

# product overview

## EMC TEST EQUIPMENT



when quality is an issue, the choice is Haefely EMC

## electrostatic discharge

### PESD 1610

#### 16kV Electro Static Discharge Simulator

- Built according to IEC/EN 61000-4-2 and others
- 16.5 kV air discharge impulses
- 9kV contact discharge impulses
- 150pF/330Ω standard discharge network
- Contact mode current flow detection
- Ergonomic rounded handle
- Electronic polarity change
- Optical interface
- Rechargeable long life battery



### PESD 3010

#### 30kV Electro Static Discharge Simulator

- Built according to IEC/EN 61000-4-2, ISO/TR 10605 and many other standards
- 30kV air discharge impulses
- 30kV contact discharge impulse
- Outstanding flexible and modular design
- User selectable R and C values
- Automatic R and C value detection
- Contact mode current flow detection
- Ergonomic rounded handle
- Optical interface



### ESD Verification Set

- Built according to IEC/EN 61000-4-2
- Verification/calibration of ESD generators (PESD 1610, PESD 3010) up to 30 kV
- 2 Ω fully compliant Pellegrini target
- 6 dB and 20 dB attenuators
- Required cables included
- Supplied with detailed application note



# electrical fast transient / burst

## PEFT 4010

### 4kV Burst Test System

- Built according to IEC/EN 61000-4-4 edition 1 and 2 as well as to ANSI/IEEE C62.41/45 and C37.90.1
- Impulse voltage up to 4.8kV
- Frequency range from 1Hz to 2MHz
- IEC, random, continuous and real burst mode
- Ramp functions
- Integrated automated single-phase CDN for AC and DC up to 16A EUT mains current
- Burst parameters editable during testing



## PEFT 8010

### 7.3kV Burst Test System

- Built according to IEC/EN 61000-4-4 edition 1 and 2 as well as to ANSI/IEEE C62.41/45 and C37.90.1
- Impulse voltage up to 7.3kV
- Frequency range from 1Hz to 1MHz
- IEC, random, continuous and real burst mode
- Ramp functions
- Integrated automated single-phase CDN for AC and DC up to 16A EUT mains current
- Burst parameters editable during testing



## FP-EFT 32.1

### 32A Three-Phase Coupling/Decoupling Network for EFT Testing

- Built according to IEC/EN 61000-4-4 ed. 1 and 2 as well as to ANSI C62.41/45
- Superposition of EFT impulses onto three-phase power lines and DC power lines
- 8kV maximum impulse voltage
- EUT mains voltage up to 690V/400V AC, 110V DC
- EUT mains current up to 32A per phase
- Automatic coupling path switching
- Synchronization with power supply possible
- EUT over-current protection



## FP-EFT 32M

### Manual 32A Three-Phase Coupling-Decoupling Network for EFT Testing

- Built according to IEC/EN 61000-4-4 ed. 1 and 2 as well as to ANSI C62.41/45
- Superposition of EFT impulses onto three-phase power lines and DC power lines
- 8kV maximum impulse voltage
- EUT mains voltage up to 690V/400V AC, 110V DC
- EUT mains current up to 32A per phase
- Synchronization with power supply possible
- EUT over-current protection



### FP-EFT 100

#### 100A Three-Phase Coupling/Decoupling Network for EFT Testing

- Built according to IEC/EN 61000-4-4 ed. 1 and 2 and ANSI C62.41/45
- Superposition of EFT impulses onto three-phase power lines and DC power lines
- 8kV maximum impulse voltage
- EUT voltage up to 690V/400V AC
- EUT mains current up to 100A per phase
- Manual coupling path switching
- Synchronization with power supply possible



### IP 4A

#### Capacitive Coupling Clamp for superposition of Bursts on Data Lines

- Built according to IEC/EN 61000-4-4 Edition 1 & 2 and ANSI C37.90.1
- 40mm maximum cable size
- Up to 8kV impulse voltage
- Handy carrying handle



