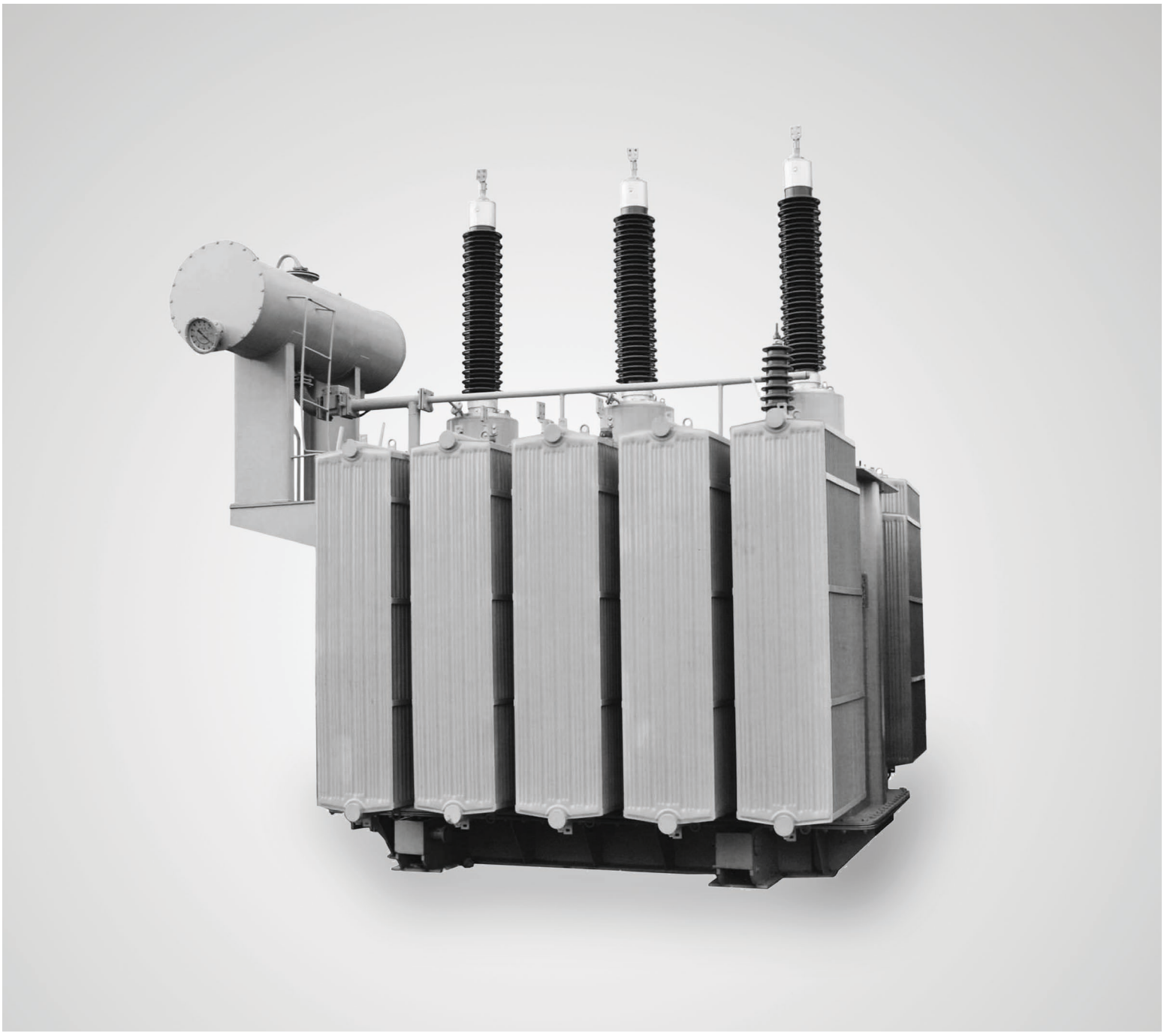
EMC PARTNER

LIGHTNING IMPULSE

Insulation Testing



This document has been
optimized for electronic media

Smart navigation through technical
specifications. Click the green links.

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

THE NEW INS SERIES

The new INS series from EMC PARTNER is another ground-breaking advance in insulation technology. With impulse repetition rates of 1 pulse per second up to 3.5 kV, and 1 pulse per 8 seconds at 30 kV, INS is probably the fastest insulation test system in the world.

A flexible offer

Optimal models corresponding to normative test levels up to 7.5 kV, 15 kV, 22.5 kV or 30 kV. The 7.5 kV model can be subsequently upgraded to 15 kV and the 22.5 kV model can be upgraded to 30 kV. Output impedance can be selected in the range 40 Ω - 5 kΩ (default 40 Ω).

Optimal personnel safety

Outputs of the generator are on top of the generator, allowing a safe manual control. Furthermore, a safety switch is always available on the front panel, while an additional remote (5 m cable included) safety switch can be optionally connected.

Superior component technology

Impulse capacitors have an expected lifetime of 6 million cycles declared by manufacturer. INS test system hence becomes an optimal solution for long duration production testing.

