EMC PARTNER

LIGHTNING IMPULSE

Insulation Testing

This document has been
optimized for electronic media

Accredited Calibration

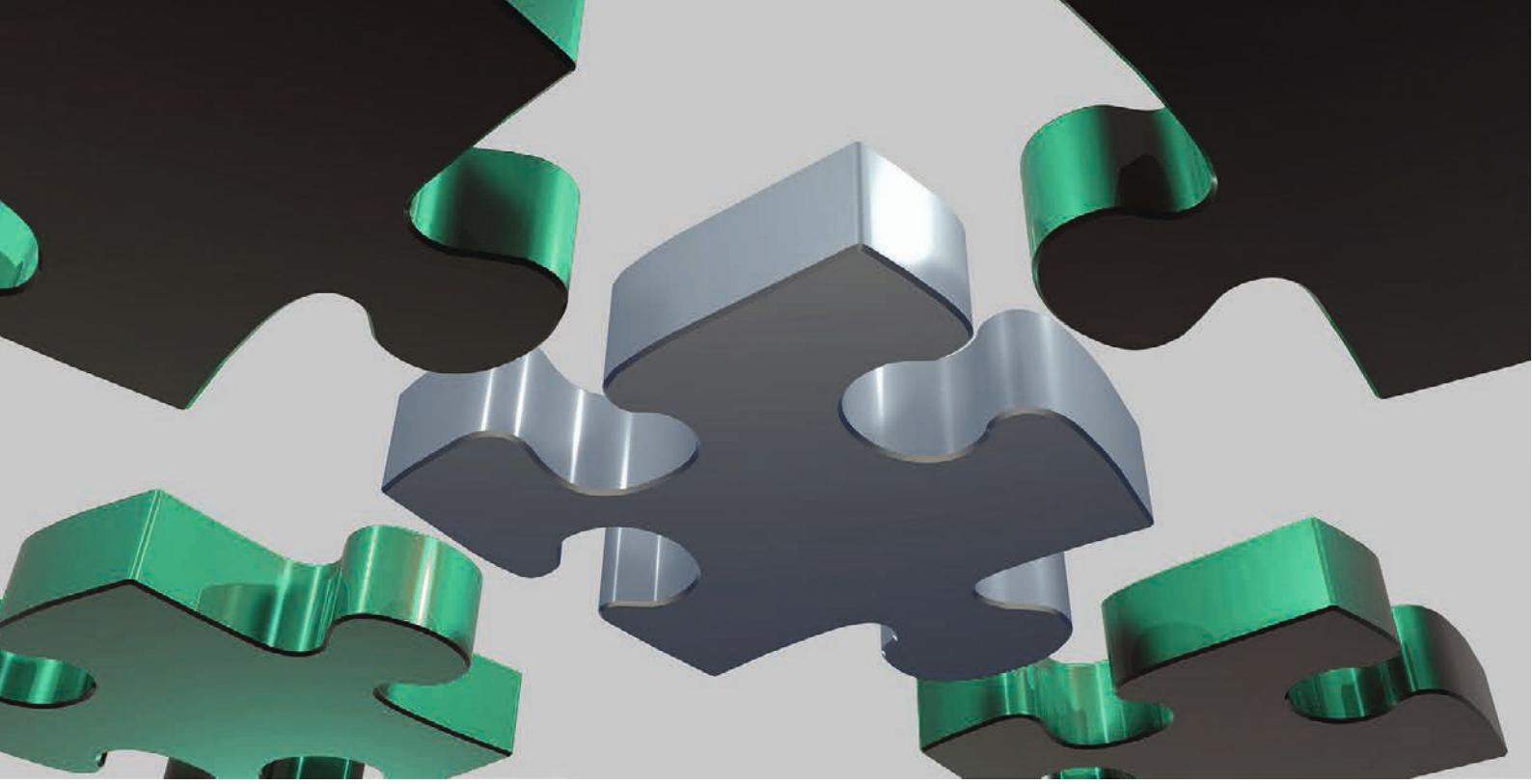
Quality at EMC PARTNER is based on an ISO 9001 management system. This is the foundation for an ISO 17025 accreditation verified by the Swiss Calibration Service (SCS). SCS No. 146 is the accreditation number of EMC PARTNER AG. Locally accredited but recognized worldwide through affiliation with the ILAC organisation

IMPULSE INSULATION TEST SYSTEMS

QUALITY AND RELIABILITY

The 1.2/50µs Lightning impulse forms the basis for a variety of insulation test applications. From simple insulation tests of material to dielectric breakdown of transformers. Solutions are available for these and product safety testing.

- Reliable solid state technology
- Reproducible impulses
- Integrated personnel safety features
- Automatic PASS /FAIL detection



UNIQUE FEATURES

Robust test equipment that gets the job done

Integrated measurement

Evaluate breakdown characteristics using the integrated Voltage and Current measurement circuits. Use the BNC outputs for impulse visualisation on an oscilloscope.

Standard, but also application specific

There is a high degree of hardware commonality in EMC PARTNER impulse generators. Adapted for specific applications.

Wide ranging

Stable impulse voltages from 0.5kV up to 144kV for practically every test application.

Leading technology

Solid state high voltage switches deliver reproducible impulses. Increases confidence in test results.

Technical Specifications

TEST SYSTEMS

MIG0603	6 kV, 1.2/50µs pulse
MIG1203	12 kV, 1.2/50µs pulse
MIG1203STEP	12 kV, 1.2/50µs pulse, prepared for IEC/EN 60065
MIG1203CWG	12 kV, 1.2/50µs & 6kV / 3 kA CWG, 1.2/50µs & 8/20µs
MIG1803	18 kV, 1.2/50µs pulse
MIG1803-12	18 kV, 1.2/50µs pulse, 12 Ohm
MIG1809	18 kV & 9 kA, 1.2/50 & 8/20µs pulse
MIG2403	24 kV, 1.2/50µs pulse
MIG2412	24 kV & 12 kA, 1.2/50 & 8/20µs pulse
MIG3603C	36 kV, 1.2/50µs pulse
MIG4803	48 kV, 1.2/50µs pulse
MIG7203	72 kV, 1.2/50µs pulse
MIG9603	96 kV, 1.2/50µs pulse
MIG12003	120 kV, 1.2/50µs pulse
MIG14403	144 kV, 1.2/50µs pulse

