

Pre-Production



# FCe™ 40 Fuel Cell Engine

The Leading Fuel Cell Engine for Commercial Vehicles

Purposed-built for MD/HD vehicles shock and vibration environment

## Combustion-Less Engine providing Zero Emission Electric Power

The 40kW Fuel Cell engine is our most robust engine with 20 kW/sec transient power capabilities offering a fully integrated freeze capable system with a rapid startup design and industry leading power density specifically designed for medium duty, shuttle bus, port trucks, GSE, ports and logistics equipment and off-road applications.

## Performance Characteristics

### Electrical

Output Power†	5 - 40kW
Output voltage	375 - 750V <sub>DC</sub> (Integrated Isolated dc-dc converter)
Ramp rate	20 kW/sec

### Efficiency

System Efficiency†	56.9 to 46.3% (10% to full power)
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### Temperature

Ambient Temperature	-30 to 50°C
Cooling Inlet	55 to 57°C (50/50 WEG)

### Fuel

Fuel Flow	2.6 kg/hr @ full power
Fuel Pressure	1200 ±300 kPa <sub>g</sub>
Fuel Type	SAE J2719 Hydrogen

### Physical Characteristics

Dimensions (L x W x H)	993 x 455 x 692 mm
Weight	148kg, (including dc-dc converter)

### Interface

Vehicle Communications	CAN SAE J1939
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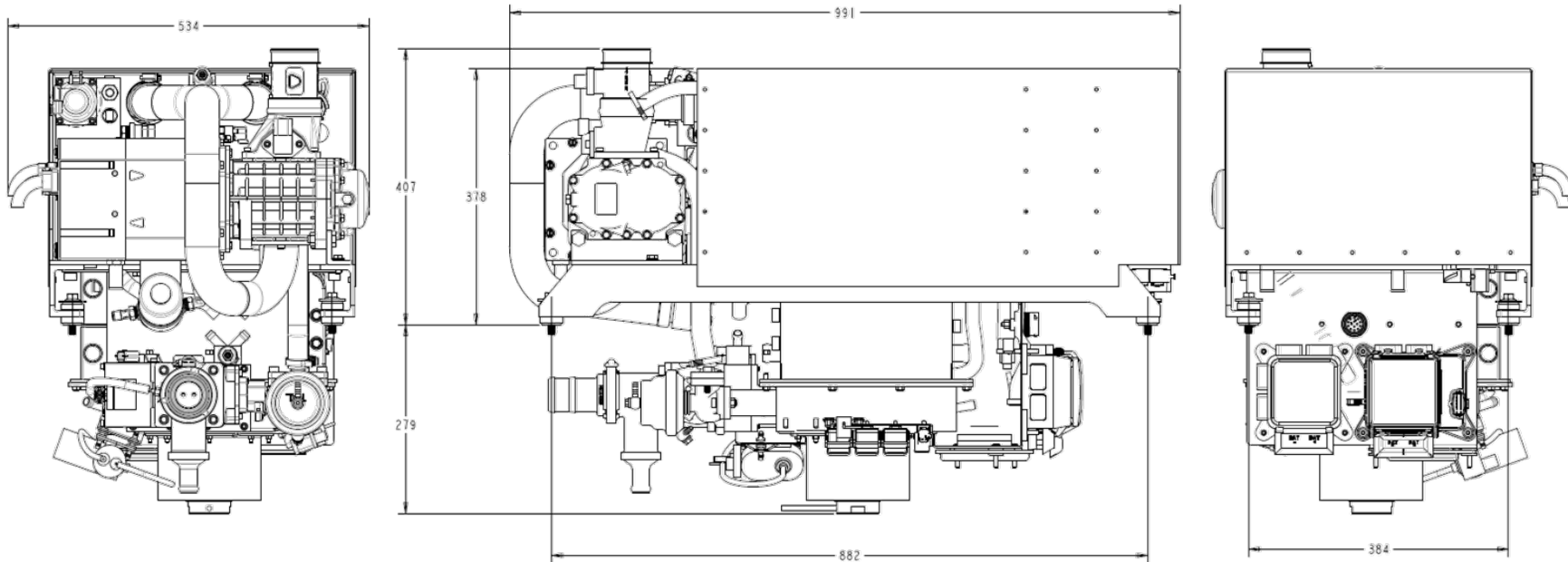
### Startup / Shutdown

Startup Time	30 seconds
Startup from Frozen Time	6 minutes
Shutdown Time	10 seconds



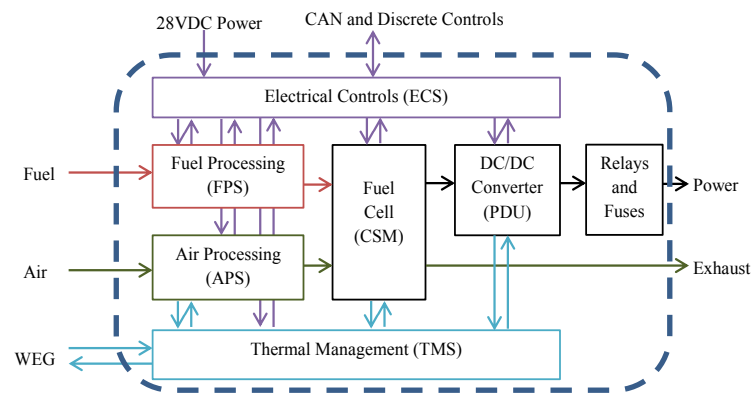
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FCe™40 is an integrated fuel cell engine that is purposed-built for medium-duty vehicles meeting SAE J1455 shock and vibration and environmental requirement. The FC engine includes the integrated dc-dc converter and the safety disconnect and protection system.

The FCe™40 engine is the most efficient fuel cell engine with all BOP components integrated and no demand from the vehicle. The low-pressure operation allows fast transient response with high efficiency even at low power range. The FC engine design allows easy installation, command and control similar to conventional engine. Cooling is 50/50 WEG system with no external DI water-cooling or circulation pump



FCe™40 Integrated FC engine diagram

† System efficiency represents energy delivered per energy fed in the form of hydrogen (calculated on a LHV basis).

‡ Full power is the maximum power the electric engine can continuously deliver.

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**Integrated Components Solutions for Clean Mobility & Energy Conservation**