ELENA

PLUG-IN HYBRID ELECTRIC VEHICLE

The First Electric Plug-in Hybrid LCV

up to **50 km** ELECTRIC RANGE

ELENA

PLUG-IN HYBRID ELECTRIC VEHICLE

ELENA is a Plug-in Hybrid Electric Vehicle based on the Mercedes-Benz Sprinter.

The electric drive mode can be switched on while driving, giving you the option to drive without any emission in urban and regional areas.

For supra-regional trips, the conventional Diesel engine can still be used without any restrictions.

The product is also available as aftermarket kit.

content

Modellregionen Elektromobilität

Modellregion Elektromobilität Region Stuttgart

NOW Nationale Organisation Wasserstoff- und Brennstoffzellentechnologie

about ELENA

who we are

huberGroup

Fraunhofer IPA

Lauer & Weiss Engineering

ARADEX

Hochschule Esslingen University of Applied Sciences

FKFS

WSEngineering GmbH & Co KG

Landesnetzwerk Mechatronik BW

inem Institut für Nachhaltige Energietechnik und Mobilität

ELENA

...is an association
of automotive experts
in Baden Württemberg

about ELENA

what we do

ELENA provides integrated solutions from idea over components up to complete electric vehicles and hybrid vehicles.

ELENA will develop a complete Plug-In Hybrid LCV until end of 2014 – the first available Plug-In Hybrid solution for this market segment.

The ELENA Plug-In Hybrid LCV Project is government-funded by the Federal Ministry of Transport, Building and Urban Development under the “Electromobility Model Regions” program for the Stuttgart region.

ELENA is continuously working closely with universities, research institutes and leading industry partners.

ELENA - concept

100%

Cargo Space

Underfloor installation of components

35%

Fuel Reduction

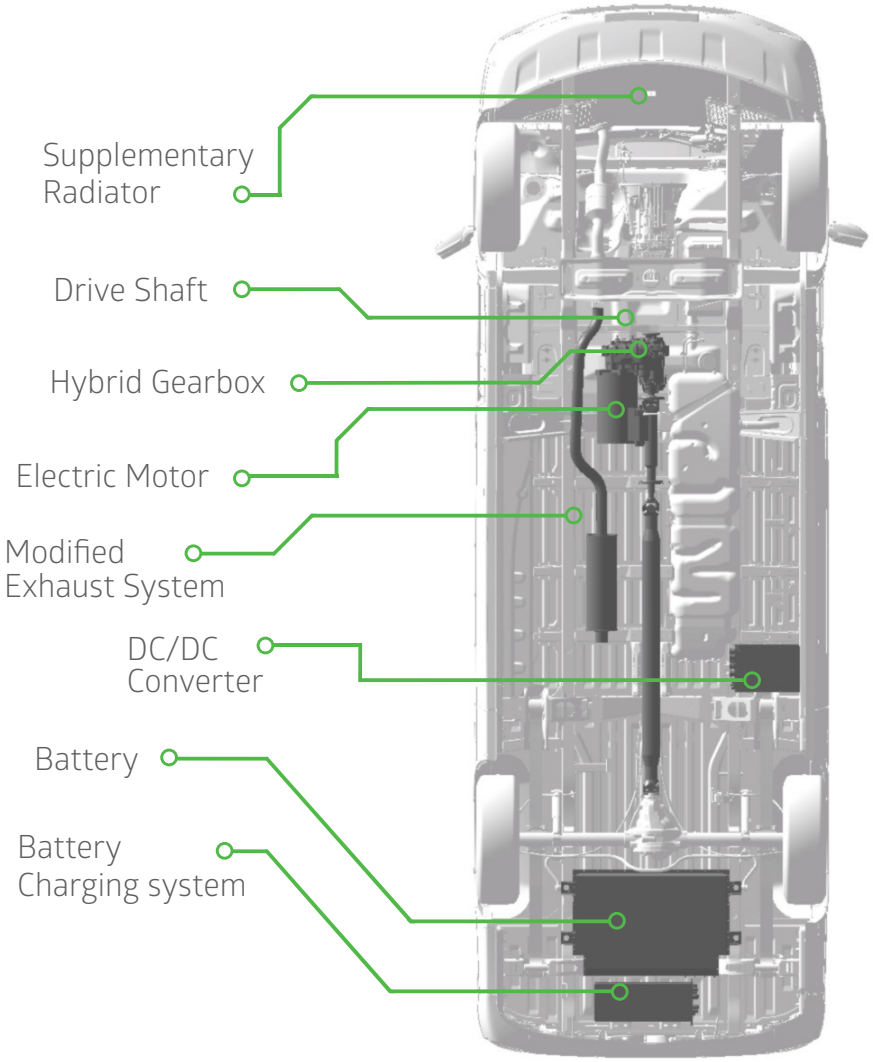
Through advanced technology

100%

Reconversion

Restoration of the original vehicle condition

Tip!
In case of vehicle change, the ELENA Plug-In Hybrid Kit can be easily installed in the new vehicle.



