

CONSULTENS® Group



Professional Services GmbH
Munich

Software Engineering
Process Engineering
Product Lifecycle Management



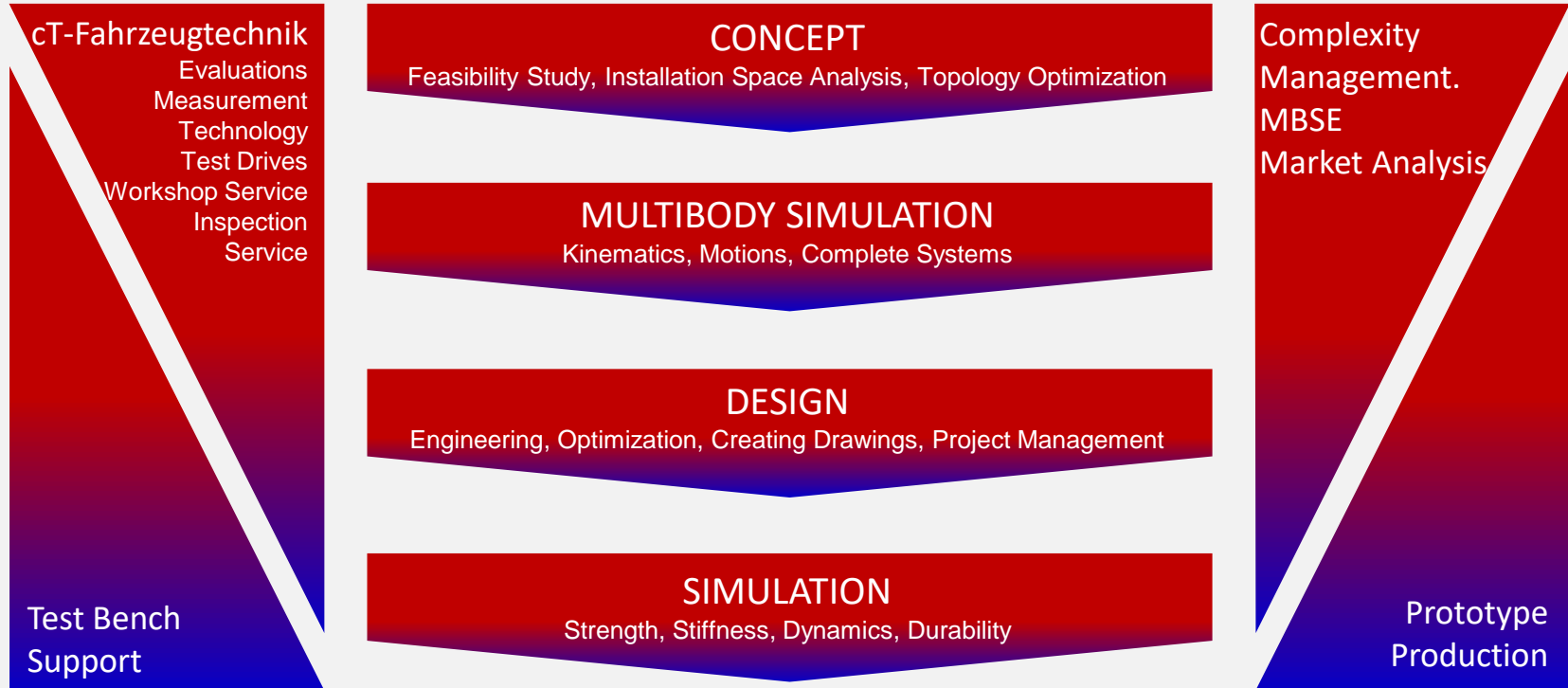
Technologies GmbH
Magdeburg – Ingolstadt

cT-Engineering
cT-Design
cT-Fahrzeugtechnik
cT-Innovation


History

- 2001** Start-up of the consultens Technologies in Magdeburg-Barleben as development partner for automotive (Chassis) and general mechanical engineering with preferences in lightweight design
- 2004** First steps into the commercial vehicle sector / light duty trucks
- 2005** Takeover of the office in Ingolstadt and diversification in other sectors
- 2006** Development partner of Volkswagen AG for electromechanical driving systems
- 2007** consultens Technologies becomes sister company of consultens Professional Services under the parent organization of the consultens group
- 2008** First steps into manufacturing prototypes with competent partners
- 2009** First steps into the development of petrol engines in Ingolstadt
- 2012** First steps into the development of diesel engines in Magdeburg-Barleben
- 2013** Opening of our prototype/vehicle workshop (certified according to Audi regulations)
- 2014** Partner for the development of components for Volkswagen Salzgitter
- 2015** Entry into test support / measurement analytics and complexity management
- 2017** Entry into market analysis, vehicle analysis and competition analysis
- 2018** Development of the **conSens Quattro M** – laser measurement system for motion measurements in vehicles.
Entry into MBSE (in cooperation with CPS)
- 2019** Entry into housing development for battery cells, design and production of a test battery cell

