HUBBELL High Voltage Test Business

HAEFELY EMC TECHNOLOGY

PEFT 4010

Burst Test System according to IEC/EN 61000-4-4 Edition 1 & 2

■ **Electrical fast transients** (EFT) are the most common sources of disturbances in modern electronic circuits. EFT/bursts are caused by the operation of electro-mechanical switches, motors or power distribution switchgears.

The PEFT 4010 instrument contains all the features expected from a top quality EFT generator. Unbeaten performance paired with a high end assembly guarantee a cost effective, long-lasting investment and valuable test results.

PEFT 4010 can either be operated by the front panel keys in a stand alone manner or be controlled by PC via RS232 or IEEE 488 as part of a complete EMC test system.

Tests can be performed manually or automatically with predefined test programs. The front panel layout with its large LCD display and the intuitive software are especially designed for self explanatory and safe operation of the instrument. Up to 36 test setups can be programmed and saved on the internal non-volatile memory.

Bursts are generated according to the related standards IEC 61000-4-4 and EN 61000-4-4. The PEFT 4010 can deliver EFT impulses in different formats including normal, continuous, random and real pulse distribution.

For better handling, the PEFT 4010 is equipped with two grounding connections, one at the front panel and one at the rear panel. This is very helpful in making connections to the ground plane if the PEFT 4010 is used either horizontally or vertically.

With the integrated "Transition Function" $U_{nominal}$, the spike frequency, the burst duration and the burst period can be varied automatically during a test. Besides this, it is also possible to edit the parameters manually during a test.

Besides conventional safety features, the PEFT 4010 contains a separate "Line ON/OFF" switch with which the main supply can be disconnected from the equipment under test.

■ Features

- ☑ **EFT impulse generation** according to newest standards and latest technology.
- ☑ **ESD control and report functions** for attaching an Electrostatic Discharge gun.
- ☑ **Automatic test operation** for shortest measuring time and minimal setup effort.
- ☑ **Data exchange** to printer or computer is possible without any additional hardware/software.
- ☑ **Compact and reliable construction** for factory, laboratory or field use.
- ☑ **Remote control** is provided by optional software (*WinFEAT&R*) designed specially for EMC testing.
- ☑ **ISO 9001 : 2000 certified** manufactured

■ Benefits

Unmatched Performance
Accurate and fast measurements make this instrument a unique tool for cost-effective and reliable testing practices. The PEFT 4010 possesses the highest frequency range available on the market today.

Wide Range of Extension Options
A wide range of options ensures a customized EMC test solution. Compatibility to other generators or detectors increases the functionality of the instrument up to an overall EMC test system.

Simple and Safe Operation
Intuitive and clear graphical presentation of the results helps finding exact failure levels. Software menus are simple to follow and do not have too many layers in the structure.
A help function has been built into the software, so that pressing the softkey "HELP" will give you more information about the operation you are attempting.
Safety features like external emergency stop or warning lamp protect the user from hazardous and dangerous situations.

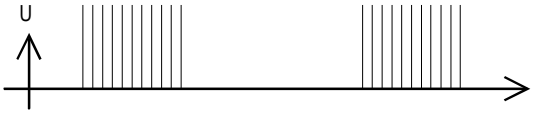
■ Applications

- ☑ **Approval Testing**
- ☑ **Product Development**
- ☑ **Post Design Diagnostics**
- ☑ **Industrial**
- ☑ **Medical**
- ☑ **Telecommunication**
- ☑ **Household**
- ☑ **many more**

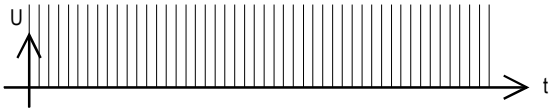
■ Burst Modes

On the PEFT 4010 instrument five different burst modes can be selected.

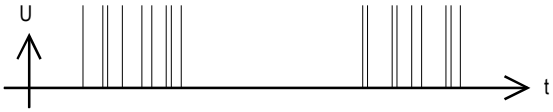
1. **Normal:** Bursts are generated as defined in IEC 61000-4-4.



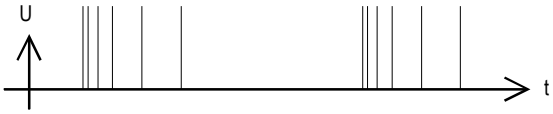
2. **Continuous:** The spikes are generated continuously with the selected frequency.



3. **Random:** The spike frequency changes within a burst between 16% and 100% of the entered value.