Outstanding precision

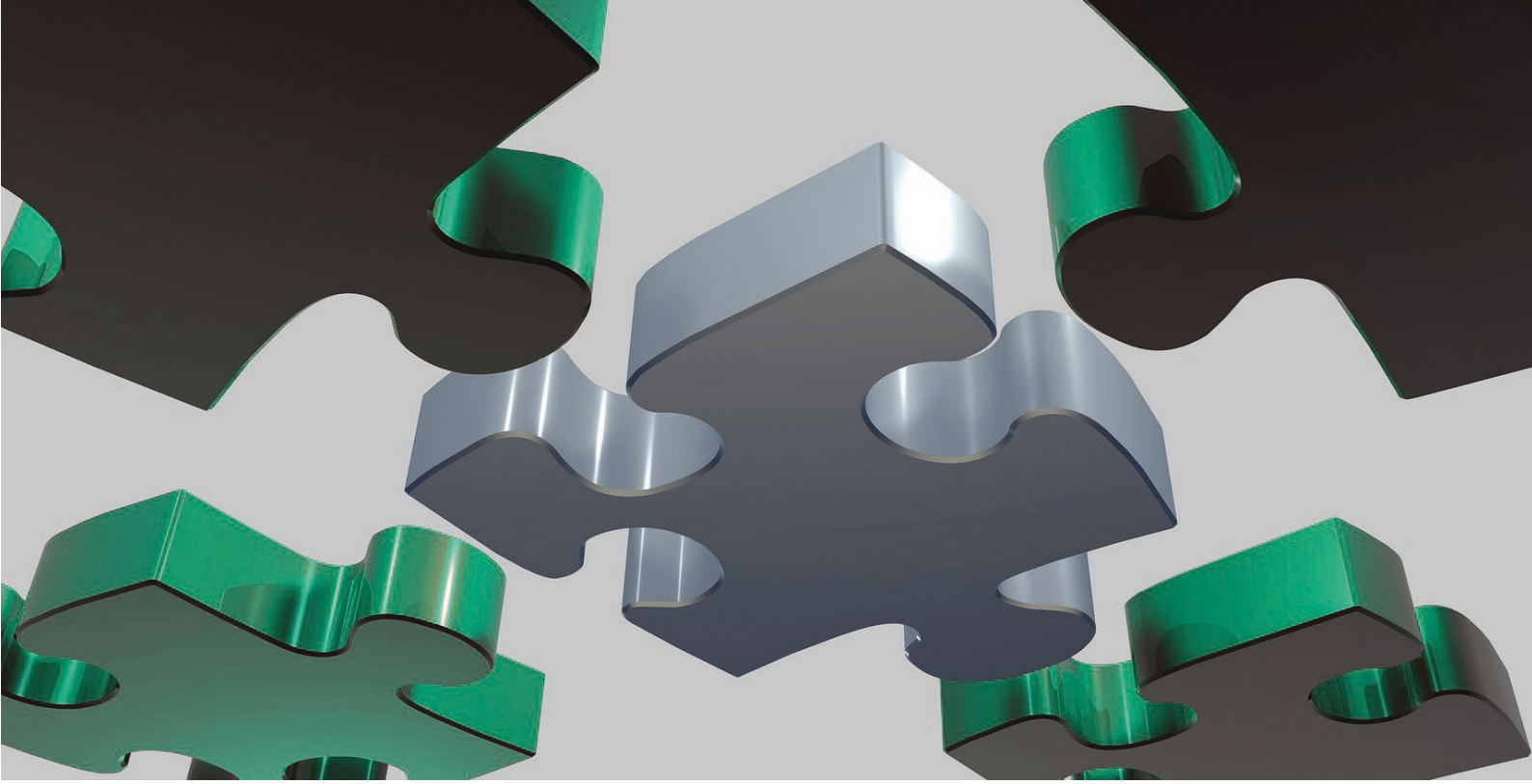
The tolerance of impulse voltage is just ± 3 % while measurement circuits offer a ± 2 % tolerance. This level of performance allows the implementation of voltage and current integrals (available with OPT-INS-MEAS).

Unbeatable compactness

15 kV solution in standard 19” unit, 4 UH and 30 kV in 19” unit, 8 UH.

Seamless test bench integration

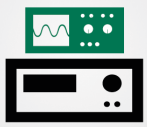
With its programmable bi-directional connectors, INS is ready for an optimal PLC integration.



UNIQUE FEATURES

Robust test equipment that gets the job done

Integrated measurement

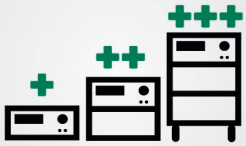


Evaluate breakdown characteristics using the integrated Voltage and Current measurement circuits. Use the BNC outputs for impulse visualisation on an oscilloscope.

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.

Tradition meets Technology

Over 25 years devoted to combining latest technologies into the best products.

100% Swiss made products

Technical Specifications

INS OR MIG INSULATION TEST SYSTEM ?

Typical insulation test systems have energy levels high enough to maintain the waveform and amplitude in tolerances provided by standards when connected to a load. In this sense, the INS- 1250 generators maintain the waveform for following loads: R > 1 kΩ or L > 50 mH or C < 6 nF. The typical energy of an INS-1250-15K is 4.5 joules at 6 kV and 28.13 joules at 15 kV.

For heavier loads, the MIG series of insulation generators provides much more energy in order to maintain the voltage waveform in tolerance. Hence, the domain of loads that an MIG1203, for example, can be used with is wider: R > 500 Ω or L > 10 mH or C < 5 nF. The energy available in the generator MIG1203 is 81 joules at 6 kV and 324 joules at 12 kV.

A MIG2403 has an energy of 648 joules at 24 kV. Hence, the energy delivered by a generator is not depending only on the output impedance but also on the storage capacitance, as the current waveform is not defined.

› **For typical loads,** INS series can be employed.
› **For heavier loads** that require more energy, the MIG series of generators is recommended.

NEW INS TEST SYSTEM

INS-1250-7K5	7.5 kV impulse 1.2/50 µs, 40 Ω and/or custom output
INS-1250-15K	15 kV impulse 1.2/50 µs, 40 Ω and/or custom output
INS-1250-22K5	22.5 kV impulse 1.2/50 µs, 40 Ω and/or custom output
INS-1250-30K	30 kV impulse 1.2/50 µs, 40 Ω and/or custom output
INS-0805	500 ohm output/ 0.5 J with 0.5 kV, 1 kV, 1.5 kV, 2 kV, 2.5 kV, 3 kV,

ACCESSORIES FOR INS TEST SYSTEM

CN-INS-500	matching network 500 Ω
CN-INS-X	custom matching network with any value in the range 40 Ω - 5 kΩ
OPT-INS-MEAS	measurement board for Upeak, Ipeak on display, BNC outputs for
	U and I waveforms monitor and U and I integral calc/display
V-PROBE-30K	30 kV common mode voltage monitor probe for INS-1250 series
EXT-INS-CON	2 m cables and terminal box for INS-1250
INS-DSO	automation package for waveform monitoring from generator
NW-INS-05J	0.5 J matching networks for INS1250-15K. For 10, 12 and 15 kV
TC-ST	test cabinet with safety circuit mountable on top of generator
EXT-TC-INS	stand for TC-ST table-top mounting
WARNING LAMP	red/green signalization lamp

MIG TEST SYSTEMS

MIG0603	6 kV, 1.2/50µs pulse
MIG0603C	6 kV, 1.2/50µs pulse 2 Ohm(CWG), 12, 40, 500 Ohm
MIG0603EN S-T-I	6 kV surge CWG, 6 kV surge IEC 62368-1 circuits 1 and 2
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