### EFT Verification Set

- Built according to IEC/EN 61000-4-4 edition 1 and edition 2
- For verification/calibration of EFT generators (PEFT.1, PEFT JUNIOR, PEFT 4010)
- Combined 50  $\Omega$  load, 54 dB attenuator
- Combined 1 k $\Omega$  load, 60 dB attenuator
- Required cables included
- Supplied with detailed application note



## s u r g e

### PSURGE 4010

#### 4kV Combination Wave Generator

- Built according to IEC/EN 61000-4-5 Ed. 1 & 2
- Impulse voltage up to 4.2kV, 1.2/50  $\mu$ s
- Impulse current up to 2.1kA, 8/20  $\mu$ s
- Positive, negative and alternating polarity
- Phase angle synchronisation
- Impulse voltage & current monitors
- Ramp functions
- Integrated single-phase CDN for AC and DC



### FP-SURGE 32.1

#### 32A Three-Phase Coupling/Decoupling Network for SURGE Testing

- Built according to IEC/EN 61000-4-5 Ed. 1 & 2
- EUT voltage up to 690V/400V AC
- EUT current up to 32A per phase
- Test level max. 6.6kV / 3.3kA
- Fully automatic test routines
- Automatic synch source switching
- Test object power line bypass mode
- Test object overcurrent protection



## PSURGE 30.2

### 30kV Surge Test System

- Built according to IEC/EN61000-4-5, IEC/EN 61010, IEC/EN 61643-1 and ANSI C62.41/45
- Impulse voltage up to 30kV (combination wave)
- Impulse current up to 30kA (8/20  $\mu$ s)
- Combination wave (1.2/50  $\mu$ s & 8/20  $\mu$ s)
- 8/20  $\mu$ s, 10/350  $\mu$ s, 10/1000  $\mu$ s current pulse
- Impulse voltage & current measurement
- Automatic polarity switching
- Integrated test cabinet



## FP-SURGE 3010

### Single-Phase Coupling/Decoupling Network for Surge Testing up to 30kV / 15kA

- Built according to ANSI C62.41/45
- Single-phase EUT powering
- EUT mains voltage up to 480V
- EUT mains current up to 10A
- Manual selection of coupling path and coupling capacitor
- Test level up to 30kV / 15kA
- EUT overcurrent protection
- Large integrated test cabinet



## PSURGE 8000

### Controller for SURGE Platform Modules

- Controls up to 99 PIM and PCD modules
- Supplies up to 8kV DC power to all connected PIM impulse modules
- PIM and PCD modules connected to PSURGE 8000 via daisy-chain-bus
- No additional extension-equipment required to connect additional PIM or PCD modules
- Large memory for complex and fully automatic test routines
- Contains all required interfaces to printer, PC, EUT, etc.



## PIM 100

### Combination Wave Impulse Module

- Built according to IEC/EN 61000-4-4 Ed. 1 & 2 and ANSI C62.41/45
- 1.2/50  $\mu$ s open circuit up to 7.4kV
- 8/20  $\mu$ s short circuit up to 3.7kA
- Impulse voltage and current monitors
- $\pm 1^\circ$  Phase synchronization
- Reliable semiconductor HV-switch
- Positive, negative and alternating polarity
- Up to 12 pulses per minute



## PIM 110

### Ring Wave Impulse Module

- Built according to IEC/EN 61000-4-12 and ANSI C62.41/45
- 100 kHz frequency, 0.5  $\mu$ s rise time
- Imp. voltage up to 7.8kV/ 12  $\Omega$ , 30  $\Omega$  and 200  $\Omega$
- Impulse voltage and current monitors
- $\pm 1^\circ$  phase synchronization
- Positive, negative and alternating polarity
- Up to 12 pulses per minute
- Reliable semiconductor HV-switch