Our Services At A Glance



CT-Fahrzeugtechnik

- ▶ **Workshop** – certified for prototype cars
- ▶ **Market Analysis - WBA**
- ▶ **conSens Quattro M - Laser measuring system**
Mobile Motion Measurement while Moving
- ▶ **Workshop Services, Inspection Services**
UVV (Accident prevention regulations), Maintenance and Services for Workshop-Equipment (e.g. Lifting platforms, roller shutters etc.)
- ▶  **- Service, Repair, Overhaul**
Oldtimer, Youngtimer, Rare vehicles



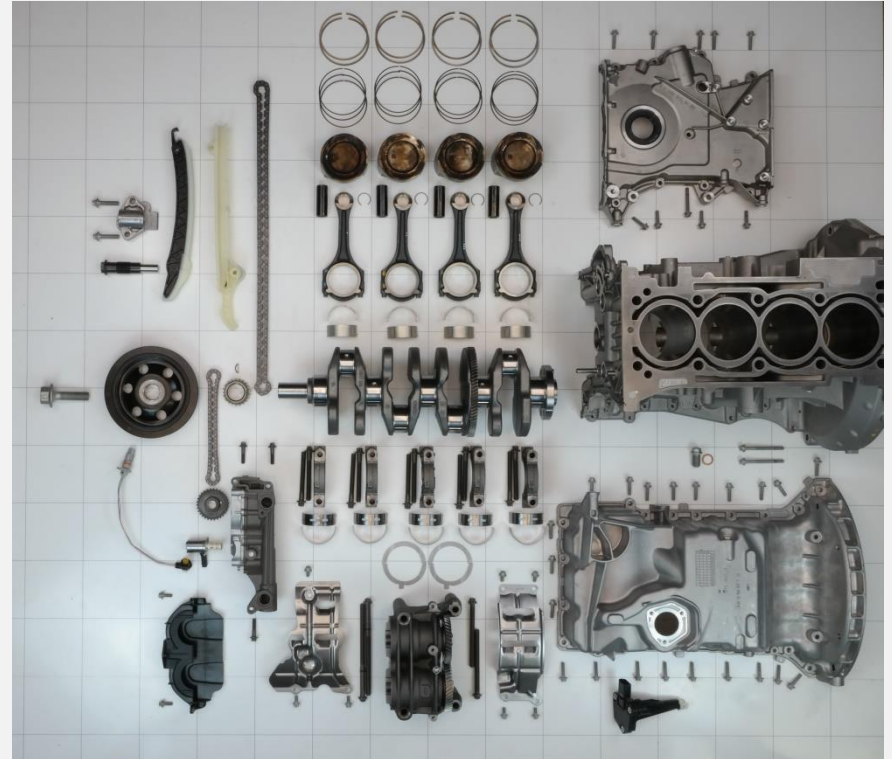
Workshop - Prototype certified

- ▶ Setting-up and dismantling of DL and functional vehicles
- ▶ Evaluation, diagnosis and measuring
- ▶ Setup and organization of measurements and test drives (e.g. temperature, pressure, movement measurements, GPS, CAN...)
- ▶ Performance of test drives on common test tracks (e.g. PGN, Ehra, Nardo, Nürburgring, ...), city, country, Autobahn - Customer profiles
- ▶ Construction and operation of component test benches
- ▶ Organization and spare parts logistics for PST and DL
- ▶ Exchange/conversion of attached parts
- ▶ Work on vehicles with HV components, e.g. Tesla, Toyota (Mirai) and almost all VAG vehicles (PHEV, E-Tron, G-Tron, H-Tron, ...)
- ▶ Partial dismantlings of third-party vehicles
- ▶ Vehicle Management
- ▶ Parts service (organization, production, purchase, ...) - also internationally
- ▶ Data processing, analysis, evaluation, reporting