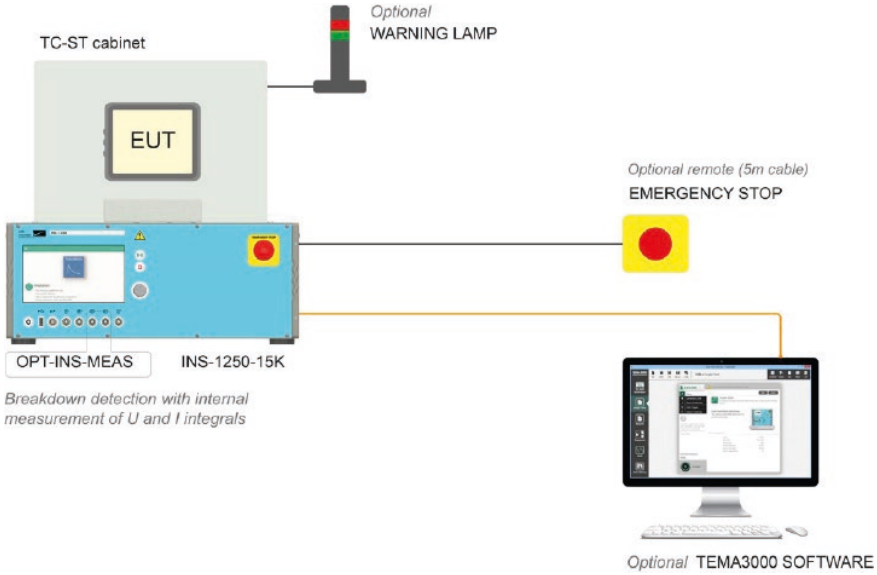
ACCESSORIES FOR MIG TEST SYSTEM

CN12-XX-500	Matching network for electricity meter testing
NW-IEC61036C1	Matching network for electricity meter testing
NW-IEC61036C2	Matching network for protection relay testing
NW-IEC60255-524	Matching network for protection relay testing
NW-IEC60255-5SEA	Matching network for EN 50470-1 testing
NW-01-2000	Matching network for testing audio, video
NW-IEC60065-1	Matching network for testing audio, video
NW-IEC60065-1A	Matching network for testing digital alarm
NW-UL1635	Matching network for insulation test
CN18-XX-500	Matching network for electricity meter testing
NW-IEC61036C118	Matching network for electricity meter testing
NW-IEC61036C218	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	EUT connection cables (1.5 m), test pistols (max. 1 kA)
CN-MIG24 PROBE	EUT connection cables (1.2 m), test pistols (max. 1 kA), interlock, warning lamps
CN-MIG24 MC	EUT connection cables (1.2 m), crocodile clips (max. 3 kA), interlock, warning lamps
CN-MIG4803	EUT connection cables (1.2 m) and crocodile clips (max. 3 kA)
TC-ST	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
CDN-M-6-32	External 3-phase mains CDN for surge up to 6kV and 32A per phase
CDN-KIT1000 Ed.3	CDN for surge up to 6kV on 2 unsymetrical communication lines

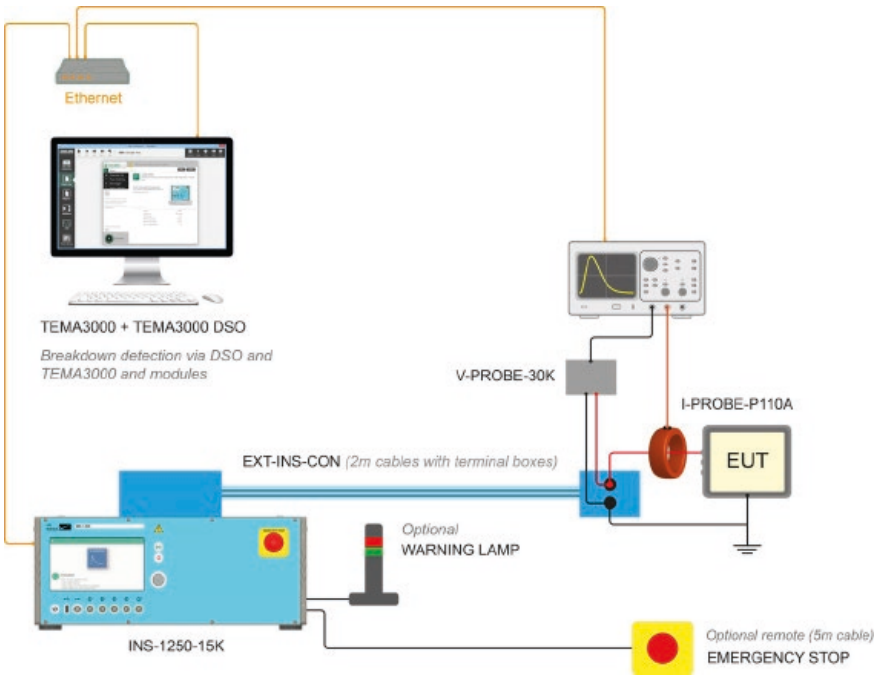
TYPICAL INSULATION TEST SYSTEMS

Load: R > 1 kΩ or L > 50 mH or C < 6 nF

› Test setup for small EUTs on top of the generator.



› Test setup for small EUTs with calibrated waveform at 2m cable



INS-1250-7K5

INS-1250-7K5 circuit: voltage impulse 1.2/50 µs, 7.5 kV

Standards	IEC60060-1, IEC61010-1, IEC61180,
	IEC60335-1, IEC60664-1, latest editions
Application	test insulation against voltage impulse
Impulse capacitance	250 nF ± 20 %
Energy at max. voltage	7.03 joules
Default output impedance	40 Ω, additional impedances on request
Adjust. voltage OC (>10 MΩ)	100 V – 7.5 kV
Calibrated level	500 V – 7.5 kV ± 3 % (waveform in tolerance also under load)
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Undershoot	< 5 %
Waveform in tolerance for **(with standard Zout)**	R > 1 kΩ (max. level may be reduced, ask for details)
	L > 50 mH
	C < 6 nF (max. level may be reduced, ask for details)
SC current waveform	not defined
Pulse repetition	up to 1 / 1 s @ 5 kV, 1 / 1.5 s @ 7.5 kV
Polarity	positive, negative, alternating

INS-1250-7K5 control features

User interface	7” capacitive touch screen
Processor, RAM	Quad-core 1.2 GHz, 1 GB RAM
Internal memory	4 GB
Communication interfaces	Gigabit Ethernet, 2 x RS232, 2 x USB A
Impulse counter	programmable up to 29’999
Trigger out	BNC, max. 10 V on front panel
Programmable BNCs	4 programmable BNCs (2 front, 2 back)
Input functions via BNC	Start test, Stop test, EUT fail, EUT mark,
	External trigger in, Emergency stop
Output functions via BNC	Running state, Safety circuit state
Emergency stop	On front panel, standard red/yellow as in
	IEC 60947-5-5, IEC 60204-1, ISO 13850