ACCESSORIES

CN12-XX-500	Matching network for insulation test
NW-IEC61036C1	Matching network for electricity meter testing
NW-IEC61036C2	Matching network for electricity meter testing
NW-IEC60255-5	Matching network for protection relay testing
NW-IEC60255-5SEA	Matching network for protection relay testing
NW-01-2000	Matching network for EN 50470-1 testing
NW-IEC60065-1	Matching network for testing audio, video
NW-IEC60065-1A	Matching network for testing audio, video
NW-UL1635	Matching network for testing digital alarm
CN18-XX-500	Matching network for insulation test
NW-IEC61036C118	Matching network for electricity meter testing
NW-IEC61036C218	Matching network for electricity meter testing
NW-IEC60255-518	Matching network for protection relay testing
NW TO MIG1803	Matching network for protection relay testing
NW-NMI-M6C3C4	Matching network for electricity meter testing
CN24-40-80	Matching network for insulation test
CN24-XX-500	Matching network for insulation test
CN-MIG18 AMP	1.5m Matching network and test pistols for insulation test
CN-MIG24	1.2m Matching network and test pistols for insulation test
CN-MIG4803	1.2m Matching network and test pistols for insulation test
TC-MIG24	Test cabinett with safety circuit
STAGE 2403 4	Module used to extend MIG7203 up to 96 kV
STAGE 2403 5	Module used to extend MIG9603 up to 120 kV
STAGE 2403 6	Module used to extend MIG12003 up to 144 kV

MIG0603

MIG0603 circuit: voltage impulse 1.2/50 µs, 6 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	200 joules
Output impedance	40 Ω ± 10 %
Adjustable voltage OC	250 V – 6.2 kV ± 10 %
Calibrated level	500 V – 6 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 500 Ω
	L > 10 mH
	C < 5 nF
SC current waveform	not defined
Pulse repetition	up to 1 / 4 s @ 500 V, 1 / 9 s @ 6 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG0603 control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = 6 kV, accuracy ± 3%
Surge current monitor BNC	10 V = 150 A, accuracy ± 3%
Surge voltage on display	0.1 – 6.3 kV, accuracy ± 3%
Surge current on display	10 – 150 A, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG0603 supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA
Weight	24 kg
W x d x h	45 x 57 x 19 cm
Version	19" unit, 4 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG0603 optional accessories

Test cabinet	TC-MIG24 with warning lamps
Test pistols	CN-MIG24, with warning lamps and 1.2m cable
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG1203

MIG1203 circuit: voltage impulse 1.2/50 µs, 12 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	420 joules
Output impedance	40 Ω ± 10 %
Adjustable voltage OC	500 V – 13 kV ± 10 %
Calibrated level	1 kV – 12 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 500 Ω
	L > 10 mH
	C < 5 nF
SC current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 14 s @ 12 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG1203 control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = 12 kV, accuracy ± 3%
Surge current monitor BNC	10 V = 300 A, accuracy ± 3%
Surge voltage on display	0.1 – 13.2 kV, accuracy ± 3%
Surge current on display	10 – 300 A, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG1203 supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA

Weight	28 kg
W x d x h	45 x 57 x 25 cm

Version	19“ unit, 4 UH

Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa

Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG1203 optional accessories

Test cabinet	TC-MIG24 with warning lamps
Test pistols	CN-MIG24, with warning lamps and 1.2m cable
500 Ω output adapter	CN12-XX-500
500 Ω, 0.5 J energy out	NW-IEC61036C1, for electricity meters
	NW-IEC61036C2, for electricity meters
	NW-IEC60255-5, for protection relays
	NW-IEC60255-5SEA, for protection relays
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG1203STEP

MIG1203STEP circuit: voltage impulse 1.2/50 µs, 12 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	420 joules
Output impedance	40 Ω ± 10 %
Adjustable voltage OC	500 V – 13 kV ± 10 %
Calibrated level	1 kV – 12 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 500 Ω
	L > 10 mH
	C < 5 nF
Current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 14 s @ 12 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG1203STEP circuit: STEP voltage impulse, 12 kV

To be used with NWs for	IEC/EN 60065, IEC/EN 60950, UL1635
Application	to be used with special NWs, not standalone
Adjustable voltage OC	500 V – 13 kV ± 10 %
Calibrated level	1 kV – 12 kV
Voltage waveform	rise time: tr < 1 µs
	duration 50 % – 50 %: td > 1000 µs
Current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 14 s @ 12 kV
Polarity	positive, negative, alternating

MIG1203STEP control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = 12 kV, accuracy ± 3%
Surge current monitor BNC	10 V = 300 A, accuracy ± 3%
Surge voltage on display	0.1 – 13.2 kV, accuracy ± 3%
Surge current on display	10 – 300 A, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG1203STEP supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA

Weight	28 kg
W x d x h	45 x 57 x 25 cm
Version	19" unit, 4 UH

Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG1203STEP optional accessories

All accessories of MIG1203	available
	NW012000, 1 J @ 7 kV, 1.3 J @ 8 kV
	NW-IEC60065-1, $C_{IMPULSE}$ = 1 nF, 4 MΩ in ||
	NW-IEC60065-1A, $C_{IMPULSE}$ = 1 nF, no || resistor
	NW-UL1635
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG1203CWG

MIG1203CWG circuit: voltage impulse 1.2/50 µs, 40 Ω, 12 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	recommended for electricity meter testing
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	420 joules
Output impedance	40 Ω ± 10 %
Adjustable voltage OC	500 V – 12.2 kV ± 10 %
Calibrated level	1 kV – 12 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 500 Ω
	L > 10 mH
	C < 5 nF
SC current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 15 s @ 12 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG1203CWG circuit: voltage impulse 1.2/50 µs, 4 Ω, 12 kV

Standards	IEC60060-1, IEC61010-1, IEC60335-1
Application	recommended for household equip. testing
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	420 joules
Output impedance	4 Ω ± 10 %
Adjustable voltage OC	500 V – 12 kV ± 10 %
Calibrated level	1 kV – 12 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 500 Ω
	L > 20 mH
	C < 10 nF
SC current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 15 s @ 12 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG1203CWG circuit: CWG / Surge 2 Ω, 6 kV

