



DiAS[®] 733

Digital Impulse Analyzing System



Impulse voltage tests in industry are mainly used to control the quality of any high voltage equipment. Usually the test object is subjected to a fast voltage impulse. A defined impulse wave shape is applied to the test object according to the relevant standards. Changes in the wave-shape caused by the test object are used for detection of insulation faults. This procedure is commonly used for routine testing of transformers, bushings or other high voltage equipment. The DiAS[®]733 is an excellent and reliable tool for accurate measurement of all kinds of wave-shapes. Haefely Test AG also manufacture complete impulse voltage test systems to meet most requirements. This impulse generation capability plus impulse measurement offers a complete solution to modern testing needs.

DiAS[®]733 incorporates many of our own experiences in the high voltage business, plus those of our customers.

Capturing the complete impulse enables to obtain information about the test object faster and in more detail. DiAS[®]733 is the tool which utilizes latest technology to perform this task.

The DiAS[®]733 is a compact 1- or 2-channel digital impulse analyzing system. Measurement evaluation and analysis of impulse voltages and currents can be performed according to IEC 61083, IEC 60060, IEC 60076, IEC 60099, and IEC 60230, the relevant standards for High Voltage Impulse Testing. Automatic evaluation of the impulse shapes specified in the above standards, as well as a manual evaluation mode are available.

The DiAS[®]733 is ready for integration in a complete impulse voltage test system. The system can be fully controlled by a host computer via standard interfaces or, to reduce interference effect, via an optical link.

FEATURES

- 10 bit real vertical resolution at 100 MS/s
- 128 k memory point depth (for 10 bit data)
- Automatic evaluation of all common impulse shapes and their parameters
- Loaded with functionalities: Difference, Parameter Tolerance, FFT, Step response, Smoothing, Advanced Evaluation and more
- Fulfils IEC 61083-1 & IEC 61083-2 standards
- Clear documentation and reporting including, Test information, notes, grouping, etc.

BENEFITS

Easy, intuitive understandable and useable graphic user interface (GUI)

Automatic test report generation from the integrated reporting tool with user definable layout, logo insertion, etc.

Manual re-evaluation tool for all impulse parameters.

Automatic hardware calibration with additional calibrator RIC422-4

Easy re-calibration and **system upgrade** due to modular and independent hardware design.

APPLICATIONS

testing of:

- Distribution Transformers
- Power Transformers
- Switchgears
- Surge Arrestors
- Cables

- Research & Development
- Universities
- etc.



MEASUREMENT (DIGITIZING) FEATURES

10 bit amplitude resolution. Together with the powerful software analysis tools detailed impulse diagnostics are possible.

Variable memory depth up to 128k data points.

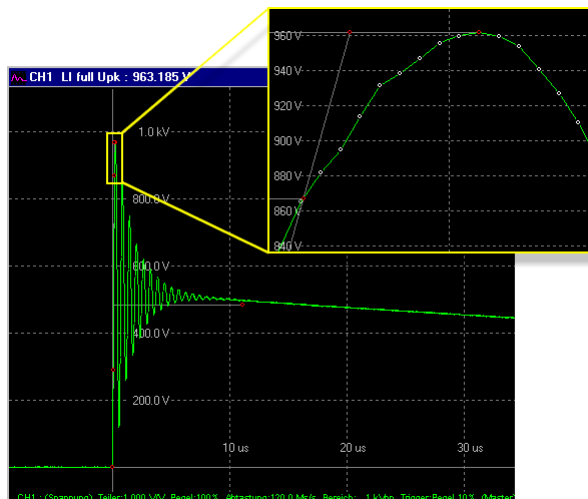
Used memory depth

- ☒ 32k points
- ☐ 64k points
- ☐ 128k points

A maximum of 128'000 samples can be recorded. A variable memory depth allows to choose a suitable record length and helps to avoid unnecessarily large file sizes.

100 MS/s and an analogue bandwidth of **30 MHz** is fast enough to capture the common impulse shapes in high voltage test labs.

High frequency signal components usually have very low amplitudes. High amplitude resolution is therefore critical. The highest bandwidth limit is usually determined by the external high voltage divider.



Example of a single points resolution at 100 MS/s.

Excellent linearity and low noise level. All tests of this 10 bit system achieve better results than required by the related standards!



A complete **Record of Performance** is provided with every measuring channel built into a system to ensure highest performance and reliability of the investment.

