

HYBRID ELECTRIC VEHICLE

ABSTRACT

A hybrid electric vehicle includes a high voltage DC bus and an internal combustion engine. The internal combustion engine is mechanically coupled to a non self-excited generator /motor which is preferably a switched reluctance machine. A power inverter electrically and bidirectionally couples the high voltage DC bus to the non self-excited switched reluctance generator/motor. Front and rear axle dual DC-AC inverters electrically and bidirectionally couple two traction AC non self-excited switched reluctance motors/gear reducers to the high voltage DC bus for moving the vehicle and for regenerating power. An ultracapacitor coupled to the high voltage DC bus. A bidirectional DC-DC converter interposed between a low voltage battery and the high voltage DC bus transfers energy to the high voltage DC bus and ultracapacitor to ensure that the non self-excited switched reluctance generator/motor operating in the motor mode is able to start the engine.

Figure 1A