SECTION HAC

HEATER & AIR CONDITIONING CONTROL SYSTEM

CONTENTS

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000014392073

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper repair, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery or batteries, and wait at least three minutes before performing any service.**

Working with HFC-134a (R-134a)

INFOID:0000000014392074

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed compressor failure is likely to occur. Refer to HA-17, "Description". To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant Identifier.**
- **Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor failure is likely to occur.**
- **The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.**
- **Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.**
- **Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.**

CONTAMINATED REFRIGERANT

If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.

- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended.
- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact NISSAN Customer Affairs for further assistance.

Precaution for Service Equipment

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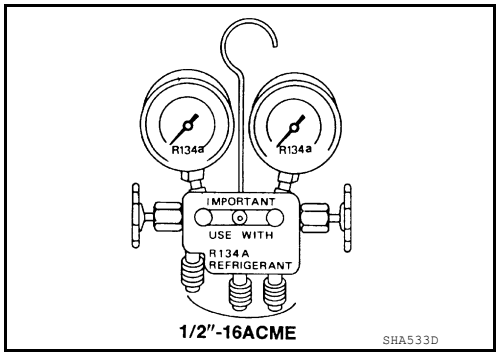
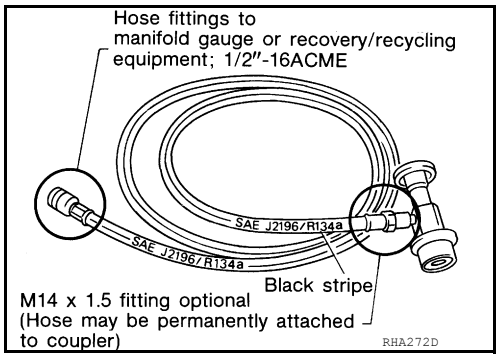
MANIFOLD GAUGE SET

Be certain that the gauge face indicates R-134a or 134a. Make sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) along with specified oil.



SERVICE HOSES

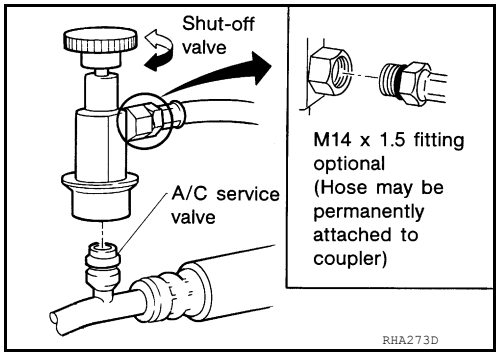
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



Precaution for Work

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- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.

- If a part is specified as a non-reusable part, always replace it with a new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components:

- Water soluble dirt:
- Dip a soft cloth into lukewarm water, wring the water out of the cloth and wipe the dirty area.
- Then rub with a soft, dry cloth.

- Oily dirt:
- Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%) and wipe the dirty area.
- Then dip a cloth into fresh water, wring the water out of the cloth and wipe the detergent off.
- Then rub with a soft, dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

PREPARATION

PREPARATION

Special Service Tool

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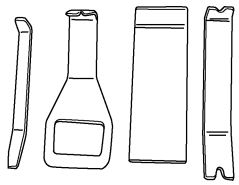
The actual shape of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name	Description
— (J-46534) Trim Tool Set  AWJIA0483ZZ	Removing trim components

Commercial Service Tool

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Tool name	Description
Power tool  PIIB1407E	Loosening nuts, screws and bolts

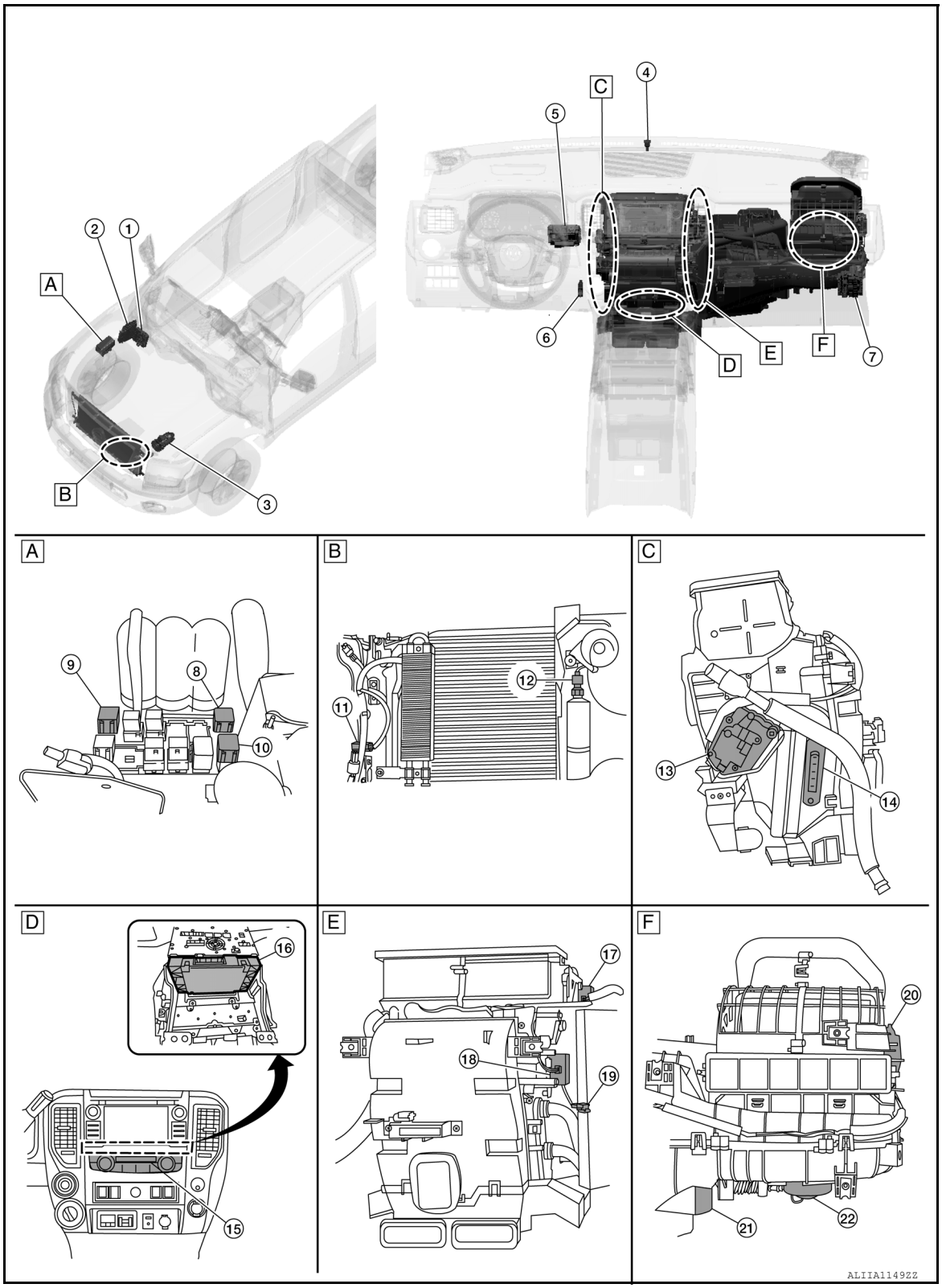
SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000014392079

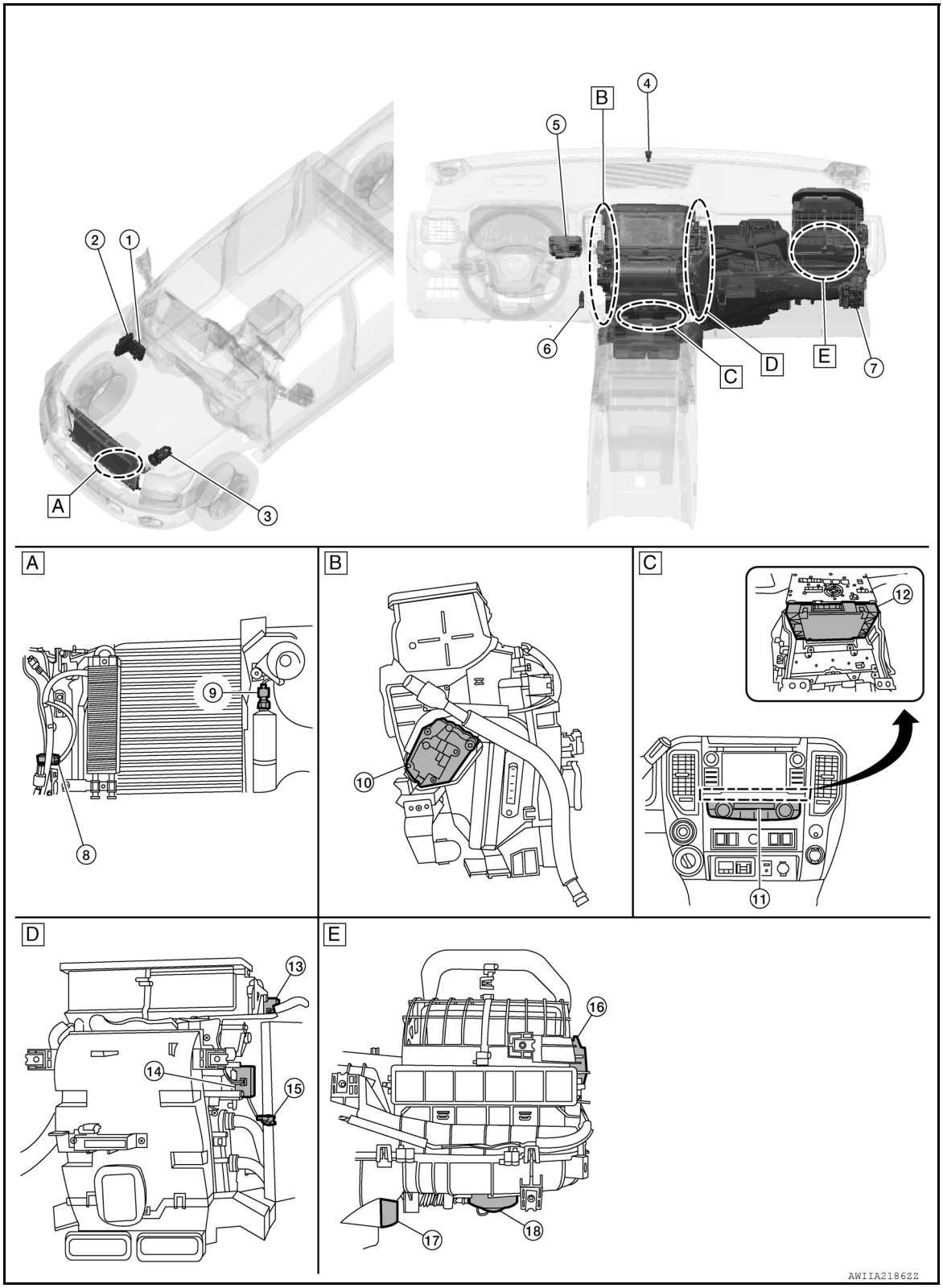
CUMMINS 5.0L



A. Relay box
B. View with grille removed
C. Behind LH center of instrument panel (view with A/C assembly removed from vehicle)
D. Center of instrument panel
E. Behind RH center of instrument panel (view with A/C assembly removed from vehicle)
F. Behind RH side of instrument panel (view with A/C assembly removed from vehicle)

No.	Component	Description
1.	IPDM E/R	• A/C relay is integrated into IPDM E/R. IPDM E/R operates A/C relay when A/C compressor request signal is received from ECM via CAN communication line. • Refer to PCS-5, "Component Parts Location" for detailed installation location.
2.	ECM	• The ECM sends an A/C compressor ON request to the IPDM E/R based on the status of engine operation and load as well as refrigerant pressure information. If all the conditions are met for A/C operation, the ECM transmits the A/C compressor ON request to the IPDM E/R. The ECM shares the refrigerant pressure sensor signal, engine RPM, and engine coolant temperature with the A/C auto amp. via CAN communication line. • Refer to EC-736, "Component Parts Location" for detailed installation location.
3.	A/C compressor	Refer to HAC-14, "A/C Compressor".
4.	Sunload sensor	Refer to HAC-16, "Sunload Sensor".
5.	BCM	• BCM transmits blower motor ON signal to the front blower motor relay. • Refer to BCS-5, "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.
6.	In-vehicle sensor	Refer to HAC-16, "In-vehicle Sensor".
7.	Fuse block (J/B) (Front blower motor relay)	• Located in the passenger compartment behind the instrument panel RH, the fuse block (J/B) contains the front blower motor relay and several fuses required for the air conditioner control system. • The front blower motor relay controls the flow of current to fuse 17 and 27 in the fuse block (J/B). The relay is connected directly to ground and is controlled by the BCM.
8.	PTC relay-2	Refer to HAC-15, "PTC Heater (Cummins 5.0L)".
9.	PTC relay-3	Refer to HAC-15, "PTC Heater (Cummins 5.0L)".
10.	PTC relay-1	Refer to HAC-15, "PTC Heater (Cummins 5.0L)".
11.	Ambient sensor	Refer to HAC-15, "Ambient Sensor".
12.	Refrigerant pressure sensor	Refer to HAC-16, "Refrigerant Pressure Sensor".
13.	Air mix door motor LH	Refer to HAC-13, "Air Mix Door Motor LH".
14.	PTC heater	Refer to HAC-15, "PTC Heater (Cummins 5.0L)".
15.	A/C switch assembly	A/C control operation signal is transmitted from the A/C switch assembly to the A/C auto amp.
16.	A/C auto amp.	Refer to HAC-15, "A/C Auto Amp.".
17.	Mode door motor	Refer to HAC-14, "Mode Door Motor".
18.	Air mix door motor RH	Refer to HAC-14, "Air Mix Door Motor RH".
19.	Intake sensor	Refer to HAC-13, "Intake Sensor".
20.	Intake door motor	Refer to HAC-14, "Intake Door Motor".
21.	Variable blower control	Refer to HAC-14, "Variable Blower Control".
22.	Front blower motor	Refer to HAC-14, "Front Blower Motor".

VK56VD



A. View with grille removed

B. Behind LH center of instrument panel (view with A/C assembly removed from vehicle)

C. Center of instrument panel

D. Behind RH center of instrument panel (view with A/C assembly removed from vehicle)

E. Behind RH side of instrument panel (view with A/C assembly removed from vehicle)

No.	Component	Description
1.	IPDM E/R	• A/C relay is integrated into IPDM E/R. IPDM E/R operates A/C relay when A/C compressor request signal is received from ECM via CAN communication line. • Refer to PCS-5, "Component Parts Location" for detailed installation location.
2.	ECM	• The ECM sends an A/C compressor ON request to the IPDM E/R based on the status of engine operation and load as well as refrigerant pressure information. If all the conditions are met for A/C operation, the ECM transmits the A/C compressor ON request to the IPDM E/R. The ECM shares the refrigerant pressure sensor signal, engine RPM, and engine coolant temperature with the A/C auto amp. via CAN communication line. • Refer to EC-736, "Component Parts Location" for detailed installation location.
3.	A/C compressor	Refer to HAC-14, "A/C Compressor".
4.	Sunload sensor	Refer to HAC-16, "Sunload Sensor".
5.	BCM	• BCM transmits blower motor ON signal to the front blower motor relay. • Refer to BCS-5, "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.
6.	In-vehicle sensor	Refer to HAC-16, "In-vehicle Sensor".
7.	Fuse block (J/B) (Front blower motor relay)	• Located in the passenger compartment behind the instrument panel RH, the fuse block (J/B) contains the front blower motor relay and several fuses required for the air conditioner control system. • The front blower motor relay controls the flow of current to fuse 17 and 27 in the fuse block (J/B). The relay is connected directly to ground and is controlled by the BCM.
8.	Ambient sensor	Refer to HAC-15, "Ambient Sensor".
9.	Refrigerant pressure sensor	Refer to HAC-16, "Refrigerant Pressure Sensor".
10.	Air mix door motor LH	Refer to HAC-13, "Air Mix Door Motor LH".
11.	A/C switch assembly	A/C control operation signal is transmitted from the A/C switch assembly to the A/C auto amp.
12.	A/C auto amp.	Refer to HAC-15, "A/C Auto Amp.".
13.	Mode door motor	Refer to HAC-14, "Mode Door Motor".
14.	Air mix door motor RH	Refer to HAC-14, "Air Mix Door Motor RH".
15.	Intake sensor	Refer to HAC-13, "Intake Sensor".
16.	Intake door motor	Refer to HAC-14, "Intake Door Motor".
17.	Variable blower control	Refer to HAC-14, "Variable Blower Control".
18.	Front blower motor	Refer to HAC-14, "Front Blower Motor".

Intake Sensor

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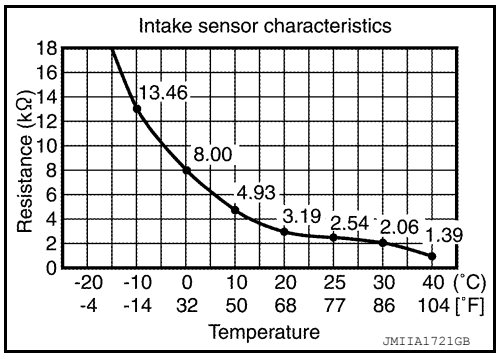
Intake sensor measures evaporator fin temperature. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



Air Mix Door Motor LH

INFOID:0000000014392081

- Air mix door motor LH consists of a motor that drives door, PBR (Potentio Balance Resistor) that detects door position and LCU (Local Control Unit) that performs multiplex communication control (LIN) with A/C auto amp. Refer to HAC-21, "Door Control".
- Rotation of motor is transmitted to air mix door LH by link and lever. Air flow temperature is switched.

Air Mix Door Motor RH

INFOID:0000000014392082

- Air mix door motor RH consists of a motor that drives door, PBR (Potentio Balance Resistor) that detects door position and LCU (Local Control Unit) that performs multiplex communication control (LIN) with A/C auto amp. Refer to HAC-21, "Door Control".
- Rotation of motor is transmitted to air mix door RH by link and lever. Air flow temperature is switched.

Mode Door Motor

INFOID:0000000014392083

- Mode door motor consists of a motor that drives door, PBR (Potentio Balance Resistor) that detects door position and LCU (Local Control Unit) that performs multiplex communication control (LIN) with A/C auto amp. Refer to HAC-21, "Door Control".
- Rotation of motor is transmitted to mode door (ventilator door, foot door, and defroster door) by link and lever. Air outlet is switched.

Intake Door Motor

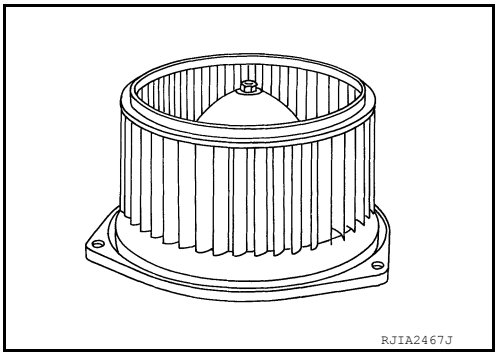
INFOID:0000000014392084

- Intake door motor consists of a motor that drives door, PBR (Potentio Balance Resistor) that detects door position and LCU (Local Control Unit) that performs multiplex communication control (LIN) with A/C auto amp. Refer to HAC-21, "Door Control".
- Rotation of motor is transmitted to intake door by lever. Air inlet is switched.

Front Blower Motor

INFOID:0000000014392085

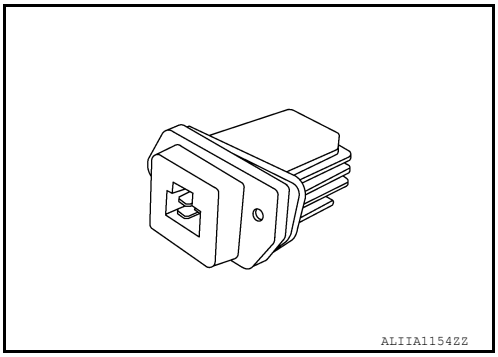
- The blower motor utilizes a brush-less motor with a rotating magnet.
- Quietness is improved over previous motors where the brush was the point of contact and the coil rotated.



Variable Blower Control

INFOID:0000000014392086

The variable blower control controls the speed of the blower motor by controlling the ground circuit of the front blower motor. The A/C auto amp. provides voltage to the gate of the variable blower control based on the position of the blower control dial. The variable blower control is a metal-oxide semiconductor field effect transistor (MOSFET) that varies the ground side current of the front blower motor. By applying a variable voltage to the gate, the variable blower control controls the current flow to ground, thereby controlling the speed of the front blower motor.



A/C Compressor

INFOID:0000000014392087

Vaporized refrigerant is drawn into the A/C compressor from the evaporator where it is compressed to a high-pressure, high-temperature vapor. The hot compressed vapor is then discharged to the condenser.

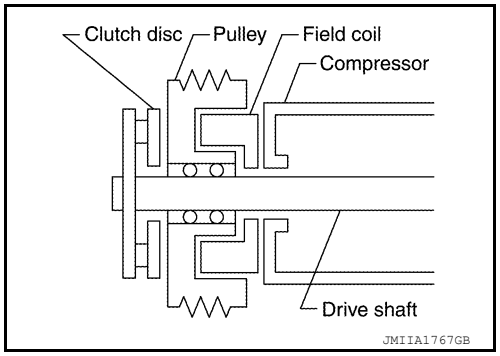
MAGNET CLUTCH

Description

A/C compressor is driven by the magnet clutch which is magnetized by electric power supply.

Structure and Operation

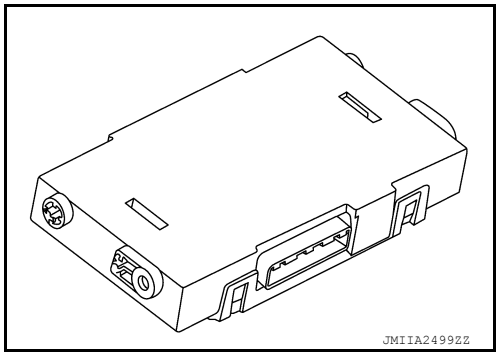
- Magnet clutch consists of pulley, clutch disc, and field coil.
- Pulley is connected with crankshaft pulley of engine via drive belt and is always rotated while engine is running.
- Clutch disc is connected with driveshaft of A/C compressor.
- Field coil, which becomes a strong electric magnet when electricity is supplied, strongly pulls clutch disc and presses it to pulley.
- When A/C relay integrated in IPDM E/R turns ON, electricity is supplied to field coil, clutch disc is presses to pulley, and engine rotational movement is transmitted from crankshaft pulley ⇒ drive belt ⇒ pulley ⇒ clutch disc ⇒ driveshaft. A/C compressor is operated. When A/C relay turns OFF, electricity is not supplied to field coil, and clutch disc is released from pulley. A/C compressor is not operated.



A/C Auto Amp.

INFOID:0000000014392088

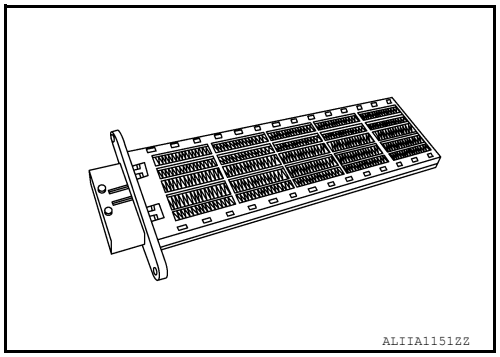
A/C auto amp. controls automatic air conditioning system by inputting and calculating signals from each sensor and each switch.



PTC Heater (Cummins 5.0L)

INFOID:0000000014392090

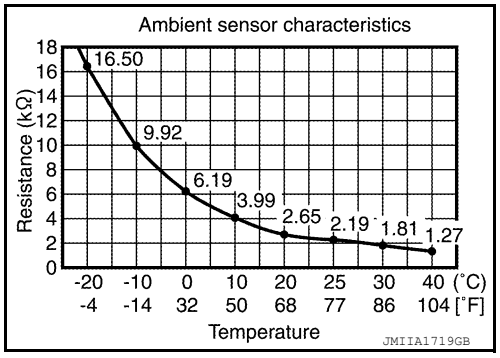
- PTC stands for “Positive Temperature Coefficient” and is a ceramic material with barium titanate as the primary component.
- The positive temperature coefficient (PTC) heater provides supplemental heat by warming the air as it flows through its electrically controlled heating grid.
- The PTC relays control the flow of current to the PTC heater. The PTC relays are controlled by the A/C auto amp.



Ambient Sensor

INFOID:0000000014392091

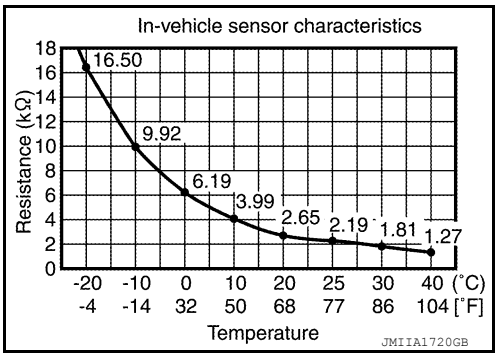
Ambient sensor measures ambient air temperature. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



In-vehicle Sensor

INFOID:0000000014392092

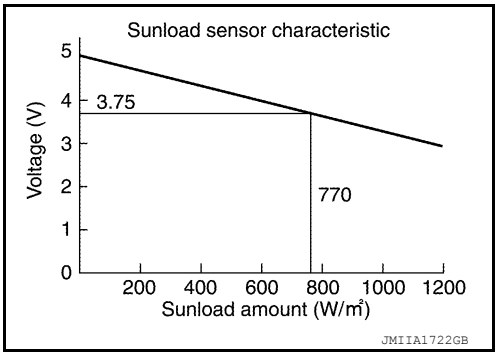
In-vehicle sensor measures temperature of intake air that flows through aspirator to passenger room. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



Sunload Sensor

INFOID:0000000014392093

Sunload sensor measures sunload amount. This sensor converts sunload amount to voltage signal by photodiode and transmits it to A/C auto amp.

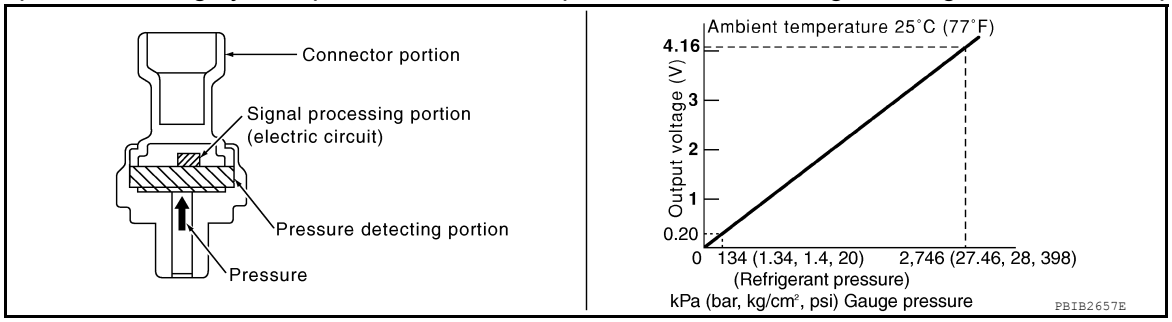


Refrigerant Pressure Sensor

INFOID:0000000014392094

DESCRIPTION

- The refrigerant pressure sensor converts high-pressure side refrigerant pressure into voltage and outputs it to ECM.
- ECM operates cooling system protection and idle speed control according to voltage value that is input.



STRUCTURE AND OPERATION

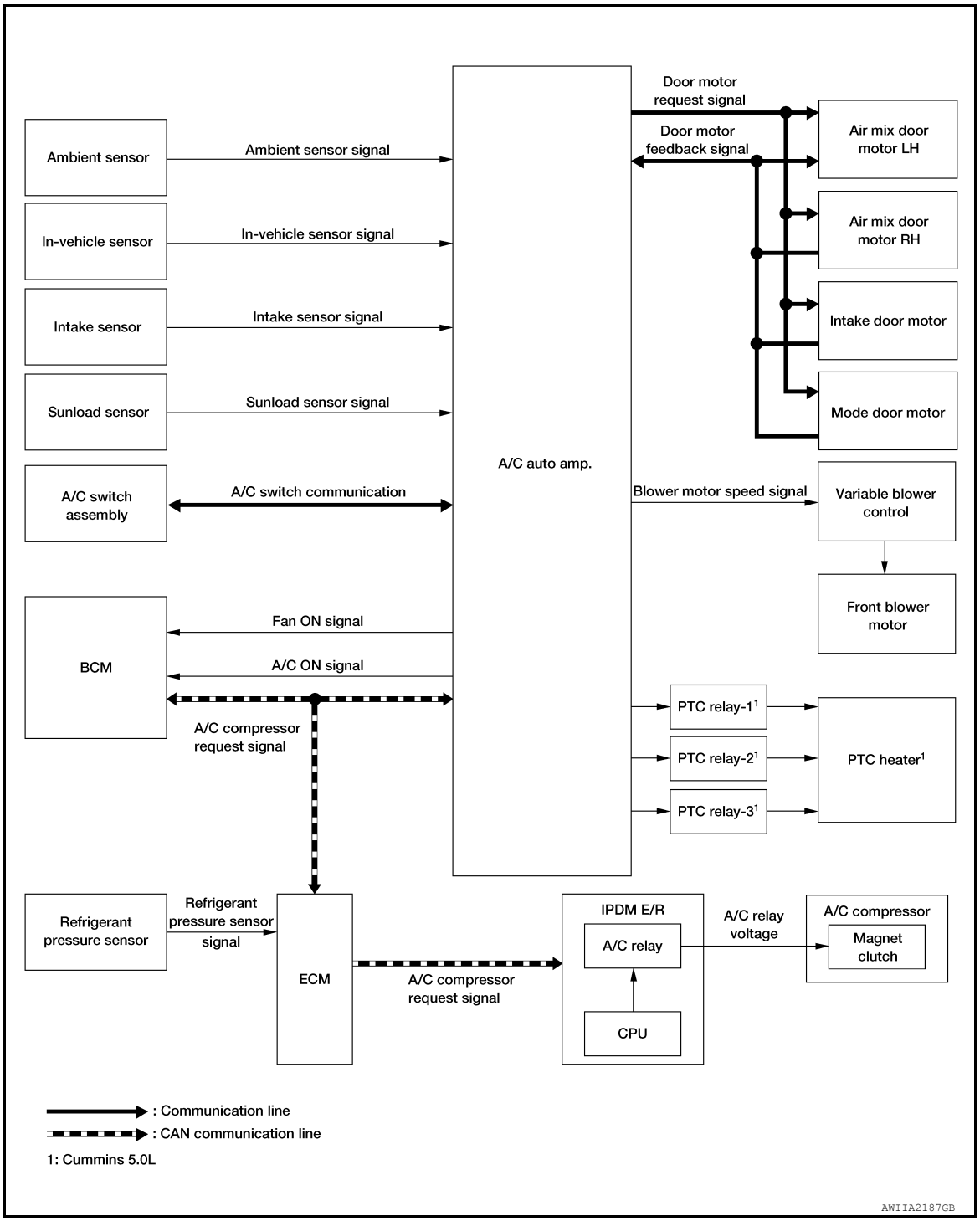
- The refrigerant pressure sensor is a capacitance type sensor. It consists of a pressure detection area and a signal processing area.
- The pressure detection area, which is a variable capacity condenser, changes internal static capacitance according to pressure force.
- The signal processing area detects the static capacitance of the pressure detection area, converts the static capacitance into a voltage value, and transmits the voltage value to ECM.

SYSTEM

System Description

INFOID:0000000014392095

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

- Front automatic air conditioning system is controlled by each function of A/C auto amp., ECM, IPDM E/R and BCM.

Control by A/C auto amp.

- HAC-19, "Air Flow Control"
- HAC-20, "Air Inlet Control"
- HAC-18, "Air Outlet Control"

- HAC-20, "Compressor Control"
- HAC-21, "Door Control"
- HAC-18, "Temperature Control"
- Correction for input value of each sensor

Ambient sensor (setting temperature correction)
- A/C auto amp. controls passenger room temperature so that the optimum level always matches the temperature level that the passenger may feel. Correction is applied to the target temperature that is set using temperature control dial according to ambient temperature detected by ambient sensor.

In-vehicle sensor (in-vehicle temperature correction)
- Passenger room temperature detected by in-vehicle sensor is corrected for each front air conditioning control (driver side and passenger side).

Intake sensor (intake temperature correction)
- A/C auto amp. performs correction to change recognition intake temperature of A/C auto amp. quickly when difference is large between recognition intake temperature and intake temperature detected by intake temperature sensor. The correction is performed to change recognition intake temperature slowly when difference is small.

Sunload sensor (sunload amount correction)
- Sunload amount detected by sunload sensor is corrected for each air conditioning control.
- A/C auto amp. performs correction to change recognition sunload amount of A/C auto amp. slowly when sunload amount changes quickly, for example when entering or exiting a tunnel.

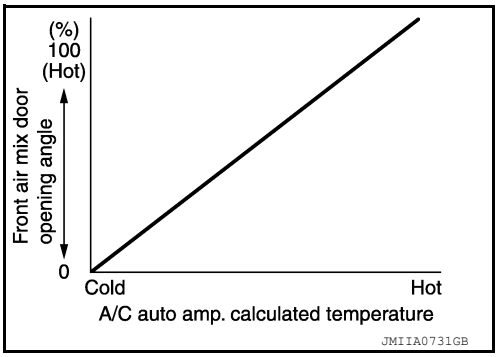
Control by IPDM E/R
- Relay control
  Refer to PCS-6, "RELAY CONTROL SYSTEM : System Description".

Control by BCM
- Relay control
  Refer to BCS-16, "POWER CONSUMPTION CONTROL SYSTEM : System Description".

Temperature Control

INFOID:0000000014392096

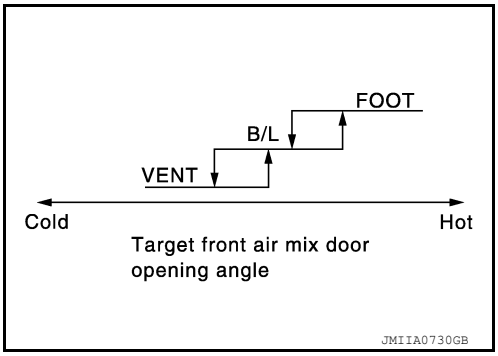
- When ignition switch is in the ON position, A/C auto amp. always automatically controls temperature regardless of front air conditioning operational state.
- A/C auto amp. calculates the target air mix door opening angle depending on set temperature, in-vehicle temperature, ambient temperature, and sunload.
- Air mix door is controlled depending on the comparison of current air mix door opening angle and target air mix door opening angle.
- Regardless of in-vehicle temperature, ambient temperature, and sunload, air mix door is fixed at the fully cold position when set temperature is 18.0°C (60°F) and at the fully hot position when set temperature is 32.0°C (90°F).



Air Outlet Control

INFOID:0000000014392097

- While air outlet is in automatic control, A/C auto amp. selects the mode door position depending on a target air mix door angle and outlet air temperature calculated from sunload.
- If ambient temperature is excessively low, D/F is selected to prevent windshield fogging when air outlet is set to FOOT.



Air Flow Control

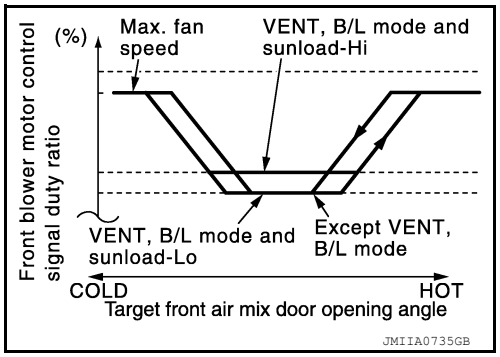
INFOID:0000000014392098

DESCRIPTION

- A/C auto amp. changes duty ratio of blower motor drive signal and controls air flow continuously. When air flow is increased, duty ratio of blower motor control signal gradually increases to prevent a sudden increase in air flow.
- In addition to manual control and automatic control, air flow control consists of starting fan speed control, low coolant temperature starting control, high in-vehicle temperature starting control and fan speed control at door motor operation

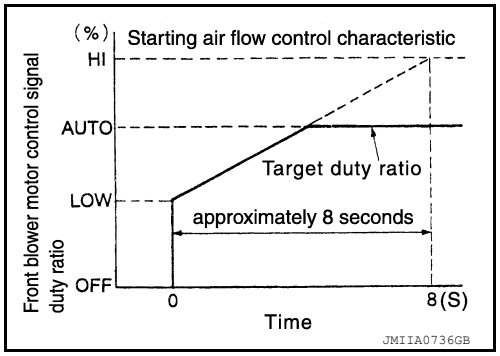
AUTOMATIC AIR FLOW CONTROL

- A/C auto amp. decides target air flow depending on target air mix door opening angle.
- A/C auto amp. changes duty ratio of blower motor control signal and controls the air flow continuously so that air flow matches the target air flow.
- When air outlet is VENT or B/L, the minimum air flow is changed depending on sunload.



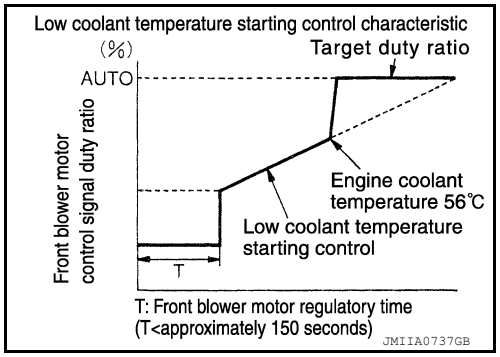
STARTING AIR FLOW CONTROL

- When blower motor is activated, A/C auto amp. gradually increases duty ratio of blower motor control signal to prevent a sudden increase in discharge air flow.
- It takes approximately 8 seconds for air flow to reach HI from LOW.



LOW COOLANT TEMPERATURE STARTING CONTROL

If the engine coolant temperature is 56°C (133°F) or less, to prevent a cold discharged air flow, A/C auto amp. suspends blower motor activation for a maximum of 150 seconds depending on target air mix door opening angle. After this, blower motor control signal is increased gradually, and blower motor is activated.



HIGH IN-VEHICLE TEMPERATURE STARTING CONTROL

When front evaporator fin temperature is high [intake sensor value is 35°C (95°F) or more], to prevent a hot discharged air flow, A/C auto amp. suspends blower motor activation for approximately 3 seconds so that front evaporator is cooled by refrigerant.

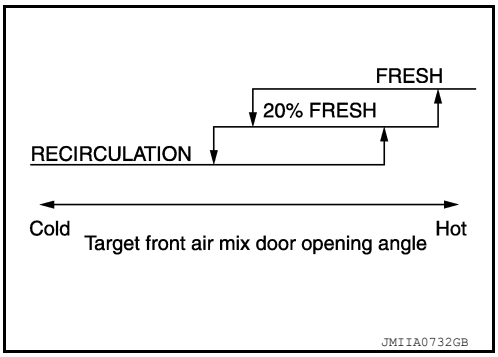
FAN SPEED CONTROL AT DOOR MOTOR OPERATION

When mode door motor is activated while air flow is more than the specified value, A/C auto amp. reduces fan speed temporarily so that mode door moves smoothly.

Air Inlet Control

INFOID:0000000014392099

The intake door is automatically controlled by the temperature setting, ambient temperature, in-vehicle temperature, intake temperature, amount of sunload and ON/OFF operation of the compressor.
Intake door automatic control selects FRE, 20% FRE, or REC depending on a target air mix door opening angle, based on in-vehicle temperature, ambient temperature, and sunload.



Compressor Control

INFOID:0000000014392100

DESCRIPTION

- When the compressor activation condition is satisfied while blower motor is activated, A/C auto amp. transmits A/C ON signal and blower fan ON signal to ECM via CAN communication.
- ECM judges that the compressor can be activated depending on the state of each sensor (refrigerant pressure sensor signal and others) and transmits A/C compressor request signal to IPDM E/R via CAN communication.
- IPDM E/R turns A/C relay ON and activates the compressor depending on request from ECM.

COMPRESSOR PROTECTION CONTROL AT PRESSURE MALFUNCTION

When high-pressure side value that is detected by refrigerant pressure sensor is as per the following state, ECM requests IPDM E/R to turn A/C relay OFF and stops the compressor.

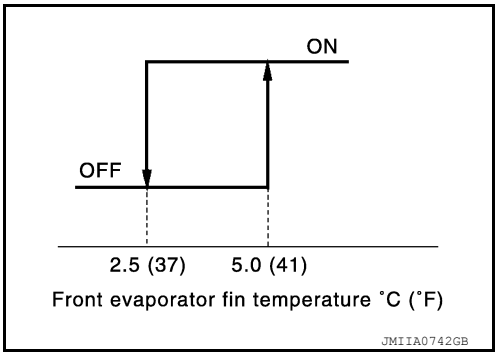
- 3.12 MPa (31.82 kg/cm^2, 452.4 psi) or more (When the engine speed is less than 1,500 rpm)
- 2.74 MPa (27.95 kg/cm^2, 397.3 psi) or more (When the engine speed is 1,500 rpm or more)
- 0.14 MPa (1.43 kg/cm^2, 20.3 psi) or less

COMPRESSOR OIL CIRCULATION CONTROL

When the engine starts while the engine coolant temperature is 56°C (133°F) or less, ECM activates the compressor for approximately 6 seconds and circulates the compressor lubricant once.

LOW TEMPERATURE PROTECTION CONTROL

- When intake sensor detects that front evaporator fin temperature is 2.5°C (37°F) or less, A/C auto amp. requests ECM to turn compressor OFF and stops the compressor.
- When the front evaporator fin temperature returns to 5.0°C (41°F) or more, the compressor is activated.



OPERATING RATE CONTROL

When set temperature is other than fully cold or air outlet is “VENT”, “B/L” or “FOOT” A/C auto amp. controls the compressor activation depending on ambient temperature.

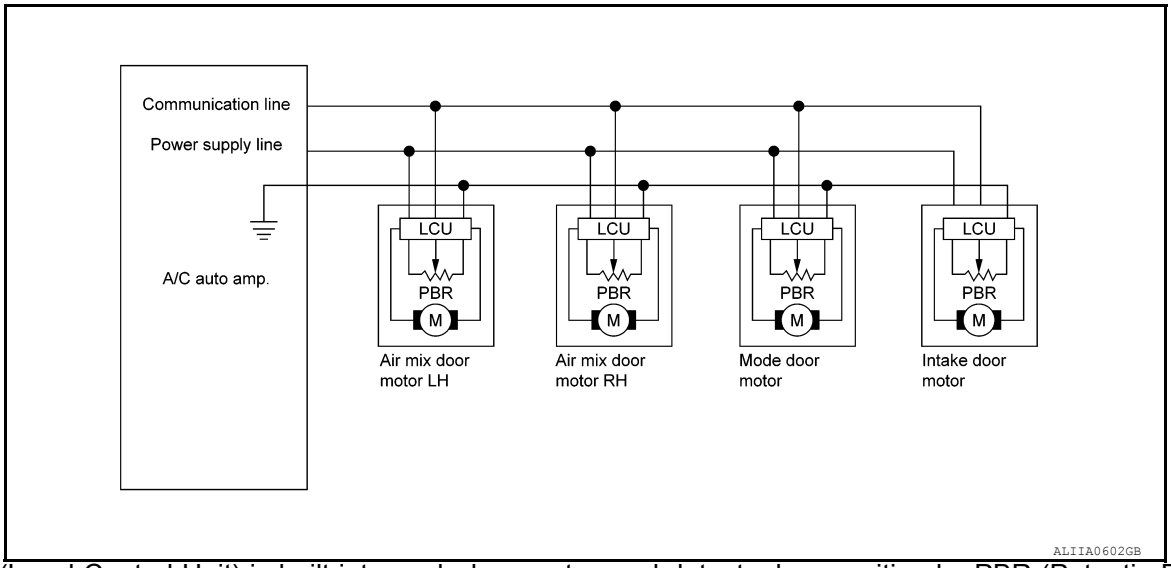
AIR CONDITIONING CUT CONTROL

When the engine is running in excessively high load condition, ECM requests IPDM E/R to turn A/C relay OFF and stops the compressor.

Door Control

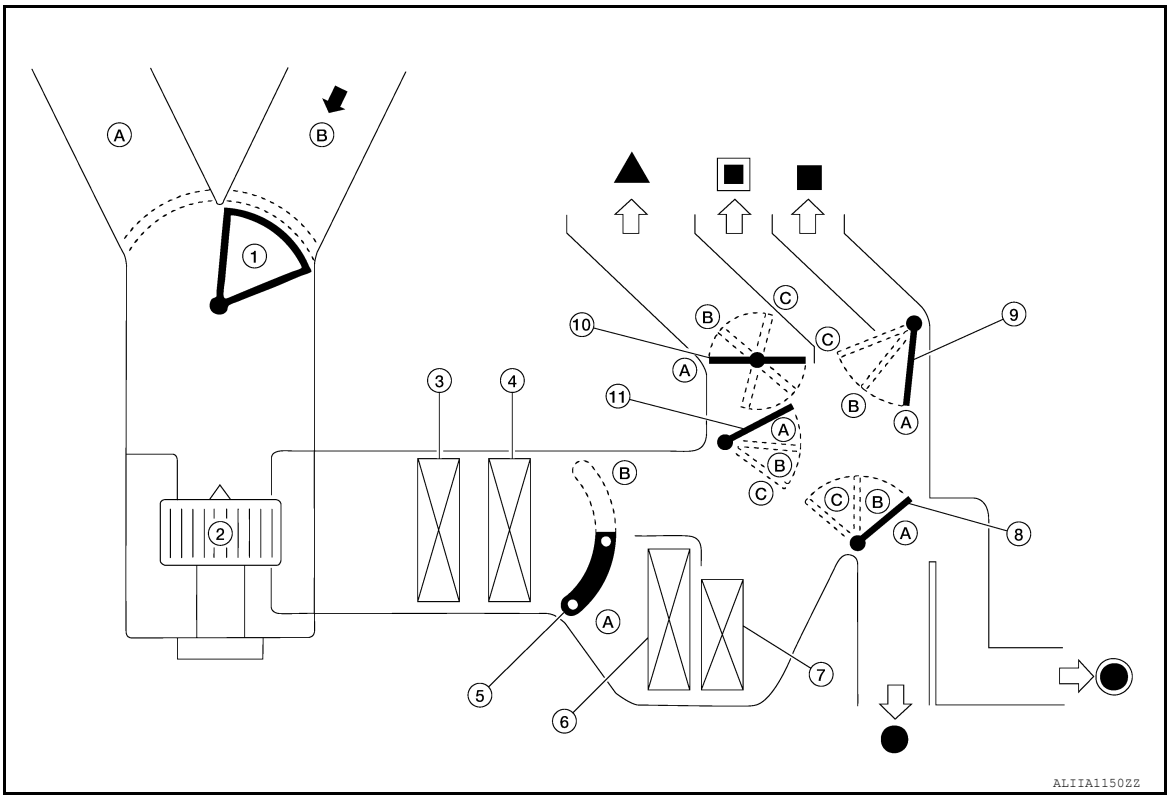
INFOID:0000000014392101

DOOR MOTOR CONTROL



- LCU (Local Control Unit) is built into each door motor, and detects door position by PBR (Potentio Balance Resistor).
- A/C auto amp. communicates with each LCU via communication line and receives each door position feedback signal from each LCU.
- Each LCU controls each door to the appropriate position depending on the control signal from A/C auto amp.
- Each LCU transmits the signal of door movement completion to A/C auto amp., when the door movement is completed.

SWITCHES AND THEIR CONTROL FUNCTION



1. Intake door
2. Blower motor
3. In-cabin microfilter
4. Front evaporator
5. Air mix door
6. Front heater core
7. PTC heater (Cummins 5.0L)
8. Foot door
9. Ventilator door
10. Defroster door
11. Max. cool door

◉ Rear foot
⬅ Recirculation air
⇦ Discharge air
▲ Defroster
■ Center ventilator
▣ Side ventilator
● Front foot

Switch position			Door position						
			Mode door					Air mix door	
			Ventilator door	Max. cool door	Defroster door	Foot door	Intake door	Driver side	Passenger side
AUTO switch			AUTO						
MODE switch			A	A	A	A	—	—	—
			B	B	A	B			
			C	C	B	B			
			C	B	B	B			
DEF switch			C	A	C	C			
Intake switch*							A		
							B		
Temperature control switch (Driver side)	DUAL switch: OFF	Full cold [18°C (60°F)]	—	—	—	—	—	A	—
		18.5°C – 31.5°C (61°F – 89 °F)						AUTO	
		Full hot [32°C (90°F)]						B	
Temperature control switch (Driver side)	DUAL switch: ON	Full cold [18°C (60°F)]						A	
		18.5°C – 31.5°C (61°F – 89 °F)						AUTO	
		Full hot [32°C (90°F)]						B	
Temperature control switch (Passenger side)		Full cold [18°C (60°F)]						—	A
		18.5°C – 31.5°C (61°F – 89 °F)							AUTO
		Full hot [32°C (90°F)]							B
ON·OFF switch	OFF		C	C	B	B	B		—

*: Inlet status is displayed by indicator when activating automatic control.

AIR DISTRIBUTION

VENT MODE ( )					
OUTLET	VENT				
	ASST	CTR		DR	RR
		ASST	DR		
AIR FLOW DISTRIBUTION RATIO (%)	22	22	22	22	12

B/L MODE ( )									
OUTLET	VENT					FOOT			
	ASST	CTR		DR	RR	Fr ASST	Fr DR	Rr ASST	Rr DR
		ASST	DR						
AIR FLOW DISTRIBUTION RATIO (%)	11	11	11	11	16	15	15	5	5

D/F1 MODE ( )											
OUTLET	VENT					FOOT				DEF	
	ASST	CTR		DR	RR	Fr ASST	Fr DR	Rr ASST	Rr DR	Fr	Side
		ASST	DR								
AIR FLOW DISTRIBUTION RATIO (%)	6	—	—	6	16	18	18	7	7	17	5

D/F2 MODE ( )											
OUTLET	VENT					FOOT				DEF	
	ASST	CTR		DR	RR	Fr ASST	Fr DR	Rr ASST	Rr DR	Fr	Side
		ASST	DR								
AIR FLOW DISTRIBUTION RATIO (%)	5	—	—	5	16	15	15	6	6	25	7

DEF MODE ( )											
OUTLET	VENT					FOOT				DEF	
	ASST	CTR		DR	RR	Fr ASST	Fr DR	Rr ASST	Rr DR	Fr	Side
		ASST	DR								
AIR FLOW DISTRIBUTION RATIO (%)	5	—	—	5	14	—	—	—	—	60	16

Fail-safe

INFOID:0000000014392102

FAIL-SAFE FUNCTION

If a communication error exists between the A/C auto amp. and the AV control unit and preset switch for 30 seconds or longer, air conditioning is controlled under the following conditions:

When ambient temperature is less than 3°C (37°F) and engine coolant temperature is less than 56°C (133°F)

Compressor : ON
Air outlet : DEF
Air inlet : FRE (Fresh air intake)

Blower fan speed	**: AUTO**
Set temperature	**: Setting before communication error occurs**

When ambient temperature is 3°C (37°F) or more, or engine coolant temperature is 56°C (133°F) or more

Compressor	**: ON**
Air outlet	**: AUTO**
Air inlet	**: 20% FRE (20% fresh air intake)**
Blower fan speed	**: AUTO**
Set temperature	**: Setting before communication error occurs**

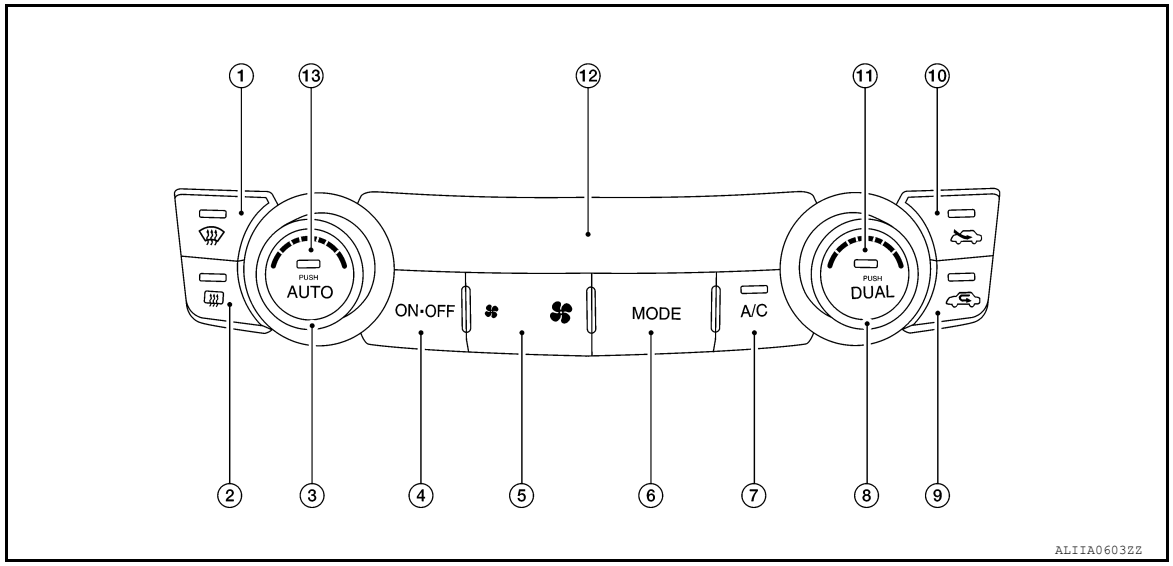
OPERATION

Switch Name and Function

INFOID:0000000014392103

CONTROL OPERATION

A/C Switch Assembly



1. Defroster switch
2. Rear window defogger switch
3. Temperature control dial (driver side)
4. ON/OFF switch
5. Fan control switch
6. MODE switch
7. A/C switch
8. Temperature control dial (passenger side)
9. Recirculation switch
10. Fresh air switch
11. DUAL switch
12. Display
13. AUTO switch

Switch Operation

AUTO switch	Turns the switch indicator lamp and “AUTO” indicator on the display ON, and then front air conditioning system becomes the following state: • Air inlet: Automatic control • Air outlet: Automatic control • Blower fan: Automatic control • Compressor: ON
Defroster switch	Turns defroster mode (switch indicator) between ON ⇔ OFF each time. When defroster switch is pressed while front air conditioning system is in the ON position • When defroster mode is turned ON, front air conditioning system becomes the following state: - Air inlet: Fresh air intake - Air outlet: DEF - Blower fan: Automatic control (If fan speed other than AUTO is selected before pressing defroster switch, fan speed is manual control.) - Compressor: ON • When defroster mode is turned OFF, front air conditioning system state returns to the previous state before defroster mode is selected. But, the following state is continued: - Air inlet: Fresh air intake - Compressor: ON When defroster switch is pressed while front air conditioning system is in the OFF position. • When defroster mode is turned ON, front air conditioning system becomes the following state: - Air inlet: Fresh air intake - Air outlet: Defroster - Blower fan: Automatic control - Compressor: ON • When defroster mode is turned OFF, entire front air conditioning system is set to AUTO mode. **NOTE:** When defroster mode turns ON while front air conditioning system is in automatic control (“AUTO” is indicated), automatic control is released (“AUTO” turns OFF).
DUAL switch	• Turns left and right ventilation temperature control (switch indicator) between ON ⇔ OFF each time. • When DUAL switch indicator is ON, the driver side and passenger side temperatures can each be set independently. • When DUAL switch indicator is OFF, the driver side outlet and setting temperature is applied to both sides. • Left and right ventilation temperature control is cancelled by turning the DEF mode ON. **NOTE:** When front air conditioning system is in the OFF position, left and right ventilation temperature control can be selected only while front air conditioning system state (when MODE switch is pressed) is indicated on the display.
Fan switch (UP/DOWN)	Blower fan speed is manually controlled with these switches. Seven speeds are available for manual control (as shown on the display screen). **NOTE:** • When fan switch is pressed while front air conditioning system is in OFF, front air conditioning system is activated. (Compressor control state returns to the previous state before front air conditioning system OFF.) • When fan switch is pressed while front air conditioning system is in automatic control (“AUTO” is indicated), automatic control is released (“AUTO” turns OFF).
A/C switch	Compressor control (switch indicator) changes between ON ⇔ OFF each time this switch is pressed while front blower motor is operated. **NOTE:** • A/C switch cannot be turned ON when front blower motor is OFF. • A/C switch cannot be turned OFF when air outlet is D/F or DEF. • Air inlet changes to fresh air intake when A/C switch is turned OFF while air inlet is set to recirculation.
MODE switch	Selects air outlet sequentially from VENT ⇒ B/L ⇒ FOOT ⇒ D/F ⇒ VENT each time. **NOTE:** • When front air conditioning system is in the OFF position, air outlet can be selected. • When MODE switch is pressed while front air conditioning system is in automatic control (“AUTO” is indicated), automatic control is released (“AUTO” turns OFF).
ON/OFF switch	• Turns front air conditioning system ON/OFF. • When front air conditioning system turns OFF, air inlet changes to recirculation (REC), recirculation switch indicator ON and air outlet becomes automatic control.

Fresh air switch	Air inlet changes to fresh air (FRE) when this switch is pressed. • Fresh air switch indicator ON: Fresh air intake • Fresh air switch indicator OFF: Recirculation **NOTE:** When front air conditioning system is in the OFF position, air inlet can be selected.
Recirculation switch	Air inlet changes to recirculation (REC) when this switch is pressed. • Recirculation switch indicator ON: Recirculation • Recirculation switch indicator OFF: Fresh air intake **NOTE:** • When front air conditioning system is in the OFF position, air inlet can be selected. • When MODE switch and DEF switch is in the D/F or DEF position, air inlet cannot be selected to recirculation (REC).
Temperature control dial (Driver side)	Setting temperature is selected using this dial within a range between 18°C (60°F) and 32°C (90°F) at a rate of 0.5°C (1.0°F) per adjustment. **NOTE:** When air conditioning system is OFF, setting temperature can be selected only while air conditioning system status screen [only when MODE switch (driver side) is pressed] is indicated on display.
Temperature control dial (Passenger side)	• Outlet air flow temperature of passenger side can be changed without changing outlet air flow temperature of driver side. • Setting temperature is selected using this dial within a range between 18°C (60°F) and 32°C (90°F) at a rate of 0.5°C (1.0°F) per adjustment. **NOTE:** • When air conditioning system is OFF, setting temperature can be selected only while air conditioning system status screen [only when MODE switch (passenger side) is pressed] is indicated on display. • When DEF mode is ON, temperature control dial (passenger side) is inoperative.

