

Technical Specification

E-MIG1203CWG
revised: 22. June 2003

1 MIG Tester Type MIG1203CWG

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1.1 Introduction

The MIG1203CWG is designed for different tests:

Insulation test on capacitive loads as insulation material, air insulation, gas insulation etc.

 waveform 1.2/50 μ s up to 12 kV with a serial resistor of 40 Ohm, current limited with 40 Ω

Insulation test on capacitive and inductive loads as motors, coils, etc.

 waveform 1.2/50 μ s up to 12 kV with a source impedance of 4 Ω , current up to 3 kA

Immunity SURGE test up to 6 kV.

 waveform 1.2/50 μ s up to 6 kV, current 8/20 μ s source impedance 2 Ω

The MIG "Modular-Impulse-Generator" is a flexible kit system, ready to quote tailored generators for special test applications. The MIG is a further innovative solution of EMC PARTNER AG to cover customers requests.

The basic units are discharge modules (patent pending) which can be configured in serial or parallel, to offer an optimum solution for the customer need. The use of one type of discharge module guarantees a high reliability and a high quality.

The MIG generators are compact and have an excellent value for money.

The MIG generators are modern test equipment with the following features:

- Solid state impulse switch and solid state polarity change (no mechanical switch, no spark gaps or tubes) - advantages: low jitters, no high frequency switching noise,
- Microprocessor menu controlled, printer port and RS232 remote control
- Safety in accordance with VDE 0104 (safety circuit, connector for warning lamp)
- Integrated peak measurement for voltage and current. Peak display and monitor output for v,i
- Windows software for PC control available for windows 95, 98, 2000, NT or XP.

2 General

2.1 Brief description of the generator

The MIG1203CWG is an insulation tester with a voltage wave shape 1,2/50 μ s. The specified voltage waveform is generated across an open circuit (oc), or within the load range specified under technical data. The exact waveform delivered is a function of the surge generator and the impedance to which the surge is applied.

For failure detection (breakdown, flashover) the peak output voltage and current of the MIG are indicated on the front display and the two BNC monitor outputs (v,i) allow monitoring the voltage and current wave shapes by an oscilloscope connected onto.

2.2 EUT connection (equipment under test)

Generally we strongly recommend the test cabinet TC-MIG24 placed on top of the MIG generators for personal safety. The test cabinet is so designed that the cover can not be opened during the test. Only when the output to the EUT is shorted, and the high voltage capacitor is discharged, the test cabinet can be opened. The green and red warning lamps are integrated in the test cabinet. When the dimensions of the EUT are greater than 0,2 x 0,35 x 0,35 m (h x w x l) the test cabinet TC-MIG24 can not be used anymore. A bigger test cabinet can not be placed on top of the MIG generator.

In this case the customer either arrange his own safety appliance or ask EMC PARTNER to quote for a tailored test cabinet placed beside the MIG generator.

For large EUT like racks the CN-MIG24 test pistol can be use up to 18 kV.

2.3 Standards, applications

IEC 60060-1: 1989, High voltage test techniques. Part 1 General definition and test requirements.

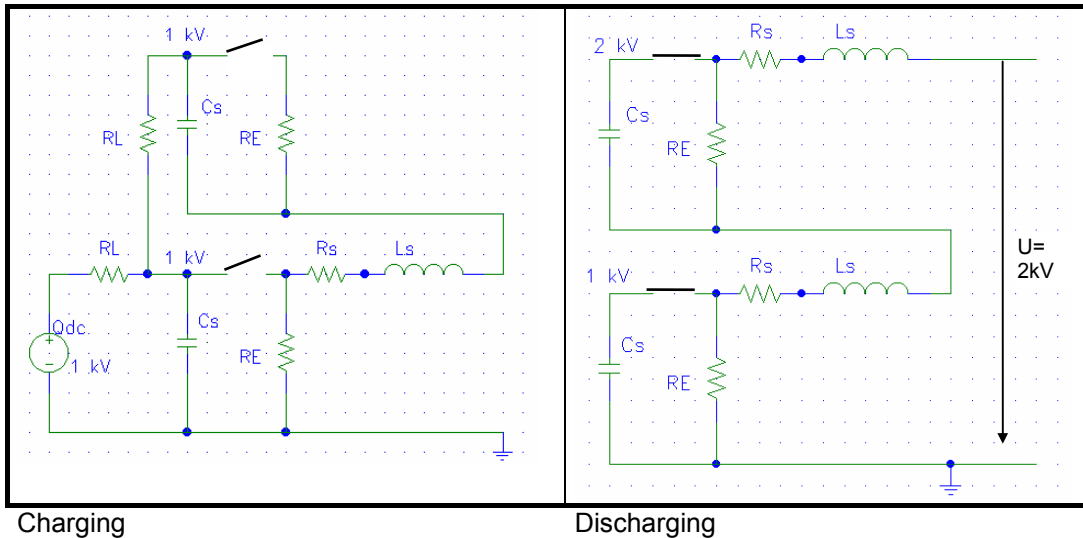
IEC 61010-1: 1990-09, Safety requirements for electrical equipment for measurement, control and laboratory use. Complies only to paragraph with impulse tests specification

IEC 60664-1: Insulation co-ordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests. Complies only to paragraph with impulse tests specification

Applications - test objects:

Wattourmeter, Counters, Protection circuits, Cables, Transformers, Bushings, Capacitors, Protection switches, etc.

