

CONDUCTED SUSCEPTIBILITY

Military & Aerospace Testing





This document has been optimized for electronic media



Smart navigation through technical specifications. Click the green links.



WHEN GETTING RESULTS MATTERS

THERE IS ONLY ONE CHOICE

Military and avionic testing is all about quality and precision. MIL-MG3 brilliantly fulfills these requirements.

A flexible solution that includes:

- › MIL-STD-461C CS06 spikes, power leads
- › MIL-STD-461 CS106 transients, power leads
- › MIL-STD-461 CS115 bulk cable injection
- › MIL-STD-461 CS116 damped sinusoidal transients
- › MIL-STD-1275 Imported spikes
- › DO-160 section 17 Voltage spikes
- › DO-160 section 19 Inductive switching transients

Ease of use, predefined test routines and large aperture couplers make MIL-MG3 the most efficient and technically advanced instrument in this category.

FLEXIBLE SOLUTION

MIL-MG3 modular test system is the first of its kind to employ touch screen technology. An enhanced user interface and choice of couplers allow easy expansion to a test suite for MIL-STD and DO-160 impulse requirements



MIL-MG3 TEST SYSTEM

- MIL-MG3 Mainframe Unit

Available Plug-Ins

- MIL3-REC (CS115)
- MIL3-10K10M (CS116)
- MIL3-30M100M (CS116)
- MIL3-CS116 CUSTOM FREQUENCY
- MIL3-SPIKE
- MIL3-SPIKE-SLOW
- MIL3-SPIKE-FAST
- MIL3-1275
- MIL3-DO-160 S17
- MIL3-DO-160 S19

Accessories for MIL-STD-461


- **CN-BT6**
Only one coupler for CS115 and CS116 testing. No change of EUT cables position. Aperture diameter (50mm)
- **VERI-MIL3**
Includes all necessary calibration and measurement loads.

Included Benefits

Stable	Pulse reproducibility during test cycle
Precise	Repeatable test results over long time
Reliable	Evolution of established technology
Fast	Minimum setup and calibration time
Polarity	Maintain test integrity by electronic switching
Automated	Save and repeat test routines.

AVAILABLE PLUG-INS

Modules are available for MIL-MG3 system to cover the CS115, CS116, CS106, DO-160 section 17 and 19 test requirements. Select modules for specific test and later add new modules to enhance the system capability. New modules are automatically recognised and controlled by the system firmware.

	MIL3-REC	MIL-STD-461 / CS115
	<ul style="list-style-type: none">› Bulk cable injection impulse› Rise & fall time < 2ns pulse duration 30ns	
	MIL3-10K10M	MIL-STD-461 / CS116
	<ul style="list-style-type: none">› Damped sinusoidal transients› Oscillation frequencies 10kHz, 100kHz, 1MHz, 10MHz.	
	MIL3-30M100M	MIL-STD-461 / CS116
	<ul style="list-style-type: none">› Damped sinusoidal transient› Oscillation frequencies 30MHz, 100MHz.	
	MIL3-CS116 CUSTOM FREQUENCY	MIL-STD-461 / CS116
	<ul style="list-style-type: none">› Choose any CS116 frequency in the range 10kHz to 30MHz	
	MIL3-SPIKE	MIL-STD-461 / CS106
	<ul style="list-style-type: none">› Transients, power leads› Rise time 1.5us and pulse duration 5us	
	MIL3-SPIKE -SLOW & FAST	MIL-STD-461C / CS06
	<ul style="list-style-type: none">› Spikes, power leads› Pulse duration 10us and 0.15us	
	MIL3-1275	MIL-STD-1275
	<ul style="list-style-type: none">› Imported spike› Oscillation frequency 100kHz	
	MIL3-DO-160-S17	DO-160 SECTION 17
	<ul style="list-style-type: none">› Voltage spikes› Rise time 2us and pulse duration 10us	
	MIL3-DO-160-S19	DO-160 SECTION 19
	<ul style="list-style-type: none">› Inductive switching transients› Burst duration > 150us and spike frequency 250kHz	

EMERGENCY STOP



Enhanced safety is standard

Red/Yellow Emergency Stop button on front panel of generator can be complemented with remote option.

Add warning lamps and a test cabinet for enhanced test place safety.

UNIQUE FEATURES

Leading technology - New designs take advantage of latest innovations.

