SB-10049579-7351

iKNow
Knowledge Base

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Availability:	ISIS
Major System:	COOLING
Current Language:	English
Other Languages:	NONE
Viewed:	638

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Title: **Horton Stratis Fan Hub Diagnostics**

Applies To: **Prostar, LoneStar, TranStar, WorkStar, IBB**

DESCRIPTION

Horton VMaster Ultra (Stratis) Viscous Fan Drive Troubleshooting Guide
Engine feature code 12THX

GENERAL OPERATION (ALL ENGINES)

- Horton VMaster is a variable speed drive. It does not function like an on/off drive. Even when the drive is off the fan will spin between 50-300 rpm.
- When drive is commanded off by ECU, fan speed should be 50 to 300 rpm.
- When drive is commanded on by ECU, fan speed should be approximately 125% of the engine speed.
    - Example: At 2100 engine rpm x 1.25 fan drive ratio, the fully engaged fan speed should be approximately between 2490 and 2600 rpm
- After first start of the day (A/C in off position) Time for fan to disengage
    - At high idle (2100 engine rpm), disengagement may take up to 2 minutes after disengagement command, depending on the ambient temperature
    - At low idle (600 engine rpm), disengagement occurs approximately 25 to 30 minutes after disengagement command.
- Warm truck (A/C in off position) Time for fan to disengage
    - At high idle (2100 engine rpm), disengagement occurs approximately 20 seconds after disengagement command.
    - At low idle (600 engine rpm), disengagement occurs approximately 25 to 30 minutes after disengagement command.
- Caution: This fan clutch has left hand threads.

N13 and EPA10 MaxxForce 11 / 13

TROUBLESHOOTING

1. Visual Inspection
    - Check for rubbing on wire.


    -
        - If rubbing is present and inside wires are visible, but no copper is visible apply heat shrink over the harness.
        - If copper can be seen, check to see if it is only one single wire, or multiple wires.
            - If it is one wire, place electrical tape over the wire.
            - Using 4:1 heat shrink will allow the heat shrink tubing to pass over the connector as shown. P/N: ZBJE849565 or equivalent
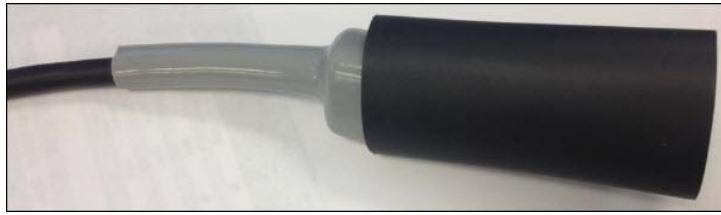
- If multiple wires are showing copper, remove and replace the fan hub assembly.
  - Reroute the wiring harness at outlined in IK0900071
- Check to see if ARB is touching the target wheel. Refer to Picture 1 and Picture 2.
  - If it is touching, reposition ARB to clear the target wheel as shown in Picture 1.
- Check to see if the target wheel is loose, moves, or spins freely.
  - If it is loose, moves, or spins freely replace the fan hub assembly.
- An improperly positioned ARB or loose target wheel can cause the damage in Picture 4.
- Pull / Push on fan - refer to Picture 5.
  - Rotating the fan by hand, the hub should provide a smooth and consistent resistance.
  - If it rotates freely approximately 1" or more before resistance is felt, replace the fan hub assembly.
  - If you have any questions on this process, call Horton customer service at 1 (800) 621-1320 for assistance.