DIAGNOSIS SYSTEM (A/C AUTO AMP.)

CONSULT Function (HVAC)

INFOID:0000000014392104

CONSULT can display each diagnosis item using the diagnosis test modes as shown.

CONSULT application items

Diagnosis mode	Description
Self Diagnostic Result	Displays the diagnosis results judged by A/C auto amp.
Data Monitor	Displays A/C auto amp. input/output data in real time.
Work support	Changes the setting for each system function.
Active Test	The signals used to activate each device are forcibly supplied from A/C auto amp.
ECU Identification	Displays the A/C auto amp. number.

SELF DIAGNOSTIC RESULT

Refer to HAC-38, "DTC Index".

DATA MONITOR

Display item list

Monitor item [Unit]		Description
AMB TEMP SEN	[°C]	Ambient sensor value converted from ambient sensor signal received from ambient sensor
IN-VEH TEMP	[°C]	In-vehicle sensor value converted from in-vehicle sensor signal received from in-vehicle sensor
INT TEMP SEN	[°C]	Intake sensor value converted from intake sensor signal received from intake sensor
SUNLOAD SEN	[w/m^2]	Sunload sensor value converted from sunload sensor signal received from sunload sensor
AMB SEN CAL	[°C]	Ambient sensor value calculated by A/C auto amp.
IN-VEH CAL	[°C]	In-vehicle sensor value calculated by A/C auto amp.
INT TEMP CAL	[°C]	Intake sensor value calculated by A/C auto amp.
SUNL SEN CAL	[w/m^2]	Sunload sensor value calculated by A/C auto amp.
COMP REQ SIG	[On/Off]	Displays A/C switch ON/OFF status transmitted to other units via CAN communication
FAN REQ SIG	[On/Off]	Displays blower switch ON/OFF status transmitted to other units via CAN communication
FAN DUTY	[%]	Duty ratio of blower motor judged by A/C auto amp.
XM		Target discharge air temperature judged by A/C auto amp. according to the temperature setting and the value from each sensor
ENG COOL TEMP	[°C]	Water temperature signal value received from ECM via CAN communication
VEHICLE SPEED	[km/h (mph)]	Vehicle speed signal value received from meter via CAN communication
PA TARGET A/TEMP		Target discharge front air temperature (passenger side) judged by A/C auto amp. depending on the temperature setting and the value from each sensor

WORK SUPPORT

Work item	Description	Reference
TEMP SET CORRECT (Setting of difference between temperature setting and control temperature)	If the temperature felt by the customer is different than the air flow temperature controlled by the temperature setting, the auto amplifier control temperature can be adjusted to compensate for the temperature setting.	HAC-67, "Temperature Setting Trimmer"
REC MEMORY SET (REC memory function setting)	• If the ignition switch is turned to the OFF position while the REC switch is set to ON (recirculation), “With” or “Without” of the REC switch ON (recirculation) condition can be selected. • If “With” was set, the REC switch will be ON (recirculation) when turning the ignition switch to the ON position again. • If “Without” was set, the air inlets will be controlled automatically when turning the ignition switch to the ON position again.	HAC-68, "Inlet Port Memory Function (REC)"
FRE MEMORY SET (FRE memory function setting)	• If the ignition switch is turned to the OFF position while the FRE switch is set to ON (fresh air intake), “With” or “Without” of the FRE switch ON (fresh air intake) condition can be selected. • If “With” was set, the FRE switch will be ON (fresh air intake) when turning the ignition switch to the ON position again. • If “Without” was set, the air inlets will be controlled automatically when turning the ignition switch to the ON position again.	HAC-67, "Inlet Port Memory Function (FRE)"
BLOW SET (Blow setting to DEF in FOOT mode)	In the FOOT mode, the air blowing to the DEF can change ON/OFF.	HAC-67, "Foot Position Setting Trimmer"

NOTE:

When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10V or less, the setting of “Work support” may be cancelled.

ACTIVE TEST

Test item	Description
HVAC TEST	The operation check of A/C system can be performed by selecting the mode. Refer to the following table for the conditions of each mode.

HVAC TEST

	Test item						
	MODE 1	MODE 2	MODE 3	MODE 4	MODE 5	MODE 6	MODE 7
Mode door position	VENT	VENT	B/L	D/F1	D/F2	DEF	DEF
Intake door position	REC	REC	20%FRE	FRE	FRE	FRE	FRE
Air mix door position (driver & passenger side)	FULL COLD	FULL COLD	FULL COLD	FULL HOT	FULL HOT	FULL HOT	FULL HOT
Blower motor (V)	4	4	8	HI	HI	8	HI
A/C compressor (Magnet clutch)	ON	ON	ON	OFF	OFF	ON	ON
PTC heater 1	OFF	OFF	OFF	ON	ON	ON	ON
PTC heater 2	OFF	OFF	OFF	OFF	ON	ON	ON
PTC heater 3	OFF	OFF	OFF	OFF	OFF	ON	ON

NOTE:

Perform the inspection of each output device after starting the engine because the A/C compressor has been operating.

DIAGNOSIS SYSTEM (BCM)
COMMON ITEM
COMMON ITEM : CONSULT Function (BCM - COMMON ITEM)

INFOID:0000000014718389

APPLICATION ITEM
CONSULT performs the following functions via CAN communication with BCM.

Direct Diagnostic Mode	Description
ECU Identification	The BCM part number is displayed.
Self Diagnostic Result	The BCM self diagnostic results are displayed.
Data Monitor	The BCM input/output data is displayed in real time.
Active Test	The BCM activates outputs to test components.
Work support	The settings for BCM functions can be changed.
Configuration	• The vehicle specification can be read and saved. • The vehicle specification can be written when replacing BCM.
CAN Diag Support Mntr	The result of transmit/receive diagnosis of CAN communication is displayed.

SYSTEM APPLICATION
BCM can perform the following functions:

System	Sub System	Direct Diagnostic Mode						
		ECU Identification	Self Diagnostic Result	Data Monitor	Active Test	Work support	Configuration	CAN Diag Support Mntr
Door lock	DOOR LOCK		×	×	×	×		
Rear window defogger	REAR DEFOGGER			×	×	×		
Warning chime	BUZZER			×	×			
Interior room lamp timer	INT LAMP			×	×	×		
Exterior lamp	HEADLAMP			×	×	×		
Wiper and washer	WIPER			×	×	×		
Turn signal and hazard warning lamps	FLASHER			×	×	×		
Air conditioner	AIR CONDITIONER			×				
Intelligent Key system	INTELLIGENT KEY		×	×	×	×		
Combination switch	COMB SW			×				
BCM	BCM	×	×			×	×	×
Immobilizer	IMMU		×	×	×			
Interior room lamp battery saver	BATTERY SAVER			×	×			
Vehicle security system	THEFT ALM			×	×	×		
RAP system	RETAINED PWR			×				
Signal buffer system	SIGNAL BUFFER			×				

FREEZE FRAME DATA (FFD)
The BCM records the following vehicle condition at the time a particular DTC is detected, and displays it on CONSULT.

CONSULT screen item	Indication/Unit	Description	
Vehicle Speed	km/h	Vehicle speed at the moment a particular DTC is detected	
Odo/Trip Meter	km	Total mileage (Odometer value) at the moment a particular DTC is detected	
Vehicle Condition	SLEEP>LOCK	Power position status at the moment a particular DTC is detected*	While turning BCM status from low power consumption mode to normal mode (Power supply position is “LOCK”*).
	SLEEP>OFF		While turning BCM status from low power consumption mode to normal mode (Power supply position is “OFF”.)
	LOCK>ACC		While turning power supply position from “LOCK” *to “ACC”
	ACC>ON		While turning power supply position from “ACC” to “IGN”
	RUN>ACC		While turning power supply position from “RUN” to “ACC” (Vehicle is stopped and selector lever is in P position.)
	CRANK>RUN		While turning power supply position from “CRANKING” to “RUN” (From cranking up the engine to run it)
	RUN>URGENT		While turning power supply position from “RUN“ to “ACC” (Emergency stop operation)
	ACC>OFF		While turning power supply position from “ACC” to “OFF”
	OFF>LOCK		While turning power supply position from “OFF” to “LOCK”*
	OFF>ACC		While turning power supply position from “OFF” to “ACC”
	ON>CRANK		While turning power supply position from “IGN” to “CRANKING”
	OFF>SLEEP		While turning BCM status from normal mode (Power supply position is “OFF”.) to low power consumption mode
	LOCK>SLEEP		While turning BCM status from normal mode (Power supply position is “LOCK”*.) to low power consumption mode
	LOCK		Power supply position is “LOCK” (Ignition switch OFF)*
	OFF		Power supply position is “OFF” (Ignition switch OFF)
	ACC		Power supply position is “ACC” (Ignition switch ACC)
	ON		Power supply position is “IGN” (Ignition switch ON with engine stopped)
	ENGINE RUN		Power supply position is “RUN” (Ignition switch ON with engine running)
	CRANKING		Power supply position is “CRANKING” (At engine cranking)
IGN Counter	0 - 39	The number of times that ignition switch is turned ON after DTC is detected • The number is 0 when a malfunction is detected now. • The number increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition is switched OFF → ON. • The number is fixed to 39 until the self-diagnosis results are erased if it is over 39.	

NOTE:
*: Power supply position shifts to “LOCK” from “OFF”, when ignition switch is in the OFF position, selector lever is in the P position, and any of the following conditions are met:
- Closing door
- Opening door
- Door is locked using door request switch
- Door is locked using Intelligent Key

The power supply position shifts to “ACC” when the push-button ignition switch (push switch) is pushed at “LOCK”.

AIR CONDITIONER

AIR CONDITIONER : CONSULT Function (BCM - AIR CONDITIONER)

INFOID:0000000014718397

DATA MONITOR

Monitor Item [Unit]	Description
FAN ON SIG [On/Off]	Indicates condition of fan switch.
AIR COND SW [On/Off]	Indicates condition of A/C switch.

DIAGNOSIS SYSTEM (IPDM E/R)

CONSULT Function (IPDM E/R)

INFOID:0000000014718462

APPLICATION ITEM

CONSULT performs the following functions via CAN communication with IPDM E/R:

Direct Diagnostic Mode	Description
Self Diagnostic Result	The IPDM E/R self diagnostic results are displayed.
Data Monitor	The IPDM E/R input/output data is displayed in real time.
Active Test	The IPDM E/R activates outputs to test components.
CAN Diag Support Mntr	The result of transmit/receive diagnosis of CAN communication is displayed.

SELF DIAGNOSTIC RESULT

Refer to PCS-23, "DTC Index".

DATA MONITOR

Monitor Item [Unit]	Main Signals	Description
AC COMP REQ [On/Off]	×	Indicates A/C compressor request signal received from ECM on CAN communication line
TAIL&CLR REQ [On/Off]	×	Indicates position light request signal received from BCM on CAN communication line
HL LO REQ [On/Off]	×	Indicates low beam request signal received from BCM on CAN communication line
HL HI REQ [On/Off]	×	Indicates high beam request signal received from BCM on CAN communication line
FR FOG REQ [On/Off]	×	Indicates front fog light request signal received from BCM on CAN communication line
FR WIP REQ [Stop/1LOW/Low/Hi]	×	Indicates front wiper request signal received from BCM on CAN communication line
WIP AUTO STOP [STOP P/ACT P]	×	Indicates condition of front wiper auto stop signal
WIP PROT [Off/BLOCK]	×	Indicates condition of front wiper fail-safe operation
IGN RLY1 -REQ [On/Off]		Indicates ignition switch ON signal received from BCM on CAN communication line.
IGN RLY [On/Off]	×	Indicates condition of ignition relay
PUSH SW [On/Off]		Indicates condition of push-button ignition switch.
INTER/NP SW [On/Off]		Indicates condition of AT shift position.
ST RLY CONT [On/Off]		Indicates starter relay status signal received from BCM on CAN communication line.
IHBT RLY -REQ [On/Off]		Indicates starter control relay signal received from BCM on CAN communication line.
ST/INHI RLY [Off/ ST /INHI]		Indicates condition of starter relay and starter control relay.
DETENT SW [On/Off]		Indicates condition of AT shift selector (park position switch).
DTRL REQ [Off]		Indicates daytime light request signal received from BCM on CAN communication line
HOOD SW [On/Off]		Indicates condition of hood switch.
THFT HRN REQ [On/Off]		Indicates theft warning horn request signal received from BCM on CAN communication line
HORN CHIRP [On/Off]		Indicates horn reminder signal received from BCM on CAN communication line
HOOD SW 2 [On/Off]		Indicates condition of hood switch 2.

ACTIVE TEST

Test item	Description
REAR DEFOGGER	This test is able to check rear defogger operation [On/Off].
FRONT WIPER	This test is able to check wiper motor operation [Hi/Lo/Off].
EXTERNAL LAMPS	This test is able to check external lamp operation [Fog/Hi/Lo/TAIL/Off].
HORN	This test is able to check horn operation [On].

ECU DIAGNOSIS INFORMATION

A/C AUTO AMP.

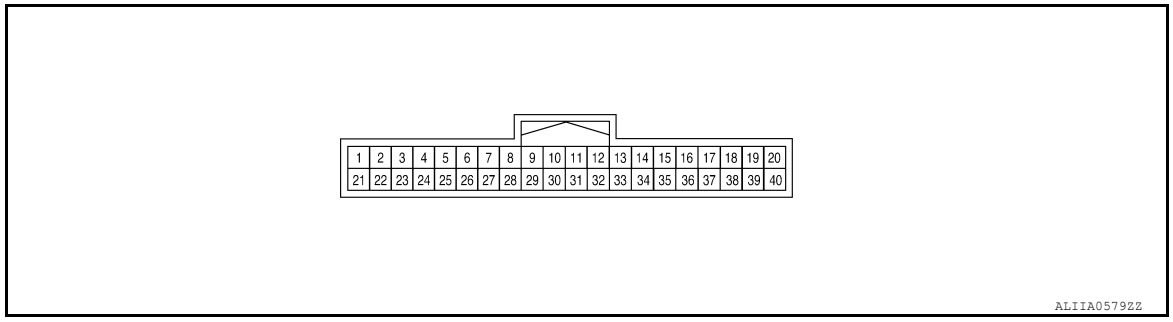
Reference Value

INFOID:0000000014392105

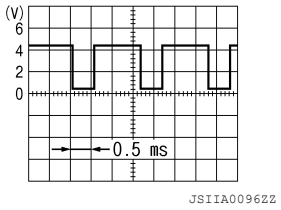
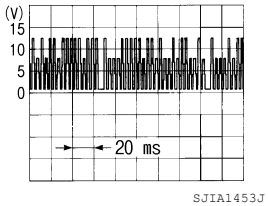
VALUES ON THE DIAGNOSIS TOOL

Monitor item	Condition		Value/Status
AMB TEMP SEN	Ignition switch ON	—	−30 - 55°C (22 - 131°F)
IN-VEH TEMP	Ignition switch ON	—	−30 - 55°C (22 - 131°F)
INT TEMP SEN	Ignition switch ON	—	−30 - 55°C (22 - 131°F)
SUNLOAD SEN	Ignition switch ON	—	0 - 1045 w/m^2 (0 - 899 kcal/m^2·h)
AMB SEN CAL	Ignition switch ON	—	−30 - 55°C (22 - 131°F)
IN-VEH CAL	Ignition switch ON	—	−30 - 55°C (22 - 131°F)
INT TEMP CAL	Ignition switch ON	—	−30 - 55°C (22 - 131°F)
SUNL SEN CAL	Ignition switch ON	—	0 - 1045 w/m^2 (0 - 899 kcal/m^2·h)
COMP REQ SIG	Engine: Run at idle after warming up	A/C switch: ON (A/C compressor operation status)	On
		A/C switch: OFF	Off
FAN REQ SIG	Engine: Run at idle after warming up	Blower fan: ON	On
		Blower fan: OFF	Off
FAN DUTY	Engine: Run at idle after warming up	Blower fan: ON	Varies
		Blower fan: OFF	0%
XM	Ignition switch ON	—	−100 - 155
ENG COOL TEMP	Ignition switch ON	—	Varies according to coolant temperature
VEHICLE SPEED	Driving	—	Equivalent to speedometer reading
PA TARGET A/TEMP	Ignition switch ON	—	Value according to target air flow temperature (passenger side)

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	−	Signal name	Input/ Output			
1 (L)	—	CAN high	Input/ Output	—		—
2 (B)	—	Ground	—	—		—
3 (SB)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
4 (BR)	Ground	TX FR	Output	Ignition switch ON		0 – 5 V
7 (W)	Ground	Ambient sensor signal	Input	Ignition switch ON		0 – 4.8 V Output voltage varies with ambient temperature
8*1 (BR)	Ground	Heated steering wheel switch signal	Input	Ignition switch ON	Heated steering wheel switch: While pressing	0 V
					Other than the above	Battery voltage
9 (G)	Ground	Sunload sensor signal	Input	Ignition switch ON		0 – 4.8 V Output voltage varies with sunload amount
12*2 (W)	Ground	Water valve	ON	Water valve open		Battery voltage
			ON	Water valve closed		0V
13 (W)	Ground	IGN 2	Input	Ignition switch ON		Battery voltage
14 (P)	Ground	Front blower motor control signal	Output	• Ignition switch ON • Front fan speed: 1st speed (manual)		 JSIIA0096ZZ
15 (Y)	Ground	RR DEF switch	Output	Defroster switch	OFF	0 V
					ON	5 V
16 (G)	Ground	Each door motor LIN signal	Input/ Output	Ignition switch ON		 SJIA1453J
17 (W)	Ground	Each door motor power supply	Output	Ignition switch ON		Battery voltage
19*3 (G/R)	Ground	PTC1 relay output signal	Input	Ignition switch ON	PTC heater: ON	0 V
					PTC heater: OFF	Battery voltage

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
20*1 (P)	Ground	Heated steering wheel relay control signal	Output	Ignition switch ON	Within 30 seconds after turning ON the heated steering switch	0 V
					Other than the above	Battery voltage
21 (P)	—	CAN low	Input/ Output	—		—
22 (B)	—	Ground	—	—		—
23 (G)	Ground	Ignition power supply	Input	Ignition switch ON		Battery voltage
24 (V)	Ground	RX FR	Input	Ignition switch ON		0 – 5 V
26 (R)	—	Sensor ground	—	—		—
27 (G)	Ground	In-vehicle sensor signal	Input	Ignition switch ON		0 – 4.8 V Output voltage varies with in-vehicle temperature
28 (P)	Ground	Intake sensor signal	Input	Ignition switch ON		0 – 4.8 V Output voltage varies with front evaporator fin temperature
33 (Y)	Ground	Compressor ON signal	ON	A/C switch OFF		5 V
			ON	A/C switch ON		0 V
34 (L/W)	Ground	Front blower motor feedback	ON	-		Battery voltage
35 (B/W)	Ground	RR DEF feedback	Input	Defroster switch	OFF	0 V
					ON	Battery voltage
37 (B)	—	ACTR Ground	—	—		—
38 (W)	Ground	Fan ON signal	ON	Blower switch OFF		5 V
			ON	Blower switch ON		0 V
39*3 (LG)	Ground	PTC2 relay output signal	Input	Ignition switch ON	PTC heater: ON	0 V
					PTC heater: OFF	Battery voltage
40*3 (SB)	Ground	PTC3 relay output signal	Input	Ignition switch ON	PTC heater: ON	0 V
					PTC heater: OFF	Battery voltage

*1: With heated steering wheel

*2: With Cummins 5.0L

DTC Index

INFOID:0000000014392106

DTC	Items (CONSULT screen terms)	Reference
U1000	CAN COMM CIRCUIT	HAC-69, "DTC Description"
U1010	CONTROL UNIT (CAN)	HAC-70, "DTC Description"
U1321	NOT CONFIGURED	HAC-71, "DTC Description"
B257B	AMBIENT SENSOR (SHORT)	HAC-75, "DTC Description"
B257C	AMBIENT SENSOR (OPEN)	HAC-75, "DTC Description"
B2578	IN-VEHICLE SENSOR (SHORT)	HAC-72, "DTC Description"
B2579	IN-VEHICLE SENSOR (OPEN)	HAC-72, "DTC Description"
B2581	INTAKE SENSOR (SHORT)	HAC-78, "DTC Description"
B2582	INTAKE SENSOR (OPEN)	HAC-78, "DTC Description"
B2630*	SUNLOAD SENSOR (SHORT)	HAC-81, "DTC Description"
B2631*	SUNLOAD SENSOR (OPEN)	HAC-81, "DTC Description"
B2632	DR AIR MIX DOOR MOT (SHORT)	HAC-84, "DTC Description"
B2633	DR AIR MIX DOOR MOT (OPEN)	HAC-84, "DTC Description"
B2634	PASS AIR MIX DOOR MOT (SHORT)	HAC-86, "DTC Description"
B2635	PASS AIR MIX DOOR MOT (OPEN)	HAC-86, "DTC Description"
B2636	DR VENT DOOR FAIL	HAC-88, "DTC Description"
B2637	DR B/L DOOR FAIL	HAC-88, "DTC Description"
B2638	DR D/F1 DOOR FAIL	HAC-88, "DTC Description"
B2639	DR DEF DOOR FAIL	HAC-88, "DTC Description"
B263D	FRE DOOR FAIL	HAC-90, "DTC Description"
B263E	20P FRE DOOR FAIL	HAC-90, "DTC Description"
B263F	REC DOOR FAIL	HAC-90, "DTC Description"
B2654	D/F2 DOOR FAIL	HAC-88, "DTC Description"
B2655	B/L2 DOOR FAIL	HAC-88, "DTC Description"
B2796	FR SW COMM ERROR	HAC-92, "DTC Description"

*: Perform self-diagnosis under direct sunlight. When performing indoors, aim a light (more than 60 W) at sunload sensor, otherwise self-diagnosis reports an error even though the sunload sensor is functioning normally.

PTC HEATER CONTROL UNIT

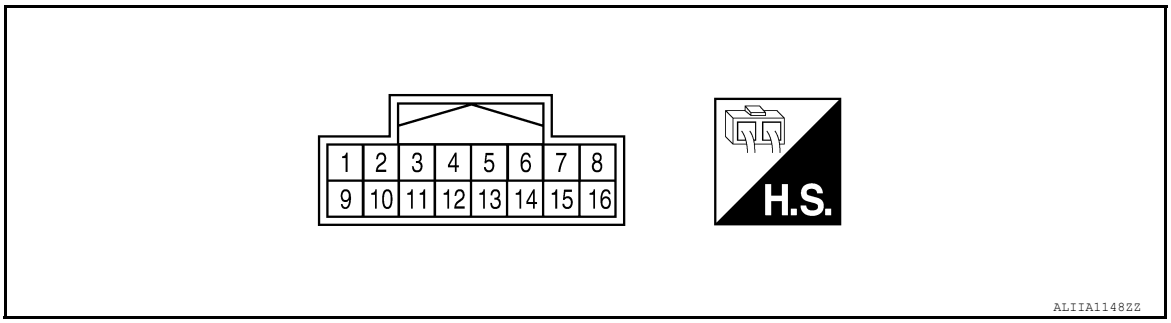
Reference Value

INFOID:0000000014718474

VALUES ON THE DIAGNOSIS TOOL

Monitor item	Condition		Value/Status
AMB TEMP SEN	Ignition switch ON	—	−30 - 55°C (22 - 131°F)
AMB SEN CAL	Ignition switch ON	—	−30 - 55°C (22 - 131°F)
ENG COOL TEMP	Ignition switch ON	—	Varies according to coolant temperature

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	−	Signal name	Input/ Output			
1 (L)	—	CAN-H	Input/ Output	—		—
2 (B)	—	Ground	—	—		—
3 (G)	Ground	Ignition power supply	Input	Ignition switch ON		Battery voltage
5 (R)	—	Sensor ground	—	—		—
9 (P)	—	CAN-L	Input/ Output	—		—
10 (SB)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
12 (W)	Ground	Ambient sensor signal	Input	Ignition switch ON		0 – 4.8 V Output voltage varies with ambient temperature
13 (L/W)	Ground	Front blower motor feedback	ON	-		Battery voltage
14 (G/R)	Ground	PTC1 relay output signal	Input	Ignition switch ON	PTC heater: ON	0 V
					PTC heater: OFF	Battery voltage
15 (LG)	Ground	PTC2 relay output signal	Input	Ignition switch ON	PTC heater: ON	0 V
					PTC heater: OFF	Battery voltage

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
16 (SB)	Ground	PTC3 relay output signal	Input	Ignition switch ON	PTC heater: ON	0 V
					PTC heater: OFF	Battery voltage

DTC Index

INFOID:0000000014718475

DTC	Items (CONSULT screen terms)	Reference
U1000	CAN COMM CIRCUIT	HAC-190, "DTC Description"
U1010	CONTROL UNIT (CAN)	HAC-191, "PTC HEATER CONTROL UNIT : DTC Description"
B257B	AMBIENT SENSOR (SHORT)	HAC-193, "DTC Description"
B257C	AMBIENT SENSOR (OPEN)	HAC-193, "DTC Description"

ECM, IPDM E/R, BCM

List of ECU Reference

INFOID:0000000014392107

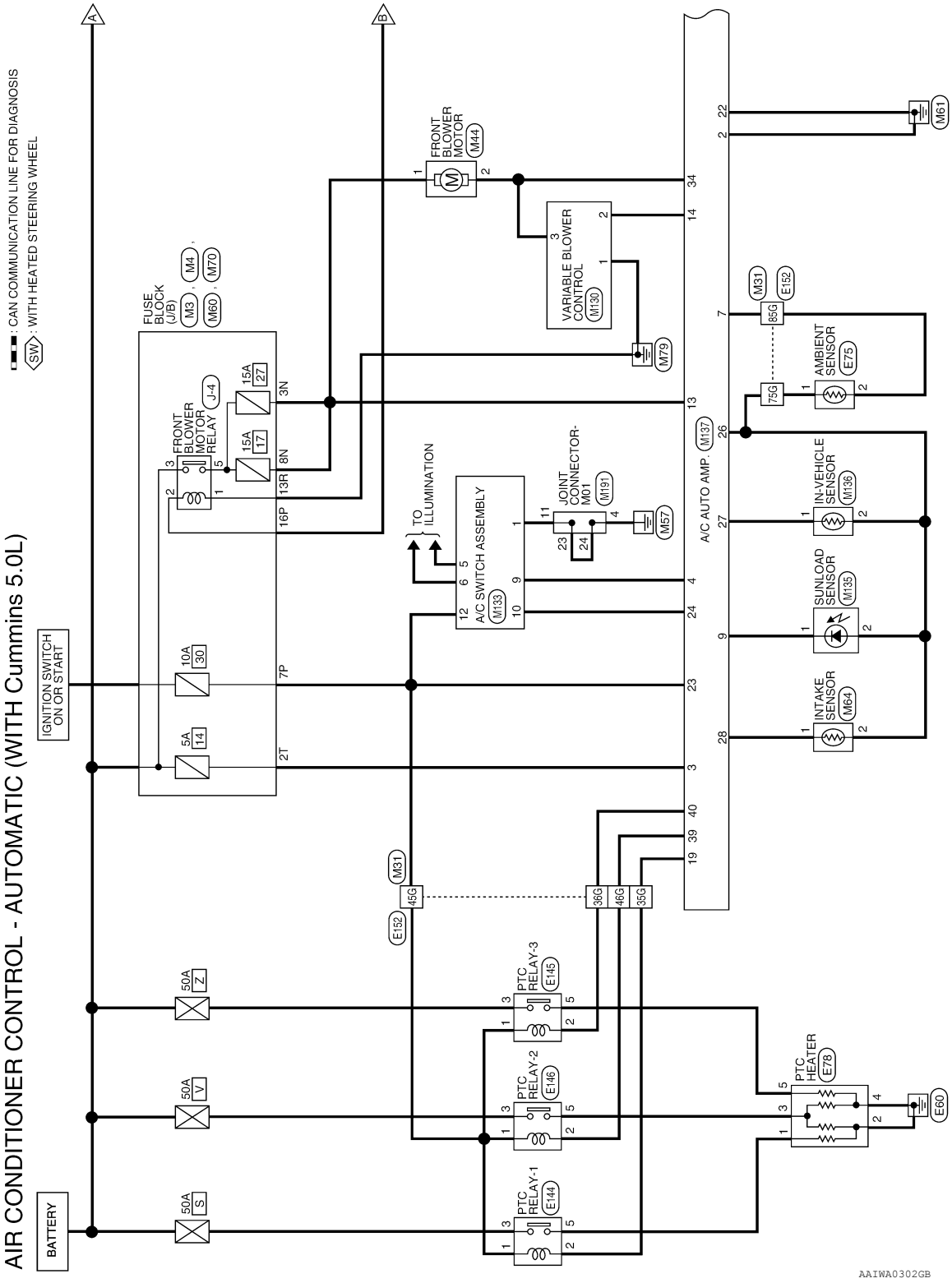
ECU	Reference
ECM (Cummins 5.0L)	EC-816, "Reference Value"
	EC-828, "Fail safe"
	EC-837, "DTC Index"
ECM (VK56VD)	EC-107, "Reference Value"
	EC-131, "Fail-safe"
	EC-136, "DTC Index"
IPDM E/R	PCS-14, "Reference Value"
	PCS-22, "Fail Safe"
	PCS-23, "DTC Index"
BCM	BCS-32, "Reference Value"
	BCS-51, "Fail Safe"
	BCS-51, "DTC Inspection Priority Chart"
	BCS-52, "DTC Index"

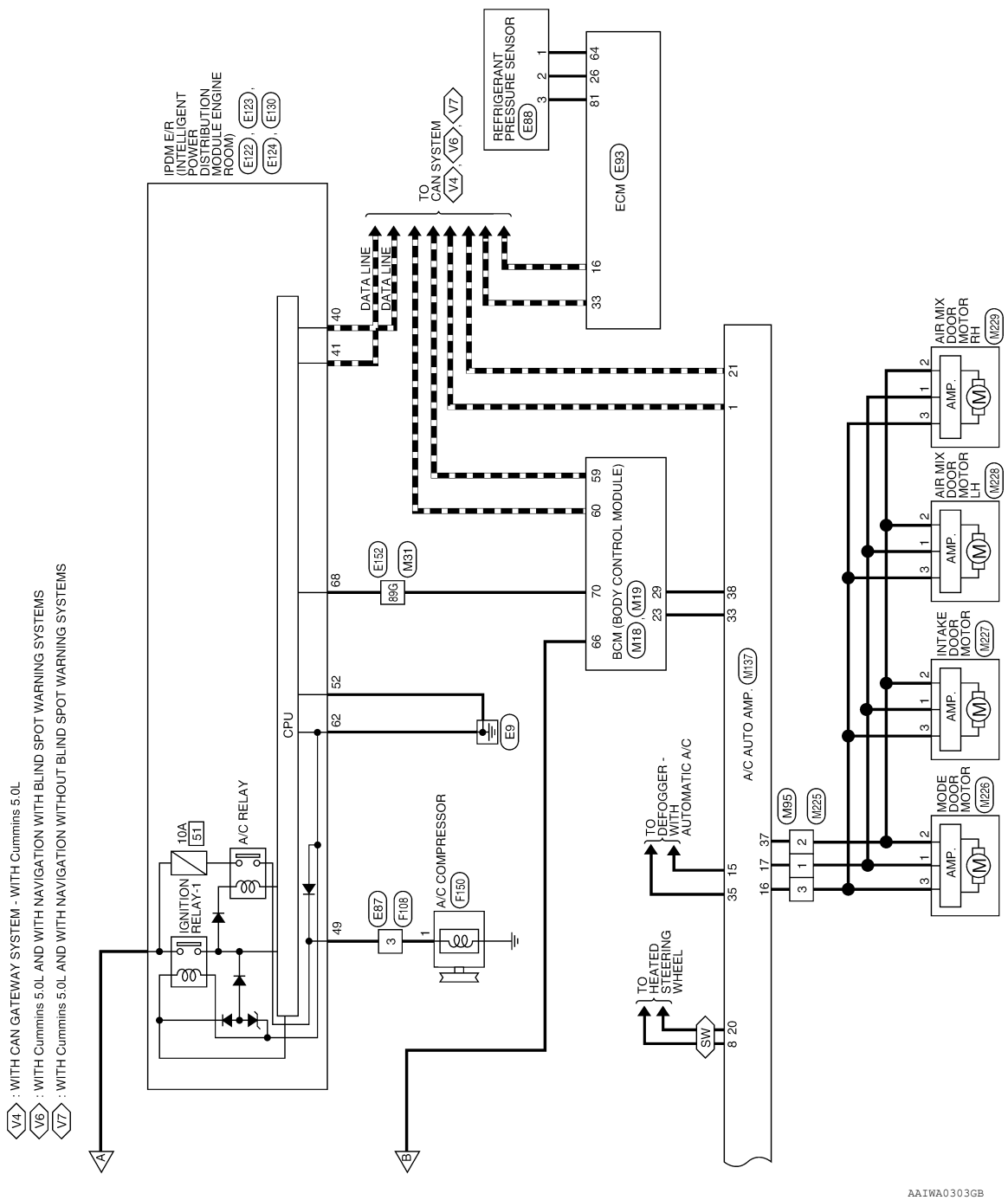
WIRING DIAGRAM

AUTOMATIC AIR CONDITIONING SYSTEM
CUMMINS 5.0L

CUMMINS 5.0L : Wiring Diagram

INFOID:0000000014392108




V4 : WITH CAN GATEWAY SYSTEM - WITH Cummins 5.0L
V6 : WITH Cummins 5.0L AND WITH NAVIGATION WITH BLIND SPOT WARNING SYSTEMS
V7 : WITH Cummins 5.0L AND WITH NAVIGATION WITHOUT BLIND SPOT WARNING SYSTEMS
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E122, E123, E124, E130
CPU
IGNITION RELAY-1
10A 51
A/C RELAY
A/C COMPRESSOR
E87
F108
F150
E9
E152
89G
M31
DATA LINE
DATA LINE
TO CAN SYSTEM
V4, V6, V7
REFRIGERANT PRESSURE SENSOR
E88
ECM E93
BCM (BODY CONTROL MODULE)
M18, M19
A/C AUTO AMP. M137
TO DEFOGGER - WITH AUTOMATIC A/C
TO HEATED STEERING WHEEL
SW
M95
M225
AIR MIX DOOR MOTOR RH M223
AIR MIX DOOR MOTOR LH M228
INTAKE DOOR MOTOR M227
MODE DOOR MOTOR M226
AMP.
A
B
AAIWA0303GB

AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH Cummins 5.0L)

Connector No.	E75
Connector Name	AMBIENT SENSOR
Connector Type	RS02FB
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	R	SENS GND
2	W/B	AMB SENS

Connector No.	E78
Connector Name	PTC HEATER
Connector Type	ALA05FB-R-RH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	BR	PTC RELAY-1 OUTPUT
2	B	GND
3	G	PTC RELAY-2 OUTPUT
4	B	GND
5	L	PTC RELAY-3 OUTPUT

Connector No.	E87
Connector Name	WIRE TO WIRE
Connector Type	54200608
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	–	TO ENGINE CONTROL HARNESS - DIESEL
2	P	TO ENGINE CONTROL HARNESS - DIESEL
3	Y/B	TO ENGINE CONTROL HARNESS - DIESEL
4	–	TO ENGINE CONTROL HARNESS - DIESEL
5	B	TO ENGINE CONTROL HARNESS - DIESEL
6	L/W	TO ENGINE CONTROL HARNESS - DIESEL

Connector No.	E88
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	RK03FB
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	R/W	REF PRESS SENS RETURN
2	R/L	REF PRESS SENS SIGNAL
3	B	PPS2 SUPPLY

Connector No.	E93
Connector Name	ECM (WITH CUMMINS 5.0L)
Connector Type	1-928-405-452
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	B	GROUND
2	B	GROUND
3	BR	SW BATTERY
4	B	GROUND
5	BR	SW BATTERY
6	BR	SW BATTERY
7	O	DOF DELTA PRESS
8	–	–
9	–	–
10	–	–
11	–	–
12	–	–
13	–	–
14	–	–
15	L/R	AT SENSOR RTN
16	P	CAN-L
17	–	–
18	G	J1939 +
19	–	–
20	G	SMART POWER LSD
21	–	–
22	–	–
23	–	–
24	SB	DPF OUT PRESS
25	–	–
26	R/L	REF PRESS SENS SIGNAL
27	–	–
28	–	–
29	–	–
30	–	–
31	–	–
32	Y	AT SSR SUPPLY
33	L	CAN-H
34	–	–
35	Y	J1939 +
36	–	–
37	L	MAIN RLY LSD
38	–	–
39	–	–
40	GR	FUEL PUMP RLY SIG
41	BR	SW RETURN
42	–	–
43	–	–
44	–	–
45	–	–
46	–	–
47	–	–
48	–	–
49	–	–
50	–	–
51	–	–
52	–	–
53	R/G	BRAKE SW OPEN
54	L	BRAKE NC
55	–	–
56	–	–
57	–	–
58	–	–
59	G/Y	ASCD SIGNAL
60	–	–
61	B/Y	ASCD RETURN
62	R	PPS2 RETURN
63	R	PPS1 RETURN
64	R/W	REF PRESS SENS RETURN
65	L/W	IGN/KEYSWITCH
66	–	–
67	–	–
68	–	–
69	–	–
70	–	–
71	–	–
72	–	–
73	B	DOSER RETURN
74	GR/R	DOSER HS
75	L/W	COOLANT SIGNAL
76	–	–
77	L	WIF SIGNAL
78	L	PPS2 SIGNAL
79	BR	PPS1 SIGNAL
80	W	PPS1 SUPPLY
81	B	PPS2 SUPPLY
82	–	–
83	BR	BATTERY
84	–	–
85	–	–
86	–	–
87	–	–
88	–	–
89	–	–
90	–	–
91	–	–

AAIIA0912GB

AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH Cummins 5.0L)

Connector No.	E122
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH12FW-NH
Connector Color	WHITE

H.S.

42 41 40 39 38 37
48 47 46 45 44 43

Terminal No.	Color of Wire	Signal Name
37	–	–
38	–	–
39	L/Y	WIPER AUTO STOP SW
40	P	CAN-L
41	L	CAN-H
42	BR	DTRL RLY
43	–	–
44	W/B	START CONT
45	GR	FUEL RLY CONT
46	Y	HOOD SW
47	Y	ALT C - (WITH VK56VD)
48	R/W	HORN RLY CONT

Connector No.	E123
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS08FBR-CS
Connector Color	BROWN

H.S.

51 50 49
56 55 54 53 52

Terminal No.	Color of Wire	Signal Name
49	Y/B	A/C COMP - (WITH CUMMINS 5.0L)
49	GR/R	A/C COMP - (WITH VK56VD)
50	BR	TRAILER TOW
51	–	–
52	B	S-GND
53	–	–
54	–	–

55	–	–
56	–	–

Connector No.	E124
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC
Connector Color	BLACK

H.S.

59 58 57
62 61 60

Terminal No.	Color of Wire	Signal Name
57	W/B	RR DEF
58	BR	FUEL PUMP - (WITH CUMMINS 5.0L)
58	B/Y	FUEL PUMP - (WITH VK56VD)
59	–	–
60	–	–
61	–	–
62	B	P GND

Connector No.	E130
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH10FB-NH
Connector Color	BLACK

H.S.

67 66 65 64 63
72 71 70 69 68

Terminal No.	Color of Wire	Signal Name
63	–	–
64	R	DETENT SW
65	–	–
66	P	PUSH START SW
67	–	–
68	L	IGN SIGNAL
69	–	–
70	–	–
71	SB	HOOD SW2

72	W	E-CPLG - (WITH VK56VD)

Connector No.	E144
Connector Name	PTC RELAY-1
Connector Type	24347-9F900
Connector Color	BLUE

H.S.

3 1
2 5

Terminal No.	Color of Wire	Signal Name
1	G	IGNITION
2	G/R	PTC 1
3	O	BATTERY
5	BR	RELAY OUTPUT

Connector No.	E145
Connector Name	PTC RELAY-3
Connector Type	24347-9F900
Connector Color	BLUE

H.S.

3 1
2 5

Terminal No.	Color of Wire	Signal Name
1	G	IGNITION
2	SB	PTC 3
3	G	BATTERY
5	L	RELAY OUTPUT

Connector No.	E146
Connector Name	PTC RELAY-2
Connector Type	24347-9F900
Connector Color	BLUE

H.S.

3 1
2 5

Terminal No.	Color of Wire	Signal Name
1	G	IGNITION
2	LG	PTC 2
3	R	BATTERY
5	G	RELAY OUTPUT

AAIIA0913GB

AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH Cummins 5.0L)

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	G	TO MAIN HARNESS
2G	B/R	TO MAIN HARNESS
3G	W/B	TO MAIN HARNESS
4G	BR/W	TO MAIN HARNESS
5G	BR	TO MAIN HARNESS
6G	P	TO MAIN HARNESS - (WITH VK56VD)
6G	R/W	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
7G	Y	TO MAIN HARNESS
8G	G	TO MAIN HARNESS
9G	R	TO MAIN HARNESS
10G	W	TO MAIN HARNESS
11G	R/G	TO MAIN HARNESS
12G	W/B	TO MAIN HARNESS
13G	BR	TO MAIN HARNESS
14G	Y/B	TO MAIN HARNESS
15G	G/W	TO MAIN HARNESS
16G	G	TO MAIN HARNESS
17G	G/Y	TO MAIN HARNESS
18G	G/Y	TO MAIN HARNESS
19G	Y/V	TO MAIN HARNESS
20G	G/Y	TO MAIN HARNESS
21G	B/Y	TO MAIN HARNESS
22G	G/R	TO MAIN HARNESS
23G	Y/R	TO MAIN HARNESS

24G	G/B	TO MAIN HARNESS
25G	R/W	TO MAIN HARNESS
26G	R	TO MAIN HARNESS
27G	LG	TO MAIN HARNESS
28G	G/B	TO MAIN HARNESS
29G	G/B	TO MAIN HARNESS
30G	BR/Y	TO MAIN HARNESS
31G	P	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
31G	R	TO MAIN HARNESS - (WITH VK56VD)
32G	P	TO MAIN HARNESS
33G	Y/L	TO MAIN HARNESS
34G	GR	TO MAIN HARNESS
35G	G/R	TO MAIN HARNESS
36G	SB	TO MAIN HARNESS
37G	R/W	TO MAIN HARNESS
38G	BR	TO MAIN HARNESS
39G	BR	TO MAIN HARNESS
40G	–	TO MAIN HARNESS
41G	R/G	TO MAIN HARNESS
42G	O	TO MAIN HARNESS
43G	B	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
43G	G	TO MAIN HARNESS - (WITH VK56VD)
44G	R/Y	TO MAIN HARNESS
45G	G	TO MAIN HARNESS
46G	LG	TO MAIN HARNESS
47G	R	TO MAIN HARNESS
48G	W	TO MAIN HARNESS
49G	–	TO MAIN HARNESS
50G	BR	TO MAIN HARNESS
51G	R	TO MAIN HARNESS
52G	L	TO MAIN HARNESS
53G	W	TO MAIN HARNESS
54G	W	TO MAIN HARNESS
55G	G	TO MAIN HARNESS
56G	W	TO MAIN HARNESS
57G	Y	TO MAIN HARNESS
58G	BG	TO MAIN HARNESS
59G	BG	TO MAIN HARNESS
60G	BG	TO MAIN HARNESS
61G	B	TO MAIN HARNESS
62G	W	TO MAIN HARNESS
63G	R	TO MAIN HARNESS
64G	W/L	TO MAIN HARNESS
65G	W/R	TO MAIN HARNESS
66G	BG	TO MAIN HARNESS
67G	BG	TO MAIN HARNESS
68G	B	TO MAIN HARNESS
69G	Y	TO MAIN HARNESS
70G	L	TO MAIN HARNESS
71G	R/W	TO MAIN HARNESS
72G	L/W	TO MAIN HARNESS
73G	SHIELD	TO MAIN HARNESS
74G	W	TO MAIN HARNESS
75G	R	TO MAIN HARNESS
76G	R/G	TO MAIN HARNESS
77G	G	TO MAIN HARNESS
78G	W	TO MAIN HARNESS
79G	–	TO MAIN HARNESS
80G	R	TO MAIN HARNESS
81G	L	TO MAIN HARNESS
82G	R	TO MAIN HARNESS
83G	L	TO MAIN HARNESS
84G	L	TO MAIN HARNESS
85G	W/B	TO MAIN HARNESS
86G	B/R	TO MAIN HARNESS
87G	W/B	TO MAIN HARNESS
88G	P	TO MAIN HARNESS
89G	L	TO MAIN HARNESS
90G	G	TO MAIN HARNESS
91G	G	TO MAIN HARNESS
92G	V/W	TO MAIN HARNESS
93G	BR	TO MAIN HARNESS
94G	G	TO MAIN HARNESS
95G	G	TO MAIN HARNESS
96G	W	TO MAIN HARNESS
97G	R	TO MAIN HARNESS
98G	W/B	TO MAIN HARNESS
99G	BR	TO MAIN HARNESS
100G	GR/W	TO MAIN HARNESS

Connector No.	F108
Connector Name	WIRE TO WIRE
Connector Type	54200612
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	–	TO ENGINE ROOM HARNESS
2	O	TO ENGINE ROOM HARNESS
3	R/V	TO ENGINE ROOM HARNESS
4	–	TO ENGINE ROOM HARNESS
5	P	TO ENGINE ROOM HARNESS
6	R/V	TO ENGINE ROOM HARNESS

Connector No.	F150
Connector Name	A/C COMPRESSOR (WITH CUMMINS 5.0L)
Connector Type	6185-0862
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	R/V	A/C COMP

Connector No.	M3
Connector Name	FUSE BLOCK (J/B)
Connector Type	CS06FW-M2
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1N	–	–
2N	W	BATTERY
3N	W	BLOWER FAN RELAY OUT
4N	V	BATTERY
5N	Y	BATTERY
6N	W	BATTERY
7N	L	ACC RELAY OUT
8N	W	IGNITION

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AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH Cummins 5.0L)

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FW-CS
Connector Color	WHITE

H.S.

7P	6P	5P	4P		3P	2P	1P
16P	15P	14P	13P	12P	11P	10P	9P	8P

Terminal No.	Color of Wire	Signal Name
1P	R	IGNITION
2P	Y	IGNITION
3P	G	IGNITION RELAY OUT
4P	B/W	RR DEF RLY
5P	B/W	RR DEF RLY
6P	O	RR DEF RLY OUT
7P	G	IGNITION
8P	W	IGNITION
9P	L	BATTERY
10P	–	–
11P	–	–
12P	–	–
13P	R	BATTERY
14P	Y	BATTERY
15P	Y/LG	BATTERY
16P	W	BLOWER FAN RELAY OUT

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FG-NH
Connector Color	GREEN

H.S.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
1	G	ENG START SW NO ESCL
2	–	–
3	R	A/L POWER SUPPLY 5V
4	W/R	A/L SIGNAL
5	–	–
6	–	–

7	–	–
8	–	–
9	–	–
10	SB	COMBI SW IN 5
11	G/Y	COMBI SW IN 4
12	Y	COMBI SW IN 3
13	G/B	COMBI SW IN 2
14	V	COMBI SW IN 1
15	–	–
16	–	–
17	P	GND RF A/L
18	V	SECURITY INDICATOR
19	–	–
20	R	SHIFT P
21	R/W	STEP LAMP CONT
22	–	–
23	Y	AIRCON SW
24	–	–
25	W	BRAKE SW FUSE
26	L	SHORT IN PIN INPUT
27	R/G	BRAKE SW LAMP
28	–	–
29	W	BLOWER FAN SW
30	P	DR DOOR LOCK STATUS
31	–	–
32	Y	REAR DEFOGGER SW
33	–	–
34	–	–
35	R/G	REVERSE SW
36	W/B	HAZARD SW
37	–	–
38	–	–
39	B/R	SHIFT N/P
40	–	–

43	–	–
44	–	–
45	–	–
46	–	–
47	–	–
48	R	HIGH SIDE START SW LED
49	–	–
50	–	–
51	–	–
52	W	AUDIO DONGLE
53	–	–
54	W/L	PW UART
55	W/B	L&R SENSOR K-LINE
56	–	–
57	–	–
58	–	–
59	P	CAN-L
60	L	CAN-H
61	O	REAR DEFOGGER RELAY OUT
62	W	STARTER RELAY OUT
63	–	–
64	P	BUZZER OUT
65	–	–
66	W	BLOWER FAN RELAY OUT
67	G	IGN ELEC RELAY OUT 2
68	L	MR OUTPUT
69	R/B	AT DEVICE OUT
70	P	IGN USM OUT 1
71	O	DR REQUEST SW
72	G	AS REQUEST SW
73	–	–
74	–	–
75	L/W	COMBI SW OUT 5
76	P	COMBI SW OUT 4
77	L	COMBI SW OUT 3
78	O/B	COMBI SW OUT 2
79	R/W	COMBI SW OUT 1
80	–	–

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FB-NH
Connector Color	BLACK

H.S.

60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61

Terminal No.	Color of Wire	Signal Name
41	Y/L	TRAILER LIGHT CHECK RELAY OUT
42	R/Y	CARGO LAMP OUT

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AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH Cummins 5.0L)

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	G	TO ENGINE ROOM HARNESS
2G	B/R	TO ENGINE ROOM HARNESS
3G	W	TO ENGINE ROOM HARNESS
4G	BR/W	TO ENGINE ROOM HARNESS
5G	–	TO ENGINE ROOM HARNESS
6G	R/W	TO ENGINE ROOM HARNESS
7G	Y	TO ENGINE ROOM HARNESS
8G	G	TO ENGINE ROOM HARNESS
9G	R	TO ENGINE ROOM HARNESS
10G	W	TO ENGINE ROOM HARNESS
11G	R/G	TO ENGINE ROOM HARNESS
12G	W/B	TO ENGINE ROOM HARNESS
13G	BR	TO ENGINE ROOM HARNESS
14G	Y/B	TO ENGINE ROOM HARNESS
15G	G/W	TO ENGINE ROOM HARNESS
16G	G	TO ENGINE ROOM HARNESS
17G	O	TO ENGINE ROOM HARNESS
18G	G/Y	TO ENGINE ROOM HARNESS
19G	Y/V	TO ENGINE ROOM HARNESS
20G	G/Y	TO ENGINE ROOM HARNESS
21G	B/Y	TO ENGINE ROOM HARNESS
22G	G/R	TO ENGINE ROOM HARNESS
23G	Y/R	TO ENGINE ROOM HARNESS
24G	G/B	TO ENGINE ROOM HARNESS
25G	R/W	TO ENGINE ROOM HARNESS
26G	R	TO ENGINE ROOM HARNESS
27G	LG	TO ENGINE ROOM HARNESS
28G	G/B	TO ENGINE ROOM HARNESS
29G	G/B	TO ENGINE ROOM HARNESS
30G	BR/Y	TO ENGINE ROOM HARNESS
31G	R	TO ENGINE ROOM HARNESS
32G	R	TO ENGINE ROOM HARNESS
33G	Y/L	TO ENGINE ROOM HARNESS
34G	GR	TO ENGINE ROOM HARNESS
35G	G/R	TO ENGINE ROOM HARNESS
36G	SB	TO ENGINE ROOM HARNESS
37G	R/W	TO ENGINE ROOM HARNESS
38G	BR	TO ENGINE ROOM HARNESS
39G	BR	TO ENGINE ROOM HARNESS
40G	–	TO ENGINE ROOM HARNESS
41G	R/G	TO ENGINE ROOM HARNESS
42G	O	TO ENGINE ROOM HARNESS
43G	G	TO ENGINE ROOM HARNESS
44G	R/Y	TO ENGINE ROOM HARNESS
45G	G	TO ENGINE ROOM HARNESS
46G	LG	TO ENGINE ROOM HARNESS
47G	R	TO ENGINE ROOM HARNESS
48G	W	TO ENGINE ROOM HARNESS
49G	–	TO ENGINE ROOM HARNESS
50G	BR	TO ENGINE ROOM HARNESS
51G	R	TO ENGINE ROOM HARNESS
52G	L	TO ENGINE ROOM HARNESS
53G	W	TO ENGINE ROOM HARNESS
54G	W	TO ENGINE ROOM HARNESS
55G	G	TO ENGINE ROOM HARNESS
56G	W	TO ENGINE ROOM HARNESS
57G	Y	TO ENGINE ROOM HARNESS
58G	BG	TO ENGINE ROOM HARNESS
59G	BG	TO ENGINE ROOM HARNESS
60G	BG	TO ENGINE ROOM HARNESS
61G	O	TO ENGINE ROOM HARNESS
62G	W	TO ENGINE ROOM HARNESS
63G	O	TO ENGINE ROOM HARNESS
64G	W/L	TO ENGINE ROOM HARNESS
65G	W/R	TO ENGINE ROOM HARNESS
66G	BG	TO ENGINE ROOM HARNESS
67G	O	TO ENGINE ROOM HARNESS
68G	B	TO ENGINE ROOM HARNESS
69G	Y	TO ENGINE ROOM HARNESS
70G	L	TO ENGINE ROOM HARNESS
71G	R/W	TO ENGINE ROOM HARNESS
72G	L/W	TO ENGINE ROOM HARNESS
73G	SHIELD	TO ENGINE ROOM HARNESS
74G	W	TO ENGINE ROOM HARNESS
75G	R	TO ENGINE ROOM HARNESS
76G	R/G	TO ENGINE ROOM HARNESS
77G	BG	TO ENGINE ROOM HARNESS
78G	P	TO ENGINE ROOM HARNESS
79G	–	TO ENGINE ROOM HARNESS
80G	R	TO ENGINE ROOM HARNESS
81G	L	TO ENGINE ROOM HARNESS
82G	R	TO ENGINE ROOM HARNESS
83G	L	TO ENGINE ROOM HARNESS
84G	L	TO ENGINE ROOM HARNESS
85G	W	TO ENGINE ROOM HARNESS
86G	B/R	TO ENGINE ROOM HARNESS
87G	W	TO ENGINE ROOM HARNESS
88G	G	TO ENGINE ROOM HARNESS
89G	P	TO ENGINE ROOM HARNESS
90G	G	TO ENGINE ROOM HARNESS
91G	P	TO ENGINE ROOM HARNESS
92G	V/W	TO ENGINE ROOM HARNESS
93G	BR	TO ENGINE ROOM HARNESS
94G	B	TO ENGINE ROOM HARNESS
95G	G	TO ENGINE ROOM HARNESS
96G	R	TO ENGINE ROOM HARNESS
97G	R	TO ENGINE ROOM HARNESS
98G	W/B	TO ENGINE ROOM HARNESS
99G	R	TO ENGINE ROOM HARNESS
100G	GR/W	TO ENGINE ROOM HARNESS

Connector No.	M44
Connector Name	FRONT BLOWER MOTOR
Connector Type	M02FW-LC
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	IGNITION
2	L/W	FAN SPEED CONT

Connector No.	M60
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS06FW-CS
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1T	–	–
2T	SB	BATTERY
3T	R	RR DEF RLY
4T	G	BATTERY
5T	–	–
6T	–	–

Connector No.	M64
Connector Name	INTAKE SENSOR
Connector Type	C02FW
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	P	INTAKE SENS
2	R	SENS GND

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AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH Cummins 5.0L)

Connector No.	M70
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FBR-CS
Connector Color	BROWN

H.S.

7R	6R	5R	4R		3R	2R	1R
16R	15R	14R	13R	12R	11R	10R	9R	8R

Terminal No.	Color of Wire	Signal Name
1R	L	TAIL LAMP 2
2R	G/R	IGNITION
3R	Y/R	BATTERY
4R	–	–
5R	W	BATTERY
6R	G/W	ACCESSORY
7R	–	–
8R	–	–
9R	–	–
10R	W	BATTERY
11R	–	–
12R	BG	BATTERY
13R	B	ACCESSORY
14R	G/Y	BATTERY
15R	Y	BATTERY
16R	G/R	ACCESSORY

Connector No.	M130
Connector Name	VARIABLE BLOWER CONTROL
Connector Type	M04FW-LC
Connector Color	WHITE

H.S.

3	2
1	

Terminal No.	Color of Wire	Signal Name
1	B	GND
2	P	FAN GATE
3	L/W	FAN SPEED

Connector No.	M133
Connector Name	A/C SWITCH ASSEMBLY
Connector Type	TH12FW-NH
Connector Color	WHITE

H.S.

