Test and measurement Solutions from KUST offer a complete and versatile answer for all the challenges in today's technology. KUST is proud to offer unique and affordable test and measurement products which allow to perform complete and uncompromising testing. Products are provided in ready to use out of box and guarantee easy and stress free testing.

SUPPORT:
Technical pre and post sale support for all the products and applications. Unique products backed-up by extensive application knowledge. Service centre within your country: calibration & repair.

DESIGN:
All Products designed around customer needs and requirements, Application knowledge, field experience and test challenges taken in to consideration when test solution is created.

SALES NETWORK:
Fully trained and authorised sales network across the Europe and Middle East - Helping hand is never far away. Materials and informations available in native languages (contentiously updated).

DEVELOPMENT:
Good technical understanding of today's testing requirements allows KUST to contentiously implement new functions and introduce new products. Special customer requirements always considered.

LCR METERS | HIGH VOLTAGE TESTERS | IMPULSE/SURGE | COMPONENTS TESTERS | MILLIOHM METERS

www.kust.de | www.kust-elektronik.com
Digital Winding tester allows accurate, precision and sensitive measurement on all types of coils. Fully micro processor controlled testing allows simple PASS/FAIL result display when tester is sampling the waveform with up to 200Msps. Fully programmable, all test conditions: number of pulses, voltage, time and limits can be stored within the unit or saved to portable memory through the USB port.

Available in two variations: 5kV and 3kV models for non-destructive impulse / surge testing of magnetic components, electric motors or automotive components.
Brief Introduction:

PRINCIPLE OF THE SURGE TEST:

The terminal voltage V at the leads of the coil is actually a summation of the induced voltage created between individual loops in the coil. If the insulation separating adjacent coils is weak and if the induced voltage is higher than the dielectric strength of the weak insulation, an arc will form between the coils. Surge testing equipment is designed to create the induced voltage between adjacent coils and detect the arcing indicative of weak or failing insulation.

The internal capacitor is charged to a known voltage by the power supply. At a specific time, a high voltage switch closes which transfers the charge from the capacitor through the windings of the coil. If the resistances and loss of the entire circuit are such that the system is under damped, charge will be able to flow through the inductor and on to the other side of the capacitor resulting in an oscillation. This process of ringing will repeat until the resistances and losses in the circuit completely absorb all of the energy that was originally on the capacitor. The measurement of the terminal voltage of the coil vs time gives the surge waveform, which shows the damped oscillation.

Applications:

- Automotive Parts (sensor coils, valves, small motors)
- Chokes and filters in PSU’s
- Transformers, converters
- Inverters, deflection coils, ignition coils
- AC Motors of any size or power
- Relays, Seleonoids

Suitable for low impedance and low inductance coils and windings, Corona effect extraction thanks to sensitive and accurate measurement. Very high sampling rate allows user to test with confidence.
SURGE Testers: **PT5020 & PT5030**

Features:

**PT5020:** 100V - 3000V: 15V Resolution  
**PT5030:** 100V - 5000V: 15V Resolution

- Maximum output pulse voltage 5kV  
- Minimum inductance value of winding that can be tested: 10μH  
- 65k color 7” TFT wide display screen  
- Up to 200Msps waveform sampling rate  
- Maximum measuring speed: 6meas/sec  
- Storage depth of 8k Bytes  
- High bandwidth analog acquisition circuit  
- High-fidelity corona extraction algorithm (patented technology)  
- Four waveform comparison methods  
- Automatic storage of instrument parameters  
- Measurement of voltage, time and frequency  
- Amplification, stretch and movement of the waveform for accurate display  
- Multi-sample average, average processing of 32 standard waveforms  
- Use demagnetized impulse to ensure the conformity of tested waveforms  
- Login of different user profiles for easy management  
- 300 groups of instrument files can be stored and automatically loaded  
- Screen information can be stored in USB disk (COPY key)  
- Upgraded through USB-disk  
- Four selectable display interface effects  
- Foot control interface for easy measurements (foot switch)  
- Handler interface to support on-line operation  
- RS232C, USB Device and LAN interface, optional GPIB

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**Corona Discharge:**  
Regardless of the difference in waveforms, this method only detects the high frequency energy of corona discharge. The wave is converted by derivative calculation and its area size is calculated. In an equivalent analog circuit, the energy value of the wave that passes through high pass filter is measured.

