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Viewed:	8420		

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Title: Air Conditioning Mechanical Pressures Diagnostics

Applies To: TerraStar and TranStar

CHANGE LOG

Dealers: Please refer to the change log text box below for recent changes to this article:

05/04/2017 - Corrected Coding
5/15/2015 - Added a link to the PDF for the HVAC System Pressure Test Chart
12/9/2014 - Formatted article to template standard.
11/06/2014 - Added New SRT, and adjusted format.
10/28/2014 - Author updated for feedback purposes.

DESCRIPTION

This document is supplemental to IK1900228 and addresses Refrigerant Issues. The following procedures will guide the user through diagnostics of refrigerant issues.

SYMPTOM(s)

Incorrect gauge readings are detected during Static Pressure test or the Performance test.

Possible Causes:

Incorrect Static Pressures

Incorrect Performance Test Gauge Readings

Diagnostic Trouble Code(s) & Dashboard Indicator Light(s):

DTC/Light	Description
Not Applicable	Not Applicable

Customer Observations or Concerns: Not Applicable

SPECIAL TOOL(s) / SOFTWARE

Tool Description	Tool Number	Comments	Instructions
Not Applicable	Not Applicable	Not Applicable	Not Applicable

SERVICE PARTS INFORMATION

Kit Description	Part Number		Notes

		Quantity Required	
Not Applicable	Not Applicable	Not Applicable	Not Applicable

Air Conditioning Electrical Diagnostic Steps

NOTE:
Body controller will not engage the clutch when A/C related DTCs are active. The following procedures are ONLY VALID if the A/C system is fully charged and the A/C system checks in IK1900228were performed.

NOTE:
When a failed circuit or component is detected, repair as needed and retest for original problem.

Step	Action	Decision
1	**Static Gauge Readings:** A. Compare static gauge readings taken in IK1900228 to Pressure Temperature Relationship chart at the end of this document. **Note:** If gauges are 10 psi higher than the chart values, system contains air or some non-condensable gas. If gauges are 10 psi lower than the table listings, system is undercharged. Are the static readings correct for the ambient temperature?	**Yes:** Go to step 2. **No:** readings are low: Go to step 3 **No:** Readings are high: Go step-4.

Step	Action	Decision
2	**Performance Test Gauge Readings:**	**Yes:** If static and performance test pressure i correct, return to IK190022 and retest system.

	A. Compare gauge readings taken during the performance test performed in **IK1900228** to the appropriate HVAC System Pressure Test Chart. Are the High Side and Low Side pressures correct?	**No:** both Low-Side and Hig Side pressures are lower th normal Go to step 5. **No:** system has lower Low-Side and higher High-Side pressures: Go to step 7. **No:** system has extremely low Low-Side normal to low High-Side pressures: Go to step 10. **No:** system has higher Low Side and slightly low to norı High-Side pressures: Go to step 14. **No:** both Low-Side and Hig Side pressures are higher than normal: Go to step 17. **No:** system has higher Low Side and normal to slightly higher High-Side pressures Go to step 21.

Step	Action	Decision
3	**Leak Detection:** A. Perform Leak Detection as outlined in 2010 HVAC Manual 02221. B. Repair the A/C system as needed based on leak detection results. Click the following link to check for system damage: TSI–12-16-04R1	After inspection and any required repairs go to step

Step	Action	Decision
4	**Refrigerant Identification** A. Identify Refrigerant as outlined in 2010 HVAC Manual 02221. **CAUTION:** In the event that contaminated or unfamiliar refrigerant is detected: Recovery of contaminated refrigerant can damage recovery equipment. It is recommended to have a dedicated recovery machine when contaminated refrigerant is suspected.	Recover contaminated refrigerant, and tl go to step 24. .

Step	Action	Decision
5	**Both Low-Side and High-Side pressures are lower than normal - Compressor Rotation:** A. Use a clutch wrench to rotate the clutch in a CW direction. Verify clutch turns compressor when engaged. **Warning:**When turning the compressor by hand, only turn the unit clockwise. Is compressor seized?	**Yes:** Replace compressor. Click the following link to check for system damage: TSI–12-16-04R1 After repa are complete, go to step 24. **No:** Go to step 6.