Competition Analysis - WBA

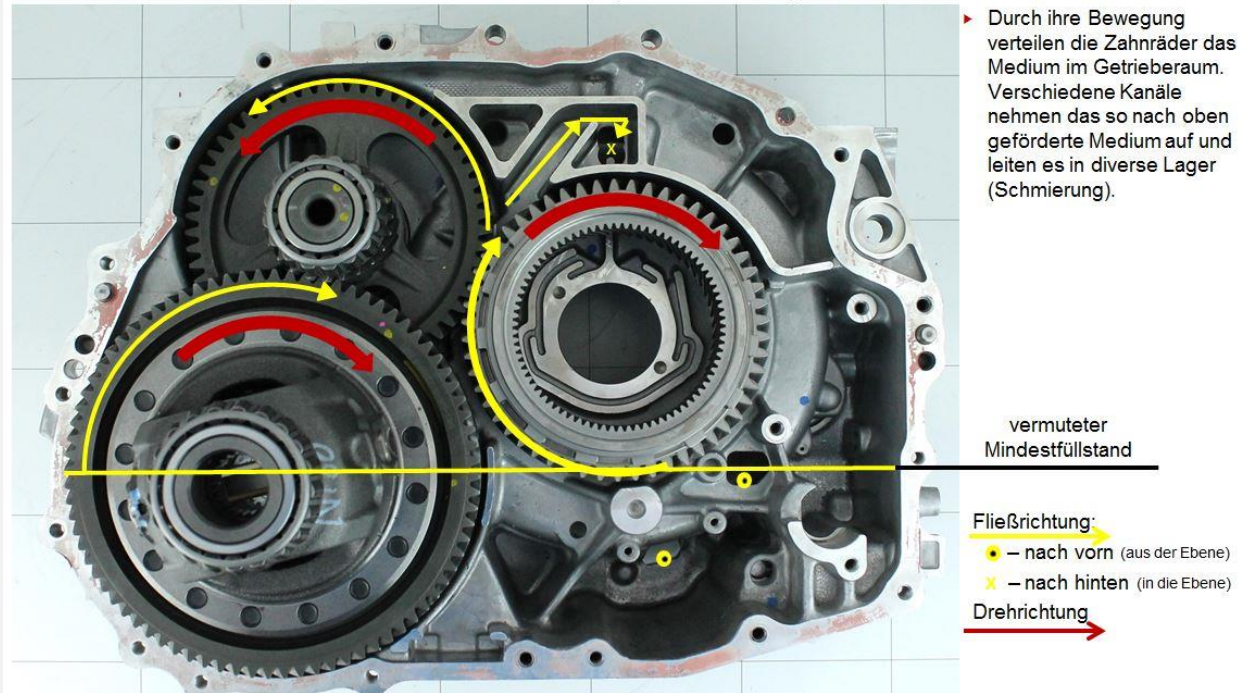
- ▶ Market analyses
- ▶ Research
- ▶ Vehicle analyses
- ▶ Vehicle dismantling/partial dismantling (e.g. drive, ancillary parts, electric drive, HV components, ...)
- ▶ Database administration
- ▶ Material testing
- ▶ Photo documentation
- ▶ Reporting



Competition Analysis - WBA

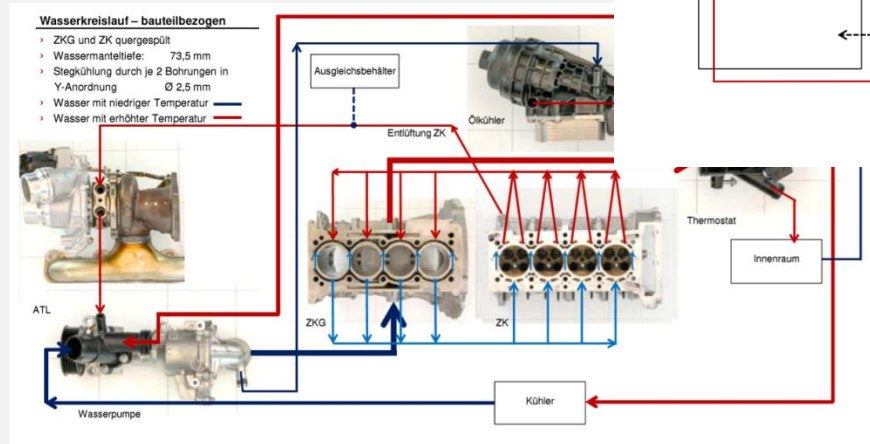
- ▶ Functional and motion illustrations
- ▶ Comments
- ▶ Legend

Flussschema 3: Medium gefördert durch die Zahnräder (Gehäuseschale 01)