1	2	3	4	5	6
7	8	9	10	11	12

Terminal No.	Color of Wire	Signal Name
1	B	GND
2	–	–
3	–	–
4	–	–
5	L	ILL +
6	GR	ILL -
7	–	–
8	–	–
9	BR	RX
10	V	TX
11	–	–
12	G	IGN

Connector No.	M95
Connector Name	WIRE TO WIRE
Connector Type	A03MW
Connector Color	WHITE

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name
1	W	TO HVAC SUB HARNESS
2	B	TO HVAC SUB HARNESS
3	G	TO HVAC SUB HARNESS

Connector No.	M135
Connector Name	SUNLOAD SENSOR
Connector Type	K02FB
Connector Color	BLACK

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	G	SUN SENS
2	R	SENS GND

Connector No.	M136
Connector Name	IN-VEHICLE SENSOR
Connector Type	A02FW
Connector Color	WHITE

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	G	IN CAR SENS
2	R	SENS GND

Connector No.	M137
Connector Name	A/C AUTO AMP.
Connector Type	TH40FW-NH
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name
1	L	CAN-H
2	B	GND
3	SB	BAT

4	BR	TX (FR CONT)
5	–	–
6	–	–
7	W	AMB SENS
8	BR	STRG HEATER SW
9	G	SUN SENS
10	–	–
11	–	–
12	–	–
13	W	IGN2(ACC)
14	P	FAN GATE
15	Y	RR DEF ON
16	G	LIN SIG
17	W	VACTR
18	–	–
19	G/R	PTC1 - (WITH CUMMINS 5.0L)
20	P	STRG HEATER RLY
21	P	CAN-L
22	B	P-GND
23	G	IGN
24	V	RX (FR CONT)
25	–	–
26	R	SENS GND
27	G	INCAR SENS
28	P	INTAKE SENS
29	–	–
30	–	–
31	–	–
32	–	–
33	Y	COMP ON
34	L/W	FAN FB
35	B/W	RR DEF F/B
36	–	–
37	B	ACTR GND
38	W	FAN ON
39	LG	PTC2 - (WITH CUMMINS 5.0L)
40	SB	PTC3 - (WITH CUMMINS 5.0L)

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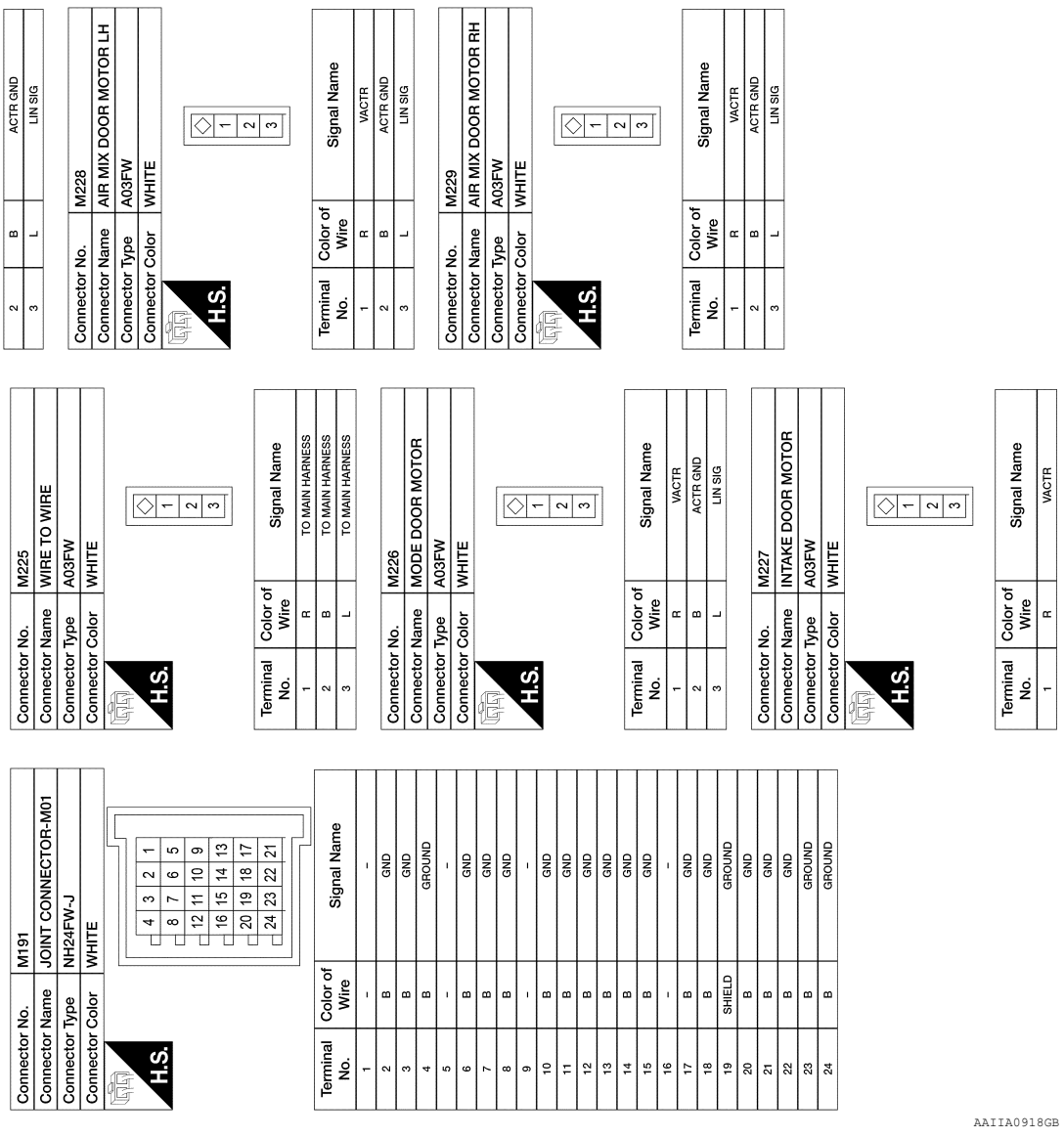
AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH Cummins 5.0L)



VK56VD

VK56VD : Wiring Diagram

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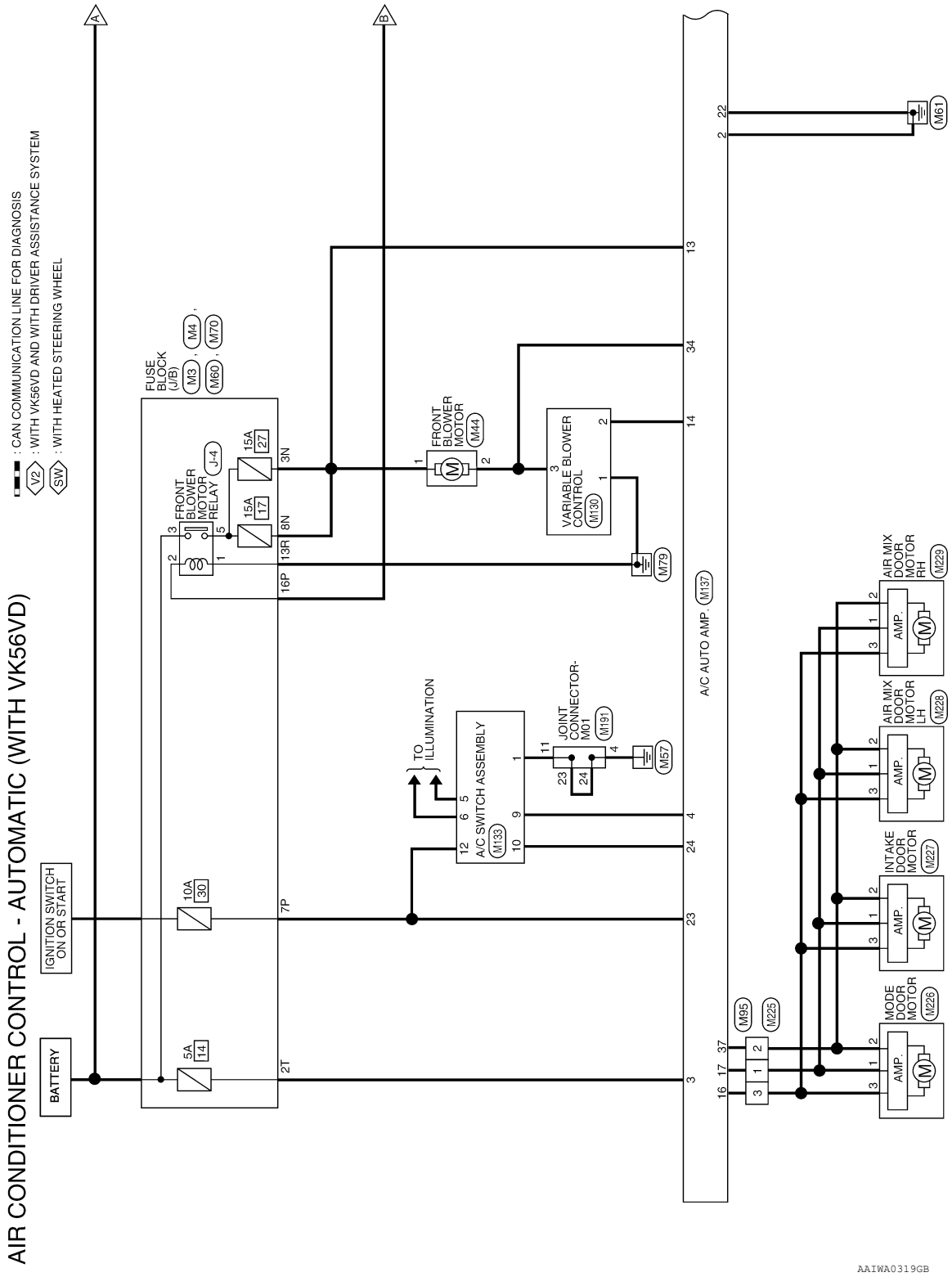

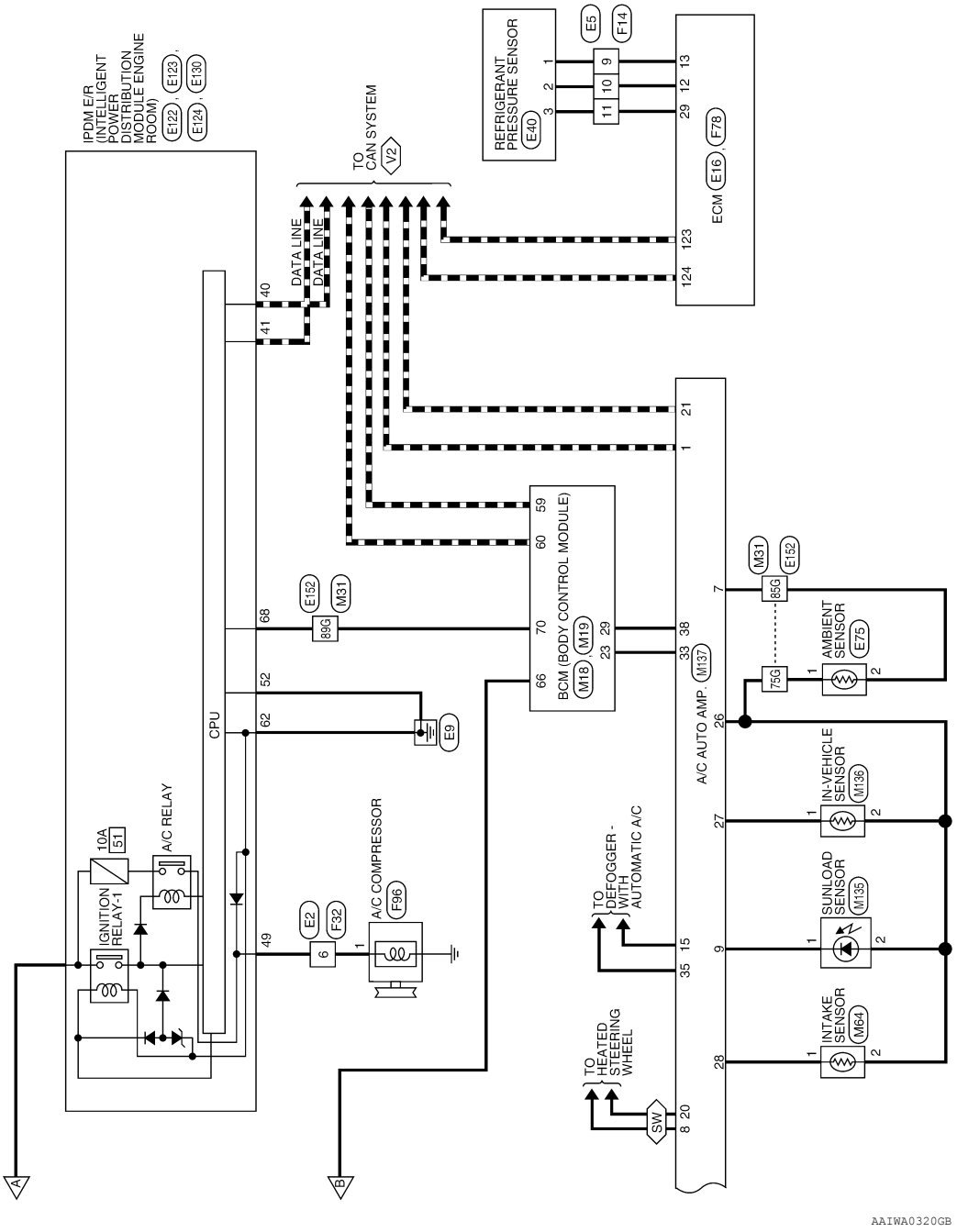
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E122, E123, E124, E130
CPU
TO CAN SYSTEM
V2
DATA LINE
DATA LINE
REFRIGERANT PRESSURE SENSOR
E40
E5
F14
ECM
E16, F78
BCM (BODY CONTROL MODULE)
M18 M19
A/C AUTO AMP.
M137
E152 M31
89G
E9
10A
51
A/C RELAY
IGNITION RELAY-1
A/C COMPRESSOR
F96
E2 F32
TO DEFOGGER - WITH AUTOMATIC A/C
TO HEATED STEERING WHEEL
SW
AMBIENT SENSOR
E75
75G
IN-VEHICLE SENSOR
M136
SUNLOAD SENSOR
M135
INTAKE SENSOR
M64
85G
A
B
AAIWA0320GB

AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH VK56VD)

Connector No.	E2
Connector Name	WIRE TO WIRE
Connector Type	RS08MGY-PR
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	TO ENGINE CONTROL HARNESS
2	L	TO ENGINE CONTROL HARNESS
3	R/W	TO ENGINE CONTROL HARNESS
4	W	TO ENGINE CONTROL HARNESS
5	SHIELD	TO ENGINE CONTROL HARNESS
6	GR/R	TO ENGINE CONTROL HARNESS
7	BR	TO ENGINE CONTROL HARNESS
8	B	TO ENGINE CONTROL HARNESS

Connector No.	E5
Connector Name	WIRE TO WIRE
Connector Type	TH24MW-NH
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	L/R	TO ENGINE CONTROL HARNESS
2	BR	TO ENGINE CONTROL HARNESS
3	V	TO ENGINE CONTROL HARNESS
4	L/O	TO ENGINE CONTROL HARNESS
5	W	TO ENGINE CONTROL HARNESS
6	B/R	TO ENGINE CONTROL HARNESS
7	Y/R	TO ENGINE CONTROL HARNESS
8	BR	TO ENGINE CONTROL HARNESS
9	W/L	TO ENGINE CONTROL HARNESS
10	L/Y	TO ENGINE CONTROL HARNESS
11	SB	TO ENGINE CONTROL HARNESS
12	L	TO ENGINE CONTROL HARNESS
13	W/R	TO ENGINE CONTROL HARNESS
14	Y	TO ENGINE CONTROL HARNESS
15	B	TO ENGINE CONTROL HARNESS
16	B	TO ENGINE CONTROL HARNESS
17	R	TO ENGINE CONTROL HARNESS
18	B	TO ENGINE CONTROL HARNESS
19	B/R	TO ENGINE CONTROL HARNESS
20	GR	TO ENGINE CONTROL HARNESS
21	V/R	TO ENGINE CONTROL HARNESS
22	B	TO ENGINE CONTROL HARNESS
23	B	TO ENGINE CONTROL HARNESS
24	P	TO ENGINE CONTROL HARNESS

Connector No.	E16
Connector Name	ECM (WITH VK56VD)
Connector Type	MAA24FB-MEA8-RH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
121	O/B	EVAP CONTROL SYSTEM PRESSURE SENSOR
122	–	–
123	P	CAN COMMUNICATION LINE (CAN-L)
124	L	CAN COMMUNICATION LINE (CAN-H)
125	SB	SENSOR POWER SUPPLY
126	–	–
127	–	–
128	V/W	FUEL TEMPERATURE SENSOR
129	–	–
130	R/W	FUEL PUMP CONTROL MODULE (FPCM) CHECK
131	–	–
132	–	–
133	W	IGNITION SWITCH
134	G/Y	ASCD STEERING SWITCH
135	B/Y	SENSOR GROUND
136	GR	FUEL PUMP CONTROL MODULE (FPCM)
137	R/W	ENG COMMUNICATION LINE
138	W	ENG COMMUNICATION LINE
139	R/G	STOP LAMP SWITCH
140	G/Y	BRAKE PEDAL POSITION SWITCH
141	Y	EVAP CANISTER VENT CONTROL VALVE
142	L/W	SENSOR POWER SUPPLY
143	O	ACCELERATOR PEDAL POSITION SENSOR 2
144	P/L	SENSOR GROUND
145	W	POWER SUPPLY FOR ECM
146	W/G	SENSOR POWER SUPPLY
147	B	ECM GROUND
148	R	SENSOR GROUND
149	B	ECM GROUND
150	W/R	ACCELERATOR PEDAL POSITION SENSOR 1
151	R/Y	SENSOR GROUND
152	B	ECM GROUND

Connector No.	E40
Connector Name	REFRIGERANT PRESSURE SENSOR (WITH VK56VD)
Connector Type	RK03FB
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	W/L	GND A PRESS
2	L/Y	PD PRES
3	SB	AVCC2 PRESS

Connector No.	E75
Connector Name	AMBIENT SENSOR
Connector Type	RS02FB
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	R	SENS GND
2	W/B	AMB SENS

Connector No.	E122
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH12FW-NH
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
37	–	–
38	–	–
39	L/Y	WIPER AUTO STOP SW
40	P	CAN-L
41	L	CAN-H
42	BR	DTRL RLY
43	–	–
44	W/B	START CONT
45	GR	FUEL RLY CONT
46	Y	HOOD SW
47	Y	ALT C - (WITH VK56VD)
48	R/W	HORN RLY CONT

AAIIA0926GB

AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH VK56VD)

Connector No.	E123
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS08FBR-CS
Connector Color	BROWN

H.S.

51		50	49
56	55	54	53	52

Terminal No.	Color of Wire	Signal Name
49	Y/B	A/C COMP - (WITH CUMMINS 5.0L)
49	GR/R	A/C COMP - (WITH VK56VD)
50	BR	TRAILER TOW
51	–	–
52	B	S-GND
53	–	–
54	–	–
55	–	–
56	–	–

Connector No.	E130
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH10FB-NH
Connector Color	BLACK

H.S.

67	66	65	64	63
72	71	70	69	68

Terminal No.	Color of Wire	Signal Name
63	–	–
64	R	DETENT SW
65	–	–
66	P	PUSH START SW
67	–	–
68	L	IGN SIGNAL
69	–	–
70	–	–
71	SB	HOOD SW2
72	W	E-CPLG - (WITH VK56VD)

Connector No.	E124
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC
Connector Color	BLACK

H.S.

59	58	57
62	61	60

Terminal No.	Color of Wire	Signal Name
57	W/B	RR DEF
58	BR	FUEL PUMP - (WITH CUMMINS 5.0L)
58	B/Y	FUEL PUMP - (WITH VK56VD)
59	–	–
60	–	–
61	–	–
62	B	P GND

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AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH VK56VD)

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	G	TO MAIN HARNESS
2G	B/R	TO MAIN HARNESS
3G	W/B	TO MAIN HARNESS
4G	BR/W	TO MAIN HARNESS
5G	BR	TO MAIN HARNESS
6G	P	TO MAIN HARNESS - (WITH VK56VD)
6G	R/W	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
7G	Y	TO MAIN HARNESS
8G	G	TO MAIN HARNESS
9G	R	TO MAIN HARNESS
10G	W	TO MAIN HARNESS
11G	R/G	TO MAIN HARNESS
12G	W/B	TO MAIN HARNESS
13G	BR	TO MAIN HARNESS
14G	Y/B	TO MAIN HARNESS
15G	G/W	TO MAIN HARNESS
16G	G	TO MAIN HARNESS
17G	G/Y	TO MAIN HARNESS
18G	G/Y	TO MAIN HARNESS
19G	Y/V	TO MAIN HARNESS
20G	G/Y	TO MAIN HARNESS
21G	B/Y	TO MAIN HARNESS
22G	G/R	TO MAIN HARNESS
23G	Y/R	TO MAIN HARNESS

24G	G/B	TO MAIN HARNESS
25G	R/W	TO MAIN HARNESS
26G	R	TO MAIN HARNESS
27G	LG	TO MAIN HARNESS
28G	G/B	TO MAIN HARNESS
29G	G/B	TO MAIN HARNESS
30G	BR/Y	TO MAIN HARNESS
31G	P	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
31G	R	TO MAIN HARNESS - (WITH VK56VD)
32G	P	TO MAIN HARNESS
33G	Y/L	TO MAIN HARNESS
34G	GR	TO MAIN HARNESS
35G	G/R	TO MAIN HARNESS
36G	SB	TO MAIN HARNESS
37G	R/W	TO MAIN HARNESS
38G	BR	TO MAIN HARNESS
39G	BR	TO MAIN HARNESS
40G	–	TO MAIN HARNESS
41G	R/G	TO MAIN HARNESS
42G	O	TO MAIN HARNESS
43G	B	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
43G	G	TO MAIN HARNESS - (WITH VK56VD)
44G	R/Y	TO MAIN HARNESS
45G	G	TO MAIN HARNESS
46G	LG	TO MAIN HARNESS
47G	R	TO MAIN HARNESS
48G	W	TO MAIN HARNESS
49G	–	TO MAIN HARNESS
50G	BR	TO MAIN HARNESS
51G	R	TO MAIN HARNESS
52G	L	TO MAIN HARNESS
53G	W	TO MAIN HARNESS
54G	W	TO MAIN HARNESS
55G	G	TO MAIN HARNESS
56G	W	TO MAIN HARNESS
57G	Y	TO MAIN HARNESS
58G	BG	TO MAIN HARNESS
59G	BG	TO MAIN HARNESS
60G	BG	TO MAIN HARNESS
61G	B	TO MAIN HARNESS
62G	W	TO MAIN HARNESS
63G	R	TO MAIN HARNESS
64G	W/L	TO MAIN HARNESS
65G	W/R	TO MAIN HARNESS
66G	BG	TO MAIN HARNESS
67G	BG	TO MAIN HARNESS
68G	B	TO MAIN HARNESS
69G	Y	TO MAIN HARNESS
70G	L	TO MAIN HARNESS
71G	R/W	TO MAIN HARNESS

72G	L/W	TO MAIN HARNESS
73G	SHIELD	TO MAIN HARNESS
74G	W	TO MAIN HARNESS
75G	R	TO MAIN HARNESS
76G	R/G	TO MAIN HARNESS
77G	G	TO MAIN HARNESS
78G	W	TO MAIN HARNESS
79G	–	TO MAIN HARNESS
80G	R	TO MAIN HARNESS
81G	L	TO MAIN HARNESS
82G	R	TO MAIN HARNESS
83G	L	TO MAIN HARNESS
84G	L	TO MAIN HARNESS
85G	W/B	TO MAIN HARNESS
86G	B/R	TO MAIN HARNESS
87G	W/B	TO MAIN HARNESS
88G	P	TO MAIN HARNESS
89G	L	TO MAIN HARNESS
90G	G	TO MAIN HARNESS
91G	G	TO MAIN HARNESS
92G	V/W	TO MAIN HARNESS
93G	BR	TO MAIN HARNESS
94G	G	TO MAIN HARNESS
95G	G	TO MAIN HARNESS
96G	W	TO MAIN HARNESS
97G	R	TO MAIN HARNESS
98G	W/B	TO MAIN HARNESS
99G	BR	TO MAIN HARNESS
100G	GR/W	TO MAIN HARNESS

Connector No.	F14
Connector Name	WIRE TO WIRE
Connector Type	TH24FW-NH
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	L/R	TO ENGINE ROOM HARNESS
2	BR	TO ENGINE ROOM HARNESS
3	V	TO ENGINE ROOM HARNESS
4	L/O	TO ENGINE ROOM HARNESS
5	W	TO ENGINE ROOM HARNESS
6	B/R	TO ENGINE ROOM HARNESS
7	Y/R	TO ENGINE ROOM HARNESS
8	BR	TO ENGINE ROOM HARNESS
9	W/L	TO ENGINE ROOM HARNESS

10	L/Y	TO ENGINE ROOM HARNESS
11	SB	TO ENGINE ROOM HARNESS
12	L	TO ENGINE ROOM HARNESS
13	W/R	TO ENGINE ROOM HARNESS
14	Y	TO ENGINE ROOM HARNESS
15	B	TO ENGINE ROOM HARNESS
16	B	TO ENGINE ROOM HARNESS
17	R	TO ENGINE ROOM HARNESS
18	B	TO ENGINE ROOM HARNESS
19	B/R	TO ENGINE ROOM HARNESS
20	GR	TO ENGINE ROOM HARNESS
21	V/R	TO ENGINE ROOM HARNESS
22	SHIELD	TO ENGINE ROOM HARNESS
23	SHIELD	TO ENGINE ROOM HARNESS
24	P	TO ENGINE ROOM HARNESS

Connector No.	F32
Connector Name	WIRE TO WIRE
Connector Type	RS08FGY-PR
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	TO ENGINE ROOM HARNESS
2	L	TO ENGINE ROOM HARNESS
3	R/W	TO ENGINE ROOM HARNESS
4	W	TO ENGINE ROOM HARNESS
5	SHIELD	TO ENGINE ROOM HARNESS
6	GR/R	TO ENGINE ROOM HARNESS
7	BR	TO ENGINE ROOM HARNESS
8	B	TO ENGINE ROOM HARNESS

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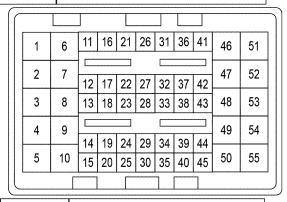
AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH VK56VD)

Connector No.	F78
Connector Name	ECM (WITH VK56VD)
Connector Type	MAB35FB-MEB20-LH
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	R	FUEL INJECTOR DRIVER POWER SUPPLY
2	SB	HIGH PRESSURE FUEL PUMP DRIVER POWER SUPPLY
3	B/R	FUEL INJECTOR NO. 8 (LO)
4	O	FUEL INJECTOR NO. 3 (LO)
5	G	FUEL INJECTOR NO. 2, 3 (HI)
6	R	FUEL INJECTOR DRIVER POWER SUPPLY
7	V/B	FUEL INJECTOR NO. 5, 8 (HI)
8	B/W	FUEL INJECTOR NO. 5 (LO)
9	R/W	INJ-L #2
10	B	ECM GROUND
11	–	–
12	L/Y	REFRIGERANT PRESSURE SENSOR
13	W/L	SENSOR GROUND
14	SHIELD	SHIELD
15	W	KNOCK SENSOR (BANK 1)
16	–	–
17	V	EXHAUST GAS TEMPERATURE SENSOR (BANK 2)
18	W	KNOCK SENSOR (BANK 2)
19	GR/R	EXHAUST GAS TEMPERATURE SENSOR (BANK 1)
20	SHIELD	SENSOR GROUND
21	–	–
22	L/Y	ENGINE OIL TEMPERATURE SENSOR
23	L/Y	ENGINE OIL PRESSURE SENSOR
24	P/GR	POWER STEERING PRESSURE SENSOR
25	V/W	FUEL RAIL PRESSURE SENSOR
26	–	–
27	W/G	SENSOR POWER SUPPLY
28	Y/R	SENSOR POWER SUPPLY
29	SB	SENSOR POWER SUPPLY
30	SB	SENSOR POWER SUPPLY
31	BR	COOLING FAN SPEED
32	LG	BATTERY TEMPERATURE SENSOR
33	R/W	CRANKSHAFT POSITION SENSOR (POS)
34	–	–
35	R/W	ENGINE COOLANT TEMPERATURE SENSOR 1
36	G/O	INTAKE AIR TEMPERATURE SENSOR
37	G/B	MASS AIR FLOW SENSOR
38	V	BATTERY CURRENT SENSOR
39	–	–
40	L/R	CAMSHAFT POSITION SENSOR (PHASE) (BANK 1)
41	P	EXHAUST VALVE TIMING CONTROL POSITION SENSOR (BANK 1)
42	R	SENSOR GROUND
43	R	SENSOR GROUND
44	G/W	SENSOR GROUND
45	BR/W	SENSOR GROUND
46	SB	HIGH PRESSURE FUEL PUMP DRIVER POWER SUPPLY
47	BR	FUEL INJECTOR NO. 1, 6 (HI)
48	Y	FUEL INJECTOR NO. 1 (LO)
49	L	FUEL INJECTOR NO. 4 (LO)
50	B	ECM GROUND
51	P	HIGH PRESSURE FUEL PUMP DRIVER POWER SUPPLY
52	R	FUEL INJECTOR NO. 6 (LO)
53	V	FUEL INJECTOR NO. 7 (LO)
54	W	FUEL INJECTOR NO. 4, 7 (HI)
55	B	ECM GROUND

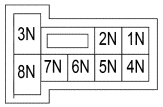
Connector No.	F96
Connector Name	A/C COMPRESSOR (WITH VK56VD)
Connector Type	6185-0862
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	GR/R	A/C COMP

Connector No.	M3
Connector Name	FUSE BLOCK (J/B)
Connector Type	CS06FW-M2
Connector Color	WHITE

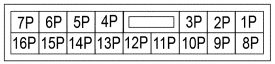
H.S.



Terminal No.	Color of Wire	Signal Name
1N	–	–
2N	W	BATTERY
3N	W	BLOWER FAN RELAY OUT
4N	V	BATTERY
5N	Y	BATTERY
6N	W	BATTERY
7N	L	ACC RELAY OUT
8N	W	IGNITION

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FW-CS
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1P	R	IGNITION
2P	Y	IGNITION
3P	G	IGNITION RELAY OUT
4P	B/W	RR DEF RLY
5P	B/W	RR DEF RLY
6P	O	RR DEF RLY OUT
7P	G	IGNITION
8P	W	IGNITION
9P	L	BATTERY
10P	–	–
11P	–	–
12P	–	–
13P	R	BATTERY
14P	Y	BATTERY
15P	Y/LG	BATTERY
16P	W	BLOWER FAN RELAY OUT

AAITA0929GB

AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH VK56VD)

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FG-NH
Connector Color	GREEN

H.S.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
1	G	ENG START SW NO ESCL
2	–	–
3	R	A/L POWER SUPPLY 5V
4	W/R	A/L SIGNAL
5	–	–
6	–	–
7	–	–
8	–	–
9	–	–
10	SB	COMBI SW IN 5
11	G/Y	COMBI SW IN 4
12	Y	COMBI SW IN 3
13	G/B	COMBI SW IN 2
14	V	COMBI SW IN 1
15	–	–
16	–	–
17	P	GND RF A/L
18	V	SECURITY INDICATOR
19	–	–
20	R	SHIFT P
21	R/W	STEP LAMP CONT
22	–	–
23	Y	AIRCON SW
24	–	–
25	W	BRAKE SW FUSE
26	L	SHORT IN PIN INPUT
27	R/G	BRAKE SW LAMP
28	–	–
29	W	BLOWER FAN SW
30	P	DR DOOR LOCK STATUS
31	–	–
32	Y	REAR DEFOGGER SW
33	–	–
34	–	
35	R/G	REVERSE SW
36	W/B	HAZARD SW
37	–	–
38	–	–
39	B/R	SHIFT N/P
40	–	–

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FB-NH
Connector Color	BLACK

H.S.

60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61

Terminal No.	Color of Wire	Signal Name
41	Y/L	TRAILER LIGHT CHECK RELAY OUT
42	R/Y	CARGO LAMP OUT
43	–	–
44	–	–
45	–	–
46	–	–
47	–	–
48	R	HIGH SIDE START SW LED
49	–	–
50	–	–
51	–	–
52	W	AUDIO DONGLE
53	–	–
54	W/L	PW UART
55	W/B	L&R SENSOR K-LINE
56	–	–
57	–	–
58	–	–
59	P	CAN-L
60	L	CAN-H
61	O	REAR DEFOGGER RELAY OUT
62	W	STARTER RELAY OUT
63	–	–
64	P	BUZZER OUT
65	–	–
66	W	BLOWER FAN RELAY OUT
67	G	IGN ELEC RELAY OUT 2
68	L	MR OUTPUT
69	R/B	AT DEVICE OUT
70	P	IGN USM OUT 1
71	O	DR REQUEST SW
72	G	AS REQUEST SW
73	–	–
74	–	–
75	L/W	COMBI SW OUT 5
76	P	COMBI SW OUT 4
77	L	COMBI SW OUT 3
78	O/B	COMBI SW OUT 2
79	R/W	COMBI SW OUT 1
80	–	–

AAIIA0930GB

AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH VK56VD)

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	G	TO ENGINE ROOM HARNESS
2G	B/R	TO ENGINE ROOM HARNESS
3G	W	TO ENGINE ROOM HARNESS
4G	BR/W	TO ENGINE ROOM HARNESS
5G	–	TO ENGINE ROOM HARNESS
6G	R/W	TO ENGINE ROOM HARNESS
7G	Y	TO ENGINE ROOM HARNESS
8G	G	TO ENGINE ROOM HARNESS
9G	R	TO ENGINE ROOM HARNESS
10G	W	TO ENGINE ROOM HARNESS
11G	R/G	TO ENGINE ROOM HARNESS
12G	W/B	TO ENGINE ROOM HARNESS
13G	BR	TO ENGINE ROOM HARNESS
14G	Y/B	TO ENGINE ROOM HARNESS
15G	G/W	TO ENGINE ROOM HARNESS
16G	G	TO ENGINE ROOM HARNESS
17G	O	TO ENGINE ROOM HARNESS
18G	G/Y	TO ENGINE ROOM HARNESS
19G	Y/V	TO ENGINE ROOM HARNESS
20G	G/Y	TO ENGINE ROOM HARNESS
21G	B/Y	TO ENGINE ROOM HARNESS
22G	G/R	TO ENGINE ROOM HARNESS
23G	Y/R	TO ENGINE ROOM HARNESS
24G	G/B	TO ENGINE ROOM HARNESS
25G	R/W	TO ENGINE ROOM HARNESS
26G	R	TO ENGINE ROOM HARNESS
27G	LG	TO ENGINE ROOM HARNESS
28G	G/B	TO ENGINE ROOM HARNESS
29G	G/B	TO ENGINE ROOM HARNESS
30G	BR/Y	TO ENGINE ROOM HARNESS
31G	R	TO ENGINE ROOM HARNESS
32G	R	TO ENGINE ROOM HARNESS
33G	Y/L	TO ENGINE ROOM HARNESS
34G	GR	TO ENGINE ROOM HARNESS
35G	G/R	TO ENGINE ROOM HARNESS
36G	SB	TO ENGINE ROOM HARNESS
37G	R/W	TO ENGINE ROOM HARNESS
38G	BR	TO ENGINE ROOM HARNESS
39G	BR	TO ENGINE ROOM HARNESS
40G	–	TO ENGINE ROOM HARNESS
41G	R/G	TO ENGINE ROOM HARNESS
42G	O	TO ENGINE ROOM HARNESS
43G	G	TO ENGINE ROOM HARNESS
44G	R/Y	TO ENGINE ROOM HARNESS
45G	G	TO ENGINE ROOM HARNESS
46G	LG	TO ENGINE ROOM HARNESS
47G	R	TO ENGINE ROOM HARNESS
48G	W	TO ENGINE ROOM HARNESS
49G	–	TO ENGINE ROOM HARNESS
50G	BR	TO ENGINE ROOM HARNESS
51G	R	TO ENGINE ROOM HARNESS
52G	L	TO ENGINE ROOM HARNESS
53G	W	TO ENGINE ROOM HARNESS
54G	W	TO ENGINE ROOM HARNESS
55G	G	TO ENGINE ROOM HARNESS
56G	W	TO ENGINE ROOM HARNESS
57G	Y	TO ENGINE ROOM HARNESS
58G	BG	TO ENGINE ROOM HARNESS
59G	BG	TO ENGINE ROOM HARNESS
60G	BG	TO ENGINE ROOM HARNESS
61G	O	TO ENGINE ROOM HARNESS
62G	W	TO ENGINE ROOM HARNESS
63G	O	TO ENGINE ROOM HARNESS
64G	W/L	TO ENGINE ROOM HARNESS
65G	W/R	TO ENGINE ROOM HARNESS
66G	BG	TO ENGINE ROOM HARNESS
67G	O	TO ENGINE ROOM HARNESS
68G	B	TO ENGINE ROOM HARNESS
69G	Y	TO ENGINE ROOM HARNESS
70G	L	TO ENGINE ROOM HARNESS
71G	R/W	TO ENGINE ROOM HARNESS
72G	L/W	TO ENGINE ROOM HARNESS
73G	SHIELD	TO ENGINE ROOM HARNESS
74G	W	TO ENGINE ROOM HARNESS
75G	R	TO ENGINE ROOM HARNESS
76G	R/G	TO ENGINE ROOM HARNESS
77G	BG	TO ENGINE ROOM HARNESS
78G	P	TO ENGINE ROOM HARNESS
79G	–	TO ENGINE ROOM HARNESS
80G	R	TO ENGINE ROOM HARNESS
81G	L	TO ENGINE ROOM HARNESS
82G	R	TO ENGINE ROOM HARNESS
83G	L	TO ENGINE ROOM HARNESS
84G	L	TO ENGINE ROOM HARNESS
85G	W	TO ENGINE ROOM HARNESS
86G	B/R	TO ENGINE ROOM HARNESS
87G	W	TO ENGINE ROOM HARNESS
88G	G	TO ENGINE ROOM HARNESS
89G	P	TO ENGINE ROOM HARNESS
90G	G	TO ENGINE ROOM HARNESS
91G	P	TO ENGINE ROOM HARNESS
92G	V/W	TO ENGINE ROOM HARNESS
93G	BR	TO ENGINE ROOM HARNESS
94G	B	TO ENGINE ROOM HARNESS
95G	G	TO ENGINE ROOM HARNESS
96G	R	TO ENGINE ROOM HARNESS
97G	R	TO ENGINE ROOM HARNESS
98G	W/B	TO ENGINE ROOM HARNESS
99G	R	TO ENGINE ROOM HARNESS
100G	GR/W	TO ENGINE ROOM HARNESS

Connector No.	M44
Connector Name	FRONT BLOWER MOTOR
Connector Type	M02FW-LC
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	IGNITION
2	L/W	FAN SPEED CONT

Connector No.	M60
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS06FW-CS
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1T	–	–
2T	SB	BATTERY
3T	R	RR DEF RLY
4T	G	BATTERY
5T	–	–
6T	–	–

Connector No.	M64
Connector Name	INTAKE SENSOR
Connector Type	C02FW
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	P	INTAKE SENS
2	R	SENS GND

AAIIA0931GB

AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH VK56VD)

Connector No.	M70
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FBR-CS
Connector Color	BROWN

H.S.

7R	6R	5R	4R		3R	2R	1R
16R	15R	14R	13R	12R	11R	10R	9R	8R

Terminal No.	Color of Wire	Signal Name
1R	L	TAIL LAMP 2
2R	G/R	IGNITION
3R	Y/R	BATTERY
4R	–	–
5R	W	BATTERY
6R	G/W	ACCESSORY
7R	–	–
8R	–	–
9R	–	–
10R	W	BATTERY
11R	–	–
12R	BG	BATTERY
13R	B	ACCESSORY
14R	G/Y	BATTERY
15R	Y	BATTERY
16R	G/R	ACCESSORY

Connector No.	M130
Connector Name	VARIABLE BLOWER CONTROL
Connector Type	M04FW-LC
Connector Color	WHITE

H.S.

3	2
1	

Terminal No.	Color of Wire	Signal Name
1	B	GND
2	P	FAN GATE
3	L/W	FAN SPEED

Connector No.	M133
Connector Name	A/C SWITCH ASSEMBLY
Connector Type	TH12FW-NH
Connector Color	WHITE

H.S.

1	2	3	4	5	6
7	8	9	10	11	12

Terminal No.	Color of Wire	Signal Name
1	B	GND
2	–	–
3	–	–
4	–	–
5	L	ILL +
6	GR	ILL -
7	–	–
8	–	–
9	BR	RX
10	V	TX
11	–	–
12	G	IGN

Connector No.	M95
Connector Name	WIRE TO WIRE
Connector Type	A03MW
Connector Color	WHITE

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name
1	W	TO HVAC SUB HARNESS
2	B	TO HVAC SUB HARNESS
3	G	TO HVAC SUB HARNESS

Connector No.	M135
Connector Name	SUNLOAD SENSOR
Connector Type	K02FB
Connector Color	BLACK

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	G	SUN SENS
2	R	SENS GND

Connector No.	M136
Connector Name	IN-VEHICLE SENSOR
Connector Type	A02FW
Connector Color	WHITE

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	G	IN CAR SENS
2	R	SENS GND

Connector No.	M137
Connector Name	A/C AUTO AMP.
Connector Type	TH40FW-NH
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name
1	L	CAN-H
2	B	GND
3	SB	BAT

4	BR	TX (FR CONT)
5	–	–
6	–	–
7	W	AMB SENS
8	BR	STRG HEATER SW
9	G	SUN SENS
10	–	–
11	–	–
12	–	–
13	W	IGN2(ACC)
14	P	FAN GATE
15	Y	RR DEF ON
16	G	LIN SIG
17	W	VACTR
18	–	–
19	G/R	PTC1 - (WITH CUMMINS 5.0L)
20	P	STRG HEATER RLY
21	P	CAN-L
22	B	P-GND
23	G	IGN
24	V	RX (FR CONT)
25	–	–
26	R	SENS GND
27	G	INCAR SENS
28	P	INTAKE SENS
29	–	–
30	–	–
31	–	–
32	–	–
33	Y	COMP ON
34	L/W	FAN FB
35	B/W	RR DEF F/B
36	–	–
37	B	ACTR GND
38	W	FAN ON
39	LG	PTC2 - (WITH CUMMINS 5.0L)
40	SB	PTC3 - (WITH CUMMINS 5.0L)

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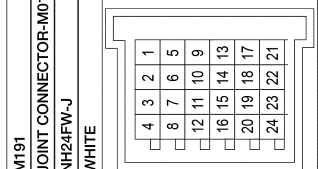
AIR CONDITIONER CONTROL CONNECTORS - AUTOMATIC (WITH VK56VD)

Connector No.	M191
Connector Name	JOINT CONNECTOR-M01
Connector Type	NH24FW-J
Connector Color	WHITE

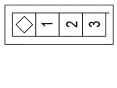
H.S.



Terminal No.	Color of Wire	Signal Name
1	–	–
2	B	GND
3	B	GND
4	B	GROUND
5	–	–
6	B	GND
7	B	GND
8	B	GND
9	–	–
10	B	GND
11	B	GND
12	B	GND
13	B	GND
14	B	GND
15	B	GND
16	–	–
17	B	GND
18	B	GND
19	SHIELD	GROUND
20	B	GND
21	B	GND
22	B	GND
23	B	GROUND
24	B	GROUND

Connector No.	M225
Connector Name	WIRE TO WIRE
Connector Type	A03FW
Connector Color	WHITE

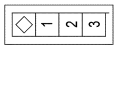
H.S.



Terminal No.	Color of Wire	Signal Name
1	R	TO MAIN HARNESS
2	B	TO MAIN HARNESS
3	L	TO MAIN HARNESS

Connector No.	M226
Connector Name	MODE DOOR MOTOR
Connector Type	A03FW
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1	R	VACTR
2	B	ACTR GND
3	L	LIN SIG

Connector No.	M227
Connector Name	INTAKE DOOR MOTOR
Connector Type	A03FW
Connector Color	WHITE

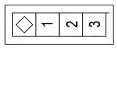
H.S.

Terminal No.	Color of Wire	Signal Name
1	R	VACTR

2	B	ACTR GND
3	L	LIN SIG

Connector No.	M228
Connector Name	AIR MIX DOOR MOTOR LH
Connector Type	A03FW
Connector Color	WHITE

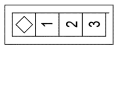
H.S.



Terminal No.	Color of Wire	Signal Name
1	R	VACTR
2	B	ACTR GND
3	L	LIN SIG

Connector No.	M229
Connector Name	AIR MIX DOOR MOTOR RH
Connector Type	A03FW
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1	R	VACTR
2	B	ACTR GND
3	L	LIN SIG

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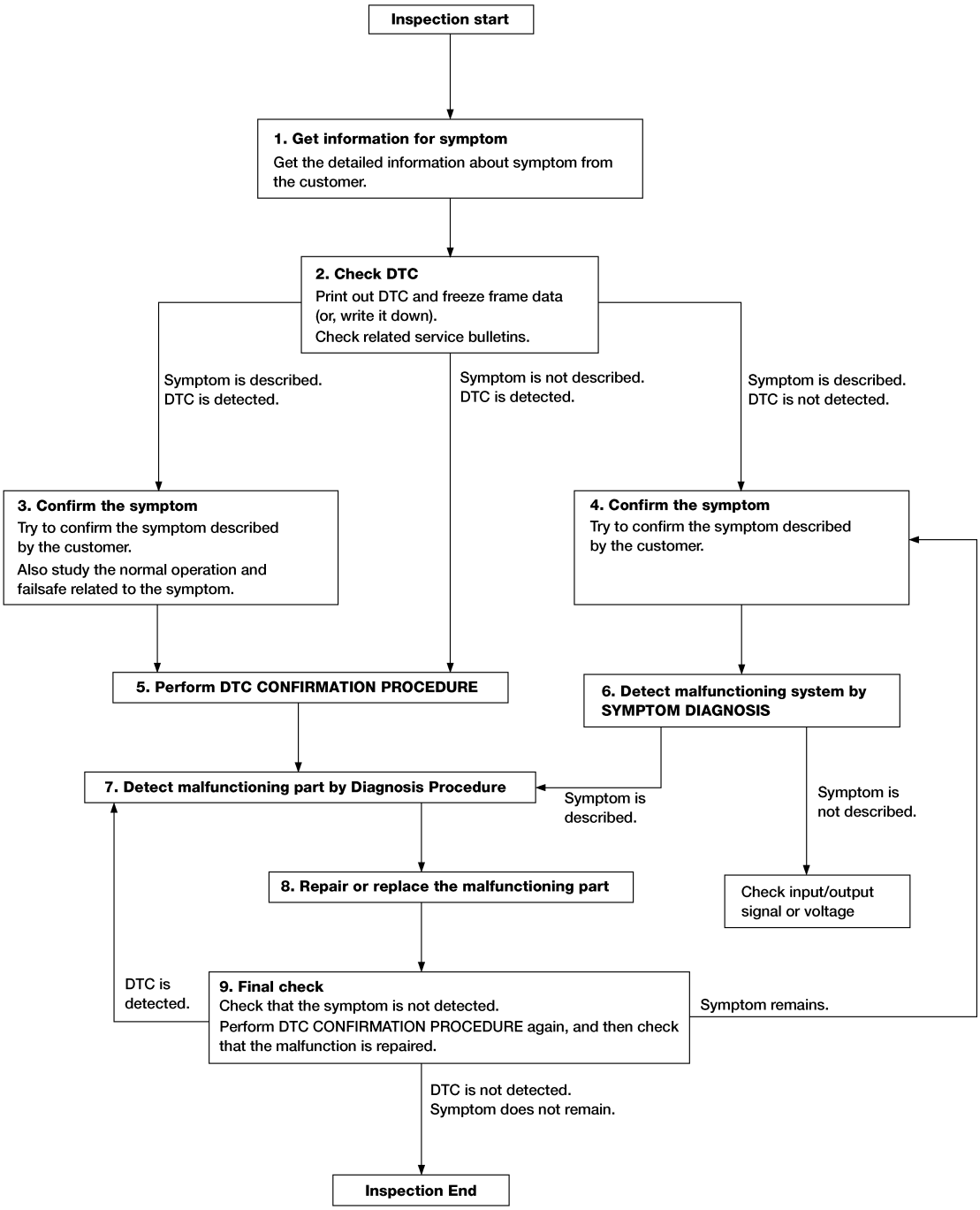
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000014392110

OVERALL SEQUENCE



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DETAILED FLOW

1.GET INFORMATION FOR SYMPTOM

1. Get detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurs).
2. Check operation condition of the function that is malfunctioning.

>> GO TO 2.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is detected:
- Record DTC and freeze frame data (Print them out using CONSULT.)
- Erase DTC.
- Study the relationship between the cause detected by DTC and the symptom described by the customer.
3. Check related service bulletins for information.

Are any symptoms described and any DTC detected?

Symptom is described, DTC is detected>>GO TO 3.
Symptom is described, DTC is not detected>>GO TO 4.
Symptom is not described, DTC is detected>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
Also study the normal operation and fail-safe related to the symptom.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the detected DTC and then check that DTC is detected again. At this time, always connect CONSULT to the vehicle, and check self diagnostic results in real time.
If two or more DTCs are detected, refer to DTC INSPECTION PRIORITY CHART, and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included in Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.
  If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 7.
NO >> Check according to GI-47, "Intermittent Incident".

6.DETECT MALFUNCTIONING SYSTEM BY SYMPTOM DIAGNOSIS

Detect malfunctioning system according to SYMPTOM DIAGNOSIS based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

Is the symptom described?

YES >> GO TO 7.
NO >> Monitor input data from related sensors or check voltage of related module terminals using CONSULT.

7.DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system.

Is malfunctioning part detected?

YES >> GO TO 8.
NO >> Check according to GI-47, "Intermittent Incident".

8. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is detected, erase it.

>> GO TO 9.

9. FINAL CHECK

When DTC is detected in step 2, perform DTC CONFIRMATION PROCEDURE again, then check that the malfunction is repaired.
When symptom is described by the customer, refer to confirmed symptom in step 3 or 4, and check that the symptom is not detected.

Is DTC detected and does symptom remain?

YES-1 >> DTC is detected: GO TO 7.
YES-2 >> Symptom remains: GO TO 4.
NO >> Before returning the vehicle to the customer, always erase DTC.

OPERATION INSPECTION

Work Procedure

INFOID:0000000014392111

DESCRIPTION

The purpose of the operational check is to check that the individual system operates normally.

Conditions : Engine running at normal operating temperature

INSPECTION PROCEDURE

1. CHECK MEMORY FUNCTION

1. Start the engine.
2. Operate the temperature control switch (driver side) and raise the temperature setting to 32°C (90°F).
3. Press the OFF switch.
4. Turn the ignition switch OFF.
5. Turn the ignition switch ON.
6. Press the AUTO switch.
7. Check that the temperature setting, before turning the ignition switch OFF, is stored.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check power and ground circuits for A/C auto amp. Refer to HAC-94, "A/C AUTO AMP. : Diagnosis Procedure".

2. CHECK BLOWER MOTOR SPEED

1. Operate the fan control dial. Check that the fan speed changes.
2. Check the operation for all fan speeds.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check blower motor system. Refer to HAC-104, "Diagnosis Procedure".

3. CHECK DISCHARGE AIR (MODE SWITCH AND DEF SWITCH)

1. Press the MODE switch and the DEF switch.
2. Check that the air outlets change according to each indicated air outlet by placing a hand in front of the outlets. Refer to HAC-21, "Door Control".

NOTE:
Confirm that the A/C compressor clutch is engaged (sound or visual inspection) and intake door position is at FRE ( ) when the D/F ( ) or DEF ( ) is selected.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check mode door system. Refer to HAC-96, "MODE DOOR MOTOR : Diagnosis Procedure".

4. CHECK INTAKE AIR

1. Press the REC ( ) switch. Indicator is turned ON.
2. Press the FRE ( ) switch. Indicator is turned ON.
3. Listen for the intake door position change. (Slight change of blower sound can be heard.)

NOTE:
Confirm that the A/C compressor clutch is engaged (sound or visual inspection) and the FRE ( ) switch is pressed when the D/F ( ) or DEF ( ) is selected.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Check intake door system. Refer to HAC-97, "INTAKE DOOR MOTOR : Diagnosis Procedure".

5. CHECK A/C SWITCH

1. Press the A/C switch.
2. The A/C switch indicator is turned ON.
   Confirm that the A/C compressor clutch engages (sound or visual inspection).

Is the inspection result normal?

YES >> GO TO 6.
NO >> Check magnet clutch system. Refer to HAC-108, "Diagnosis Procedure".

6. CHECK TEMPERATURE DECREASE

1. Operate the A/C compressor.
2. Operate the temperature control switch (driver side) and lower the temperature setting to 18°C (60°F).
3. Check that the cool air blows from the outlets.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Check for insufficient cooling. Refer to HAC-115, "Diagnosis Procedure".

7. CHECK TEMPERATURE INCREASE

1. Operate the temperature control switch (driver side) and raise the temperature setting to 32°C (90°F) after warming up the engine.
2. Check that the warm air blows from the outlets.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Check for insufficient heating. Refer to HAC-117, "Diagnosis Procedure".

8. CHECK DUAL MODE FUNCTION

1. Press the DUAL mode switch, and then check that “DUAL” is shown on the display.
2. Operate the temperature control switch (driver side). Check that the discharge air temperature (driver side) changes.
3. Operate the temperature control switch (passenger side). Check that the discharge air temperature (passenger side) changes.
4. Press the DUAL mode switch, and then check that the temperature setting (driver/passenger) is unified to the driver side temperature setting.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Refer to HAC-113, "Symptom Table" and perform the appropriate diagnosis.

9. CHECK AUTO MODE

1. Press the AUTO switch, and then check that “AUTO” is shown on the display.
2. Operate the temperature control switch (driver side). Check that the fan speed, outlet air or intake air changes. The discharge air temperature or fan speed varies depending on the ambient temperature, in-vehicle temperature, and temperature setting.

Is the inspection result normal?

YES >> Inspection End.
NO >> Refer to HAC-113, "Symptom Table" and perform the appropriate diagnosis.

CONFIGURATION (HVAC)

Work Procedure

INFOID:0000000014392112

NOTE:
- Use “Manual Configuration”.
- If an error occurs during configuration, start over from the beginning.

1.CHECK DATA PART NO. (TYPE ID)

1. Use FAST (service parts catalog) to search A/C auto amp. “DATA PART NO. (TYPE ID)”.
2. Write down “DATA PART NO. (TYPE ID)”.

>> GO TO 2.

2.WRITE CONFIGURATION

CONSULT Configuration
1. Select “Manual Configuration” of “HVAC”.
2. Select the “DATA PART NO. (TYPE ID)” found using FAST (service parts catalog) to write the “DATA PART NO. (TYPE ID)” into the A/C auto amp.

>> GO TO 3.

3.VERIFY DATA PART NO. (TYPE ID)

Compare the “DATA PART NO. (TYPE ID)” written into the A/C auto amp. with the one found using FAST (service parts catalog) to confirm they match.

Do DATA PART NOs match?

YES >> GO TO 4.
NO >> GO TO 2.

4.PERFORM SUPPLEMENTARY WORK

1. Perform self-diagnosis of all systems.
2. Erase self-diagnosis results.

>> GO TO 5.

5.OPERATION CHECK

Confirm that each function controlled by A/C auto amp. operates normally.

>> Work End.

SYSTEM SETTING

Temperature Setting Trimmer

INFOID:0000000014392113

Description

If the temperature felt by the customer is different than the airflow temperature controlled by the temperature setting, the auto amplifier control temperature can be adjusted to compensate for the temperature setting.

How to set

Using CONSULT, perform “TEMP SET CORRECT” in “Work support” of “HVAC”.

Work support items	Display (°F)	Display (°C)
TEMP SET CORRECT	6	3.0
	5	2.5
	4	2.0
	3	1.5
	2	1.0
	1	0.5
	0 (initial status)	0 (initial status)
	–1	–0.5
	–2	–1.0
	–3	–1.5
	–4	–2.0
	–5	–2.5
	–6	–3.0

NOTE:

- When the temperature setting is set to 25.0°C (77°F) and –3.0°C (–6°F), the temperature controlled by auto amp. is 25.0°C (77°F) – 3.0°C (6°F) = 22.0°C (71°F) and the temperature becomes lower than the temperature setting.
- When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10V or less, the setting of the difference between the temperature setting and control temperature may be cancelled.

Foot Position Setting Trimmer

INFOID:0000000014392114

Description

In the FOOT mode, the air blowing to the DEF can be turned ON/OFF.

How to set

Using CONSULT, perform “BLOW SET” in “Work support” of “HVAC”.

Work support items	Display	DEF door position	
		Auto control	Manual control
BLOW SET	Mode 1	OPEN	CLOSE
	Mode 2 (initial status)	OPEN	OPEN
	Mode 3	CLOSE	OPEN
	Mode 4	CLOSE	CLOSE

NOTE:

When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10V or less, the setting of the discharge air mix ratio in FOOT mode may be cancelled.

Inlet Port Memory Function (FRE)

INFOID:0000000014392115

Description

- If the ignition switch is turned to the OFF position while the FRE ( ) switch is set to ON (fresh air intake), "Perform the memory" or "Do not perform the memory" of the FRE ( ) switch ON (fresh air intake) condition can be selected.
- If "Perform the memory" was set, the FRE ( ) switch will be ON (fresh air intake) when turning the ignition switch to the ON position again.
- If "Do not perform the memory" was set, the air inlets will be controlled automatically when turning the ignition switch to the ON position again.

How to set

Using CONSULT, perform "FRE MEMORY SET" in "Work support" of "HVAC".

Work support items	Display	Setting
FRE MEMORY SET	WITHOUT	Perform the memory of manual FRE.
	WITH (initial status)	Do not perform the memory of manual FRE (auto control).

NOTE:

When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10V or less, the setting of the FRE switch memory function may be cancelled.

Inlet Port Memory Function (REC)

INFOID:0000000014392116

Description

- If the ignition switch is turned to the OFF position while the REC ( ) switch is set to ON (recirculation), "Perform the memory" or "Do not perform the memory" of the REC ( ) switch ON (recirculation) condition can be selected.
- If "Perform the memory" was set, the REC ( ) switch will be ON (recirculation) when turning the ignition switch to the ON position again.
- If "Do not perform the memory" was set, the air inlets will be controlled automatically when turning the ignition switch to the ON position again.

How to set

Using CONSULT, perform "REC MEMORY SET" in "Work support" of "HVAC".

Work support items	Display	Setting
REC MEMORY SET	WITHOUT (initial status)	Perform the memory of manual REC.
	WITH	Do not perform the memory of manual REC (auto control).

NOTE:

When the battery cable is disconnected from the negative terminal or when the battery voltage becomes 10V or less, the setting of the REC switch memory function may be cancelled.

DTC/CIRCUIT DIAGNOSIS

U1000 CAN COMM CIRCUIT

DTC Description

INFOID:0000000014392117

CAN (Controller Area Network) is a serial communication system for real time application. It is an on-vehicle multiplex communication system with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto vehicles, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with two communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. Refer to LAN-74, "CAN COMMUNICATION SYSTEM : CAN Communication Signal Chart".

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
U1000	CAN COMM CIRCUIT (CAN COMM CIRCUIT)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSE

CAN communication system

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM SELF-DIAGNOSIS

CONSULT
1. Turn ignition switch ON and wait for 2 seconds or more.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-69, "Diagnosis Procedure".
NO >> Refer to GI-47, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000014392118

1.CHECK CAN COMMUNICATION SYSTEM

Check CAN communication system. Refer to LAN-53, "Trouble Diagnosis Flow Chart".

>> Inspection End.

