

# HILO TEST

Am Hasenbiel 42, D-76297 Stutensee / Karlsruhe

## Technique from HILO-TEST

more than 36 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


**made  
in  
Germany**



You can download all data sheets of our equipment from our web site:

[www.hilo-test.de](http://www.hilo-test.de)

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# 1. EMC TEST EQUIPMENT

## 1.1 AUTOMOTIVE EMC EQUIPMENT

EMC Test Equipment designed for testing electromagnetic immunity of electrical installation and electronic components of vehicles against supply line transients.

### 1.1.1 CAR TEST SYSTEM

The CAR TEST SYSTEM include a set of pulse generators which supply different test pulses according to standards ISO 7637-2: 2011 and ISO 1650 :2012.

#### CAR TEST SYSTEM 14

A microprocessor-controlled 5" touch screen display unit is integrated and permits an easy operation of the System 14.

The software program CAR-remote permits the PC control of the generator via Ethernet and fiber optic and also allows the standardized documentation according to IEC 17025 and the evaluation of test results.

The user can use the standard test routines or define his own test sequence.

It is equipped with an Impulse Recording Function (IRF) to record definite impulses (with oscilloscope).

Furthermore, nearly all customer-specific impulse adjustments are possible by the flexible software control.

According to ISO7637-2:2011 and ISO1650:2012  
 Suitable for 12V, 24V, 42V systems until 70V  
 With different Battery currents 50/100/200 A  
 Sense electronic for battery voltage  
 Front ground connection  
 For 19" rack build in



Puls 1            1-5/2000 $\mu$ s, 600 V, ISO  
                      1-5/1000 $\mu$ s, 600 V, ISO / SAE  
 Puls 2a          1 / 50 $\mu$ s,        600 V, ISO  
                      Ri = 2/4/10/20/30/50/90/150  $\Omega$   
 Puls 3            5/100 ns,       800 V, ISO  
                      Ri = 50 $\Omega$

Puls 2b          in conjunction with power supply PS 66-55 / 33-110  
 Puls 4            in conjunction with power supply PS 66-55 / 33-110  
 Test A+B        (Puls 5) with Load Damp PG 2803 or Load Damp with PS 66-55  
 SS-AC-VG       Superimposed sinus ac Voltage Generator, 75Vp, 30Ap, DC-1MHz

## CAR SWITCH TE 14

The CAR- Transient Emission 14 is used to check the transient transition behavior when switching loads on the vehicle electrical system. It features a microprocessor controlled user interface and a display unit. The user can define his own test sequence. The test parameters are set and displayed via a 5" touch screen display and can be recorded during the test on a USB stick.

According to ISO 7637-2: 2011  
 Suitable for 12V, 24V and 42V systems until 70V  
 For different currents 50/100/200 A  
 Switch electronically and mechanical  
 Voltage drop < 2V  
 Ground plate for ground connection



## SYSTEMS WITH SPITZENBERGER & SPIES POWER AMPLIFIERS

CAR-TEST-SYSTEM 14 / S I

Power amplifier PAS 1000/GN/KFZ, 35 A= cont. current, / 50 A short time current

CAR-TEST-SYSTEM 14 / S II

Power amplifier PAS 2000/GN/KFZ, 100 A= cont. current, / 150 A short time current

CAR-TEST-SYSTEM 14 / S III

Power amplifier PAS 5000/GN/KFZ, 200 A= cont. current, / 300 A short time current

### 1.1.2 CAR-TESTER

The CAR-TESTER is a compact and well-priced EMC test device with the standard pulses accordingly to ISO 7637:2004

It includes an artificial network, a trigger able load switch and an interface to control the extern power supply.