INS-1250-7K5 supply, weight, dimensions, climatic conditions

Operating voltage	100 – 240 V (50/60 Hz) ± 10%
Power consumption	ON < 150 VA, standby < 15 VA
Weight	approx. 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
EUT connection cables	two 0.25 m cables with crocodile clips
User manual	with conformity declaration
Calibration certificate	factory calibration

INS-1250-7K5 optional accessories

500 Ω output impedance	CN-INS-500 optional output impedance
Custom output impedance	CN-INS-X selectable impedance 40 Ω - 5 kΩ
Test cabinet	TC-ST cabinet with safety circuit
Table adapter for TC-ST	EXT-TC-INS to mount TC-ST near generator
2 m extension cable	EXT-INS-CON extension cable with box
Warning lamp	WARNING-LAMP red/green
Emergency stop button	external EMRGENCY-STOP with 5m cable
Measurement board	OPT-INS-MEAS internal board for peak V, I
Voltage probe	V-PROBE-30K optional voltage probe
Software	TEMA3000 with optional modules

INS-1250-15K

INS-1250-15K circuit: voltage impulse 1.2/50 µs, 15 kV

Standards	IEC60060-1, IEC61010-1, IEC61180,
	IEC60335-1, IEC60664-1, latest editions
Application	test insulation against voltage impulse
Impulse capacitance	250 nF ± 20 %
Energy at max. voltage	28.12 joules
Default output impedance	40 Ω, additional impedances on request
Adjust. voltage OC (>10 MΩ)	200 V – 15 kV
Calibrated level	1 kV – 15 kV ± 3 % (waveform in tolerance also under load)
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Undershoot	< 5 %
Waveform in tolerance for **(with standard Zout)**	R > 1 kΩ (max. level may be reduced, ask for details)
	L > 50 mH
	C < 6 nF (max. level may be reduced, ask for details)
SC current waveform	not defined
Pulse repetition	up to 1 / 1 s @ 5 kV, 1 / 3 s @ 15 kV
Polarity	positive, negative, alternating

INS-1250-15K control features

User interface	7” capacitive touch screen
Processor, RAM	Quad-core 1.2 GHz, 1 GB RAM
Internal memory	4 GB
Communication interfaces	Gigabit Ethernet, 2 x RS232, 2 x USB A
Impulse counter	programmable up to 29’999
Trigger out	BNC, max. 10 V on front panel
Programmable BNCs	4 programmable BNCs (2 front, 2 back)
Input functions via BNC	Start test, Stop test, EUT fail, EUT mark,
	External trigger in, Emergency stop
Output functions via BNC	Running state, Safety circuit state
Emergency stop	On front panel, standard red/yellow as in
	IEC 60947-5-5, IEC 60204-1, ISO 13850

INS-1250-15K supply, weight, dimensions, climatic conditions

Operating voltage	100 – 240 V (50/60 Hz) ± 10%
Power consumption	ON < 150 VA, standby < 15 VA
Weight	approx. 26 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
EUT connection cables	two 0.25 m cables with crocodile clips
User manual	with conformity declaration
Calibration certificate	factory calibration

INS-1250-15K optional accessories

500 Ω output impedance	CN-INS-500 optional output impedance
Custom output impedance	CN-INS-X selectable impedance 40 Ω - 5 kΩ
Test cabinet	TC-ST cabinet with safety circuit
Table adapter for TC-ST	EXT-TC-INS to mount TC-ST near generator
2 m extension cable	EXT-INS-CON extension cable with box
Warning lamp	WARNING-LAMP red/green
Emergency stop button	external EMRGENCY-STOP with 5m cable
Measurement board	OPT-INS-MEAS internal board for peak V, I
Voltage probe	V-PROBE-30K optional voltage probe
Software	TEMA3000 with optional modules

INS-1250-22K5

INS-1250-22K5 circuit: voltage impulse 1.2/50 µs, 22.5 kV

Standards	IEC60060-1, IEC61010-1, IEC61180,
	IEC60335-1, IEC60664-1, latest editions
Application	test insulation against voltage impulse
Impulse capacitance	250 nF ± 20 %
Energy at max. voltage	63.28 joules
Default output impedance	40 Ω, additional impedances on request
Adjust. voltage OC (>10 MΩ)	300 V – 22.5 kV
Calibrated level	1.5 kV – 22.5 kV ± 3 % (waveform in tolerance also under load)
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Undershoot	< 5 %
Waveform in tolerance for **(with standard Zout)**	R > 1 kΩ (max. level may be reduced, ask for details)
	L > 50 mH
	C < 6 nF (max. level may be reduced, ask for details)
SC current waveform	not defined
Pulse repetition	up to 1 / 1 s @ 5 kV, 1 / 4.5 s @ 22.5 kV
Polarity	positive, negative, alternating

INS-1250-22K5 control features

User interface	7” capacitive touch screen
Processor, RAM	Quad-core 1.2 GHz, 1 GB RAM
Internal memory	4 GB
Communication interfaces	Gigabit Ethernet, 2 x RS232, 2 x USB A
Impulse counter	programmable up to 29’999
Trigger out	BNC, max. 10 V on front panel
Programmable BNCs	4 programmable BNCs (2 front, 2 back)
Input functions via BNC	Start test, Stop test, EUT fail, EUT mark,
	External trigger in, Emergency stop
Output functions via BNC	Running state, Safety circuit state
Emergency stop	On front panel, standard red/yellow as in
	IEC 60947-5-5, IEC 60204-1, ISO 13850

INS-1250-22K5 supply, weight, dimensions, climatic conditions

Operating voltage	100 – 240 V (50/60 Hz) ± 10%
Power consumption	ON < 150 VA, standby < 15 VA
Weight	approx. 35 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
EUT connection cables	two 0.25 m cables with crocodile clips
User manual	with conformity declaration
Calibration certificate	factory calibration

INS-1250-22K5 optional accessories

500 Ω output impedance	CN-INS-500 optional output impedance
Custom output impedance	CN-INS-X selectable impedance 40 Ω - 5 kΩ
Test cabinet	TC-ST cabinet with safety circuit
Table adapter for TC-ST	EXT-TC-INS to mount TC-ST near generator
2 m extension cable	EXT-INS-CON extension cable with box
Warning lamp	WARNING-LAMP red/green
Emergency stop button	external EMRGENCY-STOP with 5m cable
Measurement board	OPT-INS-MEAS internal board for peak V, I
Voltage probe	V-PROBE-30K optional voltage probe
Software	TEMA3000 with optional modules