Step	Action	Decision
6	**Charge Quantity Measurement** A. Use a recovery station to recover the refrigerant from the system and record the quantity of refrigerant recovered. B. Compare recovered quantity to charge specifications. Was the charge quantity correct +/- 4 oz?	**Yes:** Replace the compressor. **Step C:** Leak test system a repair as needed and then go to step 24

Step	Action	Decision

7	A. Start engine. B. Set controls for NORM A/C operation. C. Inspect compressor -to- condenser line, condenser, condenser-to- filter/drier line, and filter drier body for frost or a cold spot that indicates a restriction NOTE:This symptom would only occur on sleeper vehicles if the restriction occurs in the section of High-Side line common to both front and rear A/C systems Is the restriction located?	**Yes:** Repair restriction as needed and then go to step 24. **No:** Go to step 8.

Step	Action	Decision
8	**Cooling Fan Operation:** A. Check the operation of the engine cooling fan, and the fan drive. Are the fan, fan shroud, and the fan drive working properly?	**Yes:** Got to step 9. **No:** Repair fan, shroud, ar drive as needed and then to step 24.

Step	Action	Decision
9	**Pressure Transducer Check:** A. Start engine B. Turn the A/C Control to Max, Fan On, and Temp control to coldest setting. C. Use DLB to monitor A/C_High_Side_Pressure signal. D. Use the A/C charging station gauges to monitor high-side pressure. E. When the gauge pressure is stable, record the gauge value and the DLB signal value. F. Compare the DLB value in PSI to the high-side gauge reading. Does the HVAC _High_Side_Pressure value converted to PSI match the gauge within +/- 10 psi?	**Yes:** There is moisture or too much oil system. Repair as need and the go to s **No:** Repair as needed (Se Pressure Transducer Diagnostics in IK1900223 and then go to step 24.

Step	Action	Decision
10	**Hose/Line Visual Inspection:** A. Perform visual inspection of hose/line between evaporator housing and the Low-Side side of the compressor. **NOTE:**On sleeper vehicles this symptom would occur only if the hose/line damage (restriction) occurs in the section of Low-Side line common to both front and rear A/C systems. Is the hose/line damaged?	**Yes:** Repair as needed and then go to 24. **No:** Go to Step 11

Step	Action	Decision
11	**Low refrigerant charge:** A. Visually inspect all joints and seals in the air conditioning system. Look for joints and seals that are dirty. B. Clean area around dirty seal or joint and then starting with the dirty joints and seals use leak detection tool to test for leaks. Was a leak located?	**Yes:** Repair leak and then go to step 2 **No:** Go to step 12.

Step	Action	Decision
12	**Verify Charge Quantity** **A. Use a recovery station to recover the refrigerant from the system and record the quantity of refrigerant recovered. Compare recovered quantity to charge specifications.** **Was the charge quantity low?**	**Yes:** Go to step 13. **No:** Evacuate system unti pressure measure 1000 microns or less. If this valu cannot be reached, refer t LEAK DETECTION. Go to step-24.

Step	Action	Decision
13	**Expansion Valve Debris/Moisture:**	**Yes:** After flushing is complete go to st

	A. Remove expansion valve. Check for debris in inlet port. **NOTE:**On sleeper vehicles this symptom would only occur if BOTH expansion valves are blocked by debris or freeze up from moisture. Is there debris in the system?	**No:** Evacuate system unti pressure measure 1000 microns or less. After prop evacuation is reached, go step 24.

Step	Action	Decision
14	**Expansion Valve Check** A. Start engine and turn A/C to NORM, highest fan speed, and coldest temperature. B. After 5 minutes of operation, feel the expansion valve. Is the expansion valve extremely cold?	**Yes:** Go to step 15. **No:** Replace compressor. Check for debris and then flush system if necessary. Replace expansion valve then go to step 24.

