

# HILO TEST

Elektrische Prüf- und Messtechnik GmbH

## Product Catalogue

### Technique from HILO-TEST

More than 40 years' experience  
Your advantage in competition  
Impulses for your development

### We develop and produce

Generators and test equipment  
according to IEC, VDE, ISO, IEEE, DIN

### Our equipment is

user-friendly  
reliable, durable  
stand-alone programmable  
with light guide computer controllable

### Partner for sales and support:



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# 1. GENERAL CONTROL DESCRIPTION

## 1.1 Control unit

The HILO-TEST Control unit is the center of each generator, over which the user interacts with the device. With multi-testers, like the 'Multi-CE5' or 'Multi-CE7', a user can choose a subunit and change per 1-click-method all testing parameters. As well, you can create and edit your own test procedures or choose one of the predefined standard test sequences.

While testing, you get live visualizes about the state of testing as well as D.U.T. monitoring.

Furthermore changes in the parameters are possible, while the test is running. Documented report includes test parameters and results as well as D.U.T. defined information, this all can be stored on a USB stick.

'Autotest' allows running predefined or your own sequences of different subunits after each other, while leaving the D.U.T. at one output.

### Highlights:

- 5"/ 7" color touch screen display unit
- Intuitive control and pictures help to explain parameters as well as test setups
- One-click change of test parameters
- Manual operation or creation of own test procedures
- Select predefined standard procedures
- Status and D.U.T. monitoring
- Printout of test documentation to a USB stick
- Additional: Remote PC control via optically isolated Ethernet interface with Impulse Recording Function (IRF)



Figure 1: Main menu of Multi-CE5

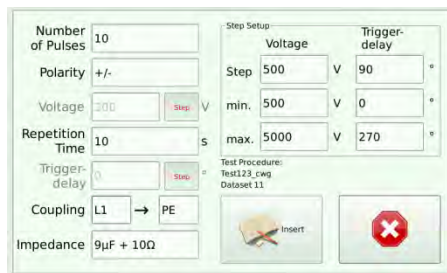


Figure 2: 1-click Parameter changes



Figure 3: Autotest

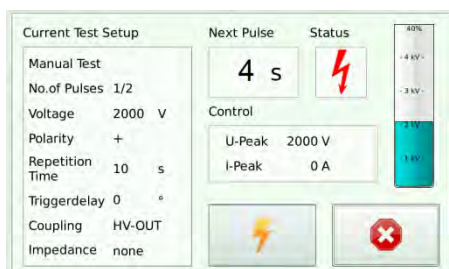


Figure 4: Impulse Test

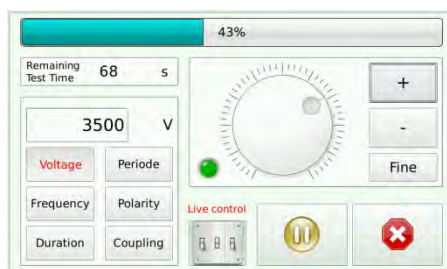


Figure 5: Live variation of parameters

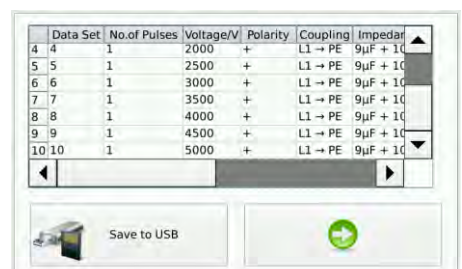


Figure 6: Test results

## 1.2 PC Software: HILO Remote Control

Hilo Remote Control is an optional software program for personal computers and permits to control HILO-Test generators from your computer. The software allows users to create and edit tests as well as to choose from predefined standard procedures. The remote also supports auto testing. Furthermore, it also allows the standardized documentation according to IEC 17025 and the evaluation of test results, which can be changed with your default text editor.

It is equipped with an Impulse Recording Function (**IRF**). In cooperation with an oscilloscope, it allows you to monitor all test pulses and to store the captured images of the waveforms at the computer, which can be added in reports.

The communication with the generator is implemented with a LAN connection. The generator is connected via an optical interface. Thus, the PC is completely isolated from the generator.

### Highlights:

- LAN connection via an optical interface
- Intuitive control and change of test parameters
- Manageable test equipment library
- Status and D.U.T. monitoring
- Definition of multiple fail/abort conditions for evaluation or automated stop of the test
- Impulse Recording Function (**IRF**), to record all or definite waveform with an oscilloscope
- Different oscilloscope predefined and selectable
- Standardized documentation according to IEC 17025

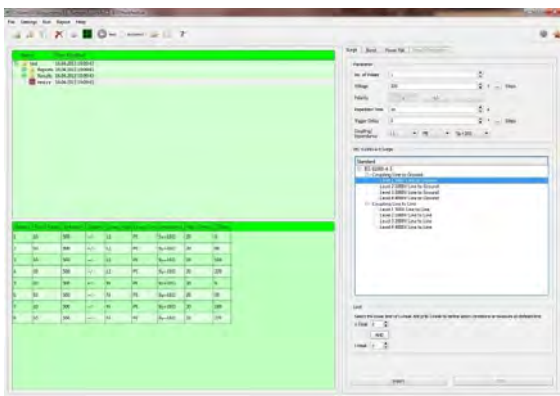


Figure 7: HILO-Remote Main window

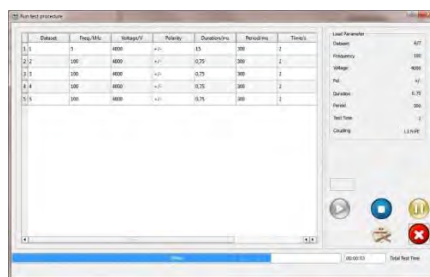


Figure 8: HILO-Remote –testing

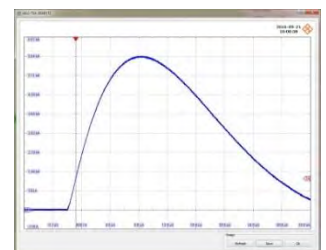


Figure 9: Oscilloscope picture feedback of IRF

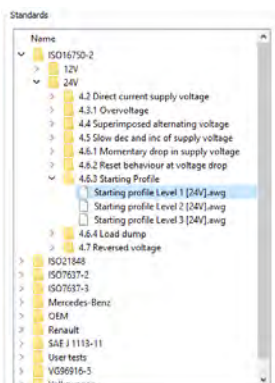


Figure 10: CAR Standards available

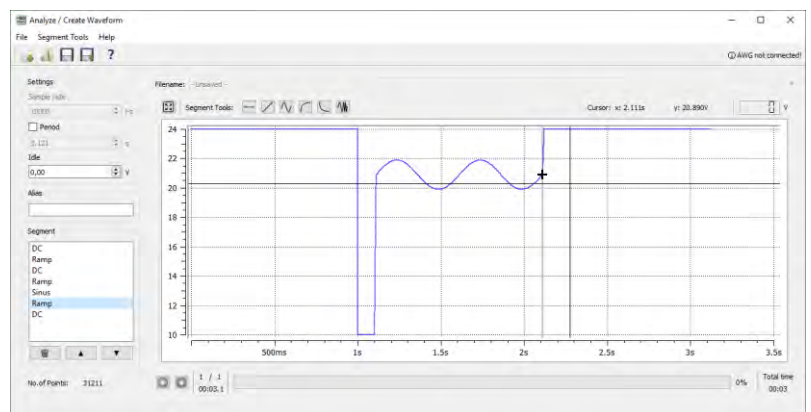


Figure 11: Custom Waveform shapes with CAR-AWG

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## 2. EMC TEST EQUIPMENT

### 2.1 AUTOMOTIVE EMC EQUIPMENT

The specific EMC requirements in automotive tests take continuously so that the test waveforms are becoming increasingly complex. As a manufacturer of EMC test simulators and due to the participation in international standardization bodies, HILO-TEST knows exactly the current and future requirements of the automotive industry.