Picture 5

Direction to rotate fan

Pull / Push in this area

Horton ILD (In Line Device)
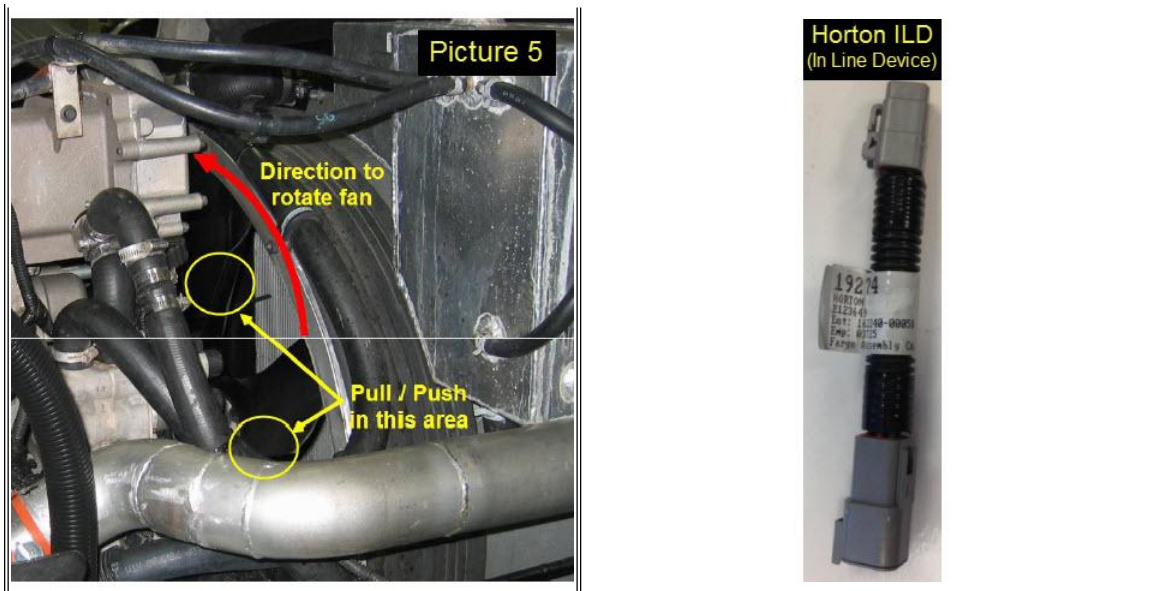
2. Electrical Inspection
   - Ensure the truck is turned off and the key is removed from the ignition.
   - Unplug the fan hub from the chassis connector.
   - Using a digital multimeter, measure the resistance between pins on the fan hub Deutsch connector.
     - Terminal 1 to Terminal 2 (1-2) Spec (>1MΩ)
       - If it fails this test, use In Line Device (ILD) shown in photo. This failure is usually associated with a 3512 code.
     - Terminal 1 to Terminal 3 (1-3) Spec (6Ω to 16Ω)
     - Terminal 2 to Terminal 5 (2-5) Spec (2.5KΩ to 4KΩ)
       - If it fails this test, replace the fan hub assembly.
     - Double check any resistance that are out of spec to ensure an accurate reading

