

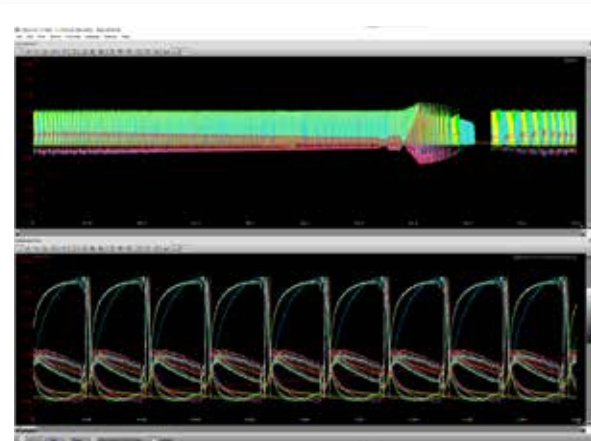
## Software LTTpro for LTT24 and LTTsmart

LTTpro is the associated software for display, analysis and storage of the data, so that the measurement chain from sensors to data acquisition to software can be offered from a single source.

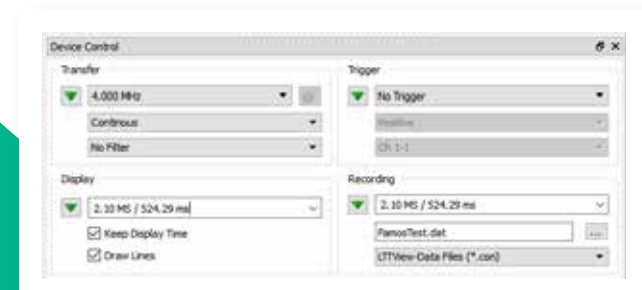
Thanks to a patented solution, no driver installation is required to get the devices up and running. As a result, the software is easy to configure. Simply connect the LTT device to the PC and plug in all sensors: the sampled analog and digital signals are immediately available in LTTpro for real time visualization, analysis by internal mathematics and direct storage into many different file formats (Famos, DASyLab, matlab, Diadem and many others).

### LTTpro Power Analyser

The software option "LTTpro PowerAnalyzer", specially developed for the LTTsmart, delivers high-performance electrical power analysis that is perfectly designed for modern electric motors at varying speeds. LTTsmart devices rely on highly optimized algorithms to precisely determine and display the rotation cycles, even at highly distorted phase current waveforms with heavy noise.



LTT Pro Software



Apart from all typical power characteristics (RMS values, active/reactive/apparent power, power factors, speed, efficiency,...), the distortion (THD = Total Harmonic Distortion) of all phase currents and phase voltages is continually calculated and displayed. Calculations based on half cycles and averaging across multiple cycles are also possible.

The parallel view of raw data and calculated PowerAnalyzer data immediately reveals the causes behind any anomalies in the key performance indicators.

At the press of a button or by setting an appropriate trigger event, entire time windows of raw data can be stored along with the corresponding calculated data from the PowerAnalyzer, down to the precise rotation, while the continuous power calculation keeps running.

The compact LTTsmart systems allow for both: operation at a test stand facility and mobile operation in a vehicle itself. In addition, the software LTTpro can also display, analyze and share previously recorded or emulated data, covering all requirements around driving cycles, vehicle testing and production monitoring.

This LTT-hardware/software package thus offers an efficient solution for measuring the power of an electric motor in testing environments as well as in real operation.

Furthermore the LTT PowerAnalyzer may as well get implemented into many third party solutions including Gl.bench, DASyLab, m.lab, LabVIEW.

## LTTsmart

ALSO AVAILABLE IN 19-INCH-VERSION WITH  
16 MODULES AND 32 CHANNELS.



- FLEXIBLE
- FAST
- PRECISE

| Input Characteristics | Range    | Bandwidth |        |       |
|-----------------------|----------|-----------|--------|-------|
|                       |          | 5 kHz     | 50 kHz | 1 MHz |
| Dynamic Range         | ±1000 V  | 110 dB    | 104 dB | 94 dB |
|                       | ±90 V    | 113 dB    | 107 dB | 96 dB |
|                       | ±10 V    | 115 dB    | 109 dB | 98 dB |
|                       | ±500 m V | 102 dB    | 94 dB  | 82 dB |

| ENOB (THD+ noise) | Range        | effective bits | dB @ 125 kHz sampling rate |
|-------------------|--------------|----------------|----------------------------|
|                   |              |                |                            |
| ±90 V             | typ 15.5 Bit | -96 dB         |                            |
| ±10 V             | typ 15.6 Bit | -97 dB         |                            |
| ±500 m V          | typ 14.3 Bit | -89 dB         |                            |

