

SECTION 412-01 Climate Control

CONTENTS	PAGE
DESCRIPTION AND OPERATION	
Air Conditioning	412-01-2

DESCRIPTION AND OPERATION

Air Conditioning

The air conditioning system components are:

- A/C compressor
- A/C condenser core
- A/C evaporator core
- Suction accumulator
- Connecting refrigerant lines
- Evaporator core orifice
- A/C cycling switch
- A/C pressure transducer (4.0L)
- Dual-function pressure switch (4.6L)
- A/C compressor pressure relief valve

The refrigerant system incorporates an A/C compressor controlled by the powertrain control module (PCM) through an A/C clutch relay.

The A/C compressor clutch will only be engaged by the PCM if all of the following conditions are met:

- The climate control assembly is set to a mode which provides an A/C request to the PCM.
- The A/C cycling switch is not open due to excessively low suction pressure in the low-pressure side of the refrigerant system.
- The A/C pressure transducer is not reading excessively high discharge pressure in the high-pressure side of the refrigerant system (4.0L).
- The dual-function pressure switch is not open due to excessively high discharge pressure in the high-pressure side of the refrigerant system (4.6L).
- The A/C compressor relay is switched to the closed position by the PCM.
- The engine coolant temperature is not excessively high.
- The PCM has not detected a wide open throttle (WOT) condition.

For additional information concerning operating specifications, refer to Section 412-00.

An A/C compressor pressure relief valve is installed in the compressor manifold and tube assembly to protect the refrigerant system against excessively high refrigerant pressures.

Refrigerant flow into the evaporator core is metered by an evaporator core orifice tube.

For additional information concerning the refrigerant cycle and principles of A/C operation, refer to Section 412-00.

A/C Compressor and Clutch Assembly

NOTE:

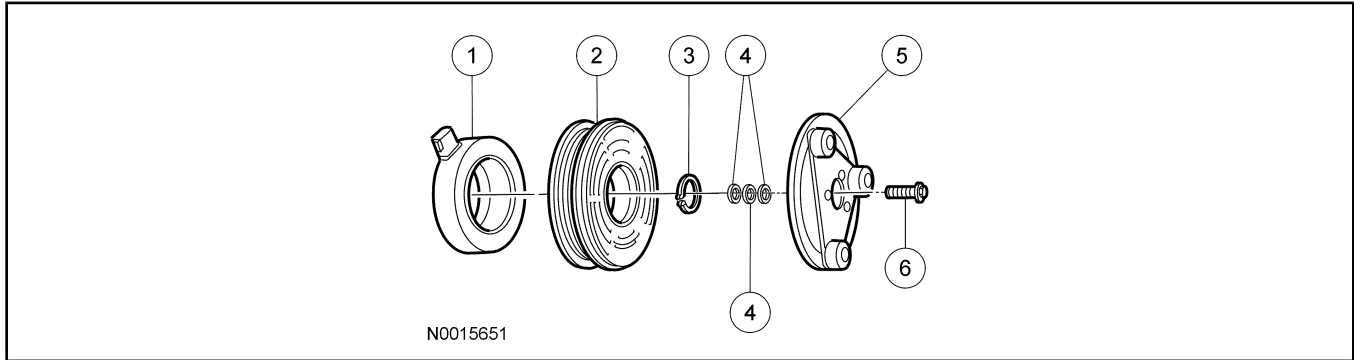
Internal A/C compressor components are not repaired separately. The Visteon FS-10 A/C compressor is repaired only as an assembly. The A/C clutch disc and hub, A/C clutch pulley, A/C clutch field coil and the shaft seal are repairable.

NOTE:

Installation of a new suction accumulator is not required when repairing the air conditioning system except when there is physical evidence of system contamination from a failed A/C compressor or damage to the suction accumulator.

