

Heating, Ventilation and Air Conditioning

GENERAL

AIR CONDITIONING SYSTEM
COMPRESSOR OIL

A/C COMPRESSOR CONTROLS (MANUAL)

AIR CONDITIONING COMPRESSOR
A/C PRESSURE TRANSDUCER

GENERAL

SPECIFICATION E6C83EAE

AIR CONDITIONER

Item		Specification
Compressor	Type	6SBU16
	Oil type & Capacity	ND-OIL8 (PAG), 120 ± 10cc
	Pulley type	L5OS-TYPE
	Displacement	160cc/rev
APT (A/C pressure transducer)	The method to measure the pressure	Voltage = 0.00878835 * Pressure (psig) + 0.5

AIR CONDITIONING SYSTEM

REFRIGERANT SYSTEM SERVICE

BASICS E792BEF9

REFRIGERANT RECOVERY

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a(R-134a) from the air conditioning system.

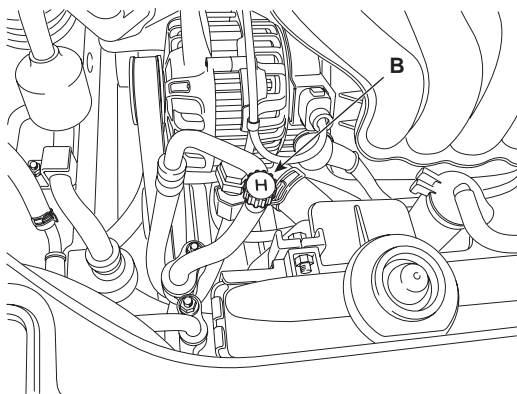
CAUTION

- *Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.*
- *Be careful when connecting service equipment.*
- *Do not breathe refrigerant or vapor.*

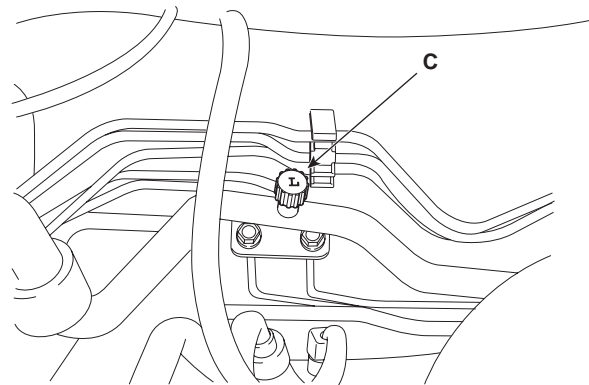
If accidental system discharge occurs, ventilate work area before resuming service.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

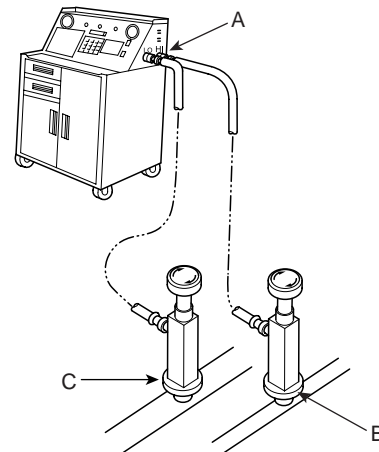
1. Connect an R-134a refrigerant Recovery/Recycling/Charging System (A) to the high-pressure service port (B) and the low-pressure service port (C) as shown, following the equipment manufacturer's instructions.



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2. Measure the amount of refrigerant oil removed from the A/C system after the recovery process is completed. Be sure to install the same amount of new refrigerant oil back into the A/C system before charging.

SYSTEM EVACUATION

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a(R-134a) from the air conditioning system.

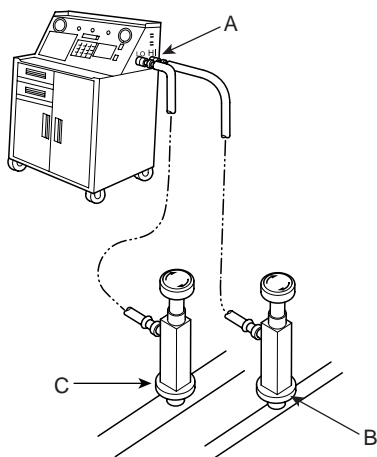
CAUTION

- **Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.**
- **Be careful when connecting service equipment.**
- **Do not breathe refrigerant or vapor.**

If accidental system discharge occurs, ventilate work area before resuming service.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using an R-134a refrigerant Recovery/Recycling/Charging System. (If the system has been open for several days, the receiver/dryer should be replaced, and the system should be evacuated for several hours.)
2. Connect an R-134a refrigerant Recovery/Recycling/Charging System (A) to the high-pressure service port (B) and the low-pressure service port (C) as shown, following the equipment manufacturer's instructions.