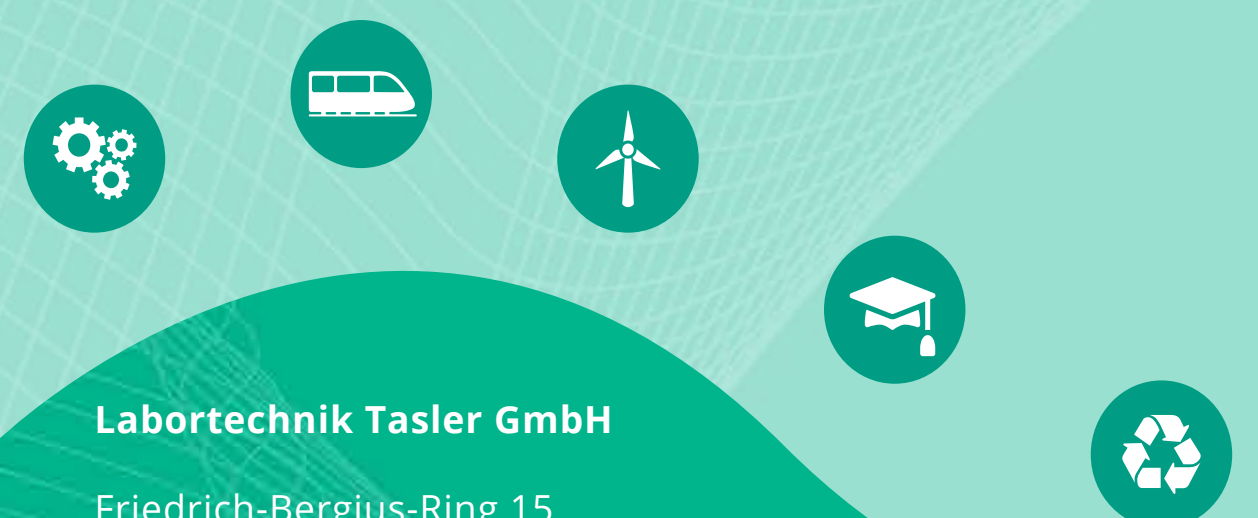
### Signal Conditioning

|                      |   |
|----------------------|---|
| ICP@/IEPE*           | Constant current supply: 4 mA. Input coupling: AC and DC  |
| Charge*              | 1 mV/pC, range: ±5 nC (optional up to ±500 nC)<br>High-pass: 0.15 Hz<br>auto charge clear; manual clear |
| Pulse/Counter Input* | Input signal: TTL<br>Time resolution 1.20 ns (832 MHz)  |
| Strain-Gauge*        | Quarter (120 Ω, 350 Ω) / Half / Full Bridges<br>Constant voltage supply: 0 ... 10 V                     |

# WE MEASURE IT ALL



- FLEXIBLE
- FAST
- PRECISE



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### Technical Data



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- FAST
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## LTTsmart – Technical Data

2-channels per module: High precision data acquisition system incl. analog frontend

Technical Specifications – Optional Specifications marked with \*

Specifications are subject to change without notice.

### Available per Module

#### 2-Channel high precision data acquisition system with 2 analog inputs:

- Synchronously sampling 2 MHz // 24 Bit ADC per channel (optional 4 MHz)
- $\pm 500$  mV,  $\pm 10$  V,  $\pm 90$  V\*
- $\pm 1000$  Vrms\*
- Extremely high precision:  $\pm(0.015\% \cdot \text{Signal} + 0.015\% \cdot \text{Range})$
- ICP®/IEPE with 4 mA supply\*
- Charge input\*
- Pulse/Counter Inputs with 1.20 ns resolution\*
- Strain-Gauge\*
- 2.5 kV galvanic isolation

**USB 3.0 Interface, Digital-I/O (3.3 V LVCMOS/LVTTL), LinkUp/LinkDown-Sync-Interface to cascade multiple devices**

**Size:** ca. 146 x 31 x 140 mm<sup>3</sup> (L x W x H) per module

### Input Characteristics

|                                       |  |
|---------------------------------------|--|
| <b>Max. Bandwidth</b>                 | DC – 900 kHz (optional 1.7 MHz)  |
| <b>Filter</b>                         | Analog: 900 kHz low-pass filter (optional 1.7 MHz)<br>Digital: a variety of selectable filters |
| <b>Inter-Channel Phase Difference</b> | $\leq 10$ ns   |
| <b>Input Connectors</b>               | BNC, High Voltage Banana and/or DIN  |
| <b>Galvanic Isolation</b>             | 2500 VDC   |
| <b>Volt Input Ranges</b>              | $\pm 500$ mV, $\pm 10$ V, $\pm 90$ V*, $\pm 1000$ Vrms*  |
| <b>Volt Input Impedance</b>           | 1M $\Omega$ _50pF, [10M $\Omega$ _5pF at $\pm 1000$ Vrms]*                                     |
| <b>Volt Input Couplings</b>           | single-ended (AC/DC) (AC available only at $\pm 500$ mV and $\pm 10$ V)                        |