INS-1250-30K

INS-1250-30K circuit: voltage impulse 1.2/50 µs, 30 kV

Standards	IEC60060-1, IEC61010-1, IEC61180,
	IEC60335-1, IEC60664-1, latest editions
Application	test insulation against voltage impulse
Impulse capacitance	250 nF ± 20 %
Energy at max. voltage	112.5 joules
Default output impedance	40 Ω, additional impedances on request
Adjust. voltage OC (>10 MΩ)	400 V – 30 kV
Calibrated level	2 kV – 30 kV ± 3 % (waveform in tolerance also under load)
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Undershoot	< 5 %
Waveform in tolerance for **(with standard Zout)**	R > 1 kΩ (max. level may be reduced, ask for details)
	L > 50 mH
	C < 6 nF (max. level may be reduced, ask for details)
SC current waveform	not defined
Pulse repetition	up to 1 / 1 s @ 5 kV, 1 / 6 s @ 30 kV
Polarity	positive, negative, alternating

INS-1250-30K control features

User interface	7” capacitive touch screen
Processor, RAM	Quad-core 1.2 GHz, 1 GB RAM
Internal memory	4 GB
Communication interfaces	Gigabit Ethernet, 2 x RS232, 2 x USB A
Impulse counter	programmable up to 29’999
Trigger out	BNC, max. 10 V on front panel
Programmable BNCs	4 programmable BNCs (2 front, 2 back)
Input functions via BNC	Start test, Stop test, EUT fail, EUT mark,
	External trigger in, Emergency stop
Output functions via BNC	Running state, Safety circuit state
Emergency stop	On front panel, standard red/yellow as in
	IEC 60947-5-5, IEC 60204-1, ISO 13850

INS-1250-30K supply, weight, dimensions, climatic conditions

Operating voltage	100 – 240 V (50/60 Hz) ± 10%
Power consumption	ON < 150 VA, standby < 15 VA
Weight	approx. 40 kg
W x d x h	45 x 57 x 19 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
EUT connection cables	two 0.25 m cables with crocodile clips
User manual	with conformity declaration
Calibration certificate	factory calibration

INS-1250-30K optional accessories

500 Ω output impedance	CN-INS-500 optional output impedance
Custom output impedance	CN-INS-X selectable impedance 40Ω - 5 kΩ
Test cabinet	TC-ST cabinet with safety circuit
Table adapter for TC-ST	EXT-TC-INS to mount TC-ST near generator
2 m extension cable	EXT-INS-CON extension cable with box
Warning lamp	WARNING-LAMP red/green
Emergency stop button	external EMRGENCY-STOP with 5m cable
Measurement board	OPT-INS-MEAS internal board for peak V, I
Voltage probe	V-PROBE-30K optional voltage probe
Software	TEMA3000 with optional modules

INS-0805

INS-0805 circuit: voltage impulse 1.2/50 us, 0.5 J, 500 Ω

Standards	IEC 61180, IEC 60255-27, IEC 62052-11, IS 13779
	IEC 60834-1/2, EN 50470-1 latest editions
Application	test insulation against voltage impulse
Voltage test levels 0.5 J	0.5 kV, 1 kV, 1.5 kV, 2 kV, 2.5 kV, 3 kV, 4 kV,
	5 kV, 6 kV, 8 kV + 0 % / - 10 %
Polarity	positive, negative, alternating
Output impedance	500 Ω ± 10 %
Impulse rise time	1.2 µs ± 30 %
Impulse duration	50 µs ± 20 %
Pulse energy at test levels	0.5 J ± 10 %
Repetition rate	1 s – 655 s
Included articles	cables and test clips

INS-0805 control features

Operating system	EMC PARTNER proprietary firmware
Languages	10 menu languages, selectable
User interface	7” colour touch display
Connectivity	ethernet, USB, RS485
Surge voltage on display	0.5 – 8 kV, accuracy ± 5%
Peak check function	yes, programmable limits for measured U
Trigger out	BNC, max. 12 V
Trigger in	auto, manual, external (BNC input)
Impulse counter	programmable up to 65’535
Emergency stop	Emergency Stop button, BNC input (EUT Fail)

INS-0805 supply, weight and dimensions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA
Temperature range	10 – 35 °C
Weight	approx. 19 kg
W x d x h	45 x 57 x 19 cm
Version	19” unit, 4 UH
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
EUT connection cables	two 0.5 m cables with crocodile clips
User manual	with conformity declaration
Calibration certificate	factory calibration

ACCESSORIES FOR INS SERIES

CN-INS-500

Application	matching network for insulation test
Standard	multiple, see generators
	IEC 62052-31 (requires INS-1250-22K5 or higher)
Output impedance	500 Ω +0/-10%, or direct generator output (40 Ω)
Test level	max. 30 kV
Weight	1.5 kg
Dimensions	24 x 10 x 8.5 cm
For generators	INS-1250-7K5, -15K, 22K5 or -30K

CN-INS-X

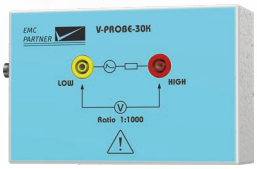
Application	matching network for insulation test
Standard	multiple, see generators
Output impedance	custom, from 40 Ω to 5 kΩ
Test level	max. 30 kV
Weight	2 kg
Dimensions	24 x 10 x 8.5 cm
For generators	INS-1250-7K5, -15K, 22K5 or -30K

OPT-INS-MEAS

Application	measurement board for U, I
Type	internal board with 2 BNC outputs
Voltage input	up to 30 kV peak, bandwidth DC – 3 MHz
Current input	up 2 kA peak, bandwidth 2 Hz – 20 MHz
Values on screen	U integral, I integral
Output	1 x BNC for U, 1 x BNC for I
U output ratios via BNC	1: 1000 ± 2 % for INS-1250-7K5 1: 2000 ± 2 % for INS-1250-15K 1: 3000 ± 2 % for INS-1250-22K5 1: 4000 ± 2 % for INS-1250-30K
I output ratios via BNC	1: 40 ± 2 % for INS-1250-7K5 1: 80 ± 2 % for INS-1250-15K 1: 120 ± 2 % for INS-1250-22K5 1: 160 ± 2 % for INS-1250-30K
Internal measurements	voltage integral, current integral
	with selectable thresholds
For generators	INS-1250-7K5, -15K, 22K5 or -30K
Availability	Can be ordered also after initial purchase