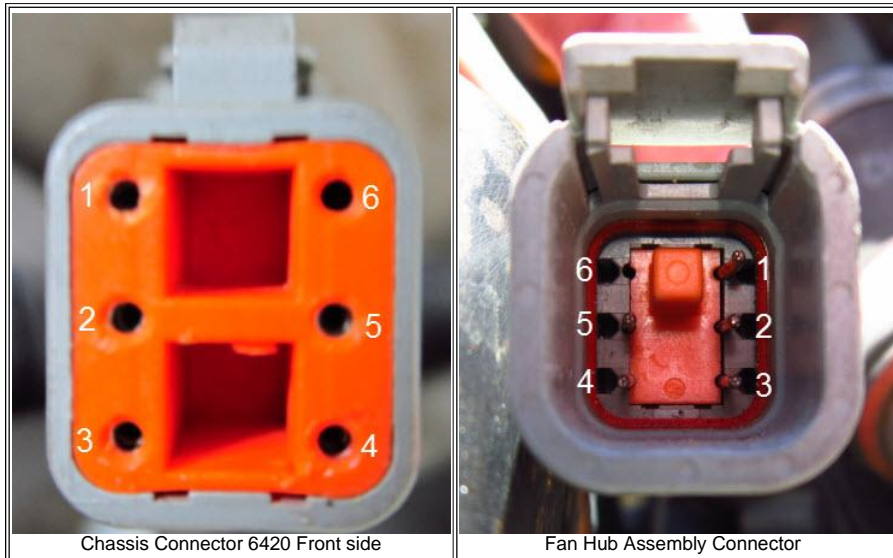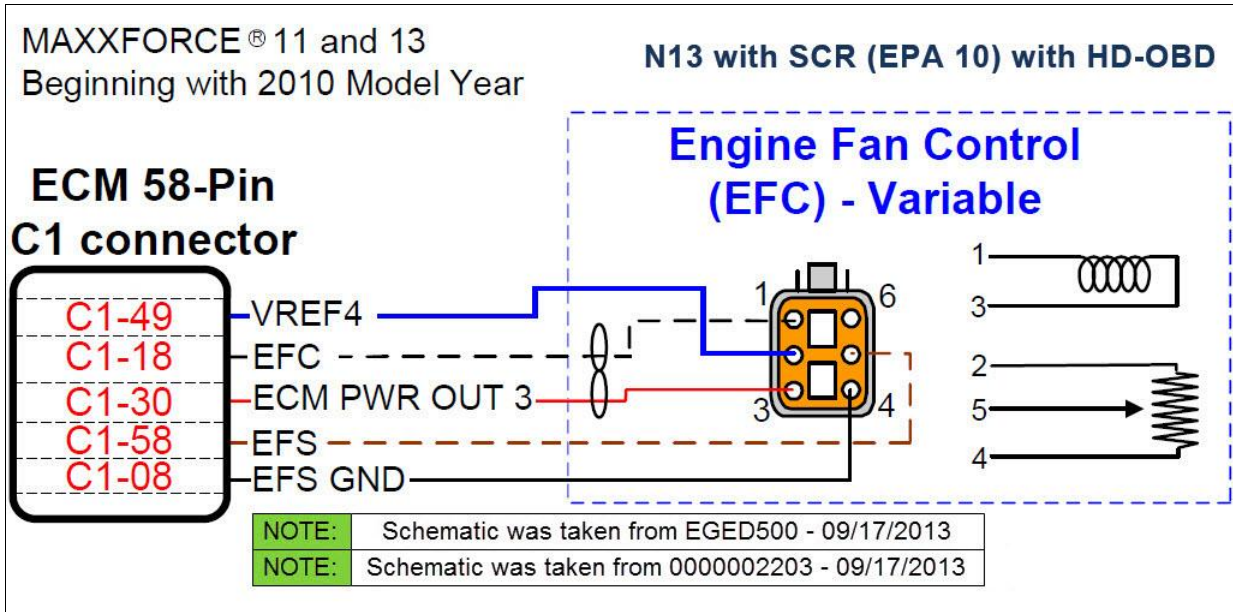| SPN	FMI	DESCRIPTION	REPAIR PROCEDURE
647	3	EFC Short to PWR	Check coil resistance.
	4	EFC Short to GND	Spec: 6Ω to 16Ω
	5	EFC Open Load / Circuit	Replace fan hub assembly if out of spec. EPA10 only.
1639	3	EFS Unrealistically HIGH	Do not replace the fan hub assembly.
	4	EFS Unrealistically LOW	Update ECM calibration to 3.5.4 or later.
	8	EFS Frequency Signal Error	
3512	14	VREF4 Voltage Deviation ECM Terminals: C1-37, C1-43, C1-49, C2-08, E1-58, E1-91	Install Horton ILD (In Line Device) P/N 800922R91 Replace fan hub assembly if both codes 3512 and 647 are present. EPA10 only.

3. Functional Test
   - Manually apply 12 volts to Pin 3 and Ground to Pin 1, checking fan operation. It should be disengaged. Some surging may be normal depending on the temperature of the fan hub.
   - Bring engine to operating temperature. 175°F-180°F.
   - Connect with ServiceMaxx and perform "Engine Fan Test".
   - The entire test (5 test points) must be recorded and submitted with the warranty claim.
   - If the visual, electrical and functional tests all check OK, the fan hub is not the cause of the customer complaint. Do NOT replace the fan hub.
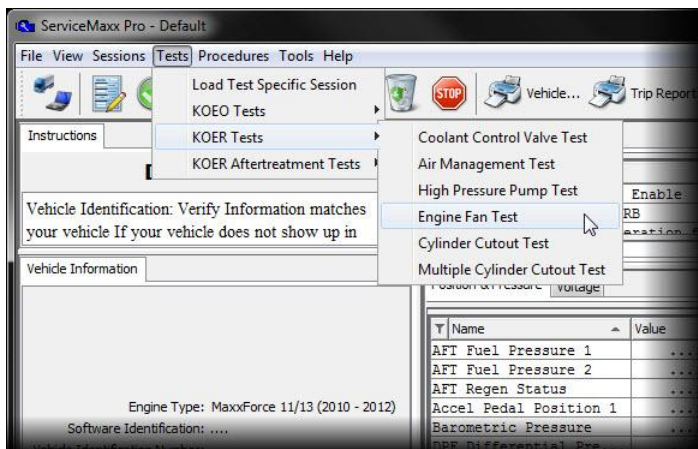
OPERATION