Standard	IEC61000-4-5 latest edition
Application	recommended for electricity meter testing
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	220 joules
Output impedance	2 Ω ± 10 %
Adjustable voltage OC	250 V – 6.1 kV ± 10 %
Calibrated level	500 V – 6 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Calibrated current SC	0.25 kA – 3 kA ± 10 %
Current waveform	8 µs ± 20 % / 20 µs ± 20 %
Undershoot	< 30 %
Pulse repetition	up to 1 / 5 s @ 500 V, 1 / 15 s @ 6 kV
Polarity	positive, negative, alternating
Synchronization	0 – 360°, step 1°
Programmable ramps	voltage, synchronisation angle
Requires	requires external CDN, e.g. CDN2000-06-32

MIG1203CWG control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = 12 kV, accuracy ± 3%, for 1.2/50
	10 V = 6 kV, accuracy ± 3%, for CWG
Surge current monitor BNC	10 V = 300 A or 3 kA, acc. ± 3%, for 1.2/50
	10 V = 3 kA, acc. ± 3%, for CWG
Surge voltage on display	0.1 – 13.2 kV, accuracy ± 3%
Surge current on display	10 – 3 kA, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG1203CWG supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA
Weight	29 kg
W x d x h	45 x 57 x 25 cm
Version	19" unit, 4 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG1203CWG optional accessories

Test cabinet	TC-MIG24 with warning lamps
Test pistols	CN-MIG24, with warning lamps and 1.2m cable
500 Ω output adapter	CN12-XX-500
500 Ω, 0.5 J energy out	NW-IEC61036C1, for electricity meters
	NW-IEC61036C2, for electricity meters
CDN for CWG tests	CDN2000-06-32
Magnetic pulse antenna	MF1000-1 or MF1000-2, as per IEC61000-4-9
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG1803

MIG1803 circuit: voltage impulse 1.2/50 µs, 18 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	3.33 µF ± 10 %
Energy at max. voltage	540 joules
Output impedance	40 Ω ± 10 %
Adjustable voltage OC	750 V – 19.5 kV ± 10 %
Calibrated level	1 kV – 18 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 500 Ω
	L > 20 mH
	C < 5 nF
SC current waveform	not defined
Pulse repetition	up to 1 / 4 s @ 1 kV, 1 / 10 s @ 18 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG1803 control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = 18 kV, accuracy ± 3%
Surge current monitor BNC	10 V = 400 A, accuracy ± 3%
Surge voltage on display	0.1 – 19.6 kV, accuracy ± 3%
Surge current on display	10 – 500 A, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG1803 supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA
Weight	33 kg
W x d x h	45 x 57 x 25 cm
Version	19“ unit, 4 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG1803 optional accessories

Test cabinet	TC-MIG24 with warning lamps
Test pistols	CN-MIG24, with warning lamps and 1.2m cable
500 Ω output adapter	CN18-XX-500
500 Ω, 0.5 J energy out	NW-IEC61036C118, for electricity meters
	NW-IEC61036C218, for electricity meters
	NW-IEC60255-518, for protection relays
	NW to MIG1803, for protection relays
Network for NMI M6	NW-NMI-M6C3C4: 9 joules at 10 and 12 kV
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG1803-12

MIG1803-12 circuit: voltage impulse 1.2/50 µs, 12 Ω, 500 Ω, 18 kV

Standards	IEC60060-1, IEC61010-1 latest editions
	IEC60335-1 (old and new editions)
Application	insulation test (also for household equipment)
Impulse capacitance	1.666 µF ± 10 %
Energy at max. voltage	270 joules
Output impedance	12 Ω ±10 %
	500 Ω ±10 % selectable through manual switch
Adjustable voltage OC	Range 1: 200 V – 3 kV ± 10 %
	Range 2: 1.5 kV – 18.6 kV ± 10 %
Calibrated voltage level	200 V – 18 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 1 kΩ
	L > 40 mH
	C < 10 nF

SC current waveform	8 µs ± 20 % / 20 µs ± 20 %
Calibrated current level	16.67 A – 1.5 kA
Pulse repetition	up to 1 / 6 s @ 0.5 kV, 1 / 15 s @ 18 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG1803-12 control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = 18 kV, accuracy ± 3%
Surge current monitor BNC	10 V = 1.5 kA, accuracy ± 3%
Surge voltage on display	0.1 – 19.6 kV, accuracy ± 3%
Surge current on display	10 – 500 A, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG1803-12 supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA

Weight	32 kg
W x d x h	45 x 57 x 25 cm
Version	19" unit, 4 UH

Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa

Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG1803-12 optional accessories

Test cabinet	TC-MIG24 with warning lamps
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG1809

MIG1809 circuit: CWG / Surge 18 kV

Standards	IEC60060-1, IEC61180-1,
	IEC61643-1 Part 1/Class III
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	1650 joules
Output impedance	2 Ω ± 20 %
Adjustable voltage OC	0.75 kV – 18.3 kV ± 10 %
Calibrated voltage level	0.75 kV – 18 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Calibrated current SC	0.375 kA – 9 kA ± 10 %
Current waveform	8 µs ± 20 % / 20 µs ± 20 %
Undershoot	< 30 %
Pulse repetition	up to 1 / 6 s @ 0.75 kV, 1 / 44 s @ 18 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG1809 control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = 18 kV, accuracy ± 3%
Surge current monitor BNC	10 V = 9 kA, accuracy ± 3%
Surge voltage on display	0.75 – 18.8 kV, accuracy ± 3%
Surge current on display	0.375 – 9.4 kA, accuracy ± 3%
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Synchro. source	EUT power, direct out
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG1809 supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA

Weight	64 kg
W x d x h	45 x 57 x 60 cm
Version	19" unit, 12 UH

Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa

Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG1809 optional accessories

Test cabinet	TC-MIG24 with warning lamps
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG2403