3 Generator circuit, wave shapes definition



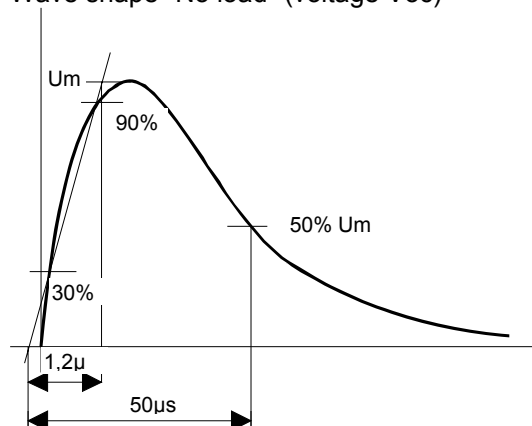
The simplified circuit diagram of the MIG1203CWG generator is showed on the figure above. The values for the different components are in the way selected that the generator delivers a 1,2/50 μ s voltage surge on open circuit. The waveform of the voltage and the current is a function of the EUT input impedance.

To generate the high voltage pulses the "Marx " generator principle is used. The modules are charged in parallel (charging) and discharged in series.

3.1 Wave shape definition

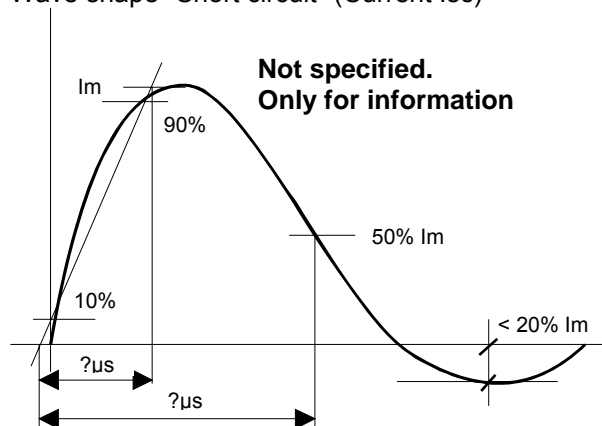
Definition of the waveforms:

Wave shape "No load" (voltage Voc)



Wave shape "No load" (voltage Voc)

Wave shape "Short circuit" (Current Isc)



Wave shape "Short circuit" (Current Isc)

3.2 Mechanical dimensions, climatic conditions

MIG type	Dimensions [mm]	Weight [kg]	Versions
	width x depth x height		
MIG1203CWG	450 x 570 x 250	24	19" Rack 4 UH

Power :			
Power voltage	L-N single phase 230 V/ 115V ±10% plus protective earth	auto switching	
Power consumption	Maximum <400 VA Standby < 10 VA	(230 V, 50 Hz)	(115 V, 60 Hz)

Environment conditions		
Temperature range	°C	0 to 35 °C
Humidity	rh %	25 to 80%
Pressure	kPa	86 to 106



Accessories to MIG1203CWG see paragraph 5

MIG1203CWG - Generator with TC-MIG24

Test cabinet

	Dimensions [mm]	Weight [kg]	Version
	width x depth x height		
Test volume	300 x 400 x 200		
Warning lamp	red/green		
Safety	Safety circuit		
TC-MIG24	450 x 500 x 270	8	

Cable: CN-MIG24		
Length of the cable	0,6 m	two wire
Warning lamp	red/green	included
Connectors	MIG: connection box	EUT: no connectors

4 Technical data

4.1 Waveform 1.2/50 μ s

Voltage Voc	No load	R > 100 Ω
Rise time 10 to 90% x 1,25	1,2 μ s	\pm 30 %
Half value time 0 to 50%	50 μ s	\pm 20 %
Setting range	500 up to 12'500 V	
in steps of	1 V	
Maximum output Voc	12'000 V	+ 10 % / -0%
Polarity	positive / negative / alternate	
Over shoot	< 5%	
High voltage output "low"	Maximum voltage between "low" and earth 260 V ac	
Current wave shape	not defined, at 4 Ohm approximate 8/20	

Impulse circuit	output on top of the tester		
Impulse capacitor	5 μ F		\pm 10 %
Energy at max. Vcharge	420 Joule		
Serial resistor,	50 Ω	0 Ω	
Wave form within tolerances and voltage range	at Rs = 50 Ω 1000 up to 12'000 V	at Zsource = 4 Ω 1000 up to 12'000 V	\pm 10 %
Resistive loads	R > 1000 Ω	R > 100 Ω	\pm 10 %
Capacitive load range	0 to 5 nF	0 to 10 nF	\pm 10 %
Inductive loads	> 20 mH	> 10 mH	\pm 10 %

