

Contributions to the Development of Powertrain / Hybrid Drive



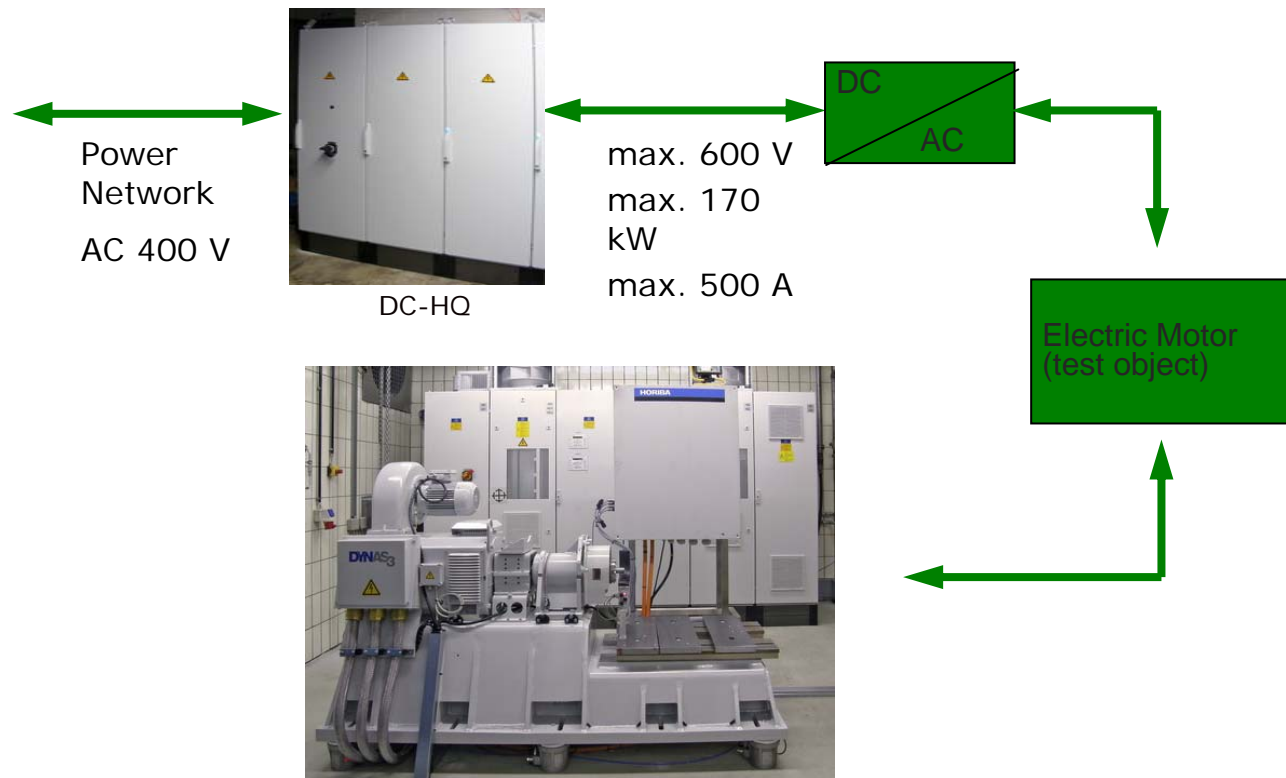
- Test Bench
- DC High Voltage Source
- Plan of Test Bench
- Test Bench / Equipment
- Battery Testing
- Spin Test Benches
- Integration of Hybrid Components
- Matrix of Competence

