PROGRAMMABLE GENERATORS OF IMPULSE DISTURBANCE

These generators are equipped with microprocessor control unit, which is extremely resistant against impulse disturbance. This compact MCU guarantees reliable and faultless operation. User can control the generator by key-board and display and also by using PC can make:

- programming of test routines,
- setting of calibrating constants and tables,
- directly operating generator by PC (special applications)

There is a min. 10 different test routines in memory for each type of disturbance. Each routine consists of 240 steps, each step has defined all parameters (amplitude, polarity ... timing, impedance and coupling to tested wires). So we could create arbitrary routines made to measure our applications. Also we can have saved unlimited number of routines in a PC and during several second transfer them to generator. By manual control we choose the initial and the final steps of routine, also we can modify some parameters.

If we dispose of calibrated oscilloscope and probe, we can make a calibration of generator. We can measure deviations of amplitude at normal levels. Then we can use the Parameter_ builder to get amplitude tables from memory of generator. Then we can correct these tables and save new parameters to the PC. At the same time we transfer new parameters into memory of generator.

The MCU of generator is equipped of fault diagnostics too.

All generators of impulse disturbance are calibrated in accordance of last norms. According to requirements of new edition of norms we provide upgrade of HW&SW.

Standard generators – simple and combined generators according to norms IEC/EN 61000-4-4, 5, 9, 10, 11, 12, 18 and 29
Despite of fact that the generators are standard the customer can partly choose a configuration of generator and its parameters in limits of standard norms.

Example: I am searching for equipment for tests of single-phase devices (alternatively three-phase devices) against impulse disturbance according to IEC 61000-4-4, 5, 9, 11, a 29. I can choose between the set of single lightweight easy transportable apparatuses and one heavy lab generator.
Set of single apparatuses (*example 1*):

1. EFT/burst generator with built-in 1ph. CDN and Power-fail module + capacitive coupling clamp and autotransformer for power fail test;
2. Surge generator with built-in 1ph. CDN + single-turn coil for impulse magnetic field.

Another set of single apparatuses (*example 2*):

1. EFT/burst generator with built-in 3ph. CDN + capacitive coupling clamp;
2. Power fail generator with built-in autotransformer;
3. Surge generator + single-turn coil for impulse magnetic field;
4. 3ph. CDN for surge generator.

Compact generator (*example*):

Burst and surge generator with built-in 1ph. CDN and Power-fail module including autotransformer + capacitive coupling clamp and single-turn coil for impulse magnetic field.

Custom generators – apparatuses of enhanced amplitude, shorted tolerance of pulse shape, accurate amplitude or special impulses according to special norms. Customer specifies parameters and facilities of generator.

Samples of special norms: IEC 61643-1, RTCA/DO160, IEC 60384-14, IEC61045-2, IEC 60947-2, IEC 60664-1, IEC 60255-5 a 22, EN 132400 etc.

Example1: Enhanced Surge generator – amplitude 20 kV/10 kA, accurate setting of amplitude in a range of 180 to 22000 V – tolerance 0,5%, accurate pulse shapes – tolerance 10 %, ratio voltage/current - tolerance 5%, current impulse without inverse overshoot, minimized repetition rate, etc.

Example 2: Enhanced EFT/burst generator – accurate apparatus with enhanced amplitude and PC control software. Rise time 5 ns ±10%, amplitude accuracy 2% in a range of 100 to 5500 V, spike frequency 1 to 1000 kHz, etc.

Example 3: Square pulse generator - enhanced amplitude 200 to 6000 V, rise and fall time 5 ns ±20%, output impedance 50 Ω, overshoot max. 5 %, etc.

Specification of standard generators

EFT/burst generator EN 61000-4-4

Voltage amplitude	±90 to ±4500V
Rise time	5 ns ±30%
Time to half value into 50Ω	50 ns ±30%
Time to half value into 1000Ω	50 ns -15/+100 ns
Output impedance	50 Ω
Timing:	
Spike frequency	1 to 200 kHz respectively 1 to 1000 kHz
Number of pulses	1 to 255
Repetition rate	100 to 1000 ms
One step time	0.1 to 300 s
Phase	0 to 359° or asynchronous
Coupling	coaxial output, L, N, PE - arbitrary combination

Surge generator EN 61000-4-5

Voltage amplitude	±90 to ±4500V
Rise time	1.2 µs ±20%
Time to half value	50 µs ±10%
Current amplitude	±45 to ±2250A
Rise time	8 µs ±20%
Time to half value	20 µs ±20%
Output impedance	2 Ω, 42 Ω
Timing:	
Repetition rate	0.5 to 128 s
Phase	0 to 359°
Coupling	floating symmetrical output, L-PE, N-PE, L-N
Measuring output	current 100A/1V

Note: decoupling coils have nonmagnetic core – their inductance doesn't fall by high peaks of load current and high amplitude of disturbing pulses.

Power fail generator – dips and interruptions EN 61000-4-11

Permanent current of DUT	16 A
Switch time	< 5 µs
Inrush current of switch	> 600 A
Fuse capability	90 A^2s
Timing:	
Phase	0 to 359°
Event duration	0.1 to 19.9 ms or n*10 ms (n = 1 to 10000)
Event number	1 to 32
Repetition rate	n*10 ms (n = 1 to 10000)

Damped sinusoidal wave EN 61000-4-12

Voltage amplitude	±90 to ±4500 V
Rise time	0.5 µs ±20%
Current amplitude	7.5 to 375 A
Rise time	< 1 µs
Oscillation frequency	100 kHz ±10%
Damping Pk2/Pk1	60% ±5%

Output impedance	12, 30, 200 Ω
Timing:	
Repetition rate	0.5 to 128 s
Phase	0 to 359°
Coupling	floating symmetrical output, L-PE, N-PE, L&N-PE, L-N
Measuring output	current 100A/1V

Damped oscillatory waves EN 61000-4-18

Slow wave

Voltage amplitude	±90 to ±4500 V
Rise time	75 ns -20%
Current amplitude	±0.45 to ±22,5 A ±20%
Oscillation frequency	0.1 and 1.0 MHz ±10%
Damping Pk5/Pk1	>50%
Damping Pk10/Pk1	<50%
Output impedance	150 and 200 Ω
Timing:	
Spike frequency	1 to 1000 Hz
Number of spikes	1 to 2000
Repetition rate	0.1 to 10 s
Step duration	1 to 300 s
Phase	0 to 359°, asynchronous
Coupling	floating symmetrical output, L-PE, N-PE, L&N-PE, L-N
Measuring output	current 100A/1V

Fast waves

Voltage amplitude	±90 to ±4500 V
Rise time	5 ns ±30%
Voltage damping Pk5/Pk1	>50%
Voltage damping Pk10/Pk1	<50%
Oscillation frequency	3 MHz, 10 MHz and 30 MHz ±10%
Current amplitude	±1.8 to ±90 A
Rise time	<330 ns at f=3 MHz <100 ns at f=10 MHz <33 ns at f=30 MHz
Current damping Pk5/Pk1	>25%
Current damping Pk10/Pk1	<25%
Coaxial output	50 Ω
Timing:	
Spike frequency	1 to 100 kHz
Number of spikes	1 to 255
Repetition rate	100 to 1000 ms
Step duration	1 to 300 s
Phase	0 to 359°, asynchronous
Coupling	coaxial output, L, N, PE - arbitrary combination
Measuring output	current 100A/1V