

# Multi CE5

Compact EMC-tester



## According to

<b>IEC 61000-4-4 : 2012</b>	BURST 5kV
<b>IEC 61000-4-5 : 2014</b>	SURGE 5kV, 2.5kA
<b>IEC 61000-4-8 : 2010</b>	Magnetic field 50/60 Hz
<b>IEC 61000-4-9 : 2001</b>	Magnetic field 8/20 $\mu$ s
<b>IEC 61000-4-11 / 29 : 2004</b>	Voltage dips/variation

The Multi-CE5 is a compact EMC test unit designed for testing electromagnetic immunity against pulsed and conducted interference. Demonstrating such immunity is generally a requirement for compliance with the European EMC directive, a necessary step leading to the CE mark.

In its basic configuration, the Multi CE5 includes an Electrical Fast Transient Generator (EFTG-CE5), a Combination Wave Generator (CWG-CE5) and a Coupling-/Decoupling Network (CDN) for single-phase power supply lines.

The Electrical Fast Transient Generator fully compliant to IEC 61000-4-4, delivers fast transient pulses with waveform 5/50 ns and a maximum burst frequency of 1 MHz. It is used for immunity testing of electronic systems and devices. The four standard IEC 61000-4-4 test levels may be easily selected by push button or all parameters may be adjusted individually.

The Combination Wave Generator fully compliant to IEC 61000-4-5 and IEEE 587 delivers a standard impulse voltage with waveform 1.2/50  $\mu$ s and a standard impulse current with waveform 8/20  $\mu$ s. It is a combined impulse-current-/impulse-voltage generator for high-

impedance loads  $RL > 100\Omega$  and may be used for surge testing of components and devices, as well as for galvanic coupling of surges to cable shields, shielded enclosures and cabinets.

The built-in capacitive Coupling-/Decoupling Network allows superimposition of the combination wave generator output to the mains voltage of the device under test.

The simulation of voltage dips and voltage variations acc. to IEC 61000-4-11 can be included as an option. Additional accessories allow the testing of immunity against both pulsed and power frequency magnetic fields according to IEC 61000-4-8 and IEC 61000-4-9.

Optionally the Multi-CE5 can include a trigger able power supply switch which allows the simulation of the voltage dips as specified in the standard IEC 61000-4-11. The variation of power supply voltage is controlled by use of an external motor driven variac. The control of the external power source is included in the mainframe.

An Induction Coil in conjunction with the Combination Wave Generator output, is used to simulate pulsed magnetic fields according to IEC 61000-4-9. Combined with the external power source, the Induction Coil can be used to simulate power frequency magnetic fields according to IEC 61000-4-8.

Additional Coupling-/Decoupling Networks covering three-phase power supply lines, DC supply lines and signal lines are also available, as well as a Capacitive Coupling Clamp for coupling to shielded interconnection lines.

The Multi-CE5 excels by its compact design, simple handling and precise reproducibility of test impulses. It features a microprocessor controlled user interface and a 7" touch screen unit for ease of use. The microprocessor allows the user to execute either standard test routines or a "user defined" test sequence. A standard USB port provides the ability to print a summary of the test parameters as well as the results to an USB stick.

The software program CE-REMOTE allows full remote control of the test generator via Ethernet light guide as well as documentation and evaluation of test results, accordingly to the IEC 17025. To record definite impulses, it is equipped with an Impulse Recording Function (IRF).

Moreover all generator functions including the built-in Coupling-/Decoupling Network, may be computer controlled via the isolated optical interface.

## System configuration

The Multi CE5 and its sub-units are available in different configurations:

Variations	Description
<b>Multi-CE5 1</b>	including SURGE and BURST
<b>Multi-CE5 2</b>	including SURGE, BURST and POWER FAIL SWITCH
<b>EFTG-CE5</b>	Stand-alone BURST generator
<b>CWG-CE5</b>	Stand-alone SURGE generator
<b>PFS-CE-16</b>	Stand-alone POWER FAIL SIMULATOR Including a power fail switch and a variable power source

### Typical configurations:

Multi CE5 1 + CDN 5416  
for 3-phase testing  
(picture on the right side)

Multi CE5 2 + VPS 250-16  
for testing surge, burst, power fail,  
voltage dips and variation

It is possible to build all  
devices in a 19" rack cabinet.



Options	Multi CE5
<b>Software CE-REMOTE Test, for remote control</b>	
With Impulse Recording Function (IRF)	
( XP, WIN7, WIN10 ) incl. 5 m fibre optic cable and PC Ethernet interface	
<b>External power source VPS 250-16</b>	
Output voltage, adjustable	0 - 250 V
Rated current	16 A
Control via interface of Multi CE5	
<b>Induction Coil HI 200 acc. to IEC 61000-4-8/9: 2010/2001</b>	
Dimensions: W * H * D	1000*1000*600 mm <sup>3</sup>
Coil factor	1.5 / m
<b>EFTC2012 Coupling Clamp acc. to IEC 61000-4-4:2012 Ed 3.0</b>	
Dimensions: W * H * D	140 * 180 * 1100 mm <sup>3</sup>
Incl. Connection cable, Fischer Koax Connector	1 m long
Maximum cable diameter:	ca. 42mm

TECHNICAL SPECIFICATIONS		Multi CE5
<b>Mainframe</b>		
Microprocessor controlled touch panel		7", capacitive
Optical Ethernet Interface for remote control of the generator		optional
Interface for saving reports		USB
External trigger input/ output		Switch/ 10 V
Coupling-/decoupling network for power supply lines		L1, N, PE
Nominal voltage, nominal current		250 V, 16 A ≈ / 16 A =
Coupling impedance (depending on the generator)		33 nF / 18 μF / 9μF+10Ω
Connector for external safety interlock loop		24 V =
External red and green warning lamps		230 V, 60W
Mains power		90V - 264V, 50/60 Hz
Dimensions of desk top case W * H * D		450*180*500 mm <sup>3</sup>
Weight		25 kg
<b>BURST</b> acc. to IEC 61000-4-4: 2012		
Pulse output voltage, adjustable		0.2 - 5.0 kV ± 10 %
Waveform		5/50 ns
Source impedance		50 Ω
Polarity, selectable		pos/neg/alt
Burst frequency, adjustable		1.0 kHz - 1.0 MHz
Burst duration, adjustable		0,01 ms - 25 ms
Burst period, adjustable		10 ms - 1000 ms
HV output for external coupling devices		coaxial
Monitor output for pulse output voltage		ratio = 100:1 ± 5%, 50 Ω
<b>SURGE</b> acc. to IEC 61000-4-5: 2014		
Test voltage (open circuit condition)		0.2 - 5.0 kV ± 10 %
Waveform acc. to IEC 60060		1.2 / 50 μs ± 20 %
Test current (short circuit condition)		0.1 - 2.5 kA ± 10 %
Waveform acc. to IEC 60060		8 / 20 μs ± 20%
Polarity of output voltage/current, selectable		pos/neg/alt
Maximum stored energy		120 Joule
Charging time for max. charging voltage		< 10 s
HV output isolated from ground		HV-OUT, 4mm
Mains synchronous triggering, phase shifting, digitally selectable		0 - 359°, step 1°
Monitor output for pulse output voltage		ratio = 1000 : 1 ± 5%
Monitor output for pulse output current		10 V ≙ 5 kA ± 5%
<b>POWER FAIL</b> acc. to IEC 61000-4-11: 2004		
Rated current / Inrush current, max.		16 A / 500A
Monitor output for mains voltage and mains current		built-in
Display of mains voltage, mains current and inrush current		
Interface for control of an external power source		