## PIM 120/PCD 120

### Telecom Test System

#### PIM 120:

- Built according to IEC/EN 61000-4-5 Ed. 1 & 2, ITU K-series and IEC 60950
- 10/700  $\mu$ s open circuit voltage
- 5/320  $\mu$ s short circuit current
- Imp. voltage up to 7.4 kV / 15  $\Omega$  and 40  $\Omega$
- Impulse voltage & current monitors
- Reliable semiconductor HV-switch
- Positive, negative and alternating polarity
- Up to 12 pulses per minute

#### PCD 120:

- 4 wire coupling unit for unshielded symmetrical operated lines
- Compliant to IEC 61000-4-5 (10/700 $\mu$ s impulse only), ITU K.20/K.21/K.44/K.45
- Fully automated operation



### PIM 130

#### Voltage Impulse Surge Module

- Built according to IEC/EN 60950, IEC/EN 60065  
UL 1950
- 1.2/50  $\mu$ s open circuit
- 8kV  $U_c$  / 7.4kV peak / 15  $\Omega$  and 40  $\Omega$
- IEC/UL charging voltage mode
- ITU impulse mode
- Impulse voltage & current monitors
- Positive, negative and alternating polarity
- Up to 12 pulses per minute



### PIM 150

#### Oscillating Wave Surge Module

- Built according to IEC/EN 61000-4-12,  
IEC 60255-22-1 and ANSI C37.90
- 100 kHz and 1 MHz burst frequencies
- 75 ns rise time
- Impulse voltage up to 3.3kV / 200  $\Omega$
- Integrated, fully automatic CDN for three-phase  
AC and DC power lines
- EUT mains voltage up to 480V/277V 16A
- Impulse voltage monitor
- Capacitive coupling clamp available (IP 4A)
- Data line CDN available (PCD 150)



### PIM 155

#### Oscillating Wave Surge Module

- Built according to IEC/EN 61000-4-10
- 100 kHz and 1 MHz burst frequencies
- Impulse voltage up to 4.6kV
- Impulse current up to 120A
- Magnetic field strength up to 100 A/m
- Impulse voltage monitor
- coil 1x1 m and stand optionally available



### PIM 200

#### Current Impulse Module

- Built according to IEC/EN 61008, 61009, 61051, 61643, ANSI C62.31, C62.33, C62.35, ITU K.20, K21, K.44, K.45 and UL 943
- 8/20  $\mu$ s current impulses from 800A up to 12kA
- 10/1000  $\mu$ s current impulses from 8A up to 110A
- Test components with clamping voltage up to 3kV
- Integrated test cabinet
- Clamping voltage and peak current display
- Generator terminals visible short-circuited when test cabinet is open (for safety reasons)



### PIM 210

#### Current Impulse Module

- Built according to IEC/EN 61051, 61643, ANSI C62.33, C62.35 and ITU K.20, K21, K.44, K.45
- 8/20  $\mu$ s current impulses from 1A up to 1.2kA
- 10/1000  $\mu$ s current impulses from 1A up to 11A
- Integrated test cabinet
- Clamping voltage and peak current display
- Generator terminals visible short-circuited when test cabinet is open (for safety reasons)



### PIM 400/PIM 410/PCD 430

#### UL 1449 Surge Test System

- Built according to UL 1449 standard
- 1.2/50  $\mu$ s open circuit
- 8/20  $\mu$ s short circuit
- Imp. voltage up to 7kV/ 2  $\Omega$  and 12  $\Omega$
- Impulse voltage & current monitors
- >200A AC fault current at 120V mains
- Synchronization with coupling phase
- EUT voltage up to 690V/400V 32A AC
- Up to 12 pulses per minute
- Fully automated test system
- System prepared to add Ringwave-module (PIM 110)



