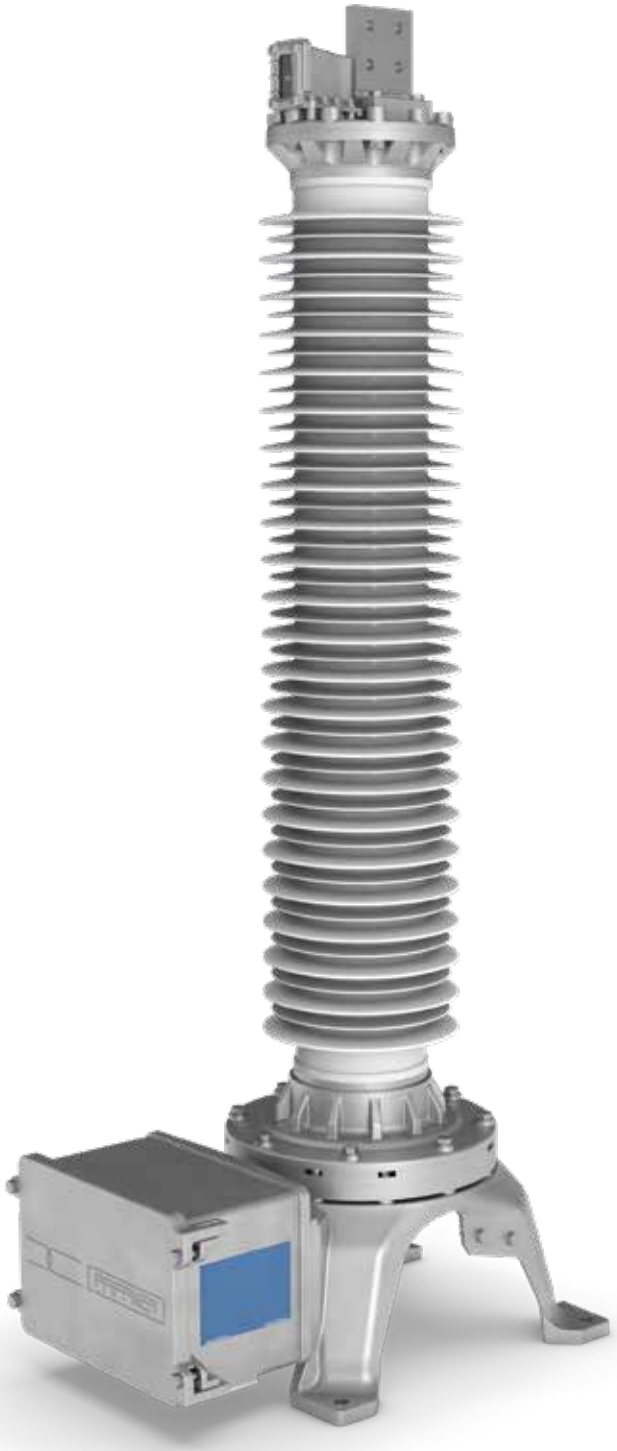
Resistive capacitive voltage divider

Outdoor operation
Oil insulated

ROF 72-550 kV



PFIFFNER

Current and voltage – our passion

General description

Resistive capacitive voltage dividers type ROF (RC divider) are used in high voltage networks within the 72.5 –550 kV (AC) range. They divide the primary voltage to standardised, equivalent secondary voltage for metering, measuring and protection devices.

The active part of the RC divider consists of capacitive and parallel connected resistive dividing elements. The length of the active part extends along the entire insulator length, which results in linear voltage distribution. Both elements are calibrated to each other and provide accurate transient voltage signals from the high voltage side to the low voltage side. The RC divider enables very high frequency bandwidth; even direct voltages (DC) can be measured.

As the active part of the RC divider is hermetically sealed, an expansion bellow in the head section compensates volume changes of the oil due to temperature variations. The operating pressure will be visualised by monitoring unit.

For voltage levels of 420 kV and higher, field distortions are avoided by using a corona ring around the head of the divider.