V-PROBE-30K

Application	voltage monitor probe for INS-1250 series
Type	common mode passive, for impulse meas.
Mounting	on top of generator or on EXT-INS-CON
Input voltage	100 V – 30 kV waveform 1.2/50 µs
Accuracy	2 %
Factor	1:1000
Max. edge speed	edges> 300kV / µs can be detected
3 dB bandwidth	DC – 3 MHz
Input impedance	50 kΩ
Input connectors	2 x 4 mm
Output connector	1 x BNC
For generators	INS-1250-7K5, -15K, 22K5 or -30K
Availability	Can be ordered also after initial purchase and mounted on site

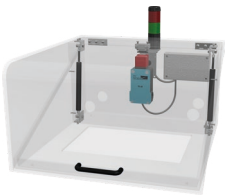


EXT-INS-CON

Application	2 m cables and terminal box for INS-1250
Voltage capability	max. 30 kV impulse 1.2/50 µs
For generators	INS-1250-7K5, -15K, 22K5 or -30K

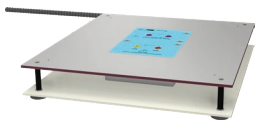
TC-ST

Standard	multiple
Application	test cabinet with safety circuit
Mounting	on top of generator
EUT volume	20 x 20 x 30 cm
Test cabinet material	acrylic glass
Insulation withstand	pulse 1.2/50 µs up to 30 kV
Weight	8 kg
Dimensions	43.5 x 47 x 25.4 cm
Included	control cable to generator
For generators	INS-1250-7K5, -15K, 22K5 or -30K
Accessories	WARNING-LAMP
	EXT-TC-INS



EXT-TC-INS

Application	stand for TC-ST table-top mounting
Insulation withstand	pulse 1.2/50 µs up to 30 kV
Weight	approx. 5 kg
Dimensions	45 x 57 x 10 cm
Requires	TC-ST



INS-DSO

Application	package for monitoring waveforms during insulation test
Control and setting	directly on generator's screen no additional computer/software required
Advantages	automation of oscilloscope settings when changing test parameters, test report directly from generator including DSO screen dumps on USB stick
Parameters measured	Vpeak, Vduration, Vintegral, waveform Ipeak, Iduration, Iintegral, waveform
Includes	firmware license, oscilloscope, cables
Oscilloscope type	100 MHz, two channels, 10" touch screen
Requires	either internal measurement board OPT-INS-MEAS or external voltage probe V-PROBE-30K and eventually external current probe

NW-INS-05J

Application	extends functionality of INS-1250 for 0.5 J low-energy
Test levels with low energy	10 kV, 12 kV and 15 kV
For generator	INS-1250-15K
Construction type	individual boxes for each voltage level

WARNING-LAMP

Application	red/green signalization lamp
Protection class	IP65, IEC 61140, VDE 0140-1
Mounting support	magnetic support, screwable bracket included
Lamp type	red and green (2 lamps), LED technology
Weight	0.3 kg
Dimensions	277 x 70 cm
Included	control cable to TC-ST/generator
For generators	INS-1250 series, IMU series

EMERGENCY-STOP

Application	remote emergency stop button
Colours	standard red/yellow as in IEC 60947-5-5, IEC 60204-1, and ISO 13850
Mounting	on table, magnetic support also included
Weight	0.5 kg
Dimensions	78 x 72 x 64 mm
Included	5 m cable
For generators	INS-1250 series, IMU series

HEAVY LOAD INSULATION TEST SYSTEMS

For example MIG1203 loads: R > 500 Ω or L > 10 mH or C < 5 nF (see for each generator)

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	750 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-ST 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

MIG0603C

MIG0603C circuit: combination wave impulse 1.2/50 µs & 8/20 µs, 6 kV / 2 Ω

Standards	IEC60060-1, IEC61010-1, IEC 61180,
	IEC 60664-1, IEC 62477-1, IEC 62109-1,
	IEC/UL/CSA 610010-2-030
Application	insulation testing, testing of clearances,
	other situations that require 2 Ω generator
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	200 joules
Output impedance	2 Ω
Adjustable voltage OC	250 V – 6.2 kV
Calibrated level	500 V – 6 kV +10% / -0%
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Waveform in tolerance for	R > 1 kΩ
	L > 20 mH
	C < 5 nF
SC current level	250 A – 3 kA ± 10 %
SC current waveform	8 µs ± 20 % / 20 µs ± 20 %
Pulse repetition	up to 1 / 4 s @ 500 V, 1 / 9 s @ 6 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG0603C circuit: voltage impulse 1.2/50 µs, 6 kV / 12 Ω, 40 Ω, 500 Ω

Standards	IEC60060-1, IEC61010-1, IEC 61180, other
Application	insulation testing with 12 Ω, 40 Ω, 500 Ω
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	200 joules
Output impedance	12 Ω, 40 Ω, 500 Ω
Adjustable voltage OC	250 V – 6.2 kV
Calibrated level	750 V – 6 kV +10% / -0%
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
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

MIG0603C 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% from range
Surge current monitor BNC	accuracy ±3% from range as follows
	2 Ω: 1 V = 300 A, max. 10 V
	12 Ω: 1 V = 50 A, max. 10 V
	40 Ω: 1 V = 15 A, max. 10 V
	500 Ω: 1 V = 1.5 A, max. 10 V
Surge voltage on display	0.5 – 6 kV, accuracy ± 3% from range
Surge current on display	2 Ω: 250 – 3000 A, accuracy ± 3% from range
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

MIG0603C supply, weight, dimensions, climatic conditions

Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA
Weight	26 kg
W x d x h	45 x 60 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

MIG0603C optional accessories

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

MIG0603EN S-T-I

MIG0603EN S-T-I circuit: combination wave impulse 1.2/50 µs & 8/20 µs, 6 kV / 2 Ω

Standards	IEC 61000-4-5
Application	surge testing with 2 Ω hybrid generator
Impulse capacitance	10 µF ± 10 %
Energy at max. voltage	186 joules
Output impedance	2 Ω
Adjustable voltage OC	250 V – 6.1 kV
Calibrated level	750 V – 6 kV ±10%
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
SC current level	250 A – 3 kA ± 10 %
SC current waveform	8 µs ± 20 % / 20 µs ± 20 %
Pulse repetition	up to 1 / 4 s @ 500 V, 1 / 9 s @ 6 kV
Polarity	positive, negative, alternating
Synchronization	0 – 359°, step 1°
Programmable ramp	voltage

