



Ford All-Electric Vehicle

Ford will produce new all-electric vehicles that don't use a drop of fuel. Below is a detailed look at the components that will make up the new electrified vehicles.

1 MOTOR CONTROLLER AND INVERTER

The motor controller monitors the motor's position, speed, power consumption and temperature. Using this information and the throttle command by the driver, the motor controller and inverter convert the DC voltage supplied by the battery to three precisely timed signals used to drive the motor.

2 HIGH VOLTAGE ELECTRIC HVAC COMPRESSOR

The high voltage air conditioning system is specifically designed for hybrid vehicle applications, drawing electrical energy directly from the main battery pack. An inverter is included in the compressor.

3 ELECTRIC WATER PUMP

The electric drive water pump circulates coolant for the traction motor, inverters, battery and heater.

4 TRACTION MOTOR

The traction motor performs the conversion between electrical and mechanical power. Electric motors also have efficiencies three times higher than that of a standard gasoline engine, minimizing energy loss and heat generation.

5 ELECTRIC POWER STEERING

Electro-hydraulic steering pump was installed to assist a retuned steering rack. A production vehicle would be designed with electric power steering.

6 GEARBOX

The transmission has the identical role as in a conventional vehicle; however, it has different design considerations due to the higher RPM range available from the electric motor and increased emphasis on efficient and silent operation. The transmission is a single-speed unit with a 5.4:1 reduction.

7 MODULAR POWERTRAIN CRADLE

A structure for monitoring all engine compartment EV components and providing isolation from the vehicle body through traditional engine mounts.

8 ELECTRIC VACUUM PUMP

The vacuum pump supplies vacuum to the brake system for power assist.

9 HIGH VOLTAGE PTC ELECTRIC COOLANT HEATER AND CONTROLLER

Heating systems are specifically designed for hybrid vehicle applications. Energy efficient PTC technology is used to heat the coolant that circulates to the passenger car heater. Heat also may be circulated to the battery.

10 VEHICLE CONTROL UNIT

The VCU communicates with the driver as well as each individual vehicle system to monitor and control the vehicle according to the algorithms developed by the vehicle integration team. The VCU manages the different energy sources available and the mechanical power being delivered to the wheels to maximize range.

11 BATTERY PACK AND BATTERY CELLS

The battery pack is made up of 7 battery modules of 14 cells, 98 cells total for 23 kWh of power. The batteries are air cooled using existing vehicle cabin air. The pack includes an electronic monitoring system known as the BMS that manages temperature and state of charge of each of the cells.

12 AC CHARGER

Power electronics are used to convert the off-vehicle AC source from the electrical grid to the DC voltage required by the battery, thus charging the battery to its full state of charge in a matter of hours. The current charger is air cooled. The production design will accommodate both 110 and 220 voltage sources.

13 DC-DC CONVERTER

A DC-DC converter allows the vehicle's main battery pack to charge the on-board 12V battery, which powers the vehicle's various accessories, headlights, etc.

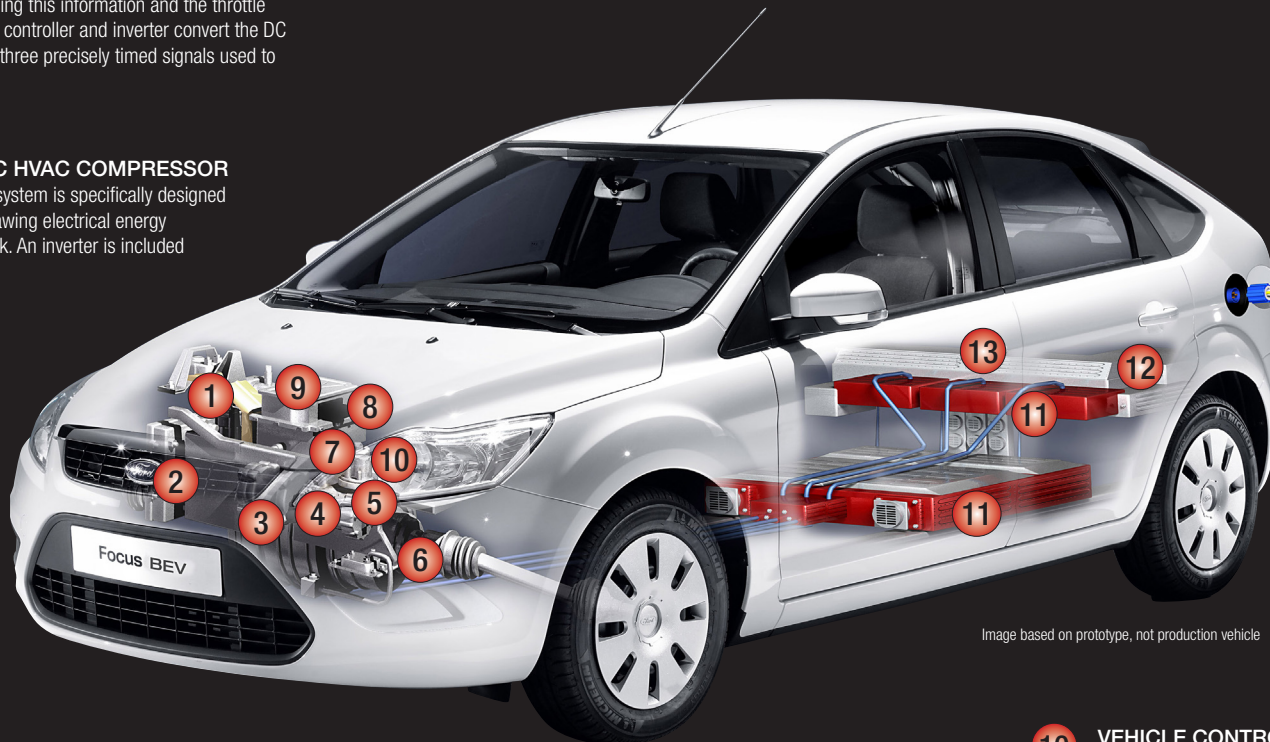


Image based on prototype, not production vehicle