The following automotive products are primarily geared to the EMC requirements in modern automobile and according to current standards:

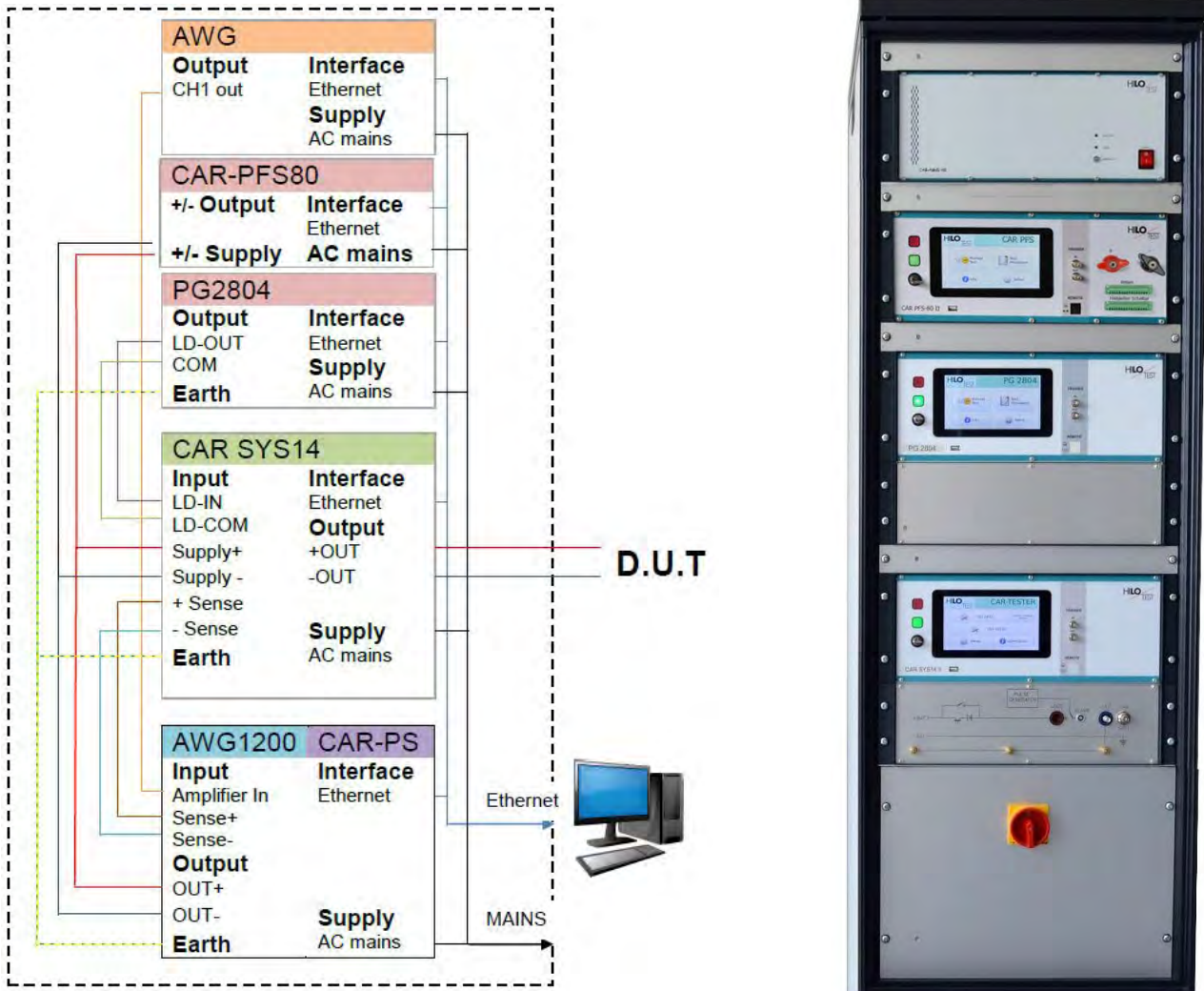


Figure: Full CAR TEST SYSTEM 14 I

## 2.1.1 CAR TEST SYSTEM

The CAR TEST SYSTEM includes a set of pulse generators which supply different test pulses.

### CAR TEST SYSTEM 14

|   |
|---|
| <b>According to</b>                       |
| <b>ISO 7637-2: 2011</b>                   |
| <b>ISO 16750-2: 2012</b>                  |
| <b>LV 124, LV 148</b>                     |
| <b>... various manufacturer standards</b> |

#### Highlights:

- Suitable for 12V, 24V, 42V systems up to 70V
- Different battery currents 50/100/200 A
- Electronic sense for battery voltage
- Front ground connections
- For 19" rack, built in
- Modular and extendable



Figure 12: CAR TEST SYSTEM with option PS 66-55 to extend by Pulse 2b and Pulse 4.

#### Base System CAR-TEST-SYS 14 I / II / III

| Included Pulse  | Waveform         | Voltage | Standard  | Ri                              |
|-----------------|------------------|---------|-----------|---------------------------------|
| <b>Pulse 1</b>  | 1-5/2000 $\mu$ s | 600 V   | ISO       |                                 |
|                 | 1-5/1000 $\mu$ s | 600 V   | ISO / SAE |                                 |
| <b>Pulse 2a</b> | 1 / 50 $\mu$ s   | 600 V   | ISO       | 2/4/10/20/30/50/90/150 $\Omega$ |
| <b>Pulse 3</b>  | 5/100 ns         | 800 V   | ISO       | 50 $\Omega$                     |

#### Systems with HILO-TEST power amplifiers:

| Variations                        | Power amplifier | Continuous current |
|-----------------------------------|-----------------|--------------------|
| <b>CAR-TEST-SYSTEM SYS 14 I</b>   | PS 66-55        | 50 A               |
|                                   | CAR-AWG 1200    | 40 A               |
| <b>CAR-TEST-SYSTEM SYS 14 II</b>  | PS 66-110       | 100 A              |
|                                   | CAR-AWG 3000    | 100 A              |
| <b>CAR-TEST-SYSTEM SYS 14 III</b> | PS 74-220       | 200 A              |
|                                   | CAR-AWG 6000    | 200 A              |



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## Configurations for the fulfillment of various standards:

| Setup                           | CAR-SYS + Battery | CAR-SYS + PS xx-xx | CAR-SYS + CAR-AWG | CAR-AWG |
|---------------------------------|-------------------|--------------------|-------------------|---------|
| ISO 7637 <sup>2)</sup>          | ✓ <sup>5)</sup>   | ✓                  | ✓                 | X       |
| ISO 16750 <sup>1)</sup>         | X                 | ✓ <sup>4)</sup>    | ✓                 | ✓       |
| ISO 21848                       | X                 | ✓                  | ✓                 | ✓       |
| LV 124/148 <sup>3)</sup>        | X                 | X                  | ✓                 | ✓       |
| MBN 1028-4                      | ✓                 | ✓                  | ✓                 | X       |
| Renault 36.00.808 <sup>1)</sup> | X                 | X                  | ✓                 | X       |
| SAEJ 1113-111 <sup>1)</sup>     | X                 | X                  | ✓                 | X       |
| VW TL81000 <sup>1)</sup>        | ✓                 | ✓                  | ✓                 | X       |

1) + Load dump (PG2804 / PS-LD)

2) + CAR-TE 14 for 4.3. Transient Emission test

3) + CAR-PFS 80 for LV E-10, E-13 and E-14 Interruptions tests

4) without Superimposed alternating voltage test

5) without Puls 2b

## Comparison of the amplifier extensions:

| Type                         | PS xx-xx                                |        |        | CAR-AWG                      |      |      |
|------------------------------|---|--------|--------|------------------------------|------|------|
| Description                  | Power supply controllable over Ethernet |        |        | Arbitrary Waveform Generator |      |      |
| Version                      | 66-55                                   | 66-110 | 74-220 | 1200                         | 3000 | 6000 |
| Max. Voltage                 | 74V                                     |        |        | 75V                          |      |      |
| Max. Current                 | 50A                                     | 100A   | 200A   | 40A                          | 100A | 200A |
| Slew Rate                    | 10V/μs                                  |        |        | 80V/μs                       |      |      |
| Bandwidth                    | -                                       |        |        | DC-1MHz                      |      |      |
| Controllable battery voltage | ✓                                       |        |        | ✓                            |      |      |
| Reversible polarity          | X                                       |        |        | ✓                            |      |      |
| Custom waveforms             | X                                       |        |        | ✓                            |      |      |

## Load Dump

Extension of the CAR-SYS 14 by the Pulse #5 (Test A and B) "Load Dump".