### 1.1.3 CAR ACCESSORIES

#### PS 66-55 External power supply

Output voltage adjustable 0 - 60 V, nominal current 50 A, with PC Ethernet Interface in connection with the Car Test System

#### PG 2803 Load dump generator

Generation of pulse 5 / Test A and Test B

#### CDN 2012 Capacitive Coupling Clamp

Capacitive coupling of BURST pulses to screened cables

#### SESD 30000 Electro Static Discharge Generator

Contact and air discharge till 30 kV, to IEC 61000-4-2 and ISO/TR 10605

## 1.2 INDUSTRIAL EMC EQUIPMENT

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

### 1.2.1 CE-TESTER

Compact EMC test unit designed for testing electromagnetic immunity against pulsed and conducted interference.

- 5" touch screen display unit
- Manual operation or creation of test procedures
- Remote PC control via optically isolated Ethernet interface
- With Impulse Recording Function (IRF)
- Printout of test parameters to an USB stick



BURST	acc. to IEC 61000-4-4
SURGE	acc. to IEC 61000-4-5
Power freq. magnetic field	acc. to IEC 61000-4-8
Pulsed magnetic field 8/20µs	acc. to IEC 61000-4-9
Voltage dips and variation	acc. to IEC 61000-4-11 / 29

### 1.2.2 CE-TESTER sub-units

Following stand-alone test generators are available

#### **EFTG 4510 Electrical Fast Transient Generator**

Simulates transient disturbances of the mains power supply caused by contact bouncing, waveform 5/50 ns, 0.2 - 5 kV, 1 KHz-1 MHz burst frequency, specified in IEC 61000-4-4

#### **CE-SURGE Combination Wave Generator**

Simulates transient disturbances of the mains power supply caused by switching in the major power system and/or secondary effects of lightning strokes, waveform 1.2 / 50 µs , 0.2- 5 kV and 8 / 20 µs, 0.1- 2.5 kA specified in IEC 61000-4-5

#### **PFS 2516 Power Fail Simulator**

Including motor driven variac 0 - 250 V, simulates transient interruptions and variation the power supply voltage specified in IEC 61000-4-11

### 1.2.3 CE-TESTER accessories

#### VPS 250-16 Variable Power Source

Motor driven variac, control by CE-TESTER, generation of voltage variation according to IEC 61000-4-11

#### HI 100 Helmholtz Coil

Air coil for generation of magnetic fields according to IEC 61000-4-8 / -9

#### EFTC 2012 Capacitive Coupling Clamp

For capacitive coupling of BURST pulses to screened cables according to IEC 61000-4-4



#### SCK 105 Surge Calibration Kit

Including impulse voltage divider and current viewing resistor  
For calibration of surge generators

#### BCK 400F Burst Calibration Kit

Including impulse voltage divider 200:1 and 400:1, input impedance 50Ω  
For calibration of burst generators

#### SESD 216 Electric Static Discharge Generator

Contact discharge up to 10 kV, air discharge up to 16, 5 kV  
As specified IEC 61000-4-2

### Coupling- / Decoupling Networks

For SURGE and/or BURST pulses  
Coupling display on the front panel  
Control by CE-TESTER via optical link



**CDN 4416** Coupling of BURST or SURGE pulses to power supply lines  
3 \* 400V, 16A, max. test voltage 5kV, 1.2/50μs

**CDN 4432** Coupling of BURST or SURGE pulses to power supply lines  
3 \* 400V, 32A, max. test voltage 5kV, 1.2/50μs

**CDN 4463** Coupling of BURST or SURGE pulses to power supply lines  
3 \* 400V, 63A, max. test voltage 5kV, 1.2/50μs

**CDN 2402** Coupling of BURST or SURGE to 4 data lines

**CDN 2802** Coupling of BURST or SURGE to 8 data lines

**CDN 2410** Coupling of SURGE and BURST  
4 \* 48V, 2A or 4 \* 240V, 10A, max. test voltage 2 kV

## 1.2.4 Combination Wave Generators

Simulate high-voltage transients and disturbances of the mains power supply caused by switching in the major power system and secondary effects of lightning strokes. According to IEC 61000-4-5, IEEE 587, and VDE 0847-4-5.