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SURGE Test performed against the master waveform, “Golden Sample” test result is used in comparison mode, limits are set to indicate difference between master and tested UUT.
EVALUATION METHODS:

Area size comparison:

This compares each area size of the master coil and the sample coil waveforms in the intentionally determined zone (% value). The area size of the wave is nearly proportional to the energy loss in the coil; therefore, the test coil is considered to be OK/NG by the amount of its energy loss. For example, when a sample coil layer has a short circuit, the short circuit area is reflected as an increase of energy loss.

Differential area comparison:

This calculates the area size of differential portion between the master coil and the sample coil waveforms in the intentionally determined zone. The differential area size represents the L value and total energy loss. This method is especially effective, when the change of the L value causes major problems.

Corona/partial discharge detection:

Regardless of the difference in waveforms, this method only detects the high frequency energy of corona discharge. The wave is converted by derivative calculation and its area size is calculated. In an equivalent analog circuit, the energy value of the wave that passes through a high pass filter is measured.

Evaluation of Motor Parts is very easy and cost effective, SURGE testing at production stage can avoid costly brake-downs in the future. KUST impulse winding tester minimise cost and time by allowing storage of 100’s instrument settings, exporting results, statistics and Waveform screen shots directly to USB drive.
## SURGE TESTER: PT5020 & PT5030

<table>
<thead>
<tr>
<th>Model</th>
<th>PT5030</th>
<th>PT5020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse voltage</td>
<td>100V-5000V, 10V ± 5%, 15V resolution</td>
<td>100V-3000V, 10V, ± 5%, 15V resolution</td>
</tr>
<tr>
<td>Number of Channels</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Inductance Test Range</td>
<td>≥ 10uH</td>
<td>≥ 10uH</td>
</tr>
<tr>
<td>Pulse energy</td>
<td>Maximum 0.25 joules</td>
<td>Maximum 0.09 joules</td>
</tr>
<tr>
<td>Measurement speed</td>
<td>up to 12 times / sec.</td>
<td>up to 12 times / sec.</td>
</tr>
<tr>
<td>Pulse number</td>
<td>Up to 32</td>
<td>Up to 32</td>
</tr>
<tr>
<td>Input impedance</td>
<td>10MΩ</td>
<td>10MΩ</td>
</tr>
<tr>
<td>Monitor</td>
<td>800x480 65k colour, dot TFT, 600x256 waveform display range</td>
<td></td>
</tr>
<tr>
<td>Waveform acquisition</td>
<td>Sampling rate: up to 200Mmps, 8 adjustable Resolution: 8 Bits memory depth: 6k Bytes, average :1-32</td>
<td></td>
</tr>
<tr>
<td>Determination method</td>
<td>Area • Bad Area • corona discharge • phase comparison</td>
<td></td>
</tr>
<tr>
<td>Waveform measurements</td>
<td>Voltage, Frequency, Time</td>
<td></td>
</tr>
<tr>
<td>Trigger</td>
<td>Manual trigger, external trigger, trigger bus, internal trigger</td>
<td></td>
</tr>
<tr>
<td>Result display output</td>
<td>OK / NG display, LED indicator light, buzzer alarm</td>
<td></td>
</tr>
<tr>
<td>Measurement Statistics</td>
<td>Measurement results with statistical functions</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>Internal memory: Up to 300 Groups (Waveform data, result, instrument settings) External: 600 Groups (Waveform data, result, instrument settings)</td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>Handler, RS232C, USB Device, USB Host, LAN/Ethernet</td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>110V/220V 50Hz/60Hz ± 10% ± 5%</td>
<td></td>
</tr>
<tr>
<td>Power Consumption</td>
<td>≤ 200VA</td>
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</tr>
<tr>
<td>General Conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work Environment</td>
<td>Temperature: 0°C - 40°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Humidity: ≤ 75% RH</td>
<td></td>
</tr>
</tbody>
</table>

**ORDERING INFO:**

PT5020 Surge tester  
PT5030 Surge tester

**STANDARD COMMUNICATION PORTS:**  
RS232, HANDLER/PLC, USB

**IN THE BOX:**  
KA1017 High Voltage test cable  
KA1027 Foot Switch  
Mains Lead  
Test Certificate

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