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2015 Jeep Cherokee Service and Repair Manual

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YOUR CURRENT VEHICLE

R-1234YF Refrigerant System Charge

R-1234YF REFRIGERANT SYSTEM CHARGE

WARNING

Review the warnings and cautions for this system before performing the procedure. Failure to follow these instructions may result in serious or fatal injury.

NOTE

The Underhood HVAC Specification Label contains the refrigerant fill specification of the vehicle being serviced.

After all refrigerant system leaks have been repaired and the refrigerant system has been evacuated, a refrigerant charge can be injected in the system (Refer to Heating and Air Conditioning/Standard Procedure).

When charging the A/C system, use an R-1234yf refrigerant recovery/recycling/charging station that meets SAE standard J2843. In accordance with SAE standard J2843, refrigerant recovery stations must charge the system

of contaminating the refrigerant system (Refer to Heating and Air Conditioning/Standard Procedure).

R-1234YF EVACUATION PROCEDURE

WARNING

Review the safety precautions and warnings in this group before performing this procedure. Failure to follow these instructions may result in serious or fatal injury.

CAUTION

A small amount of refrigerant oil is removed from the A/C system each time the refrigerant system is recovered and evacuated. Before charging the A/C system, you MUST replenish any oil lost during the recovery process. See the equipment manufacturer instructions for more information.

1. Recover the refrigerant system (Refer to Heating and Air Conditioning/Standard Procedure).

   NOTE

   When connecting service equipment couplers to refrigerant line service ports, verify that the valve of each coupler is fully closed prior to connecting. This will reduce the amount of effort required to make the connections.

2. Connect an R-1234yf refrigerant recovery/recycling/charging station with a vacuum pump that meets SAE standard J2843 to the refrigerant system, or an R-1234yf compatible manifold gauge set and a stand alone vacuum pump (depending on available equipment).
3. Open the refrigerant recovery/recycling/charging station or manifold gauge set valves and start the vacuum pump. The vacuum pump should run a minimum of 45 minutes prior to recharge to eliminate all moisture in system. When the low-side gauge reads to the lowest degree of vacuum possible (approximately -88 kPa (-26 in. Hg or greater) for 30 minutes, close all valves and turn off vacuum pump. If the refrigerant system fails to reach specified vacuum, the refrigerant system likely has a leak that must be corrected. If the refrigerant system maintains specified vacuum for at least 30 minutes, start the vacuum pump, open the valves and allow the refrigerant system to evacuate an additional 10 minutes.
4. Close the refrigerant recovery/recycling/charging station or manifold gauge set valves. Turn off and disconnect the vacuum pump.
5. Disconnect the refrigerant recovery/recycling/charging station or manifold gauge set from the refrigerant system service ports.
6. Install the caps to the refrigerant system service ports.

Refrigerant Oil Capacity

REFRIGERANT OIL CAPACITY

When an A/C system is assembled at the factory, all components except the A/C compressor are refrigerant oil free. After the refrigerant system has been charged and operated, the refrigerant oil in the A/C compressor is dispersed throughout the refrigerant system. The A/C compressor, A/C condenser, A/C evaporator and A/C receiver/drier will each retain a significant amount of the needed refrigerant oil.

It is important to have the correct amount of refrigerant oil in the A/C system. This ensures proper lubrication of the A/C compressor. Too little oil will result in damage to the A/C compressor, while too much oil will reduce the cooling capacity of the A/C system and consequently result in higher discharge air temperatures.

NOTE

Most reclaim/recycling equipment will measure the lubricant being removed during recovery. This amount of lubricant should be added back into the system. See the reclaim/recycling equipment manufacturers instructions.

It will not be necessary to check the oil level in the A/C compressor or to add oil, unless there has been an oil loss. An oil loss may occur due to a rupture or leak from a refrigerant line, a connector fitting, a component, or a component seal. If a leak occurs, add 30 milliliters (1.0 fluid ounce) of refrigerant oil to the refrigerant system after the repair has been made. Refrigerant oil loss will be evident at the leak point by the presence of a wet, shiny surface around the leak.