Vehicle Controle Unit [VCU]

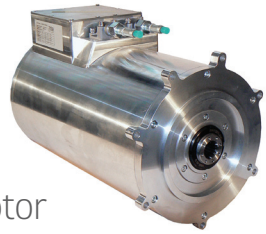
ECU 21

Vehicle Sensors

Acceleration Pedal Sensor

CAN Bus Information
[e.g. Clutch Switch, Brake Pedal Switch, ABS, ESP]

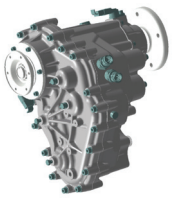
ELENA components



Inverter and E-Motor

HMI Pushbutton

Converter and Battery Charging System



Hybrid-Gearbox

Smartphone-App

Inclination sensor

HV-Battery and Battery Management System

ELENA components

Electric Servo pump

Electric Vacuum Pump

Electric Water Pump

ELENA - plenty of good reasons

OPERATING COMFORT

Ergonomic and intuitive user interface via intelligent pushbutton

Information of current operation mode (SOC, driving mode, state of gearbox) via integrated LEDs

Original vehicle operating concept maintained

Smooth mode switching via button control at standstill or while driving

DRIVING MODES

Hybrid mode set as default

Free choice of 3 driving modes

electric mode: Full electric driving by using a high-torque electric engine enabling noiseless driving free of emissions for a range of max. 50 km and a max. speed of 90 km/h

hybrid mode: Combination of both driving units to increase fuel efficiency. Fuel reduction under real driving condition by up to 35 %. The maximum speed is limited to 120 km/h.

diesel engine mode: The original driving concept available at all times.The maximum speed will be similar to the basic vehicle.

VARIABILITY

Wide variety of configurations: Passenger/ delivery vans, curtainsiders with different configurations

New and used vehicles

Loading volume is not affected. The maximum payload will be reduced by 280 kg

SAFETY CONCEPT

The vehicle dynamics control (ABS, ESP, ASR) operates in all 3 driving modes

Guaranteed high voltage cut-off in case of hazardous situations

Unrestricted system reliability (Diesel mode as fallback solution)
Redundant sensors and actuators

ESP, ABS, ASR

Unrestricted system reliability

RECUPERATION

Automatic recuperation control during braking and overrun mode depending on route profile, vehicle speed and loading

Additional energy recovery by selective load point adjustment for specific load points during long-distance driving..




XTRA-CHARGE / POWERBOOST

Optional activation of additional functionalities by pressing and holding the pushbutton in hybrid mode

Xtra-Charge: Battery charging via permanent recuperation while driving

Power-Boost: Improved performance via maximum interaction of electric and combustion driving torque

PLUG-IN

Charge of the high voltage battery by using a conventional household power outlet type „Schuko" 230 V AC. Charging time will be app. 5h.

BENEFITS OF THE CONCEPT

Noiseless travelling free of emissions in electric mode:
For low emission zones, residential areas, city centres, workshops, recreation areas, airports or simply to demonstrate environmental awareness

Efficient long-distance driving in hybrid mode:
Increase of fuel efficiency, recuperation and maximisation of the total driving range

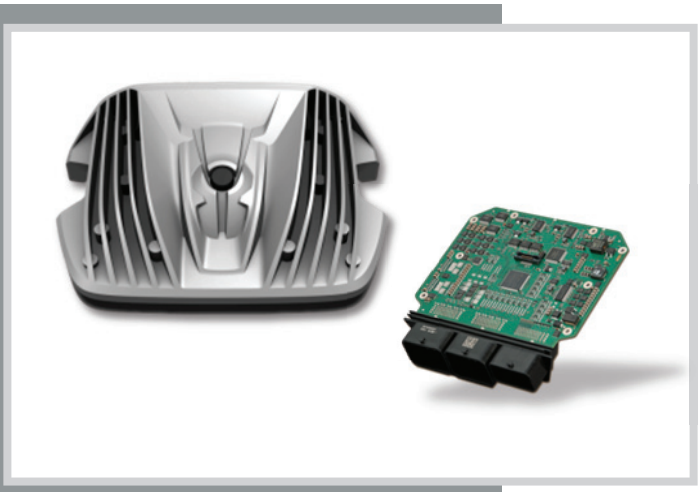
Original maximum vehicle speed when using the conventional diesel engine

the Tri-Mode-System

electric	hybrid	diesel engine
Up to 50 km electric range Noiseless Free of Emissions Vmax 90 km/h	Fuel reduction up to 35% Vmax 120 km/h	Maximum speed similar to basic vehicle

