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Surge Tester PSURGE4

P 9318



You test faster and easier, reliably

- with total electronic control and switching, requiring minimum maintenance
- integrated single phase mains coupling decoupling network
- automated coupling paths switching for single phase and three phase couplers
- integrated single phase coupling network allows the superimposition of the unattenuated and undistorted test impulses on to the power mains, at the same time the network protects the power mains from the generated surge impulses. The network can process both, EFT and surge impulses, which makes it suitable for so called "single port" tests
- thanks to the PSURGE4's electronic switch it closely simulates the impulses occurring in reality, clean, reproducible and without bouncing effects
- considerable reduction of test time through integrated P90 microprocessor control unit with the possibility to input and memorize test parameters and test sequences
- value of investment remains high thanks to the PSURGE4's high quality manufacturing to ISO 9001
- meets IEC 801-5/D, IEC 1000-4-5/D, EN 50082-1 and prEN 1000-4-5, as well as other standards and regulations derived from these standards, up to the required test levels.

Example of a system with PEFT and PSURGE4

P 9320



Application

The Surge Tester PSURGE4 has two test impulses, the hybrid or CWG Combination Wave impulse 1.2/50 µs, 8/20 µs and the 10/700 µs Telecom impulse. The CWG gives an open circuit 1.2/50 µs impulse and a 8/20 µs short circuit impulse. The PSURGE4 can be used to check EMC (Electro Magnetic Compatibility) to lightning impulses of domestic appliances, industrial measurement and process control equipment, avionics, computer systems and automotive systems. It is also used to test protective circuit elements and complex protection circuits.

The PSURGE4 simulates for test purposes, atmospheric discharges, lightning and switching operations in high and low voltage circuits as standardized impulses, called surges.

The PSURGE4 can be built gradually into a fully automated Transient Test System, using the WinPATS software. A complete test system comprise the LFP 6 Mains Interference Tester, the PEFT tester for fast transients, and the PSURGE4, as well as coupling networks and measuring instruments for the verifications of the testers and for EUT failure detection.

The WinPATS software is designed to operate all these instruments and testers with a PC AT 386 or 486, provided it is equipped with the necessary interfaces. The autonomous, stand-alone-operation of the testers is not disabled by the integration into the automated Test System. The configuration of testers can be adapted to test requirements and budget availability. There is no need to fit the testers in a clumsy rack system. This provides the flexibility to take a tester out of a system and the ability to adjust to individual test requirements without impairing the operation of the remainder of the system.

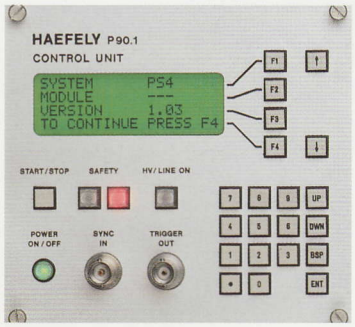
Microprocessor Control Unit P90

The most important beneficial features of the control unit P90 are:

- memory for 11 programs, which can be reused and edited by the operator. The memory contents are not lost when the tester is switched off
- all test parameters can be changed via the front panel keypad within predefined limits set by the tester
- integrated single phase surge coupler preselection of test time for each coupling path
- automated coupling path switching without interrupting power to EUT
- automated three phase coupling path switching of the external FP-SURGE 32.1 coupling network is also performed by the P90 unit
- adjustments can be made of: charging voltage, charging time, impulse shape selection (1.2/50 µs, 8/20 µs, CWG or 10/700 µs Telecom impulse), number of impulses, polarity of impulses. Voltage ramps, power mains phase angle ramps in 5° steps, feedback of EUT failure detection messages within preselected voltage and current ranges, selection of triggering mode, selection of frequency of EUT power, $16^2/_3$, 40, 50, 60 and 400 Hz can also be implemented.

A simulation software which enables customer to gain familiarity with all the features and advantages of the P90 software is also available.

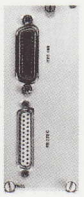
P 9317



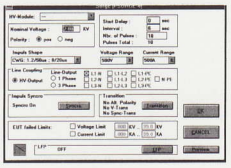
Remote Control 730

The remote control 730 is an option wich enables communication with a host computer. The 730 interface is required to operate the tester with the WinPATS software. To make the operation via PC easier also the P90 U software is available.

P 9106



Haefely's Windows-based Automated Test System software, WinPATS, is used to control and monitor the Haefely EFT, Surge and Line Interference testers by a PC. It is also possible to include the PSURGE4 in the fully automated PATS Transient Test System. The WinPATS software runs under Windows 3.1 and can be installed by the user. In order to avoid potential EMI problems, which may be present, fibre optic RS 232 transmission links available for the PATS system are strongly recommended.



WinPATS computerscreen

The P90 OPT. 1 optical decoupling link is designed to eliminate propagation of potential EMI between PSURGE4 tester and computer connected via RS 232 interfaces.

Test Report

The PSURGE4 is provided in its basic configuration with a separate printer interface for compiling test reports in accordance with the format stored in the P90's software. This test report documents all test parameters and records all events, such as test pauses or EUT failure indications.