Competition Analysis - WBA

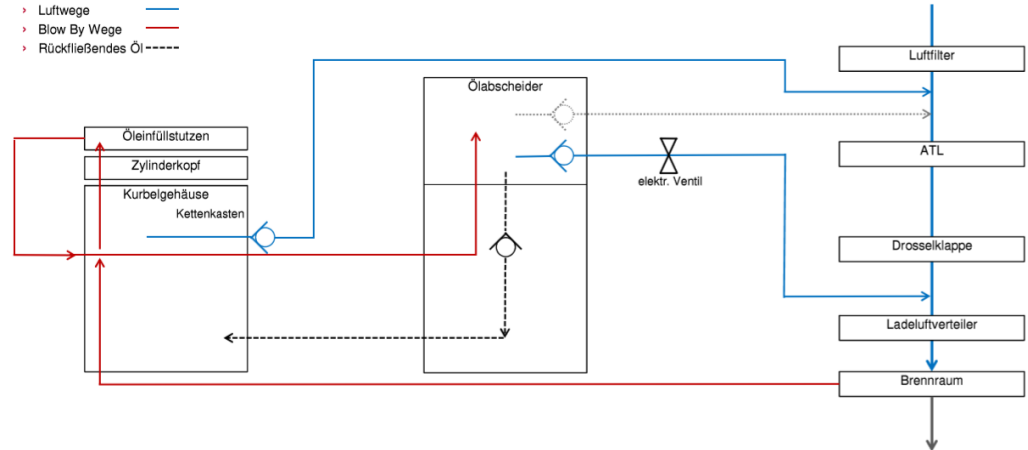
- ▶ Schematic diagrams
 - ▶ graphically or with photos
 - ▶ Comments
 - ▶ With legend
- ▶ e.g. cooling system, oil circulation system, ...



Kurbelgehäuseentlüftung – schematische Darstellung

Teillastbetrieb

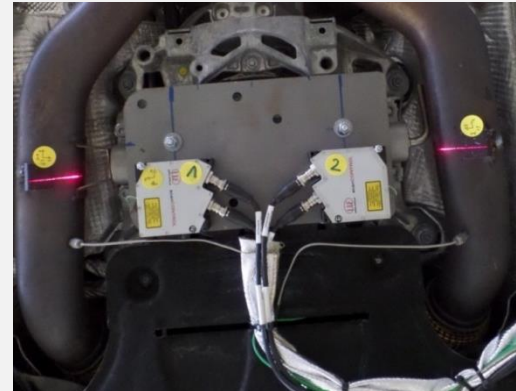
- ▶ Luftwege
- ▶ Blow By Wege
- ▶ Rückfließendes Öl -----



conSens Quattro M - Laser measuring system

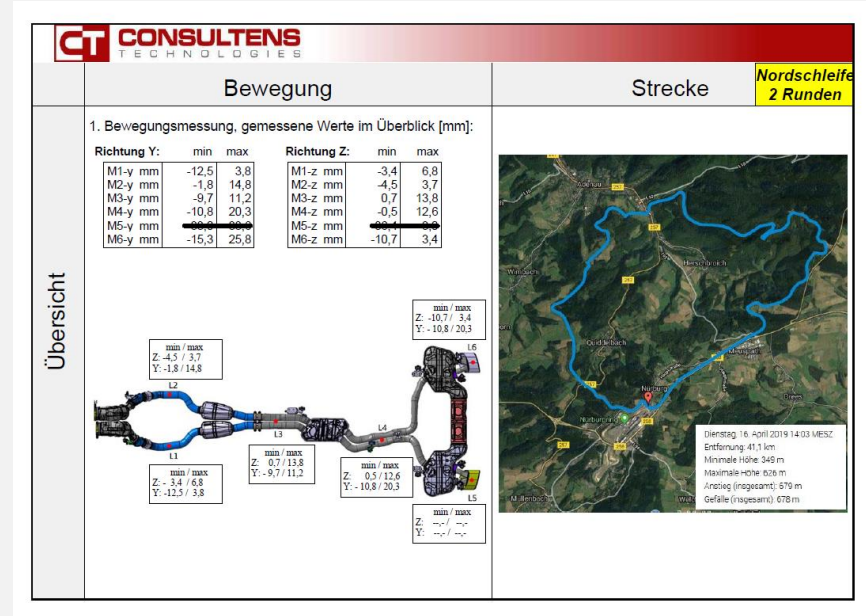
Mobile Motion Measurement while Moving

- ▶ Laser-based measuring (7 laser scanners)
 - ▶ Movement measurements of components and aggregates in the installation space (e.g. AGA, cardan, shafts, bearings, carriers, ...)
 - ▶ Vehicle data integration (CAN, ...)
- ▶ Optional: Camera-supported measurements (motion measurements, installation space views)
- ▶ Combined measurements (camera/laser)
- ▶ Additional measurements with GoPro (e.g. water passage, ...)
- ▶ ETAS
- ▶ Data logger
- ▶ Optional:
Measurement data acquisition of temperature, acceleration, pressure, if necessary also CAN bus "Flex Ray" for vehicle data, GPS, ...



