

A DUAL FUEL SYSTEM AND METHOD FOR INTERNAL COMBUSTION ENGINES

IITM Technology Available for Licensing

Problem Statement

- Existing internal combustion engine systems fail to optimize both fuel consumption and emissions simultaneously.
- Current solutions focus either on fuel efficiency or emissions control, lacking a comprehensive approach.
- There is a need for a reliable dual fuel system and method that addresses both performance enhancement and environmental impact.

Intellectual Property

- IITM IDF Ref. 2774
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Research Lab

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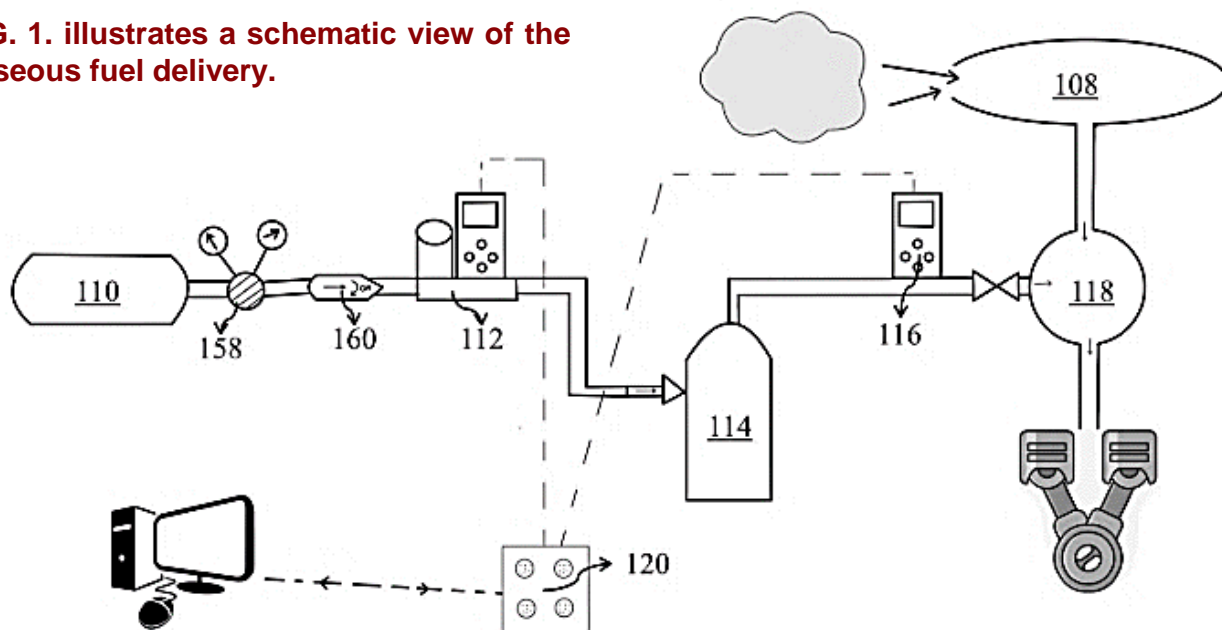
Technology

The invention introduces a dual fuel system for internal combustion engines, combining a gaseous fuel delivery unit, an open Electronic Control Unit (ECU), and an eddy current dynamometer to optimize fuel consumption and reduce emissions.

The system uses real-time engine parameters to precisely control and adjust fuel delivery, ensuring an optimal air-fuel mixture and improved combustion efficiency.

Key components include mass flow controllers, a buffer chamber, air and gas filters, a mixing chamber, exhaust gas recirculation, and advanced pressure regulation mechanisms, all managed by a central controller for dynamic adjustments based on engine load.

FIG. 1. illustrates a schematic view of the gaseous fuel delivery.



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Industrial Consultancy & Sponsored Research (IC&SR)

Technology Category/ Market

Category- Advanced Dual-Fuel Internal Combustion Engine Systems, Automobile & Transportation

Applications- Automotive, Commercial Vehicles, Power Generation, Agricultural Machinery, Marine Propulsion, Off-Road Vehicles, Custom Engine Conversions, Hybrid Powertrains.

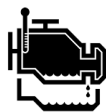
Industry- Automotive and Transportation, Energy and Power Generation, Off-Road and Specialty Vehicles

Market - Dual Fuel Engine market size is estimated to a readjusted size of USD 8706.2 million by 2028 with a **CAGR of 21.7%**. Based on Product Types the Market is categorized into **Four-Stroke** and **Two-Stroke** engines.

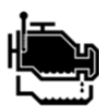
TRL (Technology Readiness Level)

TRL - 4: Technology validated in lab scale.

Key Features / Value Proposition



1. Reduced Emissions:
Dual-fuel system with exhaust gas recirculation significantly lowers NOx emissions.



2. Optimized Combustion:
Precise air-fuel mixture control enhances fuel efficiency and combustion processes.



3. Fuel Flexibility:
Adaptable to multiple gaseous fuels like methane, ammonia, and hydrogen.



4. Dynamic Load Management:
Real-time engine performance optimization through Open ECU and Eddy Current Dynamometer.



5. Safety in Fuel Delivery:
Advanced safety mechanisms including Two-Stage Pressure Regulator and Shut-Off Valve.



6. Real-time Data Acquisition:
Sophisticated sensor and data systems enable real-time monitoring and control for enhanced responsiveness.



7. Off-Road Vehicles:
Utility vehicles, construction equipment, and off-road vehicles can integrate the dual-fuel system to reduce emissions and improve fuel economy during operation.



8. Custom Engine Conversions:
The technology can be adapted for custom engine conversions, enabling enthusiasts and specialty vehicle builders to upgrade 30 existing engines for improved performance and reduced environmental impact.

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