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## 1996 FORD Scorpio Wagon OEM Service and Repair Workshop Manual

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| | |
|---|---|
| | 3.3L Duratec 29 oz (0.82 kg) |
| | 3.5L EcoBoost 29 oz (0.82 kg) |
| | 3.5L V6 PowerBoost - Hybrid, 26.5 oz (0.75 kg) |
| | 5.0L Ti-VCT 29 oz (0.82 kg) |
| | 5.2L 32V Ti-VCT – Supercharged 29 oz (0.82 kg) |
| ***Material*** : Motorcraft® A/C System Flushing Solvent / YN-23 | — |
| ***Material*** : Motorcraft® A/C Cooling Coil Coating / YN-29 | — |

**A/C (air conditioning)  COMPRESSOR CLUTCH AIR GAP**

| ITEM | MM |
|---|---|
| A/C (air conditioning)  compressor clutch air gap | 0.25 — 0.59 |
| 5.2L 32V Ti-VCT – Supercharged: A/C (air conditioning)  compressor clutch air gap | 0.21—0.55 |

**TORQUE SPECIFICATIONS**

| ITEM | NM | LB-IN |
|---|---|---|
| A/C (air conditioning)  disc and hub bolt (EVDC Compressor) | 20.5 | 181 |

| | |
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| | |
|---|---|
| 1 | BCMC (body control module C) |
| 2 | Front Evaporator Shut off Valve (FESOV) |
| 3 | High Voltage Battery Coolant Cooler |
| 4 | ACCM (air conditioning control module) |
| 5 | GWM (gateway module A) |
| 6 | SOBDMC (secondary on-board diagnostic control module C) |

**Network Message Chart**

**Module Network Input Messages - SOBDMC (secondary on-board diagnostic control module C)**

| Broadcast Message | Originating Module | Message Purpose |
|---|---|---|
| A/C (air conditioning) Compressor Request | SOBDMC (secondary on-board diagnostic control module C) | This message contains the electric A/C (air conditioning) compressor |
| Front Evaporator Shut off valve request | SOBDMC (secondary on-board diagnostic control module C) | This message contains the front evaporator shut off valve request |
| Cabin EVAP shut off valve front status | SOBDMC (secondary on-board diagnostic control module C) | This message contains the status of the front evaporator shut off valve |



**Refrigerant system operation for cooling the High Voltage Battery Coolant**

When the high voltage battery temperature is deemed to be high and the coolant that is flowing through the battery is not enough to cool the battery, the SOBDMC (secondary on-board diagnostic control module C) sends a message out to command the Electric A/C (air conditioning) compressor on and also sends a message to the BCMC (body control module C) to close the Front Evaporator Shut off Valve (FESOV). The refrigerant is routed though the High voltage battery coolant cooler (chiller), assisting in cooling down the high voltage battery coolant and then reducing the temperature of the high voltage battery.

Component Description

**Front Evaporator Shut off Valve**

The Front Evaporator Shut off Valve (FESOV) is a normally open valve allowing refrigerant to flow through the evaporator for normal cabin cooling conditions. For more information refer to the Refrigerant system

# Front Evaporator Shutoff Valve

| | |
|---|---|
| ***412-03 Supplemental Climate Control*** | ***2022 F-150*** |
| ***Removal and Installation*** | ***Procedure revision date: 08/7/2020*** |

**Front Evaporator Shutoff Valve**

**Removal**

**NOTICE**

During the removal of components, cap, tape or otherwise appropriately protect all openings to prevent the ingress of dirt or other contamination. Remove protective materials prior to installation.

**NOTE**

Removal steps in this procedure may contain installation details.

1. Remove the themostatic expansion valve manifold and tube assembly.

   Refer to: Thermostatic Expansion Valve Manifold and Tube Assembly - 3.5L V6 PowerBoost (CN)(412-00 Climate Control System - General Information, Removal and Installation).

