HILO TEST

Elektrische Prüf- und Messtechnik GmbH

Product catalogue

Technique from HILO-TEST

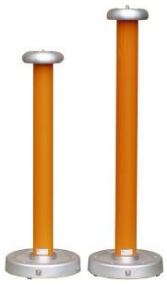
More than 40 years' experience
Your advantage in competition
Impulses for your development

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



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Made in Germany

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

www.hilo-test.de

PRODUCT OVERVIEW

1. GENERAL CONTROL DISCRIPTION

1.1 Control unit

The HILO-TEST Control unit is the centre of each generator, over which the user interacts with the device. At multi-testers, like the ‘Multi-CE5’, a user can choose a subunit and change per 1-click-methode all testing parameters. As well, he can create and edit own test procedures, or choose one of predefined standard test sequences.
While testing he gets live visualized the state of testing as well as the D.U.T. monitoring. Furthermore are changes in the parameters possible, while the test is running. The documented results, which include test parameters and results as well as in the set-up menu defined information, can be stored on an USB stick.
‘Autotest’ allows running predefined or own sequences of different subunits after each other, while leaving the D.U.T. at one output.

Highlights:

- 5”/ 7” 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 out of predefined standard procedures
- Status and D.U.T. monitoring
- Printout of test documentation to an USB stick
- Additional: Remote PC control via optically isolated Ethernet interface with Impulse Recording Function (IRF)

Figure 1: Main menu of Multi-CE5

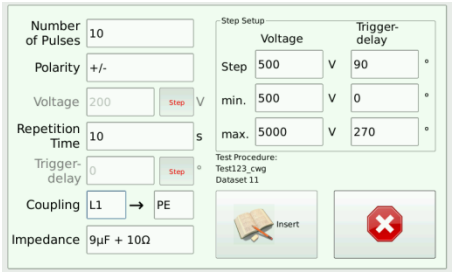


Figure 2: 1-click Parameter changes

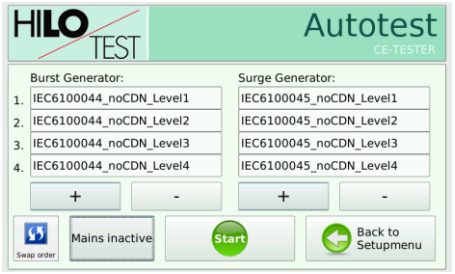


Figure 3: Autotest

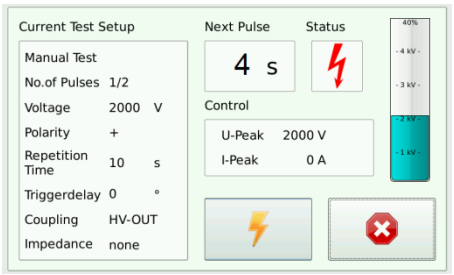


Figure 4: Impulse Test

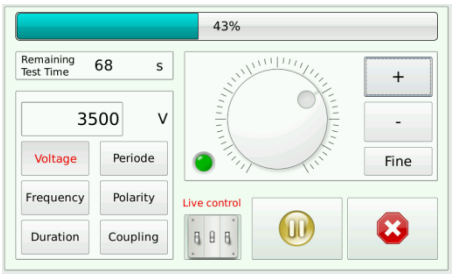


Figure 5: Live variation of parameters

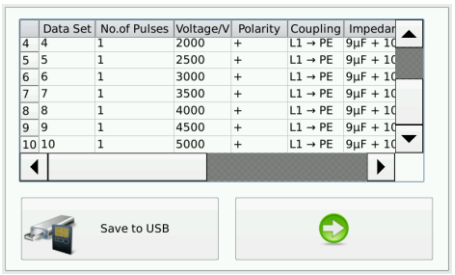


Figure 6: Test results

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 to monitor all test pulse and to store the captured image of the waveforms at 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 disconnected 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/ aboard 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