U1010 CONTROL UNIT (CAN)

DTC Description

INFOID:0000000014392119

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
U1010	CONTROL UNIT (CAN) [CONTROL UNIT (CAN)]	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–

POSSIBLE CAUSE

A/C auto amp.

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM SELF-DIAGNOSIS

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-70, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000014392120

1.REPLACE A/C AUTO AMP.

Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".

>> Inspection End.

U1321 CONFIGURATION

DTC Description

INFOID:0000000014392121

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
U1321	NOT CONFIGURED	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	—
		Threshold	If A/C auto amp. is not configured
		Diagnosis delay time	—

POSSIBLE CAUSE

A/C auto amp. not configured

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT
1. Start the engine.
2. Perform “All DTC Reading” mode.
3. Check if DTC U1321 is detected as the current malfunction in “Self Diagnostic Result” mode of “HVAC”.

Is DTC U1321 detected as the current malfunction?

YES >> Refer to HAC-71, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000014392122

1.PERFORM CONFIGURATION OF A/C AUTO AMP.

Perform configuration of A/C auto amp. when DTC “U1321” is detected.

>> Perform configuration of A/C auto amp. Refer to HAC-66, "Work Procedure".

B2578, B2579 IN-VEHICLE SENSOR

DTC Description

INFOID:0000000014392123

DTC DETECTION LOGIC

NOTE:

- If DTC is displayed along with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to HAC-69, "DTC Description".
- If DTC is displayed along with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to HAC-70, "DTC Description".

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B2578	IN-VEHICLE SENSOR (SHORT) (In-vehicle sensor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	More than 100°C (212°F)
		Diagnosis delay time	–
B2579	IN-VEHICLE SENSOR (OPEN) (In-vehicle sensor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Less than -42°C (-44°F)
		Diagnosis delay time	–

POSSIBLE CAUSE

- In-vehicle sensor
- A/C auto amp.
- Harness or connectors (The sensor circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-72, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000014392124

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-42, "CUMMINS 5.0L : Wiring Diagram".

1.CHECK IN-VEHICLE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect in-vehicle sensor connector.
3. Turn ignition switch ON.
4. Check voltage between in-vehicle sensor harness connector and ground.

(+)		(–)	Voltage (Approx.)
In-vehicle sensor			
Connector	Terminal		
M136	1	Ground	5 V

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK IN-VEHICLE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between in-vehicle sensor harness connector and ground.

In-vehicle sensor		(–)	Continuity
Connector	Terminal		
M136	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK IN-VEHICLE SENSOR

Check in-vehicle sensor. Refer to HAC-74, "Component Inspection".

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Replace in-vehicle sensor. Refer to HAC-124, "Removal and Installation".

4.CHECK IN-VEHICLE SENSOR POWER SUPPLY CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect A/C auto amp. connector.
3. Check continuity between in-vehicle sensor harness connector and A/C auto amp. harness connector.

In-vehicle sensor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M136	1	M137	27	Yes

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair harness or connector.

5.CHECK IN-VEHICLE SENSOR POWER SUPPLY CIRCUIT FOR GROUND SHORT

Check continuity between in-vehicle sensor harness connector and ground.

In-vehicle sensor		(–)	Continuity
Connector	Terminal		
M136	1	Ground	No

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair harness or connector.

6.CHECK IN-VEHICLE SENSOR POWER SUPPLY CIRCUIT FOR POWER SHORT

1. Turn ignition switch ON.
2. Check voltage between in-vehicle sensor harness connector and ground.

(+)		(–)	Voltage (Approx.)
In-vehicle sensor			
Connector	Terminal		
M136	1	Ground	0 V

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

Component Inspection

INFOID:0000000014392125

1.CHECK IN-VEHICLE SENSOR

1. Turn ignition switch OFF.
2. Disconnect in-vehicle sensor connector.
3. Check resistance between in-vehicle sensor terminals.

Terminal		Condition	Resistance: kΩ
		Temperature: °C (°F)	
1	2	–15 (5)	12.73
		–10 (14)	9.92
		–5 (23)	7.80
		0 (32)	6.19
		5 (41)	4.95
		10 (50)	3.99
		15 (59)	3.24
		20 (68)	2.65
		25 (77)	2.19
		30 (86)	1.81
		35 (95)	1.51
		40 (104)	1.27
		45 (113)	1.07

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace in-vehicle sensor. Refer to HAC-124, "Removal and Installation".

B257B, B257C AMBIENT SENSOR

DTC Description

INFOID:0000000014392126

DTC DETECTION LOGIC

NOTE:

- If DTC is displayed along with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to HAC-69, "DTC Description".
- If DTC is displayed along with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to HAC-70, "DTC Description".

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B257B	AMBIENT SENSOR (SHORT) (Ambient sensor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	More than 100°C (212°F)
		Diagnosis delay time	–
B257C	AMBIENT SENSOR (OPEN) (Ambient sensor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Less than -42°C (-44°F)
		Diagnosis delay time	–

POSSIBLE CAUSE

- Ambient sensor
- A/C auto amp.
- Harness or connectors (The sensor circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-75, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000014392127

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK AMBIENT SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ambient sensor connector.
3. Turn ignition switch ON.
4. Check voltage between ambient sensor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Ambient sensor			
Connector	Terminal		
E75	2	Ground	5 V

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK AMBIENT SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between ambient sensor harness connector and ground.

Ambient sensor		(–)	Continuity
Connector	Terminal		
E75	1	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK AMBIENT SENSOR

Check ambient sensor. Refer to HAC-77, "Component Inspection".

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Replace ambient sensor. Refer to HAC-123, "Removal and Installation".

4.CHECK AMBIENT SENSOR POWER SUPPLY CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect A/C auto amp. connector.
3. Check continuity between ambient sensor harness connector and A/C auto amp. harness connector.

Ambient sensor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
E75	2	M137	7	Yes

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair harness or connector.

5.CHECK AMBIENT SENSOR POWER SUPPLY CIRCUIT FOR GROUND SHORT

Check continuity between ambient sensor harness connector and ground.

Ambient sensor		(–)	Continuity
Connector	Terminal		
E75	2	Ground	No

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair harness or connector.

6.CHECK AMBIENT SENSOR POWER SUPPLY CIRCUIT FOR POWER SHORT

1. Turn ignition switch ON.
2. Check voltage between ambient sensor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Ambient sensor			
Connector	Terminal		
E75	2	Ground	0 V

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

Component Inspection

INFOID:0000000014392128

1.CHECK AMBIENT SENSOR

1. Turn ignition switch OFF.
2. Disconnect ambient sensor connector.
3. Check resistance between ambient sensor terminals.

Terminal		Condition	Resistance: kΩ
		Temperature: °C (°F)	
1	2	–15 (5)	12.73
		–10 (14)	9.92
		–5 (23)	7.80
		0 (32)	6.19
		5 (41)	4.95
		10 (50)	3.99
		15 (59)	3.24
		20 (68)	2.65
		25 (77)	2.19
		30 (86)	1.81
		35 (95)	1.51
		40 (104)	1.27
		45 (113)	1.07

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace ambient sensor. Refer to HAC-123, "Removal and Installation".

B2581, B2582 INTAKE SENSOR

DTC Description

INFOID:0000000014392129

DTC DETECTION LOGIC

NOTE:

- If DTC is displayed along with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to HAC-69, "DTC Description".
- If DTC is displayed along with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to HAC-70, "DTC Description".

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B2581	INTAKE SENSOR (SHORT) (Intake sensor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	More than 100°C (212°F)
		Diagnosis delay time	–
B2582	INTAKE SENSOR (OPEN) (Intake sensor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Less than -42°C (-44°F)
		Diagnosis delay time	–

POSSIBLE CAUSE

- Intake sensor
- A/C auto amp.
- Harness or connectors (The sensor circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-78, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000014392130

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK INTAKE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect intake sensor connector.
3. Turn ignition switch ON.
4. Check voltage between intake sensor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Intake sensor			
Connector	Terminal		
M64	1	Ground	5 V

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK INTAKE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between intake sensor harness connector and ground.

Intake sensor		(–)	Continuity
Connector	Terminal		
M64	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK INTAKE SENSOR

Check intake sensor. Refer to HAC-80, "Component Inspection".

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Replace intake sensor. Refer to HAC-126, "Removal and Installation".

4.CHECK INTAKE SENSOR POWER SUPPLY CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect A/C auto amp. connector.
3. Check continuity between intake sensor harness connector and A/C auto amp. harness connector.

Intake sensor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M64	1	M137	28	Yes

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair harness or connector.

5.CHECK INTAKE SENSOR POWER SUPPLY CIRCUIT FOR GROUND SHORT

Check continuity between intake sensor harness connector and ground.

Intake sensor		(–)	Continuity
Connector	Terminal		
M64	1	Ground	No

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair harness or connector.

6.CHECK INTAKE SENSOR POWER SUPPLY CIRCUIT FOR POWER SHORT

1. Turn ignition switch ON.
2. Check voltage between intake sensor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Intake sensor			
Connector	Terminal		
M64	1	Ground	0 V

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

Component Inspection

INFOID:0000000014392131

1.CHECK INTAKE SENSOR

1. Turn ignition switch OFF.
2. Disconnect intake sensor connector.
3. Check resistance between intake sensor terminals.

Terminal		Condition	Resistance: kΩ
		Temperature: °C (°F)	
1	2	–15 (5)	17.73
		–10 (14)	13.46
		–5 (23)	10.33
		0 (32)	8.00
		5 (41)	6.25
		10 (50)	4.93
		15 (59)	3.92
		20 (68)	3.14
		25 (77)	2.54
		30 (86)	2.06
		35 (95)	1.69
		40 (104)	1.39
		45 (113)	1.15

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace intake sensor. Refer to HAC-126, "Removal and Installation".

B2630, B2631 SUNLOAD SENSOR

DTC Description

INFOID:0000000014392132

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B2630	SUNLOAD SENSOR (SHORT) (Sunload sensor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Detected calorie at sunload sensor is 1395 w/m^2 (1200 kcal/m^2·h) or more
		Diagnosis delay time	–
B2631	SUNLOAD SENSOR (OPEN) (Sunload sensor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Detected calorie at sunload sensor is 0 w/m^2 (0 kcal/m^2·h)
		Diagnosis delay time	–

POSSIBLE CAUSE

- Sunload sensor
- A/C auto amp.
- Harness and connector (The sensor circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

NOTE:

- If DTC is displayed along with DTC U1000 or U1010, first diagnose the DTC U1000 or U1010. Refer to HAC-69, "DTC Description" or HAC-70, "DTC Description".
- Sunload sensor may register a malfunction when indoors, at dusk, or at other times when light is insufficient. When performing the diagnosis indoors, light the sunload sensor with a lamp (60W or more).

Is DTC “B2630” or “B2631” displayed?

YES >> Perform trouble diagnosis for the sunload sensor. Refer to HAC-81, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000014392133

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK SUNLOAD SENSOR POWER SUPPLY

1. Disconnect sunload sensor connector.
2. Turn ignition switch ON.
3. Check voltage between sunload sensor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Sunload sensor			
Connector	Terminal		
M135	1	Ground	5 V

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK CONTINUITY BETWEEN SUNLOAD SENSOR AND A/C AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect A/C auto amp. connector.
3. Check continuity between sunload sensor harness connector and A/C auto amp. harness connector.

Sunload sensor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M135	2	M137	26	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK SUNLOAD SENSOR

1. Reconnect sunload sensor connector and A/C auto amp. connector.
2. Check sunload sensor. Refer to HAC-82, "Component Inspection".

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Replace sunload sensor. Refer to HAC-125, "Removal and Installation".

4.CHECK CONTINUITY BETWEEN SUNLOAD SENSOR AND A/C AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect A/C auto amp. connector.
3. Check continuity between sunload sensor harness connector and A/C auto amp. harness connector.

Sunload sensor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M135	1	M137	9	Yes

4. Check continuity between sunload sensor harness connector and ground.

Sunload sensor		(–)	Continuity
Connector	Terminal		
M135	1	Ground	No

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

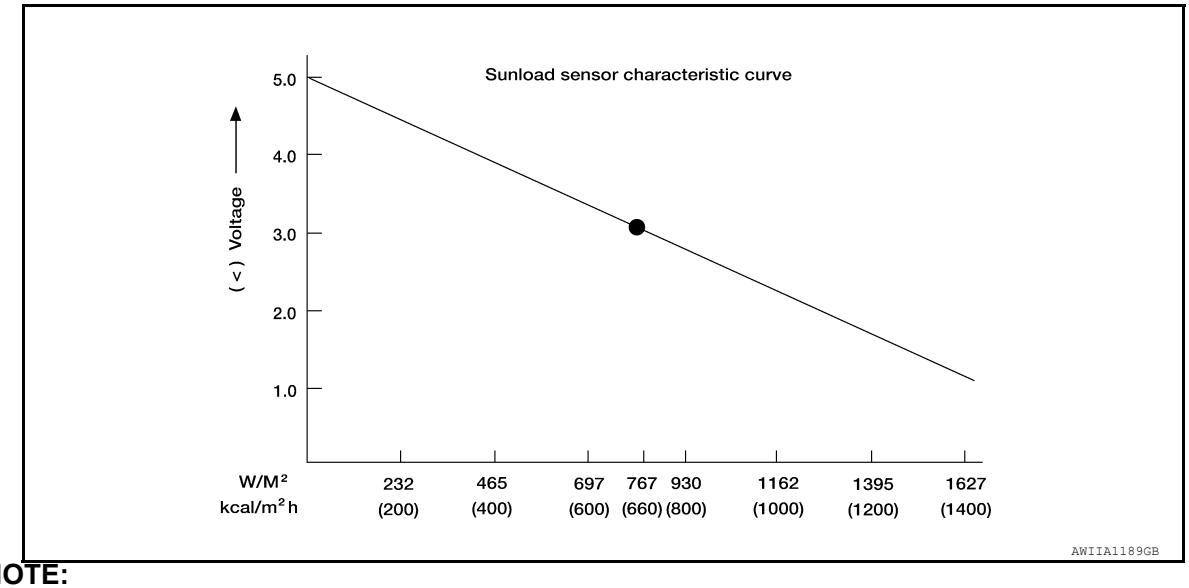
Component Inspection

INFOID:0000000014392134

1.CHECK SUNLOAD SENSOR

1. Turn ignition switch ON.
2. Check voltage between A/C auto amp. harness connector and ground.

(+)		(–)
A/C auto amp.		
Connector	Terminal	
M137	9	Ground



NOTE:
Select a place in direct sunlight when checking sunload sensor.

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace sunload sensor. Refer to HAC-125, "Removal and Installation".

B2632, B2633 AIR MIX DOOR MOTOR (DRIVER SIDE)

DTC Description

INFOID:0000000014392135

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B2632	DR AIR MIX DOOR MOT (SHORT) (Driver side air mix door motor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	PBR position is 95% or more.
		Diagnosis delay time	–
B2633	DR AIR MIX DOOR MOT (OPEN) (Driver side air mix door motor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	PBR position is 5% or less.
		Diagnosis delay time	–

POSSIBLE CAUSE

- Air mix door motor LH
- Air mix door motor LH installation condition
- A/C auto amp.
- Harness and connector (Air mix door motor LH circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-84, "Diagnosis Procedure".
NO >> Inspection End.

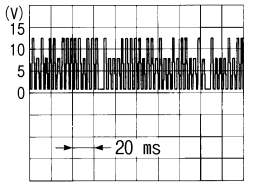
Diagnosis Procedure

INFOID:0000000014392136

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK AIR MIX DOOR MOTOR LH COMMUNICATION SIGNAL

1. Turn ignition switch ON.
2. Check output waveform between air mix door motor LH harness connector and ground with oscilloscope.

(+)		(–)	Output waveform
Air mix door motor LH			
Connector	Terminal		
M228	3	Ground	

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Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK INSTALLATION OF AIR MIX DOOR MOTOR LH

Check air mix door motor LH is properly installed. Refer to HAC-128, "Exploded View".

Is the inspection result normal?

YES >> Replace air mix door motor LH. Refer to HAC-129, "AIR MIX DOOR MOTOR : Removal and Installation - Air Mix Door Motor LH".
NO >> Repair or replace malfunctioning part.

3. CHECK AIR MIX DOOR MOTOR LH COMMUNICATION SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor LH connector and A/C auto amp. connector.
3. Check continuity between air mix door motor LH harness connector and A/C auto amp. harness connector.

Air mix door motor LH		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M228	3	M137	16	Yes

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

B2634, B2635 AIR MIX DOOR MOTOR (PASSENGER SIDE)

DTC Description

INFOID:0000000014392137

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B2634	PASS AIR MIX DOOR MOT (SHORT) (Passenger side air mix door motor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	PBR position is 95% or more.
		Diagnosis delay time	–
B2635	PASS AIR MIX DOOR MOT (OPEN) (Passenger side air mix door motor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	PBR position is 5% or less.
		Diagnosis delay time	–

POSSIBLE CAUSE

- Air mix door motor RH
- Air mix door motor RH installation condition
- A/C auto amp.
- Harness and connector (Air mix door motor RH circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-86, "Diagnosis Procedure".
NO >> Inspection End.

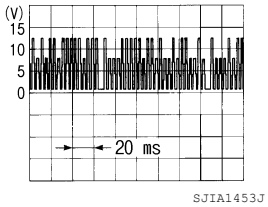
Diagnosis Procedure

INFOID:0000000014392138

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK AIR MIX DOOR MOTOR RH COMMUNICATION SIGNAL

1. Turn ignition switch ON.
2. Check output waveform between front air mix door motor RH harness connector and ground with oscilloscope.

(+)		(–)	Output waveform
Air mix door motor RH			
Connector	Terminal		
M229	3	Ground	

SJIA1453J

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK INSTALLATION OF AIR MIX DOOR MOTOR RH

Check air mix door motor RH is properly installed. Refer to HAC-128, "Exploded View".

Is the inspection result normal?

YES >> Replace air mix door motor RH. Refer to HAC-130, "AIR MIX DOOR MOTOR : Removal and Installation - Air Mix Door Motor RH".
NO >> Repair or replace malfunctioning part.

3. CHECK AIR MIX DOOR MOTOR RH COMMUNICATION SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor RH connector and A/C auto amp. connector.
3. Check continuity between air mix door motor RH harness connector and A/C auto amp. harness connector.

Air mix door motor RH		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M229	3	M137	16	Yes

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

B2636, B2637, B2638, B2639, B2654, B2655 MODE DOOR MOTOR

DTC Description

INFOID:0000000014392139

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B2636	DR VENT DOOR FAIL (DR VENT DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–
B2637	DR B/L DOOR FAIL (DR B/L DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–
B2638	DR D/F1 DOOR FAIL (DR D/F1 DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–
B2639	DR DEF DOOR FAIL (DR DEF DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–
B2654	D/F2 DOOR FAIL (D/F2 DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–
B2655	B/L2 DOOR FAIL (B/L2 DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–

POSSIBLE CAUSE

- Mode door motor
- Mode door motor control linkage installation condition
- A/C auto amp.
- Harness and connector (Mode door motor circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-89, "Diagnosis Procedure".
NO >> Inspection End.

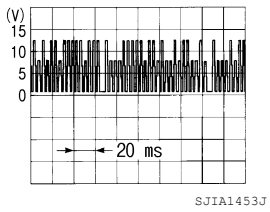
Diagnosis Procedure

INFOID:0000000014392140

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK MODE DOOR MOTOR COMMUNICATION SIGNAL

1. Turn ignition switch ON.
2. Check output waveform between mode door motor harness connector and ground with oscilloscope.

(+)		(–)	Output waveform
Mode door motor			
Connector	Terminal		
M226	3	Ground	

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK INSTALLATION OF MODE DOOR MOTOR

Check mode door motor is properly installed. Refer to HAC-128, "Exploded View".

Is the inspection result normal?

YES >> Replace mode door motor. Refer to HAC-129, "MODE DOOR MOTOR : Removal and Installation".
NO >> Repair or replace malfunctioning part.

3.CHECK MODE DOOR MOTOR COMMUNICATION SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect mode door motor connector and A/C auto amp. connector.
3. Check continuity between mode door motor harness connector and A/C auto amp. harness connector.

Mode door motor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M226	3	M137	16	Yes

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

B263D, B263E, B263F INTAKE DOOR MOTOR

DTC Description

INFOID:0000000014392141

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B263D	FRE DOOR FAIL (FRE DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Detected at FRE position
		Diagnosis delay time	–
B263E	20P FRE DOOR FAIL (20P FRE DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Detected at 20% FRE position
		Diagnosis delay time	–
B263F	REC DOOR FAIL (REC DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Detected at REC position
		Diagnosis delay time	–

POSSIBLE CAUSE

- Intake door motor
- A/C auto amp.
- Harness and connector (Intake door motor circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-90, "Diagnosis Procedure".
NO >> Inspection End.

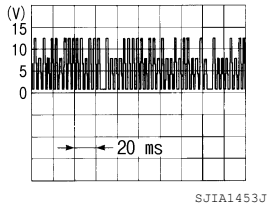
Diagnosis Procedure

INFOID:0000000014392142

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK INTAKE DOOR MOTOR COMMUNICATION SIGNAL

1. Turn ignition switch ON.
2. Check output waveform between intake door motor harness connector and ground with oscilloscope.

(+)		(–)	Output waveform
Intake door motor			
Connector	Terminal		
M227	3	Ground	

SJIA1453J

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK INSTALLATION OF INTAKE DOOR MOTOR

Check intake door motor is properly installed. Refer to HAC-128, "Exploded View".

Is the inspection result normal?

YES >> Replace intake door motor. Refer to HAC-129, "INTAKE DOOR MOTOR : Removal and Installation".
NO >> Repair or replace malfunctioning part.

3. CHECK INTAKE DOOR MOTOR COMMUNICATION SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake door motor connector and A/C auto amp. connector.
3. Check continuity between intake door motor harness connector and A/C auto amp. harness connector.

Intake door motor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M227	3	M137	16	Yes

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

B2796 CONTROL COMMUNICATION

DTC Description

INFOID:0000000014392143

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B2796	FR SW Comm error	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	When A/C auto amp. is not transmitting or receiving communication signal
		Diagnosis delay time	2 or more seconds

POSSIBLE CAUSE

- Harness and connector (communication line is open or shorted.)
- A/C switch assembly

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

NOTE:

If DTC is displayed along with DTC U1000 or U1010, first diagnose the DTC U1000 or U1010. Refer to HAC-69, "DTC Description" or HAC-70, "DTC Description".

Is DTC “B2796” displayed?

YES >> Refer to HAC-92, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000014392144

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK TX (A/C SWITCH ASSEMBLY → A/C AUTO AMP.) CIRCUIT CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect the A/C switch assembly connector and the A/C auto amp. connector.
3. Check continuity between A/C switch assembly harness connector and A/C auto amp. harness connector.

A/C switch assembly		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M133	10	M137	24	Yes

4. Check continuity between A/C switch assembly harness connector and ground.

A/C switch assembly		(–)	Continuity
Connector	Terminal		
M133	10	Ground	No

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair harness or connector.

2. CHECK RX (A/C AUTO AMP. → A/C SWITCH ASSEMBLY) CIRCUIT CONTINUITY

1. Check continuity between A/C switch assembly harness connector and A/C auto amp. harness connector.

A/C switch assembly		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M133	9	M137	4	Yes

2. Check continuity between A/C switch assembly harness connector and ground.

A/C switch assembly		(–)	Continuity
Connector	Terminal		
M133	9	Ground	No

Is the inspection result normal?

YES >> Perform trouble diagnosis for the A/C switch assembly. Refer to HAC-99, "A/C SWITCH ASSEMBLY : Diagnosis Procedure".
NO >> Repair harness or connector.

POWER SUPPLY AND GROUND CIRCUIT

A/C AUTO AMP.

A/C AUTO AMP. : Diagnosis Procedure

INFOID:0000000014392145

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK FUSE

Check fuses [No. 14 and 30, located in the fuse block (J/B)].
NOTE:
Refer to PG-164, "Terminal Arrangement".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the blown fuse after repairing the affected circuit.

2.CHECK A/C AUTO AMP. POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect A/C auto amp. connector.
3. Check voltage between A/C auto amp. harness connector and ground.

(+)		(–)	Voltage		
A/C auto amp.			Ignition switch position		
Connector	Terminal		OFF	ACC	ON
M137	3	Ground	Battery voltage	Battery voltage	Battery voltage
	23		Approx. 0 V	Approx. 0 V	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector between A/C auto amp. and fuse block (J/B).

3.CHECK A/C AUTO AMP. GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between A/C auto amp. harness connector and ground.

A/C auto amp.		(–)	Continuity
Connector	Terminal		
M137	2	Ground	Yes
	22		

Is the inspection result normal?

YES >> Inspection End.
NO >> Repair harness or connector.

AIR MIX DOOR MOTOR (DRIVER SIDE)

AIR MIX DOOR MOTOR (DRIVER SIDE) : Diagnosis Procedure

INFOID:0000000014392146

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK AIR MIX DOOR MOTOR LH POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between air mix door motor LH harness connector and ground.

(+)		(–)	Voltage (Approx.)
Air mix door motor LH			
Connector	Terminal		
M228	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK AIR MIX DOOR MOTOR LH GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor LH connector.
3. Check continuity between air mix door motor LH harness connector and ground.

Air mix door motor LH		(–)	Continuity
Connector	Terminal		
M228	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK INSTALLATION OF AIR MIX DOOR MOTOR LH

Check air mix door motor LH is properly installed. Refer to HAC-128, "Exploded View".

Is the inspection result normal?

YES >> Replace air mix door motor LH. Refer to HAC-129, "AIR MIX DOOR MOTOR : Removal and Installation - Air Mix Door Motor LH".
NO >> Repair or replace malfunctioning part.

4.CHECK AIR MIX DOOR MOTOR LH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor LH connector and A/C auto amp. connector.
3. Check continuity between air mix door motor LH harness connector and A/C auto amp. harness connector.

Air mix door motor LH		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M228	1	M137	17	Yes

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

AIR MIX DOOR MOTOR (PASSENGER SIDE)

AIR MIX DOOR MOTOR (PASSENGER SIDE) : Diagnosis Procedure

INFOID:0000000014392147

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK AIR MIX DOOR MOTOR RH POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between air mix door motor RH harness connector and ground.

(+)		(–)	Voltage (Approx.)
Air mix door motor RH			
Connector	Terminal		
M229	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK AIR MIX DOOR MOTOR RH GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor RH connector.
3. Check continuity between air mix door motor RH harness connector and ground.

Air mix door motor RH		(–)	Continuity
Connector	Terminal		
M229	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK INSTALLATION OF AIR MIX DOOR MOTOR RH

Check air mix door motor RH is properly installed. Refer to HAC-128, "Exploded View".

Is the inspection result normal?

YES >> Replace air mix door motor RH. Refer to HAC-130, "AIR MIX DOOR MOTOR : Removal and Installation - Air Mix Door Motor RH".
NO >> Repair or replace malfunctioning part.

4.CHECK AIR MIX DOOR MOTOR RH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor RH connector and A/C auto amp. connector.
3. Check continuity between air mix door motor RH harness connector and A/C auto amp. harness connector.

Air mix door motor RH		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M229	1	M137	17	Yes

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

MODE DOOR MOTOR

MODE DOOR MOTOR : Diagnosis Procedure

INFOID:0000000014392148

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK MODE DOOR MOTOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between mode door motor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Mode door motor			
Connector	Terminal		
M226	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK MODE DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect mode door motor connector.
3. Check continuity between mode door motor harness connector and ground.

Mode door motor		(–)	Continuity
Connector	Terminal		
M226	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK INSTALLATION OF MODE DOOR MOTOR CONTROL LINKAGE

Check mode door motor control linkage is properly installed. Refer to HAC-128, "Exploded View".

Is the inspection result normal?

YES >> Replace mode door motor. Refer to HAC-129, "MODE DOOR MOTOR : Removal and Installation".
NO >> Repair or replace malfunctioning part.

4.CHECK MODE DOOR MOTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect mode door motor connector and A/C auto amp. connector.
3. Check continuity between mode door motor harness connector and A/C auto amp. harness connector.

Mode door motor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M226	1	M137	17	Yes

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

INTAKE DOOR MOTOR

INTAKE DOOR MOTOR : Diagnosis Procedure

INFOID:0000000014392149

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK INTAKE DOOR MOTOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between intake door motor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Intake door motor			
Connector	Terminal		
M227	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK INTAKE DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake door motor connector.
3. Check continuity between intake door motor harness connector and ground.

Intake door motor		(–)	Continuity
Connector	Terminal		
M227	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK INSTALLATION OF INTAKE DOOR MOTOR

Check intake door motor is properly installed. Refer to HAC-128, "Exploded View".

Is the inspection result normal?

YES >> Replace intake door motor. Refer to HAC-129, "INTAKE DOOR MOTOR : Removal and Installation".
NO >> Repair or replace malfunctioning part.

4.CHECK INTAKE DOOR MOTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake door motor connector and A/C auto amp. connector.
3. Check continuity between intake door motor harness connector and A/C auto amp. harness connector.

Intake door motor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M227	1	M137	17	Yes

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

A/C SWITCH ASSEMBLY

A/C SWITCH ASSEMBLY : Component Function Check

INFOID:0000000014392150

1.CHECK OPERATION

1. Press the AUTO switch, and then check that “AUTO” is shown on the display.
2. Operate the temperature control switch (driver side). Check that the fan speed or outlet changes. (The discharge air temperature or fan speed varies depending on the ambient temperature, in-vehicle temperature, and temperature setting.)

Does it operate normally?

YES >> Inspection End.
NO >> Perform trouble diagnosis for the A/C switch assembly. Refer to HAC-99, "A/C SWITCH ASSEMBLY : Diagnosis Procedure".

A/C SWITCH ASSEMBLY : Diagnosis Procedure

INFOID:0000000014392151

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK A/C SWITCH ASSEMBLY POWER SUPPLY

1. Disconnect the A/C switch assembly connector.
2. Turn ignition switch ON.
3. Check voltage between A/C switch assembly harness connector and ground.

(+)		(−)	Voltage		
A/C switch assembly			Ignition switch position		
Connector	Terminal		OFF	ACC	ON
M133	12	Ground	Approx. 0 V	Approx. 0 V	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FUSE

Check 10A fuse [No. 30, located in the fuse block (J/B)].

NOTE:
Refer to PG-164, "Terminal Arrangement".

Is the inspection result normal?

YES >> Check harness for open circuit. Repair or replace if necessary.
NO >> Check harness for short circuit. Repair or replace if necessary.

3.CHECK A/C SWITCH ASSEMBLY GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between A/C switch assembly harness connector and ground.

A/C switch assembly		(−)	Continuity
Connector	Terminal		
M133	1	Ground	Yes

Is the inspection result normal?

YES >> Replace the A/C switch assembly. Refer to HAC-121, "Removal and Installation".
NO >> Repair the harness or connector.

DOOR MOTOR

Diagnosis Procedure

INFOID:0000000014392152

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK EACH DOOR MOTOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between intake door motor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Intake door motor			
Connector	Terminal		
M227	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK EACH DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake door motor connector.
3. Check continuity between intake door motor harness connector and ground.

Intake door motor		(–)	Continuity
Connector	Terminal		
M227	2	Ground	Yes

Is the inspection result normal?

YES >> Inspection End.
NO >> Repair harness or connector.

3.CHECK EACH DOOR MOTOR POWER SUPPLY CIRCUIT FOR OPEN

1. Disconnect A/C auto amp. connector.
2. Check continuity between intake door motor harness connector and A/C auto amp. harness connector.

Intake door motor		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M227	1	M137	17	Yes

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair harness or connector.

4.CHECK EACH DOOR MOTOR POWER SUPPLY CIRCUIT FOR SHORT

1. Disconnect following connectors:
- Air mix door motor LH
- Air mix door motor RH
- Mode door motor
2. Check continuity between intake door motor harness connector and ground.

Intake door motor		(–)	Continuity
Connector	Terminal		
M227	1	Ground	No

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

DOOR MOTOR COMMUNICATION CIRCUIT

Diagnosis Procedure

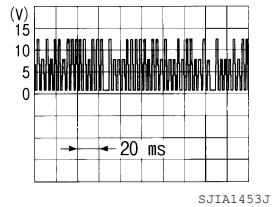
INFOID:0000000014392153

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

NOTE:
If all door motor DTCs are detected, check this circuit.

1.CHECK EACH DOOR MOTOR COMMUNICATION SIGNAL

1. Turn ignition switch ON.
2. Check output waveform between A/C auto amp. harness connector and ground with oscilloscope.

(+)		(–)	Output waveform
A/C auto amp.			
Connector	Terminal		
M137	16	Ground	

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK EACH DOOR MOTOR COMMUNICATION SIGNAL CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect A/C auto amp. connector and intake door motor connector.
3. Check continuity between A/C auto amp. harness connector and intake door motor harness connector.

A/C auto amp.		Intake door motor		Continuity
Connector	Terminal	Connector	Terminal	
M137	16	M227	3	Yes

Is the inspection result normal?

YES >> Inspection End.
NO >> Repair harness or connector.

3.CHECK EACH DOOR MOTOR COMMUNICATION SIGNAL CIRCUIT FOR SHORT

1. Disconnect following connectors:
- Air mix door motor LH
- Air mix door motor RH
- Mode door motor
2. Check continuity between A/C auto amp. harness connector and ground.

A/C auto amp.		(–)	Continuity
Connector	Terminal		
M137	16	Ground	No

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".

NO >> Repair harness or connector.

FRONT BLOWER MOTOR

Diagnosis Procedure

INFOID:0000000014392154

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Check 15A fuses [No. 17 and 27, located in fuse block (J/B)].
   NOTE:
   Refer to PG-164, "Terminal Arrangement".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the blown fuse after repairing the affected circuit.

2.CHECK FRONT BLOWER MOTOR POWER SUPPLY

1. Disconnect front blower motor connector.
2. Turn ignition switch ON.
3. Check voltage between front blower motor harness connector and ground.

(+)		(−)	Voltage (Approx.)
Front blower motor			
Connector	Terminal		
M44	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK FRONT BLOWER RELAY

1. Turn ignition switch OFF.
2. Check front blower relay. Refer to HAC-107, "Component Inspection (Front Blower Relay)".

Is the inspection result normal?

YES >> Repair harness or connector between front blower motor and fuse.
NO >> Replace front blower relay.

4.CHECK FRONT BLOWER MOTOR CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Connect front blower motor connector.
3. Disconnect variable blower control connector.
4. Turn ignition switch ON.
5. Check voltage between variable blower control harness connector and ground.

(+)		(−)	Voltage (Approx.)
Variable blower control			
Connector	Terminal		
M130	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.CHECK FRONT BLOWER MOTOR CONTROL CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect front blower motor connector.
3. Check continuity between variable blower control harness connector and front blower motor harness connector.

Variable blower control		Front blower motor		Continuity
Connector	Terminal	Connector	Terminal	
M130	3	M44	2	Yes

Is the inspection result normal?

YES >> Replace front blower motor. Refer to HAC-131, "Removal and Installation".
NO >> Repair harness or connector.

6. CHECK VARIABLE BLOWER CONTROL GROUND CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Check continuity between variable blower control harness connector and ground.

Variable blower control		(–)	Continuity
Connector	Terminal		
M130	1	Ground	Yes

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair harness or connector.

7. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

1. Turn blower control dial fully counterclockwise to the OFF position.
2. While turning the blower control dial clockwise, through each detent, check voltage between variable blower control and ground.

Variable blower control		(−)	Condition	
Connector	Terminal		Blower control dial detents	Voltage
M130	2	Ground	OFF	0.00
			1	4.00
			2	4.75
			3	5.00
			4	5.50
			5	5.75
			6	6.00
			7	6.50
			8	6.75
			9	7.00
			10	7.50
			11	8.00
			12	8.25
			13	8.50
			14	9.00
			15	9.25
			16	9.75
			17	10.00
			18	10.50
			19	10.75
			20	11.00
			21	11.50
			22	11.75
			23	12.25
			24	12.50

Is the inspection result normal?

YES >> Replace variable blower control. Refer to HAC-134, "Removal and Installation".
NO >> GO TO 8.

8. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect variable blower control connector and A/C auto amp. connector.
3. Check continuity between variable blower control harness connector and A/C auto amp. harness connector.

Variable blower control		A/C auto amp.		Continuity
Connector	Terminal	Connector	Terminal	
M130	2	M137	14	Yes

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair harness or connector.

9. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT FOR SHORT

Check continuity between variable blower control harness connector and ground.

Variable blower control		(–)	Continuity
Connector	Terminal		
M130	2	Ground	No

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> Repair harness or connector.

Component Inspection (Front Blower Motor)

INFOID:0000000014392155

1.CHECK FRONT BLOWER MOTOR

1. Connect battery voltage to terminal 1 of front blower motor.
2. Connect ground to terminal 2 of front blower motor.

Does the blower fan operate?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".
NO >> Replace front blower motor. Refer to HAC-131, "Removal and Installation".

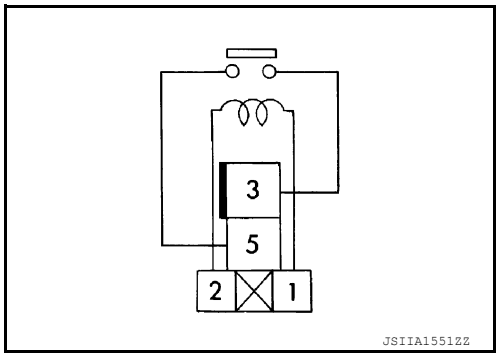
Component Inspection (Front Blower Relay)

INFOID:0000000014392156

1.CHECK FRONT BLOWER RELAY

1. Turn ignition switch OFF.
2. Remove front blower relay.
3. Check continuity between front blower relay terminals 3 and 5 when voltage is supplied between terminals 1 and 2.

Terminals		Voltage	Continuity
3	5	ON	Yes
		OFF	No



Is the inspection result normal?

YES >> Inspection End.
NO >> Replace front blower relay.

MAGNET CLUTCH

Component Function Check

INFOID:0000000014392157

1.CHECK MAGNET CLUTCH OPERATION

Perform auto active test of IPDM E/R. Refer to PCS-10, "Diagnosis Description".

Does it operate normally?

YES >> Inspection End.
NO >> Refer to HAC-108, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000014392158

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram" or HAC-51, "VK56VD : Wiring Diagram".

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Check 10A fuse (No. 51, located in IPDM E/R).
   NOTE:
   Refer to PG-174, "IPDM E/R Terminal Arrangement".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the blown fuse after repairing the affected circuit.

2.CHECK MAGNET CLUTCH POWER SUPPLY CIRCUIT

1. Disconnect A/C compressor connector and IPDM E/R connector.
2. Check continuity between A/C compressor harness connector and IPDM E/R harness connector.

A/C compressor		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F150 (Cummins 5.0L)	1	E123	49	Yes
F96 (VK56VD)				

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK MAGNET CLUTCH

Directly apply battery voltage to the magnet clutch. Check operation visually and by sound.

Does it operate normally?

YES >> Replace IPDM E/R. Refer to PCS-43, "Removal and Installation of IPDM E/R".
NO >> Replace magnet clutch. Refer to HA-33, "Removal and Installation".

PTC HEATER RELAY

Description

INFOID:0000000014392161

Power is supplied to the PTC heater with A/C auto amp. control.

Component Function Check

INFOID:0000000014392162

1. CHECK PTC HEATER RELAY POWER SUPPLY CIRCUIT

Check that an operation noise of PTC heater relays (located in relay box) can be heard when operating the air conditioning system in heat mode.

Is the inspection result normal?

YES >> PTC heater relay power supply circuit is OK.
NO >> Refer to HAC-109, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000014392163

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram".

1. CHECK PTC HEATER RELAY GROUND CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between A/C auto amp. connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
A/C auto amp.	Terminal		
M137	19	Ground	Battery voltage
	39		
	40		

Is the inspection result normal?

YES >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".
NO >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect A/C auto amp. and PTC heater relay connector.
3. Check continuity between A/C auto amp. connector and PTC heater relay connector.

A/C auto amp. connector	Terminal	PTC heater relay connector	Terminal	Continuity
M137	19	E144	2	Yes
	39	E146		
	40	E145		

4. Check continuity between A/C auto amp. connector and ground.

A/C auto amp. connector	Terminal		Continuity
M137	19	Ground	No
	39		
	40		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace harness.

3. CHECK PTC HEATER RELAY

Check PTC heater relay. Refer to HAC-110, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".
NO >> Replace appropriate PTC heater relay.

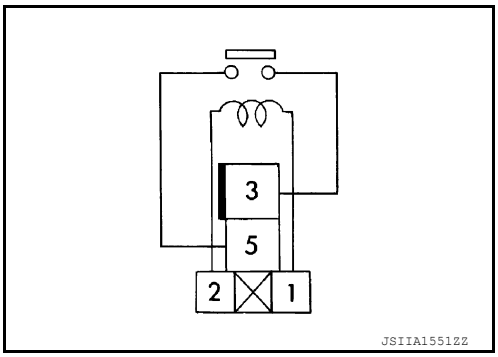
Component Inspection

INFOID:0000000014392164

1. CHECK PTC HEATER RELAY

1. Turn ignition switch OFF.
2. Remove PTC heater relay.
3. Check continuity between PTC heater relay terminal 3 and 5 when voltage is supplied between terminal 1 and 2.

Terminal		Voltage	Continuity
3	5	ON	Yes
		OFF	No



Is the inspection result normal?

YES >> Inspection End.
NO >> Replace PTC heater relay.

PTC HEATER

Diagnosis Procedure

INFOID:0000000014392165

Regarding Wiring Diagram information, refer to HAC-42, "CUMMINS 5.0L : Wiring Diagram".

1. CHECK FUSE

1. Turn ignition switch OFF.
2. Check 50A fuses (No. S, V and Z, located in relay box).
   NOTE:
   Refer to PG-165, "Terminal Arrangement".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the blown fuse after repairing the affected circuit.

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between PTC heater connector and ground.

Terminals			Condition of PTC heater	Voltage (Approx.)
(+)		(–)		
PTC heater connector	Terminal			
E78	1	Ground	ON	Battery voltage
			OFF	0 V
	3		ON	Battery voltage
			OFF	0 V
	5		ON	Battery voltage
			OFF	0 V

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 4.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect PTC heater connector.
3. Check continuity between PTC heater connector and ground.

PTC heater connector	Terminal	Ground	Continuity
E78	2	Ground	Yes
	4		

Is the inspection result normal?

YES >> Replace PTC heater. Refer to HAC-133, "Removal and Installation".
NO >> Repair or replace harness.

4. CHECK HARNESS CONTINUITY

1. Disconnect PTC relay connectors.
2. Check continuity between PTC heater connector and PTC heater relay connector.

PTC heater connector	Terminal	PTC heater relay connector	Terminal	Continuity
E78	1	E144	5	Yes
	3	E146		
	5	E145		

3. Check continuity between PTC heater connector and ground.

PTC heater connector	Terminal		Continuity
E78	1	Ground	No
	3		
	5		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".
NO >> Replace or repair harness.

SYMPTOM DIAGNOSIS

HEATER AND AIR CONDITIONING SYSTEM CONTROL SYMPTOMS

Symptom Table

INFOID:0000000014392166

NOTE:
Perform the self-diagnoses with CONSULT before performing the symptom diagnosis. If DTC is detected, perform the corresponding diagnosis.

Symptom	Corresponding malfunction part	Reference
• Air conditioning does not activate. • Air conditioning cannot be controlled. • Operation status of air conditioning is not indicated on display.	• A/C auto amp. ignition power supply circuit • Front A/C control (A/C auto amp.)	HAC-94, "A/C AUTO AMP. : Diagnosis Procedure"
• Air outlet does not change. • Mode door motor does not operate normally.	• Circuit between mode door motor and A/C auto amp. • Mode door motor control linkage • Mode door motor • A/C auto amp.	HAC-96, "MODE DOOR MOTOR : Diagnosis Procedure"
• Discharge air temperature of driver side does not change. • Air mix door motor LH does not operate normally.	• Circuit between air mix door motor LH and A/C auto amp. • Air mix door motor LH installation condition • Air mix door motor LH • A/C auto amp.	HAC-94, "AIR MIX DOOR MOTOR (DRIVER SIDE) : Diagnosis Procedure"
• Discharge air temperature of passenger side does not change. • Air mix door motor RH does not operate normally.	• Circuit between air mix door motor RH and A/C auto amp. • Air mix door motor RH installation condition • Air mix door motor RH • A/C auto amp.	HAC-95, "AIR MIX DOOR MOTOR (PASSENGER SIDE) : Diagnosis Procedure"
• Intake door does not change. • Intake door motor does not operate normally.	• Circuit between intake door motor and A/C auto amp. • Intake door motor control linkage • Intake door motor • A/C auto amp.	HAC-97, "INTAKE DOOR MOTOR : Diagnosis Procedure"
All door motors do not operate normally.	• Each door motor power supply and ground circuit • A/C auto amp.	HAC-100, "Diagnosis Procedure"
Blower motor operation is malfunctioning.	• Power supply system of front blower motor • Circuit between front blower motor and A/C auto amp. • Front blower motor • A/C auto amp.	HAC-104, "Diagnosis Procedure"
Compressor does not operate.	• Circuit between magnet clutch and IPDM E/R • Magnet clutch • IPDM E/R (A/C relay) • Circuit between ECM and refrigerant pressure sensor • Refrigerant pressure sensor • CAN communication circuit • A/C auto amp.	HAC-108, "Diagnosis Procedure"

Symptom		Corresponding malfunction part	Reference
• Insufficient cooling. • No cool air comes out. (Air flow volume is normal.)		• Magnet clutch control system • Drive belt slipping • Refrigerant cycle • ECV (electrical control valve) • Air leakage from each duct • A/C auto amp. connection recognition signal circuit • Temperature setting trimmer (front)	HAC-115, "Diagnosis Procedure"
• Insufficient heating. • No warm air comes out. (Air flow volume is normal.)		• Engine cooling system • Heater hose • Heater core • PTC heater (Cummins 5.0L) • Air leakage from each duct • Temperature setting trimmer (front)	HAC-117, "Diagnosis Procedure"
Noise is heard when front air conditioning system operates.	During compressor operation	Refrigerant cycle	HA-30, "Symptom Table"
	During front blower motor operation	• Mixing any foreign object in front blower motor • Front blower motor fan breakage • Front blower motor rotation inferiority	HAC-107, "Component Inspection (Front Blower Motor)"
• Memory function does not operate. • Setting temperature is not memorized.		• Battery power supply system of A/C auto amp. • A/C auto amp.	HAC-94, "A/C AUTO AMP. : Diagnosis Procedure"

INSUFFICIENT COOLING

Description

INFOID:0000000014392167

Symptom
- Insufficient cooling
- No cool air comes out. (Air flow volume is normal.)

Diagnosis Procedure

INFOID:0000000014392168

NOTE:
Perform self-diagnoses with CONSULT before performing symptom diagnosis. If any DTC is detected, perform the corresponding diagnosis.

1.CHECK MAGNET CLUTCH OPERATION

1. Turn ignition switch ON.
2. Operate fan switch.
3. Press A/C switch.
4. Check that A/C indicator turns ON. Check visually and by sound that compressor operates.
5. Press A/C switch again.
6. Check that A/C indicator turns OFF. Check that compressor stops.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Perform diagnosis of “COMPRESSOR DOES NOT OPERATE” in “SYMPTOM DIAGNOSIS”. Refer to HAC-119, "Diagnosis Procedure".

2.CHECK DRIVE BELT

Check tension of drive belt. Refer to EM-198, "Removal and Installation - Drive Belt".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Adjust or replace drive belt depending on the inspection results.

3.CHECK REFRIGERANT CYCLE

Connect recovery/recycling recharging equipment to the vehicle and perform pressure inspection with gauge. Refer to HA-24, "Inspection".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace parts depending on the inspection results.

4.CHECK AIR LEAKAGE FROM EACH DUCT

Check duct and nozzle, etc. of the front air conditioning system for leakage.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace parts depending on the inspection results.

5.CHECK AMBIENT TEMPERATURE DISPLAY

Check that there is not much difference between actual ambient temperature and indicated temperature on information display in combination meter.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Perform diagnosis for the A/C auto amp. connection recognition signal circuit. Refer to HAC-75, "Diagnosis Procedure".

6.CHECK SETTING OF TEMPERATURE SETTING TRIMMER (FRONT)

1. Check setting value of temperature setting trimmer (front). Refer to HAC-67, "Temperature Setting Trimmer".
2. Check that temperature setting trimmer (front) is set to “+ direction”.

NOTE:

The control temperature can be set with the setting of the temperature setting trimmer (front).

3. Set difference between set temperature and control temperature to “0”.

Is inspection result normal?

YES >> Inspection End.
NO >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".

INSUFFICIENT HEATING

Description

INFOID:0000000014392169

Symptom
- Insufficient heating
- No warm air comes out. (Air flow volume is normal.)

Diagnosis Procedure

INFOID:0000000014392170

NOTE:
Perform self-diagnosis with CONSULT before performing symptom diagnosis. If DTC is detected, perform the corresponding diagnosis.

1.CHECK COOLING SYSTEM

1. Check engine coolant level and check leakage. Refer to CO-45, "System Inspection".
2. Check reservoir tank cap. Refer to CO-45, "System Inspection".
3. Check water flow sounds of the engine coolant. Refer to CO-45, "System Inspection".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Refill engine coolant and repair or replace parts depending on the inspection results.

2.CHECK HEATER HOSE

Check installation of heater hose visually or by touching.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace parts depending on the inspection results.

3.CHECK HEATER CORE

1. Check temperature of inlet hose and outlet hose of front heater core.
2. Check that inlet side of heater core is hot and the outlet side is slightly lower than/almost equal to the inlet side.
   CAUTION:
   Always perform the temperature inspection in a short period of time because the engine coolant temperature is very hot.

Is the inspection result normal?

YES (Cummins 5.0L)>>GO TO 4.
YES (VK56VD)>>GO TO 5.
NO >> Replace heater core. Refer to HA-49, "HEATER CORE : Removal and Installation".

4.CHECK PTC HEATER

Check PTC heater. Refer to HAC-111, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace PTC heater. Refer to HAC-133, "Removal and Installation".

5.CHECK AIR LEAKAGE FROM EACH DUCT

Check duct and nozzle, etc. of front air conditioning system for air leakage.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace parts depending on the inspection results.

6.CHECK SETTING OF TEMPERATURE SETTING TRIMMER (FRONT)

1. Check setting value of temperature setting trimmer (front). Refer to HAC-67, "Temperature Setting Trimmer".
2. Check that temperature setting trimmer (front) is set to “– direction”.
   NOTE:
   The control temperature can be set by the temperature setting trimmer (front).

3. Set difference between the set temperature and control temperature to “0”.

Are the symptoms solved?

YES >> Inspection End.
NO >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".

COMPRESSOR DOES NOT OPERATE

Description

INFOID:0000000014392171

Symptom: Compressor does not operate.

Diagnosis Procedure

INFOID:0000000014392172

NOTE:
- Perform self-diagnoses with CONSULT before performing symptom diagnosis. If DTC is detected, perform the corresponding diagnosis.
- Check that refrigerant system is properly charged. If refrigerant amount is below the proper amount, perform inspection of refrigerant leakage.

1.CHECK MAGNET CLUTCH OPERATION

Check magnet clutch. Refer to HAC-108, "Component Function Check".

Does it operate normally?

YES >> GO TO 2.
NO >> Repair or replace malfunctioning parts.

2.CHECK REFRIGERANT PRESSURE SENSOR

Check refrigerant pressure sensor. Refer to EC-1368, "Diagnosis Procedure" or EC-1371, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning parts.

3.CHECK A/C AUTO AMP. OUTPUT SIGNAL

With CONSULT
Check “COMP REQ SIG” and “FAN REQ SIG” in “Data Monitor” mode of “HVAC”.

Monitor item	Condition		Status
COMP REQ SIG	A/C switch	ON	On
		OFF	Off
FAN REQ SIG	Blower motor	ON	On
		OFF	Off

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace A/C auto amp. Refer to HAC-122, "Removal and Installation".

4.CHECK ECM INPUT SIGNAL

With CONSULT
Check “AIR COND SIG” and “HEATER FAN SW” in “Data Monitor” mode of “ECM”.

Monitor item	Condition		Status
AIR COND SIG	A/C switch	ON	On
		OFF	Off
HEATER FAN SW	Blower motor	ON	On
		OFF	Off

Is the inspection result normal?

YES >> GO TO 5.
NO >> Check CAN communication system. Refer to LAN-53, "Trouble Diagnosis Flow Chart".

5.CHECK IPDM E/R INPUT SIGNAL

With CONSULT

1. Start engine.
2. Check “AC COMP REQ” in “Data Monitor” mode of “IPDM E/R”.

Monitor item	Condition		Status
AC COMP REQ	A/C switch	ON	On
		OFF	Off

Is the inspection result normal?

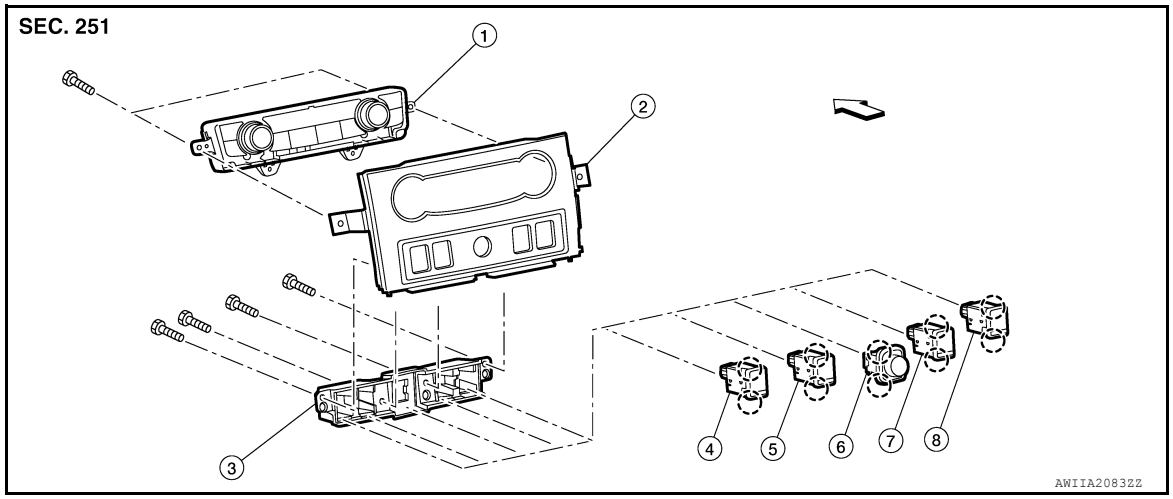
YES >> Inspection End.
NO >> Check CAN communication system. Refer to LAN-53, "Trouble Diagnosis Flow Chart".

REMOVAL AND INSTALLATION

A/C SWITCH ASSEMBLY

Exploded View

INFOID:0000000014392173



1. A/C switch assembly
2. Cluster lid C
3. Switch carrier
4. VDC OFF switch
5. Sonar system off switch (if equipped)
6. Hazard switch
7. Blind spot warning switch (if equipped)
8. Heated steering wheel switch (if equipped)

⇦ Front

Removal and Installation

INFOID:0000000014392174

REMOVAL

1. Remove cluster lid C. Refer to IP-20, "Removal and Installation".
2. Remove the screws that retain the A/C switch assembly to cluster lid C.
3. Remove A/C switch assembly.

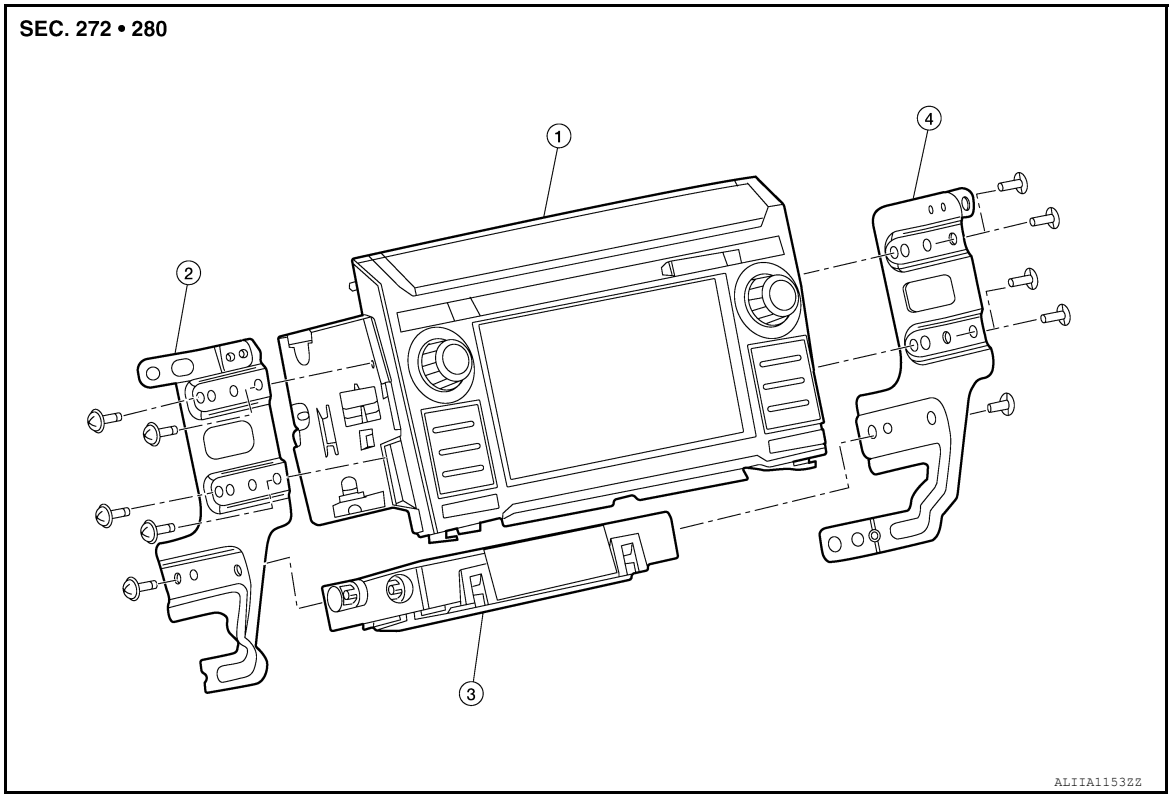
INSTALLATION

Installation is in the reverse order of removal.