- The default state of the fan is ON. Ground is required to turn the fan OFF.
- ECM C1-18 controls the fan by supplying a Ground PWM signal.
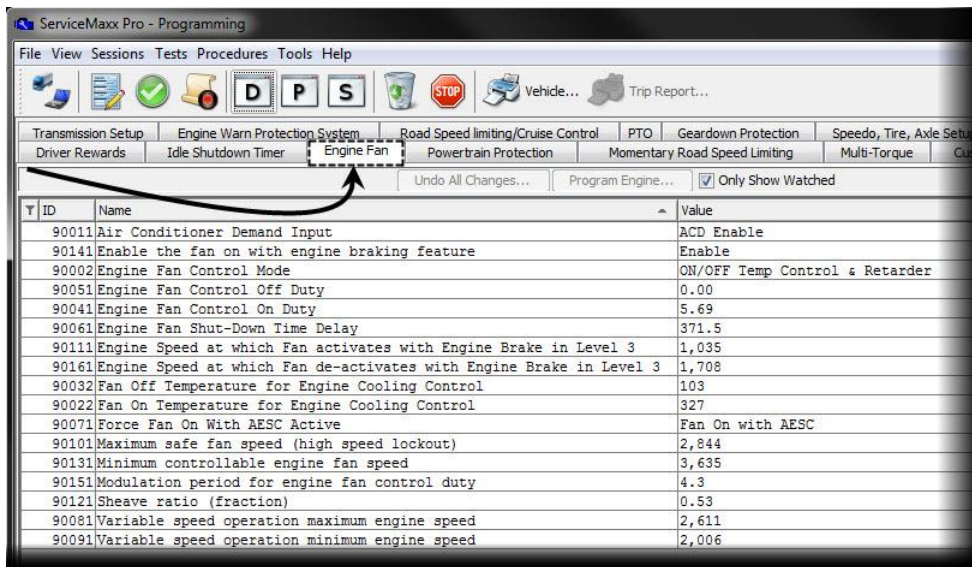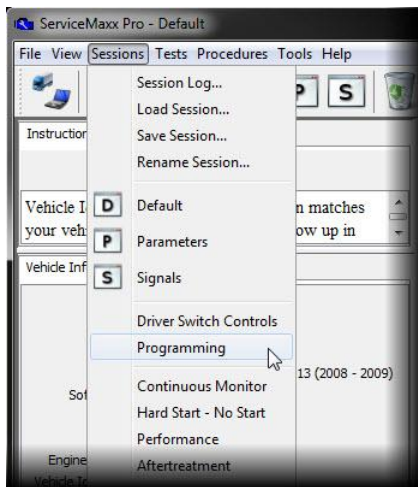- ECM C1-58 is feedback for the fan speed.

MAXXFORCE ® 11 and 13
Beginning with 2010 Model Year

N13 with SCR (EPA 10) with HD-OBD

ECM 58-Pin
C1 connector

**Engine Fan Control
(EFC) - Variable**

C1-49 —VREF4
C1-18 —EFC
C1-30 —ECM PWR OUT 3
C1-58 —EFS
C1-08 —EFS GND

NOTE: Schematic was taken from EGED500 - 09/17/2013
NOTE: Schematic was taken from 0000002203 - 09/17/2013

Chassis Connector 6420 Front side

Fan Hub Assembly Connector

EPA07 MaxxForce 11 / 13

This fan hub is controlled by the EIM using a Pulse Width Modulated (PWM) control. 100% duty cycle indicates the fan is off. The lower the duty cycle the faster the fan operates.