2. Loosen the flair nuts and remove the front evaporator shutoff valve.

# High Voltage Battery Coolant Cooler

| | |
|---|---|
| ***412-03 Supplemental Climate Control*** | ***2022 F-150*** |
| ***Removal and Installation*** | ***Procedure revision date: 11/13/2021*** |

## High Voltage Battery Coolant Cooler

### Removal

**NOTICE**

During the removal of components, cap, tape or otherwise appropriately protect all openings to prevent the ingress of dirt or other contamination. Remove protective materials prior to installation.

**NOTE**

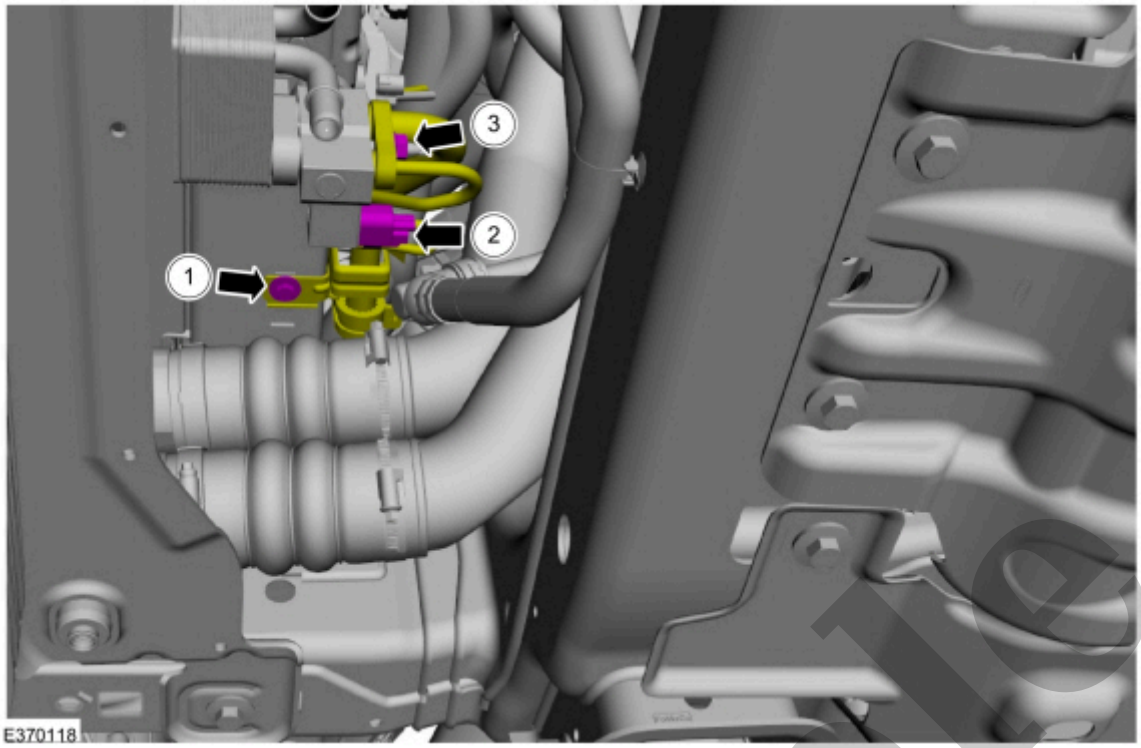
Removal steps in this procedure may contain installation details.

1. Recover the refrigerant. Refer to the appropriate Recovery procedure in Group 412.
2. Drain the electric powertrain cooling system.

   Refer to: Cooling System Filling and Bleeding(303-03F Electric Powertrain Cooling - 3.5L V6 PowerBoost (CN), General Procedures).
3. Clamp and disconnect the coolant hoses.