MIG0603EN S-T-I built-in automatic CDN

Test level	6 kV
EUT power input	AC 480 V L-N, 280 V L-PE, N-PE, 16 A
	DC 110 V +/- to PE, 16 A
Internal CDN freq. range	DC, 50 Hz, 60 Hz
Coupling surge IEC	2 Ω: L-N, direct out, 12 Ω: L-PE, N-PE
Coupling surge ANSI	2 Ω: L-N, L-PE, N-PE, L+N-PE
	12 Ω: L-N, L-PE, N-PE
Decoupling	as in IEC 61000-4-5

MIG0603EN S-T-I circuit: telecom impulse 10/700 µs & 5/320 µs, 6 kV

Standards	IEC 61000-4-5, ITU-T K.20, K.21, K.44
	IEC 62368-1, Table D.1, Circuit 1
	IEC 60950-1, Table N.1, Circuit 1
	IEC 60065 8.0, Table K.1, Circuit 1
Application	telcom testing, insulation testing
Impulse capacitance	20 µF ± 10 %
Energy at max. voltage	372 joules
Output impedance	15 Ω, 40 Ω
Adjustable voltage OC	250 V – 6.1 kV
Calibrated level	750 V – 6 kV ±10%
Voltage waveform	10 µs ± 30 % / 700 µs ± 20 %
SC current level 40 Ω	12.5 A – 150 kA ± 10 %
SC current waveform 40 Ω	5 µs ± 20 % / 320 µs ± 20 %
Pulse repetition	up to 1 / 5 s @ 500 V, 1 / 16 s @ 6 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG0603EN S-T-I circuit: 1 µF surge IEC 62368-1 and similar, 6 kV

	IEC 62368-1, Table D.1, Circuit 2
	IEC 60950-1, Table N.1, Circuit 2
	IEC 60065 8.0, Table K.1, Circuit 2
Application	insulation testing
Impulse capacitance	1 µF ± 10 %
Parallel resistor R1	76 Ω
Serial resistor R2	13 Ω
Damping resistor R3	25 Ω
Parallel capacitor C2	30 nF, 33 nF (both conditions are met)
Energy at max. voltage	18 joules
Adjustable voltage OC	250 V – 6.1 kV
Calibrated level	750 V – 6 kV +10% / -0%
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Pulse repetition	up to 1 / 4 s @ 500 V, 1 / 9 s @ 6 kV
Polarity	positive, negative, alternating
Programmable ramp	voltage

MIG0603EN S-T-I 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
Surge current monitor BNC	10 V = 3 kA
Surge voltage on display	0.25 – 6 kV
Surge current on display	125 – 3000
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

MIG0603EN S-T-I supply, weight, dimensions, climatic conditions

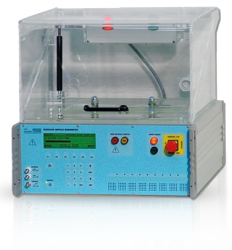
Operating voltage	115 / 230 V (50/60 Hz) ± 10%
Power consumption	ON < 400 VA, standby < 10 VA
Weight	33 kg
W x d x h	45 x 60 x 19 cm
Version	19“ unit, 4 UH
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Included articles	
Power cord	with country plug
User manual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

MIG0603EN S-T-I optional accessories

CDN for 3P CWG	CDN-M-6-32
CDNs for CWG on I/O lines	CDN-DATA-4L (CWG only),
and/or telecom on I/O lines	CDN-UTP ED3,CDN-UTP8 ED3 (CWG,telecom)
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	1.5 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-ST 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-IEC60255-524, 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	1.5 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	1.5 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
Addionally	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	1.5 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	1.5 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	750 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. CDN-M-6-32

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-ST 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-IEC60255-524, for protection relays
CDN for CWG tests	CDN-M-6-32
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	2 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-ST 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-IEC60255-524, 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	400 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	33.3 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-ST 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,
	IEC61643-11 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	2 kV – 18 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Calibrated current SC	1 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-ST 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, 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	3 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-ST 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
500 Ω, 0.5 J energy out	NW-IEC60255-524
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, -2, IEC61643-11 /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	3 kV – 24 kV
Voltage waveform	1.2 µs ± 30 % / 50 µs ± 20 %
Calibrated current SC	1.5 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-ST 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, 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	4.5 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	4.5 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	750 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	750 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-ST with warning lamps
Test cables	CN-MIG4803, 1.2 m length
CDNs for CWG tests	CDN-M-6-32, 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	750 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	50 Ω ±10 %
Adjustable voltage OC	250 V – 6.1 kV ± 10 %
Calibrated voltage level	750 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-IEC60255-524

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 generators	MIG1203, MIG1203CWG, MIG1803, MIG2403
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 µs ±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-ST)

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 , IEC62052-31, latest editions
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	MIG1803
Accessories	CN-MIG18 AMP

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 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
Output impedance / energy	500 Ω / 10 J ±1 J
Test levels with 10 J energy	10 kV, 12 kV ± 10 %
Output connectors	AMP connectors
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 , IEC62052-31, latest editions
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	contact sales@emc-partner.ch

CN-MIG18 AMP

Application	1.5 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
Input connectors	AMP type
Weight	8.5 kg
Dimensions	43.5 x 47 x 25.4 cm
For generators	MIG1203, MIG1203CWG

CN-MIG24 PROBE

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

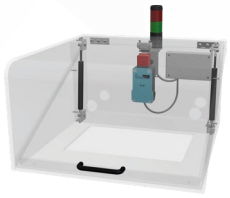
CN-MIG24 MC

Application	1.2 m cables & crocodile clips for insulation test
Voltage capability	max. 18 kV impulse 1.2/50 µs or 10/700 µs
Current capability	max. 3000 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 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-ST

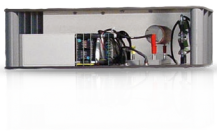


Standard	multiple
Application	test cabinet with safety circuit
Mounting	on top of generator
EUT volume	20 x 20 x 30 cm
Test cabinet material	acrylic glass
Insulation withstand	pulse 1.2/50 µs up to 30 kV
Weight	8 kg
Dimensions	43.5 x 47 x 25.4 cm
Included	control cable to generator
For generators	for INS, MIG series up to 30 kV
Accessories	WARNING-LAMP
	EXT-TC-INS , EXT-INS-CON (only with INS)