Refrigerant oil must be added when an A/C compressor, A/C condenser or an A/C evaporator is replaced, (Refer to Vehicle Quick Reference/Capacities and Recommended Fluids/Specifications).

The refrigerant oil level in a new A/C compressor must first be adjusted prior to compressor installation (refer to A/C Compressor Oil Drain Procedure).

The 1234yf oil levels can be adjusted through the use of an approved oil injection syringe (available through Mopar Service Equipment). Fill the syringe with the correct amount of the correct oil per the adjustment chart. With the system charged, connect the syringe tool to the vehicles' low pressure port. With the engine running at idle and the A/C on, set the blower speed to low. Slowly open the valve on the injector while observing the oil being drawn into the system. Once the oil is injected, close the valve, disconnect from the vehicle.

Torque Specifications

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS - HVAC

DESCRIPTION	SPECIFICATION	COMMENT
PHEV A/C Compressor Blocker Bracket to PHEV A/C Compressor Bolts	**20 N·m (15 Ft. Lbs.)**	–
PHEV A/C Compressor Blocker Bracket to PHEV A/C Compressor Nut	**28 N·m (21 ft. Lbs.)**	–
PHEV A/C Compressor Bracket to Engine Bolts	**28 N·m (21 ft. Lbs.)**	–

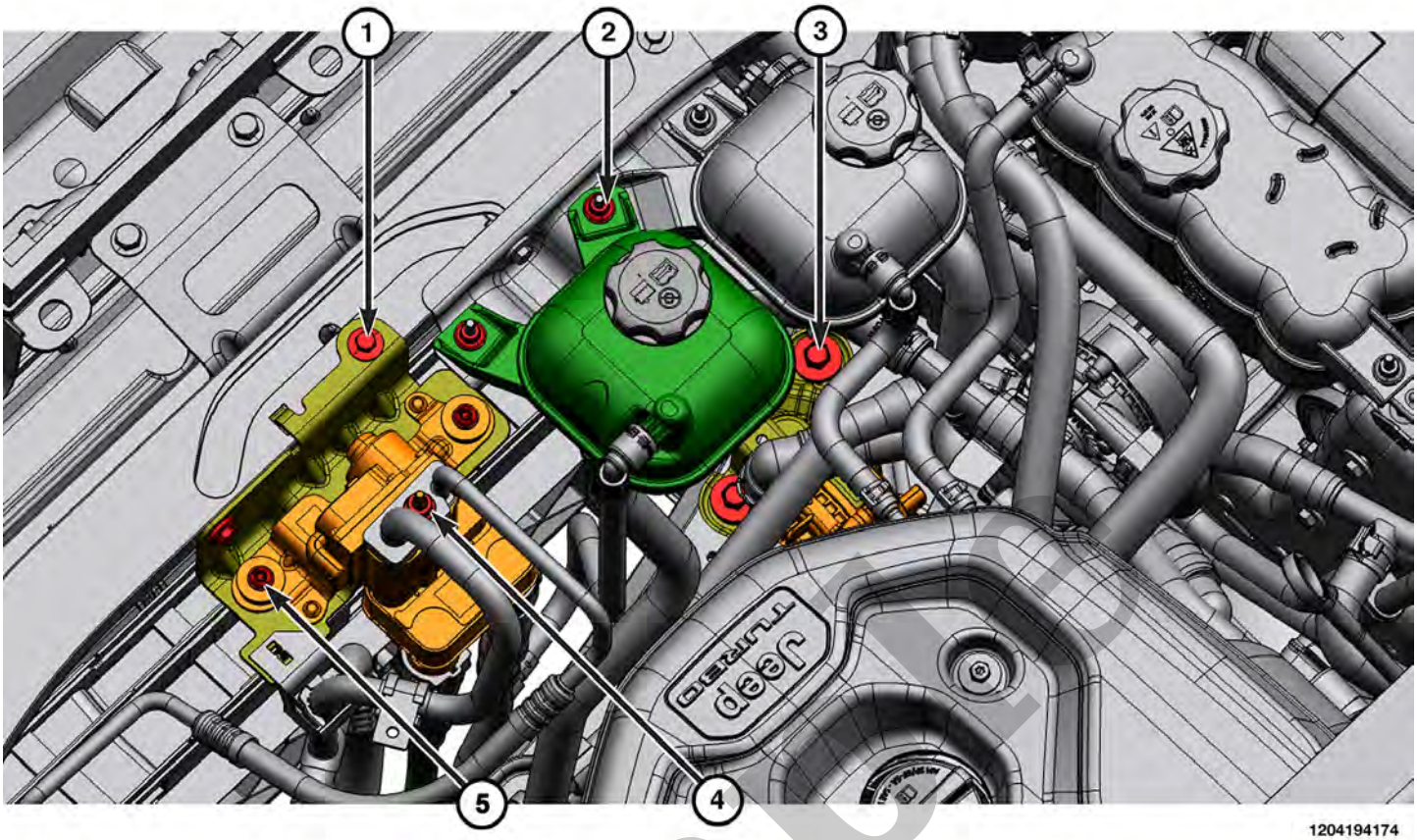
Battery Chiller

BATTERY CHILLER

WARNING

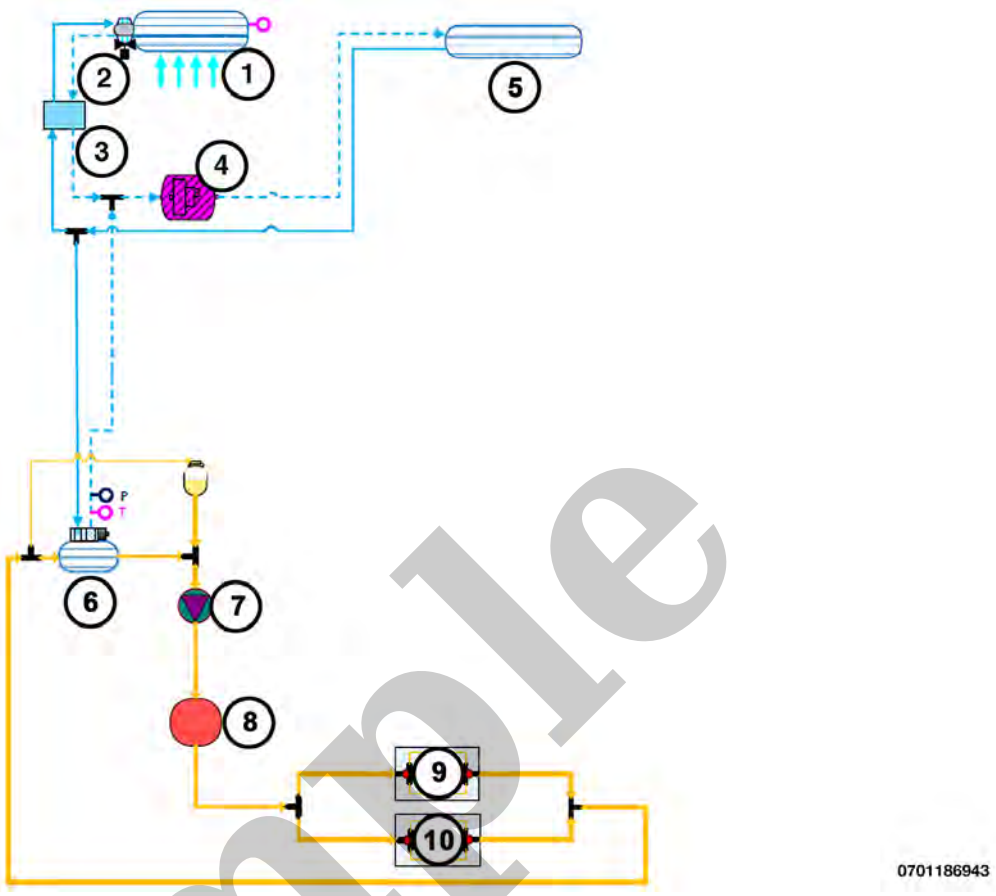
When performing any repairs that involve contact with high voltage components or systems, the technician performing repairs on the vehicle must verify that the system remains powered down during high voltage repairs.