Test Bench



DC High Voltage Source

Simulation of Traction Battery



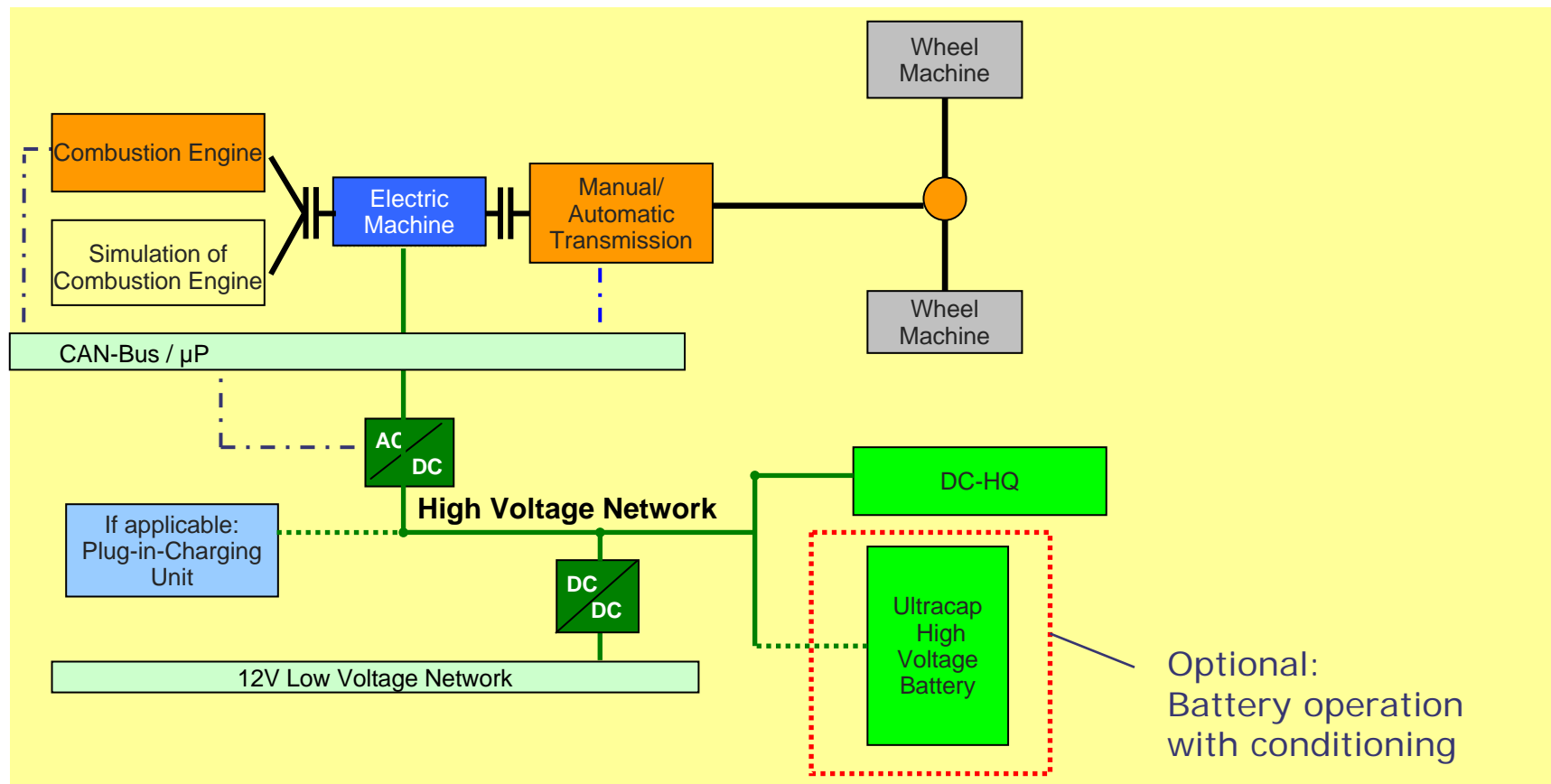
DC-HQ



	Power [kW]	Torque [Nm]	Speedmax [rpm]	Inertia [kgm ²]
Load Unit	180	420	16000	0,20

