Highest performance with up to 200 MS/s sampling rate and 12 to 14 Bit resolution simultaneously in all channels

The well-established Impulse Voltage Measuring Systems TR-AS®, including the digital recorders from our own development and manufacturing, were further developed consequently and now feature improved sampling rates up to 200 MS/s in real-time with 14 Bit resolution simultaneously in up to 16 measuring channels.

The new developed composit A/D-converter hardware system generates raw data with up to 14 Bit resolution together with the highest available sampling rate of 200 MS/s today – and optionally 400 MS/s with 10 to 12 Bit resolution is available for steep i.v. tests.

The high sampling rate of 200 MS/s and the high bandwidth of 50 MHz show increased accuracy and reduced standard deviations for the front time of full impulses as also for the peak and the time-to-chopping at front chopped impulses.

A careful design using sophisticated programmable logic controllers and SMT optimizes the demanding requirements like high sampling rate, small risetime, minimized noise, short settling time, small measuring uncertainty and good long-term accuracy.

This results in nearly smooth waveshapes without visible quantization steps and significantly improves the accuracy of diagnosis using difference method or transfer function.

The direct input of the high bandwidth precision amplifiers with an input impedance of 1 MOhm allows the measurement of the step response of i.v. dividers matching to impedance of the 2000 V measuring input.

The patented multi-timebase allows setting of up to 8 individual sampling rates each with a selectable number of samples, so individual time profiles can be generated, e.g. a profile similar to an exponential timebase.

As an option, for multichannel applications in the high power test field, the sampling rate of each individual channel can be indepently selected. With this option fast transients and slow events can be recorded with reference to a common trigger event and displayed together on the monitor.

Desktop-Housing DERA 6

Compact design for i.v. tests and calibrations in the test field and on site with connection to printer and fileserver via glassfibre LAN

12” TFT Color Display

Keyboard with touchpad in drawer

Measuring rack mount with 1 to 4 channels each with

Direct input 50 mV to 10 V on rear

Input 10 V to 2000 V on rear

Dimensions: approx. 55x55x35 cm (WxDxH)
Weight: approx. 25 kg

Measuring Rack MIRA 25

Compact design with all components including printer inside the rack

easy to move inside the test field

all sensitive connections inside the rack (keyboard, display, printer) are well shielded

17“ or 19“ large TFT-Display

Keyboard with touchpad in drawer

Wireless keyboard and mouse optional

Laser Printer in drawer

Measuring rack mount with 1 to 4 channels each with:

Direct input 50 mV to 10 V on front

Input 10 V to 2000 V on front

Measuring line bushings to the rear

Suitable for i.v. tests and calibrations in the test field with high electromagnetic distortions

Dimensions:

approx. 55x65x125 cm (WxDxH)

Weight: approx. 80 kg

Common Features of TR-AS®:

- **80% input range steps** allow finest adaptation to measuring voltage:
- **impulse measuring input** 2000-1600-1250-1000-800-640-500-400-320-250-200-160-125-100-80-64-50-40-32-25-20-16-12.8-10 V
- **direct input** 10-8-6.4-5-4-3.2-2.5-2-1.6-1.25-1-0.8-0.64-0.5-0.4-0.32-0.25-0.2-0.16-0.125-0.1-0.08-0.064-0.05 V
- **double overload of inputs** guaranted without saturation effect e.g. at unexpected high impulse current amplitudes

- **Long-term stable scale factors** of all amplifier stages guaranting stable calibration results for many years
- **Input adapter** for LEMO, C, UHF matching all kinds of Impulse Voltage Generators from known manufacturers
- **Uncertainty** of 1% (0.7%) for peak and 2% for time parameter
- **Noise level** of 0.01% and **linearity** of ± 0,1 LSB are outstanding values
- **Complete Type Test** according to IEC 61083 for all TR-AS® digital recorder available since 1993

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Digital Impulse Voltage Measuring Systems
TR-AS® 60-10-12 / 100-10-12 / 200-12-14 / 400-12
Remote Control Digital Recorder TR-AS® RC

DR. STRAUSS
Impulse Measurement
Calibration - Diagnosis
www.strauss-mess.de

The TR-AS® RC digital recorders are designed for recording task only. The WinTR-AS® software installed on an external control computer overtakes all control functions of the test procedure via the LAN with:

Setting and arming the TR-AS® RC, transfer of the raw data after recording, evaluation and display of shapes, saving the records in the database, generating the test record and printing to any network printer.