**PIM 800/PIM 810/PCD 800/PCD 100 or PCD 130**

**TIA-968A (FCC Part 68) Surge Test System**

- Built according to TIA-968A (FCC part 68/47 CFR)
- 10/560  $\mu$ s combination wave impulse
- 10/160  $\mu$ s combination wave impulse
- 9/720  $\mu$ s voltage impulse
- 2/10  $\mu$ s combination wave impulse
- Tip and ring telecom coupler for 2 and 4 wire
- Single- or three-phase power line CDN up to 690V/400V AC
- EUT current up to 32A
- RJ 11, 12 and 45 adapters
- Impulse voltage and current monitors



**PIM 900/PIM910/PIM930/PCD900**

**Telcordia (Bellcore) 1089 Surge Test System**

- Built according to Telcordia (Bellcore) GR-1089-CORE
- 10/360  $\mu$ s combination wave impulse
- 10/1000  $\mu$ s combination wave impulse
- 2/10  $\mu$ s combination wave impulse up to 5.5kV
- 3 way multiplex tip and ring telecom coupler 4 wire
- Fully automated test routines
- Tests up to 3 EUT's simultaneous, no rewiring required
- Fully automated test report generation
- 12 pair surges
- True 3, 5 and 24 terminal surges
- Single- or three-phase power line CDN up to 690V/400V 32A
- Fully automated test system
- System prepared to add combination wave (PIM 100) with single-phase CDN (PCD 100) or three-phase (PCD 130) CDN



**VTM 15000**

**Impulse transformer for Insulation Testing**

- Built according to IEC 60060-1, IEC 60335-1, IEC 61010-1, IEC 61180-1, IEC61008-1 & 61009-1
- Voltage doubler for combination wave generators, up to 15.0 kV (current wave shape not defined)
- Selectable source impedance: 12, 40 & 500 Ohm
- Separate output for each source impedance
- Floating output



### PCD 100

#### Single-Phase Coupling/Decoupling Network for SURGE Platform

- Built according to IEC/EN 61000-4-5 Edition 1 & 2  
ANSI C62.41/45, TIA-968A (FCC part 68/47 CFR),  
Telcordia (Bellcore) GR-1089-CORE
- Fully automated test routines
- Coupling of up to two different wave-shapes  
without any rewiring
- For combination wave, Ringwave and others
- Up to 8kV impulse voltage
- EUT mains up to 264V / 16A



### PCD 130

#### Three-Phase Coupling/Decoupling Network for SURGE Platform

- Built according to IEC/EN 61000-4-5 Edition 1 & 2  
ANSI C62.41/45, TIA-968A (FCC part 68/47 CFR),  
Telcordia (Bellcore) GR-1089-CORE
- Fully automated test routines
- Coupling of up to three different wave-  
shapes without any rewiring
- For combination wave, Ringwave and others
- Up to 8kV impulse voltage
- EUT mains voltage up to 690V/400V
- EUT mains current up to 32A per phase
- Correct phase angle synchronization for each  
coupling path



### FP-SURGE 100M2

#### 100A Three-Phase Coupling/Decoupling Network for SURGE Testing

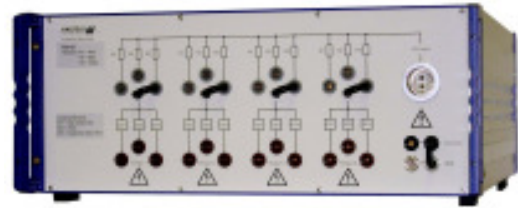
- Built according to IEC/EN 61000-4-5 Edition 1 & 2  
and ANSI C62.41/45
- Superposition of surge impulses onto three-  
phase AC power lines & DC power lines
- Up to 8kV impulse voltage
- EUT mains voltage up to 690V/400VAC & 110V DC
- EUT mains current up to 100A per phase
- Manual coupling path switching
- Synchronization with power supply