- This must be done by removing the service disconnect or high voltage disabling device.
- The high voltage power down procedure must also be performed to ensure that the vehicle is properly powered down.
- The technician must know the whereabouts of the service disconnect or high voltage disabling device throughout the repair.
- The technician must ensure that no one reconnects the service disconnect or high voltage disabling device while service is being performed.
- The technician must recheck that the service disconnect or high voltage disabling device has not been reinstalled in cases where the vehicle was unattended.



CALLOUT	DESCRIPTION	SPECIFICATION	COMMENT
1	Chiller to Upper Crossmember	**7 N·m (62 In. Lbs.)**	–
2	Battery Pressurized Coolant Bottle Nuts	**7 N·m (62 In. Lbs.)**	–
3	Battery Coolant Pump Bolts	**14 N·m (10 Ft. Lbs.)**	–
4	A/C line to Chiller Nut	**20 N·m (15 Ft. Lbs.)**	–
5	Chiller to Chiller Bracket	**Tighten Securely**	–
–	Battery Coolant Hose to Frame Bolt	**8 N·m (71 In. Lbs.)**	–
–	Coolant Hose Bracket Nut	**9 N·m (80 In. Lbs.)**	–
–	Coolant Temperature Control Valve Nuts	**8 N·m (71 In. Lbs.)**	–
–	Combo Auxiliary Coolant Pump Bracket Bolts	**7 N·m (62 In. Lbs.)**	–

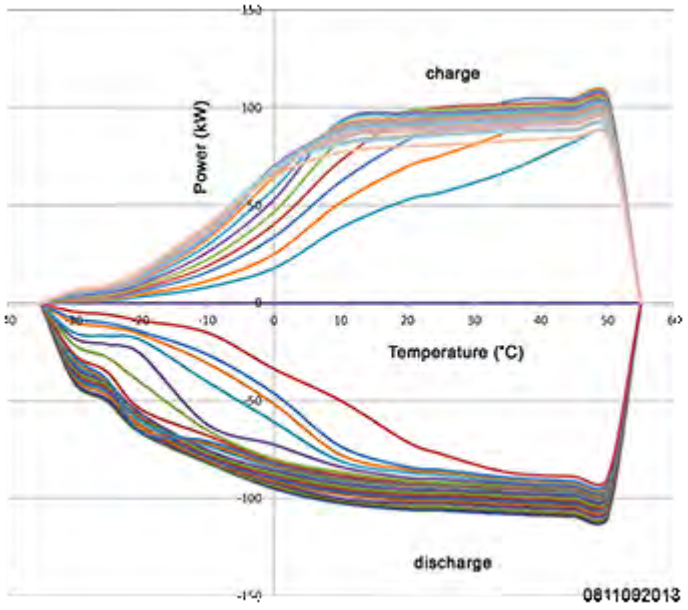
pump, battery coolant heater and split high voltage batteries.



1 - A/C Evaporator	6 - Chiller Valve
2 - Front Refrigerant Shut-off Valve	7 - Battery Coolant Pump
3 - Expansion Valve	8 - Battery Coolant Heater
4 - 300 Volt Electric A/C Compressor	9 - Primary HV Battery
5 - A/C Condenser	10 - Secondary HV Battery

OPERATION:

The Battery Pack Control Module (BPCM) maintains the high voltage battery internal temperature at an optimum operating range. The battery coolant pump circulates the coolant through the entire battery cooling system. The battery coolant heater or chiller valve are controlled to either heat or cool the HV battery depending on ambient temperature and battery internal temperature. When the ambient temperature and internal battery temperature are cold the battery coolant heater is used to heat the coolant and bring the HV battery pack to optimal operating temperature. When the battery internal temperature increases to the high threshold the coolant passes through the chiller valve to dissipate heat from the system.