A/C AUTO AMP.

Exploded View

INFOID:0000000014392175



1. AV unit
2. Audio unit bracket (LH)
3. A/C auto amp.
4. Audio unit bracket (RH)

Removal and Installation

INFOID:0000000014392176

REMOVAL

CAUTION:

Before disconnecting the AV control unit and battery terminals, turn the ignition switch OFF and wait at least 30 seconds.

NOTE:

- Before replacing A/C auto amp., perform “Before Replace ECU” of “Read / Write Configuration” to save or print current vehicle specification. Refer to HAC-66, "Work Procedure".
- After the ignition switch is turned OFF, the AV control unit continues operating for approximately 30 seconds. Therefore, data corruption may occur if battery voltage is cut off within 30 seconds.

1. Disconnect battery or batteries. Refer to PG-185, "Battery Disconnect".
2. Remove AV control unit. Refer to AV-157, "Removal and Installation" (NAVIGATION WITHOUT AMPLIFIER) or AV-277, "Removal and Installation" (NAVIGATION WITH AMPLIFIER).
3. Disconnect harness connectors from AV control unit and remove.
4. Remove screws and A/C auto amp.

INSTALLATION

CAUTION:

Be sure to perform “After Replace ECU” of “Read / Write Configuration” or “Manual Configuration” when replacing A/C auto amp. Refer to HAC-66, "Work Procedure".

Installation is in the reverse order of removal.

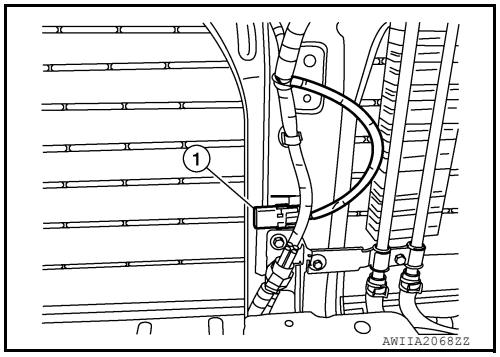
AMBIENT SENSOR

Removal and Installation

INFOID:0000000014392177

REMOVAL

1. Remove front grille. Refer to EXT-32, "Removal and Installation".
2. Disconnect harness connector from ambient sensor.
3. Remove ambient sensor (1).



INSTALLATION

Installation is in the reverse order of removal.

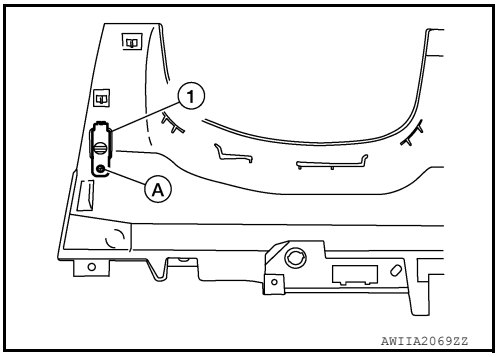
IN-VEHICLE SENSOR

Removal and Installation

INFOID:0000000014392178

REMOVAL

1. Remove instrument lower panel LH. Refer to IP-22, "Removal and Installation".
2. Remove screw (A).
3. Disconnect harness connector from in-vehicle sensor (1) and remove.



INSTALLATION

Installation is in the reverse order of removal.

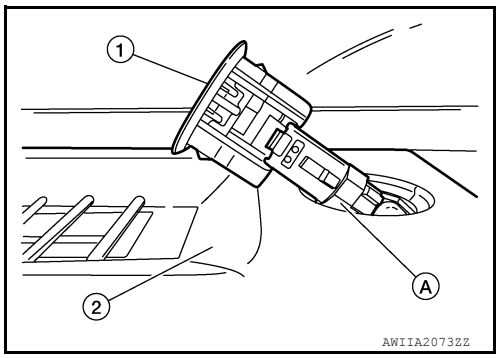
SUNLOAD SENSOR

Removal and Installation

INFOID:0000000014392179

REMOVAL

1. Release pawls and remove sunload sensor from defroster grille (2).
2. Disconnect harness connector (A) from sunload sensor (1).



INSTALLATION

Installation is in the reverse order of removal.

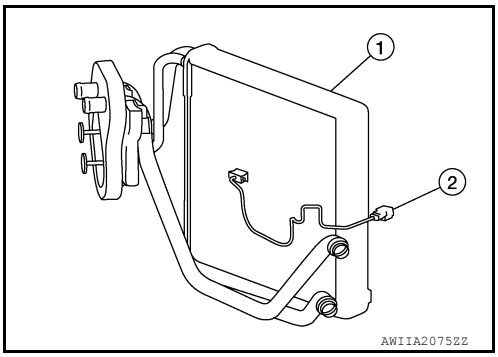
INTAKE SENSOR

Removal and Installation

INFOID:0000000014392180

REMOVAL

1. Remove evaporator from heating and cooling unit. Refer to IP-21, "Removal and Installation".
2. Disconnect harness connector from intake sensor.
3. Remove intake sensor (2) from evaporator (1).
   CAUTION:
   - **Mark mounting position of intake sensor.**
   - **Do not damage evaporator core.**



INSTALLATION

Installation is in the reverse order of removal.

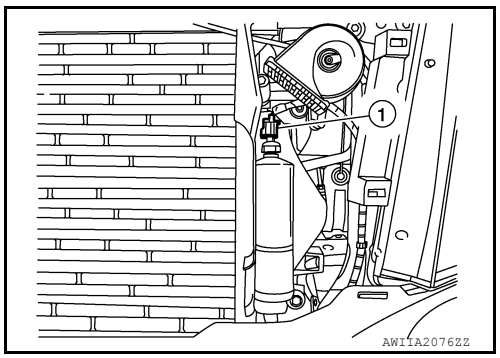
REFRIGERANT PRESSURE SENSOR

Removal and Installation

INFOID:0000000014392181

REMOVAL

1. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
2. Remove active grille shutter. Refer to EXT-34, "Removal and Installation".
3. Disconnect harness connector from refrigerant pressure sensor.
4. Remove refrigerant pressure sensor (1).



INSTALLATION

Installation is in the reverse order of removal.

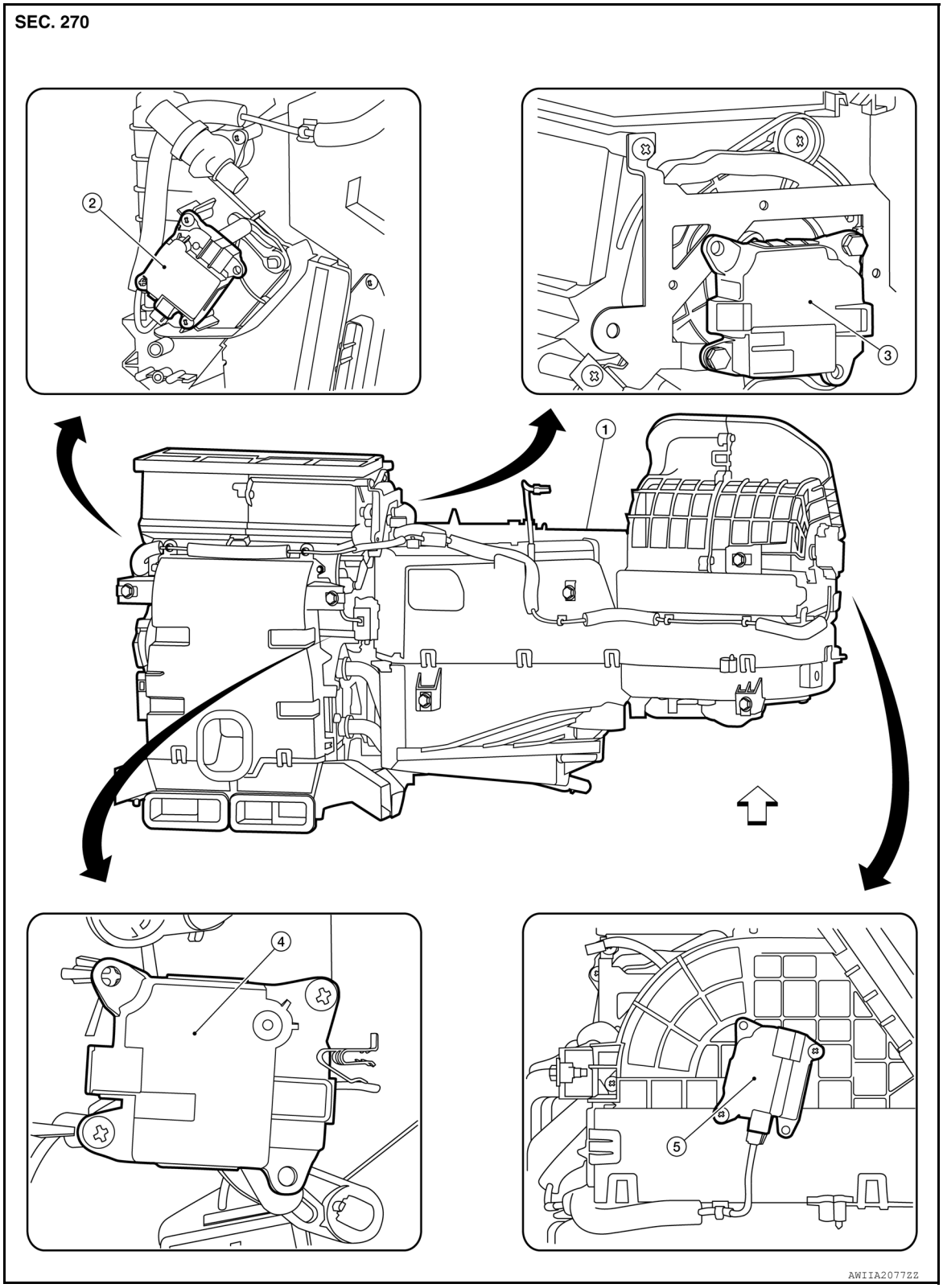
CAUTION:

- **Be careful not to damage the condenser fins.**
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-ring of the refrigerant pressure sensor for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**

DOOR MOTOR

Exploded View

INFOID:0000000014392182



1. Heating and cooling unit assembly
2. Air mix door motor LH
3. Mode door motor
4. Air mix door motor RH
5. Intake door motor
⇦ Front

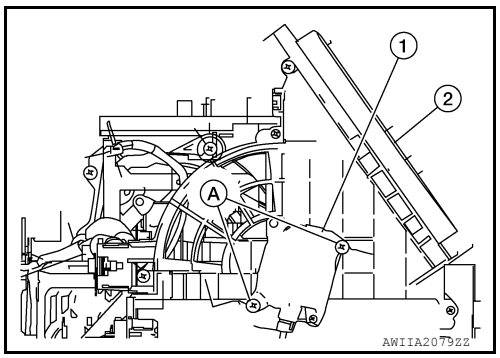
INTAKE DOOR MOTOR

INTAKE DOOR MOTOR : Removal and Installation

INFOID:0000000014392183

REMOVAL

1. Remove the heating and cooling unit assembly. Refer to HA-49, "HEATING AND COOLING UNIT ASSEMBLY : Removal and Installation".
2. Disconnect the harness connector from the intake door motor.
3. Remove the intake door motor screws (A) and intake door motor (1) from the blower unit (2).



INSTALLATION

Installation is in the reverse order of removal.

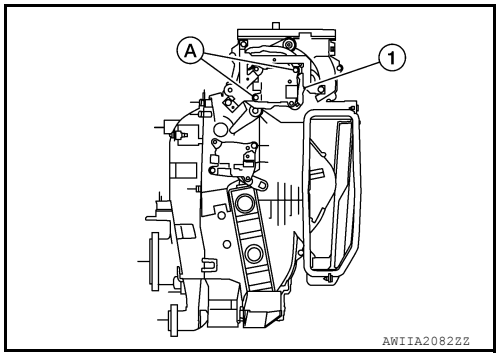
MODE DOOR MOTOR

MODE DOOR MOTOR : Removal and Installation

INFOID:0000000014392184

REMOVAL

1. Remove heating and cooling unit assembly. Refer to HA-49, "HEATING AND COOLING UNIT ASSEMBLY : Removal and Installation".
2. Remove mode door motor screws (A).
3. Disconnect the harness connector from the mode door motor (1) and remove.



INSTALLATION

Installation is in the reverse order of removal.

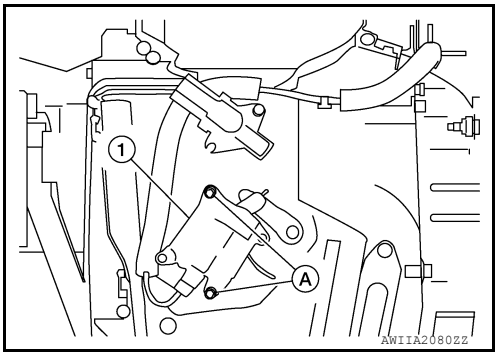
AIR MIX DOOR MOTOR

AIR MIX DOOR MOTOR : Removal and Installation - Air Mix Door Motor LH

INFOID:0000000014392185

REMOVAL

1. Remove the air mix door motor LH screws (A).
2. Disconnect the harness connector from the air mix door motor LH (1) and remove.



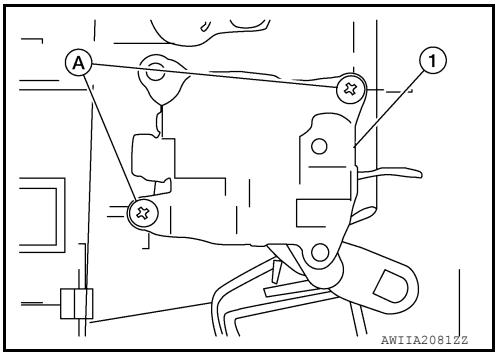
INSTALLATION
Installation is in the reverse order of removal.

AIR MIX DOOR MOTOR : Removal and Installation - Air Mix Door Motor RH

INFOID:0000000014392186

REMOVAL

1. Remove heating and cooling unit assembly. Refer to HA-49, "HEATING AND COOLING UNIT ASSEMBLY : Removal and Installation".
2. Remove blower unit. Refer to VTL-16, "BLOWER UNIT : Removal and Installation".
3. Remove air mix door motor RH screws (A).
4. Disconnect harness connector from air mix door motor RH (1) and remove.



INSTALLATION
Installation is in the reverse order of removal.

FRONT BLOWER MOTOR

Removal and Installation

INFOID:0000000014392187

For removal and installation of the front blower motor, refer to VTL-16, "BLOWER MOTOR : Removal and Installation".

COMPRESSOR

Removal and Installation

INFOID:0000000014392188

For removal and installation of the compressor, refer to HA-31, "Removal and Installation".

PTC HEATER

Removal and Installation

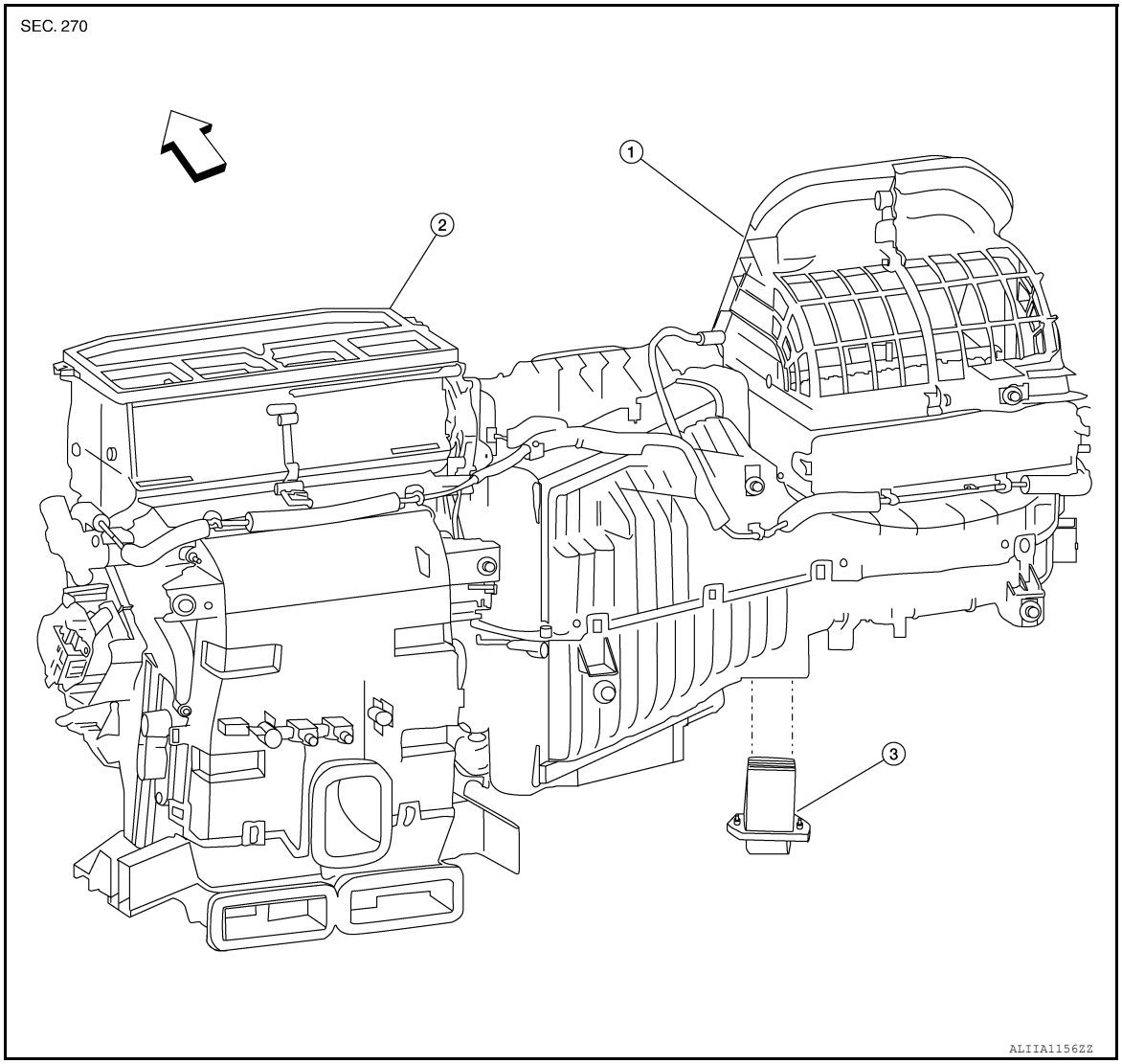
INFOID:0000000014392189

For the removal and installation of the PTC heater, refer to HA-50, "PTC HEATER : Removal and Installation".

VARIABLE BLOWER CONTROL

Exploded View

INFOID:0000000014392190



1. Blower unit
2. Heating and cooling unit assembly
3. Variable blower control

⇦ Front

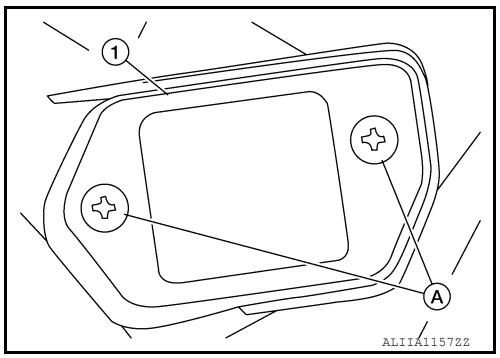
Removal and Installation

INFOID:0000000014392191

REMOVAL

1. Remove glove box assembly and housing. Refer to IP-21, "Removal and Installation".
2. Disconnect harness connector from variable blower control.

3. Remove two screws (A) and variable blower control (1).



INSTALLATION

Installation is in the reverse order of removal.

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000014392192

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper repair, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery or batteries, and wait at least three minutes before performing any service.**

Working with HFC-134a (R-134a)

INFOID:0000000014392193

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed compressor failure is likely to occur. Refer to HA-17, "Description". To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant Identifier.**
- **Use only specified oil for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If oil other than that specified is used, compressor failure is likely to occur.**
- **The specified HFC-134a (R-134a) oil rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
- **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
- **When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
- **Only use the specified oil from a sealed container. Immediately reseal containers of oil. Without proper sealing, oil will become moisture saturated and should not be used.**
- **Avoid breathing A/C refrigerant and oil vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system using certified service equipment meeting requirements of SAE J2210 [HFC-134a (R-134a) recycling equipment], or J2209 [HFC-134a (R-134a) recycling equipment], If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and oil manufacturers.**
- **Do not allow A/C oil to come in contact with styrofoam parts. Damage may result.**

CONTAMINATED REFRIGERANT

If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.

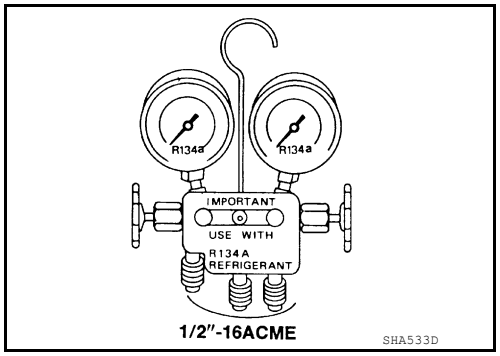
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended.
- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact NISSAN Customer Affairs for further assistance.

Precaution for Service Equipment

INFOID:0000000014392194

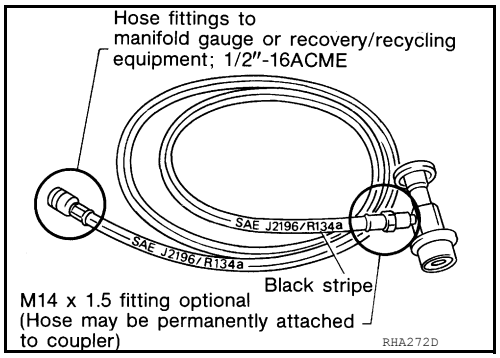
MANIFOLD GAUGE SET

Be certain that the gauge face indicates R-134a or 134a. Make sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) along with specified oil.



SERVICE HOSES

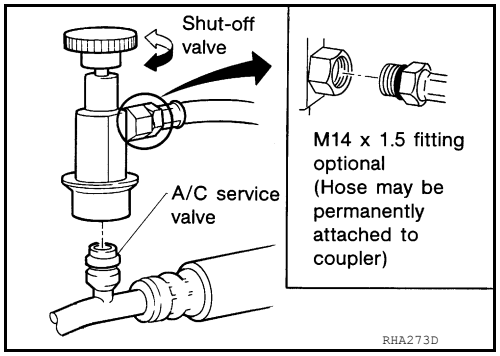
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



Precaution for Work

INFOID:0000000014392195

- When removing or disassembling each component, be careful not to damage or deform it. If a component may be subject to interference, be sure to protect it with a shop cloth.
- When removing (disengaging) components with a screwdriver or similar tool, be sure to wrap the component with a shop cloth or vinyl tape to protect it.
- Protect the removed parts with a shop cloth and prevent them from being dropped.
- Replace a deformed or damaged clip.

- If a part is specified as a non-reusable part, always replace it with a new one.
- Be sure to tighten bolts and nuts securely to the specified torque.
- After installation is complete, be sure to check that each part works properly.
- Follow the steps below to clean components:

- Water soluble dirt:
- Dip a soft cloth into lukewarm water, wring the water out of the cloth and wipe the dirty area.
- Then rub with a soft, dry cloth.

- Oily dirt:
- Dip a soft cloth into lukewarm water with mild detergent (concentration: within 2 to 3%) and wipe the dirty area.
- Then dip a cloth into fresh water, wring the water out of the cloth and wipe the detergent off.
- Then rub with a soft, dry cloth.

- Do not use organic solvent such as thinner, benzene, alcohol or gasoline.
- For genuine leather seats, use a genuine leather seat cleaner.

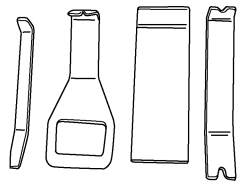
PREPARATION

PREPARATION

Special Service Tool

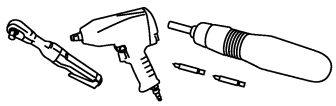
INFOID:0000000014392196

The actual shape of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name	Description
— (J-46534) Trim Tool Set  AWJIA0483ZZ	Removing trim components

Commercial Service Tool

INFOID:0000000014392197

Tool name	Description
Power tool  PIIB1407E	Loosening nuts, screws and bolts

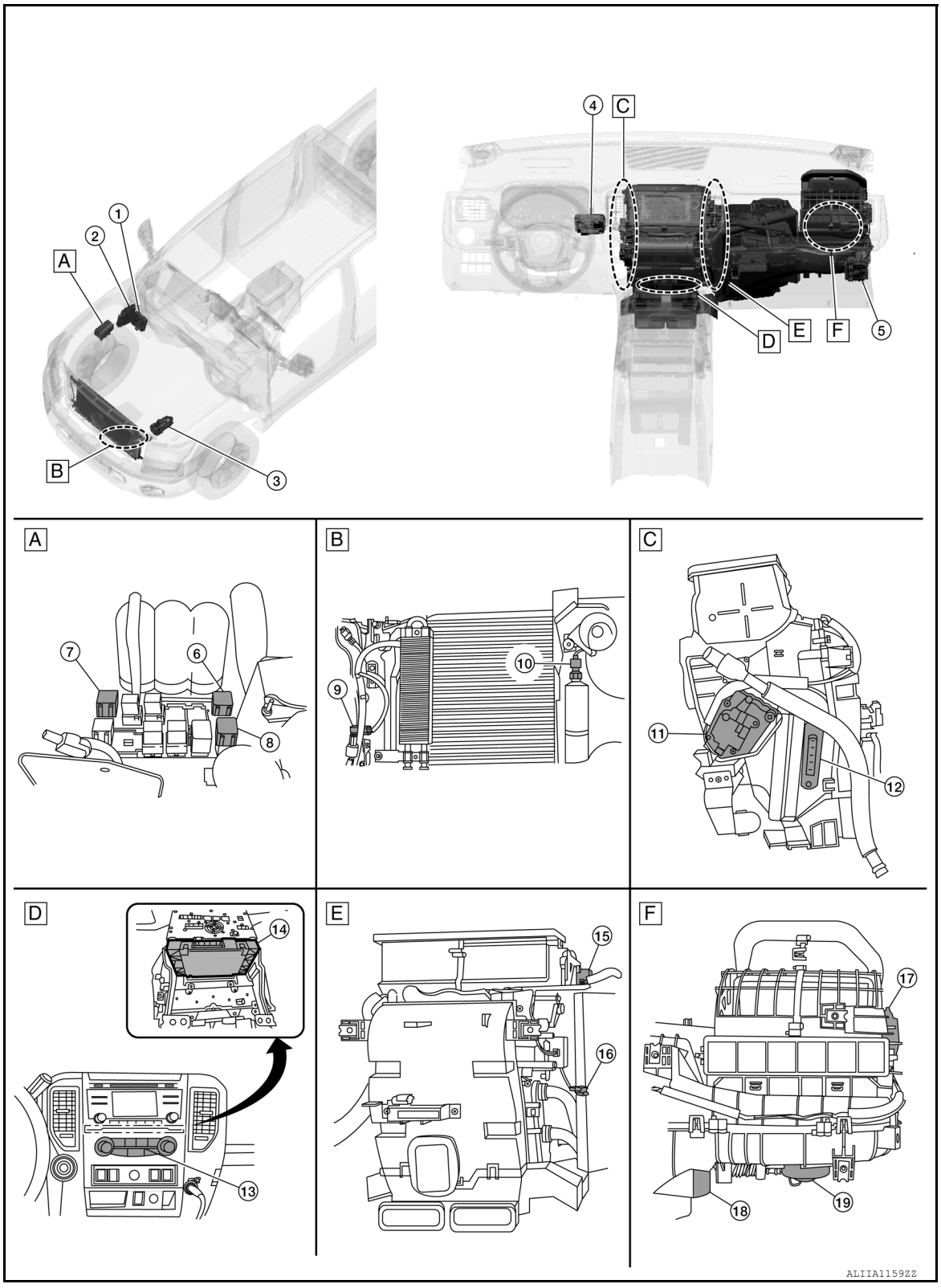
SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000014392198

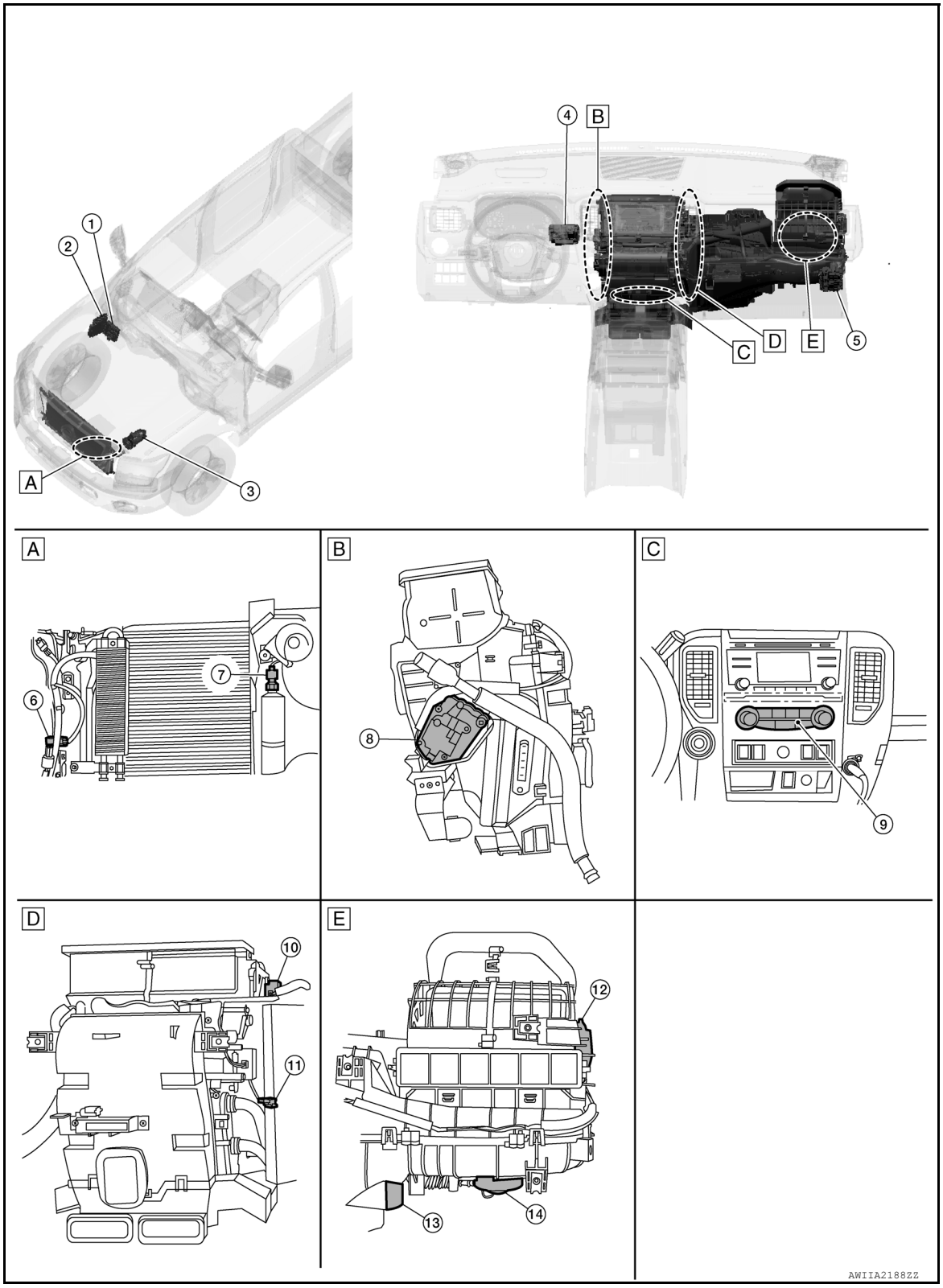
CUMMINS 5.0L



A. Relay box
B. View with grille removed
C. Behind LH center of instrument panel (view with A/C assembly removed from vehicle)
D. Center of instrument panel
E. Behind RH center of instrument panel (view with A/C assembly removed from vehicle)
F. Behind RH side of instrument panel (view with A/C assembly removed from vehicle)

No.	Component	Description
1.	IPDM E/R	• A/C relay is integrated into IPDM E/R. IPDM E/R operates A/C relay when A/C compressor request signal is received from ECM via CAN communication line. • Refer to PCS-5, "Component Parts Location" for detailed installation location.
2.	ECM	• The ECM sends an A/C compressor ON request to the IPDM E/R based on the status of engine operation and load as well as refrigerant pressure information. If all the conditions are met for A/C operation, the ECM transmits the A/C compressor ON request to the IPDM E/R. The ECM shares the refrigerant pressure sensor signal, engine RPM, and engine coolant temperature with the front air control via CAN communication line. • Refer to EC-736, "Component Parts Location" for detailed installation location.
3.	A/C compressor	Refer to HAC-144, "A/C Compressor".
4.	BCM	• BCM transmits blower motor ON signal to the front blower motor relay. • Refer to BCS-5, "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.
5.	Fuse block (J/B) (Front blower motor relay)	• Located in the passenger compartment behind the instrument panel RH, the fuse block (J/B) contains the front blower motor relay and several fuses required for the air conditioner control system. • The front blower motor relay controls the flow of current to fuse 17 and 27 in the fuse block (J/B). The relay is connected directly to ground and is controlled by the BCM.
6.	PTC relay-2	Refer to HAC-145, "PTC Heater (Cummins 5.0L)".
7.	PTC relay-3	Refer to HAC-145, "PTC Heater (Cummins 5.0L)".
8.	PTC relay-1	Refer to HAC-145, "PTC Heater (Cummins 5.0L)".
9.	Ambient sensor	Refer to HAC-145, "Ambient Sensor (Cummins 5.0L)".
10.	Refrigerant pressure sensor	Refer to HAC-145, "Refrigerant Pressure Sensor".
11.	Air mix door motor	Refer to HAC-143, "Air Mix Door Motor".
12.	PTC heater	Refer to HAC-145, "PTC Heater (Cummins 5.0L)".
13.	Front air control	The front air control controls the operation of the A/C and heating system based on inputs from the temperature control knob, the mode switches, the blower control dial, and inputs received from the ECM and combination meter across the CAN.
14.	PTC heater control	Refer to HAC-145, "PTC Heater Control (Cummins 5.0L)".
15.	Mode door motor	Refer to HAC-144, "Mode Door Motor".
16.	Intake sensor	Refer to HAC-143, "Intake Sensor".
17.	Intake door motor	Refer to HAC-144, "Intake Door Motor".
18.	Variable blower control	Refer to HAC-144, "Variable Blower Control".
19.	Front blower motor	Refer to HAC-144, "Front Blower Motor".

VK56VD



A. View with grille removed

B. Behind LH center of instrument panel (view with A/C assembly removed from vehicle)

C. Center of instrument panel

D. Behind RH center of instrument panel (view with A/C assembly removed from vehicle)

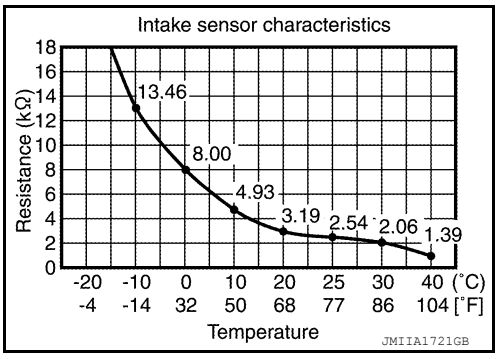
E. Behind RH side of instrument panel (view with A/C assembly removed from vehicle)

No.	Component	Description
1.	IPDM E/R	• A/C relay is integrated into IPDM E/R. IPDM E/R operates A/C relay when A/C compressor request signal is received from ECM via CAN communication line. • Refer to PCS-5, "Component Parts Location" for detailed installation location.
2.	ECM	• The ECM sends an A/C compressor ON request to the IPDM E/R based on the status of engine operation and load as well as refrigerant pressure information. If all the conditions are met for A/C operation, the ECM transmits the A/C compressor ON request to the IPDM E/R. The ECM shares the refrigerant pressure sensor signal, engine RPM, and engine coolant temperature with the front air control via CAN communication line. • Refer to EC-736, "Component Parts Location" for detailed installation location.
3.	A/C compressor	Refer to HAC-144, "A/C Compressor".
4.	BCM	• BCM transmits blower motor ON signal to the front blower motor relay. • Refer to BCS-5, "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.
5.	Fuse block (J/B) (Front blower motor relay)	• Located in the passenger compartment behind the instrument panel RH, the fuse block (J/B) contains the front blower motor relay and several fuses required for the air conditioner control system. • The front blower motor relay controls the flow of current to fuse 17 and 27 in the fuse block (J/B). The relay is connected directly to ground and is controlled by the BCM.
6.	Ambient sensor	Refer to HAC-145, "Ambient Sensor (Cummins 5.0L)".
7.	Refrigerant pressure sensor	Refer to HAC-145, "Refrigerant Pressure Sensor".
8.	Air mix door motor	Refer to HAC-143, "Air Mix Door Motor".
9.	Front air control	The front air control controls the operation of the A/C and heating system based on inputs from the temperature control knob, the mode switches, the blower control dial, and inputs received from the ECM and combination meter across the CAN.
10.	Mode door motor	Refer to HAC-144, "Mode Door Motor".
11.	Intake sensor	Refer to HAC-143, "Intake Sensor".
12.	Intake door motor	Refer to HAC-144, "Intake Door Motor".
13.	Variable blower control	Refer to HAC-144, "Variable Blower Control".
14.	Front blower motor	Refer to HAC-144, "Front Blower Motor".

Intake Sensor

INFOID:0000000014392199

Intake sensor measures evaporator fin temperature. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



Air Mix Door Motor

INFOID:0000000014392200

- Air mix door motor consists of a motor that drives door, PBR (Potentio Balance Resistor) that detects door position and LCU (Local Control Unit) that performs multiplex communication control (LIN) with front air control. Refer to HAC-149, "Door Control".
- Rotation of motor is transmitted to air mix door by link and lever. Air flow temperature is switched.

Mode Door Motor

INFOID:0000000014392201

- Mode door motor consists of a motor that drives door, PBR (Potentio Balance Resistor) that detects door position and LCU (Local Control Unit) that performs multiplex communication control (LIN) with front air control. Refer to HAC-149, "Door Control".
- Rotation of motor is transmitted to mode door (ventilator door, foot door, and defroster door) by link and lever. Air outlet is switched.

Intake Door Motor

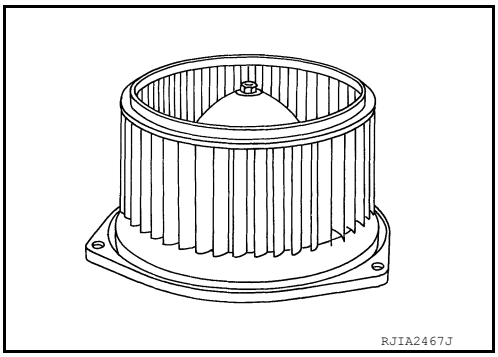
INFOID:0000000014392202

- Intake door motor consists of a motor that drives door, PBR (Potentio Balance Resistor) that detects door position and LCU (Local Control Unit) that performs multiplex communication control (LIN) with front air control. Refer to HAC-149, "Door Control".
- Rotation of motor is transmitted to intake door by lever. Air inlet is switched.

Front Blower Motor

INFOID:0000000014392203

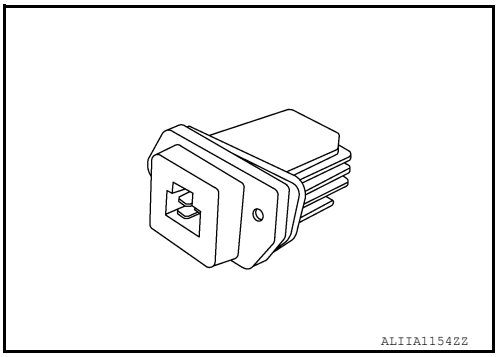
- The blower motor utilizes a brush-less motor with a rotating magnet.
- Quietness is improved over previous motors where the brush was the point of contact and the coil rotated.



Variable Blower Control

INFOID:0000000014392204

The variable blower control controls the speed of the blower motor by controlling the ground circuit of the front blower motor. The front air control provides voltage to the gate of the variable blower control based on the position of the blower control dial. The variable blower control is a metal-oxide semiconductor field effect transistor (MOSFET) that varies the ground side current of the front blower motor. By applying a variable voltage to the gate, the variable blower control controls the current flow to ground, thereby controlling the speed of the front blower motor.



A/C Compressor

INFOID:0000000014392205

Vaporized refrigerant is drawn into the A/C compressor from the evaporator where it is compressed to a high-pressure, high-temperature vapor. The hot compressed vapor is then discharged to the condenser.

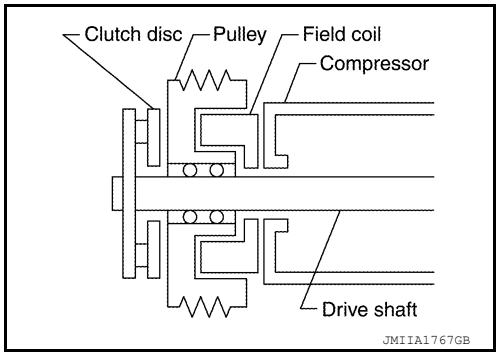
MAGNET CLUTCH

Description

A/C compressor is driven by the magnet clutch which is magnetized by electric power supply.

Structure and Operation

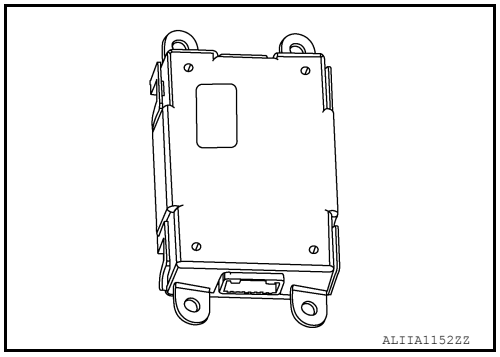
- Magnet clutch consists of pulley, clutch disc, and field coil.
  - Pulley is connected with crankshaft pulley of engine via drive belt and is always rotated while engine is running.
  - Clutch disc is connected with driveshaft of A/C compressor.
  - Field coil, which becomes a strong electric magnet when electricity is supplied, strongly pulls clutch disc and presses it to pulley.
- When A/C relay integrated in IPDM E/R turns ON, electricity is supplied to field coil, clutch disc is presses to pulley, and engine rotational movement is transmitted from crankshaft pulley ⇒ drive belt ⇒ pulley ⇒ clutch disc ⇒ driveshaft. A/C compressor is operated. When A/C relay turns OFF, electricity is not supplied to field coil, and clutch disc is released from pulley. A/C compressor is not operated.



PTC Heater Control (Cummins 5.0L)

INFOID:0000000014392207

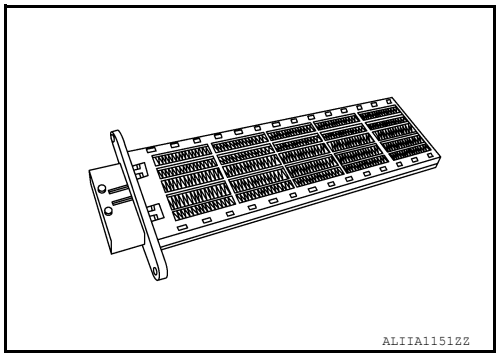
PTC heater control unit controls the operation of the PTC heater by controlling the PTC relays.



PTC Heater (Cummins 5.0L)

INFOID:0000000014392208

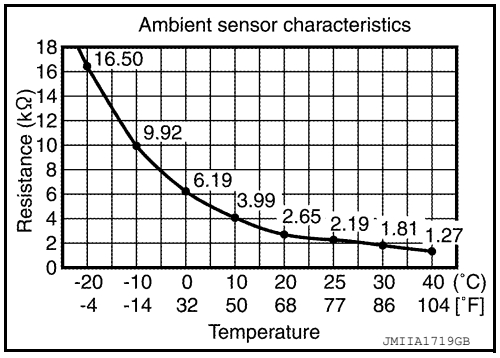
- PTC stands for “Positive Temperature Coefficient” and is a ceramic material with barium titanate as the primary component.
- The positive temperature coefficient (PTC) heater provides supplemental heat by warming the air as it flows through its electrically controlled heating grid.
- The PTC relays control the flow of current to the PTC heater. The PTC relays are controlled by the PTC heater control unit.



Ambient Sensor (Cummins 5.0L)

INFOID:0000000014392209

Ambient sensor measures ambient air temperature. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



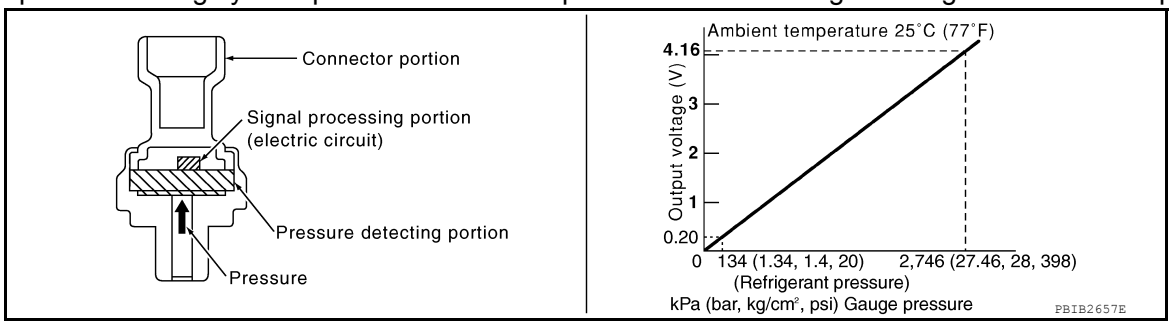
Refrigerant Pressure Sensor

INFOID:0000000014392210

DESCRIPTION

- The refrigerant pressure sensor converts high-pressure side refrigerant pressure into voltage and outputs it to ECM.

• ECM operates cooling system protection and idle speed control according to voltage value that is input.



STRUCTURE AND OPERATION

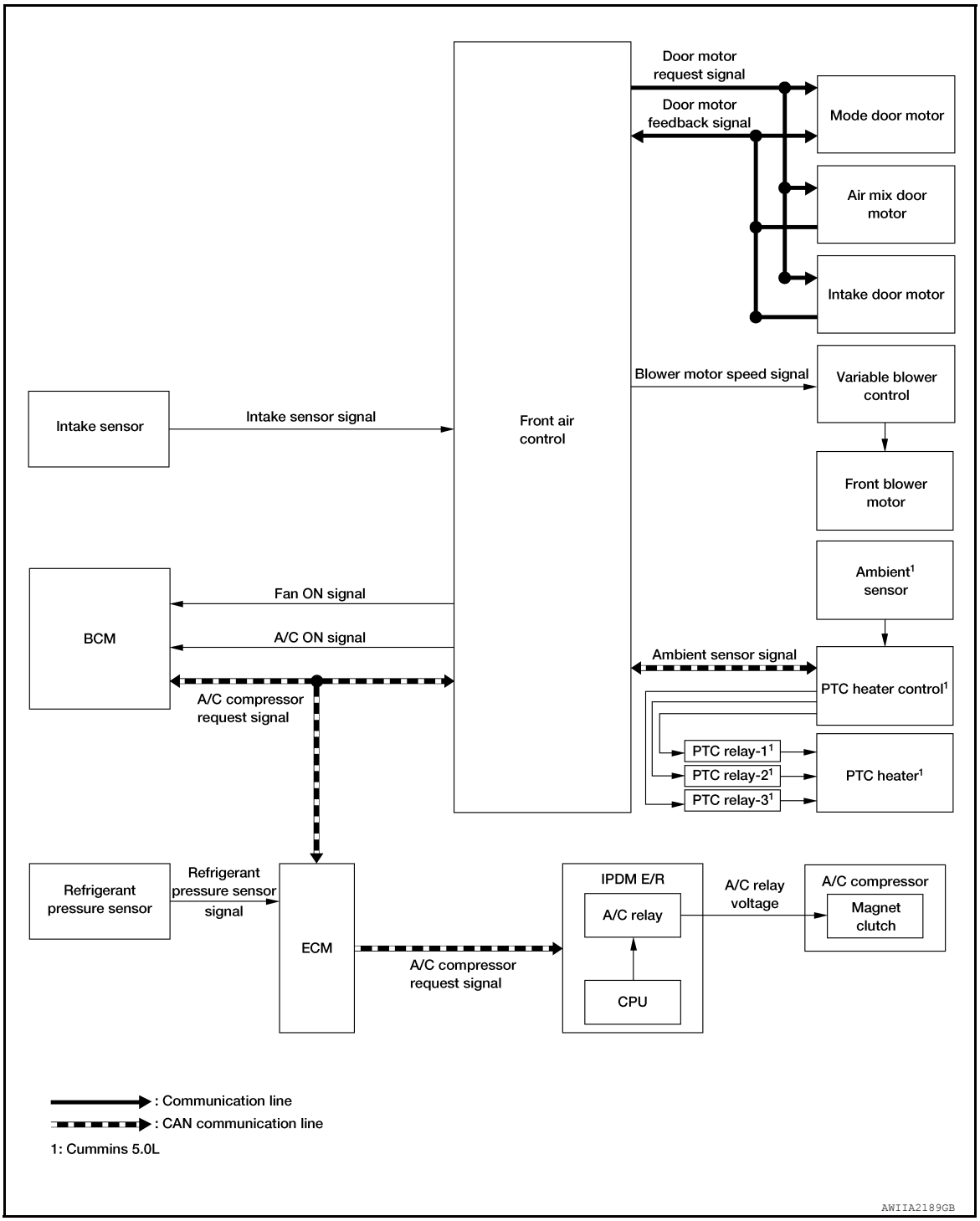
• The refrigerant pressure sensor is a capacitance type sensor. It consists of a pressure detection area and a signal processing area.
• The pressure detection area, which is a variable capacity condenser, changes internal static capacitance according to pressure force.
• The signal processing area detects the static capacitance of the pressure detection area, converts the static capacitance into a voltage value, and transmits the voltage value to ECM.

SYSTEM

System Description

INFOID:0000000014392211

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

- The manual air conditioning system is controlled by a sequence of functions from the front air control, BCM, ECM, and IPDM E/R.

Controlled by front air control:
- HAC-148, "Air Flow Control"
- HAC-148, "Air Inlet Control"
- HAC-148, "Air Outlet Control"

- HAC-148, "Compressor Control"
- HAC-149, "Door Control"
- HAC-148, "Temperature Control"

Controlled by BCM:
- Air conditioning request signal.
  Refer to BCS-7, "BODY CONTROL SYSTEM : System Description".

Control by IPDM E/R
- Relay control
  Refer to PCS-6, "RELAY CONTROL SYSTEM : System Description".

Temperature Control

INFOID:0000000014392212

- When the ignition switch is in the ON position, the customer uses the front air control temperature control dial to set the desired temperature.
- The front air control calculates the target front air mix door opening angle depending on the selected temperature, intake temperature sensor, engine coolant temperature and rpm, and ambient temperature.
- Front air mix door is controlled depending on the comparison of current front air mix door opening angle and target front air mix door opening angle.
- Regardless of ambient temperature, the front air mix door is fixed at the fully cold position when the temperature control dial is set at the full cold position and fixed at the fully hot position when the temperature control dial is set at the full hot position.

Air Outlet Control

INFOID:0000000014392213

Air outlet control is controlled by customer input. When the A/C is turned off by turning the blower control dial fully counterclockwise, the front air control retains the current selections and returns to these selections the next time the blower control dial is turned to any fan position.

NOTE:
If ambient temperature is excessively low, D/F is selected to prevent windshield fogging when air outlet is set to FOOT.

Air Flow Control

INFOID:0000000014392214

DESCRIPTION

- Front air control changes duty ratio of front blower motor control signal to control air flow continuously. When air flow is increased, duty ratio of front blower motor control signal gradually increases to prevent a sudden increase in air flow.
- In addition to manual control, air flow control is composed of fan speed control at door motor operation.

FAN SPEED CONTROL AT DOOR MOTOR OPERATION

When mode door motor is activated while air flow is more than the specified value, front air control temporarily reduces fan speed so that mode door moves smoothly.

Air Inlet Control

INFOID:0000000014392215

The intake door position is automatically controlled in MAX A/C and DEF modes. The intake door is controlled by customer input in the other modes.

Compressor Control

INFOID:0000000014392216

DESCRIPTION

In order for the IPDM E/R to complete a compressor ON request, the following conditions must be met:

1. The BCM detects a fan ON signal from the front air control. The front air control grounds the fan ON signal monitored by the BCM when the blower speed dial is in any of the fan speed positions.
2. The BCM detects an A/C ON signal from the front air control. The front air control grounds the A/C ON signal monitored by the BCM when:

- The A/C switch is pressed. The A/C switch LED illuminates and the front air control grounds the A/C ON signal monitored by the BCM. Any mode control button except D/F may be selected.

- The A/C switch is OFF, and the MAX A/C button is pressed. The A/C switch LED will automatically illuminate and the front air control grounds the A/C ON signal monitored by the BCM.
- The A/C switch is OFF, and the mode button for either D/F or DEF is selected. The front air control grounds the A/C ON signal monitored by the BCM, but it does not illuminate the A/C switch LED.

NOTE:
If the compressor was engaged by pressing the D/F or DEF mode buttons and the time spent in either mode exceeds 1 minute, then the compressor stays requested, even when modes other than D/F or DEF are selected, until either:

1. The ignition switch is turned OFF.
2. The blower speed dial is turned completely counterclockwise to the OFF position.
3. The A/C switch is manually turned OFF.

In other words, the compressor ON request cannot be turned off in D/F or DEF modes.

REFRIGERANT PRESSURE PROTECTION

The refrigerant system is protected against excessively high- or low-pressures by the refrigerant pressure sensor, located on the liquid tank on the condenser. The refrigerant pressure sensor detects the pressure inside the refrigerant line and sends a voltage signal to the ECM. If the system pressure rises above or falls below the following values, the ECM requests the IPDM E/R to de-energize the A/C relay and disengage the compressor.

- 3.12 MPa (31.82 kg/cm^2, 452.4 psi) or more (When the engine speed is less than 1,500 rpm)
- 2.74 MPa (27.95 kg/cm^2, 397.3 psi) or more (When the engine speed is 1,500 rpm or more)
- 0.14 MPa (1.43 kg/cm^2, 20.3 psi) or less

PRESSURE RELIEF VALVE

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an abnormal level [more than 2,990 kPa (30.5 kg/cm^2, 433.6 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.

COMPRESSOR OIL CIRCULATION CONTROL

When the engine starts while the engine coolant temperature is 56°C (133°F) or less, ECM activates the compressor for approximately 6 seconds and circulates the compressor lubricant once.

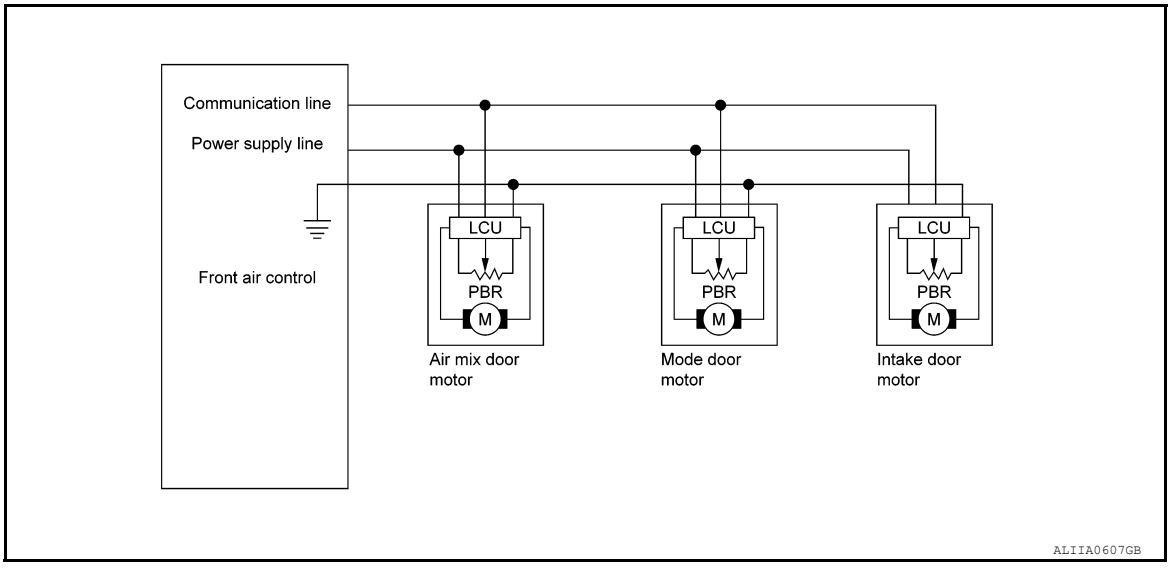
OPERATING RATE CONTROL

When the set temperature is other than fully cold or the air outlet is “VENT”, “B/L” or “FOOT”, the front air control controls the compressor activation depending on ambient temperature.