According to

**ISO 16750-2: 2012**

### Highlights:

- Suitable for 12V, 24V systems until 202V
- Source resistance, switchable
- Waveform, changeable



Figure 13: PG2804

and



PS-LD

## Comparison of the Load Dump extensions:

| Type                | PG 2804            | PS-LD                |
|---------------------|--------------------|----------------------|
| Loading voltage     | 202V               | 202V                 |
| Version             | analog (capacitor) | digital              |
| Clamping for Test B | 22V step width     | variable             |
| Rise time           | 10ms               | 2-20ms (variable)    |
| Fall time           | 50-400ms (5 steps) | 40-1000ms (variable) |



## CAR SWITCH TE 14

The CAR-Transient Emission 14 is used to check the transient transition behavior when switching loads on the vehicle's electrical system.

According to  
ISO 7637-2: 2011

### Highlights:

- Suitable for 12V, 24V and 42V systems until 70V
- For different currents 50/100/200 A
- Electronic and mechanical switch
- Voltage drop < 2V
- All distances as in the standard
- Ground plate for ground connection



Figure 14: CAR SWITCH TE 14

## CAR-PFS 80

The CAR-PFS-80 is an automotive interruptions simulator, which is designed for performing fast voltage dips and drops (micro-interruptions) according to standard requirements, mainly from vehicle manufacturers.

According to  
ISO 16750-2: 2012  
LV 124

### Highlights:

- Interruptions for data and supply lines
- Predefined sequences, adjustable
- Rise-/ fall times < 1µs
- Battery voltage: 80V DC
- Battery current: 50A, 100A
- Option: Additional relay switches



Figure 15: CAR SWITCH TE 14

### 2.1.2 CAR ACCESSORIES

| Accessories        | Description  |
|--------------------|--|
| <b>CDN 2012</b>    | <b>Capacitive Coupling Clamp</b><br>Capacitive coupling of BURST pulses to screened cables                           |
| <b>CAR ICC</b>     | <b>Inductive coupling clamp</b><br>The CAR-ICC is used for diagnostic bulk current testing (BCI) up to 1 GHz         |
| <b>CAR Cal Kit</b> | <b>CAR CALIBRATION KIT</b><br>Resistor box containing all load resistors required to verify CAR pulse & load dump    |
| <b>BCK 400 F</b>   | <b>Burst Calibration Kit</b><br>Including impulse voltage divider 200:1 and 400:1, input impedance 50                |
| <b>SESD 30000</b>  | <b>Electro Static Discharge Generator</b><br>Contact and air discharge till 30 kV, to IEC 61000-4-2 and ISO/TR 10605 |

## 2.2 INDUSTRIAL EMC EQUIPMENT

The EMC Test Equipment is designed for testing electromagnetic immunity of the electrical and electronic equipment for industrial applications.

### 2.2.1 Multi-CE

This compact EMC test unit is designed for testing electromagnetic immunity against pulsed and conducted interference.

| According to        |                                    |
|---------------------|------------------------------------|
| IEC 61000-4-4       | BURST/EFT                          |
| IEC 61000-4-5       | SURGE (CWG)                        |
| IEC 61000-4-5       | 10/700 Telecom                     |
| IEC 61000-4-8       | Power frequency magnetic field     |
| IEC 61000-4-9       | Pulsed magnetic field 8/20 $\mu$ s |
| IEC 61000-4-11 / 29 | Voltage dips and variation         |
| IEC 61000-4-12      | Ringwave                           |

#### Highlights:

- 7" touch screen display unit
- Compact Multi Generator
- Including Burst, Surge and Power Fail Simulator
- Version for 5kV and 7kV
- Including 1-Phased de-/coupling network (ISO and ANSI)
- D.U.T. and EFTG outputs on the front
- Monitor ports: Surge/Ring, **EFT**, and AC/Power fail
- Many accessories

#### Comparison of the Multi-CE systems:

| Type                     | Multi-CE5      | Multi-CE7           |
|--------------------------|----------------|---------------------|
| Maximum voltage Surge    | 5kV            | 7kV                 |
| Maximum voltage Burst    | 5kV            | 5kV                 |
| coupling network mode    | ISO            | ISO + optional ANSI |
| Mains sync. triggering   | ✓              | ✓                   |
| Integratable generators: |                |                     |
| Burst                    | 5/50ns         | ✓                   |
| Surge                    | 1.2/50 $\mu$ s | ✓                   |
| Power Fail               | ✓              | ✓                   |
| Ringwave                 | 100kHz         | ✓                   |
| Telecom Surge            | 10/700 $\mu$ s | ✓                   |



Figure 16: Multi-CE5



Figure 17: Multi-CE7

### 2.2.2 Multi-CE optional extensions

The Multi-CE is in its both basic configurations (5kV, 7kV) expandable as follows:

**Basic device: Multi-CE5** with Burst- and Surge generator, as well as 1-phased coupling network (ISO):

| Expandable to | Description   | Norm           |
|---------------|---|----------------|
| PFS-CE 16     | <b>Power Fail Generator</b><br>Simulates transient interruptions of the power supply voltage<br><i>With accessories VPS250-16: Also variations of the power supply voltage.</i> | IEC 61000-4-11 |

**Basic device: Multi-CE7** with Burst- and Surge generator, as well as 1-ph. coupling network (ANSI):

| Expandable to    | Description  | Norm           |
|------------------|--|----------------|
| <b>PFS-CE 16</b> | <b>Power Fail Generator</b><br>Simulates transient interruptions of the power supply voltage<br><i>With accessories VPS250-16: Also variations of the power supply voltage</i> | IEC 61000-4-11 |
| <b>RW-CE</b>     | <b>Ringwave Generator</b><br>Simulates high-voltage transients of the mains power supply with the waveform of a damped oscillatory wave<br>Waveform 0.5µs/100 kHz, 0 - 7 kV    | IEC 61000-4-12 |
| <b>TS-CE</b>     | <b>Telekom Surge Generator</b><br>Simulates high-voltage transients with the waveform<br>10/700µs, 0 - 7 kV  | IEC 61000-4-5  |

### 2.2.3 Multi-CE sub-units

All subunits are available as a stand-alone version. They benefit from all advantages of the modular system the Multi-CE offers.