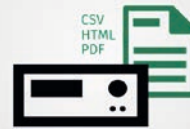
Latest generation, solid state, precise technology

Fast and stable



No generator or coupler adjustments required. System is ready for calibration or testing in less than 30 seconds.

Test reporting



Generate test reports via USB interface or built in webserver as csv, html and pdf formats.

Always up to date

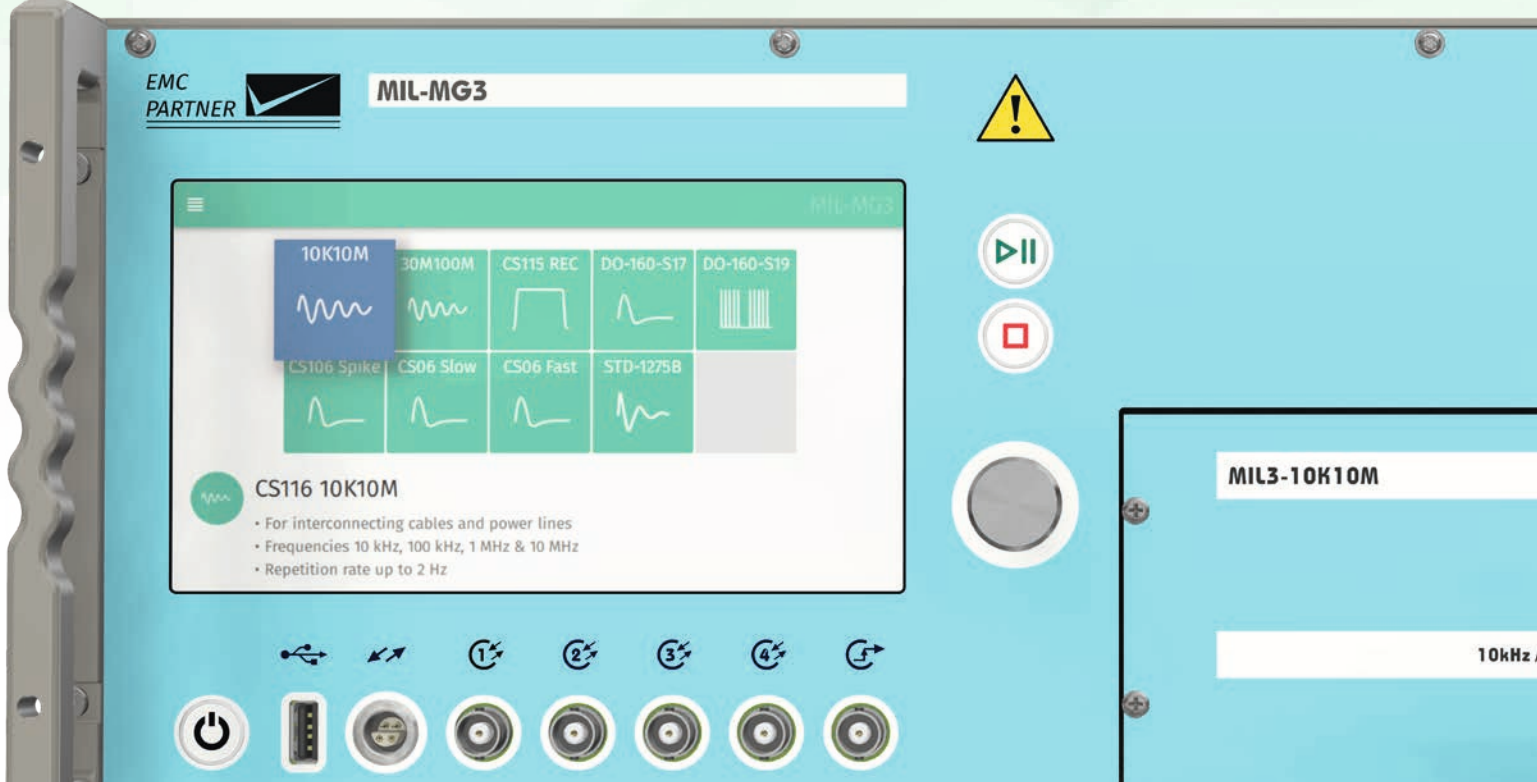


Firmware download from internet directly into the instrument.

Extend testing capability



Modular, on site upgradeable system based on plugin technology



EPOS – TOUCH THE FUTURE

EMC PARTNER Operating System (EPOS) is an independent software with free-of-charge updates for lifetime. EPOS is based on a full colour graphic interface and easy to follow on-screen graphics. Pop-up help gives information when needed, directly during the setting process. EPOS is full of features found only in top of the range instrumentation.