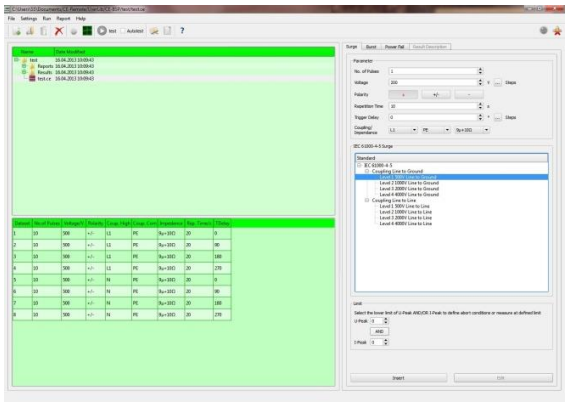


Figure 7: HILO-Remote Main window

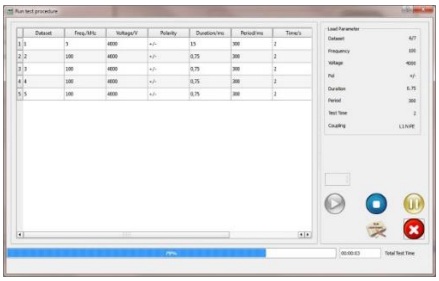


Figure 8: HILO-Remote –testing

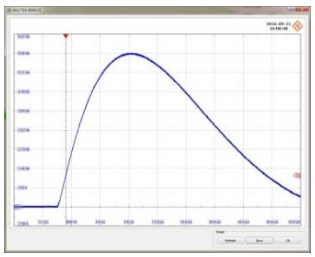


Figure 9: Oscilloscope picture feedback of IRF

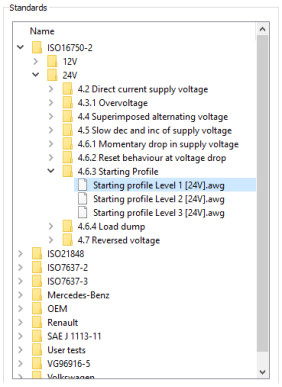


Figure 10: CAR Standards available

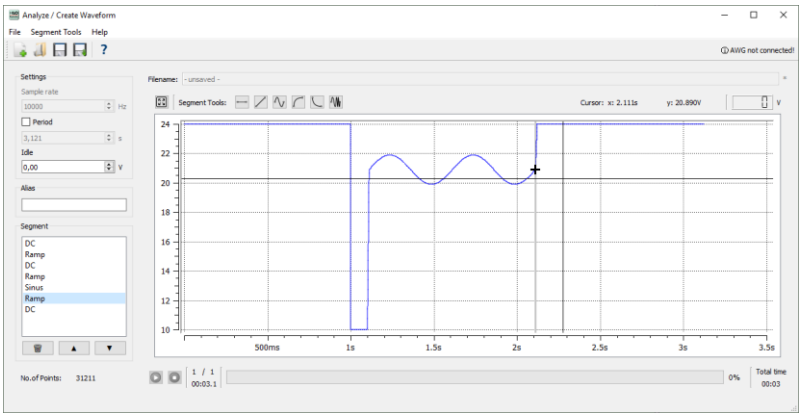


Figure 11: Custom Waveform shapes with CAR-AWG

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 especially geared to the EMC requirements in modern automobile and according to current standards:

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

According to
ISO 7637-2: 2011
ISO 16750-2: 2012
LV 124, LV 148
… various manufacturer standards

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, build in
- Modular and extendable

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

Standard System

Included Pulse	Waveform	Voltage	Standard	Ri
Pulse 1	1-5/2000µs 1-5/1000µs	600 V 600 V	ISO ISO / SAE	
Pulse 2a	1 / 50µs	600 V	ISO	2/4/10/20/30/50/90/150 Ω
Pulse 3	5/100 ns	800 V	ISO	50 Ω

Systems with HILO-TEST power amplifiers:

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

Configurations for the fulfillment of various standards:

Setup	CAR-SYS + Battery	CAR-SYS + PS xx-xx	CAR-SYS + CAR-AWG	CAR-AWG
ISO 7637 [2]	✓[5]	✓	✓	✗
ISO 16750 [1]	✗	✓[4]	✓	✓
ISO 21848	✗	✓	✓	✓
LV 124/148 [3]	✗	✗	✓	✓
MBN 1028-4	✓	✓	✓	✗
Renault 36.00.808 [1]	✗	✗	✓	✗
SAEJ 1113-111 [1]	✗	✗	✓	✗
VW TL81000 [1]	✓	✓	✓	✗

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	✗	✓
Custom waveforms	✗	✓

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	analogues	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 behaviour when switching loads on the vehicle 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
- Electronical 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
CDN 2012	**Capacitive Coupling Clamp** Capacitive coupling of BURST pulses to screened cables
CAR ICC	**Inductive coupling clamp** The CAR-ICC is used for diagnostic bulk current testing (BCI) up to 1 GHz
SESD 30000	**Electro Static Discharge Generator** 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
IEC 61000-4-5	SURGE
IEC 61000-4-8	Power frequency magnetic field
IEC 61000-4-9	Pulsed magnetic field 8/20µs
IEC 61000-4-11 / 29	Voltage dips and variation

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 front
- Many accessories

Figure 16: Multi-CE5

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	1.2/50µs	✓	✓
Power Fail		✓	✓
Ringwave	100kHz	✗	✓
Telecom Surge	10/700µs	✗	✓

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

2.2.3 Multi-CE sub-units

All sub units are available as a stand-alone version. They benefit from all advantages the modular system around the Multi-CE offers.
Following upgradable stand-alone test generators are available:

Sub-units	Description	Standard
EFTG-CE5	**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	IEC 61000-4-4
CWG-CE5	**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.	IEC 61000-4-5
PFS-CE-16	**Power Fail Simulator** Including motor driven variac 0 - 250 V, simulates transient interruptions and variation the power supply voltage.	IEC 61000-4-11
CWG-CE7	**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- 7 kV and 8 / 20 µs, 0.1- 3.5 kA.	IEC 61000-4-5
RW-CE7	**Ringwave generator** Simulates high-voltage transients of the mains power supply with the waveform of a damped oscillatory wave, mains synchronous triggering Waveform 0.5µs/100 kHz, 0 - 7 kV	IEC 61000-4-12
TS-CE7	**Telekom Surge Generator** Simulates high-voltage transients with the waveform 10/700µs, 0 - 7 kV	IEC 61000-4-5

2.2.4 Multi-CE Accessories

Accessories	Description
VPS 250-16	**Variable Power Source** Motor driven variac, control by Multi-CE5, generation of voltage variation according to IEC 61000-4-11
HI200-CE	**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 in Box	**Surge Calibration Kit in Box** 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

Figure 19: EFTC 2012

Figure 18: Multi-CE5 + CDN combination

Compatible Coupling- / Decoupling Networks

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

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 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 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:

- Standardised voltage and current waveforms
  Voltage: 1,2/50 µs; Current: 8/20 µs
- 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 1.2/50µs	CWG Pulse current 8/20µs
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:

		Current of power supply lines up to				
		16A	32A	63A	125A	200A
Maximum Testvoltage 1,2/50µs	5kV	CDN 5416	CDN 5432	CDN 5463	CDN 54125	CDN 54200
	7kV	CDN 7416	CDN 7432	CDN 5463	CDN 54125	CDN 54200
	10kV	CDN 10416	CDN 5432	CDN 5463	CDN 54125	CDN 54200
	12kV	CDN 12416	CDN 5432	CDN 5463	CDN 54125	CDN 54200

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, 1.2/50µs
CDN 12216*	power supply lines	1 * 240 V, 16 A	12 kV, 1.2/50µs
CDN 2402	4 data lines	4 * 48 V, 2 A	2,5 kV, 1.2/50µs
CDN 2410	4 data lines	4 * 240 V, 10 A	2,5 kV, 1.2/50µs
CDN 2802	8 data lines	4 * 48 V, 2 A	2,5 kV, 1.2/50µs

