E-Mobility Instruments

DEWE-E-Mobile ...
Electrical & mechanical measurements in one box

In the race to produce an electric vehicle with a range practical for everyday use, the development of energy efficient components is an important focus for automotive research centres across the globe. Consequently there is an enormous need for test and measurement systems to monitor the energy flow and storage through vehicle activity such as charging, startup, driving, parking and potential misuse of the vehicle.

DEWE-xxx-E-Mobil systems can do so much more than just capture voltage and current signals.

An extra library for power measurement (DEWESoft POWER Module) makes the calculation of for example power flow, losses, harmonics and voltage fluctuations possible. With the help of this functionality the user can, beside the DC measurement on batteries, make time synchronous analysis of the other components like converters and motors.

Key Features

- *ALL-IN-ONE*
  Power Analyzer, Combustion Analyzer, Recorder and Scope on a single machine
- *Same software interface for all instruments, easy to learn and use, online or offline calculation*
- *Synchronized analog, digital, counter, CAN bus and video inputs – to simplify analysis*
- *High isolation and high accuracy*
- *High bandwidth up to 1 MHz*
- *Test bench for electric drive trains*

Adding transducers such as accelerometers, rpm sensors or thermocouples can be handled through flexible and isolated signal conditioning, recorded synchronously alongside hundreds of channels of vehicle CAN bus data. Add a GPS sensor to give information about position, distance, velocity and direction, along with video cameras to monitor road or environmental conditions and you have a very clear view of the "E-vehicles" performance characteristics.

E-Mobile Instruments

Nothing is required to complete these instruments.

		DEWE-2600-E-Mobile-500	DEWE-510-E-Mobile-500
Dynamic analog input channels		7 voltage, 7 current, 2 additional channels possible	
Included DAQP modules for DC circuit		1x DAQP-HV-S3 and 1x DAQP-LV-D	
Included DAQP modules for two E-Drive		6x DAQP-HV-S3 and 6x DAQP-LV-D	
External quasi-static channel expansion		EPAD interface, up to 16 EPAD2 modules = 128 channels	
A/D conversion			
Sampling method		Simultaneous sampling	
Sampling rate / channel		500 kS/s	
Resolution		16 bit	
Digital I/O and counters			
Digital I/O, TTL level		8	
Counters or digital inputs, TTL level (1 counter equals 4 digital inputs)		2 included / 8 optional	
Options			
UP-CNT8-TTL adds 8 synchronous counter / encoder or 32 digital inputs, TTL level		optional	
UP-CNT8-DIFF adds 8 sync. counter / encoder or 24 digital inputs with programmable threshold levels (0..40 V), input voltage range -35 to 60 V, AC/DC coupling, and 8 sync. digital inputs protected up to 25 V_{DC}, TTL level		optional	
CAN bus option			
UP-CAN-2 2 highspeed CAN bus interfaces		included	
Video input option			
UP-DEWE-CAM-01 adds synchronized video picture acquisition of up to 200 fps (frames per second) up to 70 fps at 640 x 480 pixel up to 200 fps at 640 x 120 pixel		optional	
Combustion Analyzer option			
DEWE-xxx-CA		optional	
Speed and distance sensors			
DEWE-VGPS-200C with 20 Hz engine and interpolated 200 Hz output		optional	
Current sensors			
PNA-Clamp-150-DC (DC…100 kHz) - TEDS detection		300 A DC or AC_{peak}	
EMC			
ESD; EMC		IEC 61000-4-2; EN 55011	
Power supply	Surge	IEC 61000-4-5 4 kV	
	Burst	IEC 61000-4-4 4 kV; L, N, PE	
Voltage inputs	Surge	IEC 61000-4-5 4 kV	
	Burst	IEC 61000-4-4 4 kV	
Current inputs	Surge	IEC 61000-4-5 4 kV	
	Burst	IEC 61000-4-4 4 kV	
Shock and vibration			
Shock		EN 60068-2-27	
Vibration		EN 60068-2-6, EN 60721-3-2 class 2M2	
Environmental			
Operating temperature		0 to +50 °C (0 to +45 °C with batteries)	
Storage temperature		-20 to +70 °C	
Humidity		10 to 80 % non cond., 5 to 95 % rel. humidity	
Data storage			
Technology		Hard disk	
Capacity		600 GB	1000 GB
Max. gap free storing to disk		Typical 80 MB/s	Typical 70 MB/s
Typical duration of recording (16 ch. / 10 kS/s/ch. / 16 bit)		20 days	35 days
Power supply			
Standard		Battery powered, 3 battery slots [2], 3 batteries for ~2 hours operation incl., incl. external AC power supply	510-DC-12V Power supply 9 to 18 V_{DC} (no internal battery), incl. external AC adaptor
Optional		95 to 260 V_{AC} 50 / 60 Hz or 110 / 220 V_{DC}	
Main system [1]			
Display		15" TFT (1024 x 768)	Optional MOB-DISP-12 or -15
Processor		Intel® Core™ 2 Duo 2 GHz	
Current transducer power supply 15 V		8x Lemo sockets	
Interfaces		4x USB, 2x Ethernet, 1x RS-232	
Dimensions			
Housing		Portable instrument	
Dimensions (W x D x H)		417 x 246 x 303 mm (16.4 x 9.6 x 11.9 in.)	439 x 308 x 181 mm (17.2 x 12.1 x 7.1 in.)
Weight without batteries		Typ. 14 kg (31 lb.)	Typ. 8 kg (17.6 lb.)