Following upgradable stand-alone test generators are available:

| Sub-units        | Description  | Standard       |
|------------------|--|----------------|
| <b>EFTG-CE5</b>  | <b>Electrical Fast Transient Generator</b><br>Simulates transient disturbances of the mains power supply caused by contact bouncing<br>Waveform 5/50 ns, 0.2 - 5 kV, 1 kHz-1 MHz burst frequency   | IEC 61000-4-4  |
| <b>CWG-CE5</b>   | <b>Combination Wave Generator</b><br>Simulates transient disturbances of the mains power supply caused by switching in the major power system and/or secondary effects of lightning strokes<br>Waveform 1.2 / 50 µs, 0.2- 5 kV and 8 / 20 µs, 0.1- 2.5 kA. | IEC 61000-4-5  |
| <b>PFS-CE-16</b> | <b>Power Fail Simulator</b><br>Including motor driven variac 0 - 250 V, simulates transient interruptions and variation the power supply voltage   | IEC 61000-4-11 |
| <b>CWG-CE7</b>   | <b>Combination Wave Generator</b><br>Simulates transient disturbances of the mains power supply caused by switching in the major power system and/or secondary effects of lightning strokes<br>Waveform 1.2 / 50 µs, 0.2- 7 kV and 8 / 20 µs, 0.1- 3.5 kA. | IEC 61000-4-5  |
| <b>RW-CE7</b>    | <b>Ringwave generator</b><br>Simulates high-voltage transients of the mains power supply with the waveform of a damped oscillatory wave, mains synchronous triggering<br>Waveform 0.5µs/100 kHz, 0 - 7 kV  | IEC 61000-4-12 |
| <b>TS-CE7</b>    | <b>Telekom Surge Generator</b><br>Simulates high-voltage transients with the waveform 10/700µs,<br>0 - 7 kV  | IEC 61000-4-5  |

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## 2.2.4 Multi-CE Accessories

| Accessories    | Description   |
|----------------|---|
| VPS 250-16     | <b>Variable Power Source</b><br>Motor-driven variac, control by Multi-CE5, generation of voltage variation according to IEC 61000-4-11                            |
| HI200-CE       | <b>Helmholtz Coil</b><br>Air coil for the generation of magnetic fields according to IEC 61000-4-8 / -9   |
| EFTC 2012      | <b>Capacitive Coupling Clamp</b><br>For capacitive coupling of BURST pulses to screened cables according to IEC 61000-4-4   |
| SCK 105 in Box | <b>Surge Calibration Kit in Box</b><br>Including impulse voltage divider and current viewing resistor<br><b>For calibration/verification of surge generators</b>  |
| BCK 400F       | <b>Burst Calibration Kit</b><br>Including impulse voltage divider 200:1 and 400:1, input impedance 50Ω<br><b>For calibration/verification of burst generators</b> |
| EFTC-CK        | <b>Calibration kit for burst coupling clamps (EFTC2012)</b><br>Transducer plate with connecting adapter<br><b>For calibration/verification of coupling clamps</b> |

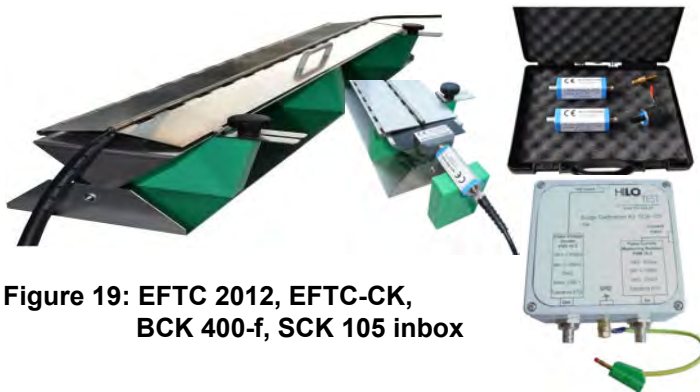


Figure 19: EFTC 2012, EFTC-CK, BCK 400-f, SCK 105 inbox



Figure 18: Multi-CE5 + CDN 5416 combination

### Compatible Coupling- / Decoupling Networks

For SURGE and/or BURST pulses  
Coupling display on the front panel  
Control by Multi-CE5.

**ANSI Coupling & 690V Options Available**

| Variations | Burst/Surge coupling to | Supply voltage | Maximal test voltage |
|------------|-------------------------|----------------|----------------------|
| CDN 5416   | power supply lines      | 3 * 400V, 16A  | 5kV, 1.2/50μs        |
| CDN 5432   | power supply lines      | 3 * 400V, 32A  | 5kV, 1.2/50μs        |
| CDN 5463   | power supply lines      | 3 * 400V, 63A  | 5kV, 1.2/50μs        |
| CDN 54125  | power supply lines      | 3 * 400V, 125A | 5kV, 1.2/50μs        |
| CDN 54200  | power supply lines      | 3 * 400V, 200A | 5kV, 1.2/50μs        |
| CDN 7416   | power supply lines      | 3 * 400V, 16A  | 7kV, 1.2/50μs        |
| CDN 7432   | power supply lines      | 3 * 400V, 32A  | 7kV, 1.2/50μs        |
| CDN 7463   | power supply lines      | 3 * 400V, 63A  | 7kV, 1.2/50μs        |
| CDN 74125  | power supply lines      | 3 * 400V, 125A | 7kV, 1.2/50μs        |
| CDN 74200  | power supply lines      | 3 * 400V, 200A | 7kV, 1.2/50μs        |
| CDN 2402   | 4 data lines            | 4 * 48V, 2A    | 2,5 kV, 1.2/50μs     |
| CDN 2410   | 4 data lines            | 4 * 240V, 10A  | 2,5 kV, 1.2/50μs     |
| CDN 2802   | 8 data lines            | 8 * 48V, 2A    | 2,5 kV, 1.2/50μs     |

## 2.2.5 Combination Wave Generators

Surge pulses occur due to direct or indirect lightning strikes in a circuit or by switching transients caused by switching inductive loads or short circuits. This leads to currents or electromagnetic fields cause high voltage or current transients. Surge voltages and currents can reach several thousands of volts and thousands of amperes. Our following Surge generators simulate these disturbances for all the necessary level:

According to

IEC 61000-4-5

IEC 60060

### Highlights:

- 7" Color touch panel display
- Standardized voltage and current waveforms  
Voltage: 1,2/50  $\mu$ s; Current: 8/20  $\mu$ s
- Up to 24 kV and 12 kA
- 1- or 3-phase and data line CDNs available



Figure 20: Combination wave generator

| Variations | CWG Pulse voltage 1.2/50 $\mu$ s | CWG Pulse current 8/20 $\mu$ s |
|------------|----------------------------------|--------------------------------|
| CWG-CE5    | 5 kV                             | 2.5 kA                         |
| CWG-CE7    | 7 kV                             | 3.5 kA                         |
| PG 10-504  | 10 kV                            | 5.0 kA                         |
| PG 12-804  | 12 kV                            | 6.0 kA                         |
| PG 24-2500 | 24 kV                            | 12 kA                          |

## 2.2.6 Coupling- / Decoupling Networks for CWG

Allow superposition of the disturbances to the mains voltage or to signal lines of the device under test.

As specified in

IEC 61000-4-5

IEC 60060

Coupling networks for power supply lines 3\*400V: ANSI Coupling & 690V Option Available

|                                    |      | Current of power supply lines up to |           |           |            |            |
|------------------------------------|------|-------------------------------------|-----------|-----------|------------|------------|
|                                    |      | 16A                                 | 32A       | 63A       | 125A       | 200A       |
| Maximum Testvoltage 1,2/50 $\mu$ s | 5kV  | CDN 5416                            | CDN 5432  | CDN 5463  | CDN 54125  | CDN 54200  |
|                                    | 7kV  | CDN 7416                            | CDN 7432  | CDN 7463  | CDN 74125  | CDN 74200  |
|                                    | 10kV | CDN 10416                           | CDN 10432 | CDN 10463 | CDN 104125 | CDN 104200 |
|                                    | 12kV | CDN 12416                           | CDN 12432 | CDN 12463 | CDN 124125 | CDN 124200 |