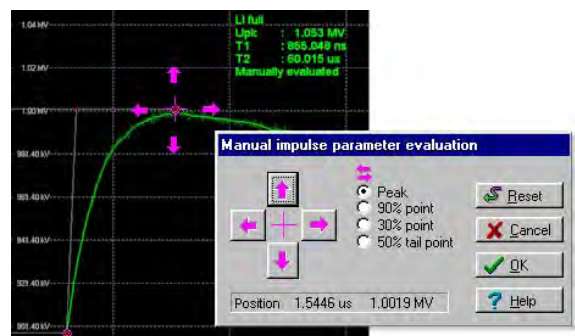
ANALIZING FEATURES

Impulse shapes are analyzed automatically in full accordance with the standards. The DiAS® enables activation of only those impulse shapes and parameters which are really needed.

Activated impulse settings		Displayed impulse parameters	
☒ LI full	☒ ECI	☒ T1	☒ No. (counter)
☒ LI frontchopped	☒ RCI	☒ Tp	☒ A, f (oscillation)
☒ LI tailchopped	☒ OLI	☒ T2	☒ Beta, Tau (overshoot)
☒ SI IEC 60	☒ OSI	☒ Td	☒ f (OLI, OSI)
☒ SI IEC 76-3	☒ Step	☒ Tc	☒ Accuracy warning
☒ SI ANSI	☒ AC (BIAS test)	☒ T0	☐ Offset

Define user specific interface.

Manual evaluation on every newly recorded or re-loaded impulse can still be performed for "special" cases - The best mean curve generator remains the human eye.



The software guides through the process. E.g. if the peak point (100 %) is moved - the 90 %, 50 % and 30 % points are moved automatically and the influence on all parameters is shown in real-time.

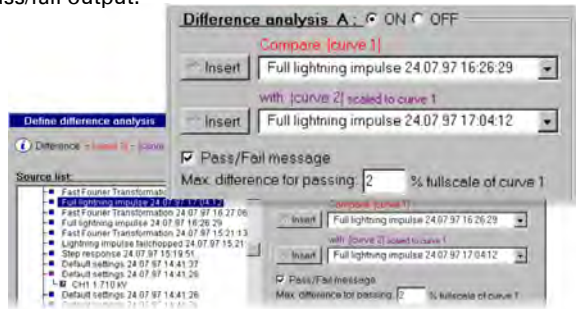
Multi-functional display. Real-curve¹, mean-curve², difference (mean - real), all points³, help-points⁴ and lines⁵ etc. to calculate the parameters are shown in the curve display. The parameter calculation method is fully transparent. The evaluation of parameters is graphically documented - "what you see is what you get" (WYSIWYG). The display can be zoomed using the mouse to resolutions where the individual data points can be seen.

An **Online Toolbox** can be opened by a single click, which gives access to all curve related functions such as: Stepped zooming back, preview printout, print curve, copy to clipboard, recalculation (auto & guided), manual evaluation, signal processing (smoothing), measurement cursors, grid normalization, grid optimization, FFT calculation, edit related curve information, add memos, save complete measurement, save window, save data as ASCII.

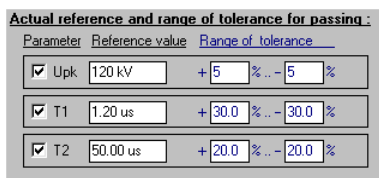


FUNCTIONS

Difference Function to subtract two wave-shapes. With auto-fitting and auto-zooming. Chose your curves from the database or define automated calculation sequences with pass/fail output.



Parameter Tolerance Analysis to enter a max. limit on evaluated parameters (e.g. $U_{pk} \pm 5\%$). Define



automated tolerance calculation sequences with pass/fail output.

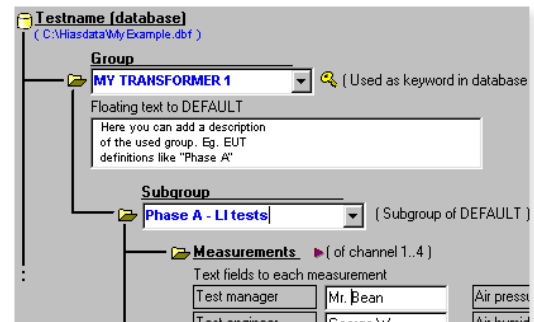
Sequence Function (option) enables full test sequences to be automated for applications such as distribution transformer production without system operators.

Step response evaluation. Internal measurement including random interleaved sampling (RIS) and external measurements (e.g. from a giga sample scope) can be loaded and analyzed



Measurement & test information, user notes, grouping & sub-grouping, headers for clear documentation and reporting of saved impulses.

