Countries:	AUSTRALIA, BAHAMAS, BOLIVIA, BRAZIL, BELIZE, CANADA, CHILE, COLOMBIA, COSTA RICA, DOMINICAN REPUBLIC, ECUADOR, EL SALVADOR, TRINIDAD AND TOBAGO, UNITED STATES, URUGUAY, VENEZUELA, MEXICO, ARUBA, NICARAGUA, PERU, PUERTO RICO, Curaçao, GUATEMALA, GUYANA, HAITI, HONDURAS, JAMAICA, NEW ZEALAND, PANAMA	**Document ID:**	IK1900228
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Viewed:	7176		

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Title: 2010 and Newer Vehicle Air Conditioning Diagnostics (Start Here)

Applies To: Post 2010 NGV

CHANGE LOG

6/30/2015 - Changed formatting of tables in Diagnostic section to fit on one page when printed.
6/24/2015 - Changed all occurences of reference to IK1900198 to reference IK1900235 instead.
05/26/2015 - Fixed link on step 6 to properly route viewer to IK1900226
5/15/2105 - Fixed link to S16046 Manual and added link to PDF for the HVAC System Pressure Test Chart.
4/9/2015 - Added SPN 2609 to symptom table

DESCRIPTION

This document addresses Air Conditioning issues on the following 2010 to 2014 vehicles with a BCM.

The following procedures will guide the user through : Common Air Conditioning failure areas, diagnostic tools, SRTs, and warranty filing.

Note: For anything Pre-2010, reference the Pre-2010 A/C HVAC Resource Center located IK1900156.

SYMPTOM

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

SPN	FMI	Description
2609	16	A/C High Pressure Protection
2609	15	Low Charge 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 air conditioning
- "Warm" A/C
- No air flow through vents
- No rear A/C
- Inoperative MaxxPro no-idle A/C system

SPECIAL TOOLS / SOFTWARE

Tool Description	Tool Number	Comments	Instructions
Robinair Air Conditioning Machine or equivalent	34988	A/C recovery, vac, and performance test	

SERVICE PARTS INFORMATION

Due to variety of configurations, reference the parts catalog for vehicle being repaired.

Parts Catalog

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 so system pressures can stabilize.

Consider the following before beginning:

- Are any Air Conditioning related AFC's open?
- Was the vehicle recently in for an Air Conditioning repair, in which the system was not properly filled or serviced?
- Were A/C repairs made recently, and fault codes not cleared properly?

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**

- IK1900235 No-Idle HVAC Operational Check - STARTING POINT
- IK1900227 Rear A/C Electrical and Mechanical Diagnostics

DIAGNOSTIC STEPS

Step	Action	Decision
1	**Customer Interview:** Review the Repair Order to determine the following: • What is the Air Conditioning 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? • 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?	**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 IK1900235 **No:** to step 2.

Step	Action	Decision
2	**Preliminary checks:** **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	**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.

	• 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?	

Step	Action	Decision
3	**Diagnostic Trouble Codes:** 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.

Step	Action	Decision
4	**Static Pressure:** **NOTE:** 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.	**Yes:** Go to step 5. **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?

Step	Action	Decision
5	**Compressor Engagement:** 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

Step	Action	Decision
6	**Performance Test:** 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: NORM A/C; Highest blower speed; Coldest cooling temperature. I. Operate the system for five minutes, or until gauge readings settle. 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.	**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

	Does the Cab and rear HVAC operate correctly?	

Step	Action	Decision
7	**Rear A/C Test:** 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 Warm Air **IK1900231**

WARRANTY INFORMATION:

Standard Repair Times: Due to the variety of vehicle confirgurations and number of components affected, reference the SRT Manual (quick links below) for repair times.

Description

A/C SYSTEM PRELIMINARY DIAGNOSIS (EXCEPT 5000, 9000 SERIES), PERFORM
A/C MECHANICAL PRESSURES DIAGNOSIS (EXCEPT 5000, 9000 SERIES), PERFORM
A/C ELECTRICAL DIAGNOSIS (EXCEPT 5000, 9000 SERIES) , PERFORM
A/C CONTROL HEAD DIAGNOSIS
A/C REAR UNIT ELECTRICAL AND MECHANICAL DIAGNOSIS (EXCEPT 5000,9000 SERIES), PERFORM

SRT Manual

Other Resources:

Document Number	Description
S16046	HEAT VENTILATION AIR CONDITIONING (HVAC) FOR 2010 - 3200 Bus, DuraStar®, TerraStar™, TranStar®, WorkStar® Models
0000002221	HEAT VENTILATION AIR CONDITIONING (HVAC) FOR 2010 ProStar and LoneStar Models (Formerly S16047)
IK1900207	**2010 and Later ProStar and LoneStar HVAC Information**
IK1900022	A/C Refrigerant and Oil Capacities

air conditioning air conditioning

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