TR-AS® RC with 1 to 4 measuring channels located closed to the test field

Control Computer - Laptop PC inside the control room

TR-AS® RC Remote Control Housing

for connection via LAN (green) to the host computer (PC or Laptop)

Measuring rack mount with 1 to 4 channels

with brackets for building into any 19“ measuring rack or for using on the desk

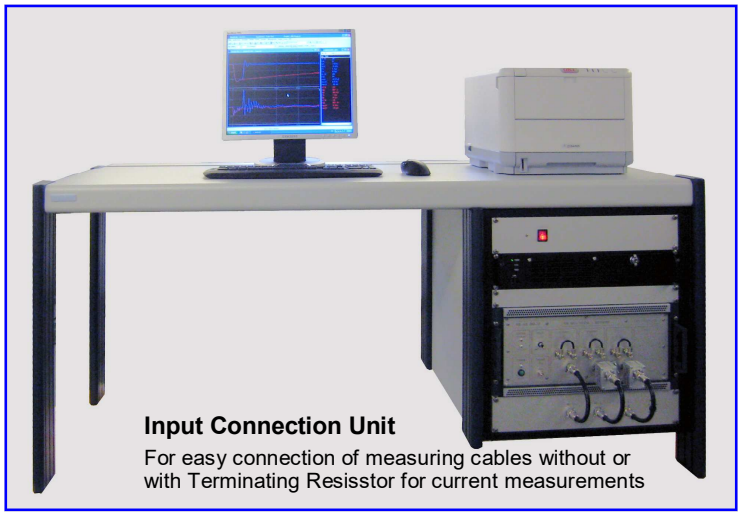
Direct input 50 mV to 10 V

Measuring Input 10 V to 2000 V

suitable for i.v. tests and calibrations in the test field and on-site

Dimensions: appr. 50x55x20 cm (WxDxH)

Weight: approx. 16 kg



Input Connection Unit
For easy connection of measuring cables without or with Terminating Resisstor for current measurements

Working Desk with Measuring Rack MIRA 12

for installation of 19” measuring rack mount, for reducing of electromagnetic interferences into the neccesary connection cables and disturbances caused hereby, with complete assembly of the offered components, with additional mains filter, approx. dimensions: Table 160 x 80 x 75 cm, MIRA 55 x 60 x 70 cm (W x D x H)

Industrial PC Control Computer

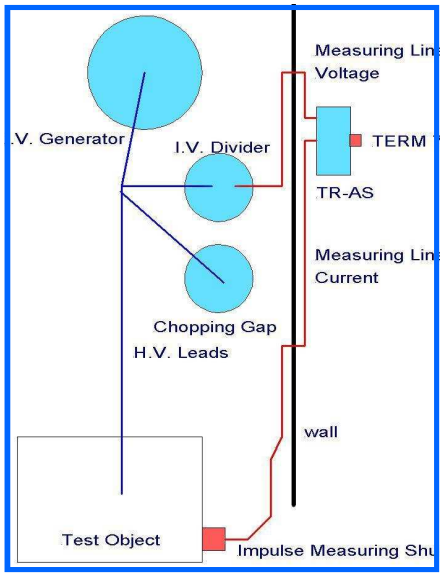
19“ TFT display, Color Laserprinter, Keyboard and Mouse, connected to the TR-AS® digital recorder via fibre-optic LAN

TR-AS® RC Remote Control Housing

Measuring rack mount with 1 to 4 channels
with brackets for building into any 19“ measuring rack or for using on the desk
Direct input 50 mV to 10 V
Measuring Input 10 V to 2000 V
for connection via LAN to the host computer (PC or Laptop)

This new designed measuring technique of network controlled digital recorders gives the possibility for applications were measuring channels are distributed in large test fields, in control rooms on-site or anywhere around the world via Internet.

The following example show how to reduce earthing problems in a very large transformer testfield



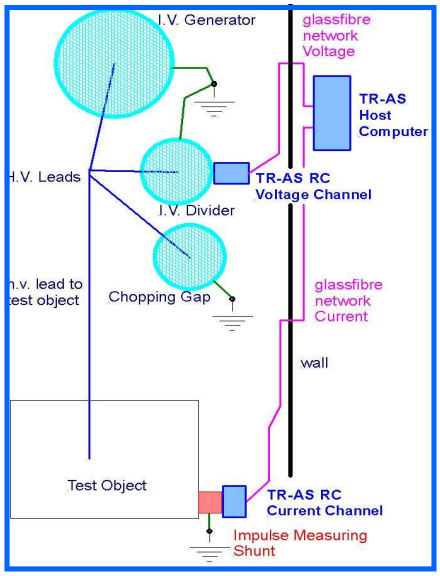
The left picture shows the typical arrangement of the voltage and current measuring circuit with a measuring system TR-AS® or TR-AS® RC for voltage and current with the known

Earthing Problem:

I.V. Generator, chopping gap and i.v. divider have with respect to the Test Object a different ground potential. During the impulse test ground currents are flowing over the coaxial shield of the measuring lines which cause distortions in voltage and current lapse.

The right picture show the suggested arrangement with the ***solved earthing problems*** using two separate remote controlled TR-AS® RC digital recorder for voltage and current measurement.

Both digital recorders are controlled from the control computer with installed WinTR-AS® software which joins the records of voltage and current to one common record.