MIG2403 circuit: voltage impulse 1.2/50 µs, 24 kV

Standards	IEC60060-1, IEC61010-1,
	IEC61180-1, IEC61180-2, latest editions
Application	test insulation against voltage impulse
Impulse capacitance	2.5 µF ± 10 %
Energy at max. voltage	720 joules
Output impedance	40 Ω ± 10 %
Adjustable voltage OC	1 kV – 26 kV ± 10 %
Calibrated level	2 kV – 24 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 1 kΩ
	L > 20 mH
	C < 5 nF
SC current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 2 kV, 1 / 13 s @ 24 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG2403 control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = 24 kV, accuracy ± 3%
Surge current monitor BNC	10 V = 600 A, accuracy ± 3%
Surge voltage on display	1 – 26.4 kV, accuracy ± 3%
Surge current on display	25 – 660 A, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG2403 supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA
Weight	43 kg
W x d x h	45 x 57 x 43 cm
Version	19“ unit, 8 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG2403 optional accessories

Test cabinet	TC-MIG24 with warning lamps
80 Ω output adapter	CN24-40-80, with 1.5 m cables and clips
500 Ω output adapter	CN24-XX-500, with AMP connectors
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG2412

MIG2412 circuit: CWG / Surge 24 kV

Standards	IEC61000-4-5, ANSI C62.41, IEC60060-1,
	IEC61180-1, -2, IEC61643-1 Part 1/Class III
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	3000 joules
Output impedance	2 Ω ± 20 %
Adjustable voltage OC	1 kV – 24.5 kV ± 10 %
Calibrated voltage level	2 kV – 24 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Calibrated current SC	1 kA – 12 kA ± 10 %
Current waveform	8 µs ± 20 % / 20 µs ± 20 %
Undershoot	< 30 %
Pulse repetition	up to 1 / 10 s @ 2 kV, 1 / 30 s @ 24 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG2412 control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = 24 kV, accuracy ± 3%
Surge current monitor BNC	10 V = 12 kA, accuracy ± 3%
Surge voltage on display	1 – 26.4 kV, accuracy ± 3%
Surge current on display	0.5 – 13.2 kA, accuracy ± 3%
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Synchro. source	EUT power, direct out
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG2412 supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA
Weight	149 kg
W x d x h	60 x 65 x 123 cm
Version	19" rack (with wheels), 18 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG2412 optional accessories

No CDN for powered EUTs	no CDN available for MIG2412
Test cabinet	TC-MIG24 with warning lamps
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG3603C

MIG3603C circuit: voltage impulse 1.2/50 µs, 12 Ω, 36 kV

Standards	IEC60060-1, IEC61010-1,
	IEC60355-1, IEC61180-1, latest editions
Application	test insulation against voltage impulse
Impulse capacitance	1.666 µF ± 10 %
Energy at max. voltage	1080 joules
Output impedance	12 Ω ±10 %
Adjustable voltage OC	2 kV – 36.5 kV ± 10 %
Calibrated voltage level	4 kV – 36 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 500 Ω
	L > 20 mH
	C < 20 nF
Pulse repetition	up to 1 / 6 s @ 4 kV, 1 / 22 s @ 36 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG3603C circuit: voltage impulse 1.2/50 µs, 500 Ω, 36 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	1.666 µF ± 10 %
Energy at max. voltage	1080 joules
Output impedance	500 Ω ±10 %
Adjustable voltage OC	2 kV – 36.5 kV ± 10 %
Calibrated voltage level	4 kV – 36 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 500 Ω
	L > 20 mH
	C < 20 nF
Pulse repetition	up to 1 / 6 s @ 4 kV, 1 / 22 s @ 36 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG3603C circuit: voltage impulse 1.2/50 µs, 500 Ω, 6 kV

Standard	IEC60355-1
Application	test insulation against voltage impulse
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	180 joules
Output impedance	500 Ω ±10 %
Adjustable voltage OC	250 V – 6.1 kV ± 10 %
Calibrated voltage level	500 V – 6 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Pulse repetition	up to 1 / 4 s @ 500 V, 1 / 10 s @ 6 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG3603C circuit: CWG / Surge 2 Ω, 6 kV

Standard	IEC61000-4-5 latest
Application	test insulation against voltage impulse
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	180 joules
Output impedance	2 Ω ±10 %
Adjustable voltage OC	250 V – 6.1 kV ± 10 %
Calibrated voltage level	250 V – 6 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
SC current waveform	8 µs ± 20 % / 20 µs ± 20 %
Pulse repetition	up to 1 / 4 s @ 500 V, 1 / 10 s @ 6 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG3603C control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = 36 kV o5 6 kV accuracy ± 3%
Surge current monitor BNC	10 V = 3 kA, accuracy ± 3%
Surge voltage on display	0.2 – 37.8 kV, accuracy ± 3%
Surge current on display	10 A – 3.3 kA, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG3603C supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA
Weight	50 kg
W x d x h	45 x 57 x 43 cm
Version	19" unit, 8 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG3603C optional accessories

Test cabinet	TC-MIG24 with warning lamps
Test cables	CN-MIG4803, 1.2 m length
CDNs for CWG tests	CDN2000-06-32, CDN KIT1000 ED3 up to 6 kV
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG4803

MIG4803 circuit: voltage impulse 1.2/50 µs, 16 Ω, 48 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	1.25 µF ± 10 %
Energy at max. voltage	1440 joules
Output impedance	16 Ω ±10 %
Adjustable voltage OC	2 kV – 48.2 kV ± 10 %
Calibrated voltage level	8 kV – 48 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 500 Ω
	L > 20 mH
	C < 10 nF
SC current waveform	8 µs ± 20 % / 20 µs ± 20 %
Pulse repetition	up to 1 / 6 s @ 4 kV, 1 / 30 s @ 48 kV
Polarit	positive, negative, alternating
Programmable ramp	voltage

MIG4803 circuit: voltage impulse 1.2/50 µs, 50 Ω, 48 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	1.25 µF ± 10 %
Energy at max. voltage	1440 joules
Output impedance	50 Ω ±10 %, manually switchable
Adjustable voltage OC	2 kV – 48.2 kV ± 10 %
Calibrated voltage level	8 kV – 48 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 500 Ω
	L > 20 mH
	C < 10 nF
SC current waveform	8 µs ± 20 % / 20 µs ± 20 %
Pulse repetition	up to 1 / 6 s @ 4 kV, 1 / 30 s @ 48 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG4803 circuit: CWG / Surge 2 Ω, 6 kV