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3. If the low-pressure does not reach more than 93.3 kPa (700 mmHg, 27.6 in.Hg) in 10 minutes, there is probably a leak in the system. Partially charge the system, and check for leaks (see Leak Test.).
4. Remove the low pressure valve from the low-pressure service port.

SYSTEM CHARGING

Use only service equipment that is U.L.-listed and is certified to meet the requirements of SAE J2210 to remove HFC-134a(R-134a) from the air conditioning system.

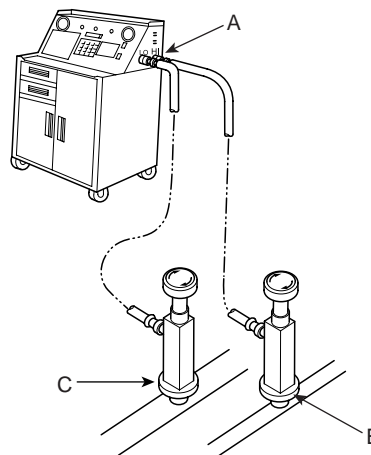
CAUTION

- **Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.**
- **Be careful when connecting service equipment.**
- **Do not breathe refrigerant or vapor.**

If accidental system discharge occurs, ventilate work area before resuming service.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect an R-134a refrigerant Recovery/ Recycling/ Charging System (A) to the high-pressure service port (B) as shown, following the equipment manufacturer's instructions.



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2. Add the same amount of new refrigerant oil to system that was removed during recovery. Use only specified refrigerant oil. Charge the system with 15.8 ± 0.88 oz. (450 ± 25g) of R-134a refrigerant. Do not overcharge the system the compressor will be damaged.

REFRIGERANT LEAK TEST

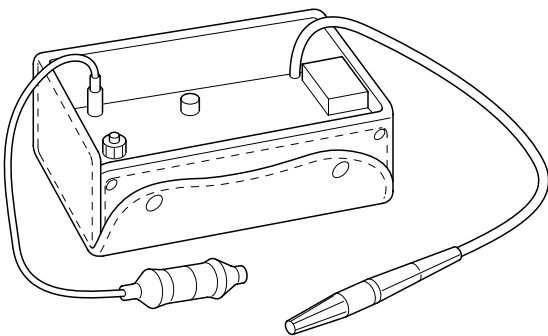
Always conduct a leak test with an electronic leak detector whenever leakage or refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening or connection fittings.

NOTE

In order to use the leak detector properly, read the manual supplied by the manufacturer.

If a gas leak is detected, proceed as follows:

1. Check the torque on the connection fittings and, if too loose, tighten to the proper torque. Check for gas leakage with a leak detector (A).
2. If leakage continues even after the fitting has been tightened, discharge the refrigerant from the system, disconnect the fittings, and check their seating faces for damage. Always replace, even if the damage is slight.
3. Check the compressor oil and add oil if required.
4. Charge the system and recheck for gas leaks. If no leaks are found, evacuate and charge the system again.



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COMPRESSOR OIL

INSPECTION EEEECEC2

OIL SPECIFICATION

1. The HFC-134a system requires synthetic (PAG) compressor oil whereas the R-12 system requires mineral compressor oil. The two oils must never be mixed.
2. Compressor (PAG) oil varies according to compressor model. Be sure to use oil specified for the model of compressor.

HANDLING OF OIL

1. The oil should be free from moisture, dust, metal powder, etc.
2. Do not mix with other oil.
3. The water content in the oil increases when exposed to the air. After use, seal oil from air immediately. (HFC-134a Compressor Oil absorbs moisture very easily.)
4. The compressor oil must be stored in steel containers, not in plastic containers.

COMPRESSOR OIL CHECK

The oil used to lubricate the compressor is circulating with the refrigerant.

Whenever replacing any component of the system or a large amount of gas leakage occurs, add oil to maintain the original amount of oil.