Integrated Web Server



Use any browser to access test reports from the generator.

Simple touch screen navigation



Save time with the latest in intuitive menu structures.

Interactive Interface



User interface adapted to specific modules.

We speak your language



Select between English, German, French, Italian, Spanish, Russian, Chinese (traditional and simplified).



TEMA3000 SOFTWARE SUITE

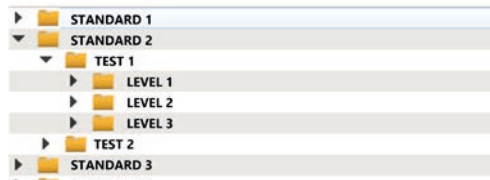
The best solution for professional EMC Test Labs enables comfortable test setups, easy parameter changes and customizable test reports and DSO integration.

Customizable test reports



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

Manage tests and sequences



- › Predefined test setups
- › Save and load own tests and sequences

Productive workflow



- › Minimum learning time
- › Integrated assistant function

Smart connectivity



- › Transfer tests / reports to PC
- › Remote control from computer

Technical Specifications

PLUGINS

MIL-MG3	Main frame	MIL3-REC	MIL3-10K10M	MIL3-30M100M	MIL3-CS116 CUSTOM	MIL3-SPIKE	MIL3-SPIKE-SLOW	MIL3-SPIKE-FAST	MIL3-DO-160-S17	MIL3-DO-160-S19	MIL3-1275B
MIL-461G CS115	✓	✓									
MIL-461G CS116	✓		✓	✓	✓						
MIL-461C CS06	✓					✓	✓	✓			
MIL-461F CS106	✓					✓					
MIL-1275B	✓										✓
DO-160 S17	✓								✓		
DO-160 S19	✓									✓	
ECSS-E-ST-20-07C rev1.							✓	✓			

ACCESSORIES

MIL-MG3	Main frame	MIL3-REC	MIL3-10K10M	MIL3-30M100M	MIL3-CS116 CUSTOM	MIL3-SPIKE	MIL3-SPIKE-SLOW	MIL3-SPIKE-FAST	MIL3-DO-160-S17	MIL3-DO-160-S19	MIL3-1275B
CN-BT6	✓	✓	✓	✓	✓						
VERI-MIL3	✓	✓	✓	✓	✓						
CN-MIG-BT5	✓					✓	✓		✓		
DC-S17CL	✓					✓	✓	✓	✓		
VERI5	✓					✓	✓	✓			
VERI50	✓								✓		
20dB ATTEN.	✓		opt								
I-PROBE-CS	✓	✓	✓	✓	✓						
TEMA3000	✓	opt	opt	opt	opt	opt	opt	opt	opt	opt	opt

1. MIL-MG3 MAINFRAME AND PLUGINS

1.1. TECHNICAL SPECIFICATIONS

MIL-MG3 Mainframe

Operating system	EPOS proprietary firmware
Languages	8 menu languages, selectable
User interface	7" capacitive touch display
Connectivity	gigabit ethernet, USB, RS485
Synchronization on signals	40 – 800 Hz
Synchronization source	external, 50 – 280 V
Synchronization angle	0 – 359° ± 5°, 1° step
Impulse polarity	positive, negative, electronic switching
Automatic ramp	test level
Trigger out	BNC, max. 6 V
Programmable connectors	6 BNC connectors (inputs/outputs) as follows
Programmable input functions	Trigger input, Start Test, Stop Test, EUT Fail, EUT Mark, Emergency Stop
Programmable input max. voltage	low range: 0 – 1.5 V, high range: 2.3 – 24 V
Programmable output functions	Running State, Safety Circuit State
Programmable output max. U, I	max. 24 V, max. 300 mA
Safety features (standard)	Emergency stop button on front panel red/yellow as per IEC 60947-5-5, IEC 60204-1, ISO 13850 Safety circuit
Safety accessories (optional)	WARNING LAMP (24 V, max. 2.4 W), TC-ST test cabinet Remote EMERGENCY STOP button



MIL3-REC

Standard	MIL-STD-461, CS115
Test level into 100 Ω	1 – 10 A ± 10 % , adjustable
Waveform	rectangular pulse
Z_{out}	50 Ω
Pulse rise and fall time	< 2 ns
Pulse duration	≥ 30 ns
Repetition rate	max. 33 Hz
Requires	CN-BT6, VERI-MIL3
Optional	I-PROBE-CS