5" touch screen display unit  
 Manual operation or creation of test procedures  
 Remote PC control via optically isolated Ethernet interface  
 With Impulse Recording Function (IRF)  
 Printout of test parameters to an USB stick



**PG 7-250 CWG** Pulse voltage 1.2/50µs, 7 kV, Pulse current 8/20µs, 3.5 kA

**PG 10-504 CWG** Pulse voltage 1.2/50µs, 10 kV, Pulse current 8/20µs, 5.0 kA

**PG 12-804 CWG** Pulse voltage 1.2/50µs, 12 kV, Pulse current 8/20µs, 6.0 kA

**PG 24-2500 CWG** Pulse voltage 1.2/50µs, 24 kV, Pulse current 8/20µs, 12 kA

## 1.2.5 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.

**CDN 6416** Coupling of BURST or SURGE pulses to power supply lines  
 3 \* 400 V, 16 A, max. test voltage 7 kV, 1.2/50µs

**CDN 6463** Coupling of BURST or SURGE pulses to power supply lines  
 3 \* 400 V, 63 A, max. test voltage 7 kV, 1.2/50µs

**CDN 10416** Coupling of BURST or SURGE pulses to power supply lines  
 3 \* 400 V, 16 A, max. test voltage 10 kV, 1.2/50µs

**CDN 10463** Coupling of BURST or SURGE pulses to power supply lines  
 3 \* 400 V, 63 A, max. test voltage 10 kV, 1.2/50µs

**CDN 10216** Coupling of BURST or SURGE pulses to power supply lines  
 1 \* 240 V, 16 A, max. test voltage 10 kV, 1.2/50µs

**CDN 12416** Coupling of SURGE pulses to power supply lines  
 3 \* 400 V, 16 A, max. test voltage 12 kV, 1.2/50µs

**CDN 12216** Coupling of SURGE pulses to power supply lines  
 1 \* 240 V, 16 A, max. test voltage 12 kV, 1.2/50µs  
 Differential mode / common mode



## 1.2.6 Oscillatory Wave ( Ring Wave ) Generators

5" touch screen display unit  
 Manual operation or creation of test procedures  
 Remote PC control via optically isolated Ethernet interface  
 With Impulse Recording Function (IRF)  
 Printout of test parameters to an USB stick



### IPG 612T Ring-wave generator

Simulates high-voltage transients of the mains power supply caused by switching in the major power system, mains synchronous triggering  
 Waveform  $0.5\mu\text{s}/100\text{ kHz}$ , 0 - 6 kV  
 Specified in IEC 61000-4-12  
 Coupling-/decoupling network for power supply lines , as option  
 Modification for testing RCCB's according to IEC 1008-1, as option

### IPG 2553 High-frequency magnetic field test generator

Simulates high-frequency magnetic fields caused by switching in gas Isolated substations of the power system  
 Specified in IEC 61000-4-10  
 Including Helmholtz-Coil,  $1*1*0.6\text{ m}$   
 Damped magnetic field 100 kHz, 0 - 10 A/m, repetition rate 40 Hz  
 Damped magnetic field 1.0 MHz, 0 - 100 A/m, repetition rate 400 Hz

### IPG 2554 Oscillatory wave generator

Simulates high-voltage transients of the mains power supply caused by switching in gas isolated substations of the power system  
 Specified in IEC 61000-4-18  
 Slow damped oscillatory wave:  
 100 kHz, 0.25 - 3 kV, repetition rate 400 Hz  
 1.0 MHz, 0.25 - 3 kV, repetition rate 400 Hz  
 Fast damped oscillatory wave:  
 3 / 10 / 30 / MHz, 0.25 - 4 kV, repetition rate 5000 Hz

The IPG is to obtain in the following different configurations:

IPG 2554 fast slow  
 IPG 2554 fast  
 IPG 2554 slow

## 1.3 TELECOM TEST EQUIPMENT

### 1.3.1 High-Voltage Test Generator

Designed for testing over voltage protection devices of telecommunication installations.