Technical Data of Digital Recorder
TR-AS® 60-8-10-12 / 100-8-10-12 / 200-12-14 / 400-12

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Impulse Measurement
Calibration - Diagnosis
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Digital Recorder	100 -8 [1]	100 -10 [1]	100/200 -12	400 -12 [3]	200 -14
Rated resolution of output data (Bit / %)	8 / 0.4	10 / 0.1	12 / 0.025	12 / 0.025	14 / 0.006
Static integral non-linearity (%)	0.5	0.25	0.2	0.2	0.1
Static differential non-linearity	0.8	0.6	0.3	0.3	0.3
Dynamic differential non-linearity	0.8	0.8	0.8	0.8	0.8 [2]
Sampling rate selectable	2.5 kHz - 25 / 60 / 100 / 200 MS/s [1]			2.5 kHz-400 MS/s	2.5 kHz-200 MS/s
Sampling interval uncertainty	0.1 ns				
Non-linearity of Quarz Time Base	0.01%				
Record Length (standard/optional)	256k / 1M				
No. of Timebase	2 to 8 selectable				
Timebase Recording Mode	A-B-C-...H-Sequence				

Input Stage	values in brackets on request (reference systems)
No. Measuring Channels	1 .. 4
Measuring input, single ended	N-type / LEMO optional
Measuring range for impulse	10 - 2000 V
Bandwidth analogue (-3dB)	DC - 50 MHz (70 MHz)
Risetime	7 ns (5 ns)
Input test voltage 0.1/2000 us	± 3.5 kV
Input impedance	1 MOhm / 33 pF
Direct measuring input	50 mV - 10 V, BNC
Bandwidth analogue (-3dB)	DC - 70 MHz
Risetime	5 ns
Input impedance	1 MOhm / 33 pF
Input Settings	Factor 1.2
automatically controled	24 Stages
Internal Noise Level	< 0.1%
Interferences	< 0.1%
Record Interval	
at sampling rate 200 MS/s	1.25 / 5 ms
at sampling rate 100 MS/s	2.5 / 10 ms
at sampling rate 5 MS/s	52 / 209 ms
Trigger	
channels single, OR-connected	yes
internal level	pos. and neg. level
internal dynamic (deviation)	pos. and neg. dU/dt
external	5 - 200 V, BNC
Selftest and Calibration check	**memory, scale factor and risetime**
Limits on overall errors	**according to all applicable Standards (IEC 61083, IEC 60, IEEE 1122, IEEE 4, ...)**
Impulse scale factor	
constancy in time interval 0.25-1.0 µs and 0.42 µs upto >20 ms	≤ 1%
uncertainty	< 0.5%
lightning and switching i.v., full and standard chopped, impulse current	
peak value	1% (0.7% optional)
time parameter	2%
front chopped voltage 1.2/50 µs	
peak value, Tc=0.5µs	1.5% (1% optional)
time-to-chopping, Tc=0.5µs	3% (2% optional)
Evaluation	WinTRAS - Software
shape, accuracy:	according to IEC-61083-2
automatic meancurve calculation	ON/OFF selectable
manual evaluation	ON/OFF selectable
Calibration Interval	every 2 to 4 years recommended

1) 100 MS/s systems available also with 60 and 25 MS/s max. sampling rate
2) referenced to 12 Bit (according to IEC 1083-1)
3) 400 MS/s with terminated input only

Control and Evaluating System

Personal Computer state of the art, Dual-Core CPU with ≥ 2GHz, ≥ 2GB RAM, Harddisk ≥ 250 GByte, Diskdrive 3,5", DVD-RW, color laserprinter, fibre-optic LAN adapter / RJ45 LAN connection and external fibre-optic media converter...
Power: Voltage 230 V +10%/-20%, (optional 100/115 V), Frequency 50-60 Hz, Power 400 VA
Environmental: Ambient Temp +5...+40°C, Humidity 0...90%, non condensating
Technical data and design subject to change without notice. Alternative design on request.

Application

Approved and *reference measuring systems in high-voltage and high-power tests*
precise steep impulse measurement
simultan multichannel systems
dynamic tests
fourier-analyses
quality control ..

DKD-Calibration

The measuring systems can be calibrated in our DKD Calibration Laboratory accreditated by the PTB. The Calibration Laboratory issues DKD-Calibration Certificates which documents the traceability to National Standards.

Type Test Report TR-AS® 100-10

Since 01.08.1993 a complete type test report according to IEC 61083-1 is available for the digital impulse voltage measuring system TR-AS® 100-10 which is designed as an approved, reference or reference standard measuring system.

Type Test Report TR-AS® 200-14

The new family with TR-AS® 100-12 to TR-AS® 200-14 consequently continue developed show improved performance. The excellent overall performance makes them the most sophisticated system today available for comparative measurements during transformer tests.

A complete family of digital recorders!

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