Oil total volume in system:
120±10cc (4.05±0.34 fl.oz)

OIL RETURN OPERATION

There is close affinity between the oil and the refrigerant. During normal operation, part of the oil recirculates with the refrigerant in the system.

When checking the amount of oil in the system, or replacing any component of the system, the compressor must be run in advance for oil return operation. The procedure is as follows :

1. Open all the doors and the engine hood.
2. Start the engine and air conditioning switch to "ON" and set the blower motor control knob at its highest position.
3. Run the compressor for more than 20 minutes between 800 and 1,000 rpm in order to operate the system.

4. Stop the engine.

REPLACEMENT OF COMPONENT PARTS

When replacing the system component parts, supply the following amount of oil to the component parts to be installed.

Component parts to be installed	Amount of Oil
Evaporator	50 cc (1.70 fl.oz)
Condenser	30 cc (1.02 fl.oz)
Receiver/dryer	30 cc (1.02 fl.oz)
Refrigerant line(One piece)	10 cc (0.34 fl.oz)

For compressor replacement, subtract the volume of oil drained from the removed compressor from the specified volume, and drain the calculated volume of oil from the new compressor :

The specified volume - volume of removed compressor = volume to drain from the new compressor.

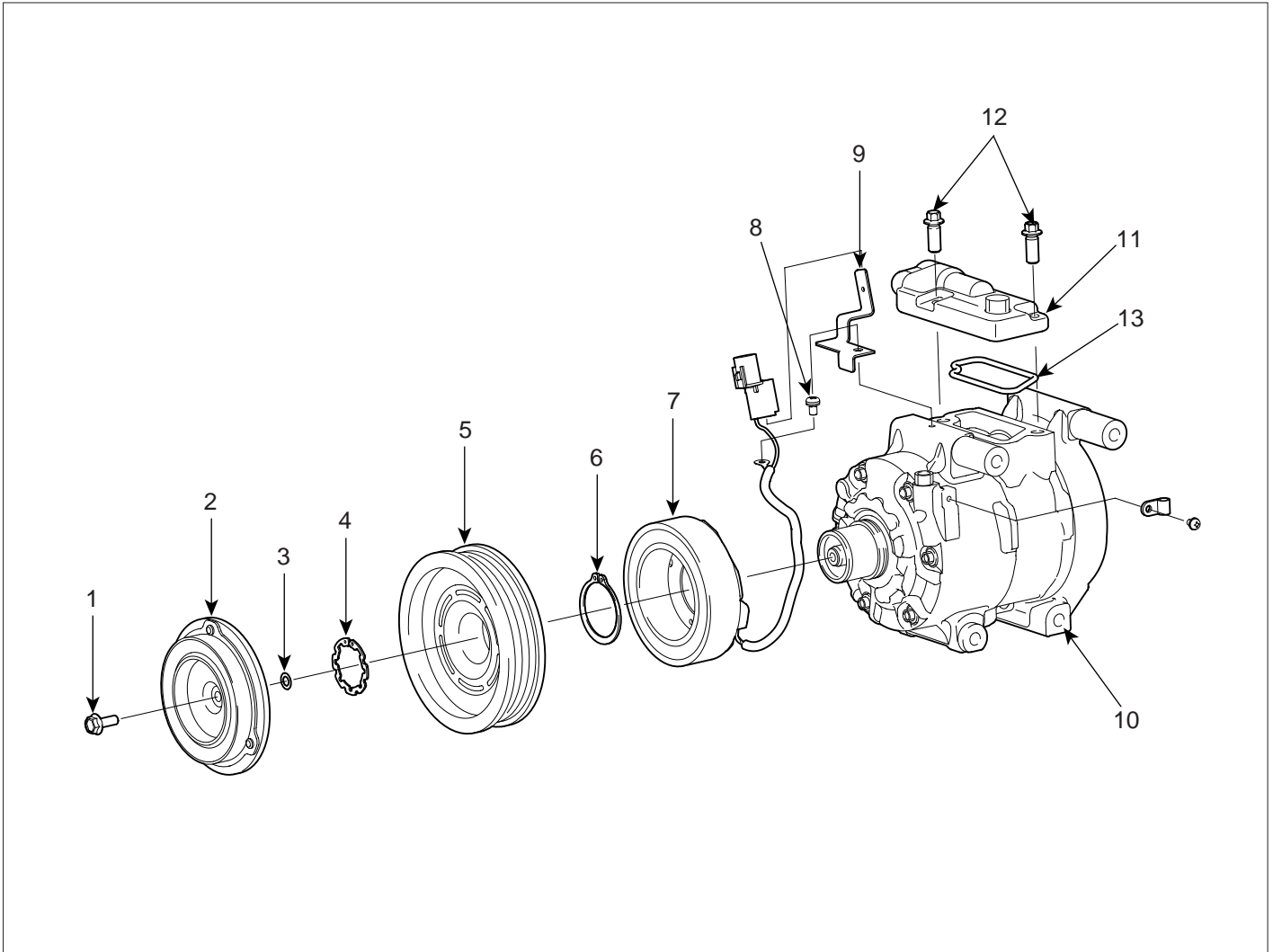
NOTE

Even if no oil is drained from the removed compressor, don't drain more than 50cc from new compressor.

