

Car Hybrid Propulsion Strategy Using an Ultra-Light GDI Two Stroke Engine

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ABSTRACT

Going from the example of the urban traffic in Europe, where the car use in town areas generally do not exceed 50 km/day, a series hybrid vehicle with light and compact thermal engine as an auxiliary power unit (APU) is demonstrated to be a promising concept. The paper describes such a configuration in base of a developed two-stroke engine with electronically controlled gasoline direct injection. The injection system is characterized by a high-pressure modulation obtained in base of the water hammer effect, which can be accurately adapted for a wide load and speed range of the engine. In this assembly the engine has extremely small dimensions and a dry weight of 8 kg, requiring a place which do not disturb the functions of the basic electric vehicle. The performances are convicting, the CO₂ emission being reduced 3 times in comparison with a series four-stroke engine for the same car type, with an autonomy of 340 km and with a maximum speed of 100 km/h. The paper presents the features of the engine and of the injection system, giving an overview of the electronic management as well. The vehicle was successfully tested during the challenge Michelin in October 1998 in France and was exposed at the 1998 International Car Exhibition of Paris as well.

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