MIL3-10K10M

Standard	MIL-STD-461, CS116 (10 kHz – 10 MHz)
Test level into 100 Ω	@ 10 kHz: 0.02 – 0.22 A ± 10 %, adjustable
Test level into 100 Ω	@ 100 kHz: 0.2 – 2.0 A ± 10 %, adjustable
Test level into 100 Ω	@ 1 MHz: 1 – 12 A ± 10 %, adjustable
Test level into 100 Ω	@ 10 MHz: 2 – 12 A ± 10 %, adjustable
Waveform	damped oscillation@10k,100k,1MHz,10MHz ±10%
Z_{out}	≤ 100 Ω
Damping factor (Q)	15 ± 5 for all frequencies
Repetition rate	max. 2 Hz for all frequencies
Coupler for all frequencies	CN-BT6
Calibration fixture all freq.	VERI-MIL3
Optional	I-PROBE-CS, 20dB ATTENUATOR



MIL3-30M100M

Standard	MIL-STD-461, CS116 (30 MHz – 100 MHz)
Test level into 100 Ω	@ 30 MHz: 2 – 12 A ± 10 %, adjustable
Test level into 100 Ω	@ 100 MHz: 1 – 6 A ± 10 %, adjustable
Waveform	damped oscillation@30MHz,100MHz ±10%
Z_{out}	≤ 100 Ω
Damping factor (Q)	15 ± 5 for all frequencies
Repetition rate	max. 2 Hz for all frequencies
Coupler for all frequencies	CN-BT6
Calibration fixture all freq.	VERI-MIL3
Optional	I-PROBE-CS



MIL3-CS116 CUSTOM FREQUENCY

Standard	MIL-STD-461, CS116
Test level into 100 Ω	according to Fig. CS116-2
Frequency	choose any frequency from 10 kHz to 30 MHz
Waveform	damped oscillation
Z_{out}	≤ 100 Ω
Damping factor (Q)	15 ± 5 for all frequencies
Repetition rate	max. 2 Hz for all frequencies
Coupler for all frequencies	CN-BT6
Calibration fixture all freq.	VERI-MIL3
Optional	I-PROBE-CS



MIL3-SPIKE

Standard	MIL-STD-461F CS106, MIL-STD-461C CS06
Output impedance	< 2 Ω
Test level into 5 Ω	100 – 500 V \pm 10 %, adjustable
Waveform	voltage spike
Pulse rise time	1.5 μ s \pm 0.5 μ s
Pulse front time	3.5 μ s \pm 0.5 μ s
Pulse duration	5 μ s \pm 22 %
Voltage sag amplitude	\leq 120 V @ 400 V test level
Voltage sag duration	\leq 20 μ s @ 400 V test level
Repetition rate	max. 10 Hz
Synchronization	0 – 359° \pm 5°, 1° step
Requires	CN-MIG-BT5 , VERI5 , DC-S17CL



MIL3-SPIKE-SLOW

Standard	MIL-STD-461C CS06, ECSS-E-ST-20-07C Rev. 1 CS, power leads, transients
Waveform duration	10 μ s \pm 20 %
Polarity	positive and negative
Repetition rate	0.1 – 60 s
Synchronization	0 – 359° \pm 5°
Synchronization input	50 – 280 V, 40 – 800 Hz
Serial injection	
Test level	20 – 300 V \pm 10 %
Z_{out}	< 2 Ω
EUT current serial inj.	max. 1280A @50Hz, 160A @400Hz, 80A @800Hz
Requires	CN-MIG-BT5 , VERI5
Optional	DC-S17CL (see EUT supply limits)
Parallel injection	
Test level	20 – 500 V \pm 10 %
Z_{out}	< 1 Ω
EUT voltage parallel inj.	max. 250V @DC - 60Hz, 60V @60 - 400Hz, 30V @400 - 800Hz
Requires	VERI5
Optional	DC-S17CL (see EUT supply limits)



MIL3-SPIKE-FAST

Standard	MIL-STD-461C CS06, ECSS-E-ST-20-07C Rev. 1 CS, power leads, transients
Waveform duration	0.15 μ s \pm 20%
Polarity	positive and negative
Repetition rate	0.1 – 60 s
Synchronization	0 – 359° \pm 5° up to 400 Hz
Synchronization input	50 – 280 V, 40 – 800 Hz