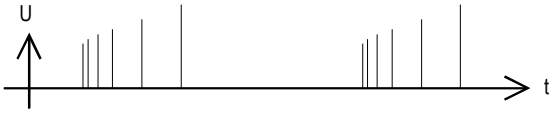


4. **Real:** The spike frequency is changed from the entered value to 16% within a burst. Burst amplitude remains constant.



5. **Real5 / Real100:** Spike frequency reduces within a burst from 100% to 16% and simultaneously the amplitude increases from ca. 50% to 100%. The nominal spike frequencies at the start of a burst packet are fixed at 5 kHz or 100 kHz.

This feature is only available when the relevant option is integrated in the PEFT 4010 hardware.



■ Remote Control Software (WinFEAT&R)

The control software (WinFEAT&R©) can be installed in the Microsoft® Windows 95 or higher environments and can be used to control equipment for EFT (IEC 61000-4-4), SURGE (IEC 61000-4-5), AC Magnetic fields (IEC 61000-4-8) and Dips or Interrupts (IEC 61000-4-11) etc.

■ Coupling/Decoupling Network (CDN)

A single phase Coupling/Decoupling Network (CDN) is built into the PEFT 4010 which enables coupling of the EFT impulses into a single phase mains network.

If it is necessary to inject EFT Impulse into a three phase mains system, the PEFT 4010 can be used together with an external three phase CDN (up to 100A per phase) with coupling path selection either controlled directly from the PEFT 4010 or manually.

Injection of EFT impulses into signal and control cables is required by IEC 61000-4-4. The PEFT 4010 has a direct high voltage output connector for use with the coupling clamp IP4A. The IP4A fulfils all the requirements of IEC 61000-4-4.

Bursts can also be coupled directly into electronic circuits using the optional electric and magnetic field generation probes, mainly used for failure detection.

■ Interfacing

EUT Failed
Connect pass/fail detection hardware to this BNC input and the EUT (Equipment Under Test) condition, as determined by specific EUT supervision hardware, is added to the database of test information and finally the log file. EUT condition can also be used to determine the test course.

Trigger In
External signals can be used to trigger impulse generation to a particular event.

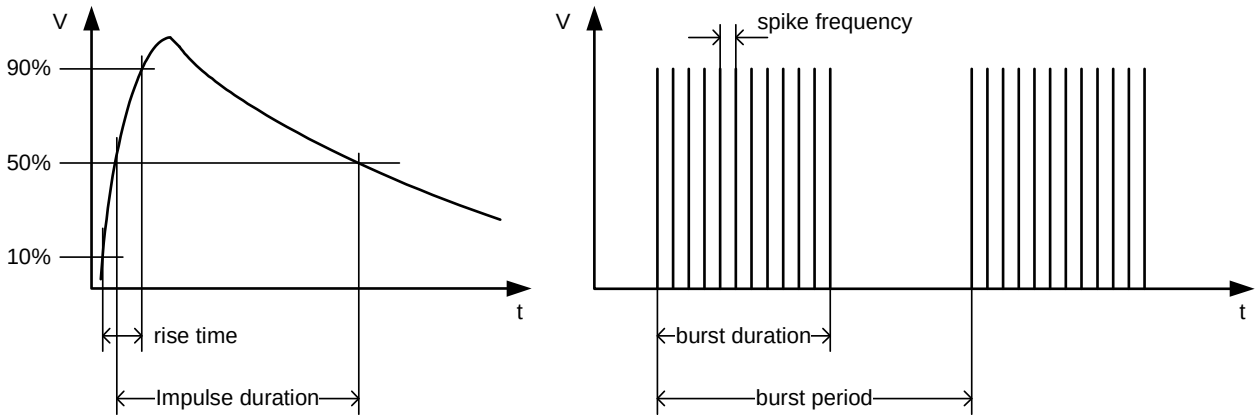
Sync In
Impulses can be synchronised to any external cyclic signal with a high degree of accuracy.

PESD Control
This interface can be used to attach the PESD 1610 generator to the PEFT 4010. The PEFT 4010 is able to control and document the ESD pistol operation.

P90 Extension
The P90 interface is a self developed standard used for communication between test instruments. The primary function of this interface is to control the automatic three phase CDN which is available as an option.

