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WHEN QUALITY IS AN ISSUE, THE CHOICE IS HAEFELY EMC



PEFT 4010

PEFT 4010 IMMUNITY TEST SOLUTION  
EFT/BURST AND ESD

EMC



# PEFT 4010 IMMUNITY TEST SYSTEM

## PEFT 4010

### THE TEST SOLUTION FOR EMC TESTS

ESD according to:

- IEC 61000-4-2
- EN 61000-4-2

EFT according to:

- IEC 61000-4-4
- EN 61000-4-4

Household, Industrial, Telecommunication, Medical, and many more applications.

Electrostatic charges are created by bringing dissimilar insulation materials together and then parting them. Walking over an insulated floor is a typical example. The resultant discharge (ESD) is a high frequency field which can cause failure in electronic circuits.

Bursts or EFT's (Electrical fast transients) are caused by operation of electro-mechanical switches, motors and distribution switch-gear connected to the power distribution network.

A typical burst consists of a large number of recurring impulses at high frequency for a short time. The impulse distribution for an opening switch is of decreasing frequency with increasing amplitude.

### THE HAEFELY EMC PEFT 4010 UNIT IS A STAND ALONE EFT AND ESD TEST SYSTEM FOR

- approval testing
- product development
- post design diagnostics.

PEFT 4010 mainframe contains a high performance EFT generator, single phase mains coupler and control functions for the PESD 1600 ElectroStatic Discharge (ESD) generator.

The test system can be expanded to include:

- hand held remote control unit
- computer control from WinPATS and winFEAT&R software
- 3-phase CDN's up to 100 A
- capacitive coupling clamp
- 8 kV test level
- field detection probes
- immunity and emission probes

### COMBINED EFT and ESD TESTING

PEFT 4010 contains all the features expected from a top quality EFT generator, plus the ability to control and document ESD testing using the Haefely PESD 1600.

A fibre optic link connects PEFT 4010 mainframe with PESD 1600.

Separate menus for EFT and ESD tests are included in the PEFT 4010, plus the ability to read parameters from the ESD generator changed by the user once a test has been started.

### EASY FRONT PANEL OPERATION

The BOOSTER START function enables Tests or complete Programs to be started with a minimum number of keystrokes. The front panel layout and software structure are both intuitive and powerful.



The information key opens up a whole menu structure dedicated to calibration and service information, so for example the next due calibration date can be programmed to prompt the operator.

# EMC

## PRODUCT APPROVAL

PEFT 4010 test system can be used together with the remote control PESD 1600 as an automatic test system to fulfill current and future EFT / ESD approval requirements. Test programs for both EFT and ESD can be entered from the PEFT 4010 front panel and stored in one of the memory locations. This makes the system compatible with reproducibility requirements in the approval process.

Instrument calibration information is stored internally, a valuable aid to maintaining QA.

An adapter is used to mount the PEFT 4010 vertically, maintaining easy access to the instrument front panel and a good ground plane connection, while freeing the test area for larger EUTs. A printer connected to the Centronix interface delivers ESD and EFT printouts for quality purposes which include

- date
- time
- equipment setup ( ESD & EFT )
- external event parameters as detected by the PEFT 4010 EUT fail input



Integration into our WinFEAT&R and WinPATS remote control software packages together with other EMC simulators, increases the power and flexibility of this system still further.

## PRODUCT DEVELOPMENT

PEFT 4010 mainframe can deliver EFT impulses in different formats including

- IEC pulse distribution
- continuous impulses
- random pulse distribution
- real burst with constant amplitude
- real burst with changing amplitude and frequency



EFT's are injected using the integrated single phase CDN, capacitive coupling clamp external three phase CDN or direct into electronic circuits using the electric and magnetic field generation probes.

The following parameter can be programmed to perform variations:

- test voltage
- spike frequency
- synchronisation angle
- all the above plus polarity

High parameter resolution helps to find exact failure levels.

A 2 MHz spike frequency exceeds the requirements of all current standards, but reflects reality.

Higher test levels up to 8 kV can be achieved.

An expanded mode, enables testing beyond normal instrument limits.

