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Title: Air Conditioning Diagnostics

Applies To: Post 2010 NGV

CHANGE LOG

10/28/2014 - Author updated for feedback purposes
10/1/2014 - Updated with new IKnow likns.
9/8/2014 - Updated SRT, special tools and coding.
8/05/2014 - Initial Article Release.

DESCRIPTION

This document addresses A/C issues on the following 2010 to 2014 vehicles with a BCM:

The following procedures will guide the user through common failure areas, diagnostic tools, SRTs, and warranty filing.

SYMPTOMS:

No cold air, not cold enough, or no air flow though vents.

Diagnostic Trouble Codes:

SPN	FMI	DESCRIPTION
2609	16	A/C High Pressure Protection
1079	1	5 volt sensor supply below normal
3985	9	A/C Control Head Circuit Failed To Communicate With Body Controller
1552	2	A/C Control Head Temperature Mix DM1
3981	2	A/C Control Head Mode Fault DM1
3984	2	A/C Control Head Air Inlet DM1
2058	9	Rear A/C Data Link Communication Failure
2058	14	Rear A/C Data Link Communication Failure
3982	2	A/C Rear Blower Speed Control Switch Error
3983	2	

		Rear A/C Temperature Control Switch Error
520465	2	A/C Control Head Multiple Motor Faults

Customer Observations or Concerns:

- Malfunction Indicator Light (MIL)

- No Cab A/C

- Not blowing cold enough

- No air flow though vents.

- No Rear A/C

- Inoperative MaxxPro No Idle A/C System

SPECIAL TOOLS

Tool Description	Product Number	Comments	Instructions
Robinair A/C Machine or equivalent	**34988**	**Used for Recover, Vacuum, and Performance test A/C system**	

Tools Resource Center

SERVICE PARTS INFORMATION

Please see likes below for parts information as this article covers multiple models.

Parts Catalog
Parts Review

PROCEDURE OVERVIEW

Note:Do not start engine until steps 2-4 have been completed. If the engine has been run recently, allow the vehicle to sit for one hour to allow system pressures to stabilize.

Before starting to diagnose the problem, it is important to consider the following:

- Are there A/C related AFC's open?
- Was the vehicle recently in for an A/C repair in which the system was not properly filled or serviced?
- Have there been recent A/C repairs and a fault code not cleared?

If the A/C issue is known (blown off hose, visible dye, inoperative blower motor) go directly to the respective steps or iKNow articles listed below. Otherwise, go to step 1.

- IK1900226 A/C Control Head Issues
- IK1900225 A/C Mechanical Pressures diagnostics
- IK1900223 A/C Sensor/ Electronic Issues
- IK1900198 12V-No Idle HVAC Unit
- IK1900227 Rear A/C Electrical and Mechanical Diagostics

DIAGNOSTIC STEPS

1	Customer Interview	Decision
Review the Repair Order to determine the following: • What is the A/C System doing specifically? (No cold air, not cold enough, no air flow at vent, or no defrost? • When does the concern occur? Vehicle stationary, when idling overnight, or going down the road?		Yes, cab A/C works correctly but rear A/C does not: Go to step 7. Yes, concern is with MaxxPro No-Idle HVAC unit: Go to IK1900198 No: Go to step 2.

• Is the problem intermittent, or happen consistently? • Have you had the vehicle serviced recently? When and where? Was there an A/C related service performed during that service? • Does issue concern the passenger compartment, the sleeper, or both? • If equipped with a No-Idle system does the issue only happen when utilizing the No-Idle System? Is the problem confined to the rear A/C system while the Cab A/C works correctly? Is the problem confined to the operation or performance of the MaxxPro No Idle system?	

2	Preliminary checks	Decision
Note: Do not start engine until steps 2-4 have been completed. If the engine has been run recently, allow the vehicle to sit for one hour to allow system pressures to stabilize. Perform a visual check of the A/C system to verify that no obvious problems are present. With the engine off, inspect the following items: • Compressor and clutch mounting • Compressor clutch coil wiring and connection • Compressor drive belt and belt tensioner • A/C hoses and connections • Condenser mounting • Condenser fins (blockage by debris) • Receiver-drier mounting • Expansion valve mounting • Filter element • Fresh air module drains • Fresh air module mounting and overall condition • Electrical connections to pressure transducer and low pressure switch • Electrical connections to actuators for airflow doors (recirculate, temperature, and mode doors) • Fan speeds and mode door operation Were any issues found?		Yes: Repair as necessary. Restore system to operational condition and operate the A/C system to determine if the complaint was corrected. No: Go to step 3.

3	Diagnostic Trouble Codes	Decision
Check for A/C related DTC's: Are any A/C related DTC's found?		Yes: Go to FAULT CODES in IK1900207 No: Go to step 4.