**PCD 121**

**Manual Surge Coupling Unit for Symmetrical Data and Control Lines**

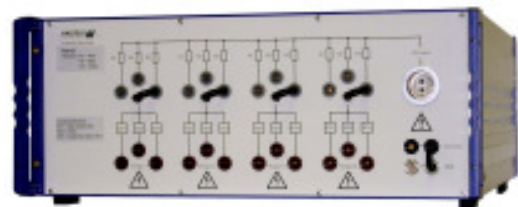
- Built according to IEC/EN 61000-4-5 Edition 2 Figure 14 (Ed. 1 Figure 12)
- Coupling of combination wave impulses
- Up to 2 pairs / 4 wires can be tested
- Serial resistors included, 4 x 40/80/160 Ohm
- Gas arrestors and Avalanche Breakdown Diodes coupling elements included
- Can be used with any surge generator
- Impulse voltage up to 6.6kV
- Signal Bandwidth up to > 10 MHz.



**PCD 122**

**Manual Surge Coupling Unit for Symmetrical Data and Control Lines**

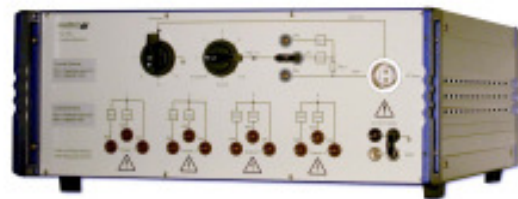
- Built according to IEC/EN 61000-4-5 Edition 2 Figure 14 (Ed. 1 Figure 12)
- Coupling of 10/700 μs impulses
- Up to 2 pairs / 4 wires can be tested
- Serial resistors included, 4 x 25/50/100 Ohm
- Gas arrestors and Avalanche Breakdown Diodes coupling elements included
- Can be used with any surge generator
- Impulse voltage up to 6.6kV
- Signal Bandwidth up to > 10 MHz.



**PCD 126**

**Manual Surge Coupling Unit for Asymmetrical Data and Control Lines**

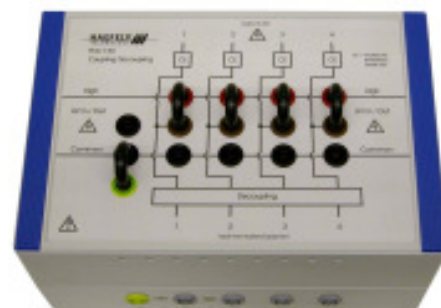
- Built according to: IEC/EN 61000-4-5 Ed. 1 Figure 10 & 11 for CWG IEC/EN 61000-4-5 Ed. 2 Figure 11,12&13 for CWG IEC/EN 61000-4-12 Figure 9, 10, 13 & 14 for Ring Wave 100kHz
- Coupling of Combination Wave impulses and Ring Wave 100kHz impulses
- Up to 4 wires can be tested simultaneously
- 40 Ohm Serial resistor included
- Capacitors and Avalanche Breakdown Diodes coupling elements included
- Impulse voltage up to 6.6kV
- Signal Bandwidth up to some 100 kHz.



**PCD 150**

**Manual Surge Coupling/Decoupling Unit for Data and Control Lines**

- Built according to IEC/EN 61000-4-12:1995 Figure 9, 10, 13 & 14
- For Damped oscillatory wave 100 kHz & 1MHz
- For Ring Wave 100 kHz with Z = 200 Ohm
- Up to 4 wires can be tested with one unit
- Up to 8 wires can be tested with two units
- Default coupling elements are Avalanche Breakdown Diodes
- Impulse voltage up to 4.4kV
- Signal Bandwidth up to some 10 kHz.



## DEC 5

### Surge Decoupling Unit for Symmetrical Data and Control Lines

- Built according to:
  - IEC/EN 61000-4-5 Edition 1 Figure 12
  - IEC/EN 61000-4-5 Edition 2 Figure 14
  - ITU K.44:2003 Figures A.5-1, A6.1-1 to A6.1-5
- Up to four wire can be tested simultaneous
- Decoupling of combination wave impulses
- Decoupling of 10/700  $\mu$ s telecom impulses
- Decoupling: Inductors 20mH compensated
- Protection elements are Gas arrestors and Breakdown avalanche diodes
- Can be used with any surge generator
- Impulse voltage up to 6.6kV
- Signal Bandwidth up to some 100 kHz.