Detection of EUT Failures (EUT Failure/Status)

An EUT failure signal at the front panel BNC input of the PSURGE4 stops the test sequence and initiates the print-out of a message in the test report.

The EUT/OPT.1 optical transmission link is available as an accessory, and is used to avoid the propagation of potential EMI signals between EUT and tester.

Operator safety is enhanced by the safety cut/off switch with a large push button designed for the fast interruption of the entire test system in case of an emergency.

An Adapter Set is available for the EUT output socket of the tester's integrated coupling network.

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Technical Data

Surge Outputs

Combination wave: 1.2/50 µs, 8/20µs	wave shape in accordance with IEC 1000-4-5/D (801-5)	
Open circuit voltage 1.2/50 µs	0.5 kV up to 4.0 kV	+ 0% – 10% +10% – 0%
Short circuit current 8/20 µs	0.25 kA up to 2.0 kA	+ 0% – 10% +10% – 0%
Dynamic impedance U_{max}/I_{max}	2 Ω	±0.25 Ω
Polarity	positive/negative	
Output "Common"	floating	
Repetition rate of the impulses	12 per minute at 4 kV	
Wave-shape 10/700 µs	wave shape in accordance with IEC 1000-4-5/D (801-5)	
Open circuit voltage 10/700 µs	0.5 kV up to 4.0 kV	+ 0% – 10% +10% – 0%
Short circuit current 4/300 µs	12.5 A up to 100 A	+ 0% – 10% +10% – 0%
Source impedance (series resistor)	15 Ω	
Attenuation resistor (switch operated)	25 Ω	
Total source impedance	40 Ω	
Polarity	positive/negative	
Output "Common"	floating	
Repetition rate	6 per minute at 4 kV; higher at lower charging voltages	

Integrated Single Phase Surge Coupler

Rated power	250 V AC 50/60 Hz 115 V DC	16 A 16 A
Coupling path (conductor/ground)	9 µF and 10 Ω	
Coupling path (conductor/conductor)	18 µF	
Short-circuit/by-pass function	250 V AC 50/60 Hz 250 V AC 50/60 Hz	16 A 16 A

Connections

High voltage output	direct (via multi-pole plug)	
Surge coupler input	IEC 320	16 A
Surge coupler output	Schuko 250 V AC	16 A

Microprocessor Unit P90

Phase synchronization with supply	synchronization frequencies $16^2/_3$, 40, 50, 60 and 400 Hz. For externally connected couplers, such as FPSURGE 32.1, a reference signal must be connected to the "sync" input of the P90 control unit.
Impulse trigger	manual or automatic
Oscilloscope trigger	CRO output on front panel
EUT failed detection	BNC connector. Optical decoupling unit available
Peak voltage and current measurement	9 ranges, LCD display
Measurement of wave-shape	CRO output V(t) and I(t), available on the front panel
Safety systems	hardware: EMERGENCY/OUT switch software: safety circuit
AUX. OUT	Provides automatic coupling switching to the PSURGE 32.1, 3-phase filter
Printer	Connecting a printer enables a printout to be made after each test
Remote control interfaces	RS 232 and IEEE 488 integrated in optional RC730 interface

Dimensions

Rack	19", 9 HU, 480 mm
External dimensions W × H × D	520 × 433 × 500 mm
Weight	approx. 40 kg

Mains Connections

Power supply PSURGE 4.1	115 V or 230 V, 50/60 Hz ±10%, self-sensing

Environmental Conditions

Temperature	0 to 35°C
Humidity	10 to 75% RH
Atmospheric pressure	86 to 106 kPa

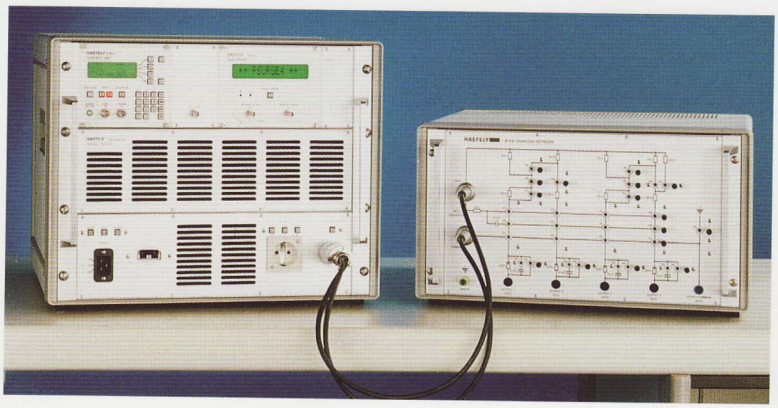
Quality

Safety	complies with IEC 348 standard
EMC	ESD IEC 801-2 up to 8 kV EFT IEC 801-4 up to 4 kV Surge IEC 801-5/D up to 2 kV
Manufactured	in accordance with ISO 9001

Accessories

Coupling into Signal and Datalines

P 9323



For the superposition of the surges of the PSURGE4 on power mains, signal, data and telecom lines a number of coupling networks are available. With these it is possible to meet all the requirements imposed by IEC 1000-4-5/D (801-5).

