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Coding Information

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Title: Ambient Air Temperature (AAT) sensor faults/location/diagnostics

Applies To: 2010 EPA MaxxForce® 11 and 13 ProStar® and WorkStar®

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ENGINE DIAGNOSTIC TROUBLE CODES

There are two ambient temperature sensors. The sensor located behind the cab along the left frame rail is the sensor the engine uses. To confirm this, unplug the sensor and observe the cluster LCD display, if the reading stays the same, the correct sensor is unplugged. There is also a sensor located at the front of the chassis that the gauge cluster uses for the temp display.

This article begins and discusses the Engine AAT Sensor, prior to and first. After August 23, 2013, Some SCR engines have the Engine AAT sensor mounted in the driver side mirror head and alternatively the sensor could be mounted to the horn bracket. The location depends on build date.

SPN	FMI	MODULE	DESCRIPTION
171	4	Engine	AAT signal out of range LOW
171	3	Engine	AAT signal out of range HIGH
171	2	Engine	AAT signal does not agree with other sensors

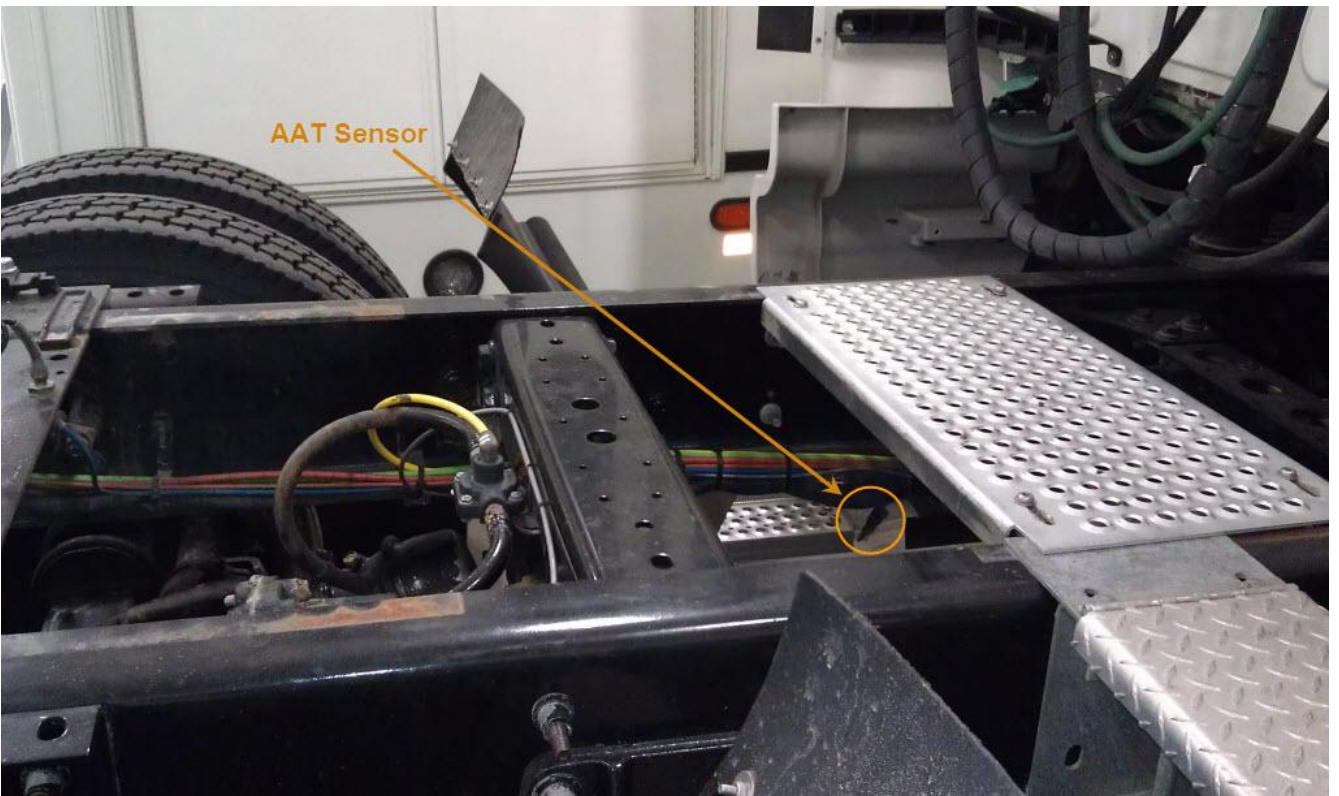
Circuit Diagnostics

NOTE: If the ECM is setting/logging code 171 2 and the sensor tests good **DO NOT** replace the sensor, there is a new calibration available as of March 7, 2014 for EGR engines, and coming in June 2014 for SCR engines to address this issue.

