



TRA- and MIG-System

Surge Testers

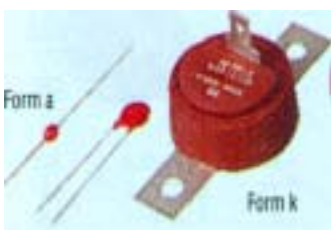


I CWG 1.2/50 μ s, 8/20 μ s

II Ring Wave, 100 kHz

III ITU K17 10/700 μ s

IV Accessories



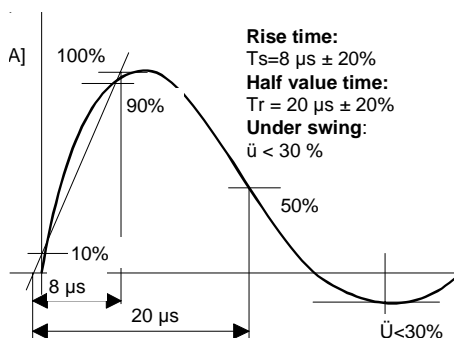
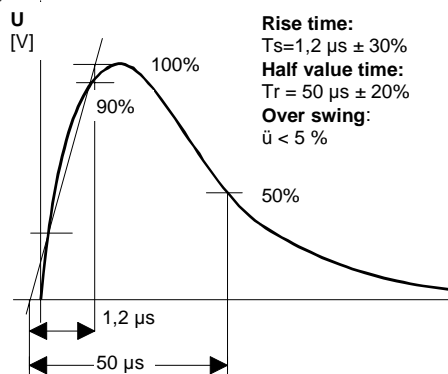
General Information About Disturbance Sources

CWG 1.2/50 μs , 8/20 μs

The following aspects of surge testing electronic systems are relevant:

- Tests for failure modes that involve flashover are influenced by the surge current that would flow after flashover.
- The surge let-through of a protective device depends on the applied voltage front.
- The response of a crowbar-type device, subjected to an intended current test, is influenced by the voltage front applied by the generator which senses a high-impedance test piece, until operation of the crowbar.

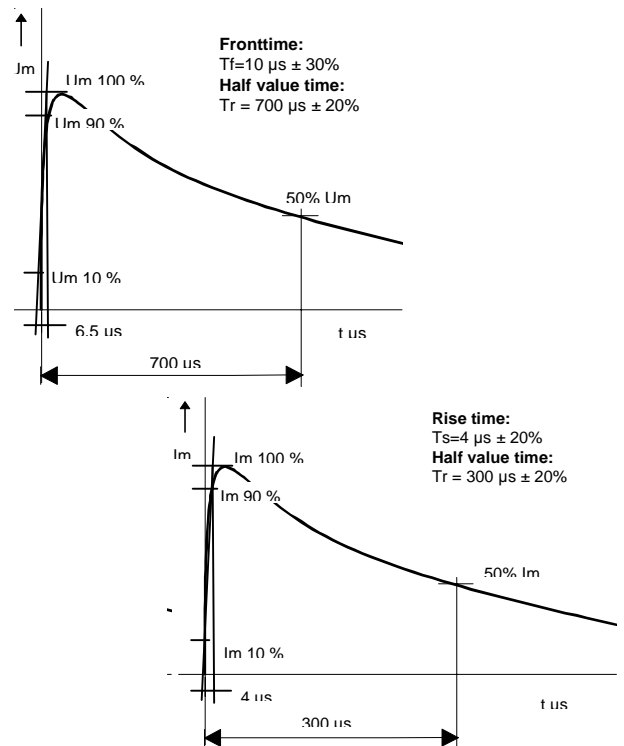
Therefore, the generator must be capable of generating a waveform 1,2/50 μs or a current waveform of 8/20 μs at clamping status of the protection circuit.



