



SERVICE MANUAL INFORMATION

**SB-19-001 DESCRIPTION OF AIR CONDITIONER
WORKSHOP MANUAL CORRECTION**

**GROUP: SERVICE MANUAL UPDATE
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SUBJECT VEHICLES: Conventional Trucks equipped with an J08E and Cab Over Engine (COE) Trucks equipped with an J05E.

The following is to inform you of the above caption. This service data should be attached to the relevant pages of the workshop manuals for maintenance and to use for servicing.

OVERVIEW:

Workshop manual correction of air conditioner descriptions.



AIR CONDITIONING SYSTEM

SPECIFICATION DATA

EN11Z0802H10004

Refrigerant	HFC 134a
Oil for air conditioning compressor.	ND-OIL 8

PRECAUTIONS REGARDING REFRIGERANT (HFC134a)

EN11Z0802H30001

1. COMPATIBILITY

The HFC134a system and R12 system do not have compatible cooling cycle components, compressor oil, and other parts.

2. ABOUT THE REFRIGERANT (HFC134a)

- (1) Always use HFC134a. If the wrong refrigerant is used, the air conditioner compressor may lock up due to poor lubrication.

3. ABOUT THE COMPRESSOR OIL

- (1) Always use compressor oil for HFC134a (ND-OIL 8). If the wrong compressor oil is used in a compressor for HFC134a, the service life of the compressor will be severely shortened due to poor lubrication.
- (2) Compressor oil for HFC134a (ND-OIL 8) has high moisture-absorbing characteristics. When disassembling the air conditioner, therefore, immediately plug openings with a plug or vinyl tape to keep outside air away from the oil.
- (3) Compressor oil for HFC134a (ND-OIL 8) has an adverse effect on acrylic and ABS resins. When replenishing the compressor oil, therefore, do not allow the oil to splatter.
- (4) Do not allow compressor oil for HFC134a (ND-OIL 8) to stick to painted surfaces, for it may cause the paint to peel.

4. ABOUT THE O-RINGS

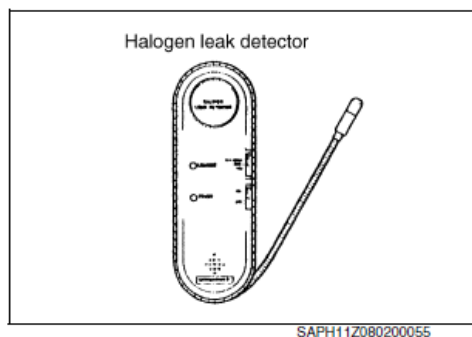
- (1) Always use an O-ring for HFC134a. If the wrong O-ring is used, the refrigerant may leak.

5. PRECAUTIONS FOR EVACUATING AIR

- (1) Always use an adapter equipped with a solenoid valve. If a vacuum pump for another refrigerant is left as it stands after vacuuming, the wrong oil remaining in the vacuum pump may flow back into the HFC134a system.


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6. CHECKING FOR REFRIGERANT LEAKS

- (1) The conventional halide torch type leak tester uses a reaction with chlorine to detect a refrigerant leak. It cannot be used to detect an HFC134a refrigerant leak, therefore, not only because HFC134a contains no chlorine but also because the tester breaks down the sucked-in HFC134a and produces a toxic substance. Also, a conventional electric refrigerant leak tester may not be sensitive enough to detect an HFC134a refrigerant leak because HFC134a refrigerant has small molecules. A halogen leak detector must therefore be used to detect an HFC134a refrigerant leak.
- (2) Detecting a refrigerant leak with the engine running is difficult because a refrigerant leak would be diluted by air from the fan, blower, and other sources. Be sure to set the starter switch to the LOCK position when checking for a refrigerant leak.

PRECAUTIONS FOR REPLENISHING THE REFRIGERANT

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1. WHAT TO DO IF REFRIGERANT GETS IN YOUR EYES

- (1) Do not rub your eyes with your hands or a handkerchief.
- (2) Immediately wash your eyes with clean water for at least 15 minutes and then see an eye specialist as soon as possible.