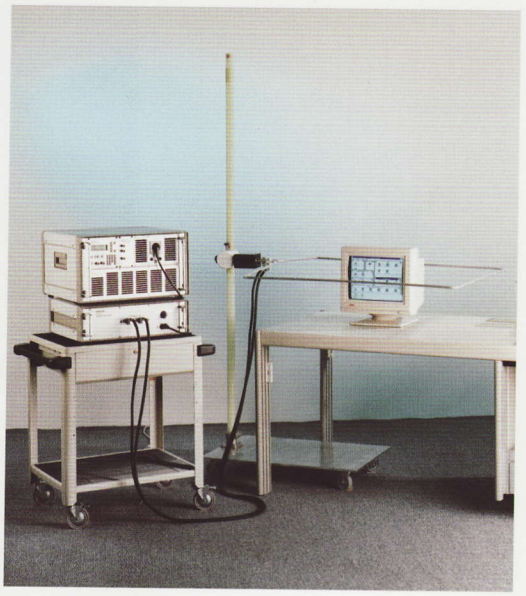
The IP 6.2 surge coupler is used to superpose the PSURGE4's impulses on signal, data and telecom lines. It is fitted with the required 40 Ohms resistors and the 0.5 µF capacitors, as well as with the 90 V gas arresters, and meets all the coupling methods for signal lines of IEC 1000-4-5/D. The IP 6.2 is also suitable for the superposition of impulses of the PSURGE4 in accordance with FTZ 21 TR 1, issued by the German Post office. Further information is available on the data sheets of these products.

Coupling into Three Phase Power Mains

For single phase power mains coupling, the surge coupling network built in to the PSURGE4 can be used.
For the superposition on three-phase power mains the FPSURGE 32.1 for frequencies of 50/60 Hz, currents up to 32 A and voltages up to 600 V is available as an accessory.
The P 90 software of the PSURGE4 is programmed so that it can also control the coupling path switching of the FPSURGE 32.1 coupling network.

Magnetic Field Tests with PSURGE4

P 9315



For magnetic field tests to IEC 1000-4-9 the MSURGE.1 test set is available. IEC 1000-4-9 specifies tests with pulsed magnetic fields of up to 1000 A/m. These tests must be carried out on powered electronic apparatus used in industrial control systems and in power stations, as well as in high and medium voltage switching stations. Pulsed magnetic fields are generated by lightning strikes on houses, antennae and grounding systems, as well as by transient fault currents and switching operations of circuit breakers. The test impulse of the MSURGE.1 system has the wave shape 6.4/16 µs in accordance with IEC 469-1, resp. 8/20 µs in accordance with IEC 60-2. The MSURGE.1 magnetic field test set has the following user benefits:

- the support stand can also be used for magnetic field tests to IEC 1000-4-8 and -10
- the coil can be fed by either the PSURGE4, the PC 6-288 or the PC 7-490 surge testers
- the coil and its support stand are designed so that vertical and horizontal magnetic field tests can be carried out with it
- there is no need to move the EUT if tests to IEC 1000-4-8, -9 and -10 are required.

The complete set consists of a magnetic coil, the connection cables to the output of the PHV 1 combination wave plug-in of the PC 6-288, the PSURGE4 or the PC 7-490 tester, and a measuring transformer at the input of the coil.

Ordering Text	Code	Order-No.
Surge Tester PSURGE4	PSURGE 4.1	249249.1
– User Manual in 3 languages (G/E/F)		
– For the tester mains supply, one of the following 10 A main cables:		
Europe Schuko	Schuko mains cable 10 A	093825.1
U.K.	U.K. mains cable 10 A	093856.1
USA	USA mains cable 10 A	093740.0
Switzerland	CH mains cable 10 A	093820.1
– For the surge coupler mains supply, one of the following 16 A main cables:		
Europe Schuko	Schuko mains cable 16 A	093849.1
U.K.	U.K. mains cable 16 A	093857.1
USA	CH mains cable 16 A	093850.1
Switzerland	CH mains cable 16 A	093855.1
Accessories		
– Remote control card RS 232 and IEEE	RC730 Remote Control	249199.1
– RS 232 Optical link	P90-OPT.1	249225.1
– Coupling network for signal and data lines	IP6.2	249518.1
– Connecting cables to IP 6.2	HV cables	093804.1
– WinPATS software working under Windows 3.1 (version 2.0)	WinPATS	249309.1
– Utility software running under DOS 3.3 (version 2.0)	P90U Utility software	249220.1
– Optical link for EUT status input	EUT-OPT.1 SPZ2	
– Adaptor set for surge coupler output	Adaptor set	249200.1
– Emergency OFF Switch	Emergency switch	093572.1
– Magnetic field test set Impulse 1 HV connection cable 1 magnetic field coild 1 × 1 m	MSURGE.1	SPZ3
– Transportable support stand	Stand	249003.1

List of Brochures

ESD Tester PSD 25 B	E 111.33
Line Interference Tester LFP 6	E 111.38
PEFT Burst-Tester	E 111.39
PATS.1 automated EMC Transient Test System	E 111.41

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