

# Arrester Test System TR-AS® 60/100-10 with 4 channels

**DR. STRAUSS**

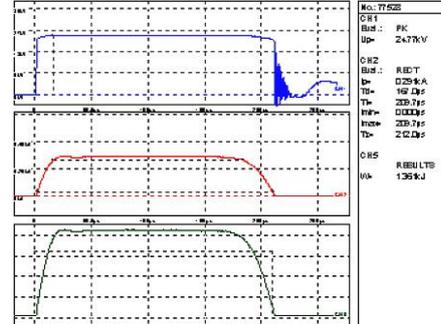
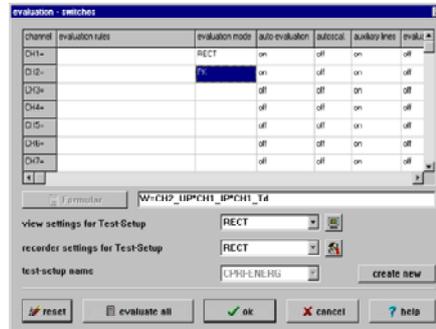
Impulse Measurement  
Calibration - Diagnosis  
www.strauss-mess.de



The first instant of the list which is found is set the tmax time  
If search automatic integration interval (tmin to tmax) is not selected it is possible to select different evaluation instants.

WinTRAS formula:

$$W[VAs] = \text{INTEGRAL}(CH5, CH2_{tmin}, CH2_{tmax})$$



## Measuring and Evaluating System TR-AS® 60-10 Type DERA 6

The system with 4 simultaneous channels is designed with digital recorder components TR-AS® 60-10 or optional TR-AS® 100-10/12 as follows:

- Ch 1 impulse current recorded with 60 MS/s up to 1000 ms
- Ch 2 residual voltage recorded with 60 MS/s up to 1000 ms
- Ch 3 arrester voltage recorded with 2.5 KS/s up to 20 sec.
- Ch 4 arrester current recorded with 2.5 KS/s up to 20 sec.

The timebase of the channels can be set individually while the trigger event is simultan for all channels.

For permanent watching of a.c. voltage and current during duty tests an additional oscilloscope is inbuilt showing the actual values rms and peak/√2 of Ch 3 and Ch 4 independent of their recording status.

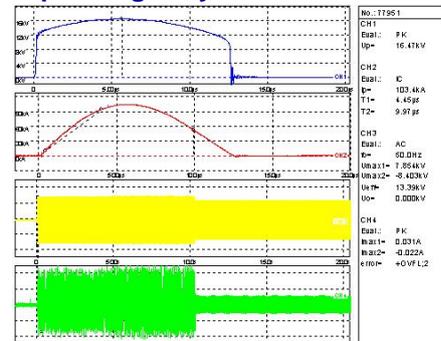
## Input of Evaluation rules with help of the MAKRO Formula Editor

## Energy calculation without integration

WinTRAS evaluation settings:

- Ch1 [u(t)] evaluated with PK = peak value
  - Ch2 [i(t)] evaluated with REC = rectangular, automatic calculation from tmin to tmax
- WinTRAS formula without integral:  
 $W = CH1\_Up \cdot CH2\_Ip \cdot CH2\_Td$   
 or  
 $W = CH1\_Up \cdot CH2\_Ip \cdot (CH2\_tmax - CH2\_tmin)$

## Operating Duty Tests



- Ch 1 residual voltage 0 to 20 µs
- Ch 2 impulse current 0 to 20 µs
- Ch 3 a.c. voltage 0 to 20 s

## Rectangular evaluation

Td The time duration where the amplitude of the Impulse is greater than 90% of its peak value.

Tt The time duration where the amplitude of the Impulse is greater than 10% of its peak value.

Tz Time from T0 (virtual time zero) to the first crossing with zero line

Ip, Up Peak value of current, voltage

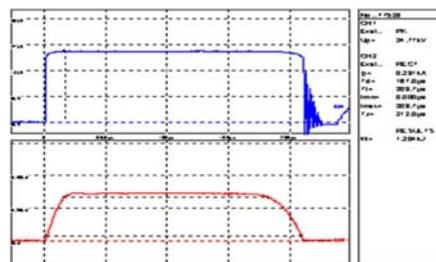
Tmin begin of the integral interval

Tmax end of the integral interval

If search automatic integration interval (tmin to tmax) is selected the software searched the tmax instant.

The software tries to find following time instants:

- Tz time-to-zero, first crossing with 0% level
- T10 crossing with 10% level, Tt
- T30 crossing with 30% level, Tie30
- T50 crossing with 50% level, T2
- T70 crossing with 70% level, Tie70



## Energy calculation with integration

According to IEC 60099-4

$$W = U_{res}(U_i - U_{res}) \cdot 1/Z \cdot T = U \cdot I \cdot T$$

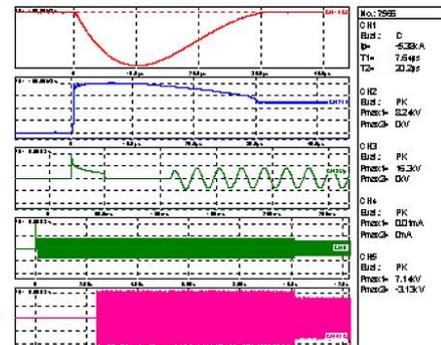
$$\Rightarrow W = \int_{tmin}^{tmax} u(t) \cdot i(t) dt$$

tmin to tmax is the time in which the amplitude is greater then 0% of the peak value.

If found automatic integration interval is on, the software tries to found the impulse end.

WinTRAS evaluation settings:

- Ch1 [u(t)] evaluated with PK = peak value
- Ch2 [i(t)] evaluated with REC = rectangular, automatic calculation from tmin to tmax
- Ch5 = Ch1[u(t)] · Ch2[i(t)]



- Ch 1 impulse current 0 to 50 µs
- Ch 2 residual voltage 0 to 50 µs
- Ch 2\* residual voltage 0 to 250 µs
- Ch 3 a.c. voltage 0 to 12 s
- Ch 4 a.c. current 0 to 12 s

Display application of a.c. voltage 100 ms behind impulse current in Ch 2\*.

Display of reduction of a.c. voltage resp. current after 10 seconds in Ch 3 and 4.