### Further Coupling networks:

| Variations | Burst/Surge coupling to | Supply voltage  | Maximal test voltage   |
|------------|-------------------------|-----------------|------------------------|
| CDN 10216  | power supply lines      | 1 * 240 V, 16 A | 10 kV, 1.2/50 $\mu$ s  |
| CDN 12216* | power supply lines      | 1 * 240 V, 16 A | 12 kV, 1.2/50 $\mu$ s  |
| CDN 2402   | 4 data lines            | 4 * 48 V, 2 A   | 2,5 kV, 1.2/50 $\mu$ s |
| CDN 2410   | 4 data lines            | 4 * 240 V, 10 A | 2,5 kV, 1.2/50 $\mu$ s |
| CDN 2802   | 8 data lines            | 4 * 48 V, 2 A   | 2,5 kV, 1.2/50 $\mu$ s |

\* special for the usage of differential mode and common mode

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## 2.2.7 Oscillatory Wave (Ring Wave) Generators

| According to                 | Generator | Description                                  |
|------------------------------|-----------|--|
| IEC 61000-4-12<br>IEC 1008-1 | RW-CE7    | Ringwave generator<br>RCCB's testing         |
| IEC 61000-4-10               | IPG 2553  | High-frequency magnetic field test generator |
| IEC 61000-4-18               | IPG 2554  | Oscillatory wave generator                   |

### Highlights:

- 7" Color touch panel display
- Versatile and upgradable
- Different configurations possible
- External data line CDN available
- Internal 3-phased coupling/decoupling network (IPG2554)
- Common and differential mode



Figure 21: IPG2554

| Variations      | Description  |
|-----------------|--|
| <b>RW-CE7</b>   | <p><b>Ringwave generator</b><br/>           Simulates high-voltage transients of the mains power supply caused by switching in the major power system, mains synchronous triggering<br/>           Waveform 0.5µs/100 kHz, 0 - 7 kV<br/>           Specified in IEC 61000-4-12<br/>           Option: Coupling-/decoupling network for power supply lines<br/>           Option: Modification for testing RCCB's according to IEC 1008-1</p>   |
| <b>IPG 2553</b> | <p><b>High-frequency magnetic field test generator</b><br/>           Simulates high-frequency magnetic fields caused by switching in gas isolated substations of the power system<br/>           Specified in IEC 61000-4-10<br/>           Including Helmholtz-Coil, 1*1 m<br/>           Damped magnetic field 100 kHz, 10/30/100 A/m, repetition rate 40 Hz<br/>           Damped magnetic field 1.0 MHz, 10/30/100 A/m, repetition rate 400 Hz</p>  |
| <b>IPG 2554</b> | <p><b>Oscillatory wave generator</b><br/>           Simulates high-voltage transients of the mains power supply caused by switching in gas isolated substations of the power system<br/>           Specified in IEC 61000-4-18<br/>           Slow damped oscillatory wave (DOW):<br/>           100 kHz, 0.25 - 3 kV, repetition rate 400 Hz<br/>           1.0 MHz, 0.25 - 3 kV, repetition rate 400 Hz<br/>           Fast damped oscillatory wave (DOW):<br/>           3 / 10 / 30 / MHz, 0.25 - 4 kV, repetition rate 5000 Hz</p> <p>The IPG is to obtain in the following different configurations:<br/>           IPG 2554 (contains both fast &amp; slow DOW)<br/>           IPG 2554 fast (contains fast DOW)<br/>           IPG 2554 slow (contains slow DOW)</p> |

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## 2.3 TELECOM TEST EQUIPMENT

### 2.3.1 High-Voltage Test Generator

Telecommunication networks are exposed to particularly natural disasters such as lightning and its effects. Therefore all connected telecommunications systems require reliable protection. Our subsequent Surge Simulators are specifically designed for EMC testing of telecommunications systems in accordance with ITU-T:

**Devices, specified in  
ITU-T K12, K17**

#### Highlights:

- 7" Color touch panel display
- Multiple variations
- Different output impedances
- Different safety test cover mounted on the top of the equipment
- I<sup>t</sup> Limit monitoring and evaluation



Figure 22: IPG1050

#### High-voltage pulse generator

| Variations      | Pulse-type      | Waveform       | Voltage | Energy |
|-----------------|-----------------|----------------|---------|--------|
| <b>IPG 620</b>  | Lightning surge | 1.2/50 $\mu$ s | 6 kV    | 20 J   |
| <b>IPG 1050</b> | Lightning surge | 1.2/50 $\mu$ s | 10 kV   | 50 J   |
| <b>IPG 1272</b> | Lightning surge | 1.2/50 $\mu$ s | 12 kV   | 72 J   |

#### Generators with multiple Waveforms:

**Devices, specified in  
ITU-T K12, K17, K20**

| Variations          | Pulse-type      | Waveform   | Voltage | Energy |
|---------------------|-----------------|--|---------|--------|
| <b>PG 5-200-1/2</b> | Lightning surge | 1.2/50 $\mu$ s                                       | 5 kV    | 10 J   |
|                     | Switching surge | 10/700 $\mu$ s                                       | 5 kV    | 200 J  |
| <b>PG 6-364</b>     | Lightning surge | 1.2/50 $\mu$ s                                       | 6 kV    | 20 J   |
|                     | Switching surge | 10/700 $\mu$ s                                       | 6 kV    | 360 J  |
|                     | Option:         | 100/700 $\mu$ s<br>0.5/700 $\mu$ s<br>1/1000 $\mu$ s |         |        |
| <b>PG 10-1000</b>   | Lightning surge | 1.2/50 $\mu$ s                                       | 10 kV   | 50 J   |
|                     | Switching surge | 10/700 $\mu$ s                                       | 10 kV   | 1000 J |
| <b>PG 12-1400</b>   | Lightning surge | 1.2/50 $\mu$ s                                       | 12 kV   | 70 J   |
|                     | Switching surge | 10/700 $\mu$ s                                       | 12 kV   | 1400 J |
| <b>PG 14-1960</b>   | Switching surge | 10/700 $\mu$ s                                       | 14 kV   | 1960 J |
|                     | Switching surge | 0.5/700 $\mu$ s                                      | 14 kV   | 1960 J |
| <b>PG 20-4000</b>   | Switching surge | 10/700 $\mu$ s                                       | 20 kV   | 4000 J |

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### 2.3.2 Special Generators

|                        |
|------------------------|
| According to           |
| ITU-T K12, K17, K20    |
| ITU-T 12 TR 1          |
| GR-1089-CORE           |
| FCC Part 68, TIA - 968 |

| Variations         | Description  |
|--------------------|--|
| <b>IPG 255</b>     | <b>Insulation test with impulse voltage according to IEC 255</b><br>Impulse voltage: 0.8/1.0/1.5/2.5/4.0/5.0/6.0/8.0 kV,<br>We = 0.5 J, Rs = 500 Ohm   |
| <b>IPG 506</b>     | <b>Front chopped wave generator</b><br>Designed for measurement of dc spark-over voltage and<br>Impulse spark-over voltage<br>5 kV impulse, dU/dt = 100V/μs - 5000 V/μs<br>Insulation resistance 0,5 -5 GΩ<br>According to ITU-T, K12  |
| <b>IPG 506-SYM</b> | <b>Symmetric Front chopped wave generator</b><br>Test system for two stage SPDs<br>2 x Impulse spark-over voltage<br>2 x 5 kV impulse, dU/dt = 100V/μs - 5000 V/μs<br>Insulation resistance 0,5 -5 GΩ  |
| <b>PIG 1500</b>    | <b>Power induction generator</b><br>Designed for testing telecommunication ports<br>Open circuit output voltage 30 - 1500 V<br>Series resistor 200 Ω / 600 Ω<br>Coupling impedance, optional 100Ω +0, 5μF +1.0μF<br>According to ITU-T K20   |
| <b>PG 6-432</b>    | <b>Impulse life test generator</b><br>Lifetime test of SPDs<br>Switching Surge 10/700 μs, 2*100 A, 430 J<br>Switching Surge 10/1000 μs, 2*100 A, 430 J<br>According to ITU-T 12 TR 1, K17, K20   |
| <b>PG 6-500</b>    | <b>Surge current generator, 2/4* 5 kV, or 100/500 A, 2/10 μs</b><br>Designed for testing 2-wire or 4-wire telecom ports<br>First-Level Lightning Surge ± 2500 V, 500 A, 2/10 μs<br>Second-Level Lightning Surge ± 5000 V, 500 A, 2/10 μs<br>Intra-Building Lightning Surge ± 800 V, 100 A, 2/10 μs<br>Intra-Building Lightning Surge ± 1500 V, 100 A, 2/10 μs<br>According to Fig. 4.2 of GR-1089-CORE standard FCC Part 68, TIA - 968 |
| <b>PG 2-750</b>    | <b>Surge current generator</b><br>1.6kV, 10/160μs, 4*100A or 800V, 10/560μs, 2*100A<br>Optional 1kV, 10/1000μs, 2*100A according to GR-1089-CORE<br>According to FCC Part 68, TIA – 968  |
| <b>PG 4-641</b>    | <b>Surge current generator</b><br>3.6kV, 10/160μs, 480A<br>According to FCC Part 68, TIA – 968   |