   Use the General Equipment: Fluid Container

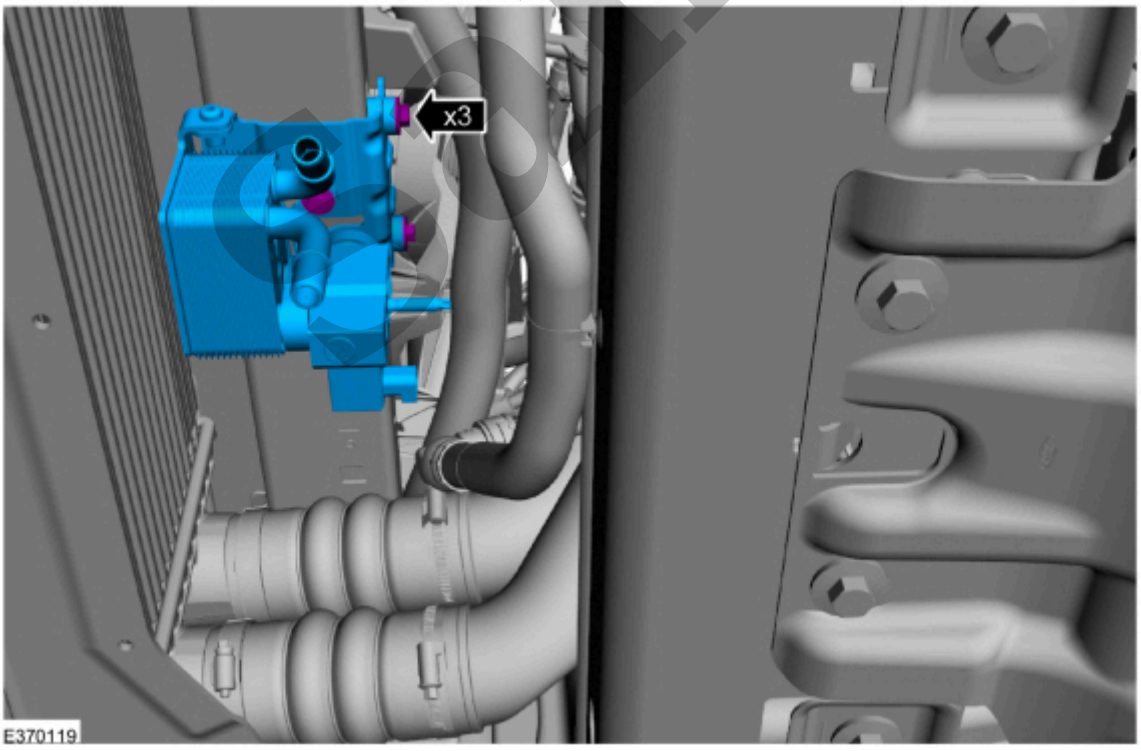
   Use the General Equipment: Hose Clamp(s)




Click here to learn about symbols, color coding, and icons used in this manual.

5. Remove the mounting retainers and the high voltage battery coolant cooler.

   ***Torque*** : 80 lb.in (9 Nm)

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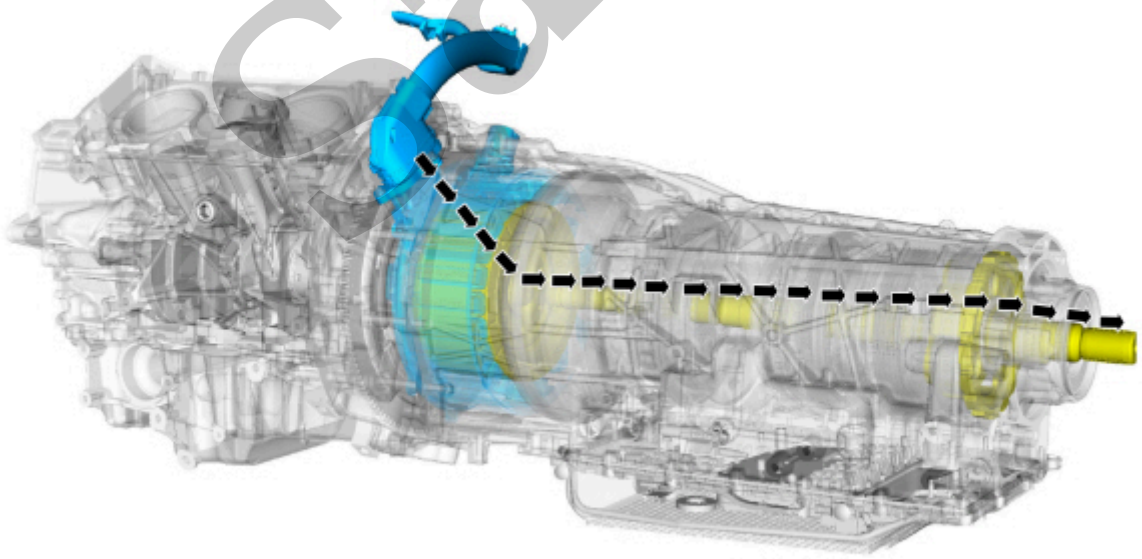
# Electric Motor

