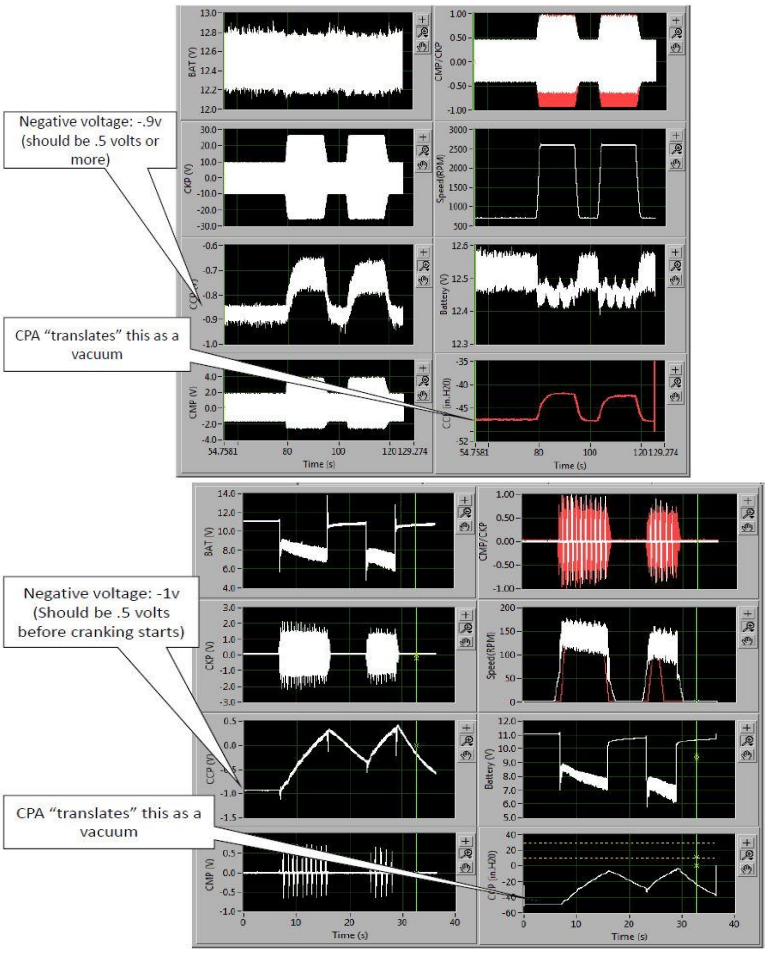
- **Example 4 : CCP not meeting middle pressure threshold of 30"H2O (PIC Below)**
  - Confirm Crankcase Breather Outlet is properly plugged
  - Confirm Oil Dipstick (MF7 and MF11/13L ONLY) is correctly seated and properly sealed
  - Confirm oring on fill cap is NOT damaged (PIC Below)



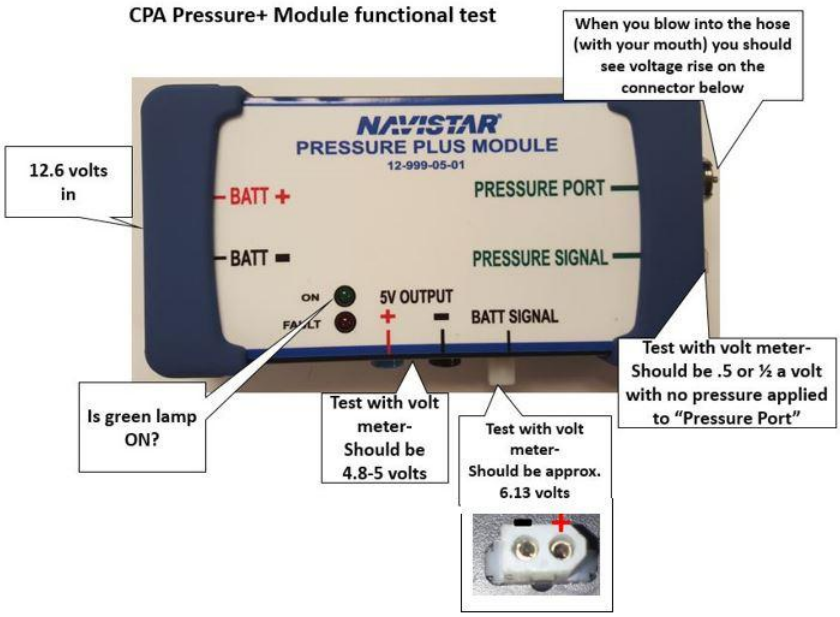
PRESSURE PLUS MODULE:

Errors with pressure plus module follow guidleines below

- **Example 1: CCP reading negative voltage. Signal GROUND is open or has high resistance**
  - Using a DMM- Measure the BNC end and ensure correct voltage output at KOEO
  - If voltage measured is NOT correct: Replace CPA Extension Cable and retest



- Overview of Pressure Plus Module (PPM)



Additional diagnostics available> **PPM SIGNAL DIAGNOSTICS**

RESOURCES

- MED_BEAM Instructions
- BB_BEAM Instructions
- V8_RCT INSTRUCTIONS
- V8_RCT+ INSTRUCTIONS
- V8_CCP INSTRUCTIONS
- V8_BBT INSTRUCTIONS
- V8 IDLE INSTRUCTIONS

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