### Number of Channels

|                            |   |
|----------------------------|---|
| <b>max. No. of Devices</b> | Any number of devices with up to 8 modules each (max. 16 channels per device) |
| <b>Synchronization</b>     | Yes (max. delay between devices: $< 20$ ns)                                   |
| <b>External Clock</b>      | 1 input and 1 output with 3.3 V LVPECL  |
| <b>External Trigger</b>    | 1 input and 1 output with 3.3 V LVCMOS/LVTTL                                  |
| <b>Digital in/out</b>      | 8 inputs and 8 outputs with 3.3 V LVCMOS/LVTTL                                |

### Data Transfer Rates

|                        |   |
|------------------------|---|
| <b>PC with USB</b>     | $\geq 170$ MByte/s (USB 3.0), 35 MByte/s (USB 2.0)    |
| <b>Recording Media</b> | internal RAM, PC's hard disk                          |
| <b>Internal RAM</b>    | 64 MByte per channel<br>512 MByte RAM with 8 channels |

### Data Recording and Formats

|                               |   |
|-------------------------------|---|
| <b>RAM</b>                    | 64 MByte per channel<br>512 MByte RAM with 8 channels |
| <b>Interface to PC</b>        | USB 3.0, USB 2.0                                      |
| <b>Recording Media</b>        | internal RAM, PC's hard disk                          |
| <b>Available file formats</b> | Famos, DASyLab, DIAdem, Excel, m.lab                  |

### Operation Conditions

|                                  |   |
|----------------------------------|---|
| <b>Power Supply</b>              | <ul style="list-style-type: none"> <li>• 12-16 VDC (absolute max. rating 10-35 VDC)</li> <li>• 5 W typical per channel</li> <li>• external power supply: 100-240 VAC</li> </ul> |
| <b>Environmental Temperature</b> | $+10$ °C to $+30$ °C  |
| <b>Operating System</b>          | Windows 7 / 8 / 10, Linux and others  |



### LTTsmart - Modules



|       |      |    |            |            |     |    |
|-------|------|----|------------|------------|-----|----|
| Type  | Base | HH | MM, LL, Li | LDi / LDiP | LLp | LH |
| Front | A    | B  | C          | D          | E   | F  |

### Module variants - Detailed information

|                 | Base   | HH     | LH     | MM | LL | LLp | Li     | LDi | LDiP   |                 |
|-----------------|--------|--------|--------|----|----|-----|--------|-----|--------|-----------------|
| 1000 Vrms       |        | ✓(2 x) | ✓(1 x) |    |    |     |        |     |        | 1000Vrms        |
| +/- 90 V        |        |        |        | ✓  |    |     |        |     |        | +/- 90 V        |
| +/- 10 V        |        | ✓      | ✓      | ✓  | ✓  | ✓   | ✓      | ✓   | ✓      | +/- 10 V        |
| +/- 500 mV      |        | ✓      | ✓      | ✓  | ✓  | ✓   | ✓      | ✓   | ✓      | +/- 500 mV      |
| +/- 100 mA      |        |        |        |    |    |     |        | ✓   | ✓      | +/- 100 mA      |
| ICP             |        |        |        |    |    |     |        | ✓   | ✓      | ICP             |
| Resistance      |        |        |        |    |    |     |        | ✓   | ✓      | Resistance      |
| PT 100, PT 1000 |        |        |        |    |    |     |        | ✓   | ✓      | PT 100, PT 1000 |
| Charge          |        |        |        |    |    |     |        | ✓   | ✓      | Charge          |
| Strain Gauge    |        |        |        |    |    |     |        | ✓   | ✓      | Strain Gauge    |
| Pulse/Counter   |        |        |        |    |    |     |        |     | ✓      | Pulse/Counter   |
| Digital I/O     | ✓(8 x) |        |        |    |    |     | ✓(2 x) |     | ✓(2 x) | Digital I/O     |
| Sync Up/Down    | ✓      |        |        |    |    |     |        |     |        | Sync Up/Down    |
| USB 3.1         | ✓      |        |        |    |    |     |        |     |        | USB 3.1         |
| Power Input     | ✓      |        |        |    |    |     |        |     |        | Power Input     |
| Front-Style     | A      | B      | F      | C  | C  | E   | C      | D   | D      | Front-Style     |

## About us

Labortechnik Tasler GmbH with its headquarters in Würzburg, Germany, has been developing, producing and selling patented real-time data acquisition systems around the globe for over 25 years.

Through many years of cooperation with its renowned customers from a wide variety of sectors, such as **electric motors, the power industry, mechanical and plant engineering, research and development, aerospace, the automotive industry and the military**, Labortechnik Tasler GmbH has been able to gather relevant experience that has contributed to the development of the **LTTsmart**. The modular concept now makes it possible to assemble the devices individually with different function modules for each customer according to his individual requirements.



**Labortechnik Tasler GmbH – fast, flexible and precise measurement technology**



**Michael Tasler**  
General Manager

Michael Tasler founded Labortechnik Tasler GmbH based on one of his patents concerning high performance real-time data acquisition systems.

He is a specialist in physics as well as in high performance analog and digital design. He graduated from the University Of Texas at Austin, USA.