SENSOR LOCATION

Pre SCR engines and/ SCR Engine prior to August 2013

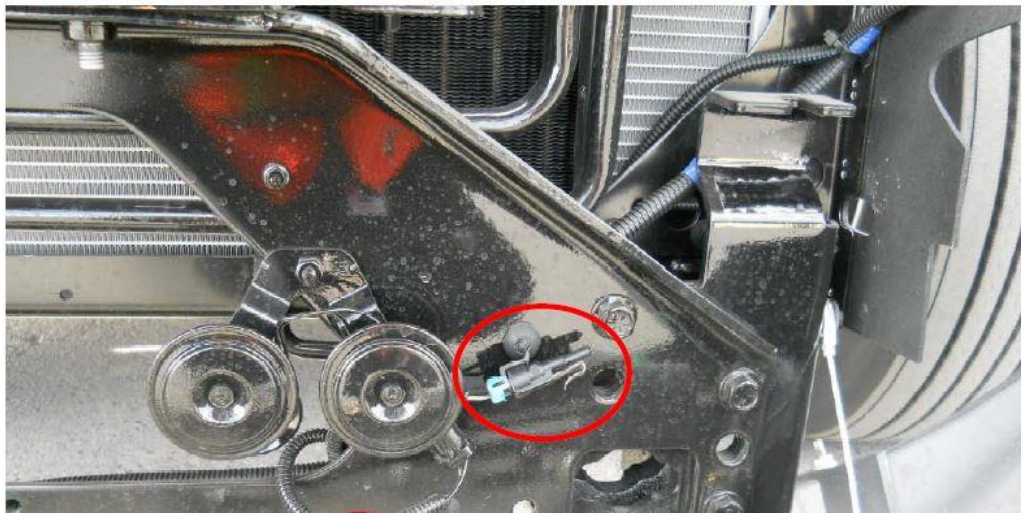
The engine sensor is located on the left frame rail midway between the back of cab and front drive axle, or near the front drive axle. The two photos below show both possible mounting locations.