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### 3. COMPONENT TEST GENERATORS

Designed for testing passive and active components and devices:

- 7"/5" color touch panel display
- Meets testing recommendation of many product standards
- Surge voltage test of transformers, optical couplers, and electrical installations
- Surge voltage test of over-voltage protection devices and circuits
- Dielectric testing of X/Y-capacitors
- Spark over detection on the test sample with an adjustable current sensor

#### 3.1 HIGH VOLTAGE PULSE GENERATORS

Designed for **dielectric testing**, lightning surge 1.2/50  $\mu$ s

| Variations | Pulse-type      | Waveform       | Voltage | Energy |
|------------|-----------------|----------------|---------|--------|
| IPG 605    | Lightning surge | 1.2/50 $\mu$ s | 6 kV    | 5 J    |
| IPG 620    | Lightning surge | 1.2/50 $\mu$ s | 6 kV    | 20 J   |
| IPG 1012   | Lightning surge | 1.2/50 $\mu$ s | 10 kV   | 12 J   |
| IPG 1050   | Lightning surge | 1.2/50 $\mu$ s | 10 kV   | 50 J   |
| IPG 1218   | Lightning surge | 1.2/50 $\mu$ s | 12 kV   | 18 J   |
| IPG 1272   | Lightning surge | 1.2/50 $\mu$ s | 12 kV   | 72 J   |
| IPG 2025   | Lightning surge | 1.2/50 $\mu$ s | 20 kV   | 25 J   |
| IPG 2436   | Lightning surge | 1.2/50 $\mu$ s | 24 kV   | 36 J   |



Figure 24: IPG 605-2436 with output on the rear panel



Figure 23: IPG 605-2436 with safety test cover

Measurement of **Insulation resistance** According to IEC 60065

| Variations | Surge impulse voltage | Measurement voltage | Isolation resistor  |
|------------|-----------------------|---------------------|---------------------|
| IPG 1201   | 12 kV                 | 500V                | 0.5 - 20 M $\Omega$ |

Designed for dielectric testing of **X/Y-capacitors and power line filters**

| Variations | Waveform       | Voltage    | Energy | Capacitor range                 |
|------------|----------------|------------|--------|---------------------------------|
| IPG 809    | 1.7/46 $\mu$ s | 0.1 - 8 kV | 9 J    | 0.1- 27 nF                      |
| PG 6-401   | 1.6/47 $\mu$ s | 0.1 - 6 kV | 400 J  | 33/47/68/100/150/220/330/470 nF |

Designed for **photovoltaic module** testing

| Variations | Waveform       | Voltage | Energy | Capacitance  |
|------------|----------------|---------|--------|--------------|
| PG 10-200  | 1.2/50 $\mu$ s | 10 kV   | 200 J  | 10 nF-183 nF |
| PG 12-360  | 1.2/50 $\mu$ s | 12 kV   | 360 J  | 10 nF-183 nF |
| PG 20-100  | 1.2/50 $\mu$ s | 20 kV   | 100 J  | 27 nF-183 nF |

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### 3.2 HIGH CURRENT PULSE GENERATORS

HILO-TEST manufactures power generators for surge current material and safety tests, in particular for the examination of diverting elements such as gas discharge tubes, varistors, SPDs, and components in which such protective elements are installed.

**According to  
IEC / EN 61643-11**

**Highlights:**

- 7"/5" color touch panel display
- Compact tester as table usage
- Cabinet tester optional with testing compartment
- Safety test cover mounted on the top of the equipment
- EMC-2015: Plugin for different wave shapes



Figure 26: PG 6-200/400



Figure 25: EMC 2015

**Compact tester:**

| Variations      | Type                          | Pulse current | Waveform    | Energy |
|-----------------|-------------------------------|---------------|-------------|--------|
| <b>PG 6-250</b> | Varistor tester               | 10A - 2.5 kA  | 8/20µs      | 250 J  |
| <b>PG 6-200</b> | Surge Current Generator       | 5 kA          | 8/20µs      | 200 J  |
| <b>PG 6-400</b> | Surge Current Generator       | 10 kA         | 8/20µs      | 400 J  |
| <b>EMC 2015</b> | <b>Pulse Generator System</b> |               |             |        |
|                 | Current standard plug-in      | 25 kA         | 8 / 20 µs   | 1500 J |
|                 | Current plug-in               | 5 kA          | 10 / 50 µs  | 1500 J |
|                 | Current plug-in               | 600 A         | 10 / 350 µs | 1500 J |
|                 | Current plug-in               | 300 A         | 10 / 700 µs | 1500 J |
|                 | Current plug-in               | 200 A         | 10/1000 µs  | 1500 J |
|                 | Combination wave plug-in      | 2 * 10 kV     | 1.2 / 50 µs | 1500 J |
|                 |                               | 2 * 10 kA     | 8 / 20 µs   | 1500 J |
|                 | Varistor test plug-in         | 3 kA          | 8 / 20 µs   | 250 J  |
|                 | Voltage plug-in               | 10kV          | 10/700 µs   |        |

**Cabinet tester:**

| Variations  | Pulse current | Waveform        | Energy  |
|-------------|---------------|-----------------|---------|
| PG 6-2402   | 2*(1-25) kA   | 8/20 $\mu$ s    | 2400 J  |
| PG 10-10000 | 2*(1-50) kA   | 8/20 $\mu$ s    | 10000 J |
| PG 20-7000  | 50 kA         | 8/20 $\mu$ s    | 7000 J  |
| PG 20-10000 | 70 kA         | 8/20 $\mu$ s    | 10000 J |
| PG 20-14000 | 100 kA        | 8/20 $\mu$ s    | 14000 J |
| PG 10-2500  | 500 A         | 10/700 $\mu$ s  | 2500 J  |
| PG 20-4000  | 500 A         | 10/700 $\mu$ s  | 4000 J  |
| PG 10-4000  | 500 A         | 10/1000 $\mu$ s | 4000 J  |
| PG 10-8000  | 1.0 kA        | 10/1000 $\mu$ s | 8000J   |
| PG 10-6000  | 10 kA         | 10/50 $\mu$ s   | 6000 J  |
| PG 10-7000  | 2.5 kA        | 10/350 $\mu$ s  | 7000 J  |
| PG 10-12500 | 5 kA          | 10/350 $\mu$ s  | 12500 J |
| PG 10-25000 | 10 kA         | 10/350 $\mu$ s  | 25000 J |



Figure 27: PG 10-10000



Figure 28: PG 20-14000

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## 4. HIGH-VOLTAGE TEST AND MEASUREMENT EQUIPMENT

HILO-TEST produce several devices and components, the range of these products includes:

- High-voltage test of isolations with ac- dc or impulse voltage
- Measuring equipment for ac-, dc- or impulse voltage
- High-voltage dividers for ac-, dc- or impulse voltage (HVT: Page 19))
- Current viewing resistors for ac-, dc- or impulse current

### 4.1 AC- / DC TEST EQUIPMENT

**AC test set-up** - Designed for AC isolation test

**Highlights:**

- 7" Color touch panel display
- Massive safety test cover mounted on the top or security glass front door with safety switch
- Ground rod inside the safety test cover
- Burn and Turn-off modus
- Current limitation and shutdown
- Step function



Figure 30: AC Tester



Figure 29: HVTS as 19" cabinet with a test compartment

| Variations  | Description                        | Voltage | Current |
|-------------|------------------------------------|---------|---------|
| AC-TESTER 6 |                                    | 10 kV   | 100 mA  |
| HVTS 30-20  | Test mode burning and over current | 30 kV   | 20 mA   |
| HVTS 30-40  |                                    | 30 kV   | 40 mA   |
| HVTS 50-10  |                                    | 50 kV   | 10 mA   |

**High voltage DC Tests** - Compact DC high voltage test device, developed for DC isolations tests

**Highlights:**

- 7" Color touch panel display
- Adjustable rise time
- Test time adjustable
- Current limit adjustable
- Error message when over

| Variations | Voltage | Current |
|------------|---------|---------|
| HTS 20-5   | 20 kV   | 5 mA    |
| HTS 20-10  | 20 kV   | 10 mA   |



Figure 31: HTS 20-10

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## 4.2 SAFETY TEST COVERS

### Highlights:

- For High-voltage testing of components
- Prevents accidental contact with live parts of test objects
- With ground rod
- Security door switch with Interlock
- Different test sample connections
- Red / green lights

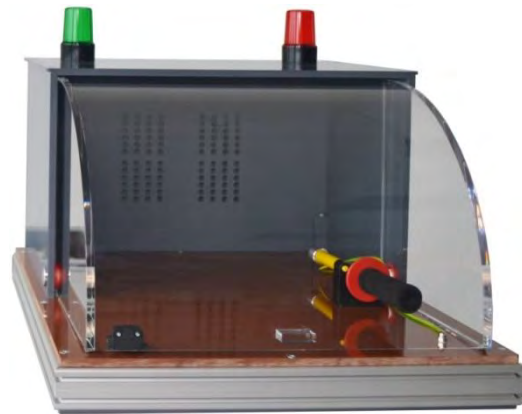



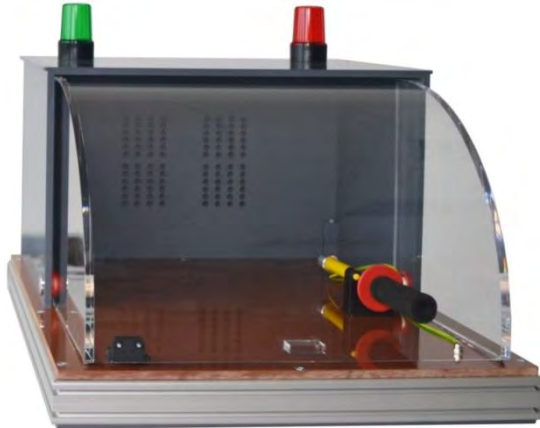


Figure 32: PA 504

### Variations:

|            | PA 503   | PA 505   |
|------------|--|--|
|            |    |   |
| Test space | 400*140*300 mm <sup>3</sup>  | 400*250*400 mm <sup>3</sup>  |
|            | PA 502   | PA504  |
|            |   |  |
| Test space | 440*180*300 mm <sup>3</sup>  | 460*300*550 mm <sup>3</sup>  |
| Further:   | <p><b>PU Test device switch unit</b><br/>           High-voltage testing of components<br/>           Switch unit for 8 test samples<br/>           Optionally build in with impulse voltage divider and current shunt</p> |  |

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## 4.3 CALIBRATION EQUIPMENT

### Highlights:

- Pulse generator
- Measuring the step response
- Different operational modes

| Variations     | Usage   | Impulse rise time |
|----------------|---|-------------------|
| <b>IPG 250</b> | Impulse generators for calibration purposes/<br>step response measurement | < 3 ns            |

### Calibration Kits

| Variations      | Usage                 |
|-----------------|-----------------------|
| <b>SCK 105</b>  | Surge Calibration Kit |
| <b>BCK 400F</b> | Burst Calibration Kit |

## 4.4 HIGH-VOLTAGE MEASUREMENT EQUIPMENT

All HILO-TEST voltage divider HVT – RCR is included in the HVM2015 firmware. The user connects the voltage divider, set it in the device menu, and can start with the measurements immediately.

### Highlights:

- High voltage measurement equipment
- Measuring up to 10 kV
- Optional up to 20 kV
- With ext. HVT: up to 300 kV
- Firmware set up for all Hilo-Test dividers implemented
- Remote Ethernet interface with fiber optic

| Variations      | Usage   | Extern input | Direct input           |
|-----------------|---|--------------|------------------------|
| <b>HVM 2015</b> | Measurement device for high ac, dc<br>and pulse voltage | 0 - 100 V    | 10KV<br>Optional: 20kV |



Figure 33: HVM 2015

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## 4.5 HIGH-VOLTAGE DIVIDERS

The High voltage divider types HVT - RCR processes from DC up to their cut-off frequencies in the MHz range uniformly excellent transmission characteristics. The voltage divider consists of a resistive branch, which is constructed of high-grade resistance and a capacitive branch with series damping.

### Highlights:

- Broadband high voltage divider for AC, DC and impulse voltage
- Very good accuracy, high bandwidth, low rise time
- Manual operation or creation of test procedures with HVM2015

| Variations | Description               |
|------------|---------------------------|
| PVD ***    | Impulse voltage divider   |
| HVT***RCR  | Wideband voltage dividers |



Figure 34:  
HVT 240/300 RCR



Figure 35:  
HVT 80/120/160 RCR



Figure 36:  
HVT 40 RCR



Figure 37:  
HVT 2.5/10/20 RCR

| HVT variations  | 10     | 20     | 40     | 80     | 120    | 160    | 240    | 300    |
|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|
| DC voltage      | 11 kV  | 22 kV  | 40 kV  | 80 kV  | 120 kV | 160 kV | 240 kV | 300 kV |
| AC voltage eff. | 8 kV   | 15 kV  | 30 kV  | 60 kV  | 90 kV  | 120 kV | 180 kV | 230 kV |
| Pulse voltage   | 20 kV  | 40 kV  | 100 kV | 160 kV | 200 kV | 250 kV | 360 kV | 480 kV |
| Divider ratio   | 1000:1 | 2000:1 | 2500:1 | 5000:1 | 5000:1 | 5000:1 | 5000:1 | 5000:1 |

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## 4.6 CURRENT VIEWING RESISTORS

| Variations    | Usage  |
|---------------|--|
| Series ISM*** | Current measuring resistors for <b>high pulse currents</b> |
| Series WSM*** | Current measuring resistors for <b>high ac currents</b>    |