Door Control

INFOID:0000000014392217

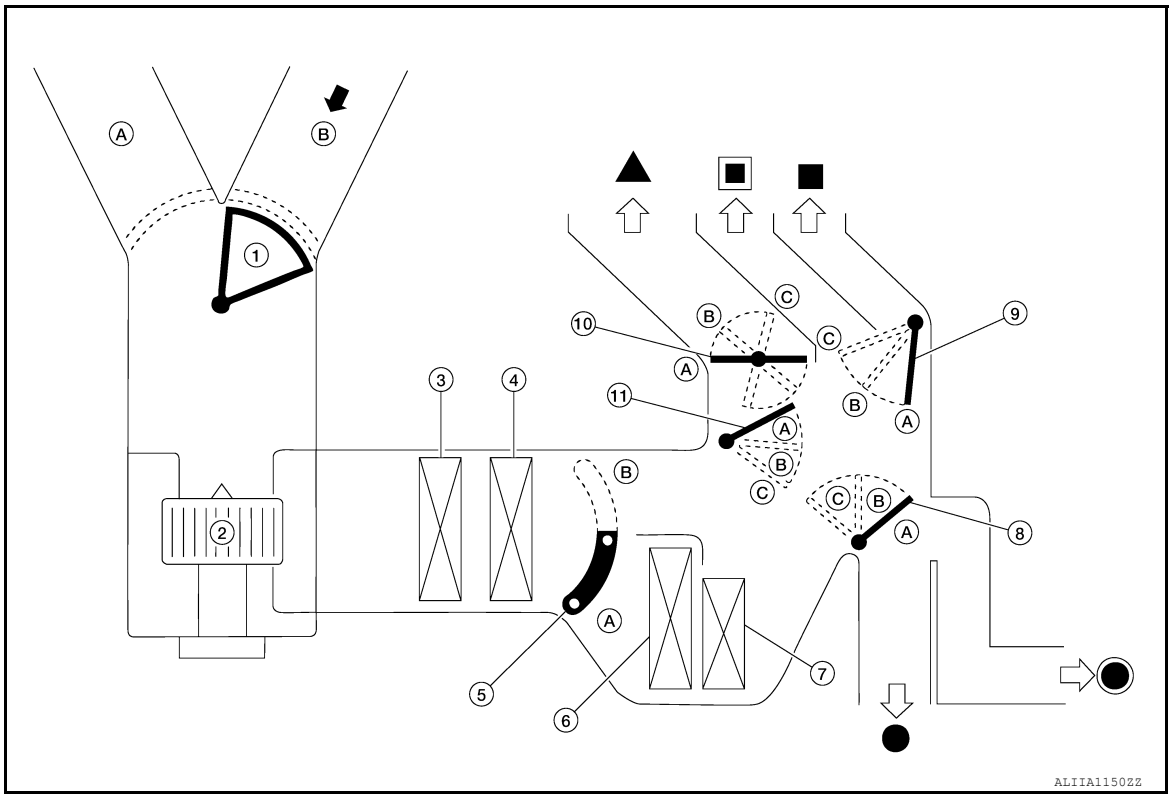
DOOR MOTOR CONTROL



- A Local Control Unit (LCU) is built into each door motor and detects the door position by using a Potentio Balanced Resistor (PBR).

- Each door motor LCU has a unique address. The front air control communicates with the door motor LCUs using each door's unique communication address. The front air control sends requested door position commands to each door motor LCU via a Local Interconnect Network (LIN) communication line. Each door motor's LCU receives the command and sends back a door position feedback signal.
- Each LCU controls each door to the appropriate position depending on the control signal from the front air control. When the door movement is complete, the LCU transmits a signal to the front air control indicating that the door movement is complete.

SWITCHES AND THEIR CONTROL FUNCTION



1. Intake door
2. Blower motor
3. In-cabin microfilter
4. Front evaporator
5. Air mix door
6. Front heater core
7. PTC heater (Cummins 5.0L)
8. Foot door
9. Ventilator door
10. Defroster door
11. Max. cool door

Rear foot
Recirculation air
Discharge air
Defroster
Center ventilator
Side ventilator
Front foot

Switch position			Door position					
			Mode door					
			Ventilator door	Max. cool door	Defroster door	Foot door	Intake door	Air mix door
MODE switch			A	A	A	A	—	—
			B	B	A	B		
			C	C	B	B		
			C	B	B	B		
DEF switch			C	A	C	C		
Intake switch*			—	—	—	—	A	
							B	
Temperature control dial	Full cold [18°C (60°F)]						—	A
	18.5°C – 31.5°C (61°F – 89 °F)							AUTO
	Full hot [32°C (90°F)]							B

*: Inlet status is displayed by indicator when activating Max A/C or D/F modes.

AIR DISTRIBUTION

VENT MODE ( )					
OUTLET	VENT				
	ASST	CTR		DR	RR
		ASST	DR		
AIR FLOW DISTRIBUTION RATIO (%)	25	25	25	25	—

B/L MODE ( )									
OUTLET	VENT					FOOT			
	ASST	CTR		DR	RR	Fr ASST	Fr DR	Rr ASST	Rr DR
		ASST	DR						
AIR FLOW DISTRIBUTION RATIO (%)	15	15	15	15	—	14	14	6	6

D/F1 MODE ( )											
OUTLET	VENT					FOOT				DEF	
	ASST	CTR		DR	RR	Fr ASST	Fr DR	Rr ASST	Rr DR	Fr	Side
		ASST	DR								
AIR FLOW DISTRIBUTION RATIO (%)	6	—	—	6	24	24	20	9	9	17	5

D/F2 MODE ( )

OUTLET	VENT					FOOT				DEF	
	ASST	CTR		DR	RR	Fr ASST	Fr DR	Rr ASST	Rr DR	Fr	Side
		ASST	DR								
AIR FLOW DISTRIBUTION RATIO (%)	6	—	—	6	—	20	20	8	8	25	7

DEF MODE ( )

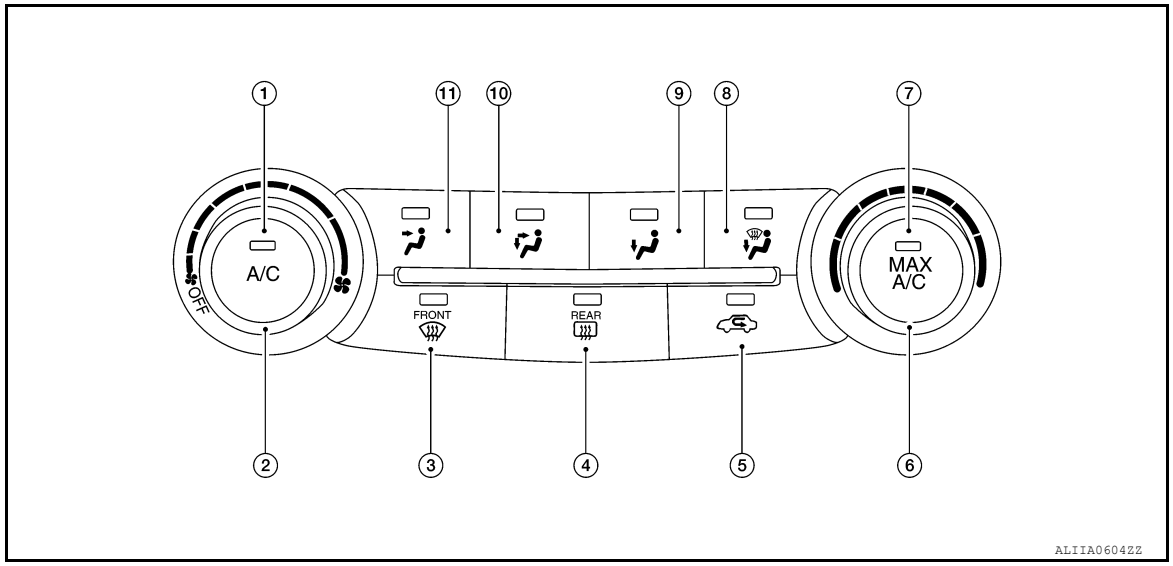
OUTLET	VENT					FOOT				DEF	
	ASST	CTR		DR	RR	Fr ASST	Fr DR	Rr ASST	Rr DR	Fr	Side
		ASST	DR								
AIR FLOW DISTRIBUTION RATIO (%)	5	—	—	5	—	—	—	—	—	70	20

OPERATION

Switch Name and Function

INFOID:0000000014392218

Front Air Control



1. A/C switch
2. Blower control dial (with OFF switch)
3. DEF switch
4. Rear DEF switch
5. REC switch
6. Temperature control dial
7. MAX A/C switch
8. D/F switch
9. FOOT switch
10. B/L switch
11. VENT switch

Switch Operation

A/C switch	Switches the compressor control switch indicator between ON ⇔ OFF with each press while front blower fan is activated. The circuit used by the BCM to detect an A/C ON request is grounded. **NOTE:** When front blower fan is OFF, the compressor control cannot be activated.
Blower control dial (with OFF switch)	• Blower fan speed is manually controlled with the dial for varying blower speed. When ON, the circuit used by the BCM to detect a fan ON request signal is grounded. • Turns air conditioning system OFF. **NOTE:** When blower control dial is turned to any ON position, the air conditioning system is activated. (Compressor control state returns to the previous state before air conditioning system was turned OFF.)
DEF switch	Switches DEF mode (switch indicator) between ON ⇔ OFF with each press. • When DEF mode is turned ON, the air conditioning system changes to the following state: - Air inlet: Fresh air intake - Air outlet: DEF - Blower fan: Manual setting. - Compressor: ON • When DEF mode is turned OFF, the air conditioning system state returns to the previous state before DEF mode was selected, but the following state is continued: - Air inlet: Fresh air intake - Compressor: ON **NOTE:** When front blower fan is OFF, DEF cannot be activated.

MAX A/C switch	Switches the MAX A/C and compressor control switch indicators between ON ⇔ OFF with each press while front blower fan is activated. • When MAX A/C mode is turned ON, the air conditioning system changes to the following state: - Air inlet: Recirculation air intake - Air outlet: Manual setting - Blower fan: Manual setting - Compressor: ON • When MAX A/C mode is turned OFF, the air conditioning system state returns to the previous state before MAX A/C mode is selected. But, the following state is changed: - Air inlet: Fresh air intake - Compressor: ON **NOTE:** When front blower fan is OFF, the compressor control cannot be activated.
MODE switches	Selects air outlet from VENT, B/L, FOOT, and D/F. **NOTE:** When the air conditioning system is OFF, the air outlet can still be selected.
REC switch	• Air inlet is selected to fresh air intake (REC) by pressing this switch. - REC indicator: ON **NOTE:** • When the air conditioning system is OFF, the air inlet can still be selected. • When D/F mode or DEF is selected, the REC button is disabled.
Temperature control dial	• Selects desired temperature between full cold and full hot. - Clockwise rotation: Temperature increases. - Counterclockwise rotation: Temperature decreases.

DIAGNOSIS SYSTEM (HVAC)

CONSULT Function (HVAC)

INFOID:0000000014392219

CONSULT can display each diagnosis item using the diagnosis test modes as shown.

CONSULT application items

Diagnosis mode	Description
Self Diagnostic Result	Displays the diagnosis results judged by front air control.
Data Monitor	Displays A/C auto amp. input/output data in real time.
Work support	Changes the setting for each system function.
Active Test	The signals used to activate each device are forcibly supplied from front air control.
ECU Identification	Displays the front air control number.

SELF DIAGNOSTIC RESULT

Refer to HAC-38, "DTC Index".

DATA MONITOR

Display item list

Monitor item [Unit]		Description
INT TEMP SEN	[°C]	Intake sensor value converted from intake sensor signal received from intake sensor
COMP REQ SIG	[On/Off]	Displays A/C switch ON/OFF status transmitted to other units via CAN communication
FAN REQ SIG	[On/Off]	Displays blower switch ON/OFF status transmitted to other units via CAN communication
FAN DUTY	[%]	Duty ratio of blower motor judged by front air control
ENG COOL TEMP	[°C]	Water temperature signal value received from ECM via CAN communication
VEHICLE SPEED	[km/h (mph)]	Vehicle speed signal value received from meter via CAN communication

ACTIVE TEST

Test item	Description
HVAC TEST	The operation check of A/C system can be performed by selecting the mode. Refer to the following table for the conditions of each mode.

HVAC TEST

	Test item						
	MODE 1	MODE 2	MODE 3	MODE 4	MODE 5	MODE 6	MODE 7
Mode door position	VENT1	VENT2	B/L	D/F1	D/F2	DEF	DEF
Intake door position	REC	REC	20%FRE	FRE	FRE	FRE	FRE
Air mix door position	FULL COLD	FULL COLD	FULL COLD	FULL HOT	FULL HOT	FULL HOT	FULL HOT
Blower motor (V)	4	4	8	HI	HI	8	HI
A/C compressor (Magnet clutch)	ON	ON	ON	OFF	OFF	ON	ON

NOTE:

Perform the inspection of each output device after starting the engine, because the A/C compressor has been operating.

DIAGNOSIS SYSTEM (BCM)
COMMON ITEM
COMMON ITEM : CONSULT Function (BCM - COMMON ITEM)

INFOID:0000000014722917

APPLICATION ITEM
CONSULT performs the following functions via CAN communication with BCM.

Direct Diagnostic Mode	Description
ECU Identification	The BCM part number is displayed.
Self Diagnostic Result	The BCM self diagnostic results are displayed.
Data Monitor	The BCM input/output data is displayed in real time.
Active Test	The BCM activates outputs to test components.
Work support	The settings for BCM functions can be changed.
Configuration	• The vehicle specification can be read and saved. • The vehicle specification can be written when replacing BCM.
CAN Diag Support Mntr	The result of transmit/receive diagnosis of CAN communication is displayed.

SYSTEM APPLICATION
BCM can perform the following functions:

System	Sub System	Direct Diagnostic Mode						
		ECU Identification	Self Diagnostic Result	Data Monitor	Active Test	Work support	Configuration	CAN Diag Support Mntr
Door lock	DOOR LOCK		×	×	×	×		
Rear window defogger	REAR DEFOGGER			×	×	×		
Warning chime	BUZZER			×	×			
Interior room lamp timer	INT LAMP			×	×	×		
Exterior lamp	HEADLAMP			×	×	×		
Wiper and washer	WIPER			×	×	×		
Turn signal and hazard warning lamps	FLASHER			×	×	×		
Air conditioner	AIR CONDITIONER			×				
Intelligent Key system	INTELLIGENT KEY		×	×	×	×		
Combination switch	COMB SW			×				
BCM	BCM	×	×			×	×	×
Immobilizer	IMMU		×	×	×			
Interior room lamp battery saver	BATTERY SAVER			×	×			
Vehicle security system	THEFT ALM			×	×	×		
RAP system	RETAINED PWR			×				
Signal buffer system	SIGNAL BUFFER			×				

FREEZE FRAME DATA (FFD)
The BCM records the following vehicle condition at the time a particular DTC is detected, and displays it on CONSULT.

CONSULT screen item	Indication/Unit	Description	
Vehicle Speed	km/h	Vehicle speed at the moment a particular DTC is detected	
Odo/Trip Meter	km	Total mileage (Odometer value) at the moment a particular DTC is detected	
Vehicle Condition	SLEEP>LOCK	Power position status at the moment a particular DTC is detected*	While turning BCM status from low power consumption mode to normal mode (Power supply position is “LOCK”*).
	SLEEP>OFF		While turning BCM status from low power consumption mode to normal mode (Power supply position is “OFF”.)
	LOCK>ACC		While turning power supply position from “LOCK” *to “ACC”
	ACC>ON		While turning power supply position from “ACC” to “IGN”
	RUN>ACC		While turning power supply position from “RUN” to “ACC” (Vehicle is stopped and selector lever is in P position.)
	CRANK>RUN		While turning power supply position from “CRANKING” to “RUN” (From cranking up the engine to run it)
	RUN>URGENT		While turning power supply position from “RUN“ to “ACC” (Emergency stop operation)
	ACC>OFF		While turning power supply position from “ACC” to “OFF”
	OFF>LOCK		While turning power supply position from “OFF” to “LOCK”*
	OFF>ACC		While turning power supply position from “OFF” to “ACC”
	ON>CRANK		While turning power supply position from “IGN” to “CRANKING”
	OFF>SLEEP		While turning BCM status from normal mode (Power supply position is “OFF”.) to low power consumption mode
	LOCK>SLEEP		While turning BCM status from normal mode (Power supply position is “LOCK”*.) to low power consumption mode
	LOCK		Power supply position is “LOCK” (Ignition switch OFF)*
	OFF		Power supply position is “OFF” (Ignition switch OFF)
	ACC		Power supply position is “ACC” (Ignition switch ACC)
	ON		Power supply position is “IGN” (Ignition switch ON with engine stopped)
	ENGINE RUN		Power supply position is “RUN” (Ignition switch ON with engine running)
	CRANKING		Power supply position is “CRANKING” (At engine cranking)
IGN Counter	0 - 39	The number of times that ignition switch is turned ON after DTC is detected • The number is 0 when a malfunction is detected now. • The number increases like 1 → 2 → 3...38 → 39 after returning to the normal condition whenever ignition is switched OFF → ON. • The number is fixed to 39 until the self-diagnosis results are erased if it is over 39.	

NOTE:
*: Power supply position shifts to “LOCK” from “OFF”, when ignition switch is in the OFF position, selector lever is in the P position, and any of the following conditions are met:
- Closing door
- Opening door
- Door is locked using door request switch
- Door is locked using Intelligent Key

The power supply position shifts to “ACC” when the push-button ignition switch (push switch) is pushed at “LOCK”.

AIR CONDITIONER

AIR CONDITIONER : CONSULT Function (BCM - AIR CONDITIONER)

INFOID:0000000014722918

DATA MONITOR

Monitor Item [Unit]	Description
FAN ON SIG [On/Off]	Indicates condition of fan switch.
AIR COND SW [On/Off]	Indicates condition of A/C switch.

DIAGNOSIS SYSTEM (IPDM E/R)

CONSULT Function (IPDM E/R)

INFOID:0000000014722919

APPLICATION ITEM

CONSULT performs the following functions via CAN communication with IPDM E/R:

Direct Diagnostic Mode	Description
Self Diagnostic Result	The IPDM E/R self diagnostic results are displayed.
Data Monitor	The IPDM E/R input/output data is displayed in real time.
Active Test	The IPDM E/R activates outputs to test components.
CAN Diag Support Mntr	The result of transmit/receive diagnosis of CAN communication is displayed.

SELF DIAGNOSTIC RESULT

Refer to PCS-23, "DTC Index".

DATA MONITOR

Monitor Item [Unit]	Main Signals	Description
AC COMP REQ [On/Off]	×	Indicates A/C compressor request signal received from ECM on CAN communication line
TAIL&CLR REQ [On/Off]	×	Indicates position light request signal received from BCM on CAN communication line
HL LO REQ [On/Off]	×	Indicates low beam request signal received from BCM on CAN communication line
HL HI REQ [On/Off]	×	Indicates high beam request signal received from BCM on CAN communication line
FR FOG REQ [On/Off]	×	Indicates front fog light request signal received from BCM on CAN communication line
FR WIP REQ [Stop/1LOW/Low/Hi]	×	Indicates front wiper request signal received from BCM on CAN communication line
WIP AUTO STOP [STOP P/ACT P]	×	Indicates condition of front wiper auto stop signal
WIP PROT [Off/BLOCK]	×	Indicates condition of front wiper fail-safe operation
IGN RLY1 -REQ [On/Off]		Indicates ignition switch ON signal received from BCM on CAN communication line.
IGN RLY [On/Off]	×	Indicates condition of ignition relay
PUSH SW [On/Off]		Indicates condition of push-button ignition switch.
INTER/NP SW [On/Off]		Indicates condition of AT shift position.
ST RLY CONT [On/Off]		Indicates starter relay status signal received from BCM on CAN communication line.
IHBT RLY -REQ [On/Off]		Indicates starter control relay signal received from BCM on CAN communication line.
ST/INHI RLY [Off/ ST /INHI]		Indicates condition of starter relay and starter control relay.
DETENT SW [On/Off]		Indicates condition of AT shift selector (park position switch).
DTRL REQ [Off]		Indicates daytime light request signal received from BCM on CAN communication line
HOOD SW [On/Off]		Indicates condition of hood switch.
THFT HRN REQ [On/Off]		Indicates theft warning horn request signal received from BCM on CAN communication line
HORN CHIRP [On/Off]		Indicates horn reminder signal received from BCM on CAN communication line
HOOD SW 2 [On/Off]		Indicates condition of hood switch 2.

ACTIVE TEST

Test item	Description
REAR DEFOGGER	This test is able to check rear defogger operation [On/Off].
FRONT WIPER	This test is able to check wiper motor operation [Hi/Lo/Off].
EXTERNAL LAMPS	This test is able to check external lamp operation [Fog/Hi/Lo/TAIL/Off].
HORN	This test is able to check horn operation [On].

ECU DIAGNOSIS INFORMATION

FRONT AIR CONTROL

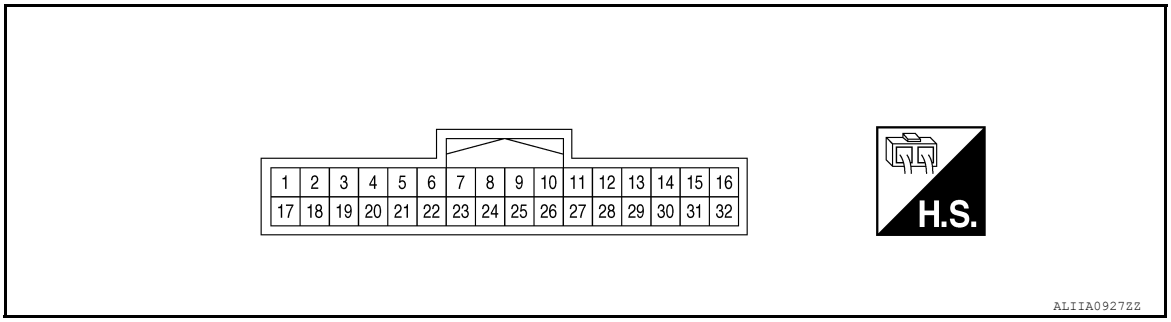
Reference Value

INFOID:0000000014392223

VALUES ON THE DIAGNOSIS TOOL

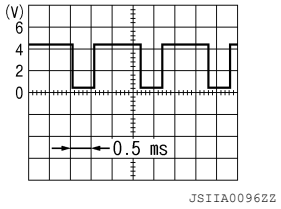
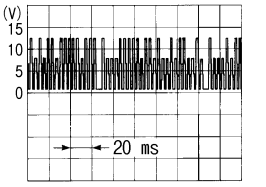
Monitor item	Condition		Value/Status
INT TEMP SEN	Ignition switch ON	—	−30 - 55°C (22 - 131°F)
COMP REQ SIG	Engine: Run at idle after warming up	A/C switch: ON (A/C compressor operation status)	On
		A/C switch: OFF	Off
FAN REQ SIG	Engine: Run at idle after warming up	Blower fan: ON	On
		Blower fan: OFF	Off
FAN DUTY	Engine: Run at idle after warming up	Blower fan: ON	Varies
		Blower fan: OFF	0%
ENG COOL TEMP	Ignition switch ON	—	Varies according to coolant temperature
VEHICLE SPEED	Driving	—	Equivalent to speedometer reading

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	−	Signal name	Input/ Output			
1 (L)	—	CAN high	Input/ Output	—		—
2 (B)	—	Ground	—	—		—
3 (SB)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
4 (L)	Ground	Illumination (+)	ON	Lighting switch	OFF	0 V
					1st position	Battery voltage
9 (W)	Ground	IGN 2	Input	Ignition switch ON		Battery voltage

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	−	Signal name	Input/ Output			
10 (P)	Ground	Front blower motor control signal	Output	• Ignition switch ON • Front fan speed: 1st speed (manual)		 JSIIA0096ZZ
11 (Y)	Ground	RR DEF switch	Output	Defroster switch	OFF	0 V
					ON	5 V
12 (G)	Ground	Each door motor LIN signal	Input/ Output	Ignition switch ON		 SJIA1453J
13 (W)	Ground	Each door motor power supply	Output	Ignition switch ON		Battery voltage
17 (P)	—	CAN low	Input/ Output	—		—
18 (B)	—	Ground	—	—		—
19 (G)	Ground	Ignition power supply	Input	Ignition switch ON		Battery voltage
20 (GR)	—	Illumination (-)	—	—		0 V
21 (R)	—	Sensor ground	—	—		—
22 (P)	Ground	Intake sensor signal	Input	Ignition switch ON		0 – 4.8 V Output voltage varies with front evaporator fin temperature
25 (Y)	Ground	Compressor ON signal	ON	A/C switch OFF		5 V
			ON	A/C switch ON		0 V
26 (L/W)	Ground	Front blower motor feed-back	ON	-		Battery voltage
27 (B/W)	Ground	RR DEF feedback	Input	Defroster switch	OFF	0 V
					ON	Battery voltage
29 (B)	—	ACTR Ground	—	—		—
30 (W)	Ground	Fan ON signal	ON	Blower switch OFF		5 V
			ON	Blower switch ON		0 V

DTC Index

INFOID:0000000014392224

DTC	Items (CONSULT screen terms)	Reference
U1000	CAN COMM CIRCUIT	HAC-190, "DTC Description"
U1010	CONTROL UNIT (CAN)	HAC-191, "FRONT A/C CONTROL : DTC Description"
B257B	AMBIENT SENSOR (SHORT)	HAC-193, "DTC Description"
B257C	AMBIENT SENSOR (OPEN)	HAC-193, "DTC Description"
B2581	INTAKE SENSOR (SHORT)	HAC-196, "DTC Description"
B2582	INTAKE SENSOR (OPEN)	HAC-196, "DTC Description"
B2632	DR AIR MIX DOOR MOT (SHORT)	HAC-199, "DTC Description"
B2633	DR AIR MIX DOOR MOT (OPEN)	HAC-199, "DTC Description"
B2636	DR VENT DOOR FAIL	HAC-201, "DTC Description"
B2637	DR B/L DOOR FAIL	HAC-201, "DTC Description"
B2638	DR D/F1 DOOR FAIL	HAC-201, "DTC Description"
B2639	DR DEF DOOR FAIL	HAC-201, "DTC Description"
B263D	FRE DOOR FAIL	HAC-203, "DTC Description"
B263E	20P FRE DOOR FAIL	HAC-203, "DTC Description"
B263F	REC DOOR FAIL	HAC-203, "DTC Description"
B2654	D/F2 DOOR FAIL	HAC-201, "DTC Description"
B2655	B/L2 DOOR FAIL	HAC-201, "DTC Description"

*: Perform self-diagnosis under direct sunlight. When performing indoors, aim a light (more than 60 W) at sunload sensor, otherwise self-diagnosis reports an error even though the sunload sensor is functioning normally.

PTC HEATER CONTROL UNIT

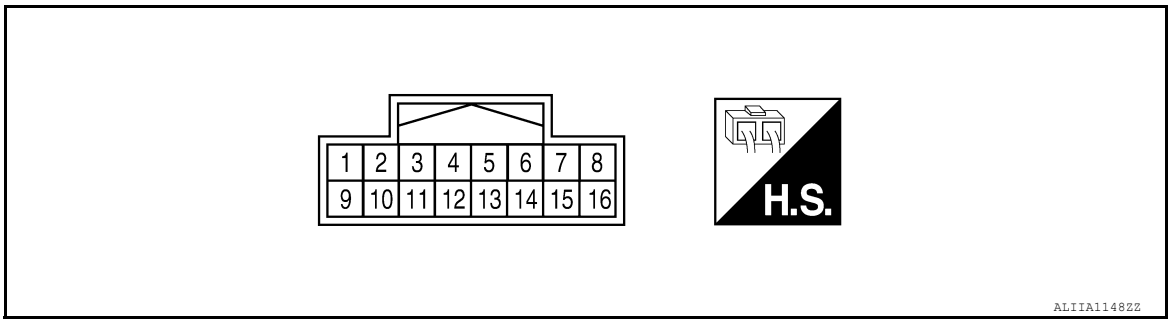
Reference Value

INFOID:0000000014392225

VALUES ON THE DIAGNOSIS TOOL

Monitor item	Condition		Value/Status
AMB TEMP SEN	Ignition switch ON	—	−30 - 55°C (22 - 131°F)
AMB SEN CAL	Ignition switch ON	—	−30 - 55°C (22 - 131°F)
ENG COOL TEMP	Ignition switch ON	—	Varies according to coolant temperature

TERMINAL LAYOUT



PHYSICAL VALUES

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	−	Signal name	Input/ Output			
1 (L)	—	CAN-H	Input/ Output	—		—
2 (B)	—	Ground	—	—		—
3 (G)	Ground	Ignition power supply	Input	Ignition switch ON		Battery voltage
5 (R)	—	Sensor ground	—	—		—
9 (P)	—	CAN-L	Input/ Output	—		—
10 (SB)	Ground	Battery power supply	Input	Ignition switch OFF		Battery voltage
12 (W)	Ground	Ambient sensor signal	Input	Ignition switch ON		0 – 4.8 V Output voltage varies with ambient temperature
13 (L/W)	Ground	Front blower motor feedback	ON	-		Battery voltage
14 (G/R)	Ground	PTC1 relay output signal	Input	Ignition switch ON	PTC heater: ON	0 V
					PTC heater: OFF	Battery voltage
15 (LG)	Ground	PTC2 relay output signal	Input	Ignition switch ON	PTC heater: ON	0 V
					PTC heater: OFF	Battery voltage

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
16 (SB)	Ground	PTC3 relay output signal	Input	Ignition switch ON	PTC heater: ON	0 V
					PTC heater: OFF	Battery voltage

DTC Index

INFOID:0000000014392226

DTC	Items (CONSULT screen terms)	Reference
U1000	CAN COMM CIRCUIT	HAC-190, "DTC Description"
U1010	CONTROL UNIT (CAN)	HAC-191, "PTC HEATER CONTROL UNIT : DTC Description"
B257B	AMBIENT SENSOR (SHORT)	HAC-193, "DTC Description"
B257C	AMBIENT SENSOR (OPEN)	HAC-193, "DTC Description"

ECM, IPDM E/R, BCM

List of ECU Reference

INFOID:0000000014392227

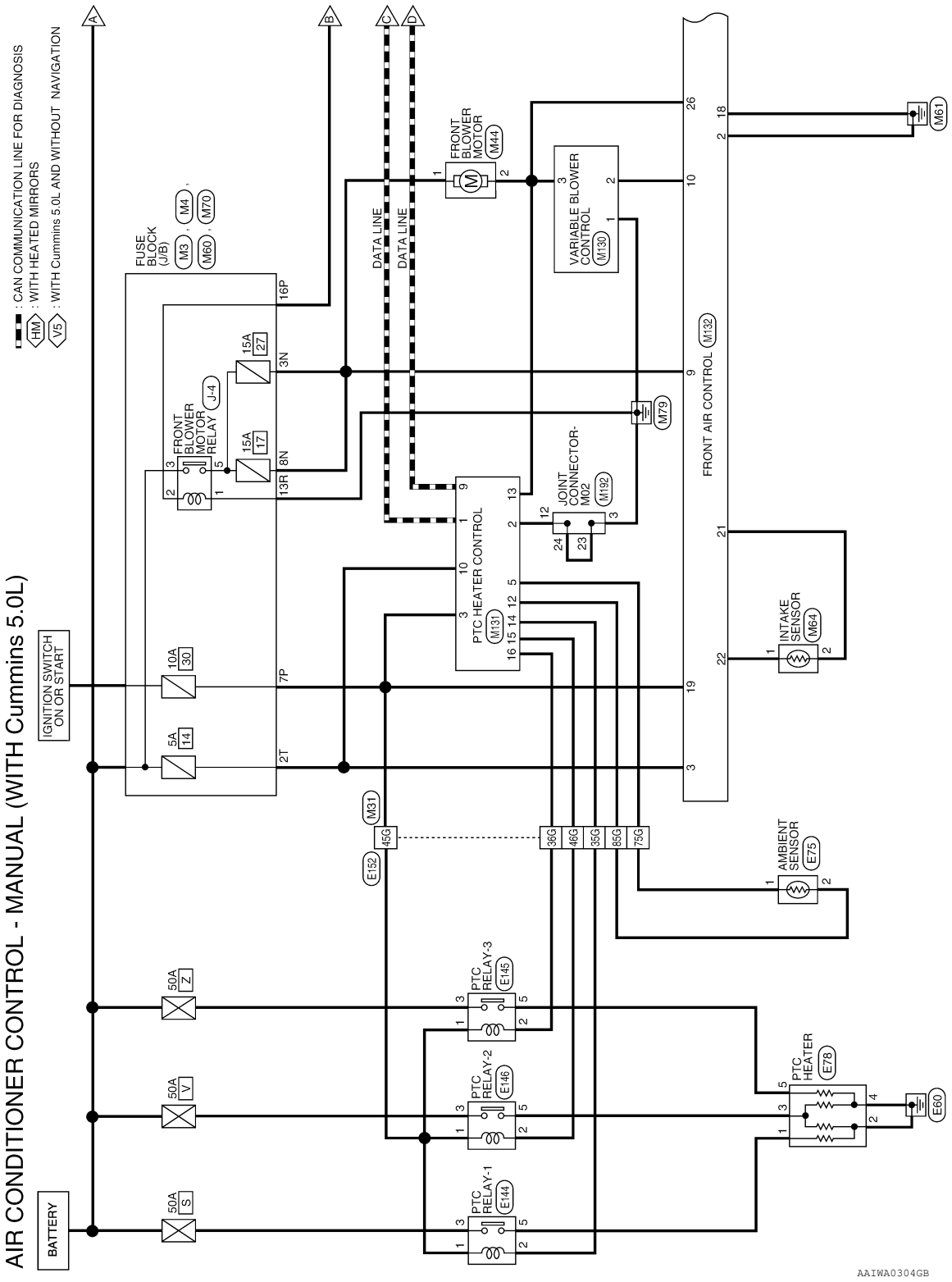
ECU	Reference
ECM (Cummins 5.0L)	EC-816, "Reference Value"
	EC-828, "Fail safe"
	EC-837, "DTC Index"
ECM (VK56VD)	EC-107, "Reference Value"
	EC-131, "Fail-safe"
	EC-136, "DTC Index"
IPDM E/R	PCS-14, "Reference Value"
	PCS-22, "Fail Safe"
	PCS-23, "DTC Index"
BCM	BCS-32, "Reference Value"
	BCS-32, "Reference Value"
	BCS-51, "DTC Inspection Priority Chart"
	BCS-52, "DTC Index"

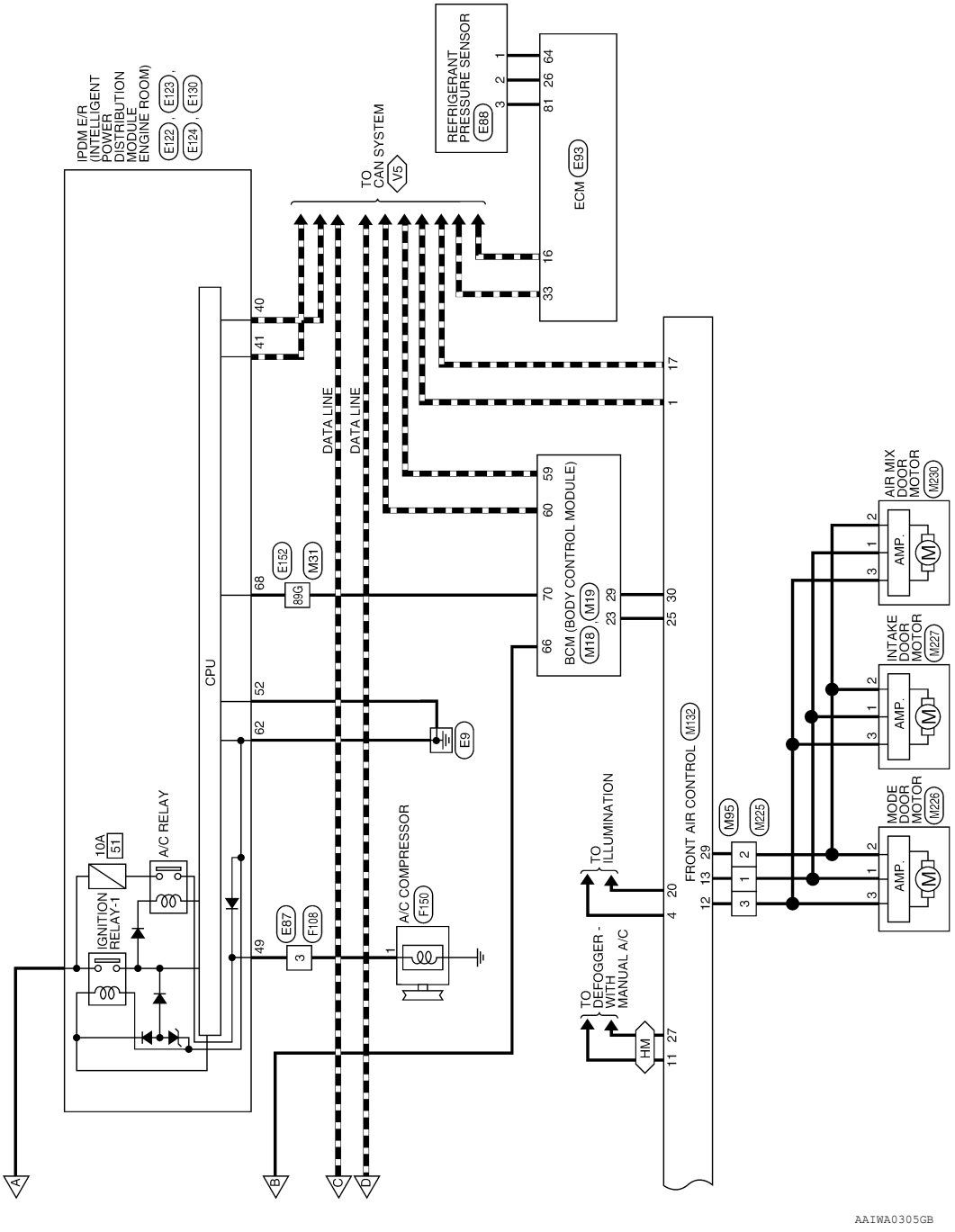
WIRING DIAGRAM

MANUAL AIR CONDITIONING SYSTEM
CUMMINS 5.0L

CUMMINS 5.0L : Wiring Diagram

INFOID:0000000014392228




IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E122, E123, E124, E130
CPU
TO CAN SYSTEM
V5
REFRIGERANT PRESSURE SENSOR
E88
ECM E93
DATA LINE
DATA LINE
BCM (BODY CONTROL MODULE)
M18, M19
E152
M31
89G
E9
10A
51
A/C RELAY
IGNITION RELAY-1
E87
F108
A/C COMPRESSOR
F150
TO ILLUMINATION
TO DEFOGGER - WITH MANUAL A/C
HM
FRONT AIR CONTROL M132
M95
M225
AIR MIX DOOR MOTOR M230
INTAKE DOOR MOTOR M227
MODE DOOR MOTOR M226
AMP.
A
B
C
D
AAIWA0305GB

AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH Cummins 5.0L)

Connector No.	E75
Connector Name	AMBIENT SENSOR
Connector Type	RS02FB
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	R	SENS GND
2	W/B	AMB SENS

Connector No.	E78
Connector Name	PTC HEATER
Connector Type	ALA05FB-R-RH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	BR	PTC RELAY-1 OUTPUT
2	B	GND
3	G	PTC RELAY-2 OUTPUT
4	B	GND
5	L	PTC RELAY-3 OUTPUT

Connector No.	E87
Connector Name	WIRE TO WIRE
Connector Type	54200608
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name

1	–	TO ENGINE CONTROL HARNESS - DIESEL
2	P	TO ENGINE CONTROL HARNESS - DIESEL
3	Y/B	TO ENGINE CONTROL HARNESS - DIESEL
4	–	TO ENGINE CONTROL HARNESS - DIESEL
5	B	TO ENGINE CONTROL HARNESS - DIESEL
6	L/W	TO ENGINE CONTROL HARNESS - DIESEL

Connector No.	E88
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	RK03FB
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	R/W	REF PRESS SENS RETURN
2	R/L	REF PRESS SENS SIGNAL
3	B	PPS2 SUPPLY

Connector No.	E93
Connector Name	ECM (WITH CUMMINS 5.0L)
Connector Type	1-928-405-452
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	B	GROUND
2	B	GROUND
3	BR	SW BATTERY
4	B	GROUND
5	BR	SW BATTERY
6	BR	SW BATTERY
7	O	DOF DELTA PRESS
8	–	–
9	–	–
10	–	–
11	–	–
12	–	–
13	–	–
14	–	–
15	L/R	AT SENSOR RTN
16	P	CAN-L
17	–	–
18	G	J1939 +
19	–	–
20	G	SMART POWER LSD
21	–	–
22	–	–
23	–	–
24	SB	DPF OUT PRESS
25	–	–
26	R/L	REF PRESS SENS SIGNAL
27	–	–
28	–	–
29	–	–
30	–	–
31	–	–
32	Y	AT SSR SUPPLY
33	L	CAN-H
34	–	–
35	Y	J1939 +
36	–	–
37	L	MAIN RLY LSD
38	–	–
39	–	–
40	GR	FUEL PUMP RLY SIG
41	BR	SW RETURN
42	–	–
43	–	–
44	–	–
45	–	–
46	–	–
47	–	–
48	–	–
49	–	–
50	–	–
51	–	–
52	–	–
53	P/G	BRAKE SW OPEN
54	L	BRAKE NC
55	–	–
56	–	–
57	–	–
58	–	–
59	G/Y	ASCD SIGNAL
60	–	–
61	B/Y	ASCD RETURN
62	R	PPS2 RETURN
63	R	PPS1 RETURN
64	R/W	REF PRESS SENS RETURN
65	L/W	IGN/KEYSWITCH
66	–	–
67	–	–
68	–	–
69	–	–
70	–	–
71	–	–
72	–	–
73	B	DOSER RETURN
74	GR/R	DOSER H/S
75	L/W	COOLANT SIGNAL
76	–	–
77	L	WIF SIGNAL
78	L	PPS2 SIGNAL
79	BR	PPS1 SIGNAL
80	W	PPS1 SUPPLY
81	B	PPS2 SUPPLY
82	–	–
83	BR	BATTERY
84	–	–
85	–	–
86	–	–
87	–	–
88	–	–
89	–	–
90	–	–
91	–	–

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AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH Cummins 5.0L)

Connector No.	E122
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH12FW-NH
Connector Color	WHITE

H.S.

42 41 40 39 38 37
48 47 46 45 44 43

Terminal No.	Color of Wire	Signal Name
37	–	–
38	–	–
39	L/Y	WIPER AUTO STOP SW
40	P	CAN-L
41	L	CAN-H
42	BR	DTRL RLY
43	–	–
44	W/B	START CONT
45	GR	FUEL RLY CONT
46	Y	HOOD SW
47	Y	ALT C - (WITH VK56VD)
48	R/W	HORN RLY CONT

Connector No.	E123
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS08FBR-CS
Connector Color	BROWN

H.S.

51 50 49
56 55 54 53 52

Terminal No.	Color of Wire	Signal Name
49	Y/B	A/C COMP - (WITH CUMMINS 5.0L)
49	GR/R	A/C COMP - (WITH VK56VD)
50	BR	TRAILER TOW
51	–	–
52	B	S-GND
53	–	–
54	–	–

55	–	–
56	–	–

Connector No.	E124
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC
Connector Color	BLACK

H.S.

59 58 57
62 61 60

Terminal No.	Color of Wire	Signal Name
57	W/B	RR DEF
58	BR	FUEL PUMP - (WITH CUMMINS 5.0L)
58	B/Y	FUEL PUMP - (WITH VK56VD)
59	–	–
60	–	–
61	–	–
62	B	P GND

Connector No.	E130
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH10FB-NH
Connector Color	BLACK

H.S.

67 66 65 64 63
72 71 70 69 68

Terminal No.	Color of Wire	Signal Name
63	–	–
64	R	DETENT SW
65	–	–
66	P	PUSH START SW
67	–	–
68	L	IGN SIGNAL
69	–	–
70	–	–
71	SB	HOOD SW2

72	W	E-CPLG - (WITH VK56VD)

Connector No.	E144
Connector Name	PTC RELAY-1
Connector Type	24347-9F900
Connector Color	BLUE

H.S.

3 1
2 5

Terminal No.	Color of Wire	Signal Name
1	G	IGNITION
2	G/R	PTC 1
3	O	BATTERY
5	BR	RELAY OUTPUT

Connector No.	E145
Connector Name	PTC RELAY-3
Connector Type	24347-9F900
Connector Color	BLUE

H.S.

3 1
2 5

Terminal No.	Color of Wire	Signal Name
1	G	IGNITION
2	SB	PTC 3
3	G	BATTERY
5	L	RELAY OUTPUT

Connector No.	E146
Connector Name	PTC RELAY-2
Connector Type	24347-9F900
Connector Color	BLUE

H.S.

3 1
2 5

Terminal No.	Color of Wire	Signal Name
1	G	IGNITION
2	LG	PTC 2
3	R	BATTERY
5	G	RELAY OUTPUT

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AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH Cummins 5.0L)

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	G	TO MAIN HARNESS
2G	B/R	TO MAIN HARNESS
3G	W/B	TO MAIN HARNESS
4G	BR/W	TO MAIN HARNESS
5G	BR	TO MAIN HARNESS
6G	P	TO MAIN HARNESS - (WITH VK56VD)
6G	R/W	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
7G	Y	TO MAIN HARNESS
8G	G	TO MAIN HARNESS
9G	R	TO MAIN HARNESS
10G	W	TO MAIN HARNESS
11G	R/G	TO MAIN HARNESS
12G	W/B	TO MAIN HARNESS
13G	BR	TO MAIN HARNESS
14G	Y/B	TO MAIN HARNESS
15G	G/W	TO MAIN HARNESS
16G	G	TO MAIN HARNESS
17G	G/Y	TO MAIN HARNESS
18G	G/Y	TO MAIN HARNESS
19G	Y/V	TO MAIN HARNESS
20G	G/Y	TO MAIN HARNESS
21G	B/Y	TO MAIN HARNESS
22G	G/R	TO MAIN HARNESS
23G	Y/R	TO MAIN HARNESS

24G	G/B	TO MAIN HARNESS
25G	R/W	TO MAIN HARNESS
26G	R	TO MAIN HARNESS
27G	LG	TO MAIN HARNESS
28G	G/B	TO MAIN HARNESS
29G	G/B	TO MAIN HARNESS
30G	BR/Y	TO MAIN HARNESS
31G	P	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
31G	R	TO MAIN HARNESS - (WITH VK56VD)
32G	P	TO MAIN HARNESS
33G	Y/L	TO MAIN HARNESS
34G	GR	TO MAIN HARNESS
35G	G/R	TO MAIN HARNESS
36G	SB	TO MAIN HARNESS
37G	R/W	TO MAIN HARNESS
38G	BR	TO MAIN HARNESS
39G	BR	TO MAIN HARNESS
40G	–	TO MAIN HARNESS
41G	R/G	TO MAIN HARNESS
42G	O	TO MAIN HARNESS
43G	B	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
43G	G	TO MAIN HARNESS - (WITH VK56VD)
44G	R/Y	TO MAIN HARNESS
45G	G	TO MAIN HARNESS
46G	LG	TO MAIN HARNESS
47G	R	TO MAIN HARNESS
48G	W	TO MAIN HARNESS
49G	–	TO MAIN HARNESS
50G	BR	TO MAIN HARNESS
51G	R	TO MAIN HARNESS
52G	L	TO MAIN HARNESS
53G	W	TO MAIN HARNESS
54G	W	TO MAIN HARNESS
55G	G	TO MAIN HARNESS
56G	W	TO MAIN HARNESS
57G	Y	TO MAIN HARNESS
58G	BG	TO MAIN HARNESS
59G	BG	TO MAIN HARNESS
60G	BG	TO MAIN HARNESS
61G	B	TO MAIN HARNESS
62G	W	TO MAIN HARNESS
63G	R	TO MAIN HARNESS
64G	W/L	TO MAIN HARNESS
65G	W/R	TO MAIN HARNESS
66G	BG	TO MAIN HARNESS
67G	BG	TO MAIN HARNESS
68G	B	TO MAIN HARNESS
69G	Y	TO MAIN HARNESS
70G	L	TO MAIN HARNESS
71G	R/W	TO MAIN HARNESS
72G	L/W	TO MAIN HARNESS
73G	SHIELD	TO MAIN HARNESS
74G	W	TO MAIN HARNESS
75G	R	TO MAIN HARNESS
76G	R/G	TO MAIN HARNESS
77G	G	TO MAIN HARNESS
78G	W	TO MAIN HARNESS
79G	–	TO MAIN HARNESS
80G	R	TO MAIN HARNESS
81G	L	TO MAIN HARNESS
82G	R	TO MAIN HARNESS
83G	L	TO MAIN HARNESS
84G	L	TO MAIN HARNESS
85G	W/B	TO MAIN HARNESS
86G	B/R	TO MAIN HARNESS
87G	W/B	TO MAIN HARNESS
88G	P	TO MAIN HARNESS
89G	L	TO MAIN HARNESS
90G	G	TO MAIN HARNESS
91G	G	TO MAIN HARNESS
92G	V/W	TO MAIN HARNESS
93G	BR	TO MAIN HARNESS
94G	G	TO MAIN HARNESS
95G	G	TO MAIN HARNESS
96G	W	TO MAIN HARNESS
97G	R	TO MAIN HARNESS
98G	W/B	TO MAIN HARNESS
99G	BR	TO MAIN HARNESS
100G	GR/W	TO MAIN HARNESS

Connector No.	F108
Connector Name	WIRE TO WIRE
Connector Type	54200612
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	–	TO ENGINE ROOM HARNESS
2	O	TO ENGINE ROOM HARNESS
3	R/V	TO ENGINE ROOM HARNESS
4	–	TO ENGINE ROOM HARNESS
5	P	TO ENGINE ROOM HARNESS
6	R/V	TO ENGINE ROOM HARNESS

Connector No.	F150
Connector Name	A/C COMPRESSOR (WITH CUMMINS 5.0L)
Connector Type	6185-0862
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	R/V	A/C COMP

Connector No.	M3
Connector Name	FUSE BLOCK (J/B)
Connector Type	CS06FW-M2
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1N	–	–
2N	W	BATTERY
3N	W	BLOWER FAN RELAY OUT
4N	V	BATTERY
5N	Y	BATTERY
6N	W	BATTERY
7N	L	ACC RELAY OUT
8N	W	IGNITION

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AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH Cummins 5.0L)

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FW-CS
Connector Color	WHITE

H.S.

7P 6P 5P 4P 3P 2P 1P
16P 15P 14P 13P 12P 11P 10P 9P 8P

Terminal No.	Color of Wire	Signal Name
1P	R	IGNITION
2P	Y	IGNITION
3P	G	IGNITION RELAY OUT
4P	B/W	RR DEF RLY
5P	B/W	RR DEF RLY
6P	O	RR DEF RLY OUT
7P	G	IGNITION
8P	W	IGNITION
9P	L	BATTERY
10P	–	–
11P	–	–
12P	–	–
13P	R	BATTERY
14P	Y	BATTERY
15P	Y/LG	BATTERY
16P	W	BLOWER FAN RELAY OUT

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FG-NH
Connector Color	GREEN

H.S.

20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21

Terminal No.	Color of Wire	Signal Name
1	G	ENG START SW NO ESCL
2	–	–
3	R	A/L POWER SUPPLY 5V
4	W/R	A/L SIGNAL
5	–	–
6	–	–
7	–	–
8	–	–
9	–	–
10	SB	COMBI SW IN 5
11	G/Y	COMBI SW IN 4
12	Y	COMBI SW IN 3
13	G/B	COMBI SW IN 2
14	V	COMBI SW IN 1
15	–	–
16	–	–
17	P	GND RF A/L
18	V	SECURITY INDICATOR
19	–	–
20	R	SHIFT P
21	R/W	STEP LAMP CONT
22	–	–
23	Y	AIRCON SW
24	–	–
25	W	BRAKE SW FUSE
26	L	SHORT IN PIN INPUT
27	R/G	BRAKE SW LAMP
28	–	–
29	W	BLOWER FAN SW
30	P	DR DOOR LOCK STATUS
31	–	–
32	Y	REAR DEFOGGER SW
33	–	–
34	–	–
35	R/G	REVERSE SW
36	W/B	HAZARD SW
37	–	–
38	–	–
39	B/R	SHIFT N/P
40	–	–
41	Y/L	TRAILER LIGHT CHECK RELAY OUT
42	R/Y	CARGO LAMP OUT
43	–	–
44	–	–
45	–	–
46	–	–
47	–	–
48	R	HIGH SIDE START SW LED
49	–	–
50	–	–
51	–	–
52	W	AUDIO DONGLE
53	–	–
54	W/L	PW UART
55	W/B	L&R SENSOR K-LINE
56	–	–
57	–	–
58	–	–
59	P	CAN-L
60	L	CAN-H
61	O	REAR DEFOGGER RELAY OUT
62	W	STARTER RELAY OUT
63	–	–
64	P	BUZZER OUT
65	–	–
66	W	BLOWER FAN RELAY OUT
67	G	IGN ELEC RELAY OUT 2
68	L	MR OUTPUT
69	R/B	AT DEVICE OUT
70	P	IGN USM OUT 1
71	O	DR REQUEST SW
72	G	AS REQUEST SW
73	–	–
74	–	–
75	L/W	COMBI SW OUT 5
76	P	COMBI SW OUT 4
77	L	COMBI SW OUT 3
78	O/B	COMBI SW OUT 2
79	R/W	COMBI SW OUT 1
80	–	–

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FB-NH
Connector Color	BLACK

H.S.

60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41
80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61

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AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH Cummins 5.0L)

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	G	TO ENGINE ROOM HARNESS
2G	B/R	TO ENGINE ROOM HARNESS
3G	W	TO ENGINE ROOM HARNESS
4G	BR/W	TO ENGINE ROOM HARNESS
5G	–	TO ENGINE ROOM HARNESS
6G	R/W	TO ENGINE ROOM HARNESS
7G	Y	TO ENGINE ROOM HARNESS
8G	G	TO ENGINE ROOM HARNESS
9G	R	TO ENGINE ROOM HARNESS
10G	W	TO ENGINE ROOM HARNESS
11G	R/G	TO ENGINE ROOM HARNESS
12G	W/B	TO ENGINE ROOM HARNESS
13G	BR	TO ENGINE ROOM HARNESS
14G	Y/B	TO ENGINE ROOM HARNESS
15G	G/W	TO ENGINE ROOM HARNESS
16G	G	TO ENGINE ROOM HARNESS
17G	O	TO ENGINE ROOM HARNESS
18G	G/Y	TO ENGINE ROOM HARNESS
19G	Y/V	TO ENGINE ROOM HARNESS
20G	G/Y	TO ENGINE ROOM HARNESS
21G	B/Y	TO ENGINE ROOM HARNESS
22G	G/R	TO ENGINE ROOM HARNESS
23G	Y/R	TO ENGINE ROOM HARNESS
24G	G/B	TO ENGINE ROOM HARNESS
25G	R/W	TO ENGINE ROOM HARNESS
26G	R	TO ENGINE ROOM HARNESS
27G	LG	TO ENGINE ROOM HARNESS
28G	G/B	TO ENGINE ROOM HARNESS
29G	G/B	TO ENGINE ROOM HARNESS
30G	BR/Y	TO ENGINE ROOM HARNESS
31G	R	TO ENGINE ROOM HARNESS
32G	R	TO ENGINE ROOM HARNESS
33G	Y/L	TO ENGINE ROOM HARNESS
34G	GR	TO ENGINE ROOM HARNESS
35G	G/R	TO ENGINE ROOM HARNESS
36G	SB	TO ENGINE ROOM HARNESS
37G	R/W	TO ENGINE ROOM HARNESS
38G	BR	TO ENGINE ROOM HARNESS
39G	BR	TO ENGINE ROOM HARNESS
40G	–	TO ENGINE ROOM HARNESS
41G	R/G	TO ENGINE ROOM HARNESS
42G	O	TO ENGINE ROOM HARNESS
43G	G	TO ENGINE ROOM HARNESS
44G	R/Y	TO ENGINE ROOM HARNESS
45G	G	TO ENGINE ROOM HARNESS
46G	LG	TO ENGINE ROOM HARNESS
47G	R	TO ENGINE ROOM HARNESS
48G	W	TO ENGINE ROOM HARNESS
49G	–	TO ENGINE ROOM HARNESS
50G	BR	TO ENGINE ROOM HARNESS
51G	R	TO ENGINE ROOM HARNESS
52G	L	TO ENGINE ROOM HARNESS
53G	W	TO ENGINE ROOM HARNESS
54G	W	TO ENGINE ROOM HARNESS
55G	G	TO ENGINE ROOM HARNESS
56G	W	TO ENGINE ROOM HARNESS
57G	Y	TO ENGINE ROOM HARNESS
58G	BG	TO ENGINE ROOM HARNESS
59G	BG	TO ENGINE ROOM HARNESS
60G	BG	TO ENGINE ROOM HARNESS
61G	O	TO ENGINE ROOM HARNESS
62G	W	TO ENGINE ROOM HARNESS
63G	O	TO ENGINE ROOM HARNESS
64G	W/L	TO ENGINE ROOM HARNESS
65G	W/R	TO ENGINE ROOM HARNESS
66G	BG	TO ENGINE ROOM HARNESS
67G	O	TO ENGINE ROOM HARNESS
68G	B	TO ENGINE ROOM HARNESS
69G	Y	TO ENGINE ROOM HARNESS
70G	L	TO ENGINE ROOM HARNESS
71G	R/W	TO ENGINE ROOM HARNESS
72G	L/W	TO ENGINE ROOM HARNESS
73G	SHIELD	TO ENGINE ROOM HARNESS
74G	W	TO ENGINE ROOM HARNESS
75G	R	TO ENGINE ROOM HARNESS
76G	R/G	TO ENGINE ROOM HARNESS
77G	BG	TO ENGINE ROOM HARNESS
78G	P	TO ENGINE ROOM HARNESS
79G	–	TO ENGINE ROOM HARNESS
80G	R	TO ENGINE ROOM HARNESS
81G	L	TO ENGINE ROOM HARNESS
82G	R	TO ENGINE ROOM HARNESS
83G	L	TO ENGINE ROOM HARNESS
84G	L	TO ENGINE ROOM HARNESS
85G	W	TO ENGINE ROOM HARNESS
86G	B/R	TO ENGINE ROOM HARNESS
87G	W	TO ENGINE ROOM HARNESS
88G	G	TO ENGINE ROOM HARNESS
89G	P	TO ENGINE ROOM HARNESS
90G	G	TO ENGINE ROOM HARNESS
91G	P	TO ENGINE ROOM HARNESS
92G	V/W	TO ENGINE ROOM HARNESS
93G	BR	TO ENGINE ROOM HARNESS
94G	B	TO ENGINE ROOM HARNESS
95G	G	TO ENGINE ROOM HARNESS
96G	R	TO ENGINE ROOM HARNESS
97G	R	TO ENGINE ROOM HARNESS
98G	W/B	TO ENGINE ROOM HARNESS
99G	R	TO ENGINE ROOM HARNESS
100G	GR/W	TO ENGINE ROOM HARNESS

Connector No.	M44
Connector Name	FRONT BLOWER MOTOR
Connector Type	M02FW-LC
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	IGNITION
2	L/W	FAN SPEED CONT

Connector No.	M60
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS06FW-CS
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1T	–	–
2T	SB	BATTERY
3T	R	RR DEF RLY
4T	G	BATTERY
5T	–	–
6T	–	–

Connector No.	M64
Connector Name	INTAKE SENSOR
Connector Type	C02FW
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	P	INTAKE SENS
2	R	SENS GND

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AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH Cummins 5.0L)

Connector No.	M70
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FBR-CS
Connector Color	BROWN

H.S.