Combination waves or Hybrid, are used in a wide range of test application. The most common use is to simulate lightning impulses onto the public single or three phase supply. The current and voltage waveforms are defined in IEC 61000-4-5 and ANSI C62.41

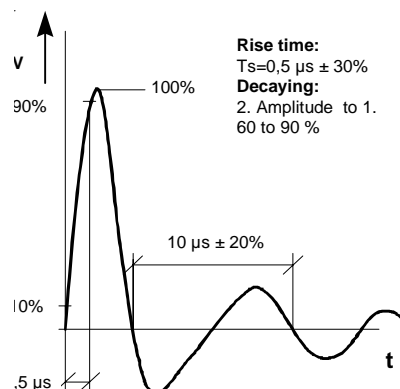
ITU K44 10/700 μs

The 10/700 μs wave generator has been defined in CCITT K44 for outdoor telecommunication lines. The same definition of the 10/700 μs generator has been brought over into the document IEC 61000-4-5.



Ring Wave, 100 kHz

Ring waves are used to simulate lightning or switching effects in public single or three phase supplies behind a primary protection. The current and voltage waveforms are defined in IEC 61000-4-12 and ANSI C62.41 as follows:



MIG0603IN "SURGE Waveform" - Tester Overview, General Data

Overview of tester types

MIG0603IN3: CWG 1.2/50, 8/20 μ s
6.3 kV, 3.15 kA
Ring 100 kHz 6.3 kV
Single phase CDN
10/700 μ s, 6 kV

MIG0603-3P: CWG 1.2/50, 8/20 μ s
6.3 kV, 3.15 kA
Automatically or manually
operated CDN up to 100 A
per phase

MIG1206-3P: CWG 1.2/50, 8/20 μ s
12 kV, 6 kA
Automatically or manually
operated CDN up to 100 A
per phase

Control

- Trigger: auto or manual
- Ramps: Voltage, Polarity, Synchronisation
- Protocol: Peak values, Polarity, Number of shots, Synchronisation
- Measurement: CWG, v and i

Accessories

- 1 power cord depending on country
- cables or connectors for EUT connections
- 1 auxiliary connector (safety circuit)
- 1 user manual, with verification protocol and declarations LVD, EMC

Test levels

CWG 1.2/50, 8/20 μ s and ring wave as specified in ANSI/IEEE C62.41

Location Category A Outside and Service Entrance	Location Category B Major Feeders and Short Branch Circuits	Location Category C Outlets and Long Branch Circuits
Voltagess 10 kV or more		
6 kV Impulse or Ring		6 kV Ring
Currents 10 kA or more		
3 kA Impulse 500 A Ring		200 A Ring

Category Wave Form	OCV Open Circuit Voltage SCI Short Circuit Current	Generator Source Impedance
C Combination CWG	>6 kV >3 kA	2 Ω
B Combination CWG	6 kV 3kA	2 Ω
Ring Wave	6 kV 500 A	12 Ω
A Ring Wave	6 kV 200 A	30 Ω

Ring wave 100 kHz as specified in IEC 61000-4-12

Test level	Common mode [kV]	Differential mode [kV]
1	0.5	0.25
2	1.0	0.5
3	2.0	1.0
4	4.0	2.0
x	special	special

Note: x is an open class. This level can be specified in the product specification.

Test voltages in accordance with IEC 61000-4-5

Installation class	POWER SUPPLY		UNSYM. OPERATED CIRCUITS, LDB		SYMM. OPERATED CIRCUITS/LINES		DB,SDB (1)	
	Coupling mode		Coupling mode		Coupling mode		Coupling mode	
	Line to Line kV	Line to ground kV	Line to line kV	Line to ground kV	Line to line kV	Line to ground kV	line to line kV	line to ground kV
0	NO TEST is advised (N.T.)							
1	N.T.	0.5	N.T.	0.5	N.T.	0.5	N.T.	N.T.
2	0.5	1.0	0.5	1.0		1.0		0.5
3	1.0	2.0	1.0	2.0		2.0		N.T.
4	2.0	4.0	2.0	4.0		4.0		
5	*)	*)	2.0	4.0		4.0		
x								