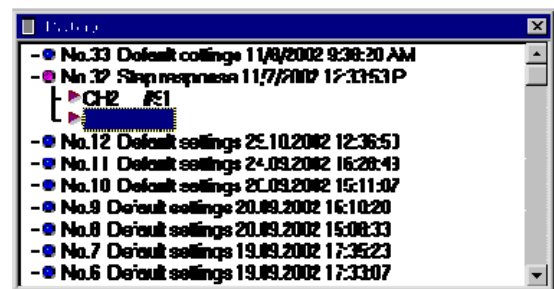
Information can be added to a specific pulse and the result can be saved in a clear customized data structure.



ADDITIONAL FEATURES

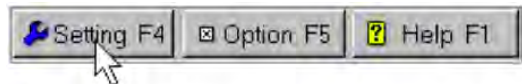
Useful items such as: loading external files (scope, .tdg, stepdata, ASCII, .txt), impulse counter, pre-setable normalized and/or optimized scaling, hardware check information, etc. are implemented in the control software.

History stack to search non-saved measurements. The last 10 complete measurements are saved in dynamic memory. For instant recall open history and click on the required pulse.

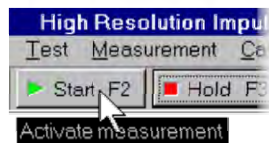




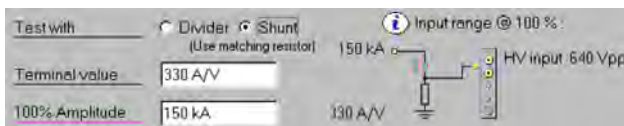
All **standard Windows features** are included. Self explanatory menus and symbols, quick access buttons,



on-line help and hint texts for all functions, graphically supported dialogue boxes.



E.g. select "Shunt" and enter a terminal value of 330 A/V. A measuring circuit image, the chosen input range and the correct input connector are indicated as well as the hint to use a matching resistor.



Office software (option) for training or analysis.



An identical software, that runs without the DiAS[®]733 hardware, enables off-line analysis on a computer out of the lab. This can also help for staff training.

Cut & Paste. The DiAS[®] software runs under the

Windows platform. This ensures state-of-the-art performance. Pictures of measurement curves are saved as WMF (Windows Metafile) which allows cut and paste functionality between other programs such as Microsoft Word.

Standards

DiAS[®] fulfils and surpasses the requirements of IEC 61083-1 and IEC 61083-2

The software has been developed based on following standards: IEC 60060, IEC 60076, IEC 60099, IEC 60230, IEC 60517, ANSI C 57.12.90, IEEE Std 4



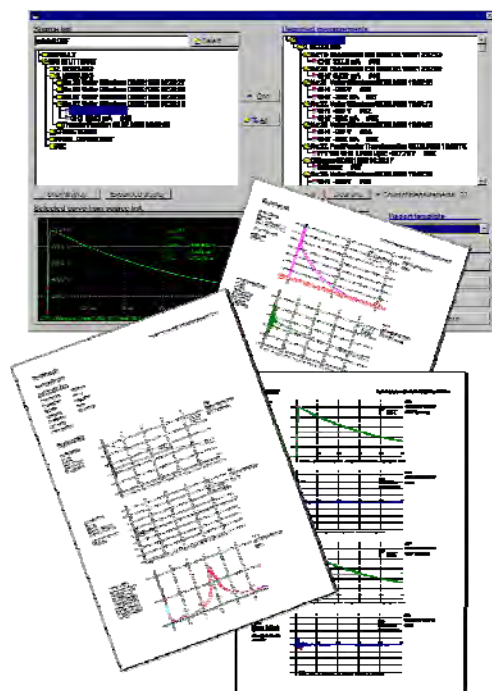
Fully automatic calibration together with an (optional) Haefely reference impulse calibrator RIC 422. Amplitude deviations can be entered from a floppy disk to provide automatic correction against a nominal standard calibrator.

As a result the best achievable accuracy is obtained without any further calculation.



Reporting tool enables selection and combination of any impulse measurement in the DiAS[®] database. To assist in evaluating the correct impulse the actual measurement curve for the selected data is displayed before starting report generation.

Predefined report templates can be chosen or a template can be modified to create a customer specific report layout.