A/C COMPRESSOR CONTROLS (MANUAL)

AIR CONDITIONING COMPRESSOR

COMPONENTS E2A3FF13



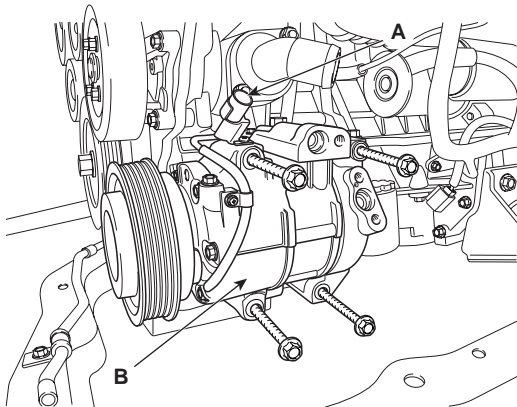
- | | |
|-------------------------------|-------------------------|
| 1. Bolt | 8. Screw |
| 2. Disc & hub assembly | 9. Connector bracket |
| 3. Shim (Gap washer) | 10. Compressor assembly |
| 4. Retainer ring (Pulley) | 11. Manifold |
| 5. Pulley | 12. Bolt wrench |
| 6. Retainer ring (Field coil) | 13. Gasket |
| 7. Field coil | |

HA -8

HEATING, VENTILATION AND AIR CONDITIONING

REMOVAL E9DB81D4

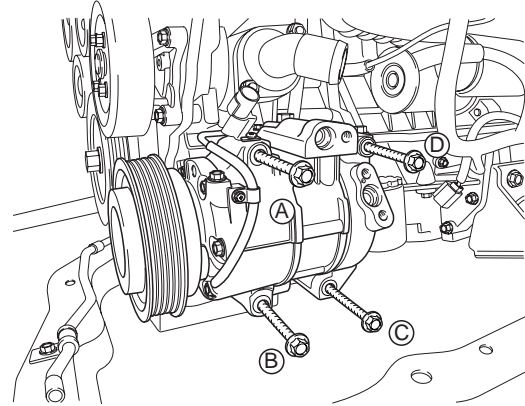
1. If the compressor is marginally operable, run the engine at idle speed, and let the air conditioning work for a few minutes, then shut the engine off.
2. Disconnect the negative cable from the battery.
3. Recover the refrigerant with a recovery/charging station (Refer to HA-8).
4. Loosen the drive belt (Refer to HA-14).
5. Remove the bolts, then disconnect the suction line and discharge line from the compressor. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.
6. Disconnect the compressor clutch connector (A), and then remove 4 mounting bolts and the compressor.



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INSTALLATION EC1FAEBF

1. Make sure of the length of compressor mounting bolts, and then tighten it A B C D order.



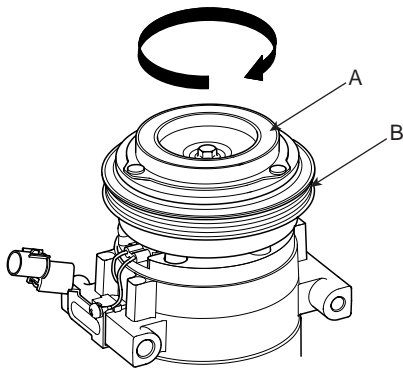
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Tightening torque : 2.0 ~ 2.5 kgf.m
(19.6 ~ 24.5 N.m, 14.5 ~ 18.1 lbf.ft)