Rear panel view of the PEFT 4010

Technical Specifications



Wave Shape into 50Ω load	
Rise time	5 ns ± 30 %
Impulse duration	50 ns ± 30 %

Wave Shape into 1000Ω load	
Rise time	5 ns ± 30 %
Impulse duration	50 ns – 15 / + 100 ns

Burst Characteristic	
Voltage range	0.22 … 4.8 kV (0.1 … 4.8 kV in expanded mode)
Spike frequency	1 Hz … 1 MHz (1 Hz … 2 MHz in expanded mode)
Burst duration	0.01 … 999 ms
Burst period	0.1 Hz … 400 Hz 2.5 ms … 10 s 1 period … 500 periods
Impulses per second	max. 12'000
Impulses per burst	max. 1'000
Spike distribution	normal, continuous, random, real (real5, real100 with "Real Burst" option)
Polarity	positive, negative, alternating
Test time	10 s … 8 h per path

Weight and Dimension	
Weight	14 kg
W x H x D	450mm x 130mm x 570mm

Single Phase Coupling/Decoupling Network	
Maximum AC voltage	264 V @ 16 … 440 Hz
Maximum AC current	16 A @ 50 … 60 Hz, 10 A @ 400 Hz
Maximum DC voltage	125 V
Maximum DC current	16 A (dependant on DC voltage)
Coupling Modes	L-GND, N-GND, PE-GND, LN-GND, LPE-GND, NPE-GND, LNPE-GND
Residual voltage at Test Supply Input	≤ 10% of applied test voltage

Synchronisation	
Frequency	16 $^{2}/_{3}$ Hz, 40 Hz, 50 Hz, 60 Hz, 400 Hz, auto
Impulse trigger	automatic, manual, external

System Configuration	
EUT fail input	BNC, logic low to trigger
P90 interface	for a 3-phase CDN extension
PESD interface	for connecting an ESD generator
Printer interface	Centronix
Computer interface	RS-232, IEEE-488 (optional)

Power Supply	
Voltage	85 … 264 VAC, 150 VA
Frequency	50 / 60 Hz

Scope of Supply

PEFT 4010 instrument including all cables, user manual and calibration certificate (Art. No. 249601).

Picture shows: vertical mounted PEFT 4010 with Field Generation Probes, Coax Cables, PESD 1610, Easy Control and Verification Kit.

Accessories and Options

Ordering Information	Ordering Number
FP-EFT 32.1 is a fully automatic three phase 32A, 690V/400V CDN. Coupling path selection is controlled from the PEFT 4010.	249253
FP-EFT 32M is manual three phase 32A, 690V/400V CDN. Coupling path selection is manual.	249017
FP-EFT 100M is a manual three phase CDN for operation up to 100A, 690V/400V.	249586
IP4A is a capacitive coupling clamp for superposition of burst on data lines in accordance with IEC 61000-4-4, edition 1 and 2.	249130
Easy Control hand held remote control unit used to start, stop or load tests and programs from the PEFT 4010 memory.	249602
Vertical Operation Stand mounts the PEFT 4010 vertically for easy access while the instrument stands on a floor level ground plane.	249735
Real Burst Circuit Board allows "Real5/Real100" burst mode with changing amplitude while varying frequencies and improves the impulse shape with frequencies > 1 MHz.	249734
E and H Field Generation Probes set can be used to inject near fields and to find electromagnetic sensitive areas in a test object.	249608
WinFEAT&R control software for remote operation, data logging and analysis (FEAT&R = Fast, Easy, Accurate Testing & Reporting).	249970
Upgrade Kit PEFT 4010 updates the PEFT 4010 instrument to the newest standard (IEC61000-4-4, Ed. 2, July 2004). The kit contains a firmware upgrade, a single phase verification adapter and an application note. With firmware V1.30 or higher, no upgrade is necessary.	249528
IEEE-488 Interface P95 IEEE card	249556
OPTICAL DEC95 RS-232 optical link for a galvanic isolation between PEFT 4010 and PC.	249689
EUT-OPT.1 optical link for electrical decoupling of the EUT failed input.	249449
AC Adapter Set for country specific power plug (B, CH, US).	249200
AC Adapter Schuko-UK converts Euro to UK plugs (13A, 250V).	249739
DC Adapter Set for DC applications.	249733
EFT Verification Set for verifying the HV output with 50Ω and 1000Ω load.	249995
Adapter Verification for wave shape verification at the line output of the PEFT 4010.	249603
Fiber Optic Interface for connecting the PESD 1610 with the PEFT 4010 mainframe.	249667
Warning Lamp	249944
Emergency Stop Switch	249945

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