Plan of Test Bench

Wheel Machine Test Bench with High Voltage Source



Test Bench



Load Unit / Drive Machine

	Power [kW]	Output Voltage [V]	Output Current [A]
E Drive Test Bench (Kratzer)	150	0 - 600	± 500
E Drive Test Bench (Horiba)	150	0 - 600	± 600

- Simulation of operating conditions for E drive testing in climatic box (from -65 °C up to 180 °C) - power measurement, 4-channels with 4 x 200A respectively 700A)
- High Precision Converter
- Transient Recorder, 10-channels
- Engine Tester for automatic measurement of grounding and winding resistance

Battery Simulation for E-Mobility Testing

	Power [kW]	Torque [Nm]	Speed _{max} [rpm]	Inertia [kgm ²]
Drive Machines	460	1000	10000	0,90
Drive Machines	180	430	15000	0,20
Wheel Machines	260	3200	3000	10.55
Intermediate Gear Box	200	500	18000	

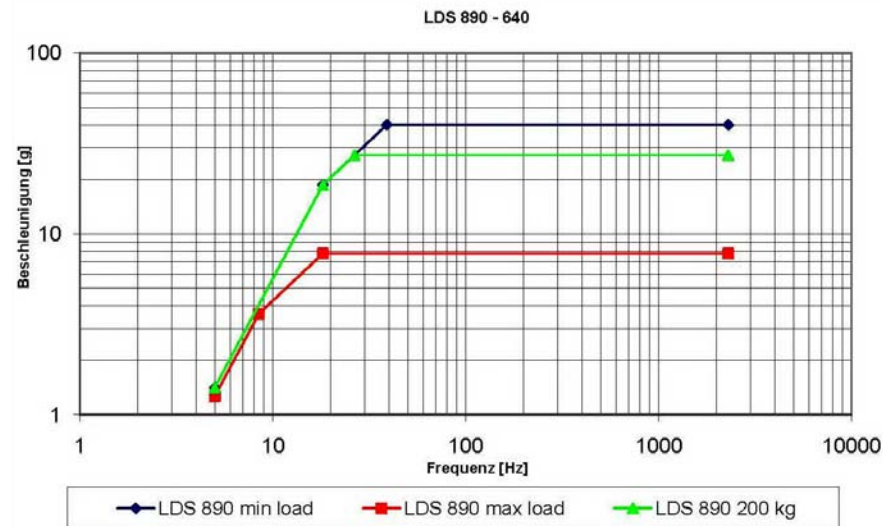
(Hot) Shaker System LDS 890

(Hot-) Shaker – measuring data

- Massenelement : 85.68 kg
- Frequenzbereich : DC – 2300 Hz
- Power : 53400 N
- Speed : 1.6 m/s
- Acceleration max. : 392.4 m/s² (40g_n)
- Loading max. : 700 kg



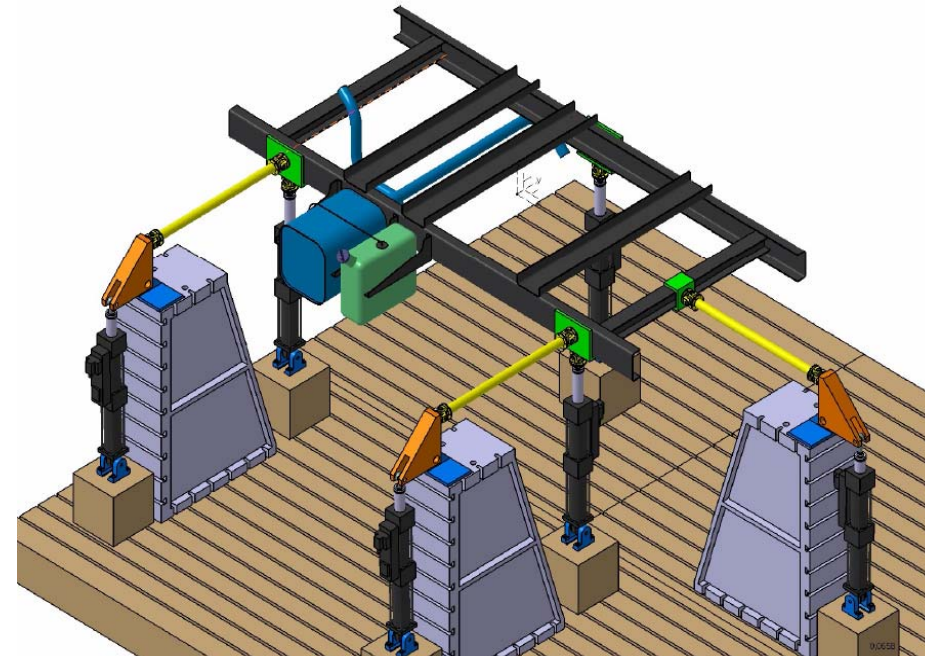
Option: LCF or HCF
fatigue loading of
battery pack