## DEC 6

### Surge Decoupling Unit for Symmetrical Data and Control Lines

- Build according to ITU K.44:2003 Figures A.5-1 and A6.1-1 to A6.1-5
- Decoupling of 10/700  $\mu$ s telecom impulses
- Decoupling of combination wave impulses
- Up to four wire can be tested simultaneous
- Decoupling: Resistors 200 Ohm
- Protection elements are Gas arrestors and Breakdown avalanche diodes
- Can be used with any surge generator
- Impulse voltage up to 6.6kV
- Signal Bandwidth up to some 10 MHz.



## DEC 7

### Surge Decoupling Unit for Asymmetrical Data and Control Lines

- Built according to:
  - IEC/EN 61000-4-5 Edition 1 Figure 10 & 11
  - IEC/EN 61000-4-5 Edition 2 Figure 11, 12 & 13
  - IEC 61000-4-12:1995 Figure 9, 10, 13 & 14
- Decoupling of Combination wave impulses
- Decoupling of Ringwave 100 kHz impulses
- Up to four wire can be tested simultaneous
- Decoupling: Inductors 20mH not compensated
- Protection elements are Varistors and Breakdown avalanche diodes
- Can be used with any surge generator
- Impulse voltage up to 6.6kV
- Signal Bandwidth up to some 100 Hz.



## MSURGE

### Magnetic Impulse Field Test System

- Built according to IEC/EN 61000-4-9
- 8/20 $\mu$ s magnetic field wave shape
- Up to 3000A/m field strength
- Sturdy construction
- Horizontal and vertical testing
- Control from Haefely surge generators
- Single turn coil with 1m x 1m square area



## PS 1500

### 15kV Voltage Surge Generator

- Built according to IEC/EN 60065, IEC/EN 60950-1 and UL 1414
- Impulse voltage up to 15kV
- Up to 24 discharges per minute
- Positive and Negative Polarity
- External trigger input
- automatic selection of 4M $\Omega$ /100 M $\Omega$  parallel resistor
- Impulse voltage monitor
- Including test pistol
- Flash measurement
- Insulation/safety testing
- Component testing
- Small and compact design



## radio frequency disturbance

### PAMP

#### Conducted Immunity RF Test System

- Built according to IEC/EN 61000-4-6 ed.1 & 2
- 28W output power
- Up to 10V test level
- 150kHz to 230MHz system bandwidth
- Automated with WinPAMP software
- All parameters variable
- IEC and discrete frequency steps
- AC/DC or Telecom Signal Line CDNs available
- Coupling/Decoupling clamps available



## line disturbance

### PLINE 1610

#### 16A Dips, Interruptions and Variations Simulator

- Built according to IEC/EN 61000-4-11
- Voltage variation testing
- High & Low impedance interrupts
- Inrush current capability more than 500A
- Integrated variacs for  $U_{nom}$  and  $U_{dip}$
- Adjustment of  $U_{dip}$  between 0 ... 80% at any level
- 40A capability at 40% nominal voltage
- Fully integrated solution, no additional equipment required



### PHF 510/2010/4010/4030

#### Single Phase/Three Phase Harmonics and Flicker Measuring System

- Built according to newest IEC/EN standards (IEC/EN 61000-3-2, IEC/EN 61000-3-3, IEC/EN 61000-4-7, IEC/EN 61000-4-15)
- Fully integrated turn key solution
- PASS/FAIL indication
- 500VA/2000VA/4000VA/3 x 4000VA clean AC power source
- Discrete reference impedance for flicker measurements
- Easy to use software for control, measurement and analysing