Post August 2013 build w/SCR engine, driver's side mirror head

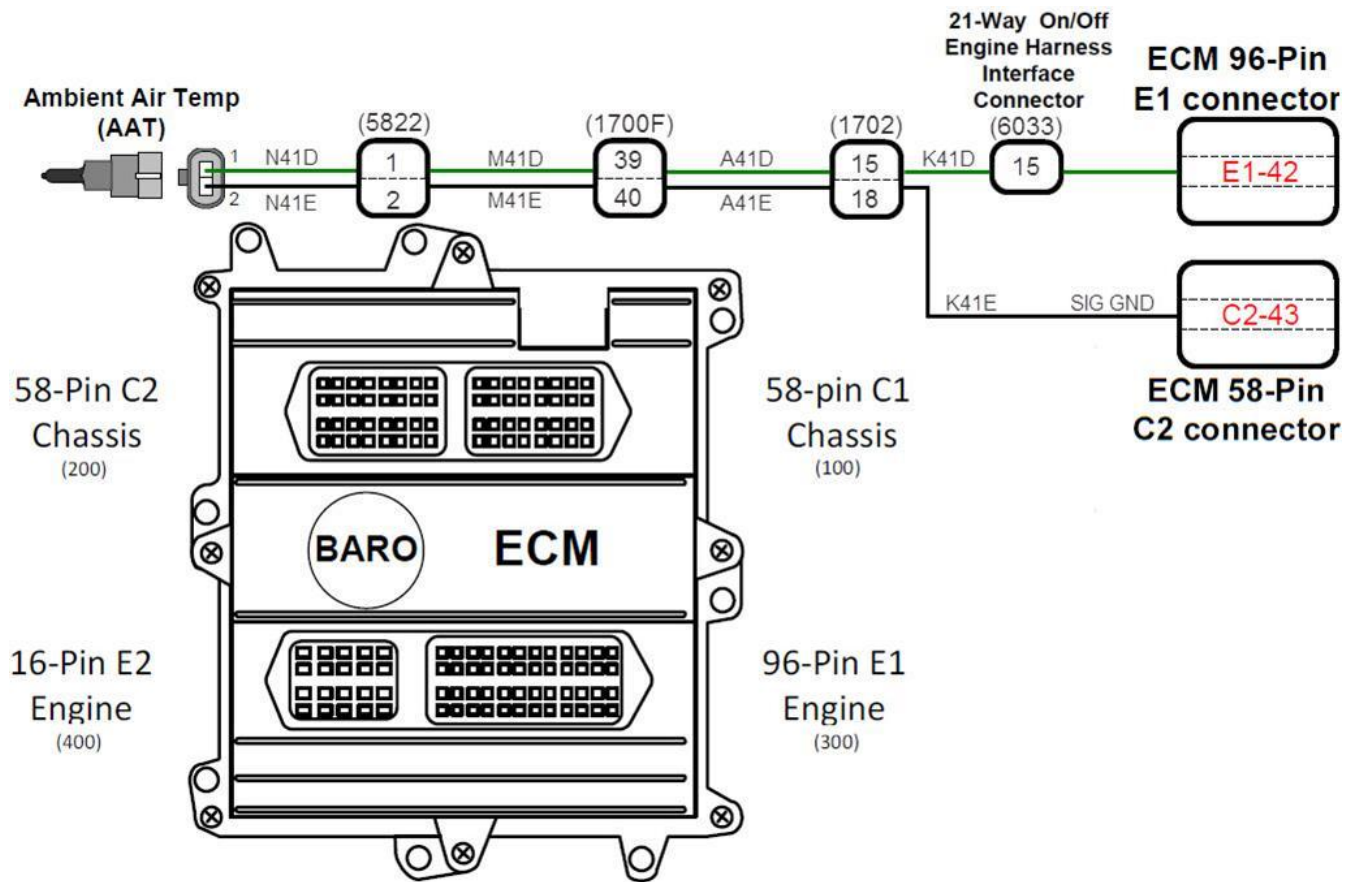


ISX AND N13 ALTERNATE LOCATION



ENGINE CIRCUIT DIAGRAM

Pre SCR engine or SCR Pre August 2013 build date



W/SCR and post August 2013 build date(N13/ISX)

[Click HERE](#)

CAB AMBIENT TEMPERATURE SENSOR

The instrument cluster, connector 1501 pin 9, sends a 5-volt source to the temperature sensor. As the voltage goes across the temperature sensor it decreases, the amount of voltage drop depends on outside temperature. The reduced voltage then returns to the instrument cluster on pin 8 of connector 1500. The instrument cluster turns the received signal into to the temperature shown on the display.

Note: The Electronic Gage Cluster display will replace temperature reading with two dashes (- -) if a fault is present with the Ambient Temperature Sensor circuit.

SPN	FMI	MODULE	DESCRIPTION
171	3	Cluster	Fault on Analog Input 3 when used for outside temperature
171	4	Cluster	Fault on Analog Input 3 when used for outside temperature

Step	Test Points	Specification	In Spec	NOT In Spec
1	Measure Resistance of the sensor and compare to the chart below	Based on Ambient temp	Go to next step	Replace sensor
2	Measure voltage between ambient temperature sensor connector cavity A and GND	5 +/- 0.5 Vdc	Go to next step	Inspect wire from cluster 1501-9 to AAT sensor pin A for open or short
3	Measure voltage between ambient temperature sensor connector cavity A and cavity B	5 +/- 0.5 Vdc	Go to next step	Inspect ZVR wire from cluster 1500-8 to AAT sensor pin B for open or short

AAT SENSOR TEMP VS. RESISTANCE CHART

TEMP °F	TEMP °C	R NOM	R MIN	R MAX	± (%) TOL NOM
-76°F	-60°C	1410910	1,267,349.9	1,554,470.1	10.175
-58°F	-50°C	671960	611,483.6	732,436.4	9
-40°F	-40°C	336000	310,464.0	361,536.0	7.6
-22 °F	-30°C	177000	165,185.3	188,814.8	6.675
-4 °F	-20°C	97060	91,382.0	102,738.0	5.85
14°F	-10°C	55319	52,483.9	58,154.1	5.125
32°F	00°C	32654	31,225.4	34,082.6	4.375
50°F	10°C	19903	19,141.7	20,664.3	3.825
68°F	20°C	12493	12,058.9	12,927.1	3.475
77 °F	25°C	10,000	9,662.0	10,338.0	3.38
86°F	30°C	8056	7,776.1	8,335.9	3.475
104°F	40°C	5327	5,131.2	5,522.8	3.675
122°F	50°C	3603	3,463.4	3,742.6	3.875
140°F	60°C	2488	2,382.3	2,593.7	4.25
158°F	70°C	1752	1,673.2	1,830.8	4.5
176°F	80°C	1255	1,191.9	1,318.1	5.025
194°F	90°C	915	866.3	963.7	5.325
212°F	100°C	680	639.2	720.8	6
230°F	110°C	517	484.2	549.8	6.35
248°F	120°C	390	363.9	416.1	6.7
266°F	130°C	300	277.3	322.7	7.575
284°F	140°C	235	216.3	253.7	7.975
302°F	150°C	185	168.6	201.4	8.85

CLUSTER CIRCUIT DIAGRAMS

IMPORTANT: Due to variations during vehicle production, be sure to select the most current wiring schematic manual, specific to the year and model of the vehicle being serviced.

- [ProStar / LoneStar wiring for Cab Sensor](#)
- [ProStar / LoneStar wiring for Cab Sensor with Front Axle Load Sensor](#)
- [HPV wiring for Cab Sensor](#)
- [HPV wiring for Cab Sensor with Front Axle Load Sensor](#)
- [TerraStar wiring for Cab Sensor](#)

The Cab Temperature Sensor is typically mounted near the front bumper or on the cooling package. If the sensor cannot be found verify the wiring to the gauge cluster is present or that the outside air temp monitor feature as ordered on the truck.

OTHER RESOURCES

- [2006-2009 Cummins Ambient Air Temperature Sensor Location](#)
- [2006-2009 Cummins Active Fault 249 / 256 Ambient Air Temperature Sensor 1 Circuit](#)

WARRANTY CODING/SRT

08 - AIR TEMPERATURE DISPLAY SENSOR, REPLACE			
Hours	Code	Model	Engine
0.5	A08-3240	Models, ALL	

Claims for this procedure should be coded to warranty

12000	160	Sender, Ambient Temperature
08960	784	Thermometer, Electronic

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