WARNING LAMP

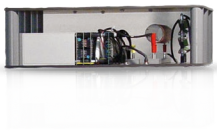
Cable Length	5m
Dimensions	diameter 7x cm x 25 cm
Weight	0.5 kg

STAGE2403 4



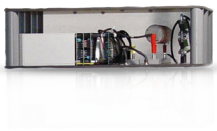
Standard	IEC60060-1, IEC61010-1 latest editions
Application	module used to extend MIG7203 up to 96 kV
Weight	17 kg
For generator	MIG7203
Upgrade	generator must return to EMCP for upgrade

STAGE2403 5



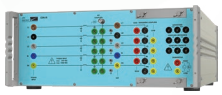
Standard	IEC60060-1, IEC61010-1 latest editions
Application	module used to extend MIG9603 up to 120 kV
Weight	17 kg
For generator	MIG9603
For generator	MIG7203, together with STAGE2403 4
Upgrade	generator must return to EMCP for upgrade

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

CDN-M-6-32



Standards	IEC61000-4-4, IEC61000-4-5, other
Type	3-ph., manual
EUT voltage AC	max. 3 x 480V L-L, 50 / 60 Hz
EUT current AC	max. 3 x 32A (covers 0 – 32 A as per standard)
Current flow	bi-directional (source to EUT and EUT to source)
Test level EFT (as per IEC)	max. 6 kV
Test level surge (as per IEC)	max. 6 kV
Surge waveform	as required for current EUT range 0 – 32A
Residual voltage	typically < 5 % for EFT and < 12 % for surge
Dimensions	19” unit, basic 4 UH
Weight	depending on options
Included in delivery	10 connectors (power, EUT), 5 EUT cables
	adapter for EFT calibration
Generators	IMU-MGE, IMU-MGS, MIG1203CWG, MIG3603C
Options	to be ordered additionally when required
PROT32-AC690	3-ph. AC 690V/32A automatic overcurrent
	circuit breaker (for tests on AC lines)

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)

NOTES

EMC PARTNER

PRODUCT APPLICATION RANGE

CONSUMER & INDUSTRIAL ELECTRONICS

Transient Test Systems for conducted EMC tests on electronic equipment. ESD, EFT, surge, ring wave, DOW, dips, magnetic field, common and differential mode. Compliant to IEC, EN and ANSI standards.

AEROSPACE ELECTRONICS

Impulse generators and couplers for avionic applications. Single stroke, multiple stroke and multiple burst according to RTCA / DO-160, EUROCAE / ED-14 and aircraft manufacturer standards.

Component TestING

Voltage and current Impulse generators for design and production testing of varistors, gas discharge tubes, surge protective devices, X / Y capacitors and specialist impulse generators for semiconductor tests.

DEFENCE ELECTRONICS

Complete test solutions for MIL-STD-461 requirements CS06, CS106, CS115, CS116, CS117 and CS118.

TELECOM & data line testing

Voltage and current impulse generators, CDNs, power contact, power induction equipment for exchange and customer equipment according to ITU, IEC, EN and ETSI requirements.

ENERGY & UTILITY EQUIPMENT

High current CDNs combined with transient test equipment fulfil requirements to test renewable and classical energy distribution network and monitoring equipment.

CUSTOMER ServiceS

Customer support throughout an equipment's lifetime is central to the EMC PARTNER AG philosophy. Directly from our ISO accredited facility in Switzerland or through our network of services centres, we provide support wherever you

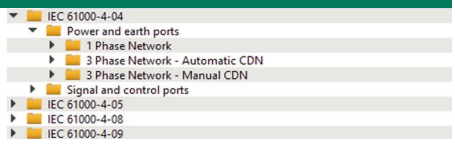
TEMA3000 SOFTWARE SUITE

TEMA3000 - The best solution for professional EMC Test Labs enables comfortable test setups, easy parameter changes and customizable protocolls with DSO integration for EPOS based test system.

Customizable Reporting

- Customize & edit your reports
- Export to multiple file formats
- Integrate DSO measurements

Manage Tests and Sequences



- Predefined basic IEC test setups
- Save and load tests & sequences
- Combine tests to sequences

Productive Workflow

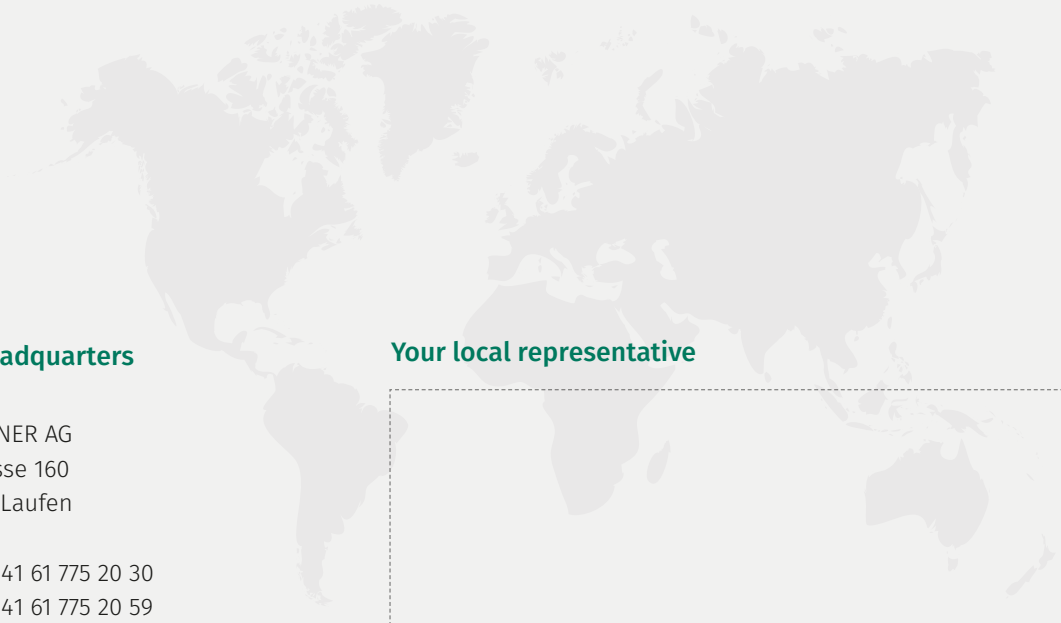
- Minimum learning time
- Drag and drop technology
- Integrated assistant function

Smart Connectivity

- Transfer rests / reports to PC
- Integrated webserver
- Remote control from computer

For further information please do not hesitate to contact your local EMC PARTNER AG representative.
Visit our website for more information and contact details.

www.emc-partner.com



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