5" touch screen display unit

Manual operation or creation of test procedures

Remote PC control via optically isolated Ethernet interface

With Impulse Recording Function (IRF)

Printout of test parameters to an USB stick

With different covers and without cover deliverable



#### Devices, specified in CCITT 12 TR 1, K17

- IPG 620 High-voltage pulse generator**  
Lightning surge 1.2/50  $\mu$ s, 6 kV, 20 J
- IPG 1050 High-voltage pulse generator**  
Lightning surge 1.2/50  $\mu$ s, 10 kV, 50 J
- IPG 1252 High-voltage pulse generator**  
Lightning surge 1.2/50  $\mu$ s, 12 kV, 50 J

#### Devices, specified in ITU-T/CCITT 12 TR 1, K17, K20

- PG 10-700 High-voltage pulse generator**  
Lightning surge 1.2/50  $\mu$ s, 4.5 kV, 10 J  
Switching surge 10/700  $\mu$ s, 4.5 kV, 200 J
- PG 6-364 High-voltage pulse generator**  
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 or 0.5/700 $\mu$ s or 1/1000 $\mu$ s
- PG 10-1000 High-voltage pulse generator**  
Lightning surge 1.2/50 $\mu$ s, 10kV, 50 J  
Switching surge 10/700  $\mu$ s, 10kV, 1000 J
- PG 12-1400 High-voltage pulse generator**  
Lightning surge 1.2/50 $\mu$ s, 12 kV, 70 J  
Switching surge 10/700  $\mu$ s, 12kV, 1400 J
- PG 14-1960 High-voltage pulse generator**  
Switching surge 10/700  $\mu$ s, 14 kV, 1960 J  
Switching surge 0.5/700  $\mu$ s, 14 kV, 1960 J
- PG 20-4000 High-voltage pulse generator**  
Switching surge 10/700  $\mu$ s, 20 kV, 4000 J



### 1.3.2 Special Generators

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

## 2. COMPONENT TEST GENERATORS

Designed for testing passive and active components and devices:

Surge voltage test of transformers, optical couplers and electrical installations

Surge current test of over-voltage protection devices and circuits

Dielectric testing of X/Y-capacitors

Impulse current test from Over voltage protectors, and protecting circuits

Spark over detection on the test sample with adjustable current sensor

### 2.1 HIGH VOLTAGE PULSE GENERATORS

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

<b>IPG 605</b>	Lightning surge	1.2/50 $\mu$ s	6 kV	5 J
<b>IPG 620</b>	Lightning surge	1.2/50 $\mu$ s	6 kV	20 J
<b>IPG 1012</b>	Lightning surge	1.2/50 $\mu$ s	10 kV	12 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
<b>IPG 1218</b>	Lightning surge	1.2/50 $\mu$ s	12 kV	18 J
<b>IPG 2025</b>	Lightning surge	1.2/50 $\mu$ s	20 kV	25 J
<b>IPG 2436</b>	Lightning surge	1.2/50 $\mu$ s	24 kV	36 J

IPG 605-2436 with output on the rear panel



IPG 606-2436 with safety test cover



5" touch screen display unit

Manual operation or creation of test procedures

Remote PC control via optically isolated Ethernet interface

With Impulse Recording Function (IRF)

Printout of test parameters to an USB stick

#### **IPG 1201 HV Impulse Generator**

Surge test of Insulations up to 12 kV

Measurement of Insulation resistance  $U_0 = 500$  V,  $R_{iso} = 0.5 - 20$  M $\Omega$