- Desired Fan Speed and Actual Fan Speed may not always match due to the fan speed to engine ratio and normal viscous delays.
- The fan hub may seem to surge or operate erratically. This may be normal operation.
- The fan may be commanded on for a data link message from other modules, such as A/C demand or Transmission temperature.
- Any engine temperature sensor input to the ECM can cause the EIM to turn the fan on.

TROUBLESHOOTING

- Perform the visual inspection on the harness as shown in the section above.
- The "Engine Fan Test" is not available for the EPA07 engine.
- Measure resistance from Terminal 1 to Terminal 3 (1-3) Spec (6Ω to 16Ω)
- Manually apply 12 volts to Pin 3 and Ground to Pin 1, checking fan operation. It should be disengaged. Some surging may be normal depending on the temperature of the fan hub.
- Open a Programming session in ServiceMaxx and view the Engine Fan tab to monitor signals.

OPERATION

- The default state of the fan is ON. B+ is needed to turn the fan OFF.
- EIM X1-18 controls the fan by supplying a B+ PWM signal.
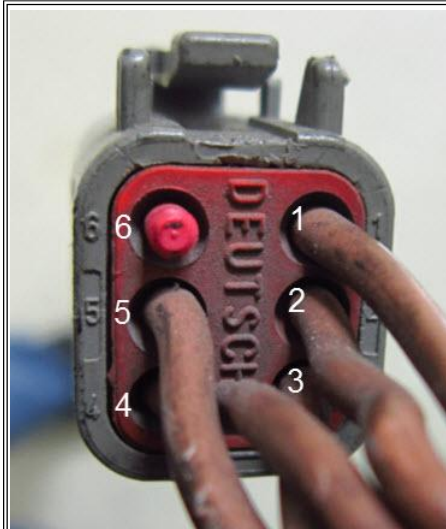- EIM X2-2 is feedback for the fan speed.

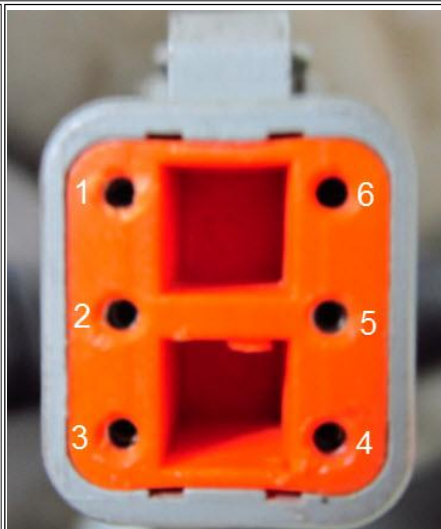International® MAXXFORCE® 11 and 13
2008 Model Year

EIM Connector X1-X4

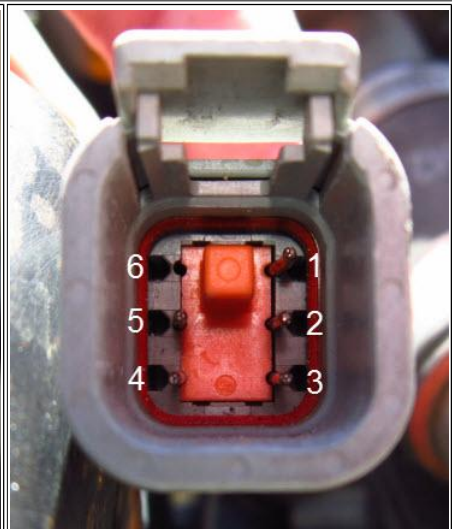|	
X1-14	VREF
X1-18	EFAN
X2-2	EFANS
X1-6	SIG GND

Variable Electronic Fan Control

Horton Fan

NOTE: Schematic was taken from EGED430 - 09/17/2013

EPA07 Chassis Connector 6420 Backside

EPA07 Chassis Connector 6420 Front side

Fan Hub Assembly Connector

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