Step	Action	Decision
15	**Expansion Valve Debris** A. Remove the expansion valve and check for debris at the inlet port. Are there traces of aluminum or desiccant particles?	**Yes:** Go to step 16. **No:** Obtain replacement compressor, but do not in until completing step 16.

Step	Action	Decision
16	**Debris in system** A. Click the following link to check for system damage: **A/C system flush tool**	After inspection and any required repa to step 24.

Step	Action	Decision
17	**Added Air Flow** A. Operate a large fan in front of the condenser and recheck readings. **NOTE:** These readings may indicate normal operation for a stationary vehicle. Are readings normal with the fan blowing in front of the condenser?	**Yes:** Readings are normal. Return to IK1900228 and continue Performance with fan. **No:** Remove the large fan then go to step-18.

Step	Action	Decision
18	A. Review static pressure recorded in IK1900228. **Note:** If static pressure were not measured, see Static Pressure in IK1900228 for test conditions. Was static pressure correct? **Static pressure**	**Yes:** Go to step 19. **No:** If static pressure is not correct, go to step 1 of this procedure.

Step	Action	Decision
19	**Cooling Module Inspection** Is air flow restricted? A. Inspect Radiator, CAC, and A/C Condenser, for debris between the components and clogged fins.	**Yes:** Go to step 20. **No:** Go to step 21.

Step	Action	Decision
		Yes: Go to step 24.

20	B. Start engine and turn A/C to NORM, highest fan speed, and coldest temperature. After 5 minutes of operation use temperature probe to measure vent temperature. **CAUTION:**To prevent radiator damage, do not hold direct high pressure water or air close to the radiator fins. Is system performance correct? **Radiator Exterior Back-Flush** A. Use a pressure washer on the fan side of the system to back flush the debris out the front of the cooling module.	**No:** Check engine fan, fa shroud, and fan clutch operation. Repair as nee and then go to step 24.

Step	Action	Decision
21	**Cab Air Leak** A. Check for exterior air leaks into the cab. Are there exterior air leak?	**Yes:** Repair cab fresh-air leaks as req and then go to step 24. **No:** Go to step 22.

Step	Action	Decision
22	**Heater Shut Off Valves** A. Verify heater shut off valve is closed (If equipped). Is heater valve closed?	**Yes:** Go to step 23. **Yes:** Close valve and retest.

Step	Action	Decision
23	**Blend Door Calibration** Recalibrate the front interior actuator / door position by performing the following steps: A. Turn the ignition switch to the ON position. B. Set Blower Fan Speed Control to any speed (1 - 7). C. Set Mode Control to Defrost.	**Yes:** Go to step 23. **No:** Go to step 10 of **HVAC Control I Issues (IK1900226)**

	D. Remove fuse panel cover, and remove the HVAC 5 Amp fuse (fuse position F1-B) for battery to HVAC Control head. **NOTE**: Do not operate the HVAC control panel controls during the recalibration. E. Wait approximately 30 seconds, and reinstall the fuse. F. Listen for the sound of actuators moving the Mode, Blend, and Fresh / Recirculate doors through their full range of motion. G. Start the vehicle, and check for correct operation of all HVAC modes and temperature. Did recalibration fix the issue?	

Step	Action	Decision
24	**Assemble and Test:** After problem is detected and repaired, perform A/C recovery, system flush if required, oil calculations, pressure test, evacuation, and recharge to return system to working condition. Verify system works correctly and operator concern is corrected	Return vehicle to customer.

WARRANTY INFORMATION

NOTE: There are multiple noun groups that the diagnostic time could be charged to.

WARRANTY CLAIM CODING:

Group:	**19000 -Truck Air Conditioner**
Noun:	**Multiple Nouns - Code to repair made**

Warranty Coding Manual

STANDARD REPAIR TIMES:

19 - AIR CONDITIONING SYSTEM INSPECTION/PERFORMANCE DIAGNOSTICS

Hours	Code	Model	Engine
Varies by model	A/C MECHANICAL PRESSURES DIAGNOSIS (EXCEPT 5000, 9000 SERIES), PERFORM	All	All

Link to the Standard Repair Time Manual: Click Here

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