According to IEC 60065

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

- IPG 809 HV Impulse Generator**  
Pulse voltage 0.1 - 8 kV, 1.7/46  $\mu$ s, 9 J  
Capacitor range 0.1- 27 nF
- PG 6-401 HV Impulse Generator**  
Pulse voltage 0.1 - 6 kV, 1.6/47  $\mu$ s, 400 J  
Capacitor range 33/47/68/100/150/220/330/470nF

Designed for solar module testing

- PG 10-200 HV Impulse Generator**  
HV-Impulse generator, 1.2/50  $\mu$ s, 10 kV, 200 J, 10 nF-183 nF
- PG 12-360 HV Impulse Generator**  
HV-Impulse generator, 1.2/50  $\mu$ s, 12 kV, 360 J, 10 nF-183 nF
- PG 20-100 HV Impulse Generator**  
HV-Impulse generator, 1.2/50  $\mu$ s, 20 kV, 100 J, 27 nF-183 nF

## 2.2 HIGH CURRENT PULSE GENERATORS

5" touch screen display unit  
Manual operation or creation of test procedures  
Remote PC control via optically isolated Ethernet interface  
With Impulse Recording Function (IRF)  
Printout of test parameters to an USB stick  
Safety test cover mounted on the top of the equipment

- PG 6-250 Varistor Tester**  
10A - 2.5 kA, 8/20 $\mu$ s, 250 J
- PG 6-200 Surge Current Generator**  
5 kA, 8/20 $\mu$ s
- PG 6-400 Surge Current Generator**  
10 kA, 8/20 $\mu$ s

- EMC 2004 Pulse Generator System**  
8 / 20  $\mu$ s 25 kA 1500 J  
10 / 50  $\mu$ s 5 kA 1500 J  
10 / 350  $\mu$ s 600 A 1500 J  
10 / 700  $\mu$ s 300 A 1500 J  
10/1000  $\mu$ s 200 A 1500 J  
Combination wave plug-in:  
1.2 / 50  $\mu$ s 2 \* 10 kV 1500 J  
8 / 20  $\mu$ s 2 \* 10 kA 1500 J  
Varistor test plug-in:  
8 / 20  $\mu$ s 3 kA 250 J  
Spannungseinschub:  
10/700  $\mu$ s 10kV



Device type	Pulse current	Wave shape	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 12-3600	40 kA	8/20 $\mu$ s	3600 J
PG 15-6600	70 kA	8/20 $\mu$ s	6600 J
PG 20-7000	50 kA	8/20 $\mu$ s	7000 J
PG 20-14000	100 kA	8/20 $\mu$ s	14000 J
PG 10-2500	500 A	10/700 $\mu$ s	2500 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
PG 15/27k	75 kA	20/75 $\mu$ s	27000J
PG 5/35k	10 kA	700/2500 $\mu$ s	35000 J
PG 2.5/120k	120 kA	50/1000 $\mu$ s	120000J



## 3. HIGH-VOLTAGE TEST AND MEASUREMENT EQUIPMENT

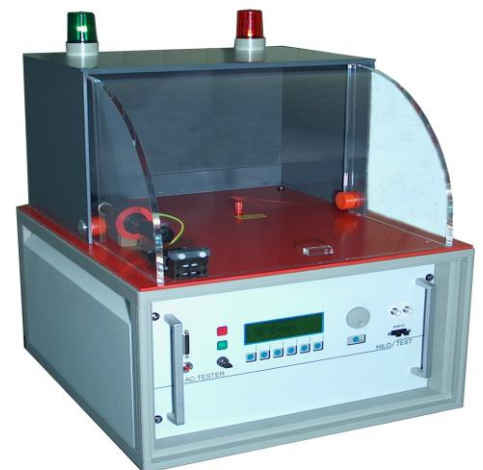
Hilo-Test produces several devices and components, the range of these products includes:  
 High-voltage test of isolations with ac- dc or impulse voltage  
 Measuring equipment for ac-, dc- or impulse voltage  
 High-voltage dividers for ac-, dc- or impulse voltage  
 Current viewing resistors for ac-, dc- or impulse current