Standard	IEC61000-4-5 latest
Application	test insulation against voltage impulse
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	180 joules
Output impedance	2 Ω ±10 %
Adjustable voltage OC	250 V – 6.1 kV ± 10 %
Calibrated voltage level	250 V – 6 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
SC current waveform	8 µs ± 20 % / 20 µs ± 20 %
Pulse repetition	up to 1 / 4 s @ 500 V, 1 / 10 s @ 6 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG4803 circuit: Surge 50 Ω, 6 kV

Standard	IEC61000-4-5 latest
Application	test insulation against voltage impulse
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	180 joules
Output impedance	2 Ω ±10 %
Adjustable voltage OC	250 V – 6.1 kV ± 10 %
Calibrated voltage level	250 V – 6 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Pulse repetition	up to 1 / 4 s @ 500 V, 1 / 10 s @ 6 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG4803C control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = 48 kV o5 6 kV accuracy ± 3%
Surge current monitor BNC	10 V = 3 kA, accuracy ± 3%
Surge voltage on display	0.2 – 48.2 kV, accuracy ± 3%
Surge current on display	10 A – 3.3 kA, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG4803 supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA
Weight	66 kg
W x d x h	45 x 57 x 60 m
Version	19“ unit, 12 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG4803 optional accessories

Test cables	CN-MIG4803, 1.2 m length
CDNs for CWG tests	CDN2000-06-32, CDN KIT1000 ED3 up to 6 kV
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG7203

MIG7203 circuit: voltage impulse 1.2/50 µs, 24 Ω, 72 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	2.5 µF ± 10 %
Energy at max. voltage	840 joules
Output impedance	24 Ω ± 10 %
Adjustable voltage OC	1 kV – 72 kV ± 10 %, in 3 stages: 24, 48, 72 kV
Calibrated level	4 kV – 72 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 1 kΩ
	L > 20 mH
	C < 3 nF, for stage 1 (up to 24 kV)
	C < 2.5 nF for stage 2 (up to 48 kV)
	C< 2 nF for stage 3 (up to 72 kV)
	1 kΩ || max. 1 nF
SC current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 30 s @ 72 kV
Polarity	positive, negative, alternating (alt. up to 48 kV)
Programmable ramp	voltage

MIG7203 circuit: voltage impulse 1.2/50 µs, 500 Ω, 72 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	2.5 µF ± 10 %
Energy at max. voltage	840 joules
Output impedance	500 Ω ± 10 %, manually selectable
Adjustable voltage OC	1 kV – 72 kV ± 10 %, in 3 stages: 24, 48, 72 kV
Calibrated level	4 kV – 72 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
SC current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 30 s @ 72 kV
Polarity	positive, negative, alternating (alt. up to 48 kV)
Programmable ramp	voltage

MIG7203 control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = total stage voltage, accuracy ± 3%
Surge current monitor BNC	10 V = 3 kA, accuracy ± 3%
Surge voltage on display	1 – 72 kV, accuracy ± 3%
Surge current on display	10 – 3300 A, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG7203 supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 2200 VA, standby < 100 VA
Unit 1 (generator rack)	
Weight	117 kg
W x d x h	61 x 66 x 128 cm
Unit 2 (controller)	
Weight	46 kg
W x d x h	45 x 60 x 37 cm
Version	19" unit / table top unit, 8 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG7203 optional accessories

Extension to 96 kV	STAGE2403 4, upgrade performed at EMCP
Extension to 120 kV	STAGE2403 5, upgrade performed at EMCP
Extension to 144 kV	STAGE2403 6, upgrade performed at EMCP
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG9603

MIG9603 circuit: voltage impulse 1.2/50 µs, 32 Ω, 96 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	0.59 µF ± 10 %
Energy at max. voltage	2718 joules
Output impedance	32 Ω ± 10 %
Adjustable voltage OC	1 kV – 96 kV ± 10 %,
	in 4 stages: 24, 48, 72, 96 kV
Calibrated level	2 kV – 96 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 1 kΩ
	L > 20 mH
	C < 3 nF, for stage 1 (up to 24 kV)
	C < 2.5 nF for stage 2 (up to 48 kV)
	C< 2 nF for stage 3 (up to 72 kV)
	C< 1.5 nF for stage 4 (up to 96 kV)
	1 kΩ || max. 1 nF
SC current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 40 s @ 96 kV
Polarity	positive, negative, alternating (alt. up to 48 kV)
Programmable ramp	voltage

MIG9603 circuit: voltage impulse 1.2/50 µs, 500 Ω, 96 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	0.59 µF ± 10 %
Energy at max. voltage	2718 joules
Output impedance	500 Ω ± 10 %, manually selectable
Adjustable voltage OC	1 kV – 96 kV ± 10 %, in 4 stages
Calibrated level	2 kV – 96 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
SC current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 40 s @ 96 kV
Polarity	positive, negative, alternating (alt. up to 48 kV)
Programmable ramp	voltage

MIG9603 control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = total stage voltage, accuracy ± 3%
Surge current monitor BNC	10 V = 3 kA, accuracy ± 3%
Surge voltage on display	1 – 96 kV, accuracy ± 3%
Surge current on display	10 – 3300 A, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG9603 supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 2200 VA, standby < 100 VA
Unit 1 (generator rack)	
Weight	142 kg
W x d x h	80 x 80 x 149 cm
Unit 2 (controller)	
Weight	47 kg
W x d x h	45 x 60 x 37 cm
Version	19" unit / table top unit, 8 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG9603 optional accessories

Extension to 120 kV	STAGE2403 5, upgrade performed at EMCP
Extension to 144 kV	STAGE2403 6, upgrade performed at EMCP
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG12003