MIG0603IN CWG 1.2/50, 8/20 μ s

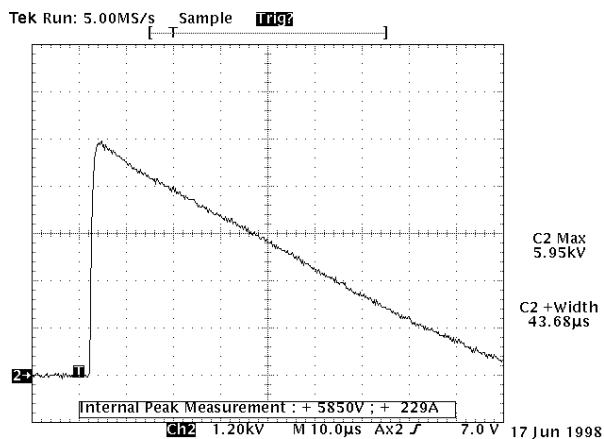
The MIG0603IN is suitable to surge single-phase power supply line 230 V, 16 A up to 6.3 kV and 3.15 kA.



MIG0603IN: CWG 1.2/50, 8/20 μ s

High voltage circuit

- Voltage (oc): 1.2/50 μ s
- Current (cs): 8/20 μ s
- Repetition rate maximum: 10/min
- Source Impedance: 2 Ohm \pm 10% .
- Source energy: 220 Joule at 6 kV
- Vpeak range 0.25 up to 6 kV \pm 10%
- Ipeak range 0.125 up to 3 kA \pm 10%
- Measurement accuracy \pm 3% (v,i)
- CDN single-phase 260V 16 A
- Coupling path L to N, 18 μ F
- Coupling path L-PE, 9 μ F and 10 Ohm



Basic data

Dimensions: 450 x 500 x 190 mm
Weight: approx. 28 kg
Power supply: 230 V or 115 V, 400 VA

MIG0603IN3 CWG, Ring Wave, 10/700

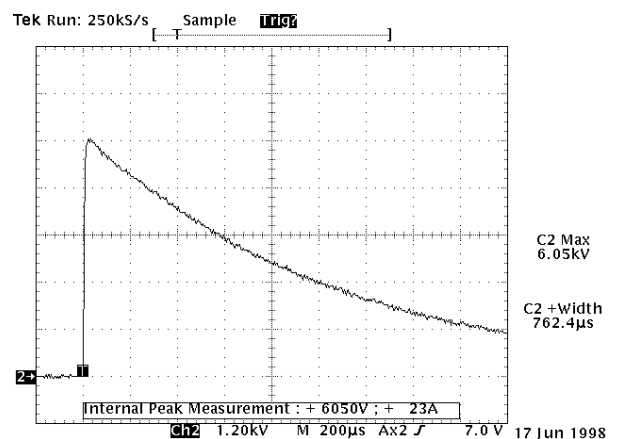
The MIG0603IN3 is suitable to carry out CWG, Ring and 10/700 μ s test on different lines. CWG and Ring specification see MIG0603IN and -IN4 as well as 10/700 μ s below.



MIG0603IN3

High voltage circuit

- Voltage (oc): 10/700 μ s
- Current (cs): 4/300 μ s, 40 Ohm
- Repetition rate maximum: 4/min
- Impulse capacitance: 20 μ F .
- Source energy: 440 Joule at 6 kV
- Vpeak range 0.25 up to 6 kV \pm 10%
- Ipeak range 0.125 up to 3 kA \pm 10%
- Measurement accuracy \pm 3%
- Damping resistor 25 Ohm
- Serial resistor 15 Ohm



Basic data

Dimensions: 450 x 500 x 190 mm
Weight: approx. 25 kg
Power supply: 230 V or 115 V, 400 VA

MIG1206, CDN-MIG-12-32 CWG 1.2/50, 8/20 μ s

The MIG1206 with CDN-MIG-12-32 is suitable to surge three-phase power supply line 440 V, 32 A up to 12 kV and 6 kA.



