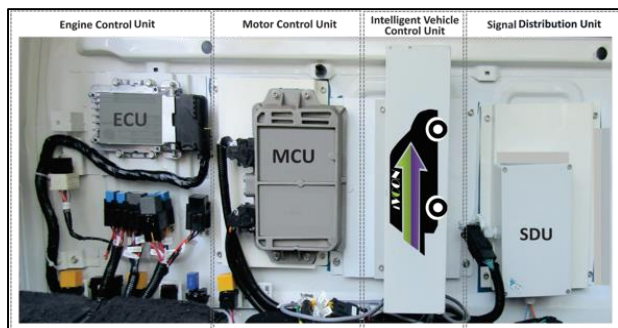


Hybrid P3 Retro-fitment solution for LCV-MT



ARAI - xEV Program

Technology

Hybrid Retro-fitment solution for LCV-MT

Technology Readiness Level: 6 (System model/demonstrator in relevant environment)

Features

- Retrofit solution for LCVs and above
- Modular and scalable solution
- Frugal solution for low cost integration
- Minimal modifications to existing vehicle
- In-house developed Control strategy with 'idiot proof' interlocks
- Thoroughly engineered system considering all vehicle performance criteria
- Three operating modes:
 - Conventional engine
 - Hybrid mode (with 2 additional control modes in-built)
 - Battery charging
 - Regenerative braking
 - Electric only mode
- Minimal serviceability to add on system; fit and forget
- Advantages of:
 - Higher fuel economy
 - Lower emissions and emission systems
 - Higher service life of vehicle
 - Reduced maintenance costs
 - Cost effective indigenous solution
- Solution also available for OE fitment for new vehicles

Application

- SCVs and LCVs
- Scalable to bigger commercial vehicles as well

Scale of Validation Achieved

A working prototype has been developed and tested. Further validation and optimization of the hardware and software is going on considering a broader range of operating scenarios.

Intellectual Property

Patent application in process

The Automotive Research Association of India

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Abstract

The world is shifting towards low carbon footprint which made it necessary to adopt efficient technologies with fewer emissions. Hybridization is one such solution, which results in improved efficiency with lower emissions that can fulfil the future emission norms. Retrofitting of hybrid components into a conventional IC engine vehicle is one of the best ways to achieve better performance both economically and technologically for in-use/existing vehicles.

ARAI's solution is primarily focused on the design and development of a novel retrofit solution of P3x architecture for the light commercial vehicle. This retrofit solution is different from other hybrid solutions in terms of powertrain. It contains an innovative add-on powertrain along with the existing powertrain. The newly designed powertrain provides 5 different hybrid modes namely engine only mode, electric only mode, motor assist mode, battery charging mode and regenerative braking mode. The retrofit work also focuses on packaging design of hybrid components into the chassis ensuring that it can sustain all load transferring from road along with additional weight without failure. To demonstrate the practical applicability of this indigenous powertrain with P3x hybrid configuration, a prototype has been developed and functionally tested.

Beneficiary Industry

- OEMs working on hybrid platforms
- Tier 1 industries supplying the smart controls for hybrid vehicles
- Service Industries
- Research Institutes/Academies/Universities working on Hybrid Vehicle programs

ARAI also offers the following development services in areas of Hybrid vehicles.

- Similar solution on OE fitment
- Electrical system design
- High voltage safety and interlocks
- Structural analysis on effect of hybridization
- MIL & SIL simulation with feasibility studies
- System and component sizing and identification
- Subjective and objective analysis