

MAHLE Powertrain Compact Range Extender Engine

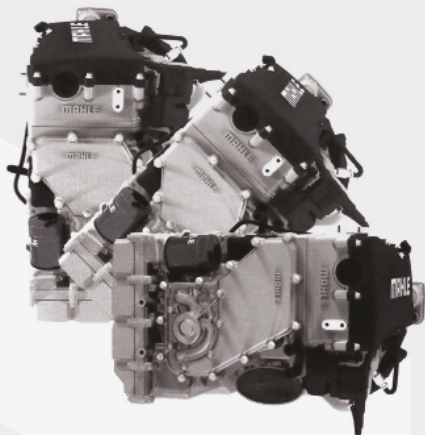
- > Specifically designed for EV applications
- Compact and lightweight
- Flexible installation options



Compact Range Extender Engine

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. over-night. 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.



>> Flexible installation & orientation

- 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

MAHLE Powertrain Ltd
Costin House
St James Mill Road
Northampton
NN5 5TZ
Tel: +44 (0)1604 738 000

MAHLE Powertrain LLC
14900 Galleon Court
Plymouth
Michigan 48170
USA
Tel: 001 734 738-52 01

MAHLE Powertrain GmbH
Wamslerstrasse 5
81829
Munich
Germany
Tel: +49 89 96 29 15-0

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Compact Range Extender Engine

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



>> Range extender engine in demonstrator vehicle

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

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.

MAHLE ZG Transmissions
Georg-Kollmannsberger-Str. 3
85386
Eching
Germany
Tel. +49 89 18 94 169-0

MAHLE Automotive Technologies
No. 1299 Huan Cheng Bei Road
Fengpu Industrial Park 201 401
Shanghai, Fengxian District
China
Tel. +86 21 5136-0595

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www.mahle-powertrain.com