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Product Sheet

Grid Measurement

Capacitive Resistive Divider (CR Divider)



Drawing on its vast experience in voltage divider design and manufacturing, CONDIS' damped capacitive-resistive divider (CR DIVIDER) offers a proven and futur proof solution for high bandwidth and transient voltage measurement on HV network.

Key advantages

- High precision and large bandwidth measurement at HV and EHV
- Highly accurate measurement of impulse voltages
- Linear voltage error from low to high voltage range
- Wide temperature range

Product features

These are sample values. Values out of these ranges are available upon request

Electrical specifications

Maximum system voltage, kV	36 to 800
Rated frequency bandwidth, Hz	from 15 up to 150'000
Extended frequency bandwidth, Hz	up to 500'000
Rated voltage factor	1.2 (cont.) / 1.9*

Output specifications

Rated secondary voltage, V	100/√3*
Secondary burden	2 MΩ // 25 pF*
Number of LV outputs	1, 2*

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Accuracy class

Accuracy class at nominal frequency	0.5P , 1.0P (IEC 61869-11:2017)
Accuracy at rated frequency bandwidth	0.5 , 1.0
Accuracy at frequencies from 30 kHz up to 150 kHz	± 5 %**
Accuracy at frequencies from 150 kHz up to 500 kHz	± 10 %**
Accuracy at impulse voltage (LIWV)	± 5 %

Environmental

Range of temperatures, °C	-50 °C to +40 °C
Cable type and length	Triaxial, 100 m*

* other values upon request

** depending on voltage levels and connecting cable length

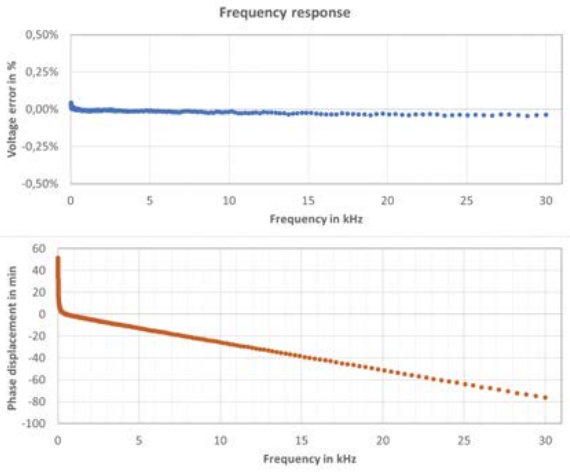
Applications for CONDIS' CR divider:

- Transient monitoring
- Measurement of electric power quality parameters
- Protection
- Travelling Wave detection

Transient measurement performance

Accuracy at rated frequency bandwidth

The frequency response is measured using a reference system injecting 10 Vpeak in the primary terminal of a CR divider with Um=36 kV. The secondary voltage measured on the low voltage terminal of the divider is compared to the reference signal, while a frequency sweep from 15 Hz up to 30 kHz is performed. The resulting voltage error and phase errors of the CR divider are depicted in Figure 1. It can observed that the voltage error remains very small and linear up to the 30 kHz mark. The phase displacement also shows very little deviation with increasing frequencies.



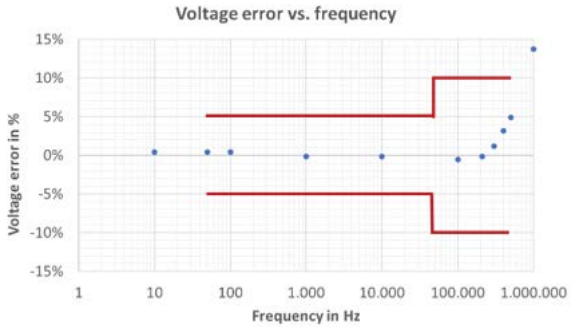
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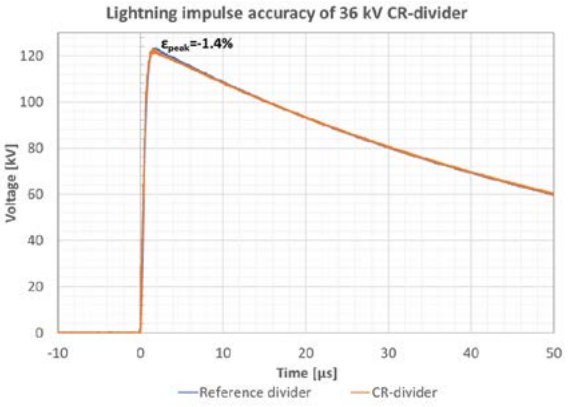
Accuracy at extended frequency bandwidth

The voltage error for the extended frequency bandwidth is measured using a signal generator injecting 10 Vpp in the primary terminal of a CR divider with Um=36 kV. The secondary voltage measured on the low voltage terminal of the divider, by use of an oscilloscope, is compared to the reference signal. The sinusoidal frequency is varied from 10 Hz up to 1 MHz. The resulting voltage error of the CR divider for this extended frequency band is shown in Figure 2. The red lines show the permitted error vs. frequency according to wideband accuracy classes defined in IEC 61869-1 Ed.2.



Accuracy at impulse voltages

Due to the integrated damping resistance, the CR divider has excellent impulse measurement performance. The damping resistance suppresses internal oscillations in the divider for fast transients, or impulses, respectively, resulting in accurate reproduction of the primary voltage. Figure 3 shows a comparison of accuracy between a laboratory reference divider (blue curve) and CONDIS' CR divider (orange curve), when a standard lightning impulse (1.2/50µs) is injected in the primary terminal.
The secondary voltage, measured on the low voltage terminal of the divider, is scaled by the divider ratio and plotted together with the reference signal.



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