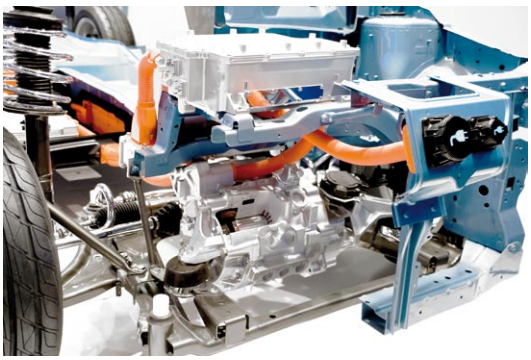
[1] Please find current specifications in the latest price list

[2] Weight of one battery: 660 g (1.45 lb.)

Application Examples for E-Mobility Measurement

Measuring on Electric Drive Trains

Electric motors offer high efficiency and high torque: ideal requirements for a powerful drive train. But in order to bring the power as effectively as possible onto the road, a drive train is necessary that optimally puts this challenge into effect. Gear drive, battery, power electronics and many more components are to be optimised for these requests.



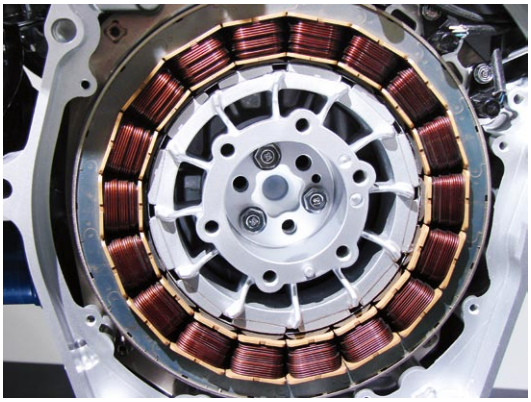
Measuring on Hybrid Vehicles and other Alternative Drive Concepts

Modern drive systems work with very fast converters that have both high pulse frequencies and steep rising edges. The power measurement is thus confronted with all tasks of modern power measurement instruments: broadband input modules, high sampling rates, highly accurate identification of reactive and active power, determination of rotation speed and torque. Beside the measurements of motors (3~, permanently energized synchronization instruments), also measurements of battery circuits and intermediate circuits are of interest – and this absolutely synchronous (DC, single-phase).

Further interesting parameters could be temperature, oscillation, acoustics, sound emission, torsion and rotation oscillation and analysis of combustion engines provided that they are used in parallel. On the one side, such systems should be as portable as maximally possible for mobile applications. On the other side, it should be possible to integrate them in engine test benches. This requires adequate data interfaces.

