



Range Extender Engine



Flexible installation & orientation

Specially designed for EV applications

Extended-range electric vehicles (E-REVs) partly overcome the limitations of current battery technology by enabling reduced battery storage capacity to be used, whilst still maintaining an acceptable vehicle range.

The E-REV is essentially a vehicle that functions as a fullperformance electric vehicle when energy is available from an on board rechargeable energy storage system, typically a battery, and having an auxiliary energy supply that is only engaged when battery energy is depleted. It is desirable that for the majority of time the vehicle will operate in a purely electric-only mode and that the user recharges the vehicle (by connecting to an external supply) when it is not in use, e.g. overnight.

Thus, the battery should be sized to cope with the majority of daily usage that the vehicle will encounter, and only rely on the range extender for infrequent, longer journeys.

- 4-stroke gasoline engine
- 900 cc twin cylinder
- 30 kW or 40 kW output
- With electric supercharger 50 kW output
- Horizontal or vertical installation capability
- Weight 50 kg (70 kg with generator)
- Compact design



Compact & lightweight
Flexible installation options

Benefits

- Overcomes future engine requirements & challenges
- Sized to be suitable for typical C-segment passenger car
- Analysis of fleet vehicle drive data using drive style analysis toolset
 - › Identifies typical daily usage pattern of passenger cars
 - › Enabled requirements for electrical components & Range extender to be determined
- Key attributes of range extender:
 - › Low cost
 - › Small package volume
 - › Good NVH attributes
 - › Reasonable fuel efficiency
- Design incorporates fully integrated axial flux generator
 - › Housed within the crankcase of the engine
 - › Small & lightweight
 - › Cost-effective solution
- Oil system enables engine to be installed vertically or horizontally for increased package flexibility



MAHLE Range extender demonstrator vehicle



Range extender engine in demonstrator vehicle

Summary

The range extender engine is specifically designed for EV applications with flexibility when it comes to installation options. This compact and lightweight engine is a cost-effective solution that is built to meet requirements for the future.

Technical specifications

Engine displacement:	900 cc
No. of cylinders:	2 in-line, 4-stroke, gasoline
Bore/Stroke:	83.0 / 83.0 mm
Compression ratio:	9.8 : 1
Fuel injection:	Port fuel injection
Installation angle:	Verticle or horizontal
Engine Control:	MAHLE Flexible ECU
Maximum power:	30 kW [4000 min ⁻¹]
Dimensions:	327 x 416 x 481 mm
Engine dry weight:	50 kg (70 kg with generator)
Fuel consumption:	240 g/kWh minimum
Emissions target:	Euro 6