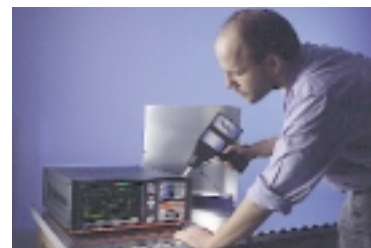
The above points help raise overall product quality and reduce the incidence of products failing at the approval stage

## DIAGNOSTIC TESTING

PEFT 4010 system can be used for diagnostic or characterisation tests using:

- Electrical and Magnetic probes on the HV output to generate a broadband field
- PESD 1600 ESD generator parameter changes on ESD gun are transferred to the PEFT 4010 and added to a test report
- manually adjustable parameters on EFT generator. The up/down keys are used to change the following parameters in real time, once a test has started:

- test voltage
- spike frequency
- burst period
- burst duration
- synchronisation angle



## TECHNICAL SPECIFICATIONS

### PEFT 4010

Waveshape 50 $\Omega$	5 / 50 ns $\pm$ 30 %
Waveshape 1 k $\Omega$	5 / 35 to 150 ns
Voltage range	0.10 - 4.5 kV
Spike frequency	1 Hz to 2 MHz
Burst duration	0.01 to 999 ms
Burst repetition	0.1 to 400 Hz or 2.5 ms to 10 s or 1 to 500 period
Polarity	Positive / Negative/Alt
Impulses per burst	1000 max
Impulses per second	12000 max
Output type	coaxial 50 $\Omega$

### Single phase CDN

Maximum AC voltage	250 V
Maximum AC current	16 A
Maximum DC voltage	110 V
Maximum DC current	16 A
Frequency range	1 to 100 MHz
Coupling attenuation	< 2dB
Decoupling attenuation	> 20dB

### Control unit

Internal memory	18 tests and programs
Manual changes when test is running	Voltage, phase, spike frequency, burst duration, burst period, coupling path
Synchronisation	16 <sup>2/3</sup> , 40, 50, 60 and 400 Hz
Sync input	Burst synchronisation with external signal
Impulse trigger	Automatic, manual, external
Spike distribution	fixed, random, real, continuous
EUT failed input	Logic low to trigger
Printer interface	Centronix
P90 extension	to control 3-phase CDNs
PESD remote	to control ESD generator
Remote interface	RS-232 and GPIB (IEEE 488)
Safety	Safety circuit, warning lamp

### Simulator design

Dimensions	500 x 130 x 445 mm
Weight	approx. 15 kg
Power supply	85 - 264 V, 50/60 Hz

Manufacturing	ISO 9001
EMC	CE mark
Safety	IEC 1010

### PESD 1600

(refer to brochure E111.59)

## INTERFACING

### EUT fail input

Connect pass/fail detection hardware to this BNC input and the EUT 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 Input

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

### Synchronisation input

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



## SYSTEM ACCESSORIES

Fibre optic interface used to connect the PESD 1600 with PEFT 4010 mainframe

PESD 1600 Remote



A remote control panel attached to the PEFT 4010 mainframe. Used to start, stop or load tests or programs from the PEFT 4010 memory.

Easy Control



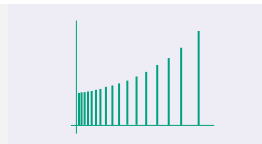
Vertical operation stand enables PEFT 4010 to be used on a floor level ground plane.

VOS



Additional high voltage circuit board makes burst modes "Real 5 kHz" and "Real 100 kHz".

Real Burst



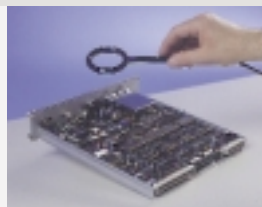
VTM 8000 Multipliers the PEFT 4010 output by two

VTM 8000



E and H Field generation probe set can be used to find electromagnetically sensitive areas in a test object.

Field Probes



This set comprises 2 probes for the detection of electric and magnetic fields.

Scan EM



FP-EFT 32.1 is a fully automatic three phase 32A CDN. Coupling path selection is direct from the PEFT 4010 front panel controls.  
 FP-EFT 100M is a manual three phase CDN for operation up to 100A.  
 Both CDNs can be used on 690V power supplies.

CDN's



IP4A is a capacitive coupling clamp for superposition of bursts on data lines in accordance with IEC 61000-4-4.

Coupling clamp



Ordering Information	Ordering No
PEFT 4010 including: all cables, user manual and calibration certificate.	249601
<b>Accessories:</b>	
PESD 1600, ESD generator	249330
PESD 1600 Remote Control, RS-232 converter with fiber optic link	249667
VOS Stand for vertical operation	249735
IP4A capacitive coupling clamp	249130
FP-EFT 32.1 3 phase automatic coupling / decoupling network	249253
FP-EFT 100M 3 phase manual coupling / decoupling network	249586
Easy Control, remote unit	249602
Real-Burst (has to be mounted in factory)	249734
VTM 8000, double output voltage to 8 kV	249604
Scan EM, near field probe set	249607
Field Probes, near field injection probes	249608
IEEE-488 GPIB Interface (has to be mounted in factory)	249556
OPTICAL DEC 95 RS232 Optical link	249689
Winpats Software	249309
winFEAT&R Software	249970
Adaptor Verification	249603
50 $\Omega$ Attenuator 54 dB	249549
1 k $\Omega$ Attenuator 60 dB	249544

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