Rotor Dynamic Analyses of Electric Engines / Generators (Life Time Analyses, Rotor Dynamic Analyses, Burst and Overspeed Testing)

Test Bench	BSI 1	BSI 2	BSI 3	Schenck BI 1U	Schenck BI 2U
Diameter of Chamber	1600 mm	1600 mm	1500 mm	200 mm	250 mm
Axial Length	900 mm	900 mm	700 mm	200 mm	200 mm
Maximum Weight of Sample	4000 kg	4000 kg	450 kg	10 kg	50 kg
Speed Range	0 – 40000 rpm	0 – 40000 rpm	0 – 65000 rpm	0 - 16000 rpm	5000 – 120000 rpm
Control System	Computer-Controlled, Programmable	Computer-Controlled, Programmable	Computer-Controlled, Programmable	Computer-Controlled	Computer-Controlled
Vibration Monitor	2 – Channel	2 – Channel	2 – Channel		
Heating System	3 x 10 kW	3 x 10 kW		1 x 3 kW	1 x 10 kW
Maximum Temperature	800 °C	800 °C	800 °C	150 °C	600 °C
Transfer of Data	Telemetry	Telemetry	Telemetry		
Temperature Measurement	Optical Pyrometer	Optical Pyrometer	Optical Pyrometer		Optical Pyrometer
Data Logging	32 Channel	32 Channel	32 Channel	2 Channel	

- Structure-dynamic analyses
- Analyses for structural integrity of assemblies and components
- Dynamic simulation testing
- Life time testing



6-Axis-LCF Test Battery Pack attached to an Utility Vehicle Frame

Matrix of Competence

- Powertrain Test Bench
- Structural Testing

Competence of KST
Competence of GEVA



	Battery Test Bench	Power Train Test Bench	Engine Test Bench	Component Integration Structural Testing	Generator Spin Test Bench
Hybrid Drive Train		Competence of KST	Competence of KST	Competence of GEVA	
Electric Drive Train		Competence of KST	Competence of KST	Competence of GEVA	
Wheel Hub Drive		Competence of KST		Competence of GEVA	Competence of GEVA
Battery Pack	Competence of KST			Competence of GEVA	
Electric Engine/Generator		Competence of KST	Competence of KST	Competence of GEVA	Competence of GEVA

Locations



KST Motorenversuch GmbH & Co. KG
Bruchstraße 24 - 32
67098 Bad Dürkheim
Germany
Telephone : +49 6322 - 799 0
Fax : +49 6322 - 799 353
E-Mail: info@kst-motorenversuch.de
Internet: <http://www.kst-motorenversuch.de>



GEVA Gesellschaft für Entwicklung
und Versuch Adlershof mbH
Willy Wolf-Bau
Friedrich-Wöhler-Straße 1
12489 Berlin
Germany
Telephone : +49 30 63 92 - 74 10
Fax : +49 30 63 92 - 74 70
E-mail: service@geva-adlershof.de
Internet: <http://www.geva-adlershof.de>