2. Install in the reverse order of removal, and note these items.
 - If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure its volume, Subtract the volume of drained oil from 120cc(4.20 oz.) the result is the amount of oil you should drain from the new compressor (through the suction fitting).
 - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for R-134a to avoid leakage.
 - To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
 - Immediately after using the oil, replace the cap on the container and seal it to avoid moisture absorption.
 - Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
 - Adjust the drive belt (Refer to HA-14)
 - Charge the system and test its performance. (Refer to HA-9)

INSPECTION ED1322D3

1. Check the plated parts of the disc & hub assembly (A) for color changes, peeling or other damage. If there is damage, replace the clutch set.
2. Check the pulley (B) bearing play and drag by rotating the pulley by hand.
Replace the clutch set with a new one if it is noisy or has excessive play/drag.



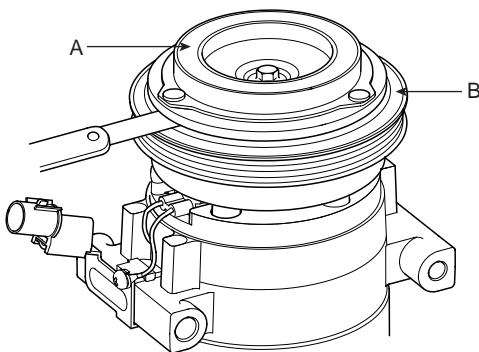
AQJF106A

3. Measure the clearance between the pulley (B) and the disc & hub assembly (A) all the way around. If the clearance is not within specified limits, remove the disc & hub assembly and add or remove shim (gap washer) as needed to increase or decrease clearance.

Clearance: $0.45 \pm 0.1\text{mm}$ (0.018 ± 0.004 in.)

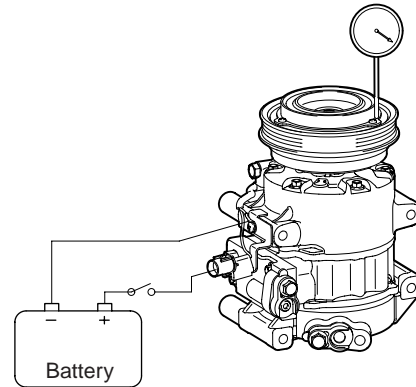
NOTE

The shims (gap washers) are available in seven thicknesses: 0.7mm, 0.8mm, 0.9mm, 1.0mm, 1.1mm, 1.2mm and 1.3mm.



AQJF106B

4. Check operation of the magnetic clutch.
Connect the compressor side terminals to the battery (+) terminal and the ground battery (-) terminal to the compressor body.
Check the magnetic clutch operating noise to determine the condition.

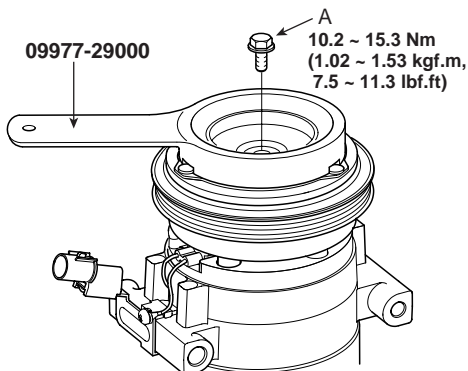


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DISASSEMBLY E0FD4FEB

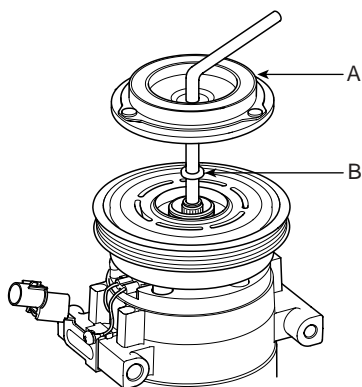
1. Remove the center bolt (A) while holding the disc & hub assembly with a commercially available disc & hub assembly bolt remover; Special tool number 09977-29000.

TORQUE: 10~15N.m (1.02~1.53kgf.m, 7.37~11lbf.ft)



AQJF106D

2. Remove the disc & hub assembly (A) and shim (gap washer) (B), taking care not to lose the shims. If the clutch needs adjustment, increase or decrease the number and thickness of shims as necessary, then reinstall the disc & hub assembly, and recheck its clearance (Refer to HA-19).