### 3.1 AC- / DC TEST EQUIPMENT

5" touch screen display unit  
 Manual operation or creation of test procedures  
 Remote PC control via optically isolated Ethernet interface  
 With Impulse Recording Function (IRF)  
 Printout of test parameters to an USB stick  
 Safety test cover mounted on the top of the equipment

**AC-TESTER**      **High-voltage test unit**  
 Measurement of protective earth resistance,  
 insulation resistance and supply current  
 5 kV, 100 mA

**AC-TESTER 6**      **High-voltage test unit**  
 Testing of electrical isolations  
 Security test cover on top of the Device,  
 Test mode burning and over current  
 With security test cover on top  
 10 kV, 100 mA



**HVTS 30-20**      **AC test set-up**  
 Designed for AC isolation test  
 30 kV, 20 mA

**HVTS 30-40**      **AC test set-up**  
 Designed for AC isolation test  
 30 kV, 40 mA

**HVTS 50-10**      **AC test set-up**  
 Designed for AC isolation test  
 50 kV, 10 mA

**HVTS 30-20 AC test equipment in 19" cabinet with test room**

- Security glass front door with safety switch
- Grounding rod
- Red and green warning lamps
- With 4 wheels, 2 stat able
- Available Voltage:  
30 KV, 20 mA, 50 KV, 10 mA

Additional integration of HV-impulse generators possible for example IPG 2025 / 2436. This provides a compact and versatile testing facility available.



**High voltage DC Tests**

- Compact DC high voltage test device, developed for DC isolations tests:
- Adjustable rise time
- Test time adjustable
- Current limit adjustable
- Error message when over current

- HVS 20-5** DC test set-up, 20 kV, 5 mA
- HVS 20-10** DC test set-up, 20 kV, 10 mA



**3.2 SAVERY TEST COVERS**

- PA 503 Safety test cabinet**  
High-voltage testing of components  
Prevents accidental contact with live parts of test objects  
Test voltage until 10 kV

- PA 504, PA 505 Additional test cabinet**  
until 12 kV

- PU Test device switch unit**  
High-voltage testing of components  
Switch unit for 8 test samples  
Optionally build in with impulse voltage divider and current shunt





### 3.3 CALIBRATION EQUIPMENT

**IPG 250** Impulse generators for calibration purposes/ step response measurement  
Impulse rise time < 3ns

### 3.4 HIGH-VOLTAGE MEASUREMENT EQUIPMENT

**HVM 2015** Measurement device for high ac, dc and pulse voltage  
0 - 100 V input  
10KV voltage direct input  
Optional 20kV voltage direct input



### 3.5 HIGH-VOLTAGE DIVIDERS

For AC, DC and impulse voltage

**PVD \*\*\*** Impulse voltage divider

**HVT\*\*\*RCR** Wide band voltage dividers



**HVT 240/300 RCR**



**HVT 80/120/160 RCR**



**HVT 40 RCR**



**HVT 2.5/10/20 RCR**

### 3.6 CURRENT VIEWING RESISTORS

**Series ISM\*\*\*** Current measuring resistors  
For high pulse currents

**Series WSM\*\*\*** Current measuring resistors  
For high ac currents



### 3.7 HIGH VOLTAGE CAPACITOR CHARGING UNIT

**HCC\*\*\*\*** High voltage capacitor charging units

4	10	20	30	40	50	60	KV
400	120	60	40	30	24	20	mA



### 3.8 MISCELLANOS

Multi-channel trigger unit  
Trigger transformer for spark gaps  
High voltage ground switch  
Ultrasonic detector for partial discharge  
TEM-test cell

MCT 5002, MCT 5004  
IT 5413 / IT 5425  
HS 10 / HS 50  
USD 3801/3802  
TEM 2000





Am Hasenbiel 42

D-76297 Stutensee / Karlsruhe