Impulse circuit	output on the front plate 2 MC banana plug		
Impulse capacitor	10 μ F		\pm 10 %
Energy at max. Vcharge	210 Joule		
Serial resistor,	2 Ω Vp/Ip		
Wave form within tolerances and voltage range	at Zsource = 4 Ω 500 up to 6'000 V		\pm 10 %
Coupling capacitance	18 μ F		\pm 10 %
Useably CDN	CDN2000-06-25, or CDNMIG-12-32		
Waveform at no load:	No load = R > 100 Ω		
Rise time	1.2 μ s		\pm 30%
Time to half value	50 μ s		\pm 20%
Adjustable voltage range	250 V up to 6'300 V		
Settings	1 V steps		
Maximum voltage	6000 V		+10% -0%
Minimum Voltage	500 V		-10% +0%
Polarity	pos. / neg. / alternate		
Waveform at short circuit:	Short circuit R < 0,1 Ω		
Rise time	8 μ s		\pm 20%
Time to half value	20 μ s		\pm 20%
Underswing	< 30%		
Maximum current	3000 A		+10% -0%

4.2 Control and measurement

Control and measurement		
Minimum time between two impulses	5 seconds at 1000 V (12 impulses/min.) 15 seconds at 12000 V (2 impulses/min.)	selectable steps 1 second
Counter	1 to 29'999	
Trigger, Impulse release	auto or manual synchronisation onto EUT power	
Ramp functions	Voltage, synchronisation, polarity	
Voltage measurement V _{peak} on front-display v on BNC output	Accuracy 100 to 13'200 V 10 V equals 12'000 V	± 3 %
Current measurement I _{peak} on front-display i on BNC output	Accuracy 250 A up to 3300 A 10 V equals 3000 A	± 3 %
Protocol	u peak, i peak, polarity, number of pulses, RS232 for printer	
Limits for u peak and i peak for detection "passed" - "failed"	<ul style="list-style-type: none"> • Stop • Protocol • Next test 	
Set-up memory	Up to 23 memory places	
Test sequences	The set-ups can be linked serially	
Remote control	RS232	
Auxiliary port	Vac synchronisation, external warning lamp	
Emergency switch	On the front panel	

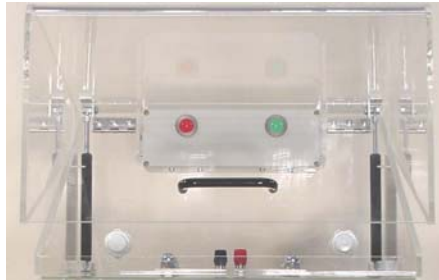
4.3 General information to MIG control

Set-up memory	Up to 15 memory places
Test sequences	the test set-ups can be linked serially
Ramps	automatic linear variation of one parameter e.g. voltage, frequency etc.
Synchronisation on different power line frequencies	16, ² / ₃ ; 40; 50; 60
Pulse trigger	Manuel or automatic Front panel: with Trigger button Rear panel: with BNC plug
Failure detection on EUT	-External Input EUT failed -Selectable limit value for impulse voltage and current for SURGE
Safety switching	Emergency stop Switch off the EMC Test and the EUT power
EUT failed detection during the test.	With accessory monitor via RS485 remote control
Test report	Printer, connected to the standard port RS 232

5 Accessories

Type
TC-MIG24
Test cabinet

Pictures



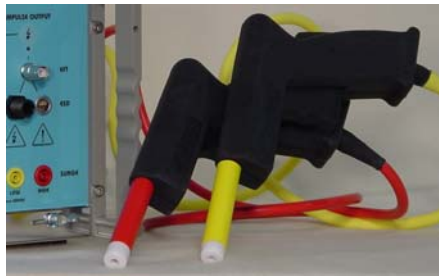
accessories to
High voltage outputs on top of
MIG1203CWG and for EUT fitting
into the test cabinet

CN-MIG24
Test pistols



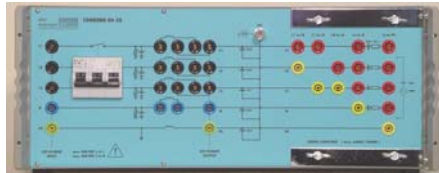
High voltage outputs on top of
MIG1203CWG and for large EUT
fitting not into the test cabinet

CN2000TT
Test pistols



SURGE CWG outputs on front of the
MIG1203CWG. SURGE current
injection.

CDN2000-06-32
Three phase coupling
de-coupling filter



SURGE CWG outputs on front of the
MIG1203CWG. SURGE coupling
onto power line.

MF1000-1
Magnetic field test IEC
61000-4-9 SURGE
MF1STAND



SURGE CWG outputs on front of the
MIG1203CWG. Magnetic field
SURGE test up to 2.5 kA/m in the
centre of the MF antenna

NW-IEC61036C1



0.5 J, 500 Ohm network 4 outputs
0.8, 1, 2.5, 4 kV.

NW-IEC61036C2



0.5 J, 500 Ohm network 5 outputs 6,
8, 10, 12 kV plus
400J 50 Ohm 12 kV