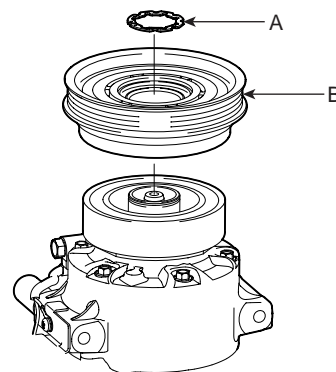


AQJF106E

3. If you removal the field coil, remove retainer ring (A) with retainer ring pliers.

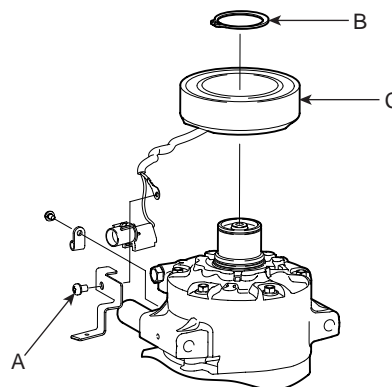
NOTE

- Be careful not to damage the pulley (B) and compressor during removal/installation.
- Once retainer ring (A) is removed, replace it with a new one.



AQJF106F

4. Remove the screw (A) from the field coil ground terminal. Remove the retainer ring (B) and then remove the field coil (C) from the shaft with a puller. Be careful not to damage the coil and compressor.



AQJF106G

5. Reassemble the compressor clutch in the reverse order of disassembly, and note these items :
 - Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
 - Install new retainer rings, and make sure they are fully seated in the groove.
 - Make sure that the pulley turns smoothly after its reassembled.

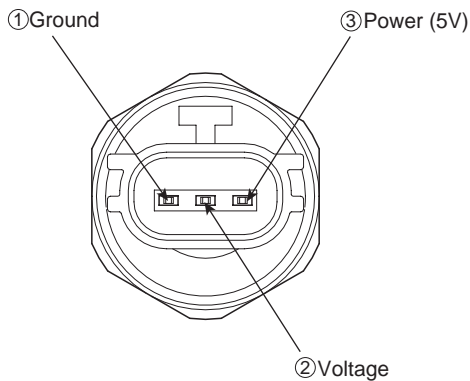
A/C PRESSURE TRANSDUCER

DESCRIPTION E4E5AA1B

A/C pressure transducer convert the pressure value of high pressure line into voltage value after measure it. By converted voltage value, engine ECU controls cooling fan by operating it high speed or low speed. Engine ECU stop the operation of compressor when the temperature of refrigerant line is so high or so low irregularly to optimize air conditioning system.

INSPECTION EAFD16EA

1. Measure the pressure of high pressure line by measuring voltage output between NO.1 and NO.2 terminals.



EQRE116B

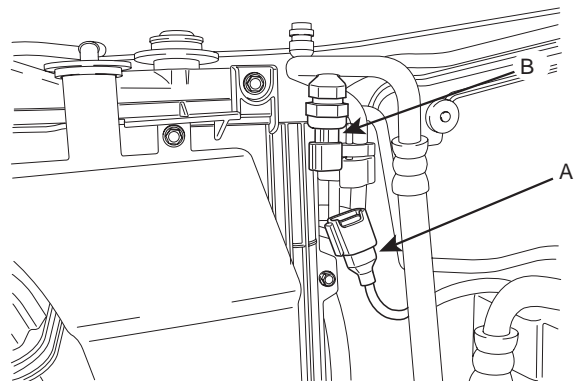
2. Inspect the voltage value whether it is sufficient to be regular value or not.

$$\text{Voltage} = 0.125 * \text{Pressure} + 0.5 \text{ [kgf/cm}^2\text{]}$$
$$\text{Voltage} = 0.00878835 * \text{Pressure} + 0.37081095 \text{ [PSIA]}$$

3. If the measured voltage value is not specification, replace the A/C pressure transducer.

REPLACEMENT ED321F46

1. Disconnect the negative (-) battery terminal.
2. Recover the refrigerant with a recovery/charging station.
3. Disconnect A/C pressure transducer connector (A) and then remove the A/C pressure transducer (B).



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⊗ WARNING

Take care that liquid & suction pipe are not bent.

4. InsInstallation is the reverse order of removal.

TORQUE: 10~12N.m (1.0~1.2kgf.m, 7.4~8.8lbf.ft)