- For optimal performance, cell operating temperature range is 10° C (50° F) to 38° C (100° F).

The BPCM tries to maintain the high voltage battery pack cells at an optimal temperature to maximize driving and minimize charging time. This is accomplished in one of three operating modes:

Thermal equalization - maintains consistent temperature inside the HV battery

- Low temperature active pump is forcing coolant through the HV battery pack to minimize the cell to cell temperature differences
- Battery chiller is not active, only used as a pass through

Active cooling - HV battery is too warm

- Low temperature active pump is active
- The Electric Air Compressor (EAC) is on forcing refrigerant from the A/C system through the battery chiller to help cool down or maintain a pre-set temperature within the HV battery pack
- Inter-loop heat exchanger is only used as a pass through

Active heating - HV battery pack is too cold

- The combustion engine may start to heat the engine coolant
- Electric coolant heater may also be energized
- High temperature auxiliary pump is active
- Low temperature active pump is active

FUNCTIONAL DESCRIPTION - PRESSURIZED COOLANT BOTTLE

The Battery Cooling system is designed to maintain a pre-set internal temperature and provide coolant flow to the High Voltage Battery components, not including engine, HVAC, and the Power Electronics. The Battery Cooling system is a low pressure (5 psi) system that uses an electric auxiliary coolant pump to force coolant through the Battery cooling loop.

requirements. Controlling the refrigerant flow through the A/C evaporator makes sure that none of the refrigerant leaving the A/C evaporator is still in a liquid state, which could damage the A/C compressor.

The A/C expansion valve is factory calibrated and cannot be adjusted or repaired and must be replaced if inoperative or damaged.

FUNCTIONAL DESCRIPTION - FRONT SHUT-OFF VALVE

The Front Shut-Off Valve turns off refrigerant flow to the chiller valve when battery cooling is not needed.

FUNCTIONAL DESCRIPTION - LOW TEMP (LT) PRESSURIZED COOLANT BOTTLE

The Low Temperature (LT) Cooling system is designed to maintain a pre-set internal temperature and provide coolant flow to the LT components. The LT system is a low pressure (5 psi) system that uses an electric auxiliary coolant pump to force coolant through the Battery cooling loop.

NOTE

If the coolant level is low, do not add additional coolant until the source of the loss has been found and repaired.

For coolant type and capacity, (Refer to Vehicle Quick Reference/Capacities and Recommended Fluids/Specifications).

The pressurized coolant bottle is equipped with a pressurized coolant bottle cap. This cap releases pressure at 34 kPa (5 psi). The pressure relief point is stamped on top of the cap. The cooling system operate at pressures of 34 kPa (5 psi) above atmospheric pressure. This results in a higher coolant boiling point allowing increased radiator cooling capacity. The cap contains a spring-loaded pressure relief valve. This valve opens when system pressure reaches 34 kPa (5 psi). A rubber gasket seals the cap to maintain vacuum during coolant cool-down and to prevent leakage when system is under pressure.

FUNCTIONAL DESCRIPTION - POWER INVERTER MODULE (PIM)

On PHEV vehicles, a high voltage Direct Current (DC) battery is used to power the Alternating Current (AC) electric motors. To accomplish this, the Power Inverter Module (PIM) is a dual inverter used between the high voltage battery and the electric motors to convert the DC power into AC power. The PIM is also capable of converting AC power into DC power to charge the high voltage battery. The PIM has the following primary functions:

The PIM interfaces with and controls a number of powertrain systems.

- The PIM controls the interaction between the battery pack and the electric motors by controlling voltage, current, and frequency.
    - The amount of current directed to the electric motor is directly proportional to the torque generated at the output shaft.