Figure 38: WSM/ ISM

| Type       | Current rating peak / rms | Nominal resistance | Power  | Impulse-load integral                | Rise-time | Band-width <sup>1)</sup> | Size | Diameter/Length | Weight |
|------------|---------------------------|--------------------|--------|--------------------------------------|-----------|--------------------------|------|-----------------|--------|
| ISM 3P/200 | 3 kA / 8 A                | 200 mΩ*            | 13 W   | 1300 A <sup>2</sup> s                | 7 ns      | 50 MHz                   | A1   | 35/430 mm       | 1.0 kg |
| ISM 3P/100 | 3 kA / 10 A               | 100 mΩ             | 10 W   | 1300 A <sup>2</sup> s                | 1.8 ns    | 200 MHz                  | A1   | 35/487 mm       | 1.3 kg |
| ISM 5P/50  | 5 kA / 10 A               | 50 mΩ              | 5 W    | 1300 A <sup>2</sup> s                | 1.8 ns    | 200 MHz                  | A    | 50/236 mm       | 1.5 kg |
| ISM 5P/20  | 5 kA / 20 A               | 20 mΩ              | 8 W    | 8000 A <sup>2</sup> s                | 1.8 ns    | 200 MHz                  | A    | 50/236 mm       | 1.5 kg |
| ISM 5P/10  | 5 kA / 30 A               | 10 mΩ              | 9 W    | 20000 A <sup>2</sup> s               | 1.8 ns    | 200 MHz                  | A    | 50/203 mm       | 1.4 kg |
| ISM 5P/5   | 5 kA / 40 A               | 5 mΩ               | 8 W    | 80000 A <sup>2</sup> s               | 7 ns      | 50 MHz                   | A    | 50/203 mm       | 1.4 kg |
| ISM 50/10  | 20 kA / 50 A              | 10 mΩ              | 25 W   | 50000 A <sup>2</sup> s               | 1.8 ns    | 200 MHz                  | B    | 65/296 mm       | 2.5 kg |
| ISM 50/5   | 20 kA / 60 A              | 5 mΩ               | 18 W   | 50000 A <sup>2</sup> s               | 1.8 ns    | 200 MHz                  | B    | 65/204 mm       | 2.1 kg |
| ISM 50/2   | 20 kA / 70 A              | 2 mΩ               | 10 W   | 50000 A <sup>2</sup> s               | 1.8 ns    | 200 MHz                  | B    | 65/149 mm       | 1.7 kg |
| ISM 100    | 40 kA / 120 A             | 1.0 mΩ             | 14.4 W | 50000 A <sup>2</sup> s               | 1.8 ns    | 200 MHz                  | B    | 65/128 mm       | 1.5 kg |
| ISM 200    | 40 kA / 220 A             | 0.25 mΩ            | 12.0 W | 2*10 <sup>6</sup> A <sup>2</sup> s   | 7.0 ns    | 50 MHz                   | B    | 65/118 mm       | 1.5 kg |
| ISM 250    | 100 kA / 250 A            | 1.0 mΩ             | 62.5 W | 5.6*10 <sup>6</sup> A <sup>2</sup> s | 1.8 ns    | 200 MHz                  | D    | 200/160 mm      | 9.0 kg |
| ISM 300    | 100 kA / 300 A            | 1.0 mΩ             | 90.0 W | 1.3*10 <sup>7</sup> A <sup>2</sup> s | 175 ns    | 2.0 MHz                  | C    | 130/417 mm      | 8.5 kg |
| ISM 350    | 100 kA / 360 A            | 0.5 mΩ             | 64.8 W | 5.6*10 <sup>6</sup> A <sup>2</sup> s | 1.8 ns    | 200 MHz                  | D    | 200/160 mm      | 9.0 kg |
| ISM 500    | 100 kA / 500 A            | 0.25 mΩ            | 62.5 W | 2.2*10 <sup>6</sup> A <sup>2</sup> s | 7.0 ns    | 50 MHz                   | D    | 200/160 mm      | 9.0 kg |
| ISM 800    | 100 kA / 800 A            | 0.10 mΩ            | 64.0 W | 1.4*10 <sup>6</sup> A <sup>2</sup> s | 44 ns     | 8.0 MHz                  | D    | 200/160 mm      | 9.0 kg |
| ISM 1200   | 100 kA / 1200 A           | 0.05 mΩ            | 72 W   | 9.0*10 <sup>6</sup> A <sup>2</sup> s | 28 ns     | 12.5 MHz                 | D    | 200/160 mm      | 9.0 kg |
| ISM 1600   | 100 kA / 1600 A           | 25 μΩ              | 64 W   | 5.6*10 <sup>6</sup> A <sup>2</sup> s | 175 ns    | 2.0 MHz                  | D    | 200/160 mm      | 9.0 kg |

| TYPE     | Current rms | Current rating peak | Nominal resistance | Power | Impulse-load-integral                | Band-width <sup>1)</sup> | Weight |
|----------|-------------|---------------------|--------------------|-------|--------------------------------------|--------------------------|--------|
| WSM15000 | 15 kA       | 150 kA              | 4 μΩ               | 900 W | 12*10 <sup>6</sup> A <sup>2</sup> s  | 30 kHz                   | 62 kg  |
| WSM10000 | 10 kA       | 100 kA              | 6 μΩ               | 600 W | 5.0*10 <sup>6</sup> A <sup>2</sup> s | 30 kHz                   | 25 kg  |
| WSM 6000 | 6 kA        | 100 kA              | 10 μΩ              | 360 W | 1.6*10 <sup>6</sup> A <sup>2</sup> s | 55 kHz                   | 13 kg  |
| WSM 4000 | 4 kA        | 60 kA               | 15 μΩ              | 240 W | 5.8*10 <sup>6</sup> A <sup>2</sup> s | 60 kHz                   | 9 kg   |
| WSM 2500 | 2.5 kA      | 60 kA               | 24 μΩ              | 150 W | 3.2*10 <sup>6</sup> A <sup>2</sup> s | 120 kHz                  | 6 kg   |
| WSM 1500 | 1.5 kA      | 60 kA               | 40 μΩ              | 90 W  | 1.0*10 <sup>6</sup> A <sup>2</sup> s | 200 kHz                  | 3.3 kg |
| WSM 1000 | 1.0 kA      | 60 kA               | 60 μΩ              | 60 W  | 4.4*10 <sup>7</sup> A <sup>2</sup> s | 200 kHz                  | 1.7 kg |
| WSM 600  | 600 A       | 40 kA               | 100 μΩ             | 36 W  | 1.5*10 <sup>7</sup> A <sup>2</sup> s | 500 kHz                  | 1.5 kg |
| WSM 400  | 400 A       | 40 kA               | 150 μΩ             | 24 W  | 6.7*10 <sup>6</sup> A <sup>2</sup> s | 1.5 MHz                  | 1.5 kg |
| WSM 250  | 250 A       | 20 kA               | 240 μΩ             | 15 W  | 2.7*10 <sup>6</sup> A <sup>2</sup> s | 1.5 MHz                  | 1.5 kg |
| WSM 150  | 150 A       | 10 kA               | 0.4 mΩ             | 9.0 W | 3.6*10 <sup>6</sup> A <sup>2</sup> s | 1.5 MHz                  | 1.2 kg |
| WSM 100  | 100 A       | 10 kA               | 0.6 mΩ             | 6.0 W | 1.6*10 <sup>6</sup> A <sup>2</sup> s | 800 kHz                  | 1.2 kg |

## 4.7 MISCELLANEOUS

HCC: High voltage Capacitor Charging unit

| HCC variations  |     |     |    |    |    |    |    |
|-----------------|-----|-----|----|----|----|----|----|
| Max Voltage/ kV | 4   | 10  | 20 | 30 | 40 | 50 | 60 |
| Max Current/ mA | 400 | 120 | 60 | 40 | 30 | 24 | 20 |

| Miscellaneous | Description                               |
|---------------|---|
| IT 5413       | Trigger transformer for spark gaps        |
| IT 5425       | Trigger transformer for spark gaps        |
| USD 3801      | Ultrasonic detector for partial discharge |
| USD 3802      | Ultrasonic detector for partial discharge |
| TEM 2000      | TEM-test cell                             |



Figure 39: HCC 30-40

Sales Partner:



ABSOLUTE EMC LLC.  
Covering sales in North America  
United States, Mexico, & Canada

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## New compact Multi CE5

Combining burst, surge, power fail and magnetic field tests



Visit page 5 for further details.