MIG12003 circuit: voltage impulse 1.2/50 µs, 32 Ω, 120 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	0.1 µF ± 10 %
Energy at max. voltage	720 joules
Output impedance	40 Ω ± 10 %
Adjustable voltage OC	1 kV – 120 kV ± 10 %,
	in 5 stages: 24, 48, 72, 96, 120 kV
Calibrated level	4 kV – 120 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 1 kΩ
	L > 20 mH
	C < 3 nF, for stage 1 (up to 24 kV)
	C < 2.5 nF for stage 2 (up to 48 kV)
	C< 2 nF for stage 3 (up to 72 kV)
	C< 1.5 nF for stage 4 (up to 96 kV)
	C< 1.0 nF for stage 5 (up to 120 kV)
	1 kΩ || max. 1 nF
SC current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 45 s @ 120 kV
Polarity	positive, negative, alternating (alt. up to 48 kV)
Programmable ramp	voltage

MIG12003 circuit: voltage impulse 1.2/50 µs, 500 Ω, 120 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	0.1 µF ± 10 %
Energy at max. voltage	720 joules
Output impedance	500 Ω ± 10 %, manually selectable
Adjustable voltage OC	1 kV – 120 kV ± 10 %, in 5 stages
Calibrated level	4 kV – 120 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
SC current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 45 s @ 120 kV
Polarity	positive, negative, alternating (alt. up to 48 kV)
Programmable ramp	voltage

MIG12003 control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = total stage voltage, accuracy ± 3%
Surge current monitor BNC	10 V = 3 kA, accuracy ± 3%
Surge voltage on display	1 – 120 kV, accuracy ± 3%
Surge current on display	10 – 3300 A, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG12003 supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 2200 VA, standby < 100 VA
Unit 1 (generator rack)	
Weight	151 kg
W x d x h	61 x 66 x 162 cm
Unit 2 (controller)	
Weight	46 kg
W x d x h	45 x 60 x 37 cm
Version	19" unit / table top unit, 8 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG12003 optional accessories

Extension to 144 kV	STAGE2403 6, upgrade performed at EMCP
Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

MIG14403

MIG14403 circuit: voltage impulse 1.2/50 µs, 48 Ω, 144 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	0.39 µF ± 10 %
Energy at max. voltage	4095 joules
Output impedance	48 Ω ± 10 %
Adjustable voltage OC	1 kV – 144 kV ± 10 %,
	in 6 stages: 24, 48, 72, 96, 120, 144 kV
Calibrated level	4 kV – 144 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 10 kΩ
	L > 20 mH
	C < 3 nF, for stage 1 (up to 24 kV)
	C < 2.5 nF for stage 2 (up to 48 kV)
	C< 2 nF for stage 3 (up to 72 kV)
	C< 1.5 nF for stage 4 (up to 96 kV)
	C< 1 nF for stage 5 (up to 120 kV)
	C< 0.5 nF for stage 5 (up to 144 kV)
	10 kΩ || max. 1 nF
SC current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 59 s @ 144 kV
Polarity	positive, negative, alternating (alt. up to 48 kV)
Programmable ramp	voltage

MIG14403 circuit: voltage impulse 1.2/50 µs, 500 Ω, 144 kV

Standards	IEC60060-1, IEC61010-1 latest editions
Application	test insulation against voltage impulse
Impulse capacitance	0.39 µF ± 10 %
Energy at max. voltage	4095 joules
Output impedance	500 Ω ± 10 %, manually selectable
Adjustable voltage OC	1 kV – 144 kV ± 10 %, in 6 stages
Calibrated level	4 kV – 144 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
SC current waveform	not defined
Pulse repetition	up to 1 / 5 s @ 1 kV, 1 / 59 s @ 144 kV
Polarity	positive, negative, alternating (alt. up to 48 kV)
Programmable ramp	voltage

MIG14403 control features

User interface	LCD and keypad, efficient menu structure
Communication interface	RS232 with (optional) adapter to USB
Surge voltage monitor BNC	10 V = total stage voltage, accuracy ± 3%
Surge current monitor BNC	10 V = 3 kA, accuracy ± 3%
Surge voltage on display	1 – 144 kV, accuracy ± 3%
Surge current on display	10 – 3300 A, accuracy ± 3%
Peak check function	yes, programmable limits for measured U, I
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 29'999
Emergency stop	Emergency Stop button, BNC input (EUT Fail)
Internal memory	up to 15 tests can be saved and recalled

MIG14403 supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 2200 VA, standby < 100 VA
Unit 1 (generator rack)	
Weight	168 kg
W x d x h	61 x 66 x 179 cm
Unit 2 (controller)	
Weight	46 kg
W x d x h	45 x 60 x 37 cm
Version	19" unit / table top unit, 8 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration

MIG14403 optional accessories

Software	TEMA: sequence, report, for latest Windows
	TEMA EXT-MEASURE for autom. DSO control

ACCESSORIES

CN12-XX-500

Application	matching network for insulation test
Standard	IEC60060-1
Output impedance	500 Ω, or direct generator output (40 Ω)
Test level	max. 12 kV
Output connectors	AMP
Weight	1.5 kg
Dimensions	24 x 10 x 8.5 cm
For generators	MIG1203, MIG1203CWG
Accessories	CN-MIG18 AMP

NW-IEC61036C1

Application	matching network for electricity meter testing
Standard	IEC62052-11, section 5.6
Output impedance / energy	500 Ω / 0.5 J
Test levels with 0.5 J energy	800 V, 1.5 kV, 2.5 kV, 4 kV
Output connectors	AMP
Weight	2 kg
Dimensions	24 x 18 x 8.5 cm
For generators	MIG1203, MIG1203CWG
Accessories	CN-MIG18 AMP

NW-IEC61036C2

Application	matching network for electricity meter testing
Standard	IEC62052-11, section 5.6
Outputs	500 Ω / 0.5 J, or 50 Ω
Test levels with 0.5 J energy	6 kV, 8 kV, 10 kV, 12 kV
Test level with 400 J energy	12 kV (50 Ω output)
Output connectors	AMP
Weight	2 kg
Dimensions	24 x 18 x 8.5 cm
For generators	MIG1203, MIG1203CWG
Accessories	CN-MIG18 AMP

NW-IEC60255-5

Application	matching network for protection relay testing
Standard	IEC60255-5, testing at 2000 m altitude
Output impedance / energy	500 Ω / 0.5 J
Test levels with 0.5 J energy	500 V, 1 kV, 2.5 kV, 5 kV
Output connectors	AMP
Weight	2 kg
Dimensions	24 x 18 x 8.5 cm
For generators	MIG1203, MIG1203CWG
Accessories	CN-MIG18 AMP