7R	6R	5R	4R		3R	2R	1R
16R	15R	14R	13R	12R	11R	10R	9R	8R

Terminal No.	Color of Wire	Signal Name
1R	L	TAIL LAMP 2
2R	G/R	IGNITION
3R	Y/R	BATTERY
4R	–	–
5R	W	BATTERY
6R	G/W	ACCESSORY
7R	–	–
8R	–	–
9R	–	–
10R	W	BATTERY
11R	–	–
12R	BG	BATTERY
13R	B	ACCESSORY
14R	G/Y	BATTERY
15R	Y	BATTERY
16R	G/R	ACCESSORY

Connector No.	M130
Connector Name	VARIABLE BLOWER CONTROL
Connector Type	M04FW-LC
Connector Color	WHITE

H.S.

3	2
1	

Terminal No.	Color of Wire	Signal Name
1	B	GND
2	P	FAN GATE
3	L/W	FAN SPEED

Connector No.	M131
Connector Name	PTC HEATER CONTROL
Connector Type	TH16FW-NH
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

Terminal No.	Color of Wire	Signal Name
1	L	CAN H
2	B	GND
3	G	IGNITION
4	–	–
5	R	SENS GND
6	–	–
7	–	–
8	–	–
9	P	CAN L
10	SB	BATTERY
11	–	–
12	W	AMB SENS
13	L/W	FAN SPEED
14	G/R	PTC 1
15	LG	PTC 2
16	SB	PTC 3

Connector No.	M95
Connector Name	WIRE TO WIRE
Connector Type	A03MW
Connector Color	WHITE

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name
1	W	TO HVAC SUB HARNESS
2	B	TO HVAC SUB HARNESS
3	G	TO HVAC SUB HARNESS

Connector No.	M132
Connector Name	FRONT AIR CONTROL
Connector Type	TH32FW-NH
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Terminal No.	Color of Wire	Signal Name
1	L	CAN-H
2	B	GND
3	SB	BAT
4	L	ILL+
5	–	–
6	–	–
7	–	–
8	–	–
9	W	IGN2(ACC)
10	P	FAN GATE
11	Y	RR DEF ON
12	G	LIN SIG
13	W	VACTR
14	–	–
15	–	–
16	–	–
17	P	CAN-L
18	B	GND(POWER)
19	G	IGN
20	GR	ILL-
21	R	SENS GND
22	P	INTAKE SENS
23	–	–
24	–	–
25	Y	COMP ON
26	L/W	FAN FB
27	B/W	RR DEF F/B
28	–	–
29	B	ACTR GND
30	W	FAN ON
31	–	–
32	–	–

Connector No.	M192
Connector Name	JOINT CONNECTOR-M02
Connector Type	NH24FW-J
Connector Color	WHITE

H.S.

4	3	2	1
8	7	6	5
12	11	10	9
16	15	14	13
20	19	18	17
24	23	22	21

Terminal No.	Color of Wire	Signal Name
1	B	GROUND
2	B	GND
3	B	GROUND
4	–	–
5	B	GROUND
6	B	GND
7	B	GROUND
8	B	GROUND
9	B	GROUND
10	B	GND
11	B	GROUND
12	B	GND
13	–	–
14	B	GND
15	B	GROUND
16	B	GND
17	–	–
18	SHIELD	SHIELD
19	SHIELD	SHIELD
20	SHIELD	SHIELD
21	B	GND
22	B	GND
23	B	GROUND
24	B	GROUND

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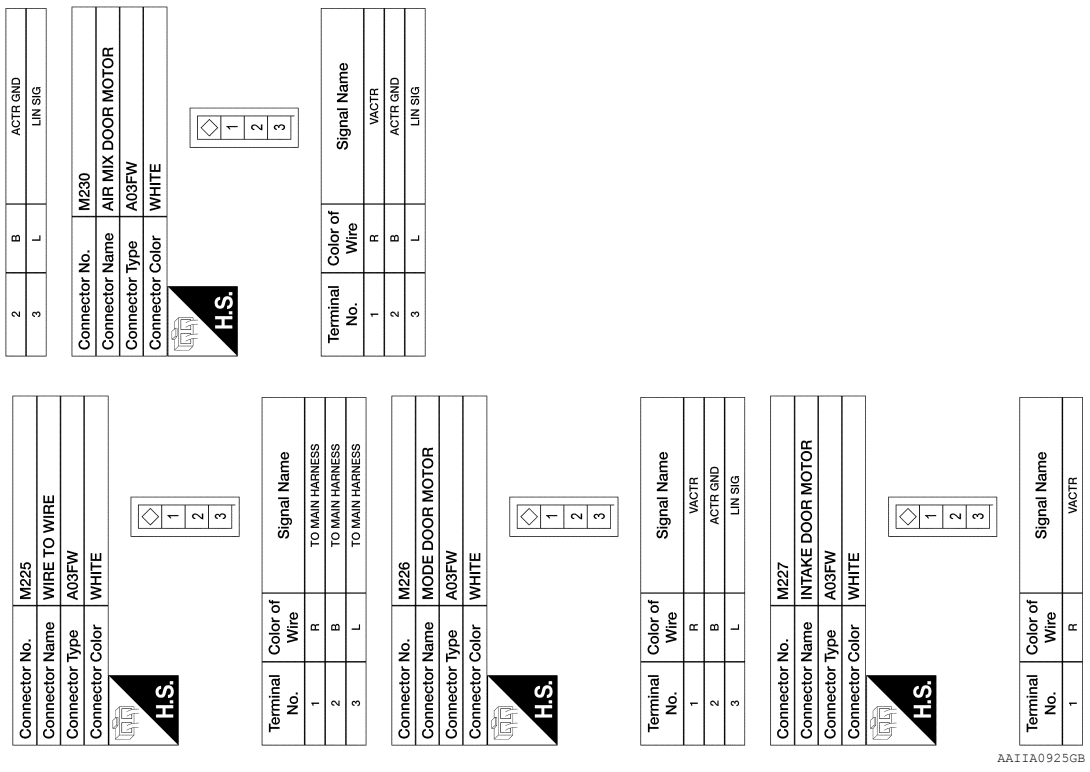
AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH Cummins 5.0L)



VK56VD

VK56VD : Wiring Diagram

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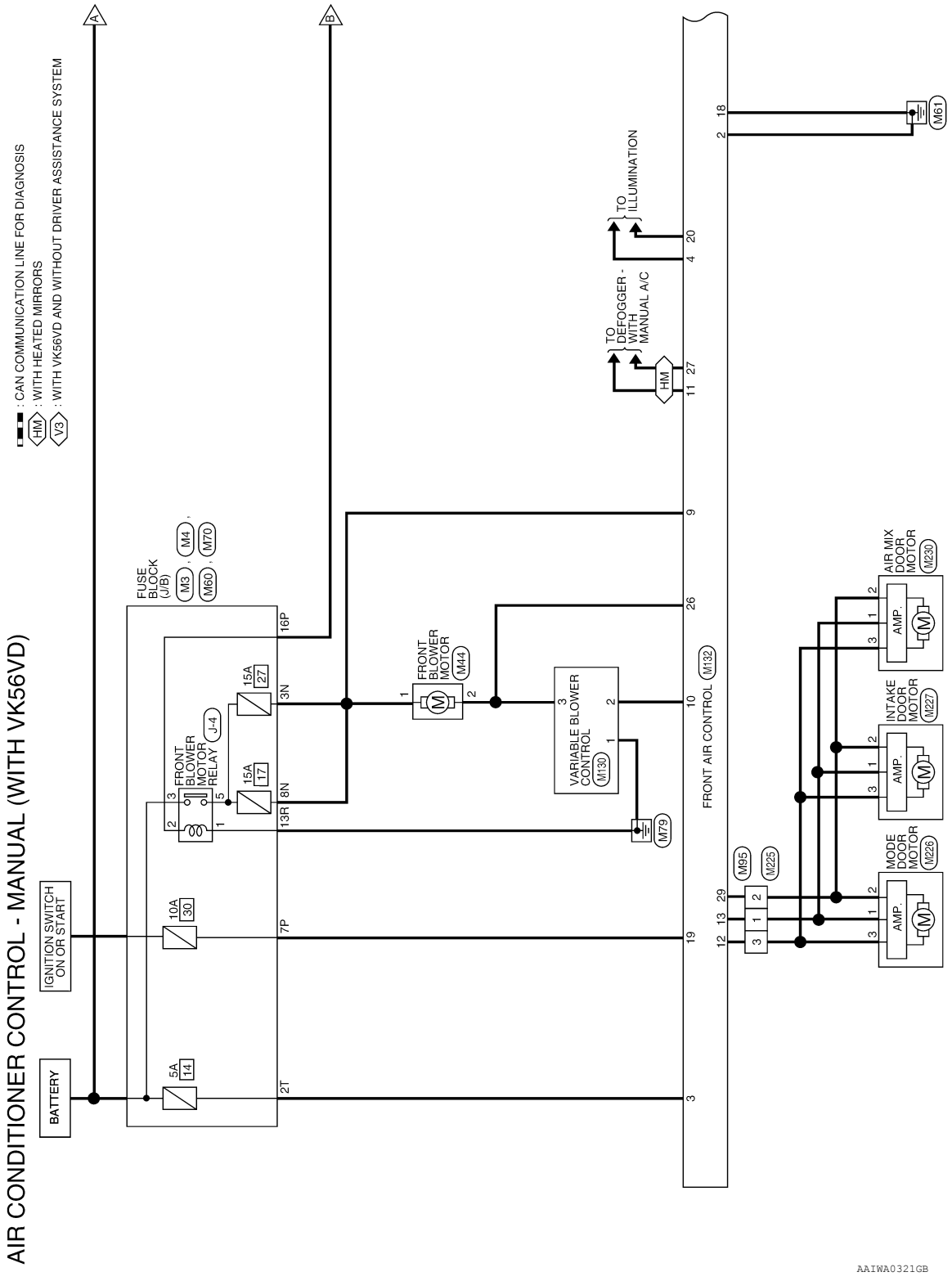
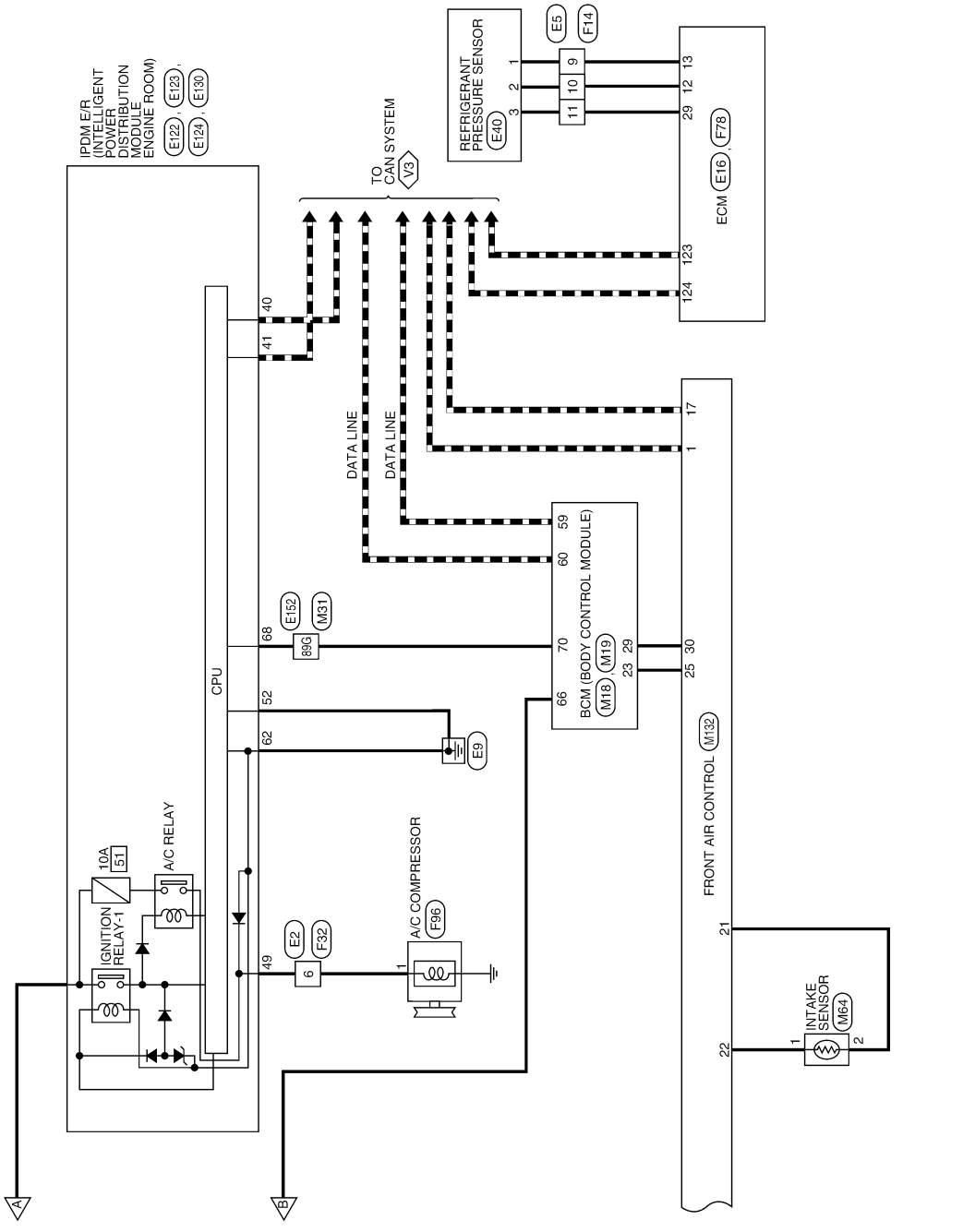
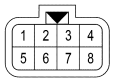



IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E122, E123, E124, E130
TO CAN SYSTEM
V3
REFRIGERANT PRESSURE SENSOR
E40
E5
F14
ECM
E16, F78
DATA LINE
DATA LINE
BCM (BODY CONTROL MODULE)
M18, M19
FRONT AIR CONTROL
M132
CPU
E152
M31
89G
E9
10A
51
A/C RELAY
IGNITION RELAY-1
E2
F32
6
A/C COMPRESSOR
F96
INTAKE SENSOR
M64
AAIWA0322GB

AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH VK56VD)

Connector No.	E2
Connector Name	WIRE TO WIRE
Connector Type	RS08MGY-PR
Connector Color	GRAY

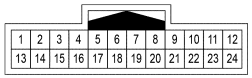
H.S.



Terminal No.	Color of Wire	Signal Name
1	W	TO ENGINE CONTROL HARNESS
2	L	TO ENGINE CONTROL HARNESS
3	R/W	TO ENGINE CONTROL HARNESS
4	W	TO ENGINE CONTROL HARNESS
5	SHIELD	TO ENGINE CONTROL HARNESS
6	GR/R	TO ENGINE CONTROL HARNESS
7	BR	TO ENGINE CONTROL HARNESS
8	B	TO ENGINE CONTROL HARNESS

Connector No.	E5
Connector Name	WIRE TO WIRE
Connector Type	TH24MW-NH
Connector Color	WHITE

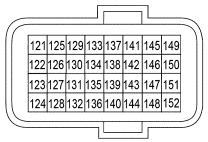
H.S.



Terminal No.	Color of Wire	Signal Name
1	L/R	TO ENGINE CONTROL HARNESS
2	BR	TO ENGINE CONTROL HARNESS
3	V	TO ENGINE CONTROL HARNESS
4	L/O	TO ENGINE CONTROL HARNESS
5	W	TO ENGINE CONTROL HARNESS
6	B/R	TO ENGINE CONTROL HARNESS
7	Y/R	TO ENGINE CONTROL HARNESS
8	BR	TO ENGINE CONTROL HARNESS
9	W/L	TO ENGINE CONTROL HARNESS
10	L/Y	TO ENGINE CONTROL HARNESS
11	SB	TO ENGINE CONTROL HARNESS
12	L	TO ENGINE CONTROL HARNESS
13	W/R	TO ENGINE CONTROL HARNESS
14	Y	TO ENGINE CONTROL HARNESS
15	B	TO ENGINE CONTROL HARNESS
16	B	TO ENGINE CONTROL HARNESS
17	R	TO ENGINE CONTROL HARNESS
18	B	TO ENGINE CONTROL HARNESS
19	B/R	TO ENGINE CONTROL HARNESS
20	GR	TO ENGINE CONTROL HARNESS
21	V/R	TO ENGINE CONTROL HARNESS
22	B	TO ENGINE CONTROL HARNESS
23	B	TO ENGINE CONTROL HARNESS
24	P	TO ENGINE CONTROL HARNESS

Connector No.	E16
Connector Name	ECM (WITH VK56VD)
Connector Type	MAA24FB-MEA8-RH
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
121	O/B	EVAP CONTROL SYSTEM PRESSURE SENSOR
122	–	–
123	P	CAN COMMUNICATION LINE (CAN-L)
124	L	CAN COMMUNICATION LINE (CAN-H)
125	SB	SENSOR POWER SUPPLY
126	–	–
127	–	–
128	V/W	FUEL TEMPERATURE SENSOR
129	–	–
130	R/W	FUEL PUMP CONTROL MODULE (FPCM) CHECK
131	–	–
132	–	–
133	W	IGNITION SWITCH
134	G/Y	ASCD STEERING SWITCH
135	B/Y	SENSOR GROUND
136	GR	FUEL PUMP CONTROL MODULE (FPCM)
137	R/W	ENG COMMUNICATION LINE
138	W	ENG COMMUNICATION LINE
139	R/G	STOP LAMP SWITCH
140	G/Y	BRAKE PEDAL POSITION SWITCH
141	Y	EVAP CANISTER VENT CONTROL VALVE
142	L/W	SENSOR POWER SUPPLY
143	O	ACCELERATOR PEDAL POSITION SENSOR 2
144	P/L	SENSOR GROUND
145	W	POWER SUPPLY FOR ECM
146	W/G	SENSOR POWER SUPPLY
147	B	ECM GROUND
148	R	SENSOR GROUND
149	B	ECM GROUND
150	W/R	ACCELERATOR PEDAL POSITION SENSOR 1
151	R/Y	SENSOR GROUND
152	B	ECM GROUND

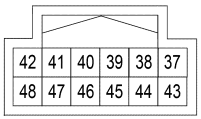
Connector No.	E40
Connector Name	REFRIGERANT PRESSURE SENSOR (WITH VK56VD)
Connector Type	RK03FB
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	W/L	GND A PRESS
2	L/Y	PD PRES
3	SB	AVCC2 PRESS

Connector No.	E122
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH12FW-NH
Connector Color	WHITE

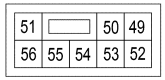
H.S.



Terminal No.	Color of Wire	Signal Name
37	–	–
38	–	–
39	L/Y	WIPER AUTO STOP SW
40	P	CAN-L
41	L	CAN-H
42	BR	DTRL RLY
43	–	–
44	W/B	START CONT
45	GR	FUEL RLY CONT
46	Y	HOOD SW
47	Y	ALT C - (WITH VK56VD)
48	R/W	HORN RLY CONT

Connector No.	E123
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS08FBR-CS
Connector Color	BROWN

H.S.



Terminal No.	Color of Wire	Signal Name
49	Y/B	A/C COMP - (WITH CUMMINS 5.0L)
49	GR/R	A/C COMP - (WITH VK56VD)
50	BR	TRAILER TOW
51	–	–
52	B	S-GND
53	–	–
54	–	–
55	–	–
56	–	–

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AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH VK56VD)

Connector No.	E124
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC
Connector Color	BLACK

H.S.

59 58 57
62 61 60

Terminal No.	Color of Wire	Signal Name
57	W/B	RR DEF
58	BR	FUEL PUMP - (WITH CUMMINS 5.0L)
58	B/Y	FUEL PUMP - (WITH VK56VD)
59	–	–
60	–	–
61	–	–
62	B	P GND

Connector No.	E130
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH10FB-NH
Connector Color	BLACK

H.S.

67 66 65 64 63
72 71 70 69 68

Terminal No.	Color of Wire	Signal Name
63	–	–
64	R	DETENT SW
65	–	–
66	P	PUSH START SW
67	–	–
68	L	IGN SIGNAL
69	–	–
70	–	–
71	SB	HOOD SW2
72	W	E-CPLG - (WITH VK56VD)

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	G	TO MAIN HARNESS
2G	B/R	TO MAIN HARNESS
3G	W/B	TO MAIN HARNESS
4G	BR/W	TO MAIN HARNESS
5G	BR	TO MAIN HARNESS
6G	P	TO MAIN HARNESS - (WITH VK56VD)
6G	R/W	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
7G	Y	TO MAIN HARNESS
8G	G	TO MAIN HARNESS
9G	R	TO MAIN HARNESS
10G	W	TO MAIN HARNESS
11G	R/G	TO MAIN HARNESS
12G	W/B	TO MAIN HARNESS
13G	BR	TO MAIN HARNESS
14G	Y/B	TO MAIN HARNESS
15G	G/W	TO MAIN HARNESS
16G	G	TO MAIN HARNESS
17G	G/Y	TO MAIN HARNESS
18G	G/Y	TO MAIN HARNESS
19G	Y/V	TO MAIN HARNESS
20G	G/Y	TO MAIN HARNESS
21G	B/Y	TO MAIN HARNESS
22G	G/R	TO MAIN HARNESS
23G	Y/R	TO MAIN HARNESS
24G	G/B	TO MAIN HARNESS
25G	R/W	TO MAIN HARNESS
26G	R	TO MAIN HARNESS
27G	LG	TO MAIN HARNESS
28G	G/B	TO MAIN HARNESS
29G	G/B	TO MAIN HARNESS
30G	BR/Y	TO MAIN HARNESS
31G	P	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
31G	R	TO MAIN HARNESS - (WITH VK56VD)
32G	P	TO MAIN HARNESS
33G	Y/L	TO MAIN HARNESS
34G	GR	TO MAIN HARNESS
35G	G/R	TO MAIN HARNESS
36G	SB	TO MAIN HARNESS
37G	R/W	TO MAIN HARNESS
38G	BR	TO MAIN HARNESS
39G	BR	TO MAIN HARNESS
40G	–	TO MAIN HARNESS
41G	R/G	TO MAIN HARNESS
42G	O	TO MAIN HARNESS
43G	B	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
43G	G	TO MAIN HARNESS - (WITH VK56VD)
44G	R/Y	TO MAIN HARNESS
45G	G	TO MAIN HARNESS
46G	LG	TO MAIN HARNESS
47G	R	TO MAIN HARNESS
48G	W	TO MAIN HARNESS
49G	–	TO MAIN HARNESS
50G	BR	TO MAIN HARNESS
51G	R	TO MAIN HARNESS
52G	L	TO MAIN HARNESS
53G	W	TO MAIN HARNESS
54G	W	TO MAIN HARNESS
55G	G	TO MAIN HARNESS
56G	W	TO MAIN HARNESS
57G	Y	TO MAIN HARNESS
58G	BG	TO MAIN HARNESS
59G	BG	TO MAIN HARNESS
60G	BG	TO MAIN HARNESS
61G	B	TO MAIN HARNESS
62G	W	TO MAIN HARNESS
63G	R	TO MAIN HARNESS
64G	W/L	TO MAIN HARNESS
65G	W/R	TO MAIN HARNESS
66G	BG	TO MAIN HARNESS
67G	BG	TO MAIN HARNESS
68G	B	TO MAIN HARNESS
69G	Y	TO MAIN HARNESS
70G	L	TO MAIN HARNESS
71G	R/W	TO MAIN HARNESS
72G	L/W	TO MAIN HARNESS
73G	SHIELD	TO MAIN HARNESS
74G	W	TO MAIN HARNESS
75G	R	TO MAIN HARNESS
76G	R/G	TO MAIN HARNESS
77G	G	TO MAIN HARNESS
78G	W	TO MAIN HARNESS
79G	–	TO MAIN HARNESS
80G	R	TO MAIN HARNESS
81G	L	TO MAIN HARNESS
82G	R	TO MAIN HARNESS
83G	L	TO MAIN HARNESS
84G	L	TO MAIN HARNESS
85G	W/B	TO MAIN HARNESS
86G	B/R	TO MAIN HARNESS
87G	W/B	TO MAIN HARNESS
88G	P	TO MAIN HARNESS
89G	L	TO MAIN HARNESS
90G	G	TO MAIN HARNESS
91G	G	TO MAIN HARNESS
92G	V/W	TO MAIN HARNESS
93G	BR	TO MAIN HARNESS
94G	G	TO MAIN HARNESS
95G	G	TO MAIN HARNESS
96G	W	TO MAIN HARNESS
97G	R	TO MAIN HARNESS
98G	W/B	TO MAIN HARNESS
99G	BR	TO MAIN HARNESS
100G	GR/W	TO MAIN HARNESS

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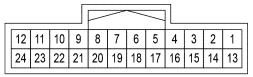
AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH VK56VD)

Connector No.	F14
Connector Name	WIRE TO WIRE
Connector Type	TH24FW-NH
Connector Color	WHITE

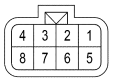
H.S.



Terminal No.	Color of Wire	Signal Name
1	L/R	TO ENGINE ROOM HARNESS
2	BR	TO ENGINE ROOM HARNESS
3	V	TO ENGINE ROOM HARNESS
4	L/O	TO ENGINE ROOM HARNESS
5	W	TO ENGINE ROOM HARNESS
6	B/R	TO ENGINE ROOM HARNESS
7	Y/R	TO ENGINE ROOM HARNESS
8	BR	TO ENGINE ROOM HARNESS
9	W/L	TO ENGINE ROOM HARNESS
10	L/Y	TO ENGINE ROOM HARNESS
11	SB	TO ENGINE ROOM HARNESS
12	L	TO ENGINE ROOM HARNESS
13	W/R	TO ENGINE ROOM HARNESS
14	Y	TO ENGINE ROOM HARNESS
15	B	TO ENGINE ROOM HARNESS
16	B	TO ENGINE ROOM HARNESS
17	R	TO ENGINE ROOM HARNESS
18	B	TO ENGINE ROOM HARNESS
19	B/R	TO ENGINE ROOM HARNESS
20	GR	TO ENGINE ROOM HARNESS
21	V/R	TO ENGINE ROOM HARNESS
22	SHIELD	TO ENGINE ROOM HARNESS
23	SHIELD	TO ENGINE ROOM HARNESS
24	P	TO ENGINE ROOM HARNESS

Connector No.	F32
Connector Name	WIRE TO WIRE
Connector Type	RS08FGY-PR
Connector Color	GRAY

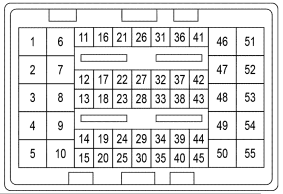
H.S.



Terminal No.	Color of Wire	Signal Name
1	W	TO ENGINE ROOM HARNESS
2	L	TO ENGINE ROOM HARNESS
3	R/W	TO ENGINE ROOM HARNESS
4	W	TO ENGINE ROOM HARNESS
5	SHIELD	TO ENGINE ROOM HARNESS
6	GR/R	TO ENGINE ROOM HARNESS
7	BR	TO ENGINE ROOM HARNESS
8	B	TO ENGINE ROOM HARNESS

Connector No.	F78
Connector Name	ECM (WITH VK56VD)
Connector Type	MAB35FB-MEB20-LH
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	R	FUEL INJECTOR DRIVER POWER SUPPLY
2	SB	HIGH PRESSURE FUEL PUMP DRIVER POWER SUPPLY
3	B/R	FUEL INJECTOR NO. 8 (LO)
4	O	FUEL INJECTOR NO. 3 (LO)
5	G	FUEL INJECTOR NO. 2, 3 (HI)
6	R	FUEL INJECTOR DRIVER POWER SUPPLY
7	V/B	FUEL INJECTOR NO. 5, 8 (HI)
8	B/W	FUEL INJECTOR NO. 5 (LO)
9	R/W	INJ-L #2
10	B	ECM GROUND
11	–	–
12	L/Y	REFRIGERANT PRESSURE SENSOR
13	W/L	SENSOR GROUND
14	SHIELD	SHIELD
15	W	KNOCK SENSOR (BANK 1)
16	–	–
17	V	EXHAUST GAS TEMPERATURE SENSOR (BANK 2)
18	W	KNOCK SENSOR (BANK 2)
19	GR/R	EXHAUST GAS TEMPERATURE SENSOR (BANK 1)
20	SHIELD	SENSOR GROUND
21	–	–
22	L/Y	ENGINE OIL TEMPERATURE SENSOR
23	L/Y	ENGINE OIL PRESSURE SENSOR
24	P/GR	POWER STEERING PRESSURE SENSOR
25	V/W	FUEL RAIL PRESSURE SENSOR
26	–	–
27	W/G	SENSOR POWER SUPPLY
28	Y/R	SENSOR POWER SUPPLY
29	SB	SENSOR POWER SUPPLY
30	SB	SENSOR POWER SUPPLY
31	BR	COOLING FAN SPEED
32	LG	BATTERY TEMPERATURE SENSOR
33	R/W	CRANKSHAFT POSITION SENSOR (POS)
34	–	–
35	R/W	ENGINE COOLANT TEMPERATURE SENSOR 1
36	G/O	INTAKE AIR TEMPERATURE SENSOR
37	G/B	MASS AIR FLOW SENSOR
38	V	BATTERY CURRENT SENSOR
39	–	–
40	L/R	CAMSHAFT POSITION SENSOR (PHASE) (BANK 1)
41	P	EXHAUST VALVE TIMING CONTROL POSITION SENSOR (BANK 1)
42	R	SENSOR GROUND
43	R	SENSOR GROUND
44	G/W	SENSOR GROUND
45	BR/W	SENSOR GROUND
46	SB	HIGH PRESSURE FUEL PUMP DRIVER POWER SUPPLY
47	BR	FUEL INJECTOR NO. 1, 6 (HI)
48	Y	FUEL INJECTOR NO. 1 (LO)
49	L	FUEL INJECTOR NO. 4 (LO)
50	B	ECM GROUND
51	P	HIGH PRESSURE FUEL PUMP DRIVER POWER SUPPLY
52	R	FUEL INJECTOR NO. 6 (LO)
53	V	FUEL INJECTOR NO. 7 (LO)
54	W	FUEL INJECTOR NO. 4, 7 (HI)
55	B	ECM GROUND

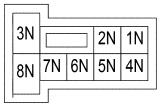
Connector No.	F96
Connector Name	A/C COMPRESSOR (WITH VK56VD)
Connector Type	6185-0862
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	GR/R	A/C COMP

Connector No.	M3
Connector Name	FUSE BLOCK (J/B)
Connector Type	CS06FW-M2
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1N	–	–
2N	W	BATTERY
3N	W	BLOWER FAN RELAY OUT
4N	V	BATTERY
5N	Y	BATTERY
6N	W	BATTERY
7N	L	ACC RELAY OUT
8N	W	IGNITION

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AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH VK56VD)

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FW-CS
Connector Color	WHITE

H.S.

7P	6P	5P	4P	3P	2P	1P
16P	15P	14P	13P	12P	11P	10P	9P	8P

Terminal No.	Color of Wire	Signal Name
1P	R	IGNITION
2P	Y	IGNITION
3P	G	IGNITION RELAY OUT
4P	B/W	RR DEF RLY
5P	B/W	RR DEF RLY
6P	O	RR DEF RLY OUT
7P	G	IGNITION
8P	W	IGNITION
9P	L	BATTERY
10P	–	–
11P	–	–
12P	–	–
13P	R	BATTERY
14P	Y	BATTERY
15P	Y/LG	BATTERY
16P	W	BLOWER FAN RELAY OUT

Connector No.	M18
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FG-NH
Connector Color	GREEN

H.S.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
1	G	ENG START SW NO ESCL
2	–	–
3	R	A/L POWER SUPPLY 5V
4	W/R	A/L SIGNAL
5	–	–
6	–	–

7	–	–
8	–	–
9	–	–
10	SB	COMBI SW IN 5
11	G/Y	COMBI SW IN 4
12	Y	COMBI SW IN 3
13	G/B	COMBI SW IN 2
14	V	COMBI SW IN 1
15	–	–
16	–	–
17	P	GND RF A/L
18	V	SECURITY INDICATOR
19	–	–
20	R	SHIFT P
21	R/W	STEP LAMP CONT
22	–	–
23	Y	AIRCON SW
24	–	–
25	W	BRAKE SW FUSE
26	L	SHORT IN PIN INPUT
27	R/G	BRAKE SW LAMP
28	–	–
29	W	BLOWER FAN SW
30	P	DR DOOR LOCK STATUS
31	–	–
32	Y	REAR DEFOGGER SW
33	–	–
34	–	–
35	R/G	REVERSE SW
36	W/B	HAZARD SW
37	–	–
38	–	–
39	B/R	SHIFT N/P
40	–	–

43	–	–
44	–	–
45	–	–
46	–	–
47	–	–
48	R	HIGH SIDE START SW LED
49	–	–
50	–	–
51	–	–
52	W	AUDIO DONGLE
53	–	–
54	W/L	PW UART
55	W/B	L&R SENSOR K-LINE
56	–	–
57	–	–
58	–	–
59	P	CAN-L
60	L	CAN-H
61	O	REAR DEFOGGER RELAY OUT
62	W	STARTER RELAY OUT
63	–	–
64	P	BUZZER OUT
65	–	–
66	W	BLOWER FAN RELAY OUT
67	G	IGN ELEC RELAY OUT 2
68	L	MR OUTPUT
69	R/B	AT DEVICE OUT
70	P	IGN USM OUT 1
71	O	DR REQUEST SW
72	G	AS REQUEST SW
73	–	–
74	–	–
75	L/W	COMBI SW OUT 5
76	P	COMBI SW OUT 4
77	L	COMBI SW OUT 3
78	O/B	COMBI SW OUT 2
79	R/W	COMBI SW OUT 1
80	–	–

Connector No.	M19
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FB-NH
Connector Color	BLACK

H.S.

60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61

Terminal No.	Color of Wire	Signal Name
41	Y/L	TRAILER LIGHT CHECK RELAY OUT
42	R/Y	CARGO LAMP OUT

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AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH VK56VD)

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	G	TO ENGINE ROOM HARNESS
2G	B/R	TO ENGINE ROOM HARNESS
3G	W	TO ENGINE ROOM HARNESS
4G	BR/W	TO ENGINE ROOM HARNESS
5G	–	TO ENGINE ROOM HARNESS
6G	R/W	TO ENGINE ROOM HARNESS
7G	Y	TO ENGINE ROOM HARNESS
8G	G	TO ENGINE ROOM HARNESS
9G	R	TO ENGINE ROOM HARNESS
10G	W	TO ENGINE ROOM HARNESS
11G	R/G	TO ENGINE ROOM HARNESS
12G	W/B	TO ENGINE ROOM HARNESS
13G	BR	TO ENGINE ROOM HARNESS
14G	Y/B	TO ENGINE ROOM HARNESS
15G	G/W	TO ENGINE ROOM HARNESS
16G	G	TO ENGINE ROOM HARNESS
17G	O	TO ENGINE ROOM HARNESS
18G	G/Y	TO ENGINE ROOM HARNESS
19G	Y/V	TO ENGINE ROOM HARNESS
20G	G/Y	TO ENGINE ROOM HARNESS
21G	B/Y	TO ENGINE ROOM HARNESS
22G	G/R	TO ENGINE ROOM HARNESS
23G	Y/R	TO ENGINE ROOM HARNESS
24G	G/B	TO ENGINE ROOM HARNESS
25G	R/W	TO ENGINE ROOM HARNESS
26G	R	TO ENGINE ROOM HARNESS
27G	LG	TO ENGINE ROOM HARNESS
28G	G/B	TO ENGINE ROOM HARNESS
29G	G/B	TO ENGINE ROOM HARNESS
30G	BR/Y	TO ENGINE ROOM HARNESS
31G	R	TO ENGINE ROOM HARNESS
32G	R	TO ENGINE ROOM HARNESS
33G	Y/L	TO ENGINE ROOM HARNESS
34G	GR	TO ENGINE ROOM HARNESS
35G	G/R	TO ENGINE ROOM HARNESS
36G	SB	TO ENGINE ROOM HARNESS
37G	R/W	TO ENGINE ROOM HARNESS
38G	BR	TO ENGINE ROOM HARNESS
39G	BR	TO ENGINE ROOM HARNESS
40G	–	TO ENGINE ROOM HARNESS
41G	R/G	TO ENGINE ROOM HARNESS
42G	O	TO ENGINE ROOM HARNESS
43G	G	TO ENGINE ROOM HARNESS
44G	R/Y	TO ENGINE ROOM HARNESS
45G	G	TO ENGINE ROOM HARNESS
46G	LG	TO ENGINE ROOM HARNESS
47G	R	TO ENGINE ROOM HARNESS
48G	W	TO ENGINE ROOM HARNESS
49G	–	TO ENGINE ROOM HARNESS
50G	BR	TO ENGINE ROOM HARNESS
51G	R	TO ENGINE ROOM HARNESS
52G	L	TO ENGINE ROOM HARNESS
53G	W	TO ENGINE ROOM HARNESS
54G	W	TO ENGINE ROOM HARNESS
55G	G	TO ENGINE ROOM HARNESS
56G	W	TO ENGINE ROOM HARNESS
57G	Y	TO ENGINE ROOM HARNESS
58G	BG	TO ENGINE ROOM HARNESS
59G	BG	TO ENGINE ROOM HARNESS
60G	BG	TO ENGINE ROOM HARNESS
61G	O	TO ENGINE ROOM HARNESS
62G	W	TO ENGINE ROOM HARNESS
63G	O	TO ENGINE ROOM HARNESS
64G	W/L	TO ENGINE ROOM HARNESS
65G	W/R	TO ENGINE ROOM HARNESS
66G	BG	TO ENGINE ROOM HARNESS
67G	O	TO ENGINE ROOM HARNESS
68G	B	TO ENGINE ROOM HARNESS
69G	Y	TO ENGINE ROOM HARNESS
70G	L	TO ENGINE ROOM HARNESS
71G	R/W	TO ENGINE ROOM HARNESS
72G	L/W	TO ENGINE ROOM HARNESS
73G	SHIELD	TO ENGINE ROOM HARNESS
74G	W	TO ENGINE ROOM HARNESS
75G	R	TO ENGINE ROOM HARNESS
76G	R/G	TO ENGINE ROOM HARNESS
77G	BG	TO ENGINE ROOM HARNESS
78G	P	TO ENGINE ROOM HARNESS
79G	–	TO ENGINE ROOM HARNESS
80G	R	TO ENGINE ROOM HARNESS
81G	L	TO ENGINE ROOM HARNESS
82G	R	TO ENGINE ROOM HARNESS
83G	L	TO ENGINE ROOM HARNESS
84G	L	TO ENGINE ROOM HARNESS
85G	W	TO ENGINE ROOM HARNESS
86G	B/R	TO ENGINE ROOM HARNESS
87G	W	TO ENGINE ROOM HARNESS
88G	G	TO ENGINE ROOM HARNESS
89G	P	TO ENGINE ROOM HARNESS
90G	G	TO ENGINE ROOM HARNESS
91G	P	TO ENGINE ROOM HARNESS
92G	V/W	TO ENGINE ROOM HARNESS
93G	BR	TO ENGINE ROOM HARNESS
94G	B	TO ENGINE ROOM HARNESS
95G	G	TO ENGINE ROOM HARNESS
96G	R	TO ENGINE ROOM HARNESS
97G	R	TO ENGINE ROOM HARNESS
98G	W/B	TO ENGINE ROOM HARNESS
99G	R	TO ENGINE ROOM HARNESS
100G	GR/W	TO ENGINE ROOM HARNESS

Connector No.	M44
Connector Name	FRONT BLOWER MOTOR
Connector Type	M02FW-LC
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	IGNITION
2	L/W	FAN SPEED CONT

Connector No.	M60
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS06FW-CS
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1T	–	–
2T	SB	BATTERY
3T	R	RR DEF RLY
4T	G	BATTERY
5T	–	–
6T	–	–

Connector No.	M64
Connector Name	INTAKE SENSOR
Connector Type	C02FW
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	P	INTAKE SENS
2	R	SENS GND

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AIR CONDITIONER CONTROL CONNECTORS - MANUAL (WITH VK56VD)

Connector No.	M70
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FBR-CS
Connector Color	BROWN

H.S.

7R 6R 5R 4R 3R 2R 1R
16R 15R 14R 13R 12R 11R 10R 9R 8R

Terminal No.	Color of Wire	Signal Name
1R	L	TAIL LAMP 2
2R	G/R	IGNITION
3R	Y/R	BATTERY
4R	–	–
5R	W	BATTERY
6R	G/W	ACCESSORY
7R	–	–
8R	–	–
9R	–	–
10R	W	BATTERY
11R	–	–
12R	BG	BATTERY
13R	B	ACCESSORY
14R	G/Y	BATTERY
15R	Y	BATTERY
16R	G/R	ACCESSORY

Connector No.	M130
Connector Name	VARIABLE BLOWER CONTROL
Connector Type	M04FW-LC
Connector Color	WHITE

H.S.

3 2
1

Terminal No.	Color of Wire	Signal Name
1	B	GND
2	P	FAN GATE
3	L/W	FAN SPEED

Connector No.	M132
Connector Name	FRONT AIR CONTROL
Connector Type	TH32FW-NH
Connector Color	WHITE

H.S.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

Terminal No.	Color of Wire	Signal Name
1	L	CAN-H
2	B	GND
3	SB	BAT
4	L	ILL+
5	–	–
6	–	–
7	–	–
8	–	–
9	W	IGN2(ACC)
10	P	FAN GATE
11	Y	RR DEF ON
12	G	LIN SIG
13	W	VACTR
14	–	–
15	–	–
16	–	–
17	P	CAN-L
18	B	GND(POWER)
19	G	IGN

Connector No.	M95
Connector Name	WIRE TO WIRE
Connector Type	A03MW
Connector Color	WHITE

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name
1	W	TO HVAC SUB HARNESS
2	B	TO HVAC SUB HARNESS
3	G	TO HVAC SUB HARNESS

20	GR	ILL-
21	R	SENS GND
22	P	INTAKE SENS
23	–	–
24	–	–
25	Y	COMP ON
26	L/W	FAN FB
27	B/W	RR DEF F/B
28	–	–
29	B	ACTR GND
30	W	FAN ON
31	–	–
32	–	–

Connector No.	M225
Connector Name	WIRE TO WIRE
Connector Type	A03FW
Connector Color	WHITE

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name
1	R	TO MAIN HARNESS
2	B	TO MAIN HARNESS
3	L	TO MAIN HARNESS

Connector No.	M226
Connector Name	MODE DOOR MOTOR
Connector Type	A03FW
Connector Color	WHITE

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name
1	R	VACTR
2	B	ACTR GND
3	L	LIN SIG

Connector No.	M227
Connector Name	INTAKE DOOR MOTOR
Connector Type	A03FW
Connector Color	WHITE

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name
1	R	VACTR
2	B	ACTR GND
3	L	LIN SIG

Connector No.	M230
Connector Name	AIR MIX DOOR MOTOR
Connector Type	A03FW
Connector Color	WHITE

H.S.

1
2
3

Terminal No.	Color of Wire	Signal Name
1	R	VACTR
2	B	ACTR GND
3	L	LIN SIG

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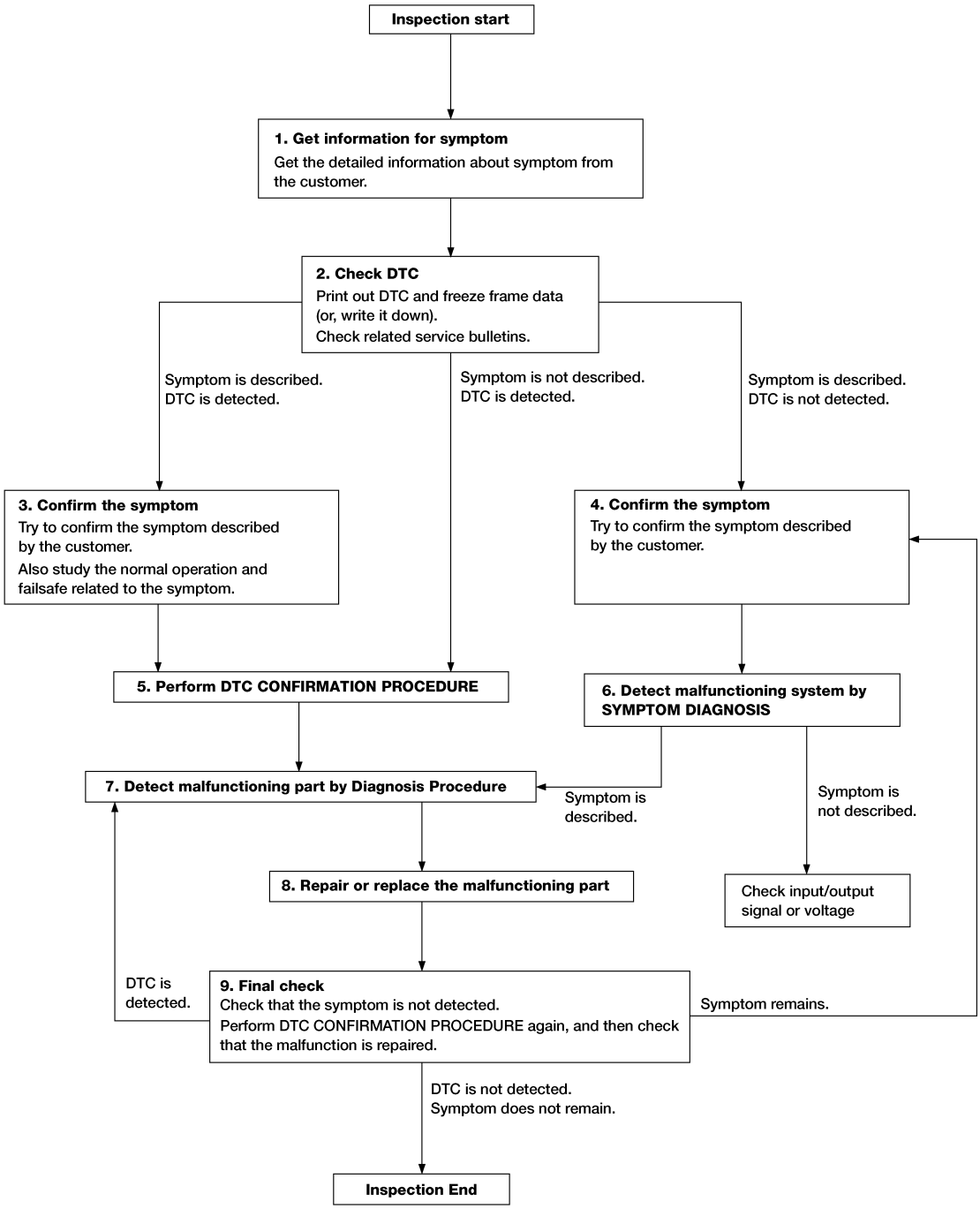
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:0000000014392230

OVERALL SEQUENCE



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DETAILED FLOW

1.GET INFORMATION FOR SYMPTOM

1. Get detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurs).
2. Check operation condition of the function that is malfunctioning.

>> GO TO 2.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is detected:

- Record DTC and freeze frame data (Print them out using CONSULT.)
- Erase DTC.
- Study the relationship between the cause detected by DTC and the symptom described by the customer.

3. Check related service bulletins for information.

Are any symptoms described and any DTC detected?

Symptom is described, DTC is detected>>GO TO 3.
Symptom is described, DTC is not detected>>GO TO 4.
Symptom is not described, DTC is detected>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
Also study the normal operation and fail-safe related to the symptom.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the detected DTC and then check that DTC is detected again. At this time, always connect CONSULT to the vehicle, and check self diagnostic results in real time.
If two or more DTCs are detected, refer to DTC INSPECTION PRIORITY CHART, and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included in Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.
  If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 7.
NO >> Check according to GI-47, "Intermittent Incident".

6.DETECT MALFUNCTIONING SYSTEM BY SYMPTOM DIAGNOSIS

Detect malfunctioning system according to SYMPTOM DIAGNOSIS based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

Is the symptom described?

YES >> GO TO 7.
NO >> Monitor input data from related sensors or check voltage of related module terminals using CONSULT.

7.DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system.

Is malfunctioning part detected?

YES >> GO TO 8.
NO >> Check according to GI-47, "Intermittent Incident".

8.REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
3. Check DTC. If DTC is detected, erase it.

>> GO TO 9.

9.FINAL CHECK

When DTC is detected in step 2, perform DTC CONFIRMATION PROCEDURE again, then check that the malfunction is repaired.
When symptom is described by the customer, refer to confirmed symptom in step 3 or 4, and check that the symptom is not detected.

Is DTC detected and does symptom remain?

YES-1 >> DTC is detected: GO TO 7.
YES-2 >> Symptom remains: GO TO 4.
NO >> Before returning the vehicle to the customer, always erase DTC.

OPERATION INSPECTION

Work Procedure

INFOID:0000000014392231

DESCRIPTION

The purpose of the operational check is to check that the individual system operates normally.

Check condition : Engine running at normal operating temperature.
Check condition : Blower control dial in OFF position.
Check condition : REC off (LED extinguished).
Check condition : VENT selected (LED illuminated).
Check condition : DEF off (LED extinguished).

OPERATION INSPECTION

1. CHECK BLOWER

1. Rotate the blower control dial clockwise one detent. Blower should operate on low speed.
2. Rotate the blower control dial one detent at a time, and continue checking blower speed until all speeds are checked.
3. Leave blower on maximum speed.

Is the test result normal?

YES >> GO TO 2.
NO >> Refer to HAC-213, "Diagnosis Procedure".

2. CHECK A/C SWITCH LED

1. Press A/C switch.
2. A/C switch indicator should turn ON.

Is the test result normal?

YES >> GO TO 3.
NO >> Refer to HAC-205, "FRONT A/C CONTROL : Diagnosis Procedure".

3. CHECK A/C SWITCH

Confirm that the compressor clutch engages (sound or visual inspection).

Is the test result normal?

YES >> GO TO 4.
NO >> Refer to HAC-217, "Diagnosis Procedure".

4. CHECK FRONT AIR CONTROL MODE LEDS

1. Press D/F ( ), FOOT ( ), B/L ( ), VENT ( ), MAX A/C, and DEF ( ).
2. Each button indicator should illuminate.

Is the test result normal?

YES >> GO TO 5.
NO >> Refer to HAC-205, "FRONT A/C CONTROL : Diagnosis Procedure".

5. CHECK DISCHARGE AIR

1. Press D/F ( ), FOOT ( ), B/L ( ), VENT ( ) and DEF ( ).
2. Confirm that discharge air comes out according to the air distribution table. Refer to HAC-149, "Door Control".

Is the test result normal?

YES >> GO TO 6.
NO >> Refer to HAC-222, "Symptom Table".

6. CHECK REC LED

1. Press DEF ( ) and make sure LED is off.
2. Make sure VENT ( ) or B/L ( ) is selected.
3. Press REC ( ) switch one time. REC indicator should illuminate.

4. Press REC ( ) switch one more time. REC indicator should go off.

Is the test result normal?

YES >> GO TO 7.
NO >> Refer to HAC-205, "FRONT A/C CONTROL : Diagnosis Procedure".

7. CHECK INTAKE DOOR OPERATION

1. Press REC ( ) switch one time. REC indicator should illuminate.
2. Listen to the sound of the air coming out of the vent.
3. Press REC ( ) switch one more time. REC indicator should go off.
4. There should be an audible change to the sound of the air flowing out of the vent.

Is the test result normal?

YES >> GO TO 8.
NO >> Refer to HAC-210, "Diagnosis Procedure".

8. CHECK TEMPERATURE DECREASE

1. Press A/C switch.
2. Rotate temperature control dial counterclockwise until maximum cold.
3. Check for cold air at selected discharge air outlets.

Is the test result normal?

YES >> GO TO 9.
NO >> Refer to HAC-224, "Diagnosis Procedure".

9. CHECK TEMPERATURE INCREASE

1. Rotate temperature control dial clockwise until maximum hot.
2. Check for hot air at appropriate discharge air outlets.

Is the test result normal?

YES >> Inspection End.
NO >> Refer to HAC-226, "Diagnosis Procedure".

CONFIGURATION (HVAC)

Work Procedure

INFOID:0000000014392232

NOTE:
- Use “Manual Configuration”.
- If an error occurs during configuration, start over from the beginning.

1.CHECK DATA PART NO. (TYPE ID)

1. Use FAST (service parts catalog) to search front air control “DATA PART NO. (TYPE ID)”.
2. Write down “DATA PART NO. (TYPE ID)”.

>> GO TO 2.

2.WRITE CONFIGURATION

CONSULT Configuration
1. Select “Manual Configuration” of “HVAC”.
2. Select the “DATA PART NO. (TYPE ID)” found using FAST (service parts catalog) to write the “DATA PART NO. (TYPE ID)” into the front air control.

>> GO TO 3.

3.VERIFY DATA PART NO. (TYPE ID)

Compare the “DATA PART NO. (TYPE ID)” written into the front air control with the one found using FAST (service parts catalog) to confirm they match.

Do DATA PART NOs match?

YES >> GO TO 4.
NO >> GO TO 2.

4.PERFORM SUPPLEMENTARY WORK

1. Perform self-diagnosis of all systems.
2. Erase self-diagnosis results.

>> GO TO 5.

5.OPERATION CHECK

Confirm that each function controlled by front air control operates normally.

>> Work End.

DTC/CIRCUIT DIAGNOSIS

U1000 CAN COMM CIRCUIT

DTC Description

INFOID:0000000014392233

CAN (Controller Area Network) is a serial communication system for real time application. It is an on-vehicle multiplex communication system with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto vehicles, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with two communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. Refer to LAN-74, "CAN COMMUNICATION SYSTEM : CAN Communication Signal Chart".

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
U1000	CAN COMM CIRCUIT (CAN COMM CIRCUIT)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSE

CAN communication system

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM SELF-DIAGNOSIS

CONSULT

1. Turn ignition switch ON and wait for 2 seconds or more.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-190, "Diagnosis Procedure".
NO >> Refer to GI-47, "Intermittent Incident".

Diagnosis Procedure

INFOID:0000000014392234

1.CHECK CAN COMMUNICATION SYSTEM

Check CAN communication system. Refer to LAN-53, "Trouble Diagnosis Flow Chart".

>> Inspection End.

U1010 CONTROL UNIT (CAN)

FRONT A/C CONTROL

FRONT A/C CONTROL : DTC Description

INFOID:0000000014392235

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
U1010	CONTROL UNIT (CAN) [CONTROL UNIT (CAN)]	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–

POSSIBLE CAUSE

Front air control

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1. PERFORM SELF-DIAGNOSIS

CONSULT
1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-191, "FRONT A/C CONTROL : Diagnosis Procedure".
NO >> Inspection End.

FRONT A/C CONTROL : Diagnosis Procedure

INFOID:0000000014392236

1. REPLACE FRONT AIR CONTROL

Replace front air control. Refer to HAC-230, "Removal and Installation".

>> Inspection End.

PTC HEATER CONTROL UNIT

PTC HEATER CONTROL UNIT : DTC Description

INFOID:0000000014392237

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
U1010	CONTROL UNIT (CAN) [CONTROL UNIT (CAN)]	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–

POSSIBLE CAUSE

PTC heater control

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM SELF-DIAGNOSIS

CONSULT
1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-192, "PTC HEATER CONTROL UNIT : Diagnosis Procedure".
NO >> Inspection End.

PTC HEATER CONTROL UNIT : Diagnosis Procedure

INFOID:0000000014392238

1.REPLACE PTC HEATER CONTROL

Replace PTC heater control.

>> Inspection End.

B257B, B257C AMBIENT SENSOR

DTC Description

INFOID:0000000014392239

DTC DETECTION LOGIC

NOTE:

- If DTC is displayed along with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to HAC-190, "DTC Description".
- If DTC is displayed along with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to HAC-191, "FRONT A/C CONTROL : DTC Description".

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B257B	AMBIENT SENSOR (SHORT) (Ambient sensor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	More than 100°C (212°F)
		Diagnosis delay time	–
B257C	AMBIENT SENSOR (OPEN) (Ambient sensor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Less than -42°C (-44°F)
		Diagnosis delay time	–

POSSIBLE CAUSE

- Ambient sensor
- PTC heater control
- Harness or connectors (The sensor circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-193, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000014392240

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

1.CHECK AMBIENT SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect ambient sensor connector.
3. Turn ignition switch ON.
4. Check voltage between ambient sensor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Ambient sensor			
Connector	Terminal		
E75	2	Ground	5 V

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK AMBIENT SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between ambient sensor harness connector and ground.

Ambient sensor		(–)	Continuity
Connector	Terminal		
E75	1	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK AMBIENT SENSOR

Check ambient sensor. Refer to HAC-195, "Component Inspection".

Is the inspection result normal?

YES >> Replace PTC heater control.
NO >> Replace ambient sensor. Refer to HAC-231, "Removal and Installation".

4.CHECK AMBIENT SENSOR POWER SUPPLY CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect PTC heater control connector.
3. Check continuity between ambient sensor harness connector and PTC heater control harness connector.

Ambient sensor		PTC heater control		Continuity
Connector	Terminal	Connector	Terminal	
E75	2	M131	12	Yes

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair harness or connector.

5.CHECK AMBIENT SENSOR POWER SUPPLY CIRCUIT FOR GROUND SHORT

Check continuity between ambient sensor harness connector and ground.

Ambient sensor		(–)	Continuity
Connector	Terminal		
E75	2	Ground	No

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair harness or connector.

6.CHECK AMBIENT SENSOR POWER SUPPLY CIRCUIT FOR POWER SHORT

1. Turn ignition switch ON.
2. Check voltage between ambient sensor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Ambient sensor			
Connector	Terminal		
E75	2	Ground	0 V

Is the inspection result normal?

YES >> Replace PTC heater control.
NO >> Repair harness or connector.

Component Inspection

INFOID:0000000014392241

1.CHECK AMBIENT SENSOR

1. Turn ignition switch OFF.
2. Disconnect ambient sensor connector.
3. Check resistance between ambient sensor terminals.

