| | | | |
|---|---|---|---|
| Countries: | CANADA, COLOMBIA, UNITED STATES, MEXICO, PUERTO RICO | Document ID: | IK0800284 |
| Availability: | ISIS, FleetISIS | Revision: | 8 |
| Major System: | ELECTRICAL SYSTEM | Created: | 5/16/2011 |
| Current Language: | English | Last Modified: | 4/15/2014 |
| Other Languages: | Français, Español, | Author: | Chris Moody |
| Viewed: | 3650 | | |

Less Info

Hide Details Coding Information

| Copy Link | Copy Relative Link | Bookmark | Add to Favorites | Print | Provide Feedback | Helpful | Not Helpful |
|---|---|---|---|---|---|---|---|
| | | View My Bookmarks | | | | 100 | 37 |

**Title: Ambient Air Temperature (AAT) Sensor Faults/Location/Diagnostics**

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

## CONTENT MENU

*Click on the items below to jump to each section:*

ENGINE DIAGNOSTIC TROUBLE CODES

SENSOR LOCATION

ENGINE CIRCUIT DIAGRAM

CAB AMBIENT TEMPERATURE SENSOR

AAT SENSOR TEMP VS. RESISTANCE CHART

CLUSTER CIRCUIT DIAGRAMS

OTHER RESOURCES

WARRANTY CODING/SRT

## 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, it 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 (*Figure 1 and Figure 2*).

Figure 1

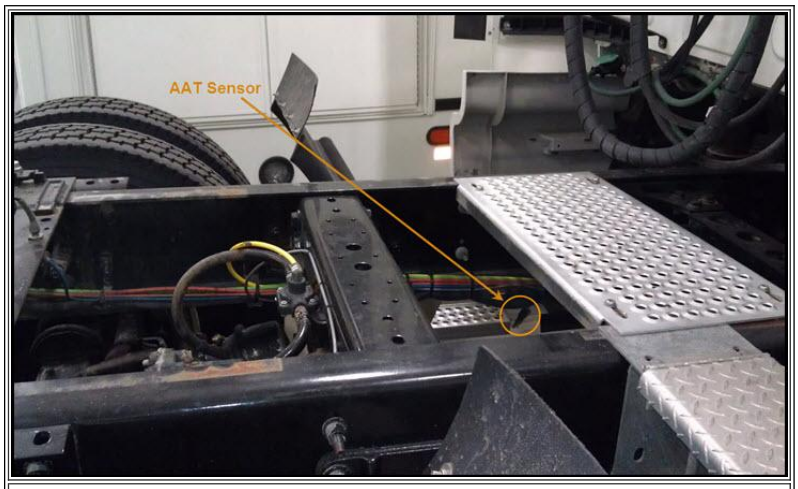


Figure 2

**Post August 2013 build w/SCR engine, driver's side mirror head** (*Figure 3*):

Figure 3

**ISX and N13 Alternate Location** (*Figure 4*):

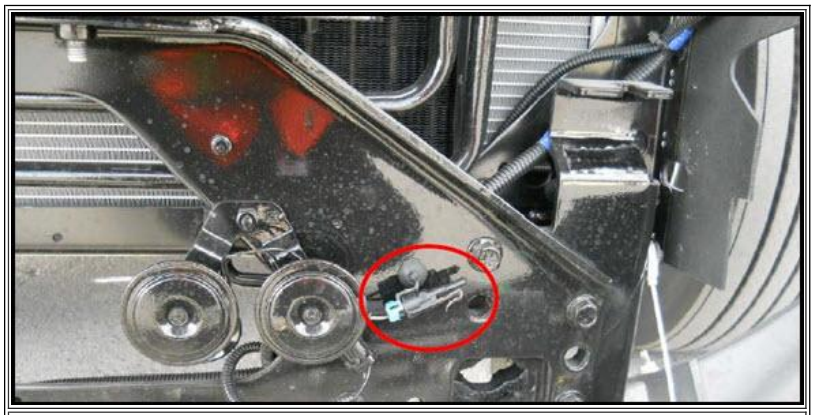

Figure 4

## ENGINE CIRCUIT DIAGRAM

**Pre SCR engine or SCR Pre August 2013 build date** (*Figure 5*):

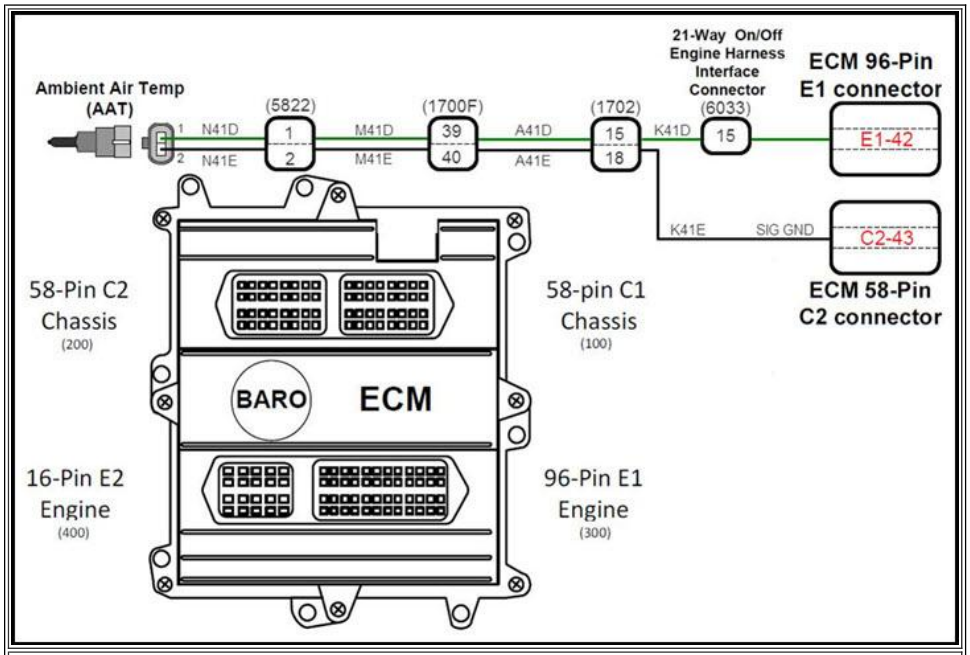


Figure 5

Click HERE for the Wiring Schematic for the W/SCR and post August 2013 build date(N13/ISX)

## 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 |

**Figure 6**

## 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

- IK0800369 - 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 | |

**NOTE:** Claims for this procedure should be coded to: Warranty.

| | | |
|---|---|---|
| 12000 | 160 | Sender, Ambient Temperature |
| 08960 | 784 | Thermometer, Electronic |

---

Return to the Content Menu

Hide Details

Feedback Information

Viewed: 3649
Helpful: 100
Not Helpful: 37

| Staff ID | Client ID | Comments | Created Date |
|---|---|---|---|
| | DYYNJZ1 | You received the following feedback From: dyynjz1 - Nick Zogelman Email Address: nick@williamsservice.com Job Classification: SE003, Service Manager Dealer: WILLIAMS SERVICE Feedback: WHAT IS NEW ABOUT THIS ARTICLE | 4/15/2014 11:24:39 AM |

---

Copyright © 2014 Navistar, Inc.