NW-IEC60255-5SEA

Application	matching network for protection relay testing
Standard	IEC60255-5, testing at sea level
Output impedance / energy	500 Ω / 0.5 J
Test levels with 0.5 J energy	900 V, 1.75 kV, 3 kV, 7.3 kV
Output connectors	AMP
Weight	2 kg
Dimensions	24 x 18 x 8.5 cm
For generators	MIG1203, MIG1203CWG
Accessories	CN-MIG18 AMP

NW-01-2000

Application	matching network for EN 50470-1 testing
Impulse capacitance	40 nF
Output impedance	50 Ω ± 20 %
Test level / energy	6 kV / 0.72 J, 7 kV / 1 J, 8 kV / 1.3 J, 12 kV / 2.9 J
Waveform voltage	100 ns ±30 % / 2000 ns ±20 %,IEC60060-1 def.
Output connectors	AMP
Weight	2 kg
Dimensions	24 x 18 x 8.5 mm
For generator	MIG1203STEP
Accessories	CN-MIG18 AMP (or placed within TC-MIG24)

NW-IEC60065-1

Application	matching network for testing audio, video, electronic apparatus
Standard	IEC60065-1, publication before ed. 7
Impulse capacitance	1 nF
Output impedance	1 kΩ ± 10 % series, 4 MΩ ± 10 % parallel
Test level	max. 10 kV
Rise time voltage	approx. 100 ns
Output connectors	AMP
Weight	1 kg
Dimensions	24 x 10 x 8 cm
For generator	MIG1203STEP
Accessories	CN-MIG18 AMP

NW-IEC60065-1A

Application	matching network for testing audio, video, electronic apparatus
Standard	IEC60065-1, ed. 7 and subsequent
Impulse capacitance	1 nF
Output impedance	1 kΩ ± 10 % series
Test level	max. 10 kV
Rise time voltage	approx. 100 ns
Output connectors	AMP

Weight	0.5 kg
Dimensions	24 x 10 x 8 cm
For generator	MIG1203STEP
Accessories	CN-MIG18 AMP

NW-UL1635

Application	matching network for testing digital alarm comm. systems, safety related controls
Standard	UL1635 paragr. 46.4, UL991 paragr. 14.7
Test level low range	0.6 – 1.2 kV in 200 Ω (energy 0.3 – 1.2 J)
Test level high range	1.2 – 2.4 kV in 200 Ω (energy 0.3 – 1.2 J)
Voltage rise time 0 – 100 %	approx. 24 µs, for both ranges
Volt. pulse duration 0 - 50%	approx. 100 µs, for both ranges
Output connectors	banana plugs 4 mm
Weight	2 kg
Dimensions	24 x 24 x 10 cm
For generator	MIG1203STEP

CN18-XX-500

Application	matching network for insulation test
Standard	IEC60060-1
Output impedance	500 Ω, or direct generator output (40 Ω)
Test level	max. 18 kV
Output connectors	AMP
Weight	1.5 kg
Dimensions	24 x 10 x 8.5 cm
For generators	MIG1203, MIG1203CWG
Accessories	CN-MIG18 AMP12 kV

NW-IEC61036C118

Application	matching network for electricity meter testing
Standard	IEC62052-11, section 5.6
Output impedance / energy	500 Ω/ 0.5 J
Test levels with 0.5 J energy	800 V, 1.5 kV, 2.5 kV, 4 kV
Output connectors	AMP
Weight	2.5 kg
Dimensions	24 x 18 x 8.5 cm
For generator	MIG1803
Accessories	CN-MIG18 AMP

NW-IEC61036C218

Application	matching network for electricity meter testing
Standard	IEC62052-11, section 5.6
Output impedance / energy	500 Ω/ 0.5 J
Test levels with 0.5 J energy	6 kV, 8 kV, 10 kV, 12 kV
Output connectors	AMP
Weight	2.5 kg
Dimensions	24 x 18 x 8.5 cm
For generator	MIG1803
Accessories	CN-MIG18 AMP

NW-IEC60255-518

Application	matching network for protection relay testing
Standard	IEC60255-5
Output impedance / energy	500 Ω / 0.5 J
Test levels with 0.5 J energy	500 V, 1 kV, 2.5 kV, 5 kV
Output connectors	AMP
Weight	2 kg
Dimensions	24 x 18 x 8.5 cm
For generator	MIG1803
Accessories	CN-MIG18 AMP

NW to MIG1803

Application	matching network for protection relay testing
Standard	IEC60255-5
Output impedance / energy	500 Ω / 0.5 J
Test levels with 0.5 J energy	900 V, 1.75 kV, 3 kV, 7.3 kV
Output connectors	AMP
Weight	2 kg
Dimensions	24 x 18 x 8.5 cm
For generator	MIG1803
Accessories	CN-MIG18 AMP

NW-NMI-M6C3C4

Application	matching network for electricity meter testing
Standard	NMI M6
Generator impedance	40 Ω
Pulse energy	9 J ± 1 J @ 10 kV, 9 J ± 1 J @ 12 kV
Test levels with 9 J energy	10 kV, 12 kV ± 10 %
Output connectors	banana plugs 4 mm
Weight	2 kg
Dimensions	24 x 18 x 8.5 cm
For generator	MIG1803

CN24-40-80

Application	matching network for insulation test
Standard	IEC62055-31
Output impedance	80 Ω, or direct generator output (40 Ω)
Test level	max. 24 kV
Weight	1 kg
Dimensions	24 x 10 x 8 cm
For generator	MIG2403
Included	1.5 m cables, alligator clips

CN24-XX-500

Application	matching network for insulation test
Standard	IEC60060-1
Output impedance	500 Ω, or direct generator output (40 Ω)
Test level	max. 24 kV
Output connectors	AMP
Weight	1.5 kg
Dimensions	24 x 10 x 8.5 cm
For generator	MIG2403
Accessories	CN-MIG4803