The Visteon FS-10 A/C compressor has the following characteristics:

- A 10-cylinder swashplate design utilizing the tangential design mount.
- A one-piece lip-type seal (installed from the front of the A/C compressor) is used to seal it at the shaft opening in the assembly.
- Five double-acting pistons operate within the cylinder assembly. The pistons are actuated by a swashplate that changes the rotating action of the shaft to a reciprocating force.
- Reed-type discharge valves are located between the cylinder assembly and the head at each end of the A/C compressor.
- The A/C compressor uses PAG oil or equivalent. This oil contains special additives required for the A/C compressor.
- The A/C compressor oil from vehicles equipped with a Visteon FS-10 A/C compressor may have a dark color while maintaining a normal oil viscosity. This is normal for this A/C compressor because carbon from the piston rings will discolor the oil.

DESCRIPTION AND OPERATION (Continued)**A/C Compressor Clutch Assembly**

Item	Part Number	Description
1	19D798	A/C clutch field coil
2	19D784	A/C clutch pulley
3	—	Pulley snap ring
4	19D648	A/C clutch hub spacer
5	19D786	A/C clutch disc and hub
6	—	A/C clutch bolt

The magnetic A/C clutch has the following characteristics:

- The A/C clutch drives the compressor shaft.
- When battery positive voltage (B+) is applied to the A/C clutch field coil, the clutch plate and hub assembly is drawn toward the A/C clutch pulley.
- The magnetic force locks the clutch plate and hub assembly and the A/C clutch pulley together as one unit, causing the compressor shaft to rotate.
- When B+ is removed from the A/C clutch field coil, springs in the clutch plate and hub assembly move the clutch plate away from the A/C clutch pulley.

Evaporator Core Orifice

The evaporator core orifice is located in the evaporator inlet line at the condenser-to-evaporator line fitting. The evaporator core orifice provides a restriction to the flow of refrigerant from the high-pressure side of the refrigerant system, and separates the low-pressure and high-pressure sides of the refrigerant system.

A/C Cycling Switch**NOTE:**

It is not necessary to recover the refrigerant before removing the A/C cycling switch.

The A/C cycling switch (ACCS) is used to prevent icing of the evaporator core by cycling OFF the A/C compressor clutch when the suction pressure in the low-pressure side of the refrigerant system drops below acceptable levels. The PCM monitors the A/C cycling switch (and dual-function pressure switch on 4.6L vehicles) through the ACCS circuit. When the ACCS circuit is open, the PCM will disengage the A/C compressor clutch. For specifications regarding operating pressure(s), refer to Section 412-00.

A/C Pressure Transducer (4.0L)**NOTE:**

It is not necessary to recover the refrigerant before removing the A/C pressure transducer.

The A/C pressure transducer is used by the PCM to monitor the discharge pressure in the high-pressure side of the refrigerant system. The PCM monitors the A/C pressure transducer through the ACP circuit. When the A/C pressure transducer is reading a discharge pressure above acceptable levels, the PCM will disengage the A/C compressor clutch.

Dual-Function Pressure Switch (4.6L)**NOTE:**

It is not necessary to recover the refrigerant before removing the dual-function pressure switch.

The dual-function pressure switch includes 2 separate sets of contacts that are opened at 2 different pressures.

The first set of contacts in the dual-function pressure switch is used to interrupt A/C compressor operation in the event of excessively high discharge pressure in the high-pressure side of the refrigerant system. The PCM monitors the first set of contacts in the dual-function pressure switch (and A/C cycling switch) through the ACCS circuit. When the ACCS circuit is open, the PCM will disengage the A/C compressor clutch.

DESCRIPTION AND OPERATION (Continued)

The second set of contacts in the dual-function pressure switch is used by the PCM to engage the high speed cooling fan. The PCM monitors the second set of contacts through the ACP circuit. When the A/C pressure rises above a preset level, the second set of contacts will close and the high-speed cooling fan will be engaged.

For specifications regarding operating pressure(s), refer to Section 412-00.

Condenser Core

NOTE:

Installation of a new suction accumulator is not required when repairing the air conditioning system except when there is physical evidence of system contamination from a failed A/C compressor or damage to the suction accumulator.