Serial injection

Test level	20 – 400 V \pm 10 %
Z_{out}	< 5 Ω @ standard test level
EUT current serial inj.	max. 32 A @ DC – 800 Hz
Requires	VERI5
Optional	DC-S17CL (see EUT supply limits)

Parallel injection

Test level	20 – 400 V \pm 10 %
Z_{out}	< 5 Ω @ standard test level
EUT voltage parallel inj.	max. 250 V @ DC – 800 Hz
Requires	VERI5
Optional	DC-S17CL (see EUT supply limits)

MIL3-DO-160-S17

Standard	DO-160 Section 17
Output impedance	50 Ω \pm 10 %
Test level into 50 Ω	50 – 1200 V \pm 10 % , adjustable
Waveform	voltage spike
Pulse rise time	1 – 2 μ s \pm 30 %
Pulse duration	> 10 μ s
Repetition rate	max. 2 Hz
Synchronization	0 – 359° \pm 5°, 1° step input 50 - 250 V / 40 - 800 Hz
EUT supply	250 V / DC - 60 Hz
parallel injection	60 V / 60 - 400Hz 30 V / 400 - 800Hz current limited only by decoupling
Requires	CN-MIG-BT5 , VERI50 , DC-S17CL



MIL3-DO-160-S19

Standard	DO-160 Section 19 – spikes/burst
Resistance	175 Ω \pm 10 %
Inductance	1.5 H \pm 10 %
Test level	\geq 600 V
Waveform	voltage spikes/burst



Spike repetition period	in the range 0.2 – 10 μ s
Burst total duration	in the range 50 - 1000 μ s
Event repetition	0.1 – 60 s, adjustable
Test duration	1 – 65535 s
Included	cables for coupling 0.5 m, 1.0 m, 2.0 m

MIL3-1275B

Standard	MIL-STD-1275B, figure 10
Test level	100 – 1000 V \pm 10 %, in open circuit
Waveform	ring wave
Rise time 10 – 90 %	< 50 ns
Oscillation frequency	100 – 500 kHz
Pulse repetition	max. 2 Hz
Max. EUT power	
DC	28 V / 30 A
AC	230 V / 10 A or 115 V / 25 A @ 50/60 Hz



1.2. POWER, CLIMATIC CONDITIONS, SHIPPING WEIGHT, DIMENSIONS

MIL-MG3 mainframe

Mains adapter	100 – 240 V \pm 10 % (50/60 Hz)
Power consumption	ON < 150 VA, standby < 15 VA
Temperature range	10 – 35 °C
Humidity	< 80 % non-condensing
Air pressure	86 – 106 kPa
Mainframe weight	17 kg
W x d x h	45 x 57 x 19 cm
Version	19" unit, 4 UH
Included articles	
Power cord	with country plug
User manual	with conformity declaration
Calibration certificate	factory calibration for each plugin ordered
Ethernet cable	1 piece

2. ACCESSORIES FOR MIL-MG3

2.1. TECHNICAL SPECIFICATIONS

CN-BT6

Standard	MIL-STD-461 CS115 and CS116
Application	injection probe
Frequency range CS115	usable rise time from 1 ns
Frequency range CS116	10 kHz – 100 MHz
EUT supply	max. 150A@50/60Hz, 20A@400Hz, 10A@800Hz
Aperture	5 cm diameter
Dimensions l x h x w	25 x 17 x 15 cm
Weight	5 kg
Included	50 Ω termination, 1 m cable, 2 m cable
Requires	CS115 and/or CS116 modules, VERI-MIL3



VERI-MIL3

Application	calibration fixture for CN-BT6 (CS115, CS116)
Weight	4.5 kg
Dimensions l x h x w	34 x 13 x 15 cm
Included	2 x 20 dB N-type, 2 x 20 dB BNC, 1 m cable



CN-MIG-BT5

Standards	MIL-STD-461F CS106, MIL-STD-461C CS06, DO-160 Section 17 serial injection
Application	injection probe
Frequency range	10 kHz – 10 MHz
EUT supply	CS106: max. 150A@50/60Hz, 20A@400Hz, 10A@800Hz CS06 SLOW: max. max. 1280A @50Hz, 160A @400Hz, 80A @800Hz Section 17, serial injection: max. 1000A@50/60Hz, 160A@400Hz, 80A@800Hz
Aperture	8 x 7 cm
Dimensions l x h x w	22 x 22 x 20 cm
Weight	13 kg
Included	1 m cable, 1 turn calibration loop
Requires	CS106 or CS06 modules or S17 module, DC-S17CL



