

Portable VLF test systems for testing medium-voltage cables according to CENELEC HD 620/621

# VLF CR-28 – up to 60 kV



## Benefits

- ▶ VLF, DC and sheath fault testing in one device
- ▶ Portable thanks to two-part construction
- ▶ High test capacitance
- ▶ Integrated discharge system
- ▶ Reporting
- ▶ Parameterisation via chip-card



**sebaKMT**

# Long cables? No problem!

## ► Description

The portable, high-performance and energy-efficient VLF test systems are used for testing cables with 0.1 Hz cosine-rectangular voltage according to CENELEC standards. In accordance with guidelines, the dielectric strength of cables and joints must be checked after installation or repair.

In total three portable systems are available, each with different voltage levels (28, 40 and 60 kV).

- VLF CR-28 up to cable series 15 kV
- VLF CR-40 up to cable series 23 kV
- VLF CR-60 up to cable series 35 kV

## High test capacity

The systems consist of a control unit and a HV unit. Thanks to their two-part construction, the systems are portable and easy to transport.

One of the advantages of the cosine-rectangular test method is the high test capacitance of up to 5  $\mu\text{F}$  at 0.1 Hz. This test capacitance allows all three phases to be tested simultaneously.

## Proven procedure

Using 0.1 Hz cosine-rectangular voltage, weak points in the cable are broken down safely. The amenities of the VLF method using 0.1 Hz cosine-rectangular voltage have been confirmed by numerous scientific examinations and practical field trials. Since the patent was granted in 1987, more than 2,500 systems have been sold worldwide. This proven voltage shape is recommended by DIN VDE standards, the HD 620 and HD 621 harmonisation documents and the IEEE 400 standard.

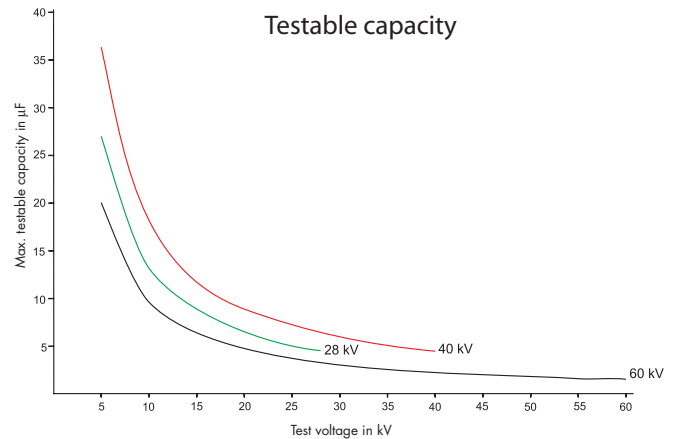
## DC testing, sheath fault testing and pinpointing

By switching to DC testing, the cables and connected substations can also be tested with negative and positive DC voltage. Aside from cable and sheath testing, the test systems can also be used for the precise pinpointing of sheath faults (in combination with a step-voltage probe).

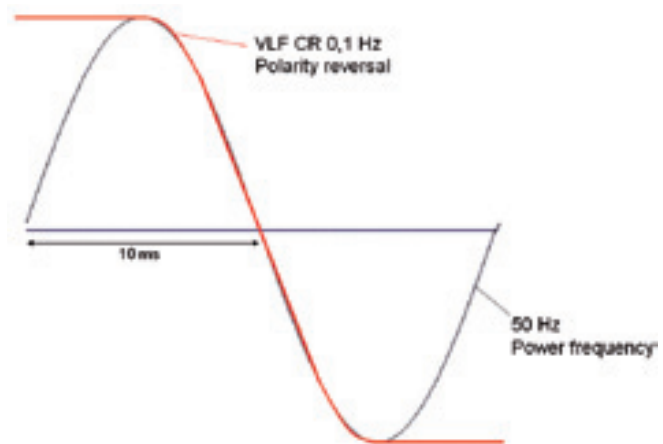
## Maximum safety

The integrated discharge system and breakdown detection provide for maximum levels of user-safety.

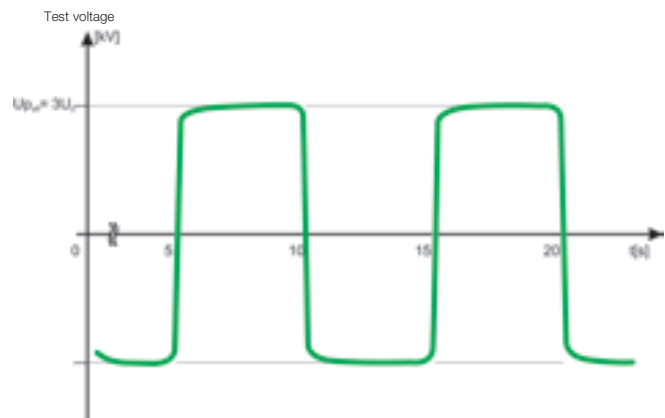
The measurement of the leakage current allows a relative evaluation of the cable insulation quality, whilst the logging function allows the archiving and further processing of test results.