The condenser is an aluminum fin and tube design heat exchanger, located in front of the vehicle radiator. It cools compressed refrigerant gas by allowing air to pass over fins and tubes to extract heat, and by condensing gas to liquid refrigerant as it is cooled.

Evaporator Core

NOTE:

Installation of a new suction accumulator is not required when repairing the air conditioning system except when there is physical evidence of system contamination from a failed A/C compressor or damage to the suction accumulator.

The evaporator core is an aluminum plate/fin type and is located in the plenum chamber. A mixture of refrigerant and oil enters the bottom of the evaporator core through the evaporator core inlet tube and then moves out of the evaporator core through the evaporator core outlet tube. Air from the blower motor is cooled and dehumidified as it flows through the evaporator core fins.

Suction Accumulator

NOTE:

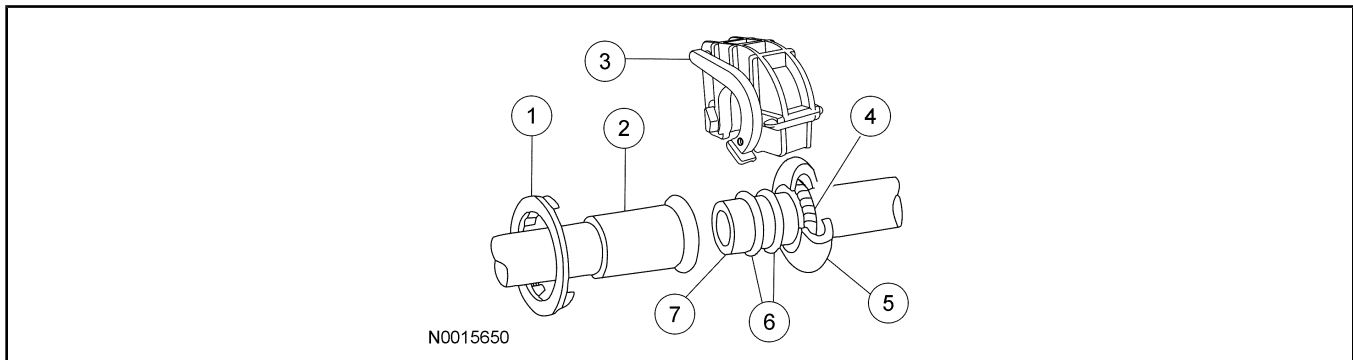
Installation of a new suction accumulator is not required when repairing the refrigerant system except when there is physical evidence of contamination from a failed A/C compressor or damage to the suction accumulator.

The suction accumulator is located at the LH rear of the engine compartment. The suction accumulator is used to prevent residual liquid refrigerant from reaching the A/C compressor after leaving the evaporator core. The suction accumulator allows the accumulated heavier liquid refrigerant and oil mixture to re-enter the compressor suction line at a controlled rate. A desiccant bag is mounted inside the canister to absorb any moisture which may be in the refrigerant system.

A/C Compressor Pressure Relief Valve

An A/C compressor pressure relief valve is incorporated in the compressor manifold and tube assembly to prevent damage to the A/C compressor and other system components, and to avoid total refrigerant loss by relieving unusually high refrigerant system discharge pressure buildups. For specifications regarding operating pressure(s), refer to Section 412-00.