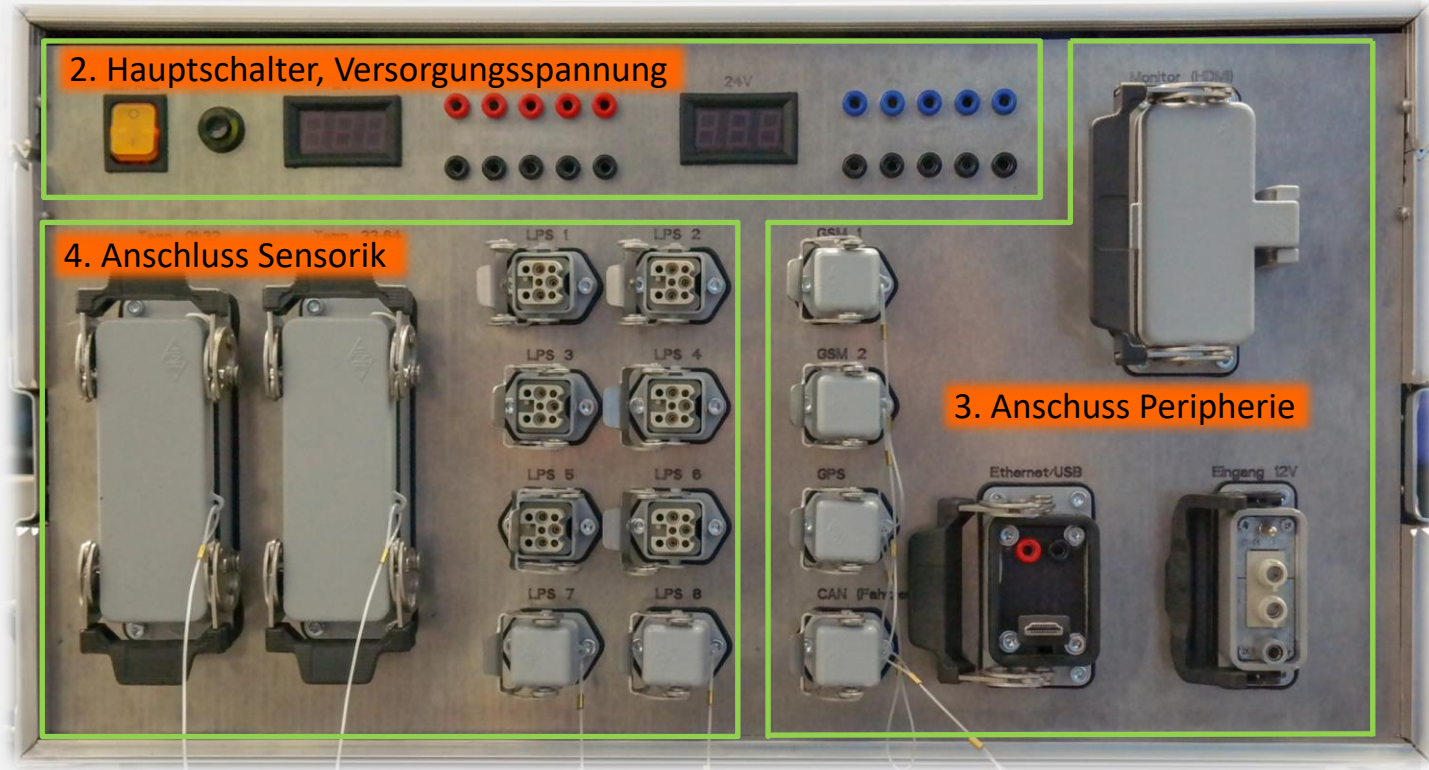
conSens Quattro M - Laser measuring system

- ▶ To be implemented:
 - ▶ Integration of additional data directly synchronous to the laser technology
 - ▶ Viewer for quick initial assessment and plausibility check of the measurement (browser-based or as software tool)



conSens Quattro M - Laser measuring system

1. General information
2. Main switch, Powersupply
3. Peripheral connection
4. Sensor connection



conSens Quattro **M** - Laser measuring system

1. General information
2. Main switch,
Powersupply
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Powerful:

The measuring system **conSens Quattro M** was developed for the acquisition of laser measurement data. The core is a powerful industrial computer with a Windows 10 operating system.