Test capacitance as function of the test voltage



Polarity reversal of the 0.1 Hz cosine-rectangular VLF voltage



Shape of 0.1 Hz cosine-rectangular VLF voltage

Thanks to its compact design and voltage level, the VLF CR-60 is ideally suited for testing 30/35 kV cables in offshore areas.

It makes sense to test offshore cables on a regular basis, as downtimes otherwise lead to losses of several hundred thousand euros.

The modified offshore system from SebaKMT meets all applicable requirements for systems of this type.

Optional transport containers are also available, which protect the system against increased, aggressive humidity. The VLF CR-60 can be stored and transported easily in these containers.



**Transport container  
VLF CR-60**



**VLF CR-60 kV in operation on the "Baltic 1" wind park (Baltic Sea)**

### Maximum test lengths

	<b>VLF CR-28 kV</b>	<b>VLF CR-40 kV Basis</b>	<b>VLF CR-40 kV Plus</b>	<b>VLF CR-60 kV Basis</b>	<b>VLF CR-60 kV Plus</b>
10 kV 240 mm <sup>2</sup> XLPE/PE cable With $U_p = 18 \text{ kV}_{\text{rms}}$	Single phase: 15 km (system: 5 km)	Single phase: 11 km (system: 3.6 km)	Single phase: 22 km (system: 7.3 km)	Single phase: 6 km (system: 2 km)	Single phase: 12 km (system: 4 km)
11 kV 240 mm <sup>2</sup> XLPE/PE cable With $U_p = 19 \text{ kV}_{\text{rms}}$	Single phase: 15 km (system: 5 km)	Single phase: 11 km (system: 3.6 km)	Single phase: 22 km (system: 7.3 km)	Single phase: 6 km (system: 2 km)	Single phase: 12 km (system: 4 km)
15 kV 240 mm <sup>2</sup> XLPE/PE cable With $U_p = 27 \text{ kV}_{\text{rms}}$	Single phase: 12.5 km (system: 4.2 km)	Single phase: 8 km (system: 2.7 km)	Single phase: 16 km (system: 5.4 km)	Single phase: 5 km (system: 1.7 km)	Single phase: 10 km (system: 3.4 km)
20 kV 240 mm <sup>2</sup> XLPE/PE cable With $U_p = 36 \text{ kV}_{\text{rms}}$		Single phase: 8.7 km (system: 2.9 km)	Single phase: 17.4 km (system: 5.8 km)	Single phase: 5.2 km (system: 1.7 km)	Single phase: 10.4 km (system: 3.4 km)
35 kV 240 mm <sup>2</sup> XLPE/PE cable With $U_p = 60 \text{ kV}_{\text{rms}}$				Single phase: 5 km (system: 1.7 km)	Single phase: 10 km (system: 3.3 km)



# We are happy to provide you with information!

<b>Technical data</b>			
<b>Model</b>	<b>VLF CR-28 kV</b>	<b>VLF CR-40 kV</b>	<b>VLF CR-60 kV</b>
VLF output voltage	0 ... 28 kV <sub>eff</sub>	0 ... 40 kV <sub>eff</sub>	0 ... 60 kV <sub>eff</sub>
Leakage current measurement (standard)	0 ... 12 mA	0 ... 7 mA	0 ... 5 mA
...	(10 µA resolution)		
Voltage wave shape	Cosine-rectangular		
Frequency	0.1 Hz		
<b>Testable cable capacitance</b>			
Plus version		4.8 µF / 40 kV <sub>eff</sub>	2 µF / 60 kV <sub>eff</sub>
Basic version	5 µF / 28 kV <sub>eff</sub>	2.4 µF / 40 kV <sub>eff</sub>	1 µF / 60 kV <sub>eff</sub>
<b>DC output voltage</b>			
Basic version	0 ... -28 kV	0 ... -40 kV	0 ... -60 kV
Plus version		0 ... +40 kV, 0 ... -40 kV	0 ... +60 kV, 0 ... -60 kV
DC leakage current measurement	0 ... 12 mA	0 ... 7 mA	0 ... 5 mA
Discharge system	Integrated	Integrated	Integrated
Input voltage	230 V, 50/60 Hz, 500 VA 120 V, 60 Hz, 500 VA		
<b>Sheath testing / sheath fault pinpointing</b>			
	Testing: 2 ... 10 kV Pinpointing: 2 ... 10 kV, Pulse-ratio 1:3 / 1:5 / 1:9		
Leakage current measurement	Yes		
Breakdown detection	Yes		
Measurement log printout	Optional		
Reporting	Yes		
Parameterisation via chip card	Yes		
Operating temperature	-20 ... +50°C		
Weight (depends on options fitted)	Approx. 25 kg + 25 kg	Approx. 55 kg + 48 kg	Approx. 85 kg + 48 kg
Dimensions (W x H x D), divided between two devices	550 x 800 x 420 mm	550 x 1,100 x 420 mm	550 x 1,100 x 420 mm

#### Delivery includes:

- ▶ Basic equipment
- ▶ Cable set HV/LV
- ▶ Accessory bag

#### Options:

- ▶ Transport container for offshore use
- ▶ ESG NT step-voltage probe

**For more information, see:**

**[www.sebakmt.com](http://www.sebakmt.com)**

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Technical data subject to change without notice.

**ISO 9001:2008**