MIG1206

Application

The three-phase coupling filter CDN-MIG12-32 can be used up to 12 kV and 6 kA. Power supply three-phase up to 440 V per phase and 32 A per phase

High voltage circuit

- Voltage (oc): 1.2/50 μ s
- Current (cs): 8/20 μ s
- Repetition rate maximum: 10/min
- Source Impedance: 2 Ohm \pm 10% .
- Source energy: 880 Joule at 12 kV
- Vpeak range 0.5 up to 12 kV \pm 10%
- Ipeak range 0.25 up to 6 kA \pm 10%
- Measurement accuracy \pm 3% (v,i)
- CDN three-phase 440V 32 A
- Coupling path L to N, 18 μ F
- Coupling path L-PE, 9 μ F and 10 Ohm
- Two boxes solution, which allows to use the MIG1206 together with the test cabinet TC-MIG24 for component testing.
- Coupling paths switching manual

MIG1206-2P CWG 1.2/50, 8/20 μ s

The MIG1206-2P is suitable to surge single-phase power supply line 230 V, 16 A up to 12 kV and 6 kA.



MIG1206-2P: CWG 1.2/50, 8/20 μ s

Application

- Surge protective devices (SPD) or varistor testing
- Surge superimposed on power supply

High voltage circuit

- Voltage (oc): 1.2/50 μ s
- Current (cs): 8/20 μ s
- Repetition rate maximum: 10/min
- Source Impedance: 2 Ohm \pm 10% .
- Source energy: 220 Joule at 6 kV
- Vpeak range 0.5 up to 12 kV \pm 10%
- Ipeak range 0.25 up to 6 kA \pm 10%
- Measurement accuracy \pm 3% (v,i)
- CDN single-phase 250 V 16 A
- Coupling path L to N, 18 μ F
- Coupling path L-PE, 9 μ F and 10 Ohm

MIG0603IN4 Ring Wave 100 kHz

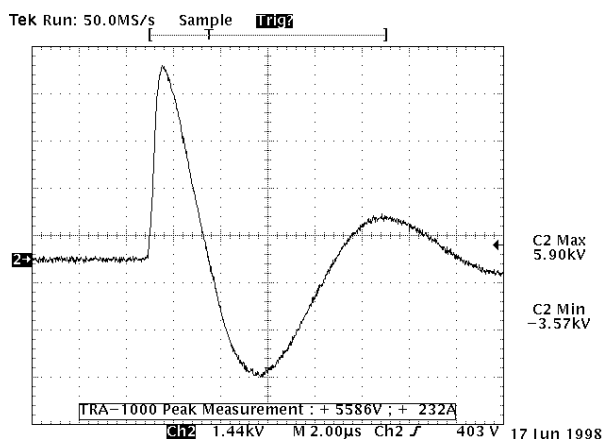
The MIG0603IN4 is suitable to carry out "Ring Wave" tests on single-phase supply line 230 V, 16 A up to 6.3 kV. Source impedance: 12 and 30 Ohm.



MIG0603IN4: Ring 100 kHz, 6.3 kV

High voltage circuit

- Rise time: 500 ns \pm 30 %
- Frequencies: 100 kHz \pm 10%
- Repetition rate maximum: 10/min
- Decaying: 60% first to second peak
- Impedance: 12, 30 Ohm
- Vpeak range 0.25 up to 6 kV \pm 10%
- Ipeak range 0.125 up to 3 kA \pm 10%
- Measurement accuracy \pm 3%
- CDN single-phase 260V 16 A
- Coupling 12 Ohm, 10 μ F
- Coupling 30 Ohm, 3 μ F



