

VLF CR series

Portable VLF test systems for testing medium voltage cables according to IEC 60502-2 and IEEE 400.2



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

DESCRIPTION

The VLF CR Series are portable, efficient, high-performance systems for testing cables with 0.1 Hz cosine-rectangular voltages, in keeping with IEC and IEEE standards. In accordance with these guidelines, the dielectric strength of cables and joints must be checked after installation or repair.

Three portable systems are available, each with different voltage levels (28, 40 and 60 kV):

- VLF CR-28 up to 15 kV rated cables
- VLF CR-40 up to 23 kV rated cables
- VLF CR-60 up to 36 kV rated cables

High test capacity

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

One of the advantages of the cosine-rectangular test method is the high test capacitance of up to 5 μF at 0.1 Hz. This test capacitance allows all three phases to be tested simultaneously with the standardized test frequency of 0.1 Hz.

Proven procedure

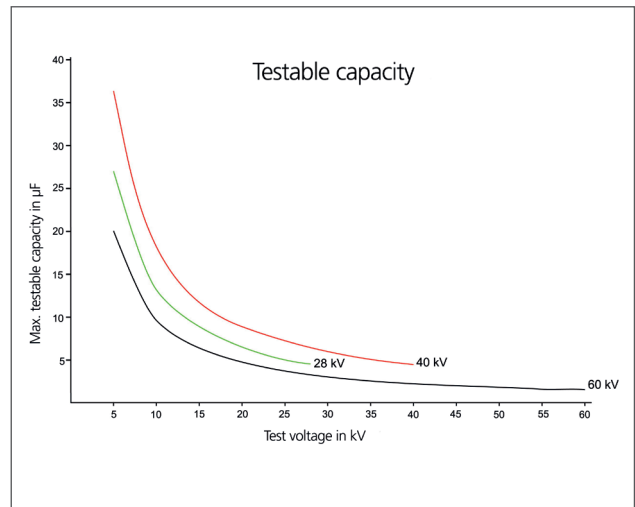
Using 0.1 Hz cosine-rectangular voltage, weak points in the cable can be safely broken down. The benefits of the VLF method using 0.1 Hz cosine-rectangular voltage have been confirmed by numerous scientific examinations and practical field trials. Since the patent was granted in 1987, more than 2,500 systems have been sold worldwide. This proven voltage shape is recommended by the CENELEC HD 620 and HD 621 harmonisation documents, the IEC 60502-2 standard and the IEEE 400.2 standard.

DC testing, sheath fault testing and pinpointing

By switching to DC testing, the cables and connected substations can be tested with negative and positive DC voltage. Aside from cable and sheath testing, the test systems can also be used to precisely pinpoint sheath faults (in combination with a step-voltage probe e.g. the ESG NT).



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



Test capacitance as function of the test voltage

Maximum safety

The integrated discharge and breakdown detection systems maximise user safety. Measuring the leakage current serves to develop a relative evaluation of cable insulation quality; test results can be archived for further processing through the logging function.

Because of its compact design and high voltage level, the VLF CR-60 is ideally suited for testing 30/36 kV cables in offshore areas.

Testing offshore cables regularly is vital because any downtime will result in massive financial losses.

The modified offshore system found in the VLF CR-60 meets all applicable requirements for sea-bound operations. Optional transport containers are also available, which protect the system against water ingress. The VLF CR-60 can be stored and transported easily in these containers. The VLF CR-60 can be stored and transported easily in these containers.



Transport container VLF CR-60

MAXIMUM TEST LENGTH

	VLF CR-28 kV	VLF CR-40 kV Basic	VLF CR-40 kV Plus	VLF CR-60 kV Basic	VLF CR-60 kV Plus
11 kV, 240 mm ² VPE/PE cable with Up = 19 kV _{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 ² VPE/PE cable with Up = 27 kV _{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)
22 kV, 240 mm ² VPE/PE cable with Up = 40 kV _{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)
36 kV, 240 mm ² VPE/PE cable with Up = 60 kV _{rms}				Single phase: 5 km (system: 1.7 km)	Single phase: 10 km (system: 3.3 km)

TECHNICAL DATA*

	VLF CR-28 kV	VLF CR-40 kV	VLF CR-60 kV
VLF output voltage	0 ... 28 kV _{rms}	0 ... 40 kV _{rms}	0 ... 60 kV _{rms}
Leakage current measurement (standard)	0 ... 12 mA	0 ... 7 mA	0 ... 5 mA
Voltage wave shape		(10 µA resolution) Cosine-rectangular	
Frequency		0.1 Hz	
Testable cable capacitance			
Plus version		4.8 µF / 40 kV _{rms}	2 µF / 60 kV _{rms}
Basic version	5 µF / 28 kV _{rms}	2.4 µF / 40 kV _{rms}	1 µF / 60 kV _{rms}
DC output voltage			
Basic version	0 ... - 28 kV	0 ... - 40 kV	0 ... - 60 kV
Plus version	0	0... ± 40 kV	0 ... ± 60 kV
DC leakage current measurement	0 ... 12 mA	0 ... 7 mA	0 ... 5 mA
Discharge system	Integrated	Integrated	Integrated
Input voltage	110/230 V, 50/60 Hz, 300 VA	110/230 V, 50/60 Hz, 300 VA	110/230 V, 50/60 Hz, 300 VA
Sheath testing / sheath fault pinpointing		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 ... +55 °C	-20 ... +40 °C	-20 ... +40 °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 1100 x 420 mm	550 x 1100 x 420 mm

ORDERING INFORMATION

Product	Order no.
VLF CR-28 kV Basic equipment, cable set HV/LV, accessory bag	899005936-S
VLF CR-40 kV Basic equipment, cable set HV/LV, accessory bag	Basic version: 899004500-S Plus version: 899004501-S
VLF CR-60 kV Basic equipment, cable set HV/LV, accessory bag	Basic version: 899007186-S Plus version: 899007187-S
VLF CR-60 kV offshore Basic equipment, cable set HV/LV, accessory bag	Basic version: 108300017 Plus version: 108300018
Optional:	
HV connection cable 10 m VLF CR 40/60	890016969
HV connection cable 15 m VLF CR 40/60	118306651
HV cable drum 25 m VLF CR 40/60	899006166
Transport container for offshore use	890025130
ESG NT step-voltage probe	1004629-S

* We reserve the right to make technical changes.

SALES OFFICES

Megger GmbH

Obere Zeil 2
D-61440 Oberursel
Germany
T 0049 6171 92987-0
E info@megger.de

Seba Dynatronic
Mess- und Ortungstechnik GmbH
Dr.-Herbert-Iann-Str. 6
96148 Baunach
Germany
T 0049 9544 68-0
E team.international@megger.de

VLF SERIES_DS_EN_V02

www.megger.com

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