Spring Lock Coupling



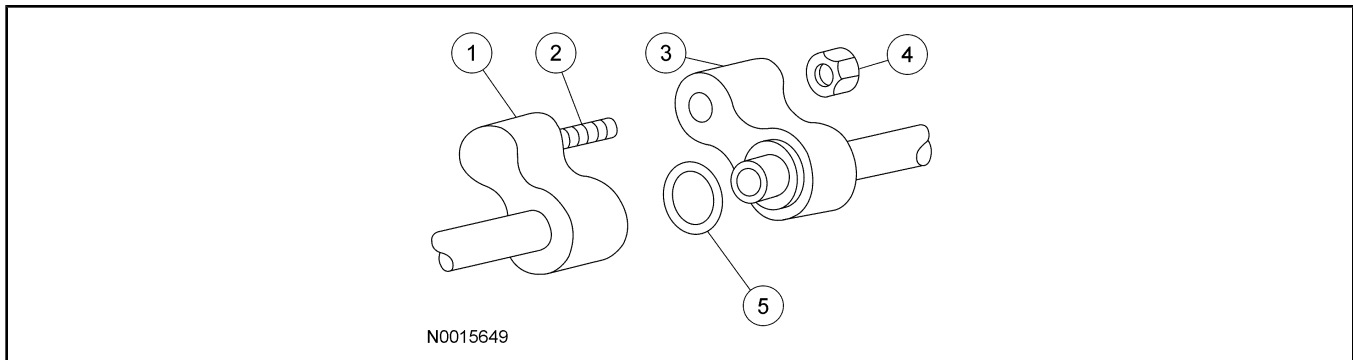
Item	Part Number	Description
1	—	Plastic indicator ring
2	—	Female fitting
3	19E746	A/C tube lock coupling clip
4	19E576	A/C tube lock coupling spring
5	—	Cage
6	19E889	O-ring seals

DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
7	—	Male fitting

The spring lock coupling is a refrigerant line coupling held together by a garter spring inside a circular cage.

- When the coupling is connected together, the flared end of the female fitting slips behind the garter spring inside the cage of the male fitting.
- The garter spring and cage then prevent the flared end of the female fitting from pulling out of the cage.
- Three O-ring seals are used to seal between the 2 halves of the coupling.
- Use only the O-ring seals listed in the Ford Master Parts Catalog for the spring lock coupling.
- A plastic indicator ring is used on the spring lock couplings of the A/C evaporator core to indicate, during vehicle assembly, that the coupling is connected. Once the coupling is connected, the indicator ring is no longer necessary but will remain captive by the coupling near the cage opening.
- The indicator ring may also be used during service operations to indicate connection of the coupling.
- An A/C tube lock coupling clip may be used to secure the coupling.

Peanut Fitting

Item	Part Number	Description
1	—	Female block
2	—	Stud (part of female block)
3	—	Male block
4	W520413-S301	Nut
5	19E889	O-ring seal

When disconnecting or connecting peanut fittings, observe the following.