Measuring Drive Train - Efficiency

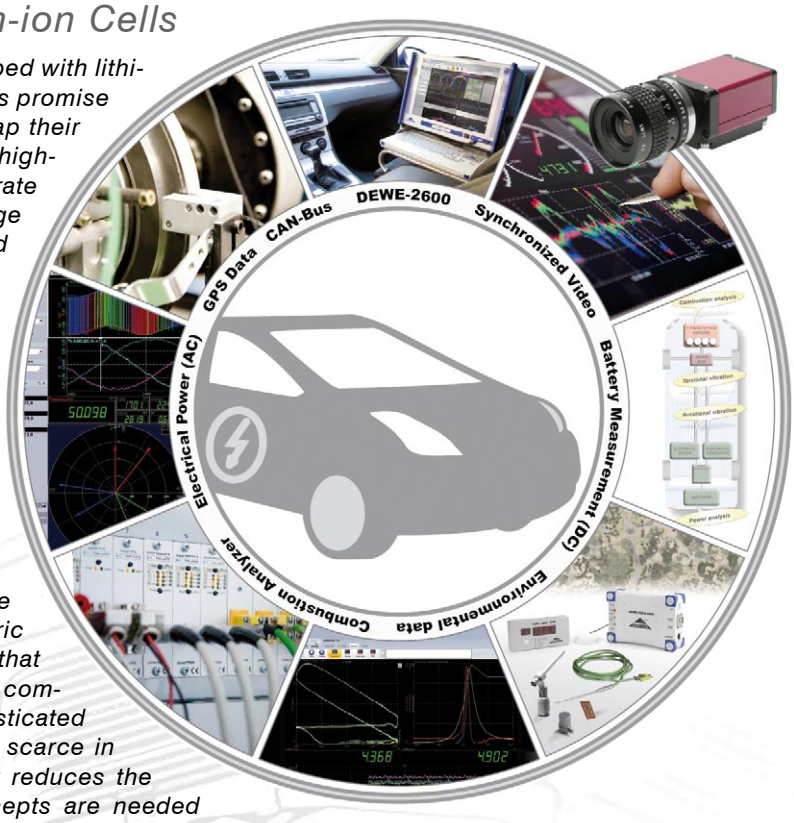
In order to meet the special demands concerning vehicle operations, it is necessary to optimize the efficiency factor and the durability. The optimisation of efficiency factors and the minimisation of losses are directly linked to complex precision measurement technology because the complex interaction of different mechatronic systems requires precise and reproducible analysis of mechanical and electrical parameters. The closer you reach the limit of 100% efficiency factor the higher are the requirements for the entire measurement chain. Dewetron offers system solutions for DC/AC-power measurement of high precision for voltages up to 1400 V and currents up to 5000 A with bandwidths up to 1 MHz.



Application Examples for E-Mobility Measurement

Battery Testing (DC) for Lithium-ion Cells

Future hybrid and electric vehicles will be equipped with lithium-ion batteries to a great extent. These batteries promise to have a high storage density. But in order to tap their full potential and to guarantee long-term and high-level operation period, intelligent and elaborate testing is absolutely necessary. Another challenge is the integration of batteries in the drive train and the entire vehicle.



Energy Management Performance

The cruising range of an electric vehicle very much depends on the careful handling of available energy. On the one side, complex energy management is necessary especially as regards heating, air conditioning and comfort. On the other side, the energy consumption of electric components has to be reduced. This means that new developments and adaptations of available components are needed. This also includes a sophisticated planning of all auxiliary consumers. Energy is a scarce in the electric vehicle. Every additional consumer reduces the cruising range and the power. Intelligent concepts are needed that economise the energy of the battery. In order to make this possible a comprehensive recording system of measured data for the electric vehicle has to exist. All disciplines involved should calibrate and optimise these data. You need measurement technology in hard- and software with the competence for the entire vehicle! DEWETRON measurement technology for electrical power measurement supports you in these objectives.

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