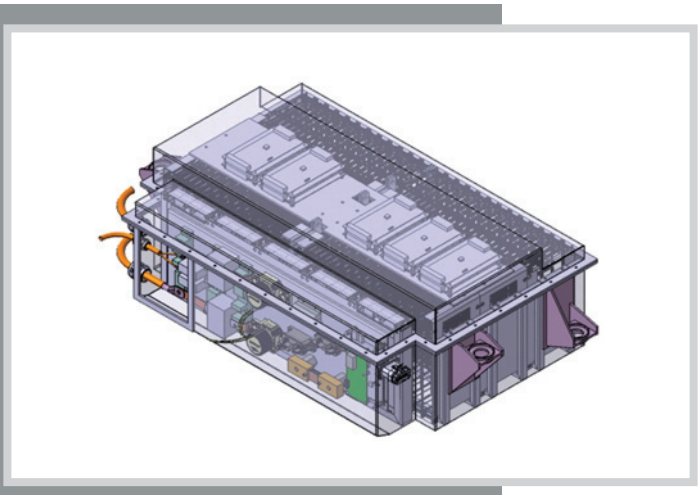
ELENA - system components

Hybrid Control Unit (HCU)



- High performance platform
- 32-Bit power architecture dual core
- Functional safety concept for ASIL C
- 16-Bit Automotive MCU for redundant data processing and safety monitoring
- Energy, power & safety management
- Full vehicle control and integration of electromotive components in the vehicle

Battery System (incl. BMS)

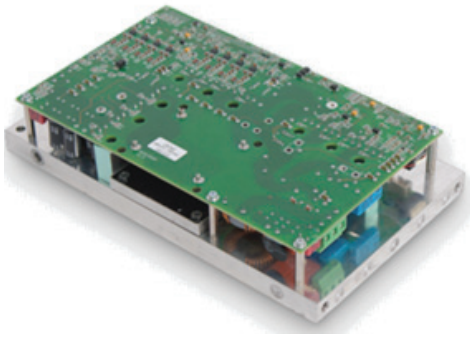


- Battery cells with BMS
- HV safety components
- SoC, SoH, safety control
- Passive cell balancing
- NCM (Lithiumnickelcobalt manganese oxide)
- High-voltage level
- [V] 288 (240 – 340)
- Number of cells: 80
- Energy content [kWh]: 17,3
- Capacity [Ah]: 60
- Battery mass [kg]: 200

Electric Motor and Power Electronic

- Electric drive incl. power electronic for the traction engine (asynchronous)
- Max. Torque: 267 Nm
- Max. Speed: 12000 rpm

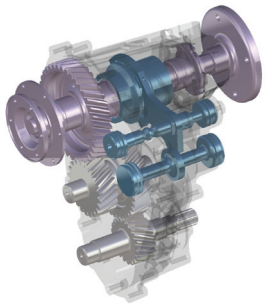
DC/DC-Converter and Battery Charging System



- Charging of high-voltage battery from AC source
- 1-phase charger, max. 3,5 kW
- on-board power supply (12 VDC) max. 1,5 kW
- Communication via CAN-Bus with HCU

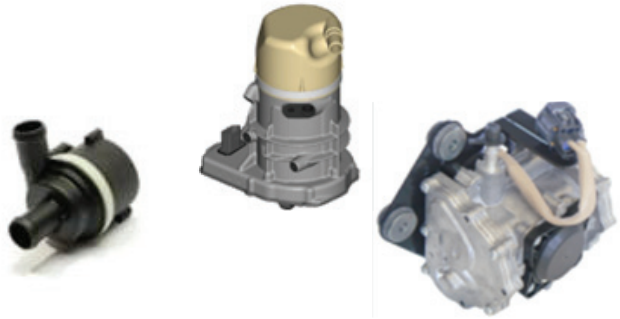
ELENA - system components

Hybrid Gearbox



- Gearbox for driving mode selection (electric/ hybrid/ diesel engine) in various speed and torque classes

Electric Actuators



- 12 V electric vacuum pump for brake booster in electric drive mode
- 12 V electric servo pump for power steering in electric drive mode
- Electric water pump for cooling the high-voltage system

HMI / Pushbutton

- Soft touch pushbutton with integrated LEDs and CAN-Bus communication
- Smartphone app for detailed status information (under preparation)

TECHNICAL DATA ELENA PHEV-SPRINTER

Basic Vehicle [exemplary]	Mercedes-Benz Sprinter 313CDI (alternative: 311/ 316 CDI)
Diesel engine (EU5 / EU6) [exemplary]	Power: 95 kW / 129 PS Torque: 305 Nm
E-Drive (asynchronous)	Power: 40 kW / 80 kW (peak) Torque: 105 Nm / 266 Nm (peak)
Traction Battery	Capacity: 17,3 kWh
Electric Range (depending on payload and route)	up to 50 km
Maximum Speed	purely electric : 90 km/h (limited)

notes

YOUR CONTACT

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