2. PRECAUTIONS FOR HANDLING REFRIGERANT (SERVICE CAN)

- (1) Do not apply heat directly to the can or immerse it in hot water, for this will cause the pressure inside the can to rise and burst the can. If the can must be warmed up, use running water that is no hotter than 40°C.
- (2) Do not drop or impart shock to the service can.
- (3) Do not open the valve on the high-pressure side of the gauge manifold while the engine is running, because it may cause high-pressure refrigerant to flow back into the service can and burst the can.
- (4) Do not hold the service can close to your face while handling it. Always wear safety goggles when working with the refrigerant.

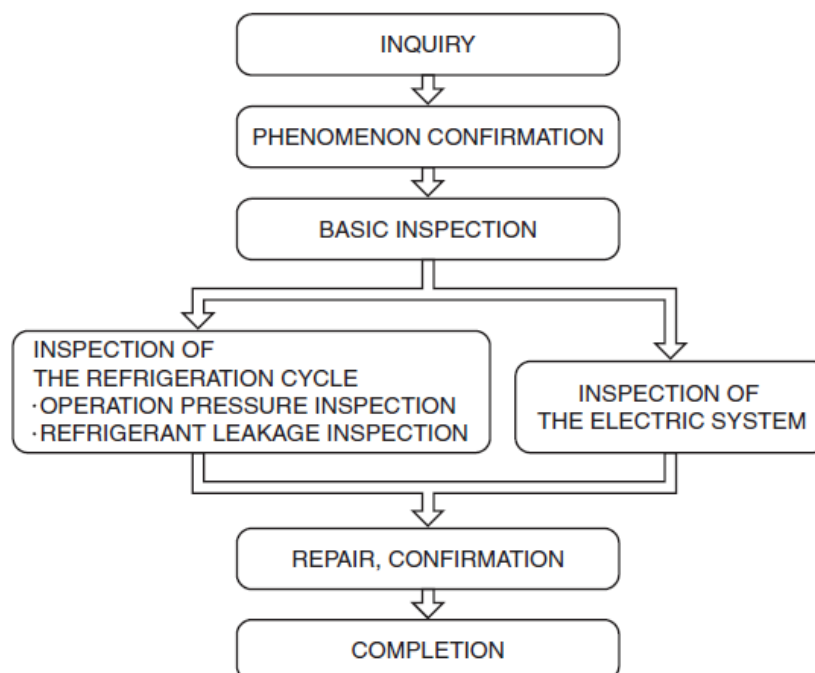
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TROUBLESHOOTING (FAULT DIAGNOSIS BY SYMPTOMS)

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FAULT DIAGNOSIS PROCEDURE



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The diagram shows the basic procedure for fault diagnosis.

BASIC INSPECTION

Symptom	Possible cause	Remedy/Prevention
Abnormal noise from around the compressor.	Loosened mounting bolts of compressor or bracket.	Retighten.
	Broken discharge or suction valve. Loosening of the connecting rod.	Repair or replace the compressor.
	Insufficient compressor oil.	Request oil quantity inspection and refilling.
Oil leakage at connection parts or tightening parts of the refrigeration cycle.	Refrigerant leakage.	Retighten. Replace the related parts.
Abnormal noise from around the blower.	Foreign objects caught in the blower. Insufficient blower tightening.	Repair or replace the compressor.
Insufficient V-belt tension.	—	V-belt retightening. If the V-belt has been worn thin, replace it with a new one.
Condenser fins covered by mud or dust.	—	Wash off any mud or dust covering the condenser fins.
Clogged air filter.	—	Clean the air filter.
The control mechanism does not operate smoothly and accurately.	—	Operate the levers and switches of the control panel and replace in case of abnormalities. Also inspect fuses and relays as required and replace them in case of abnormalities.

COMPRESSOR-RELATED

ABNORMALLY HIGH DISCHARGE PRESSURE

Symptom	Possible cause	Remedy/Prevention
The pressure on the high-pressure side is abnormally high and immediately after the compressor is stopped, the pressure rapidly drops to approximately 2 kg/cm ² .	Air has entered into the refrigeration cycle.	Evacuate and recharge the system with the specified quantity of refrigerant (discharge into the atmosphere is prohibited).

