

## Air Conditioning

The A/C 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 and 5.4L)
- A/C compressor pressure relief valve

The refrigerant system incorporates an A/C compressor controlled by the 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 HVAC module 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 and 5.4L).
- 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 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 (4.0L vehicles) or the A/C compressor (4.6L or 5.4L vehicles) 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 information concerning the refrigerant cycle and principles of A/C operation, refer to [Section 412-00](#).

### A/C Compressor and Clutch Assembly

**NOTE:** Internal FS18 A/C compressor components are not serviced separately. The A/C compressor is serviced only as an assembly. The clutch disc and hub, A/C compressor pulley and bearing and clutch field coil are serviceable.

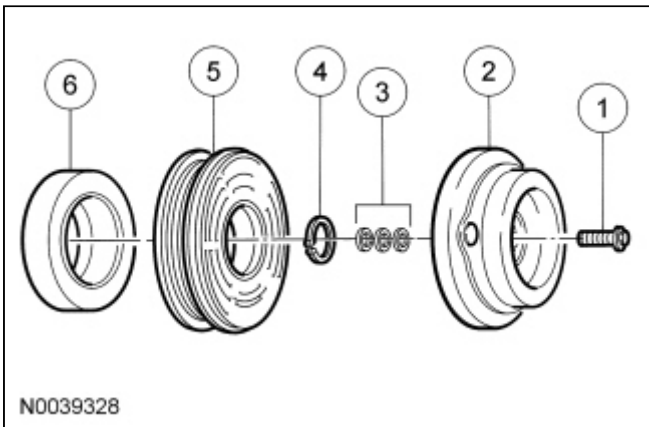
The FS18 A/C compressor:

- uses a non-serviceable shaft seal.
- has a pressure relief valve installed in the rear of the compressor on 4.6L and 5.4L vehicles to protect the refrigerant system against excessively high refrigerant pressures.
- uses PAG oil or equivalent. This oil contains special additives required for the A/C compressor.
  - PAG oil may have some slightly dark-colored streaks while maintaining normal oil viscosity. This is

normal for this A/C compressor because of break-in wear that can discolor the oil.

Use standard oil matching procedures when installing new compressors.

### A/C Compressor Clutch Assembly



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

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 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 and 5.4L vehicles) through the A/C cycling switch circuit. When the 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. 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 and 5.4L)**

**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 in series with the A/C cycling switch. When the circuit is open, the PCM will disengage the A/C compressor clutch.

The second set of contacts in the dual-function pressure switch is used by the PCM to engage the high speed cooling fan. 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**

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:** The evaporator core is not individually serviced. It is serviced only with the heater core and evaporator core housing.

The evaporator core is an aluminum plate/fin type and is located in the heater core and evaporator core housing. 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 A/C system, except when there is physical evidence of contamination from a failed A/C compressor or damage to the suction accumulator. Damage to the suction accumulator includes leaks in the suction accumulator, physical damage to the suction accumulator shell or desiccant, or moisture contamination. Moisture contamination results only from a complete loss of refrigerant and equalization of the refrigerant system pressure with atmospheric pressure for a period longer than one hour. If even a slight amount of positive refrigerant pressure is present in the system before repairs are carried out, the suction accumulator should not be replaced.

The suction accumulator is located at the LH rear of the engine compartment and 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.

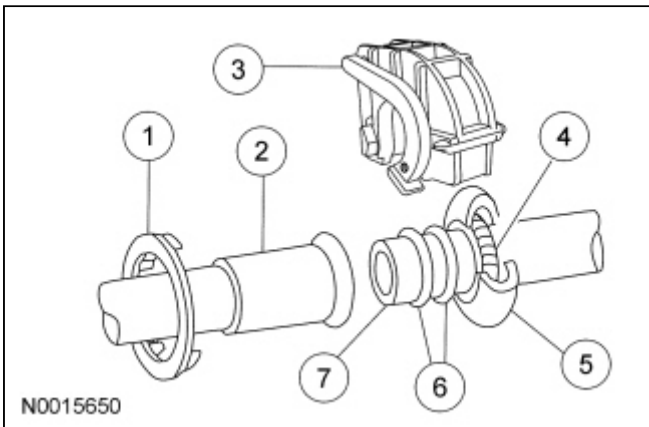
### A/C Compressor Pressure Relief Valve

**NOTE:** If the A/C compressor is operating within limits and the A/C pressure relief valve is venting, or if the A/C pressure relief valve is leaking around the threads, install a new A/C pressure relief valve and O-ring. If the A/C pressure relief valve still vents after it is replaced, diagnose the refrigerant system for a restriction.

An A/C compressor pressure relief valve is incorporated in the compressor manifold and tube assembly (4.0L) or the A/C compressor (4.6L or 5.4L) 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](#).

The A/C pressure relief valve is a separate component and can be replaced separately from the A/C compressor or compressor manifold and tube assembly. It is necessary to recover the refrigerant before removing the A/C pressure relief valve.

### 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
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

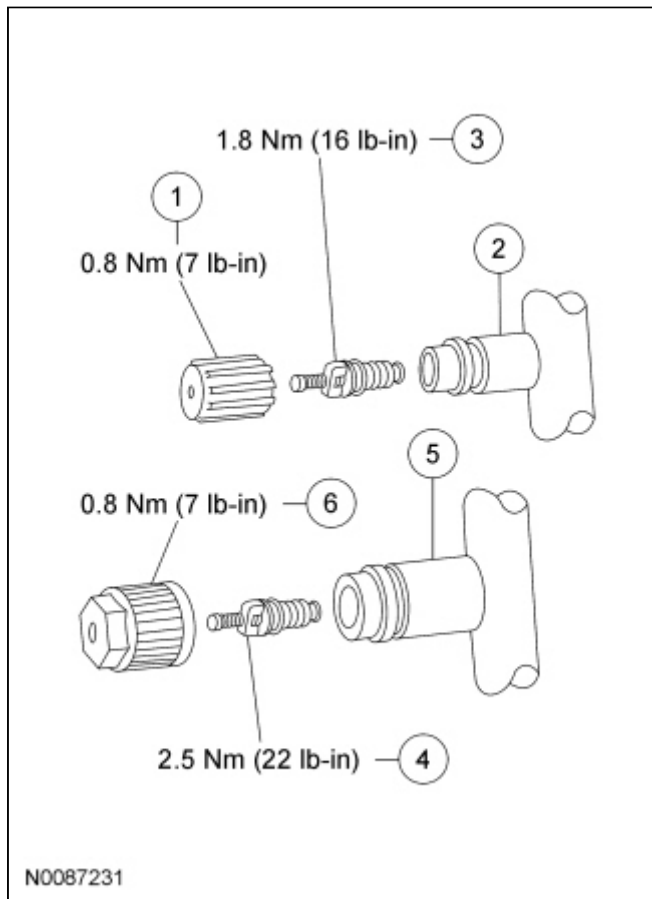
When disconnecting or connecting peanut fittings, observe the following.

- 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.
- On 4.6L and 5.4L vehicles, a gasket seal is installed along with the O-ring seal at the A/C compressor fittings.
- When correctly assembled, the male and female fittings should be flush.
- Use only the seals listed in the Ford Master Parts Catalog.

## Service Gauge Port Valves

The high-pressure service gauge port valve is located on the condenser-to-evaporator line.

The low-pressure service gauge port valve is located on the suction accumulator.



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 refrigerant system 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. Refer to [Section 412-00](#).

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