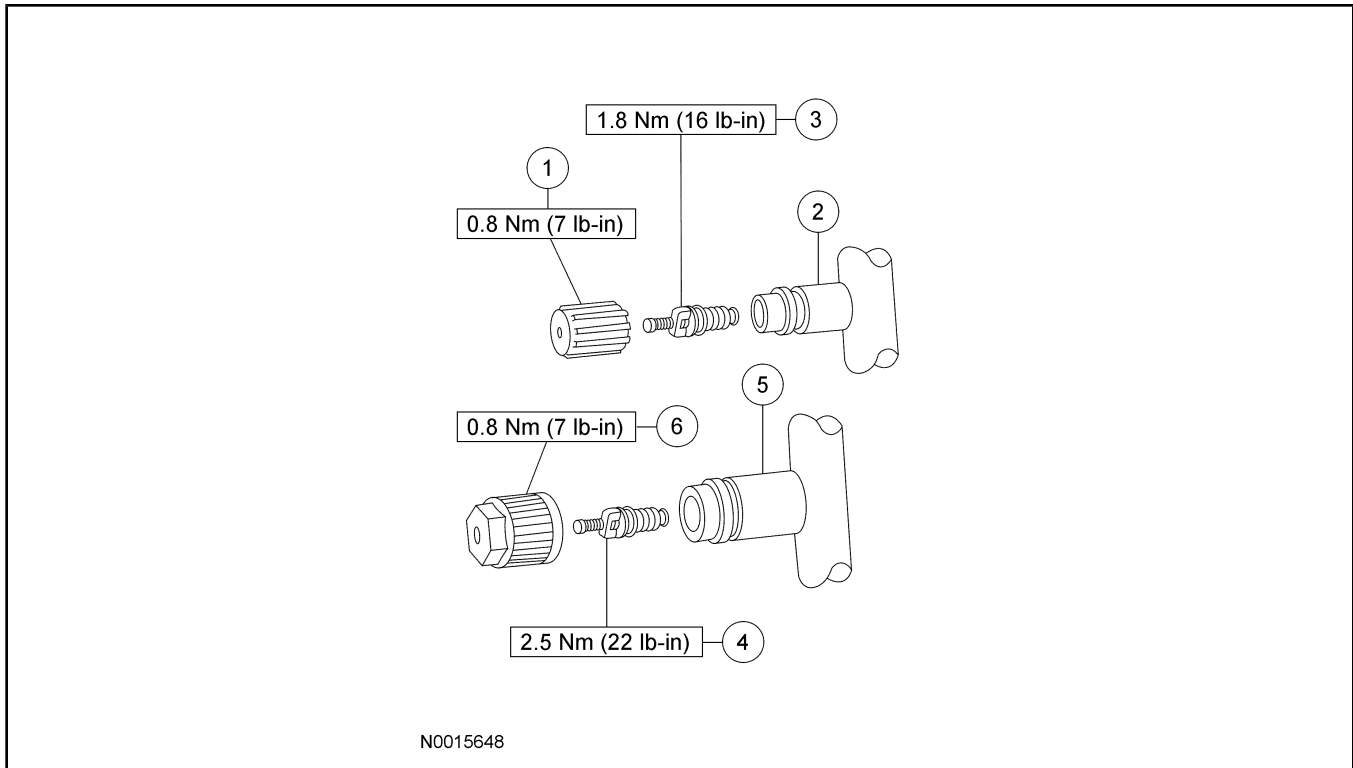
- The male and female blocks of the peanut fitting are retained with a nut.
- Support the female fitting with a wrench to prevent twisting of the tubes.
- An O-ring seal is installed around the tube on the male block.
- When correctly assembled, the male and female fittings should be flush.
- Use only the O-ring seal listed in the Ford Master Parts Catalog.

Service Gauge Port Valves

The high-pressure service gauge port valve is located on the compressor manifold and tube assembly near the condenser fitting.

The low-pressure service gauge port valve is located on the evaporator-to-suction accumulator line near the evaporator fitting.

DESCRIPTION AND OPERATION (Continued)



Item	Part Number	Description
1	19D702	Low-pressure service gauge port valve cap
2	—	Low-pressure service gauge port valve
3	19D701	Low-pressure Schrader-type valve
4	19D701	High-pressure Schrader-type valve
5	—	High-pressure service gauge port valve
6	19D702	High-pressure service gauge port valve cap

The fitting is an integral part of the refrigeration line or component.

- Special couplings are required for both the high-side and low-side service gauge ports.
- A very small amount of leakage will always be detectable around the Schrader-type valve with the service gauge port valve cap removed, and is considered normal. A new Schrader-type valve core can be installed if the seal leaks excessively.
- The service gauge port valve caps are used as primary seals in the refrigerant system to prevent leakage through the Schrader-type valves from reaching the atmosphere. Always install and tighten the A/C service gauge port valve caps to the correct torque after they are removed.

Refrigerant System Dye

Fluorescent refrigerant system dye is added to the refrigerant system at the factory to assist in refrigerant system leak diagnosis using a Rotunda-approved ultraviolet blacklight. It is not necessary to add additional dye to the refrigerant system before diagnosing leaks, even if a significant amount of refrigerant has been removed from the system. New suction accumulators are shipped with a fluorescent dye "wafer" included in the desiccant bag which will dissolve after approximately 30 minutes of continued A/C operation. It is not necessary to add dye after flushing or filtering the refrigerant system because a new suction accumulator is installed as part of the flushing or filtering procedure. Additional refrigerant system dye should only be added if more than 50% of the refrigerant system lubricant capacity has been lost due to a fitting separation, hose rupture or other damage. For additional information, refer to Section 412-00.