CN-MIG18 AMP

Application	1.5 m cables and test pistols for insulation test
Voltage capability	max. 12 kV impulse 1.2/50 µs or 10/700 µs
Current capability	max. 1000 A impulse 8/20 µs or 5/320 µs
Input connectors	AMP type
Weight	8.5 kg
Dimensions	43.5 x 47 x 25.4 cm
For generators	MIG1203, MIG1203CWG

CN-MIG24

Application	1.2 m cables and test pistols for insulation test
Voltage capability	max. 18 kV impulse 1.2/50 µs or 10/700 µs
Current capability	max. 1000 A impulse 8/20 µs or 5/320 µs
Connectors	fixed pistols
Weight	8.5 kg
Dimensions	43.5 x 47 x 25.4 cm
For generators	MIG1203, MIG1203CWG, MIG1803

CN-MIG4803

Application	1.5 m cables and test pistols for insulation test
Voltage capability	max. 48 kV impulse 1.2/50 µs or 10/700 µs
Current capability	max. 3 kA impulse 8/20 µs or 5/320 µs
Connectors	fixed cables with banana output plugs
Weight	8.5 kg
Dimensions	43.5 x 47 x 25.4 cm
For generators	MIG4803

TC-MIG24

Standard	multiple
Application	test cabinet with safety circuit
EUT volume	20 x 20 x 30 cm
Warning lamps	red and green (2 lamps)
Test cabinet material	acrylic glass, cover position adjustable
Insulation withstand	pulse 1.2/50 µs up to 36 kV
Weight	8.5 kg
Dimensions	43.5 x 47 x 25.4 cm
Included	control cable to generator
For generators	MIG generators up to 36 kV

STAGE2403 4

Standard	IEC60060-1, IEC61010-1 latest editions
Application	module used to extend MIG7203 up to 96 kV
Weight	17 kg
For generator	MIG7203
Upgrade	generator must return to EMCP for upgrade

STAGE2403 5

Standard	IEC60060-1, IEC61010-1 latest editions
Application	module used to extend MIG9603 up to 120 kV
Weight	17 kg
For generator	MIG9603
For generator	MIG7203, together with STAGE2403 4
Upgrade	generator must return to EMCP for upgrade

STAGE2403 6

Standard	IEC60060-1, IEC61010-1 latest editions
Application	module used to extend MIG12003 up to 144 kV
Weight	17 kg
For generator	MIG12003
For generator	MIG9603, together with STAGE2403 5
For generator	MIG7203, together with STAGE2403 4 and - 5
Upgrade	generator must return to EMCP for upgrade

CDN2000A-06-32

Standards	IEC61000-4-4, -4-5, -4-12 latest editions
Type	3P, automatic
EUT voltage AC	max. 3 x 415 V L-L (280 V L-N), 50 / 60 Hz
EUT current AC	max. 3 x 32 A
EUT protection AC	over-current automatic prot., < 1 s @ 125 A
EUT power DC	max. 250 V, 60 A (ask for details)
Test level burst	max. 6 kV, all IEC couplings, additional ones
Test level surge	max. 6 kV, all IEC couplings
Test level ring wave	max. 6 kV, IMU3000 only, all IEC couplings
Coupling and decoupling	full compliant to latest editions
Dimensions	19 " unit, 4 UH
Weight	30 kg

CDN-KIT1000 ED3

Standard	IEC61000-4-5 latest edition
Application	surge on 2 asymmetrical lines, figure 9
Test level surge	max. 6 kV
Low speed I/O	
EUT voltage per line	max. 200 V DC or 240 V peak
EUT current per line	max. 3 A cont. or 5 A for 5 min.
Coupling path 1	40 Ω + 0.5 µF capacitor
Decoupling 1	20 mH per line (protected 275 V max.)
High speed I/O	
EUT voltage per line	max. 24 V DC or peak
EUT current per line	max. 3 A cont. or 5 A for 5 min.
Coupling path 2	40 Ω + 27 V diode
Decoupling 2	500 Ω per line (protected 18 V max.)
Dimensions	4 modules in carrying case: 33 x 27 x 17 cm
Weight	7 kg (all modules and carrying case)

THE EMC PARTNER PRODUCT RANGE

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IMMUNITY TESTS

Transient Test Systems for all EMC tests on electronic equipment. ESD, EFT, surge, AC dips, AC magnetic field, surge magnetic field, common mode, damped oscillatory and DC dips. According to IEC and EN 61000-4-2, -4, -5, -8, -9, -10, -11, -12, -13, -14, -16, -18, -19, -29.

LIGHTNING TESTS

Impulse test equipment and accessories for aircraft, military and telecom applications. Complete solutions for RTCA / DO-160 and EUROCAE / ED-14 for indirect lighting on aircraft systems, MIL-STD-461 tests CS106, CS115, CS116, CS117, CS118 and Telecom, ITU-T .K44 basic and enhanced tests for impulse, power contact and power induction.

COMPONENT TESTS

Impulse generators for testing; varistors, gas discharge tubes (GDT), surge protective devices (SPDs), X / Y capacitors, circuit breakers, electricity meters, protection relays, insulation material, suppressor diodes, connectors, chokes, fuses, resistors, emc-gaskets, cables, etc.

EMISSION MEASUREMENTS

Measurement of Harmonics and Flicker in 1-phase and 3-phase electrical and electronic products according to IEC /EN 61000-3-2 and 61000-3-3 . HARCS Immunity software adds interharmonic tests, voltage variation according to IEC/EN 61000-4-13, -4-14.

SYSTEM AUTOMATION

A full range of accessories enhance the test systems. Test cabinets, test pistols, adapters and remote control software, simplify interfacing with the EUT. Programmable PSU, EMC hardened for frequencies from 16.7Hz to 400Hz. PS3-SOFT-EXT complies with IEC / EN 61000-4-14 and -4-28.

SERVICE

Our committment starts with a quality management system backing up our ISO 17025 accreditation. With the SCS number 146, EMC PARTNER provide accredited calibration and repairs. Our customer support team are at your service!

For further information please do not hesitate to contact your local EMC PARTNER AG representative.
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www.emc-partner.com

Swiss Headquarters

EMC PARTNER AG
Baselstrasse 160
CH - 4242 Laufen

Phone +41 61 775 20 30
Fax +41 61 775 20 59
Email sales@emc-partner.ch
Web www.emc-partner.ch

Your local representative