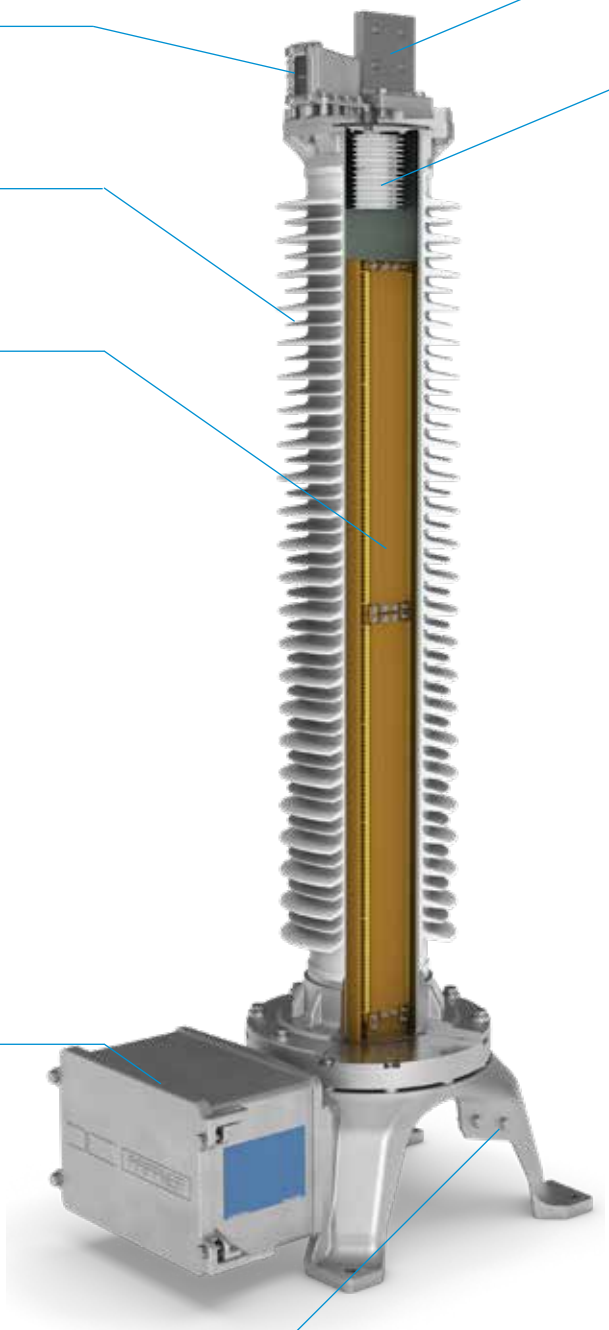
The secondary elements, like adjustment and overvoltage protection components, are located in the terminal box together with the equivalent burden replications. The cover plate of the terminal box can be opened laterally. The connecting sockets for the measuring cables are located on the bottom side of the terminal box.

The connection of the secondary output voltage can either be implemented by analogue via a shielded measuring cable or by optionally digital using a fibre optic cable. The RC dividers are factory calibrated and will be delivered with specified measuring cable.

Advantages of resistive capacitive voltage dividers

- Ferro resonance-free and no saturation effects
- Secondary output can be operated under short-circuit or no-load conditions
- AC and DC accuracy class ±0.1% @f_R
- Measurement of harmonics possible up to 1 MHz
- Transient signals can be measured
- Accuracy with harmonics up to 10 kHz of ±0.2

Design



Possible options

- Painted metal surfaces
- SF_6-Gas insulation
- Up to 4 secondary terminal outputs
- Burden replication, incl. cable parameters are placed in the terminal box
- Extended frequency transmission range up to 30 kHz
- Digital measurement signal transmission via fibre-optic cable
- Recalibration, if changes in secondary measurement system.

Highlights

Linear voltage distribution

- The optimised arrangement of the resistive and capacitive elements across the entire insulator length results in excellent voltage distribution.
- The RC divider shows a perfect performance under transient voltage stresses and under high pollution conditions.
- The linear voltage distribution prevents the occurrence of external partial discharges.