4	Static Pressure	Decision
NOTE:		Yes: Go to step 5.

Have the engine OFF and A/C system at ambient temperature when measuring static pressure.If the engine has been run recently, allow the vehicle to sit for a minimum of one hour to allow system pressures and temperatures to stabilize. 1. Inspect high and low side Schrader valves for presence of dye and pooling of oil in valve. 2. Connect gauges to the A/C system and record static pressure readings. 3. Use a temperature probe to determine the ambient temperature within 1 or 2 degrees. Record the measured temperature. 4. Locate the ambient temperature on the chart below and compare the vehicle's static pressure to the chart pressure.	No: Go to Air Conditioning Mechanical Pressures Diagnostics **IK1900225**

Temp °F	Temp °C	R134A PSIG
40 °F	4.4 °C	35
45 °F	7.2 °C	40
50 °F	10.0 °C	45
55 °F	12.8 °C	51
60 °F	15.6 °C	57
65 °F	18.3 °C	64
70 °F	21.1 °C	71
75 °F	23.9 °C	78
80 °F	26.6 °C	86
85 °F	29.4 °C	95
90 °F	32.2 °C	104
95 °F	35.0 °C	113
100 °F	37.7 °C	124
105 °F	40.5 °C	134
110 °F	43.3 °C	146

Are the A/C pressures in spec?

5 Compressor Engagement	Decision
Start engine. Turn the A/C on. Verify compressor engagement. Does the compressor engage?	Yes: Go to step 6. No: Go to Air Conditioning Electrical Diagnostics **IK1900223**

6 Performance Test	Decision
Check the System Performance by performing the following steps: A. Park the vehicle so there is no solar loading and no wind. B. Position a thermometer approximately 30 to 60 cm (12-24 inches) in front of the vehicle grille. C. Engage the engine cooling fan (unless viscous fan drive). D. Close the hood, being careful not to damage the equipment. E. Insert a thermometer into the passenger side, left instrument panel vent. Do not allow the thermometer to touch the sides of the duct. Insert a second thermometer into the lower passenger bunk vent F. Start the engine and raise the idle speed to 1500 rpm. G. Open windows and close both cab doors. H. Set the mode control to: Max A/C; Highest blower speed; Coldest cooling temperature. I. Operate the system for five minutes, or until gauge readings settle.	Yes: System is operating correctly. Discuss concern with customer. No, gauge readings are out of specification: Go to Air Conditioning Mechanical Pressures Diagnostics **IK1900225** No, gauge readings are correct but cab vent temperature is out of specification: Go to Air Conditioning Control Head Diagnostics **IK1900226** No, cab A/C works correctly but rear A/C does not: Go to step 7.

J. Record the following data:

Test Point	Value
Ambient Air Temperature	
Relative Humidity	
Cab Air duct Temp	
Low-Side psi @ 1500 RPM	
Compressor on (cut-in PSI)	
Compressor off (cut-out PSI)	
High-Side psi @ 1500 RPM	
Compressor on (cut-in PSI)	
Compressor off (cut-out PSI)	
Lower Passenger bunk vent temp	

K. Compare gauge readings, vent temperature, ambient temperature, and humidity to the appropriate HVAC System Pressure Test Chart below.

Does the Cab and rear HVAC operate correctly?

7	**Rear A/C Test**	**Decision**
	A. Start engine and raise engine speed to 1500 RPM. B. Turn cab A/C switch to NORM C. Turn cab blower switch to highest speed. D. Turn cab temperature switch to coldest position. E. Shut both cab doors and open both windows. F. Use the dash SLPR-FAN switch to vary rear blower speed from lowest to highest speed. G. Use the dash SLPR-TEMP switch to vary sleeper temperature from warmest setting to the coldest setting. H. Use the Rear HVAC Control panel blower switch to raise and lower rear blower speed. I. Use the Rear HVAC Control panel TEMP switch to raise and lower the duct air Temperature. J. Review rear duct temperature recorded in step-6 Do the dash SLPR-FAN and SLPR-TEMP switches control the rear A/C? Do the rear control panel blower speed and temperature switches control the rear A/C? Does the stabilized rear duct temperature from step-6 meet specifications (See appropriate 2010 HVAC SYSTEM PRESSURE TEST CHART)?	Yes, rear HVAC system operates correctly No, Rear A/C does not function: Go to Rear Air Conditioning Electrical and Mechanical Diagnostics **IK1900227** No, rear control panel TEMP and FAN switches are inoperative while SLPR-TEMP and SLPR-FAN switches function: *Go to Rear A/C Control Panel Inoperative* ***IK1900231*** No, one or both SLPR TEMP and SLPR FAN switches are inoperative but rear control panel TEMP and FAN switches functions correctly: Go to Sleeper Fan and Sleeper TEMP Switch Inoperative **IK1900232** No, Front and rear controls function correctly, but rear A/C blows warm air: Go to Rear A/C Blows

WARRANTY INFORMATION

Standard Repair Time(s):

19 - AIR CONDITIONING SYSTEM INSPECTION/PERFORMANCE DIAGNOSTICS

Hours	Code	Model	Engine
1.0	A19-7006A	All	All

Add-on If Required

Hours	Code	Model	Engine
0.3	A19-7006A-1 With Sleeper Cab	All	All
0.2	A19-7006A-2 Perform Extended Refrigerant Leak Test	All	All
0.2	A19-7006A-3 Perform Freon Compressor Test	All	All

SRT Manual

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