DC-S17CL

Standards	MIL-STD-461F CS106, MIL-STD-461C CS06 DO-160 Section 17
Application	decoupling units for power supply side
For serial injection	4 x decoupling capacitors, in 2 boxes
Decoupling capacitance	10 μ F
EUT voltage	max. 250V, DC - 800Hz
EUT current	not limited by decoupling capacitors
For parallel injection	2 x decoupling inductors
Decoupling inductance	1.8 mH
EUT voltage	max. 250V, DC - 800Hz
EUT current	max. 16 A
Weight	7 kg, all 4 modules and acc. in carrying case
Dimensions	34 x 28 x 17 cm (carrying case)
Included	connection cables, carrying case



VERI5

Standard	MIL-STD-461F CS106, MIL-STD-461C CS06
Application	non-inductive calibration load
Input impedance	5 $\Omega \pm 2 \%$
Power dissipation	max. 10 W
Voltage	max. 500 V as per CS106
Transfer ratio	DSO 1M Ω : 1:50 (34dB); DSO 50 Ω : 1:100 (40dB)
Weight	0.2 kg
Dimensions	12 x 2.5 x 2.5 cm
Included	factory calibration report



VERI50

Standard	DO-160 Section 17
Application	non-inductive calibration load
Input impedance	50 $\Omega \pm 2 \%$
Power dissipation	max. 10W
Voltage	max. 1200 V as per Section 17
Transfer ratio	DSO 1M Ω : 1:50 (34dB); DSO 50 Ω : 1:100 (40dB)
Weight	0.2 kg
Dimensions	12 x 2.5 x 2.5 cm
Included	factory calibration report



20dB ATTENUATOR (optional)

Application	att. reducing test level with MIL3-10K10M
Level with 20 dB (10 kHz)	for ex: 22 mA @ gen. setting 220 mA
Weight	0.1 kg
Dimensions	11 x 2.5 x 2.5 cm
Included	factory calibration report



I-PROBE-CS

Standards	MIL-STD-461G: CS115, CS116
Application	current probe for test level and rise time meas.
Output connector	N (adapter for BNC optional, ask sales)
Frequency range	10 kHz – 400 MHz
Usable rise time	1 ns
Aperture	50.8 mm (excellent for CN-BT6)
Input level	max. 4 A r.m.s., 15 A peak
Transfer impedance	- 6 dBΩ
Current time product	max. 0.6 mAs
Weight	1 kg
Dimensions	14.7 x 12.7 x 3.2 cm
Included	carrying case

TEMA3000

Application	modular control software for MIL-MG3 system
License	1 license for 1 generator
TEMA3000 basic	remote control of generator, single tests
TEMA3000-SEQUENCE	more single tests linked in a sequence
TEMA3000-REPORT	generation of customized test reports
TEMA3000-DSO	control of DSOs via Ethernet, data in report
TEMA3000-LIBRARY	collection of norm pre-programmed tests
Compatibility	Windows XP, 7, 8, 10
For generators	MIL-MG3, AVI-LV3, IMU Series, other



THE EMC PARTNER PRODUCT RANGE

Find further brochures on our website emc-partner.com/brochures or contact your local representative for a hardcopy.

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 EURO-CAE / ED-14 for indirect lightning 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

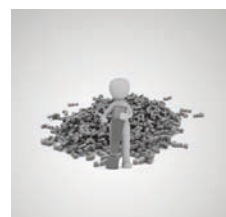
Measurement of Harmonics and Flicker in 1-phase and 3-phase electrical and electronic products according to IEC / EN 61000-3-2 and 61000-3-3 . HARCS Immunity software adds interharmonic tests, voltage variation according to IEC/EN 61000-4-13, -4-14.

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



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



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.com

Your local representative

North America Sales, Service & Support:



8526 Virginia Meadows Drive
Manassas, VA 20109
Ph: (703) 365-2330
www.hvtechnologies.com
emcsales@hvtechnologies.com

Information and specifications in this document are an indication of capability only. V4. Subject to change without notice. EMC PARTNER AG publishes only the English version of this document. Translation into other languages is not guaranteed to be a true representation of content or specification.

© by EMC PARTNER AG. No changes or reproduction without permission of EMC PARTNER AG allowed.