High accuracy at frequencies up to 10 kHz

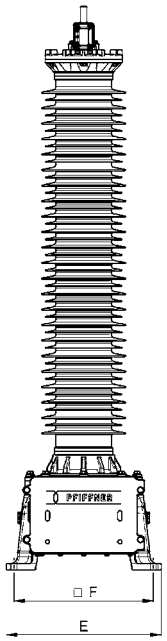
- The specially developed design of the active part with resistive and capacitive elements guarantees high measurement accuracy and stability up to the 200th harmonic of the rated system frequency.
- At the same time, high accuracy and stability in voltage variation (linearity) is achieved, starting from lower voltages up to the overvoltage factor.

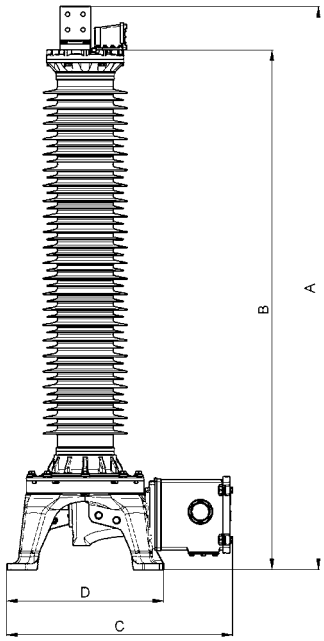
Simple measurement cable connection

- The terminal box has connecting sockets on the bottom side. The measuring cable can be easily connected without any opening of the terminal box.
- In case additional measuring cable (transmission cable) is needed, the cable can be plugged into the next free available terminal socket. To do this, the prepared burden adaption must be switched off in the terminal box. The divider is still calibrated and ready for operation.

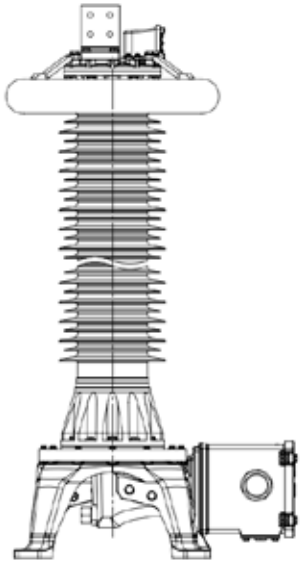
Technical data

72–362 kV





420–550 kV



Type ROF		72	123	145	170	245	300	362	420	550
Standard		DIN / IEC / IEEE								
Highest voltage for equipment (U_m)	kV	72.5	123	145	170	245	300	362	420	550
Rated power-frequency withstand voltage	kV	140	230	275	325	460	460	510	630	680
Rated lightning impulse withstand voltage	kV	325	550	650	750	1050	1050	1175	1425	1550
Rated frequency (f_r)	Hz	DC/16.7 / 50 / 60								
Accuracy class		0.1; 0.2; 0.5; 1.0; 3.0								
Frequency bandwidth	Hz	DC / 15–10000 (30000)								
Burden type		R or R//C								
Burden range		≥ 100 kΩ								
Rated voltage factors		1.5–30 sec / 1.9–30 sec / 1.9–8 h								
Temperature range	°C	-50... +40								

Type ROF			72	123	145	170	245	300	362	420	550
Total height of unit*	A	mm	1326	1626	1826	2026	2626	2869	3511	3911	4669
Height to primary terminal*	B	mm	1186	1486	1686	1886	2486	2729	3371	3771	4529
Depth of unit including terminal box	C	mm	724	724	724	724	724	724	724	724	724
Depth of unit base	D	mm	500	500	500	500	500	500	500	500	500
Width of unit base	E	mm	500	500	500	500	500	500	500	500	500
Distance between screw holes at base	F	mm	450	450	450	450	450	450	450	450	450
Min. creepage distance*		mm	2420	3540	4280	5030	7260	7900	9390	12280	14590
Approximate weight*		kg	90	100	110	130	150	170	190	210	230

* with standard composite insulator, creepage distance 25 mm/kV

Global presence

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