Terminal		Condition	Resistance: kΩ
		Temperature: °C (°F)	
1	2	–15 (5)	12.73
		–10 (14)	9.92
		–5 (23)	7.80
		0 (32)	6.19
		5 (41)	4.95
		10 (50)	3.99
		15 (59)	3.24
		20 (68)	2.65
		25 (77)	2.19
		30 (86)	1.81
		35 (95)	1.51
		40 (104)	1.27
		45 (113)	1.07

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace ambient sensor. Refer to HAC-231, "Removal and Installation".

B2581, B2582 INTAKE SENSOR

DTC Description

INFOID:0000000014392242

DTC DETECTION LOGIC

NOTE:

- If DTC is displayed along with DTC U1000, first perform the trouble diagnosis for DTC U1000. Refer to HAC-190, "DTC Description".
- If DTC is displayed along with DTC U1010, first perform the trouble diagnosis for DTC U1010. Refer to HAC-191, "FRONT A/C CONTROL : DTC Description".

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B2581	INTAKE SENSOR (SHORT) (Intake sensor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	More than 100°C (212°F)
		Diagnosis delay time	–
B2582	INTAKE SENSOR (OPEN) (Intake sensor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Less than -42°C (-44°F)
		Diagnosis delay time	–

POSSIBLE CAUSE

- Intake sensor
- Front air control
- Harness or connectors (The sensor circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-196, "Diagnosis Procedure".
NO >> Inspection End.

Diagnosis Procedure

INFOID:0000000014392243

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

1.CHECK INTAKE SENSOR POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect intake sensor connector.
3. Turn ignition switch ON.
4. Check voltage between intake sensor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Intake sensor			
Connector	Terminal		
M64	1	Ground	5 V

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK INTAKE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between intake sensor harness connector and ground.

Intake sensor		(–)	Continuity
Connector	Terminal		
M64	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK INTAKE SENSOR

Check intake sensor. Refer to HAC-198, "Component Inspection".

Is the inspection result normal?

YES >> Replace front air control. Refer to HAC-230, "Removal and Installation".
NO >> Replace intake sensor. Refer to HAC-232, "Removal and Installation".

4.CHECK INTAKE SENSOR POWER SUPPLY CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect front air control connector.
3. Check continuity between intake sensor harness connector and front air control harness connector.

Intake sensor		Front air control		Continuity
Connector	Terminal	Connector	Terminal	
M64	1	M132	22	Yes

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair harness or connector.

5.CHECK INTAKE SENSOR POWER SUPPLY CIRCUIT FOR GROUND SHORT

Check continuity between intake sensor harness connector and ground.

Intake sensor		(–)	Continuity
Connector	Terminal		
M64	1	Ground	No

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair harness or connector.

6.CHECK INTAKE SENSOR POWER SUPPLY CIRCUIT FOR POWER SHORT

1. Turn ignition switch ON.
2. Check voltage between intake sensor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Intake sensor			
Connector	Terminal		
M64	1	Ground	0 V

Is the inspection result normal?

YES >> Replace front air control. Refer to HAC-230, "Removal and Installation".
NO >> Repair harness or connector.

Component Inspection

INFOID:0000000014392244

1.CHECK INTAKE SENSOR

1. Turn ignition switch OFF.
2. Disconnect intake sensor connector.
3. Check resistance between intake sensor terminals.

Terminal		Condition	Resistance: kΩ
		Temperature: °C (°F)	
1	2	–15 (5)	17.73
		–10 (14)	13.46
		–5 (23)	10.33
		0 (32)	8.00
		5 (41)	6.25
		10 (50)	4.93
		15 (59)	3.92
		20 (68)	3.14
		25 (77)	2.54
		30 (86)	2.06
		35 (95)	1.69
		40 (104)	1.39
		45 (113)	1.15

Is the inspection result normal?

YES >> Inspection End.
NO >> Replace intake sensor. Refer to HAC-232, "Removal and Installation".

B2632, B2633 AIR MIX DOOR MOTOR (DRIVER SIDE)

DTC Description

INFOID:0000000014392245

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B2632	DR AIR MIX DOOR MOT (SHORT) (Driver side air mix door motor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	PBR position is 95% or more.
		Diagnosis delay time	–
B2633	DR AIR MIX DOOR MOT (OPEN) (Driver side air mix door motor)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	PBR position is 5% or less.
		Diagnosis delay time	–

POSSIBLE CAUSE

- Air mix door motor
- Air mix door motor installation condition
- Front air control
- Harness and connector (Air mix door motor circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-199, "Diagnosis Procedure".
NO >> Inspection End.

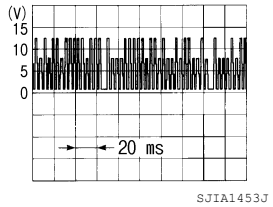
Diagnosis Procedure

INFOID:0000000014392246

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

1.CHECK AIR MIX DOOR MOTOR COMMUNICATION SIGNAL

1. Turn ignition switch ON.
2. Check output waveform between air mix door motor harness connector and ground with oscilloscope.

(+)		(–)	Output waveform
Air mix door motor			
Connector	Terminal		
M230	3	Ground	

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK INSTALLATION OF AIR MIX DOOR MOTOR

Check air mix door motor is properly installed. Refer to HAC-234, "Exploded View".

Is the inspection result normal?

YES >> Replace air mix door motor. Refer to HAC-235, "AIR MIX DOOR MOTOR : Removal and Installation - Air Mix Door Motor".
NO >> Repair or replace malfunctioning part.

3. CHECK AIR MIX DOOR MOTOR COMMUNICATION SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor connector and front air control connector.
3. Check continuity between air mix door motor harness connector and front air control harness connector.

Air mix door motor		Front air control		Continuity
Connector	Terminal	Connector	Terminal	
M230	3	M132	12	Yes

Is the inspection result normal?

YES >> Replace front air control. Refer to HAC-230, "Removal and Installation".
NO >> Repair harness or connector.

B2636, B2637, B2638, B2639, B2654, B2655 MODE DOOR MOTOR

DTC Description

INFOID:0000000014392247

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B2636	DR VENT DOOR FAIL (DR VENT DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–
B2637	DR B/L DOOR FAIL (DR B/L DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–
B2638	DR D/F1 DOOR FAIL (DR D/F1 DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–
B2639	DR DEF DOOR FAIL (DR DEF DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–
B2654	D/F2 DOOR FAIL (D/F2 DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–
B2655	B/L2 DOOR FAIL (B/L2 DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	–
		Diagnosis delay time	–

POSSIBLE CAUSE

- Mode door motor
- Mode door motor control linkage installation condition
- Front air control
- Harness and connector (Mode door motor circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-202, "Diagnosis Procedure".
NO >> Inspection End.

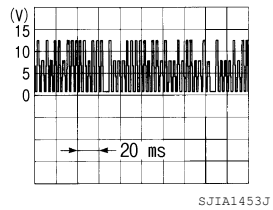
Diagnosis Procedure

INFOID:0000000014392248

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

1. CHECK MODE DOOR MOTOR COMMUNICATION SIGNAL

1. Turn ignition switch ON.
2. Check output waveform between mode door motor harness connector and ground with oscilloscope.

(+)		(–)	Output waveform
Mode door motor			
Connector	Terminal		
M226	3	Ground	

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK INSTALLATION OF MODE DOOR MOTOR

Check mode door motor is properly installed. Refer to HAC-234, "Exploded View".

Is the inspection result normal?

YES >> Replace mode door motor. Refer to HAC-235, "MODE DOOR MOTOR : Removal and Installation".
NO >> Repair or replace malfunctioning part.

3. CHECK MODE DOOR MOTOR COMMUNICATION SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect mode door motor connector and front air control connector.
3. Check continuity between mode door motor harness connector and front air control harness connector.

Mode door motor		Front air control		Continuity
Connector	Terminal	Connector	Terminal	
M226	3	M132	12	Yes

Is the inspection result normal?

YES >> Replace front air control. Refer to HAC-230, "Removal and Installation".
NO >> Repair harness or connector.

B263D, B263E, B263F INTAKE DOOR MOTOR

DTC Description

INFOID:0000000014392249

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	
B263D	FRE DOOR FAIL (FRE DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Detected at FRE position
		Diagnosis delay time	–
B263E	20P FRE DOOR FAIL (20P FRE DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Detected at 20% FRE position
		Diagnosis delay time	–
B263F	REC DOOR FAIL (REC DOOR FAIL)	Diagnosis condition	When ignition switch is ON.
		Signal (terminal)	–
		Threshold	Detected at REC position
		Diagnosis delay time	–

POSSIBLE CAUSE

- Intake door motor
- Front air control
- Harness and connector (Intake door motor circuit is open or shorted.)

FAIL-SAFE

—

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

CONSULT

1. Turn ignition switch ON.
2. Perform “Self Diagnostic Result” mode of “HVAC”.
3. Check DTC.

Is DTC detected?

YES >> Refer to HAC-203, "Diagnosis Procedure".
NO >> Inspection End.

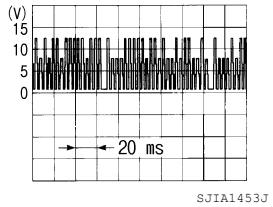
Diagnosis Procedure

INFOID:0000000014392250

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

1.CHECK INTAKE DOOR MOTOR COMMUNICATION SIGNAL

1. Turn ignition switch ON.
2. Check output waveform between intake door motor harness connector and ground with oscilloscope.

(+)		(–)	Output waveform
Intake door motor			
Connector	Terminal		
M227	3	Ground	

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK INSTALLATION OF INTAKE DOOR MOTOR

Check intake door motor is properly installed. Refer to HAC-234, "Exploded View".

Is the inspection result normal?

YES >> Replace intake door motor. Refer to HAC-235, "INTAKE DOOR MOTOR : Removal and Installation".
NO >> Repair or replace malfunctioning part.

3.CHECK INTAKE DOOR MOTOR COMMUNICATION SIGNAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake door motor connector and front air control connector.
3. Check continuity between intake door motor harness connector and front air control harness connector.

Intake door motor		Front air control		Continuity
Connector	Terminal	Connector	Terminal	
M227	3	M132	12	Yes

Is the inspection result normal?

YES >> Replace front air control. Refer to HAC-230, "Removal and Installation".
NO >> Repair harness or connector.

POWER SUPPLY AND GROUND CIRCUIT
FRONT A/C CONTROL

FRONT A/C CONTROL : Component Function Check

INFOID:0000000014392251

1.CHECK OPERATION

1. Turn the blower motor dial clockwise and verify the blower speed increases and that one of the LEDs illuminates on the mode switch.
2. Press the mode switches and verify that the modes change, the LEDs illuminate, and that air flows from the various vents.
3. Turn the temperature control dial and verify the temperature changes at the selected vents.
4. Press the DEF and REC buttons and verify air flow changes.

Does it operate normally?

YES >> Inspection End.
NO >> Perform trouble diagnosis for the front air control system. Refer to HAC-205, "FRONT A/C CONTROL : Diagnosis Procedure".

FRONT A/C CONTROL : Diagnosis Procedure

INFOID:0000000014392252

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

1.CHECK FRONT AIR CONTROL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect the front air control connector.
3. Turn ignition switch ON.
4. Check voltage between front air control harness connector and ground.

(+)		(–)	Voltage		
Front air control			Ignition switch position		
Connector	Terminal		OFF	ACC	ON
M132	3	Ground	Battery voltage	Battery voltage	Battery voltage
	19		Approx. 0 V	Approx. 0 V	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FUSE

Check fuses [No. 14 and 30, located in the fuse block (J/B)].

NOTE:
Refer to PG-164, "Terminal Arrangement".

Is the inspection result normal?

YES >> Check harness for open circuit. Repair or replace if necessary.
NO >> Check harness for short circuit. Repair or replace if necessary.

3.CHECK FRONT AIR CONTROL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between front air control harness connector and ground.

Front air control		(–)	Continuity
Connector	Terminal		
M132	2	Ground	Yes
	18		

Is the inspection result normal?

YES >> Replace the front air control. Refer to HAC-230, "Removal and Installation".
NO >> Repair the harness or connector.

AIR MIX DOOR MOTOR

AIR MIX DOOR MOTOR : Diagnosis Procedure

INFOID:0000000014392253

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

1.CHECK AIR MIX DOOR MOTOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between air mix door motor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Air mix door motor			
Connector	Terminal		
M230	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK AIR MIX DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor connector.
3. Check continuity between air mix door motor harness connector and ground.

Air mix door motor		(–)	Continuity
Connector	Terminal		
M230	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK INSTALLATION OF AIR MIX DOOR MOTOR

Check air mix door motor is properly installed. Refer to HAC-234, "Exploded View".

Is the inspection result normal?

YES >> Replace air mix door motor. Refer to HAC-235, "AIR MIX DOOR MOTOR : Removal and Installation - Air Mix Door Motor".
NO >> Repair or replace malfunctioning part.

4.CHECK AIR MIX DOOR MOTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect air mix door motor connector and front air control connector.
3. Check continuity between air mix door motor harness connector and front air control harness connector.

Air mix door motor		Front air control		Continuity
Connector	Terminal	Connector	Terminal	
M228	1	M132	13	Yes

Is the inspection result normal?

YES >> Replace front air control. Refer to HAC-230, "Removal and Installation".
NO >> Repair harness or connector.

MODE DOOR MOTOR

MODE DOOR MOTOR : Diagnosis Procedure

INFOID:0000000014392254

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

1.CHECK MODE DOOR MOTOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between mode door motor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Mode door motor			
Connector	Terminal		
M226	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK MODE DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect mode door motor connector.
3. Check continuity between mode door motor harness connector and ground.

Mode door motor		(–)	Continuity
Connector	Terminal		
M226	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK INSTALLATION OF MODE DOOR MOTOR CONTROL LINKAGE

Check mode door motor control linkage is properly installed. Refer to HAC-234, "Exploded View".

Is the inspection result normal?

YES >> Replace mode door motor. Refer to HAC-235, "MODE DOOR MOTOR : Removal and Installation".
NO >> Repair or replace malfunctioning part.

4.CHECK MODE DOOR MOTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect mode door motor connector and front air control connector.
3. Check continuity between mode door motor harness connector and front air control harness connector.

Mode door motor		Front air control		Continuity
Connector	Terminal	Connector	Terminal	
M226	1	M132	13	Yes

Is the inspection result normal?

YES >> Replace front air control. Refer to HAC-230, "Removal and Installation".
NO >> Repair harness or connector.

INTAKE DOOR MOTOR

INTAKE DOOR MOTOR : Diagnosis Procedure

INFOID:0000000014392255

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

1.CHECK INTAKE DOOR MOTOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between intake door motor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Intake door motor			
Connector	Terminal		
M227	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 4.

2.CHECK INTAKE DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake door motor connector.
3. Check continuity between intake door motor harness connector and ground.

Intake door motor		(–)	Continuity
Connector	Terminal		
M227	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair harness or connector.

3.CHECK INSTALLATION OF INTAKE DOOR MOTOR

Check intake door motor is properly installed. Refer to HAC-234, "Exploded View".

Is the inspection result normal?

YES >> Replace intake door motor. Refer to HAC-235, "INTAKE DOOR MOTOR : Removal and Installation".
NO >> Repair or replace malfunctioning part.

4.CHECK INTAKE DOOR MOTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake door motor connector and front air control connector.
3. Check continuity between intake door motor harness connector and front air control harness connector.

Intake door motor		Front air control		Continuity
Connector	Terminal	Connector	Terminal	
M227	1	M132	13	Yes

Is the inspection result normal?

YES >> Replace front air control. Refer to HAC-230, "Removal and Installation".
NO >> Repair harness or connector.

PTC HEATER CONTROL UNIT

PTC HEATER CONTROL UNIT : Diagnosis Procedure

INFOID:0000000014392256

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram".

1.CHECK PTC HEATER CONTROL POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect the PTC heater control connector.
3. Turn ignition switch ON.
4. Check voltage between PTC heater control harness connector and ground.

(+)		(–)	Voltage		
PTC heater control			Ignition switch position		
Connector	Terminal		OFF	ACC	ON
M131	10	Ground	Battery voltage	Battery voltage	Battery voltage
	3		Approx. 0 V	Approx. 0 V	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FUSE

Check fuses [No. 14 and 30, located in the fuse block (J/B)].

NOTE:
Refer to PG-164, "Terminal Arrangement".

Is the inspection result normal?

YES >> Repair the harnesses or connectors.
NO >> Replace the blown fuse after repairing the affected circuit.

3.CHECK PTC HEATER CONTROL GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between PTC heater control harness connector and ground.

PTC heater control		(–)	Continuity
Connector	Terminal		
M131	2	Ground	Yes

Is the inspection result normal?

YES >> Replace the PTC heater control.
NO >> Repair the harnesses or connectors.

DOOR MOTOR

Diagnosis Procedure

INFOID:0000000014392257

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

1.CHECK EACH DOOR MOTOR POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between intake door motor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Intake door motor			
Connector	Terminal		
M227	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK EACH DOOR MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake door motor connector.
3. Check continuity between intake door motor harness connector and ground.

Intake door motor		(–)	Continuity
Connector	Terminal		
M227	2	Ground	Yes

Is the inspection result normal?

YES >> Inspection End.
NO >> Repair harness or connector.

3.CHECK EACH DOOR MOTOR POWER SUPPLY CIRCUIT FOR OPEN

1. Disconnect front air control connector.
2. Check continuity between intake door motor harness connector and front air control harness connector.

Intake door motor		Front air control		Continuity
Connector	Terminal	Connector	Terminal	
M227	1	M132	13	Yes

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair harness or connector.

4.CHECK EACH DOOR MOTOR POWER SUPPLY CIRCUIT FOR SHORT

1. Disconnect following connectors:
- Air mix door motor
- Mode door motor
2. Check continuity between intake door motor harness connector and ground.

Intake door motor		(–)	Continuity
Connector	Terminal		
M227	1	Ground	No

Is the inspection result normal?

YES >> Replace front air control. Refer to HAC-230, "Removal and Installation".
NO >> Repair harness or connector.

DOOR MOTOR COMMUNICATION CIRCUIT

Diagnosis Procedure

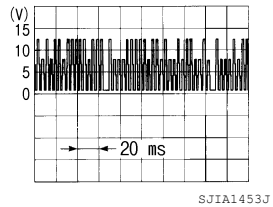
INFOID:0000000014392258

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

NOTE:
If all door motor DTCs are detected, check this circuit.

1.CHECK EACH DOOR MOTOR COMMUNICATION SIGNAL

1. Turn ignition switch ON.
2. Check output waveform between front air control harness connector and ground with oscilloscope.

(+)		(–)	Output waveform
Front air control			
Connector	Terminal		
M132	12	Ground	

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Is the inspection result normal?

YES >> GO TO 2.
NO >> GO TO 3.

2.CHECK EACH DOOR MOTOR COMMUNICATION SIGNAL CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect front air control connector and intake door motor connector.
3. Check continuity between front air control harness connector and intake door motor harness connector.

Front air control		Intake door motor		Continuity
Connector	Terminal	Connector	Terminal	
M132	12	M227	3	Yes

Is the inspection result normal?

YES >> Inspection End.
NO >> Repair harness or connector.

3.CHECK EACH DOOR MOTOR COMMUNICATION SIGNAL CIRCUIT FOR SHORT

1. Disconnect following connectors:
- Air mix door motor
- Mode door motor
2. Check continuity between front air control harness connector and ground.

Front air control		(–)	Continuity
Connector	Terminal		
M132	12	Ground	No

Is the inspection result normal?

YES >> Replace front air control. Refer to HAC-230, "Removal and Installation".
NO >> Repair harness or connector.

FRONT BLOWER MOTOR

Diagnosis Procedure

INFOID:0000000014392259

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Check 15A fuses [No. 17 and 27, located in fuse block (J/B)].
   NOTE:
   Refer to PG-164, "Terminal Arrangement".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the blown fuse after repairing the affected circuit.

2.CHECK FRONT BLOWER MOTOR POWER SUPPLY

1. Disconnect front blower motor connector.
2. Turn ignition switch ON.
3. Check voltage between front blower motor harness connector and ground.

(+)		(–)	Voltage (Approx.)
Front blower motor			
Connector	Terminal		
M44	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 3.

3.CHECK FRONT BLOWER RELAY

1. Turn ignition switch OFF.
2. Check front blower relay. Refer to HAC-216, "Component Inspection (Front Blower Relay)".

Is the inspection result normal?

YES >> Repair harness or connector between front blower motor and fuse.
NO >> Replace front blower relay.

4.CHECK FRONT BLOWER MOTOR CONTROL CIRCUIT

1. Turn ignition switch OFF.
2. Connect front blower motor connector.
3. Disconnect variable blower control connector.
4. Turn ignition switch ON.
5. Check voltage between variable blower control harness connector and ground.

(+)		(–)	Voltage (Approx.)
Variable blower control			
Connector	Terminal		
M130	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 5.

5.CHECK FRONT BLOWER MOTOR CONTROL CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect front blower motor connector.
3. Check continuity between variable blower control harness connector and front blower motor harness connector.

Variable blower control		Front blower motor		Continuity
Connector	Terminal	Connector	Terminal	
M130	3	M44	2	Yes

Is the inspection result normal?

YES >> Replace front blower motor. Refer to HAC-237, "Removal and Installation".
NO >> Repair harness or connector.

6. CHECK VARIABLE BLOWER CONTROL GROUND CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Check continuity between variable blower control harness connector and ground.

Variable blower control		(–)	Continuity
Connector	Terminal		
M130	1	Ground	Yes

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair harness or connector.

7. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT

1. Turn blower control dial fully counterclockwise to the OFF position.
2. While turning the blower control dial clockwise, through each detent, check voltage between variable blower control and ground.

Variable blower control		(−)	Condition	
Connector	Terminal		Blower control dial detents	Voltage
M130	2	Ground	OFF	0.00
			1	4.00
			2	4.75
			3	5.00
			4	5.50
			5	5.75
			6	6.00
			7	6.50
			8	6.75
			9	7.00
			10	7.50
			11	8.00
			12	8.25
			13	8.50
			14	9.00
			15	9.25
			16	9.75
			17	10.00
			18	10.50
			19	10.75
			20	11.00
			21	11.50
			22	11.75
			23	12.25
			24	12.50

Is the inspection result normal?

YES >> Replace variable blower control. Refer to HAC-240, "Removal and Installation".
NO >> GO TO 8.

8. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT FOR OPEN

1. Turn ignition switch OFF.
2. Disconnect variable blower control connector and front air control connector.
3. Check continuity between variable blower control harness connector and front air control harness connector.

Variable blower control		Front air control		Continuity
Connector	Terminal	Connector	Terminal	
M130	2	M132	10	Yes

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair harness or connector.

9. CHECK VARIABLE BLOWER CONTROL SIGNAL CIRCUIT FOR SHORT

Check continuity between variable blower control harness connector and ground.

Variable blower control		(−)	Continuity
Connector	Terminal		
M130	2	Ground	No

Is the inspection result normal?

YES >> Replace front air control. Refer to HAC-230, "Removal and Installation".
NO >> Repair harness or connector.

Component Inspection (Front Blower Motor)

INFOID:0000000014392260

1.CHECK FRONT BLOWER MOTOR

1. Connect battery voltage to terminal 1 of front blower motor.
2. Connect ground to terminal 2 of front blower motor.

Does the blower fan operate?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".
NO >> Replace front blower motor. Refer to HAC-237, "Removal and Installation".

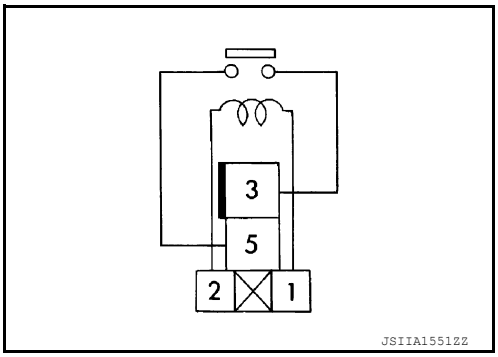
Component Inspection (Front Blower Relay)

INFOID:0000000014392261

1.CHECK FRONT BLOWER RELAY

1. Turn ignition switch OFF.
2. Remove front blower relay.
3. Check continuity between front blower relay terminals 3 and 5 when voltage is supplied between terminals 1 and 2.

Terminals		Voltage	Continuity
3	5	ON	Yes
		OFF	No



Is the inspection result normal?

YES >> Inspection End.
NO >> Replace front blower relay.

MAGNET CLUTCH

Component Function Check

INFOID:0000000014392262

1.CHECK MAGNET CLUTCH OPERATION

Perform auto active test of IPDM E/R. Refer to PCS-10, "Diagnosis Description".

Does it operate normally?

YES >> Inspection End.
NO >> Refer to HAC-217, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000014392263

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram" or HAC-176, "VK56VD : Wiring Diagram".

1.CHECK FUSE

1. Turn ignition switch OFF.
2. Check 10A fuse (No. 51, located in IPDM E/R).
   NOTE:
   Refer to PG-174, "IPDM E/R Terminal Arrangement".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the blown fuse after repairing the affected circuit.

2.CHECK MAGNET CLUTCH POWER SUPPLY CIRCUIT

1. Disconnect compressor connector and IPDM E/R connector.
2. Check continuity between compressor harness connector and IPDM E/R harness connector.

Compressor		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F150 (Cummins 5.0L)	1	E123	49	Yes
F96 (VK56VD)				

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair harness or connector.

3.CHECK MAGNET CLUTCH

Directly apply battery voltage to the magnet clutch. Check operation visually and by sound.

Does it operate normally?

YES >> Replace IPDM E/R. Refer to PCS-43, "Removal and Installation of IPDM E/R".
NO >> Replace magnet clutch. Refer to HA-33, "Removal and Installation".

PTC HEATER RELAY

Description

INFOID:0000000014392266

Power is supplied to the PTC heater with PTC heater control.

Component Function Check

INFOID:0000000014392267

1. CHECK PTC HEATER RELAY POWER SUPPLY CIRCUIT

Check that an operation noise of PTC heater relay (located in relay box) can be heard when operating the air conditioning system in heat mode.

Is the inspection result normal?

YES >> PTC heater relay power supply circuit is OK.
NO >> Refer to HAC-218, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000014392268

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram".

1. CHECK PTC HEATER RELAY GROUND CIRCUIT

1. Turn ignition switch ON.
2. Disconnect PTC heater control connector.
3. Check voltage between PTC heater control connector and ground.

Terminals			Voltage (V) (Approx.)
(+)		(–)	
PTC heater control	Terminal		
M131	14	Ground	Battery voltage
	15		
	16		

Is the inspection result normal?

YES >> Replace PTC heater control.
NO >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect PTC heater relay connectors.
3. Check continuity between PTC heater control connector and PTC heater relay connector.

PTC heater control connector	Terminal	PTC heater relay connector	Terminal	Continuity
M131	14	E144	2	Yes
	15	E146		
	16	E145		

4. Check continuity between PTC heater control connector and ground.

PTC heater control connector	Terminal		Continuity
M131	14	Ground	No
	15		
	16		

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3. CHECK PTC HEATER RELAY

Check PTC heater relay. Refer to HAC-219, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".
NO >> Replace appropriate PTC heater relay.

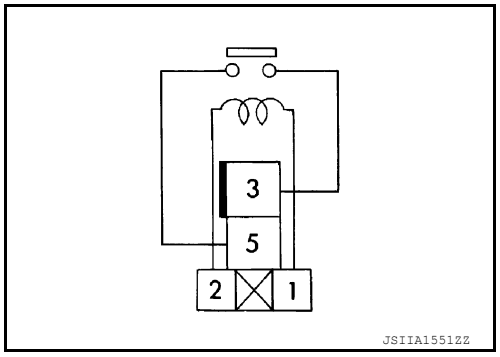
Component Inspection

INFOID:0000000014392269

1. CHECK PTC HEATER RELAY

1. Turn ignition switch OFF.
2. Remove PTC heater relay.
3. Check continuity between PTC heater relay terminal 3 and 5 when voltage is supplied between terminal 1 and 2.

Terminal		Voltage	Continuity
3	5	ON	Yes
		OFF	No



Is the inspection result normal?

YES >> Inspection End.
NO >> Replace PTC heater relay.

PTC HEATER

Diagnosis Procedure

INFOID:0000000014392270

Regarding Wiring Diagram information, refer to HAC-167, "CUMMINS 5.0L : Wiring Diagram".

1. CHECK FUSE

1. Turn ignition switch OFF.
2. Check 50A fuses (No. S, V and Z, located in relay box).
   NOTE:
   Refer to PG-165, "Terminal Arrangement".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the blown fuse after repairing the affected circuit.

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between PTC heater connector and ground.

Terminals			Condition of PTC heater	Voltage (Approx.)
(+)		(–)		
PTC heater connector	Terminal			
E78	1	Ground	ON	Battery voltage
			OFF	0 V
	3		ON	Battery voltage
			OFF	0 V
	5		ON	Battery voltage
			OFF	0 V

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 4.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect PTC heater connector.
3. Check continuity between PTC heater connector and ground.

PTC heater connector	Terminal		Continuity
E78	2	Ground	Yes
	4		

Is the inspection result normal?

YES >> Replace PTC heater. Refer to HAC-239, "Removal and Installation".
NO >> Repair or replace harness.

4. CHECK HARNESS CONTINUITY

1. Disconnect PTC relay connectors.
2. Check continuity between PTC heater connector and PTC relay connector.

PTC heater connector	Terminal	PTC heater relay connector	Terminal	Continuity
E78	1	E144	5	Yes
	3	E146		
	5	E145		

3. Check continuity between PTC heater connector and ground.

PTC heater connector	Terminal		Continuity
E78	1	Ground	No
	3		
	5		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-47, "Intermittent Incident".
NO >> Replace or repair harness.

SYMPTOM DIAGNOSIS

HEATER AND AIR CONDITIONING SYSTEM CONTROL SYMPTOMS

Symptom Table

INFOID:0000000014392271

NOTE:
Perform the self-diagnoses with CONSULT before performing the symptom diagnosis. If DTC is detected, perform the corresponding diagnosis.

Symptom	Corresponding malfunction part	Reference
• Air conditioning does not activate. • Air conditioning cannot be controlled. • Operation status of air conditioning is not indicated on display.	• Front air control ignition power supply circuit • Front air control	HAC-205, "FRONT A/C CONTROL : Diagnosis Procedure"
• Air outlet does not change. • Mode door motor does not operate normally.	• Circuit between mode door motor and front air control • Mode door motor control linkage • Mode door motor • Front air control	HAC-207, "MODE DOOR MOTOR : Diagnosis Procedure"
• Discharge air temperature does not change. • Air mix door motor does not operate normally.	• Circuit between air mix door motor and front air control • Air mix door motor installation condition • Air mix door motor • Front air control	HAC-206, "AIR MIX DOOR MOTOR : Diagnosis Procedure"
• Intake door does not change. • Intake door motor does not operate normally.	• Circuit between intake door motor and front air control • Intake door motor control linkage • Intake door motor • Front air control	HAC-208, "INTAKE DOOR MOTOR : Diagnosis Procedure"
All door motors do not operate normally.	• Each door motor power supply and ground circuit • Front air control	HAC-210, "Diagnosis Procedure"
Blower motor operation is malfunctioning.	• Power supply system of front blower motor • Circuit between front blower motor and front air control • Front blower motor • Front air control	HAC-213, "Diagnosis Procedure"
Compressor does not operate.	• Circuit between magnet clutch and IPDM E/R • Magnet clutch • IPDM E/R (A/C relay) • Circuit between ECM and refrigerant pressure sensor • Refrigerant pressure sensor • CAN communication circuit • Front air control	HAC-228, "Diagnosis Procedure"
• Insufficient cooling. • No cool air comes out. (Air flow volume is normal.)	• Magnet clutch control system • Drive belt slipping • Refrigerant cycle • Air leakage from each duct • Front air control connection recognition signal circuit	HAC-224, "Diagnosis Procedure"
• Insufficient heating. • No warm air comes out. (Air flow volume is normal.)	• Engine cooling system • Heater hose • Heater core • PTC heater (Cummins 5.0L) • Air leakage from each duct	HAC-226, "Diagnosis Procedure"

Symptom		Corresponding malfunction part	Reference
Noise is heard when front air conditioning system operates.	During compressor operation	Refrigerant cycle	HA-30, "Symptom Table"
	During front blower motor operation	• Mixing any foreign object in front blower motor • Front blower motor fan breakage • Front blower motor rotation inferiority	HAC-216, "Component Inspection (Front Blower Motor)"

INSUFFICIENT COOLING

Description

INFOID:0000000014392272

Symptom
- Insufficient cooling
- No cool air comes out. (Air flow volume is normal.)

Diagnosis Procedure

INFOID:0000000014392273

1. CONFIRM SYMPTOM BY PERFORMING OPERATION CHECK - TEMPERATURE DECREASE

1. Press the A/C switch.
2. Turn temperature control dial counterclockwise to maximum cold.
3. Check for cold air at discharge air outlets.

Can a symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2. CHECK FOR ANY SYMPTOMS

Perform a complete operational check and check for any symptoms. Refer to HAC-187, "Work Procedure".

Does another symptom exist?

YES >> Refer to HAC-222, "Symptom Table".
NO >> System OK.

3. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. CHECK DRIVE BELTS

Check A/C compressor belt tension. Refer to EM-198, "Removal and Installation - Drive Belt".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust or replace compressor belt. Refer to EM-198, "Removal and Installation - Drive Belt".

5. CHECK AIR MIX DOOR MOTOR OPERATION

Check and verify air mix door mechanism for smooth operation.

Does air mix door operate correctly?

YES >> GO TO 6.
NO >> Check air mix door motor circuit. Refer to HAC-210, "Diagnosis Procedure".

6. CHECK COOLING FAN MOTOR OPERATION

Check and verify cooling fan motor for smooth operation.

Does cooling fan motor operate correctly?

YES >> GO TO 7.
NO >> Check cooling fan motor. Refer to CO-55, "Exploded View".

7. CHECK RECOVERY/RECYCLING EQUIPMENT BEFORE USAGE

Check recovery/recycling equipment before connecting to vehicle. Verify there is no pressure in the recovery/recycling equipment by checking the gauges. If pressure exists, recover refrigerant from equipment lines.

>> GO TO 8.

8. CHECK REFRIGERANT PURITY

1. Connect recovery/recycling equipment to vehicle.
2. Confirm refrigerant purity in supply tank using recovery/recycling and refrigerant identifier.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Check contaminated refrigerant. Refer to HA-17, "Description".

9. CHECK REFRIGERANT PRESSURE

Check refrigerant pressure with manifold gauge connected. Refer to HA-24, "Inspection".

Is the inspection result normal?

YES >> Perform diagnostic work flow. Refer to HA-15, "Work Flow".
NO >> GO TO 10.

10. CHECK FOR EVAPORATOR FREEZE-UP

Start engine and run A/C. Check for evaporator freeze-up.

Does evaporator freeze up?

YES >> Perform diagnostic work flow. Refer HA-15, "Work Flow".
NO >> GO TO 11.

11. CHECK AIR DUCTS

Check ducts for air leaks.

Is the inspection result normal?

YES >> System OK.
NO >> Repair air leaks.

INSUFFICIENT HEATING

Description

INFOID:0000000014392274

Symptom
- Insufficient heating
- No warm air comes out. (Air flow volume is normal.)

Diagnosis Procedure

INFOID:0000000014392275

1. CONFIRM SYMPTOM BY PERFORMING OPERATION CHECK - TEMPERATURE INCREASE

1. Turn temperature control dial clockwise to maximum heat.
2. Check for hot air at discharge air outlets.

Can a symptom be duplicated?

YES >> GO TO 3.
NO >> GO TO 2.

2. CHECK FOR ANY SYMPTOMS

Perform a complete operational check and check for any symptoms. Refer to HAC-187, "Work Procedure".

Does another symptom exist?

YES >> Refer to HAC-222, "Symptom Table".
NO >> System OK.

3. CHECK FOR SERVICE BULLETINS

Check for any service bulletins.

>> GO TO 4.

4. CHECK ENGINE COOLING SYSTEM

1. Check for proper engine coolant level. Refer to CO-55, "Removal and Installation".
2. Check hoses for leaks or kinks.
3. Check radiator cap. Refer to CO-55, "Removal and Installation".
4. Check for air in cooling system.

>> GO TO 5.

5. CHECK AIR MIX DOOR MOTOR OPERATION

Check and verify air mix door mechanism for smooth operation.

Does air mix door operate correctly?

YES >> GO TO 6.
NO >> Check the air mix door motor circuit. Refer to HAC-210, "Diagnosis Procedure".

6. CHECK AIR DUCTS

Check for disconnected or leaking air ducts.

Is the inspection result normal?

YES (Cummins 5.0L)>>GO TO 7.
YES (VK56VD)>>GO TO 8.
NO >> Repair all disconnected or leaking air ducts.

7. CHECK PTC HEATER

Check PTC heater. Refer to HAC-220, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace PTC heater. Refer to HAC-239, "Removal and Installation".

8. CHECK HEATER HOSE TEMPERATURES

1. Start engine and warm it up to normal operating temperature.
2. Touch both the inlet and outlet heater hoses. The inlet hose should be hot and the outlet hose should be warm.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Both hoses warm: GO TO 10.

9. CHECK ENGINE COOLANT SYSTEM

Check thermostat operation. Refer to CO-45, "System Inspection".

Is the inspection result normal?

YES >> System OK.
NO >> Repair or replace as necessary.

10. CHECK HEATER HOSES

Check heater hoses for proper installation.

Is the inspection result normal?

YES >> System OK.
NO >> 1. Back flush heater core.
2. Drain the water from the system.
3. Refill system with new engine coolant. Refer to CO-47, "Changing Engine Coolant".
4. To retest: GO TO 11.

11. CHECK HEATER HOSE TEMPERATURES

1. Start engine and warm up to normal operating temperature.
2. Touch both the inlet and outlet heater hoses. The inlet hose should be hot and the outlet hose should be warm.

Is the inspection result normal?

YES >> System OK.
NO >> Replace heater core. Refer to HA-49, "HEATER CORE : Removal and Installation".

COMPRESSOR DOES NOT OPERATE

Description

INFOID:0000000014392276

Symptom: Compressor does not operate.

Diagnosis Procedure

INFOID:0000000014392277

NOTE:
- Perform self-diagnoses with CONSULT before performing symptom diagnosis. If DTC is detected, perform the corresponding diagnosis.
- Check that refrigerant system is properly charged. If refrigerant amount is below the proper amount, perform inspection of refrigerant leakage.

1.CHECK MAGNET CLUTCH OPERATION

Check magnet clutch. Refer to HAC-217, "Component Function Check".

Does it operate normally?

YES >> GO TO 2.
NO >> Repair or replace malfunctioning parts.

2.CHECK REFRIGERANT PRESSURE SENSOR

Check refrigerant pressure sensor. Refer to EC-1368, "Diagnosis Procedure" or EC-1371, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace malfunctioning parts.

3.CHECK FRONT AIR CONTROL OUTPUT SIGNAL

With CONSULT
Check “FAN ON” and “AIR COND” in “Data Monitor” mode of “BCM”.

Monitor item	Condition		Status
AIR COND SW	A/C switch	ON	On
		OFF	Off
FAN ON	Blower motor	ON	On
		OFF	Off

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace front air control. Refer to HAC-230, "Removal and Installation".

4.CHECK ECM INPUT SIGNAL

With CONSULT
Check “AIR COND SIG” and “HEATER FAN SW” in “Data Monitor” mode of “ECM”.

Monitor item	Condition		Status
AIR COND SIG	A/C switch	ON	On
		OFF	Off
HEATER FAN SW	Blower motor	ON	On
		OFF	Off

Is the inspection result normal?

YES >> GO TO 5.
NO >> Check CAN communication system. Refer to LAN-53, "Trouble Diagnosis Flow Chart".

5.CHECK IPDM E/R INPUT SIGNAL

With CONSULT

1. Start engine.
2. Check “AC COMP REQ” in “Data Monitor” mode of “IPDM E/R”.

Monitor item	Condition		Status
AC COMP REQ	A/C switch	ON	On
		OFF	Off

Is the inspection result normal?

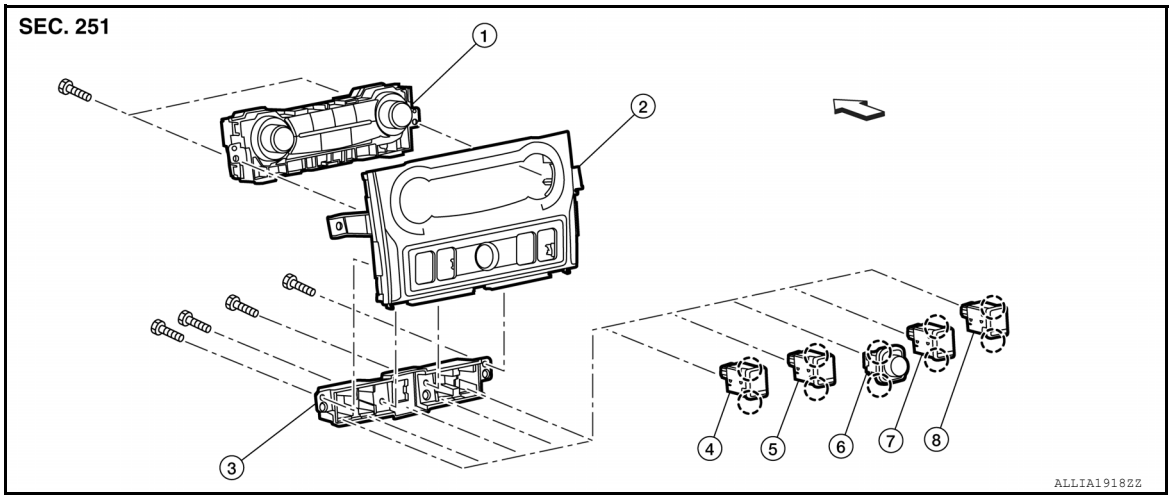
YES >> Inspection End.
NO >> Check CAN communication system. Refer to LAN-53, "Trouble Diagnosis Flow Chart".

REMOVAL AND INSTALLATION

FRONT AIR CONTROL

Exploded View

INFOID:0000000014392278



1. A/C switch assembly
2. Cluster lid C
3. Switch carrier
4. VDC OFF switch
5. Sonar system off switch (if equipped)
6. Hazard switch
7. Blind spot warning switch (if equipped)
8. Heated steering wheel switch (if equipped)

⇦ Front

Removal and Installation

INFOID:0000000014392279

REMOVAL

1. Remove cluster lid C. Refer to IP-20, "Removal and Installation".
2. Remove the screws that retain the front air control assembly to cluster lid C.
   NOTE:
   The front air control assembly is part of the A/C switch assembly.
3. Remove the front air control assembly.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

If the switches where removed from the switch carrier, visually check the switch pawls for deformation and damage during installation.

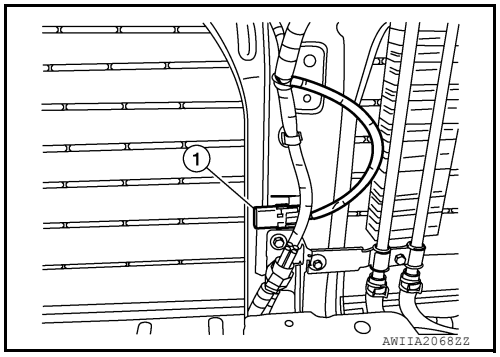
AMBIENT SENSOR

Removal and Installation

INFOID:0000000014392280

REMOVAL

1. Remove front grille. Refer to EXT-32, "Removal and Installation".
2. Disconnect harness connector from ambient sensor.
3. Remove ambient sensor (1).



INSTALLATION

Installation is in the reverse order of removal.

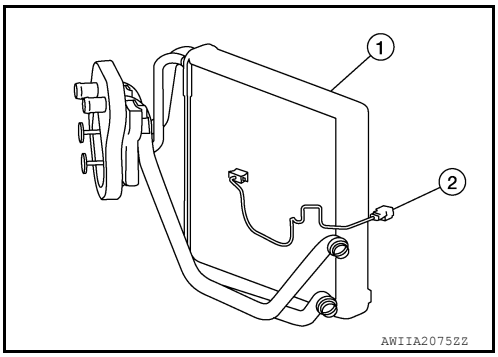
INTAKE SENSOR

Removal and Installation

INFOID:0000000014392281

REMOVAL

1. Remove evaporator from the heating and cooling unit. Refer to IP-21, "Removal and Installation".
2. Disconnect the harness connector from intake sensor.
3. Remove intake sensor (2) from evaporator (1).
   CAUTION:
   - **Mark the mounting position of intake sensor.**
   - **Do not damage evaporator core.**



INSTALLATION

Installation is in the reverse order of removal.

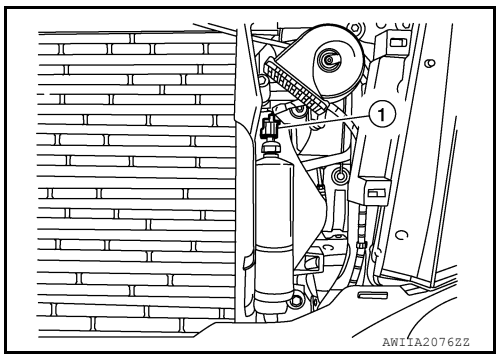
REFRIGERANT PRESSURE SENSOR

Removal and Installation

INFOID:0000000014392282

REMOVAL

1. Discharge refrigerant. Refer to HA-19, "Recycle Refrigerant".
2. Remove active grille shutter. Refer to EXT-34, "Removal and Installation" (Non-XD Models).
3. Disconnect harness connector from refrigerant pressure sensor.
4. Remove refrigerant pressure sensor (1).



INSTALLATION

Installation is in the reverse order of removal.

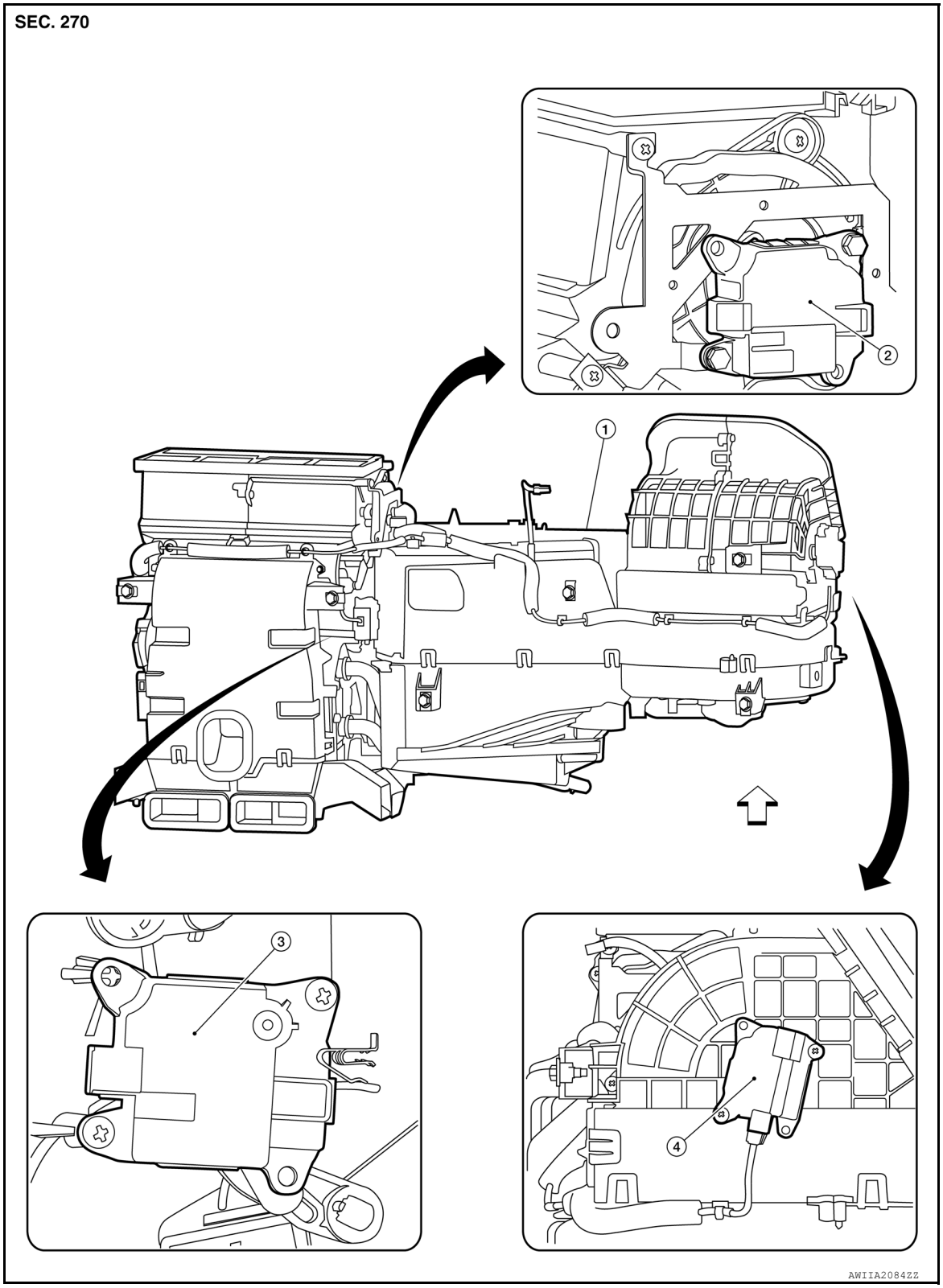
CAUTION:

- **Be careful not to damage the condenser fins.**
- **Do not reuse O-rings.**
- **Apply A/C oil to the O-ring of the refrigerant pressure sensor for installation.**
- **After charging refrigerant, check for leaks. Refer to HA-17, "Leak Test".**

DOOR MOTOR

Exploded View

INFOID:0000000014392283



1. Heating and cooling unit assembly
2. Mode door motor
3. Air mix door motor
4. Intake door motor
⇦ Front

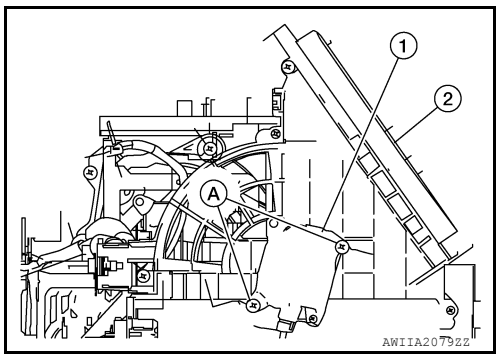
INTAKE DOOR MOTOR

INTAKE DOOR MOTOR : Removal and Installation

INFOID:0000000014392284

REMOVAL

1. Remove heating and cooling unit assembly. Refer to HA-49, "HEATING AND COOLING UNIT ASSEMBLY : Removal and Installation".
2. Disconnect harness connector from intake door motor.
3. Remove intake door motor screws (A) and intake door motor (1) from blower unit (2).



INSTALLATION

Installation is in the reverse order of removal.

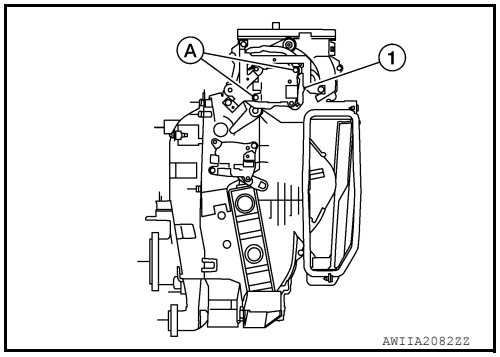
MODE DOOR MOTOR

MODE DOOR MOTOR : Removal and Installation

INFOID:0000000014392285

REMOVAL

1. Remove heating and cooling unit assembly. Refer to HA-49, "HEATING AND COOLING UNIT ASSEMBLY : Removal and Installation".
2. Remove mode door motor screws (A).
3. Disconnect the harness connector from the mode door motor (1) and remove.



INSTALLATION

Installation is in the reverse order of removal.

AIR MIX DOOR MOTOR

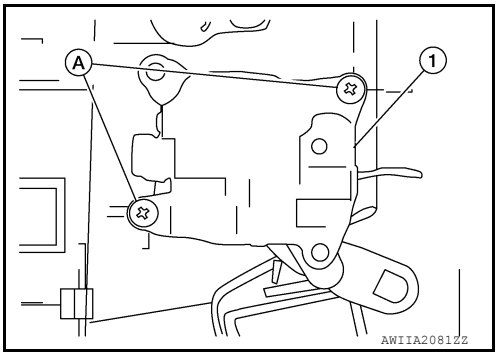
AIR MIX DOOR MOTOR : Removal and Installation - Air Mix Door Motor

INFOID:0000000014392286

REMOVAL

1. Remove heating and cooling unit assembly. Refer to HA-49, "HEATING AND COOLING UNIT ASSEMBLY : Removal and Installation".
2. Remove blower unit. Refer to VTL-16, "BLOWER UNIT : Removal and Installation".

3. Remove air mix door motor screws (A).
4. Disconnect harness connector from the air mix door motor (1) and remove.



INSTALLATION

Installation is in the reverse order of removal.

FRONT BLOWER MOTOR

Removal and Installation

INFOID:0000000014392287

For removal and installation of blower motor, refer to VTL-16, "BLOWER UNIT : Removal and Installation".

COMPRESSOR

Removal and Installation

INFOID:0000000014392288

For removal and installation of the compressor, refer to HA-31, "Removal and Installation".

PTC HEATER

Removal and Installation

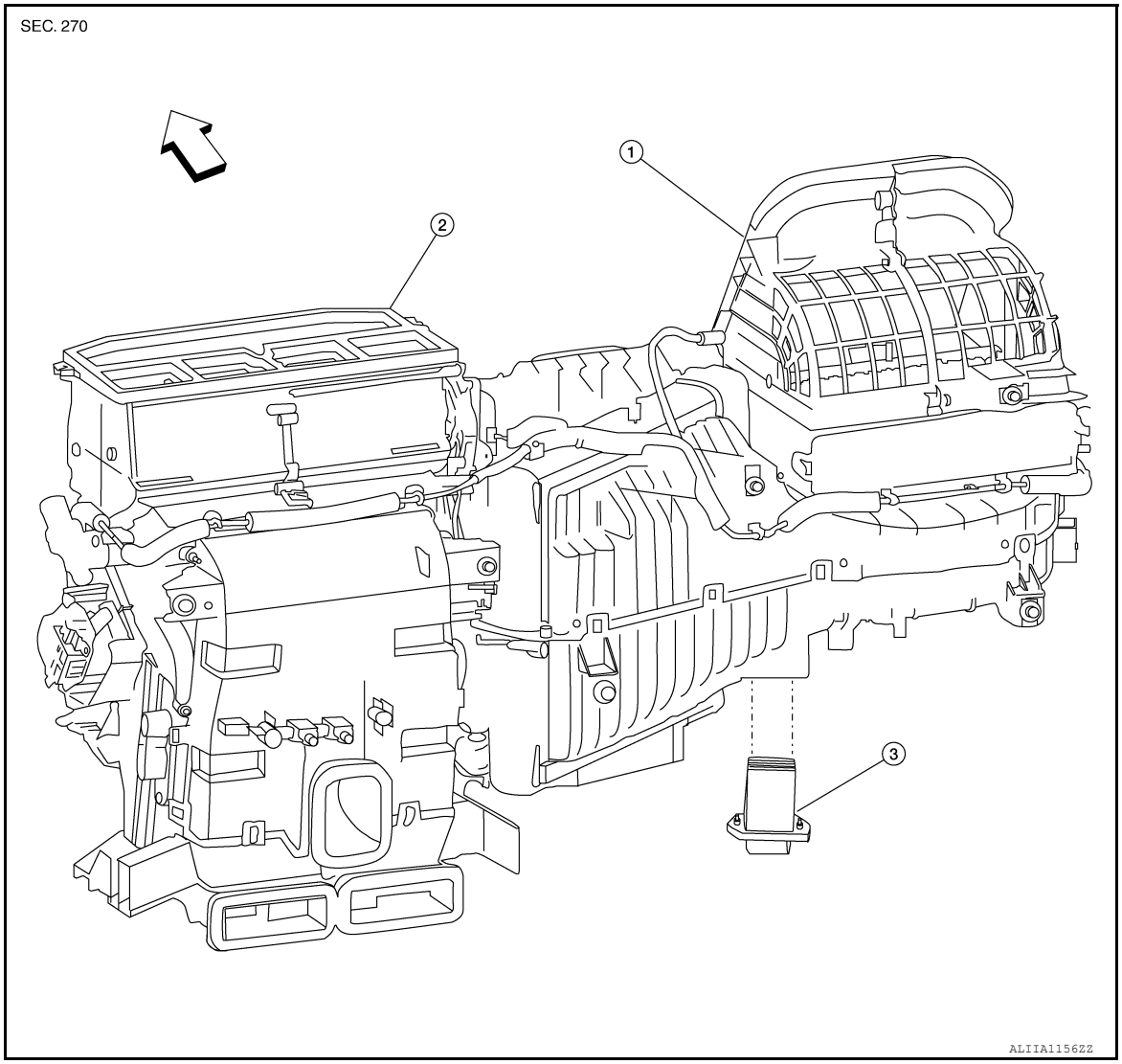
INFOID:0000000014392289

For the removal and installation of the PTC heater, refer to HA-50, "PTC HEATER : Removal and Installation".

VARIABLE BLOWER CONTROL

Exploded View

INFOID:0000000014392290



1. Blower unit
2. Heating and cooling unit assembly
3. Variable blower control

⇦ Front

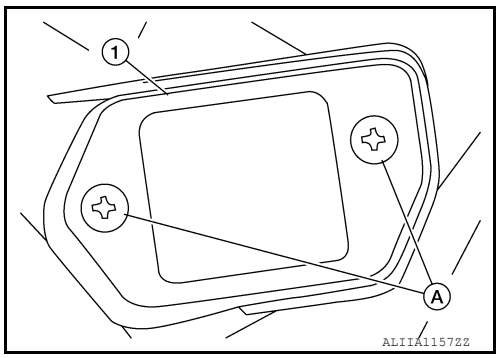
Removal and Installation

INFOID:0000000014392291

REMOVAL

1. Remove glove box assembly and housing. Refer to IP-21, "Removal and Installation".
2. Disconnect harness connector from variable blower control.

3. Remove two screws (A) and variable blower control (1).



INSTALLATION

Installation is in the reverse order of removal.