ABNORMALLY HIGH SUCTION PRESSURE

Symptom	Possible cause	Remedy/Prevention
Abnormally cold around low-pressure hose and service valve on the low-pressure side.	Excessive opening of the expansion valve.	Repair or replace of the expansion valve.
The pressure on the high-pressure side is high, but when the condenser is cooled, the suction pressure drops.	Excessive refrigerant filling.	Evacuate and recharge the system with the specified quantity of refrigerant (discharge into the atmosphere is prohibited).
When the compressor is stopped, the pressure immediately becomes the same on high-pressure side and low-pressure side.	Gasket breakage, high-pressure valve breakage, or entry of foreign matter.	Replace the gasket, replace the high pressure valve, or remove the foreign matter.

ABNORMALLY LOW DISCHARGE PRESSURE

Symptom	Possible cause	Remedy/Prevention
No dew becomes attached to the outlet of the expansion valve and the pressure on the low-pressure side is a negative pressure.	Expansion valve freezing or defective expansion valve.	Replace the expansion valve.
When the compressor is stopped, the pressure immediately becomes the same on high-pressure side and low-pressure side.	Breakage of compressor discharge valve and/or suction valve, catching of foreign matter.	Repair or replace the compressor.

ABNORMALLY LOW SUCTION PRESSURE

Symptom	Possible cause	Remedy/Prevention
No dew becomes attached to the outlet of the expansion valve and the low-pressure piping is not cold.	Expansion valve freezing or defective expansion valve.	Replace the expansion valve.
Low temperature of the discharge port, Low discharge pressure.	There is frost on the evaporator.	Reposition clean, or replace the thermostat on the evaporator then retest.
There is frost on the expansion valve.	The expansion valve becomes clogged.	Clean (moisture removal) or replace.
There is a temperature difference around receiver and drier, and in extreme cases, there is frost on the piping after the receiver strainer.	Clogging of the receiver and drier.	Replace the desiccant cartridge in the receiver drier.(Receiver drier is part of condenser.)


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DISCHARGE PRESSURE AND SUCTION PRESSURE BOTH HIGH

Symptom	Possible cause	Remedy/Prevention
Excessive dust on the condenser fins.	Insufficient condenser cooling.	Wash the dust off to improve air passage.
The surroundings of the service valve are cold compared to the evaporator.	Clogging in the equipment and/or piping on the low-pressure side.	Repair or replace.
The temperature at the expansion valve inlet is low in comparison with the temperature around receiver and drier.	Clogging in the piping on the high-pressure side.	Repair or replace the compressor.

REFRIGERANT LEAKAGE

Symptom	Possible cause	Remedy/Prevention
Notable dirt on the shaft seal part and low refrigerant.	Refrigerant leakage from the compressor shaft seal.	Repair or replace the compressor.
Oil contamination on fitting bolts.	Refrigerant leakage from the respective fitting.	Retighten.
Oil contamination on the gasket part.	Refrigerant leakage from each gasket.	Repair or replace the compressor.
Leakage from broken parts.	Refrigerant leakage from broken parts.	Repair or replace the compressor.

NO COMPRESSOR OPERATION

Symptom	Possible cause	Remedy/Prevention
No engagement of compressor.	Broken coil wire.	Repair or replace the compressor.
No engagement of compressor even with cooler switch ON.	Broken wire wrong wiring, defective contact of wiring-related parts (ground, fuse).	Repair or replace the compressor.
	Defective contact or operation of switches (thermostat, relay, cooler switch).	Repair or replace the compressor.
Simultaneously with switch ON, the rotor moves and there is compressor operation when it is pushed.	Too large gap between clutch pulley.	Repair or replace the compressor.

SLIPPING OCCURS

Symptom	Possible cause	Remedy/Prevention
The clutch slips at the time of rotation.	Drop of the battery voltage.	Diagnose charging system.
	Clutch surface contaminated with oil.	Remove the oil.
	Coil layer short-circuit.	Repair or replace the compressor.

RELATED TO THE EXPANSION VALVE

THE VALVE OUTLET IS NOT COLD

Symptom	Possible cause	Remedy/Prevention
No temperature difference can be felt between inlet and outlet.	Extremely little refrigerant in the refrigeration cycle.	Check for refrigerant leakage and repair if there is leakage. After repair fill the correct quantity of refrigerant.
No temperature difference can be felt between inlet and outlet.	Excessive opening of the expansion valve.	Replace the expansion valve.