Basic data

Dimensions: 450 x 500 x 190 mm

Weight: approx. 30 kg

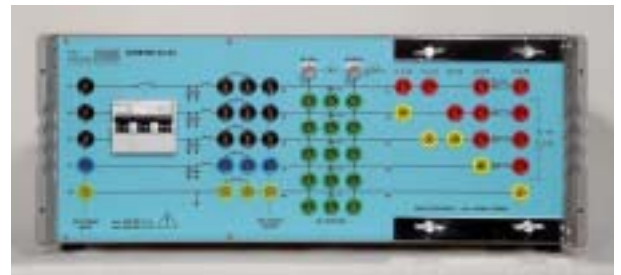
Power supply: 230 V or 115 V, 400 VA

Accessories: CDN, Special Networks

Three-phase coupling filter

CDN2000-06-25

- CDN three-phase L to L 445 V, 25 A
- Coupling path L to L/ N, 18 μ F
- Coupling path L-PE, 9 μ F and 10 Ohm
- Sincronisation onto different phases
- Coupling Ring wave 10 μ F at 12 Ohm
- Coupling Ring wave 3 μ F at 30 Ohm
- Damped oscillatory 100 k, 1 MHz



I/O and data line coupling kits

CDN2000A-06-32

- Automatically coupling paths switsching for surge, ring wave and EFT
- Control of the CDN2000A-06-32 with TRA2000, TRA2000INx and MIG0603INx



CDN-KIT1000T for ISDN balanced lines

- Two coupling circuits
- Two decoupling circuits



EMC PARTNER's Product Range

Immunity Tests



The TRA2000 performs all of the following transient tests on electronic equipment that are required for the CE-mark up to full levels: **ESD, EFT, surge, dips, a.c. magnetic field, surge magnetic field and common mode tests**. A large range of accessories for different applications is available: MF antennas, three phase couplers, verification sets, coupling kits, etc. The TRA2000 complies with IEC 61000-4-2, -4, -5, -8, -9, -11, -12p, -16, -29p.



The Modular Impulse Generator (MIG) performs **damped oscillatory tests**: 100 kHz, 1 MHz, voltage and magnetic field tests. The MIG complies with IEC 61000-4-8, -9, -10, -12 as well as with IEC 60255-4, -5, -22.



The HAR1000 with the Immunity software performs the following tests: **harmonics, voltage variation and ripple on d.c.** The HARMONICS-1000 complies with IEC 61000-4-13, -14, -17, -29p.

Lightning Tests

EMC PARTNER offers a wide range of testers in accordance with FCC 68 part D, ITU K.44, ETS 300 046, Bellcore and RTCA DO-160D, etc. for telecom, aircraft and military electronic equipment testing.



Component Tests



EMC PARTNER offers a wide range of modular impulse generators (MIG) for transient component testing on: varistors, arresters, surge protective devices (SPD), capacitors, circuit breakers, watt-hour meters, protection relays, insulation material, suppressor diodes, connectors, chokes, fuses, resistors, emc-gaskets, cables, etc.

EMC PARTNER has the largest range of impulse generators in the range up to 100 kV and 100 kA. Below is an example for an insulation tester up to 24 kV.



Emission Measurements



One unit performs all measurements on the power supplies of electronic equipment and products for the CE-Mark. The HAR1000 includes an amplifier for a clean power source, a line impedance network, the measurement systems Harmonics and Flicker. Accessories: three phase extension, "Immunity" and "ANASIM" software. Complies with IEC 61000-3-2 and -3.

We look forward to working with you

For more detailed information please contact our representative in your area or EMC PARTNER in Switzerland. For information on further products please visit also our website.

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Asia: China, Hong Kong, Israel, Japan, Malaysia, South Korea, Taiwan, ...

Australia: Australia, New Zealand

Europe: Austria, Belgium, France, Germany, Great Britain, Hungary, Ireland, Italy, Netherlands, Scandinavia, Spain, ...

You will find contact information for all representatives at EMC PARTNER's website www.emc-partner.com.

Your local representative:

EMC PARTNER offers the largest range of impulse test equipment up to 100 kA and 100 kV in the areas of:

Immunity Tests

Lightning Tests

Component Tests

Emission Measurements