Flexible:

The main focus was placed on high flexibility to be able to integrate individually available or necessary data. The system can be expanded or converted with manageable investments..

Efficient:

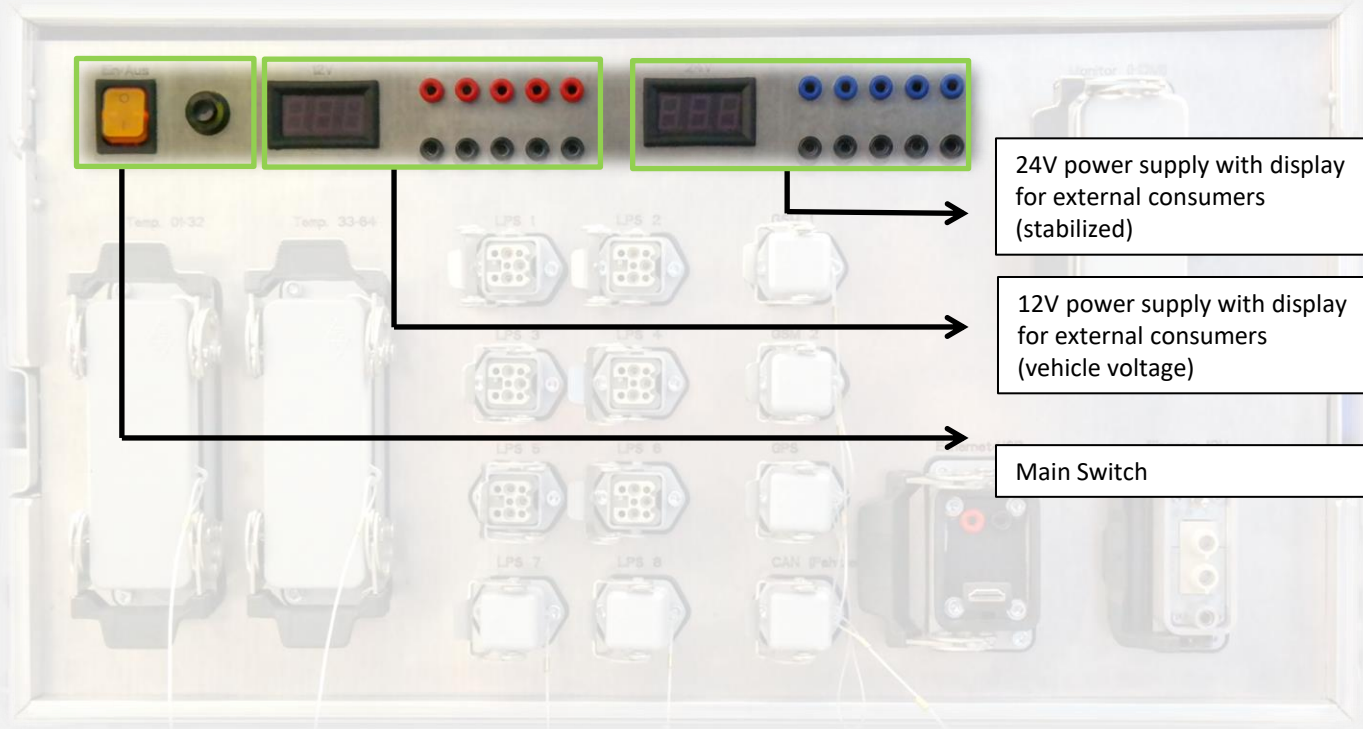
In order to be able to carry out particularly long - even customer-specific - measurement runs, we focussed on the smallest possible volume of measurement data without any loss of relevant data.

Reliable/Stable:

A further key point is the continuous power supply, to avoid any lack of power, especially for technology carriers. **conSens Quattro M** is equipped with a buffer battery. This allows the system to work autonomously for up to one hour.