THE VALVE INLET IS COLD AND THERE IS DEW ON IT

Symptom	Possible cause	Remedy/Prevention
Frost is formed.	Excessively closed expansion valve.	Adjust or replace the expansion valve.
	Clogging of the expansion valve.	Replace the desiccant cartridge in the receiver drier. (Receiver drier is part of condenser.)

ABNORMAL NOISE DURING OPERATION

Abnormal noise can occur with various operation conditions. Accordingly, careful inspection must be performed under sufficient consideration of the contents of the inquiry.

- Does the abnormal noise occur with the air conditioner OFF?
- Does the abnormal noise occur with the air conditioner ON?
- Does the noise occur sometimes, continuously, or directly after air conditioner ON?

WHEN THE AIR CONDITIONER IS ON

Symptom	Possible cause	Remedy/Prevention
Abnormal noise occurring when the refrigerant is discharged from the compressor.	Caused by refrigerant compression fluctuations.	Evacuate and recharge the system with the specified quantity of refrigerant (discharge into the atmosphere is prohibited).
Abnormal noise from the compressor.	Defective compressor.	Repair or replace the compressor.

DIRECTLY AFTER THE AIR CONDITIONER IS SWITCHED ON

Symptom	Possible cause	Remedy/Prevention
Abnormal noise occurring when the compressor is started with liquid refrigerant remaining on the inside.	Accumulation of liquid refrigerant caused by liquid compression.	Evacuate and recharge the system with the specified quantity of refrigerant (discharge into the atmosphere is prohibited).
Abnormal metallic noise when the magnet clutch disengages and engages.	Caused by disengaging and engaging of the magnet clutch.	Set the clutch gap to the lower limit value.

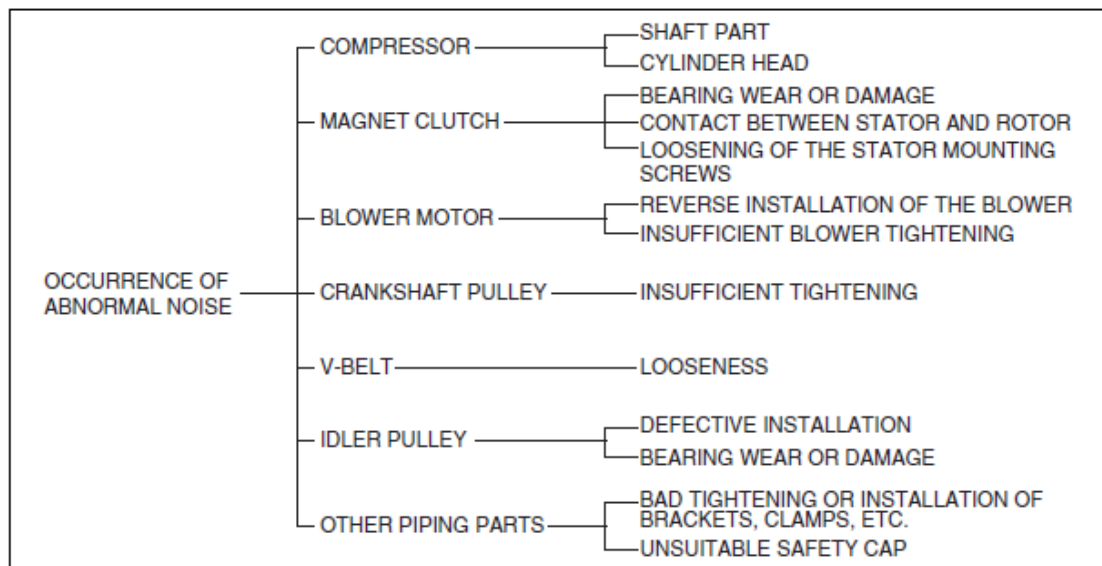
FROM TIME TO TIME AFTER THE AIR CONDITIONER IS SWITCHED ON

Symptom	Possible cause	Remedy/Prevention
An abnormal knocking noise when the clutch pulley deflection is transmitted via the shaft to the inside of the compressor.	Weak belt tension.	Adjust the belt tension to the standard upper limit value. Set the clutch gap to the lower limit value.
Abnormal noise caused by refrigerant passing through expansion valve and magnet valve.	Noise caused by passage of refrigerant through the expansion valve.	Evacuate and recharge the system with the specified quantity of refrigerant.