TECHNICAL SPECIFICATIONS

System

Number of channels	1...2
Printer	Inkjet color printer
Monitor	Desktop screen $\geq 17"$
System controller (build-in)	$\geq$ Pentium III, ≥ 256 MB RAM
Internal operating system	Windows XP (also Windows 98, 2000 for "Office software")

Analogue Part

	High voltage input	Low voltage input
Connections	LEMO (RA4250)	BNC
Input divider	1 : 200	1 : 1
Input voltages	100 Vpp .. 1950 Vpp	640 mVpp .. 11 Vpp
Input ranges	14 (factor 1.26)	14 (factor 1.26)
Overvoltage protection	2 kV	15 V
Overvoltage tested	6 kVpp (1.2/50 μ s, 10/700 μ s)	-
Input impedance	2 MOhm // 20 pF	100 kOhm // 20 pF
Analogue bandwidth (-3dB)	≥ 30 MHz	
Triggering	internal on slope or level external on slope and level	

Data Acquisition / AD-Conversion

Amplitude resolution	Real 10 bit (1'024 LSB)
Sampling rate	≥ 100 MS/s, 50 MS/s, 25 MS/s ... 100 kS/s
Memory depth	max. 128k data points (with 10 bit resolution)
Resulting measuring time	220 μ s, 450 μ s, 900 μ s, ... 280 ms

Data Handling

Internal data exchange	buffered AT-BUS
Storage medium	Floppy 1.44 MByte, 3.5" Harddisk ≥ 40 GByte CD RW Drive
Remote control	RS232, (optional optical converter)
On request	Ethernet, IEEE488

Operating Conditions

Supply voltage	100 / 115 / 230 V
Temperature range	10 .. 40°C (Printer 10..32°C)
Relative Humidity	35 .. 80 %
Warm up time	35 minutes

Mechanical

Dimensions *	52 x 30 x 50 cm (20" x 12" x 12")
Weight *	Approx. 25 kg (55 lbs)

* desktop mainframe only → plus monitor and peripheral devices

Overall Uncertainty

Full and chopped impulses (SI, LI)	$\pm 1\%$ U_{Peak}
Front chopped impulses (LIchopped)	$\pm 1\%$ U_{Peak}
All time parameters (T1, Tp, Tc, T2, etc.)	$\pm 2\%$ in time

Standards

Fulfils or surpasses the requirements of IEC 61083-1, IEC 61083-2 and IEC 60060-2

Record of Performance

Full IEC 61083-2 and IEC61083-1 record of performance are supplied with every system respectively channel insert
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Calibration

Fully automatic (with optional Reference Impulse Calibrator RIC 422-4, controlled by DiAS® software)
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a brand of

HAEFELY 



Haefely is a subsidiary
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SYSTEM DESIGN

DiAS[®]733System consists of a main unit, containing the system CPU, control computer, power supplies, data storage, interfaces and 2 slots for the exchangeable **measuring channel inserts**. All accuracy sensitive



elements are combined in one small unit per channel.

Also supplied are **peripheral devices** printer, monitor, keyboard and mouse.

The advantage of this modular design is that a single measuring channel insert (digitizer) can be easily pulled out and sent back for re-calibration while the system works with the other channels. So there is **no down time** on the system due to factory re-calibration.

Easy re-calibration: Pull out, send and receive back a single measuring channel insert.

SCOPE OF SUPPLY

- E.g. **DIAS 733-2** (2 channel system, desktop)
- | | |
|--------|--|
| Qty. 1 | DiAS [™] 733 mainframe desktop unit with system CPU, supplies, CD RW, Floppy, HDD, channel slots, Interfaces. |
| Qty. 2 | Measuring channel insert (Digitizer) including record of performance. |
| Qty. 2 | 75Ω LEMO termination resistor |
| Qty. 1 | Mouse, ASCII keyboard |
| Qty. 1 | Monitor, ≥17" |
| Qty. 1 | Inkjet color printer |
| Qty. 1 | Set of software backup disks |
| Qty. 1 | Set of all connection cables and accessories |
| Qty. 2 | Operating manuals (English) |

ORDERING INFORMATION

System

Digital Impulse Analyzing System, Desktop, 1 channel	DIAS 733-1
Digital Impulse Analyzing System, Desktop, 2 channels	DIAS 733-2

Options

Sequence recorder software tool	DS 733 SEQ
Interfacing software package to allow remote controlling the DiAS, e.g. from GC257 or GC223 (over RS232).	DS 733 REMOTE
Office Software (OS: Win98, 2000, XP)	DS 733 OFFICE
Ethernet Interface	DS 733 NET
Channel upgrade (1 additional measuring channel insert)	DS 733 CHANNEL
DKD calibration certificate per channel	DS KAL DKD

Accessories

Reference Impulse Calibrator, 4 channels, IEEE488 & RS232 interface (for full automatic calibration)	RIC 422-4
Reference Impulse Calibrator, 1 channel, (not automated, manual calibration only)	RIC 422-1

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