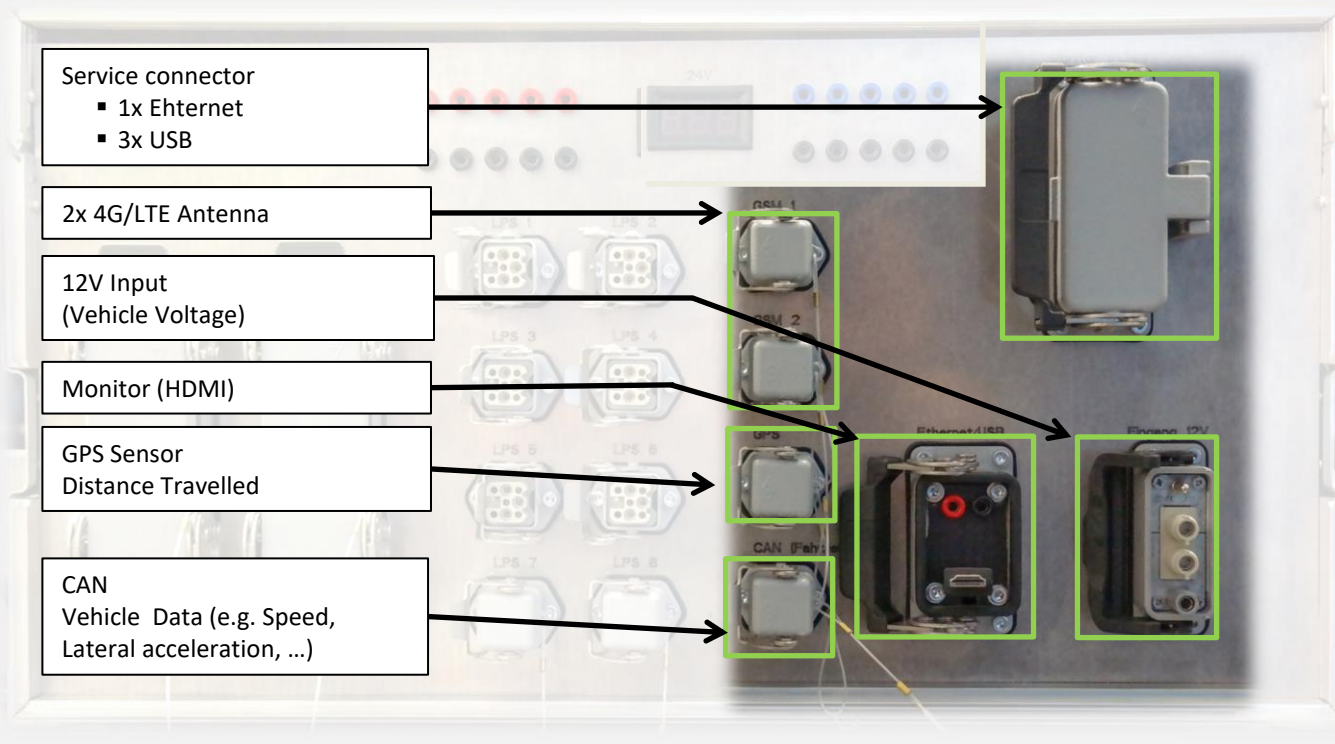
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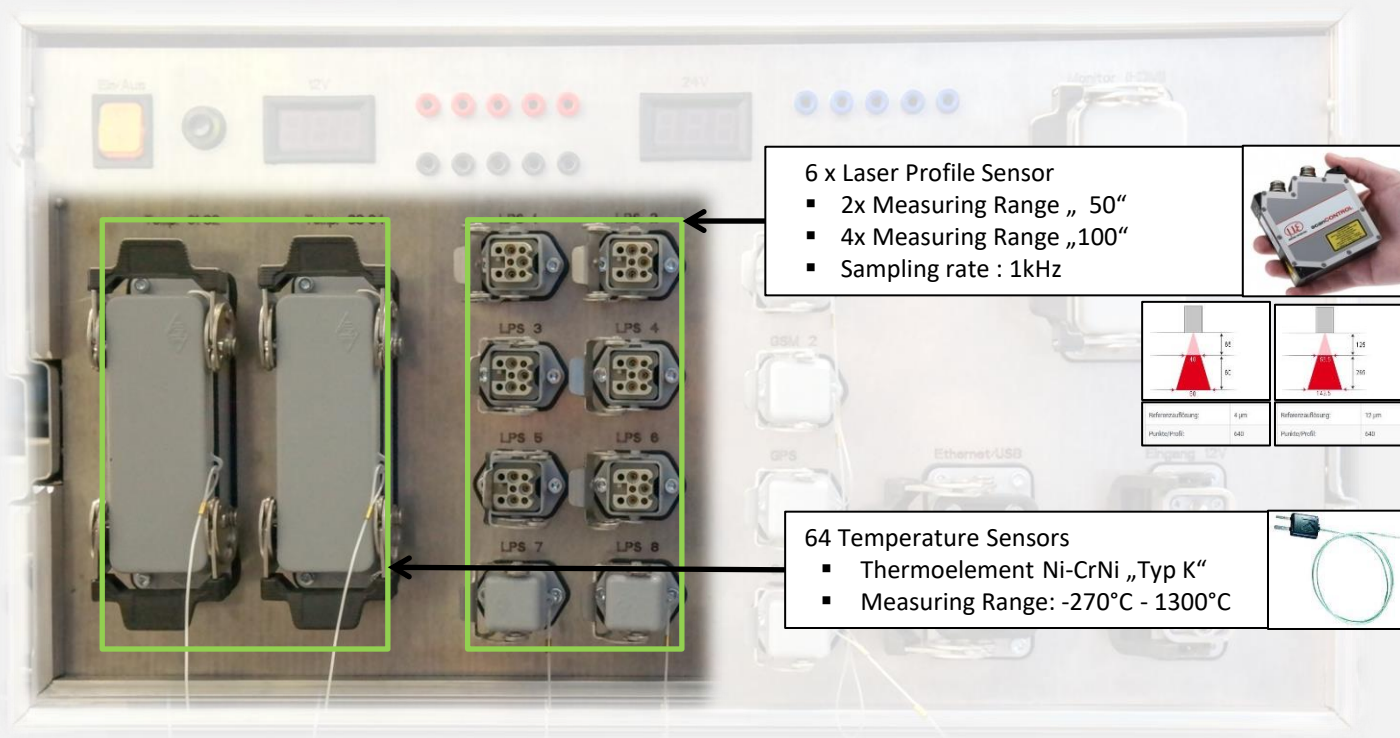
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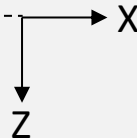
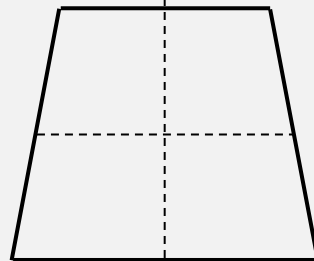
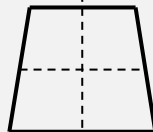
conSens Quattro M - Laser measuring system