ONLY WHEN THE AIR CONDITIONER SWITCH IS ON

Symptom	Possible cause	Remedy/Prevention
Abnormal noise from the compressor.	Defective compressor.	Repair or replace the compressor.

ABNORMAL NOISE BY PARTS



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ABNORMAL NOISE FROM THE COMPRESSOR

Symptom	Possible cause	Remedy/Prevention
A knocking noise from inside the compressor.	Foreign matter caught in discharge valve or suction valve.	Replace the compressor.
	Broken discharge valve or suction valve.	Replace the compressor.

ABNORMAL NOISE FROM THE MAGNET CLUTCH

Symptom	Possible cause	Remedy/Prevention
A rattling noise from the magnetic clutch while it is not operating.	Bearing wear or breakage.	Repair or replace the compressor.

ABNORMAL NOISE FROM THE PIPING

Symptom	Possible cause	Remedy/Prevention
The piping is vibrating.	The piping is not fixed.	Fix the piping.

ABNORMAL NOISE FROM THE BRACKET

Symptom	Possible cause	Remedy/Prevention
The bracket has play when touched and causes noise during operation.	The bracket is cracked or broken.	Replace the bracket.
	Loose fixing bolts.	Retighten.

ABNORMAL NOISE FROM THE IDLER PULLEY

Symptom	Possible cause	Remedy/Prevention
Abnormal rattling noise.	Broken bearing.	Repair or replace the compressor.
Shows play when touched.	Cracked or loose bracket.	Replace or retighten the bracket.

ABNORMAL NOISE FROM THE V-BELT/NORMAL NOISE FROM THE CRANKSHAFT PULLEY

Symptom	Possible cause	Remedy/Prevention
Rattling.	Defective installation of the crankshaft pulley.	Install the crankshaft pulley correctly.
	Broken bearing.	Replace the bearing.
	Defective key groove.	Replace the crankshaft pulley.

ABNORMAL NOISE FROM THE V-BELT

Symptom	Possible cause	Remedy/Prevention
Large deflection of the V-belt.	Loose V-belt.	Retighten the V-belt.
Cut side of the V-belt.	The pulley is off-center.	Center the pulley.

INSPECTION OF THE REFRIGERATION CYCLE

INSPECTION WITH A GAUGE MANIFOLD

NORMAL VALUE

HIGH-PRESSURE SIDE:

1.37 - 1.57 MPa
{ 14 - 16 kgf/cm²,
200 - 227 lbf/in²}

LOW-PRESSURE SIDE:

0.15 - 0.25 MPa
{ 1.5 - 2.5 kgf/cm²,
22 - 35 lbf/in²}

< CONDITIONS >

- DOORS : FULLY OPEN
- INSIDE/OUTSIDE AIR SWITCHING : INSIDE AIR
- ENGINE SPEED : 1500 rpm
- SUCTION PORT TEMPERATURE : 30 - 35°C
{ 86.0 - 95.0°F }
- BLOWER SPEED : HI
- TEMPERATURE CONTROL : COLDEST

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POOR COOLING

Symptom	Possible cause	Remedy/Prevention
Insufficient air flow.	Frosted evaporator.	Inspect the evaporator and thermistor. Repair or replace in case of abnormalities.
Poor cooling.	Insufficient evaporator heat exchange, defective operation of the fan clutch.	Remove any clogging of the condenser fins. Inspect the electric fan and replace it in case of abnormalities.

OTHER PHENOMENA

Symptom	Possible cause	Remedy/Prevention
The low-pressure side shows a negative pressure (when the refrigeration cycle is completely clogged. In case of clogging negative pressure is shown gradually).	Clogging of the refrigeration cycle (piping, expansion valve, receiver, drier, etc.)	Replace the defector parts in the refrigeration cycle.
The low-pressure side gradually shows a negative pressure.	Entry of water into the refrigeration cycle, water absorption capacity of receiver and drier exceeded.	Replace the desiccant cartridge in the receiver drier. Fully evacuate and recharge system.
Condensation forms on the low-pressure-piping.	Excessive opening of the expansion valve.	Replace the expansion valve.
When the compressor is switched off, high pressure and low pressure show the same value (the compressor does not become very hot).	Defective compressor compression.	Replace the compressor.