| | |
|---|---|
| ***303-01F Electric Motor - 3.5L V6 PowerBoost (CN)*** | ***2022 F-150*** |
| ***Description and Operation*** | ***Procedure revision date: 05/29/2019*** |

## Electric Motor

The electric motor is housed in a Hybrid Drive Unit located between the engine and transmission. The Hybrid Drive Unit includes a torque converter that the electric motor drives. The Hybrid Drive Unit also contains an engine disconnect clutch for engine starting, charging, and combined engine/electric motor drive. The engine disconnect clutch is engaged and disengaged hydraulically by the transmission fluid pump. The electric motor, torque converter and the engine disconnect clutch are serviced as an assembly as the Hybrid Drive Unit. The Hybrid Drive Unit has 4 modes of operation.



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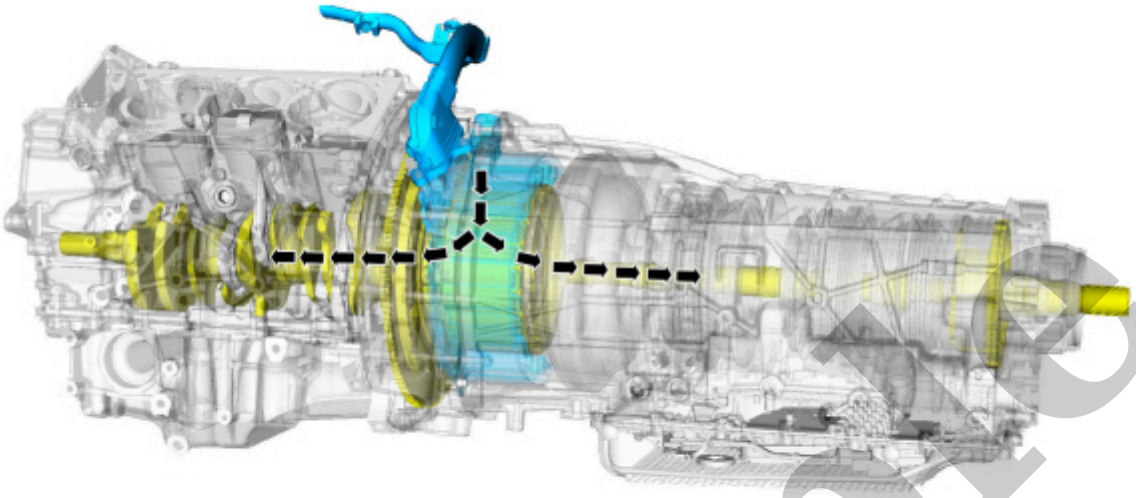
Hybrid Drive Mode – The engine disconnect clutch is engaged and the engine drives the transmission, providing torque to the wheels meeting driver demand. Requested torque above this is used to charge the high voltage battery through the electric motor. Electric motor can also assist the engine.



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Engine Start Electric Motor – The engine disconnect clutch engages and the electric motor torque is split between the driveline and the engine to start the engine.