Surface sensor,
Exit laser beam

26xx-25	x-Axis	z-Axis
Start	23,4	53,5
Center	25	66
End	29,1	78,5
Accuracy	0,045	0,002

26xx-50	X-Axis	Z-Axis
Start	42	70
Center	50	95
End	58	120
Accuracy	0,091	0,004

26xx-100	X-Axis	Z-Axis
Start	83,1	190
Center	100	240
End	120,8	290
Accuracy	0,189	0,012



LPS: Measuring range and accuracy

Workshop Services, Inspection Services

- ▶ UVV-Certification according to DGUV Rules and Regulations
- ▶ Maintenance, Installation and Service of Workshop-Equipment
- ▶ UVV-Review, Maintenance and Repair of small electrical devices
- ▶ Spare parts supply

Prüfung gemäß
DGUV Vorschrift

Nächste Prüfung



Werkstattservice/Prüfdienst:
0177/3284650

consultens Technologies GmbH
Schütterlettenweg 6
85053 Ingolstadt
www.consultens.com





- Service, Repair, Overhaul

- ▶ Oldtimer, Youngtimer, Rare Vehicles
- ▶ Technical Service
- ▶ Vehicle electrics
- ▶ Restoration
- ▶ Customizing
- ▶ Valuation report (TÜV certificate)
- ▶ Review
- ▶ Tyre service



Contactinformation:

CONSULTENS

Technologies GmbH
Steinfeldstraße 3
D- 39179 Magdeburg/Barleben

Tel: +49 39203 812-10
Fax: +49 39203 812-19
Web: www.consultens.com
Mail: info@consultens.com

CONSULTENS

Technologies GmbH
Schütterlettenweg 6
D- 85053 Ingolstadt

Tel: +49 841 99 34 8-0
Fax: +49 841 99 34 8-11
Web: www.consultens.com
Mail: info@consultens.com

CT-Fahrzeugtechnik

Südring 26
D- 85092 Kösching

Tel: +49 841 99 34 8-0
Fax: +49 841 99 34 8-11
Web: www.consultens.com
Mail: info@consultens.com

Your Contact:

In Barleben:	Hartmut Preuß (Branch Manager)	+49-172-894 6577	hartmut.preuss@consultens.com
In Ingolstadt:	Michael Wagner (Managing Director)	+49-172-898 5057	michael.wagner@consultens.com
	Stefan Kreitzick (Sales Manager)	+49-151-425 39995	stefan.kreitzick@consultens.com
In Kösching:	Stefan Kreitzick (Head of cT-Fahrzeugtechnik)	+49-151-425 39995	stefan.kreitzick@consultens.com