## Economic & Compact Transient Immunity Test Station

### ECOMPACT 4

#### Compact Test Station incl. Software

- Built according to:
  - IEC/EN 61000-4-2 (with PESD 1610)
  - IEC/EN 61000-4-4 Ed. 1 & 2
  - IEC/EN 61000-4-5 Ed. 1 & 2
  - IEC/EN 61000-4-8 (with MFS 100)
  - IEC/EN 61000-4-9 (with MFS 100)
  - IEC/EN 61000-4-11 Ed. 1 & 2
  - IEC/EN 61000-4-29
- Surge voltage up to 4.2kV, 1.2/50  $\mu$ s
- Surge current up to 2.1kA, 8/20  $\mu$ s
- EFT Impulse voltage up to 4.2kV
- Integrated single phase coupling/decoupling network 16A for Surge and EFT
- Inrush current capability more than 500A
- Dip Levels: 0%, 40%, 70% & 80%
- Line max. current: 16A AC/DC



### ECOUPLER 4

#### 16A Three-Phase Coupling/Decoupling Network for SURGE & EFT Testing

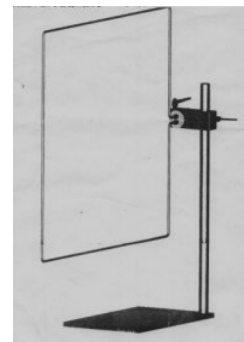
- Built according to IEC/EN 61000-4-4 Ed. 1 & 2 and IEC/EN 61000-4-5 Ed. 1 & 2
- EUT voltage up to 440V/250V AC
- EUT current up to 16A per phase
- Test level max. 4.2kV / 2.1kA
- Fully automatic test routines



### MFS 100

#### Power Frequency Magnetic Field & Magnetic Impulse Field Test System to ECOMPACT 4

- Built according to IEC/EN 61000-4-8
- Up to 110A/m field strength
- Built according to IEC/EN 61000-4-9
- 8/20 $\mu$ s magnetic field wave shape
- Up to 1000A/m field strength
- Sturdy construction
- Horizontal and vertical testing
- Single turn coil with 1m x 1m square area



## MAG 100

### Power Frequency Magnetic Field Test Equipment

- Built according to IEC/EN 61000-4-8
- 1m x 1m antenna included, optional 2m x 2.6m antenna available (see picture)
- Up to 110A/m field strength
- Horizontal and Vertical testing
- Different coil sizes available
- Software control (when used together with Haefely EMC power sources)



## accessories

### PDP 8000

#### Differential HV Probe

- Replaces two P6015 probes
- Calibration of surge impulse generators up to 8kV 10/700us
- Divider Ratio 1000:1
- ± 2% accuracy
- No adjustment/calibration required



### WinFEAT&R

#### Control and Reporting Software

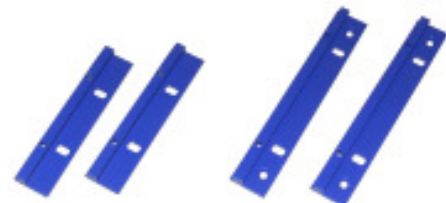
- **Fast, Easy, Accurate Testing & Reporting (FEAT&R)**
- Windows 98, 2000, ME, NT & XP supported
- Control and automatic reporting of:
  - Surge Test System
  - EFT Test System
  - Dips & Interrupts Test System
  - Oscilloscopes
  - Power and Telecom Couplers
- Network compatible
- Pre-programmed tests

**WinFEAT&R**



### Rackmounting Set

- Mounts modules in racks for greater mechanical stability and mobility
- Available for all sizes



### Test Table

- Built according to IEC/EN 61000-4-2 and IEC/EN 61000-4-4
- Made of wood without any metallic parts
- Use with ESD, EFT
- Optional vertical coupling plane and ground plane available



### Warning Lamp

- Use with SURGE, EFT and Interrupts tester
- High visibility
- Safe = green
- Dangerous = red
- Rugged and reliable design



### Emergency Switch

- Use with Surge, EFT and interrupts tester
- Cuts high voltage and mains power to EUT
- Connect in series around EUT
- Sturdy construction



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