* special for usage of differential mode and common mode

2.2.7 Oscillatory Wave (Ring Wave) Generators

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

Highlights:

- 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
RW-CE7	**Ringwave generator** Simulates high-voltage transients of the mains power supply caused by switching in the major power system, mains synchronous triggering Waveform 0.5µs/100 kHz, 0 - 7 kV Specified in IEC 61000-4-12 Option: Coupling-/decoupling network for power supply lines Option: Modification for testing RCCB´s according to IEC 1008-1
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 m Damped magnetic field 100 kHz, 10/30/100 A/m, repetition rate 40 Hz Damped magnetic field 1.0 MHz, 10/30/100 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

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:

- Multiple variations
- Different output impedances
- Different safety test cover mounted on the top of the equipment
- I*t Limit monitoring and evaluation

Figure 22: IPG1050

High-voltage pulse generator

Variations	Pulse type	Waveform	Voltage	Energy
IPG 620	Lightning surge	1.2/50 µs	6 kV	20 J
IPG 1050	Lightning surge	1.2/50 µs	10 kV	50 J
IPG 1272	Lightning surge	1.2/50 µs	12 kV	72 J

Generators with multiple Waveforms:

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

Variations	Pulse type	Waveform	Voltage	Energy
PG 5-200-1/2	Lightning surge Switching surge	1.2/50 µs 10/700 µs	5 kV 5 kV	10 J 200 J
PG 6-364	Lightning surge Switching surge	1.2/50 µs 10/700 µs	6 kV 6 kV	20 J 360 J
	Option:	100/700 µs 0.5/700 µs 1/1000 µs		
PG 10-1000	Lightning surge Switching surge	1.2/50 µs 10/700 µs	10 kV 10 kV	50 J 1000 J
PG 12-1400	Lightning surge Switching surge	1.2/50 µs 10/700 µs	12 kV 12 kV	70 J 1400 J
PG 14-1960	Switching surge Switching surge	10/700 µs 0.5/700 µs	14 kV 14 kV	1960 J 1960 J
PG 20-4000	Switching surge	10/700 µs	20 kV	4000 J

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
IPG 255	**Insulation test with impulse voltage according to IEC 255** Impulse voltage: 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 ITU-T, K12
IPG 506-SYM	**Symmetric Front chopped wave generator** 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 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 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

3. COMPONENT TEST GENERATORS

Designed for testing passive and active components and devices:

- 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 adjustable current sensor

3.1 HIGH VOLTAGE PULSE GENERATORS

Designed for **dielectric testing**, lightning surge 1.2/50 µs

Variations	Pulse type	Waveform	Voltage	Energy
IPG 605	Lightning surge	1.2/50 µs	6 kV	5 J
IPG 620	Lightning surge	1.2/50 µs	6 kV	20 J
IPG 1012	Lightning surge	1.2/50 µs	10 kV	12 J
IPG 1050	Lightning surge	1.2/50 µs	10 kV	50 J
IPG 1218	Lightning surge	1.2/50 µs	12 kV	18 J
IPG 1272	Lightning surge	1.2/50 µs	12 kV	72 J
IPG 2025	Lightning surge	1.2/50 µs	20 kV	25 J
IPG 2436	Lightning surge	1.2/50 µs	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 MΩ

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

Variations	Waveform	Voltage	Energy	Capacitor range
IPG 809	1.7/46 µs	0.1 - 8 kV	9 J	0.1- 27 nF
PG 6-401	1.6/47 µs	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 µs	10 kV	200 J	10 nF-183 nF
PG 12-360	1.2/50 µs	12 kV	360 J	10 nF-183 nF
PG 20-100	1.2/50 µs	20 kV	100 J	27 nF-183 nF

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:

- Compact tester as table usage
- Cabinet tester optional with testing room
- Safety test cover mounted on the top of the equipment
- Plug in for different wave shapes

Figure 26: PG 6-200/400

Figure 25: EMC 2015

Compact tester:

Variations	Type	Pulse current	Waveform	Energy
PG 6-250	Varistor tester	10A - 2.5 kA	8/20µs	250 J
PG 6-200	Surge Current Generator	5 kA	8/20µs	200 J
PG 6-400	Surge Current Generator	10 kA	8/20µs	400 J
EMC 2015	**Pulse Generator System**			
	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 µs	2400 J
PG 10-10000	2*(1-50) kA	8/20 µs	10000 J
PG 20-7000	50 kA	8/20 µs	7000 J
PG 20-10000	70 kA	8/20 µs	10000 J
PG 20-14000	100 kA	8/20 µs	14000 J
PG 10-2500	500 A	10/700 µs	2500 J
PG 20-4000	500 A	10/700 µs	4000 J
PG 10-4000	500 A	10/1000 µs	4000 J
PG 10-8000	1.0 kA	10/1000 µs	8000J
PG 10-6000	10 kA	10/50 µs	6000 J
PG 10-7000	2.5 kA	10/350 µs	7000 J
PG 10-12500	5 kA	10/350 µs	12500 J
PG 10-25000	10 kA	10/350 µs	25000 J

Figure 27: PG 10-10000

Figure 28: PG 20-14000

4. HIGH-VOLTAGE TEST AND MEASUREMENT EQUIPMENT

HILO-TEST produce several devises 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:

- 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 test room

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

- Adjustable rise time
- Test time adjustable
- Current limit adjustable
- Error message when over current

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

Figure 31: HTS 20-10

4.2 SAVETY 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

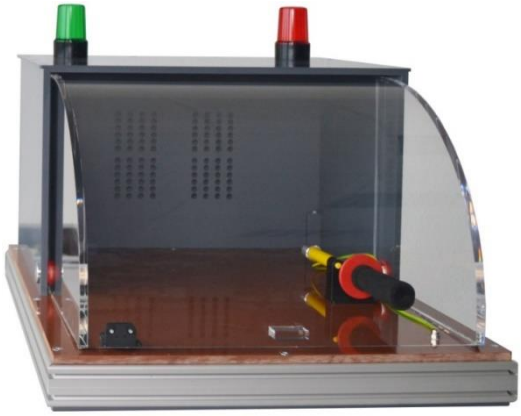
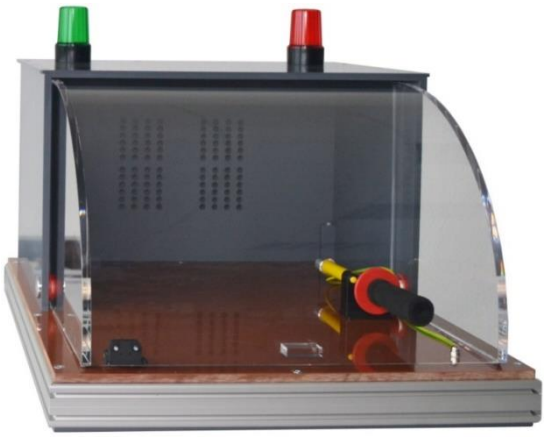


Figure 32: PA 504

Variations:

PA 503	PA 505
	
Test space 400*140*300 mm³	400*250*400 mm³
PA 502	**PA504**
	
Test space 440*180*300 mm³	460*300*550 mm³

Further:

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

4.3 CALIBRATION EQUIPMENT

Highlights:

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

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

Calibration Kits

Variations	Usage
SCK 105	Surge Calibration Kit
BCK 400F	Burst Calibration Kit

4.4 HIGH-VOLTAGE MEASUREMENT EQUIPMENT

All HILO-TEST voltage divider HVT – RCR are 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 fibre optic

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

Figure 33: HVM 2015

4.5 HIGH-VOLTAGE DIVIDERS

The High voltage divider types HVT - RCR possess 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**	Wide band 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

4.6 CURRENT VIEWING RESISTORS

Variations	Usage
Series ISM* **	Current measuring resistors for **high pulse currents**
Series WSM* **	Current measuring resistors for **high ac currents**

Figure 38: WSM/ ISM

4.7 MISCELLANOS

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

Notes:

Notes:

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Visit page 5 for further details.