Protect your investment.
From the very beginning.

Megger

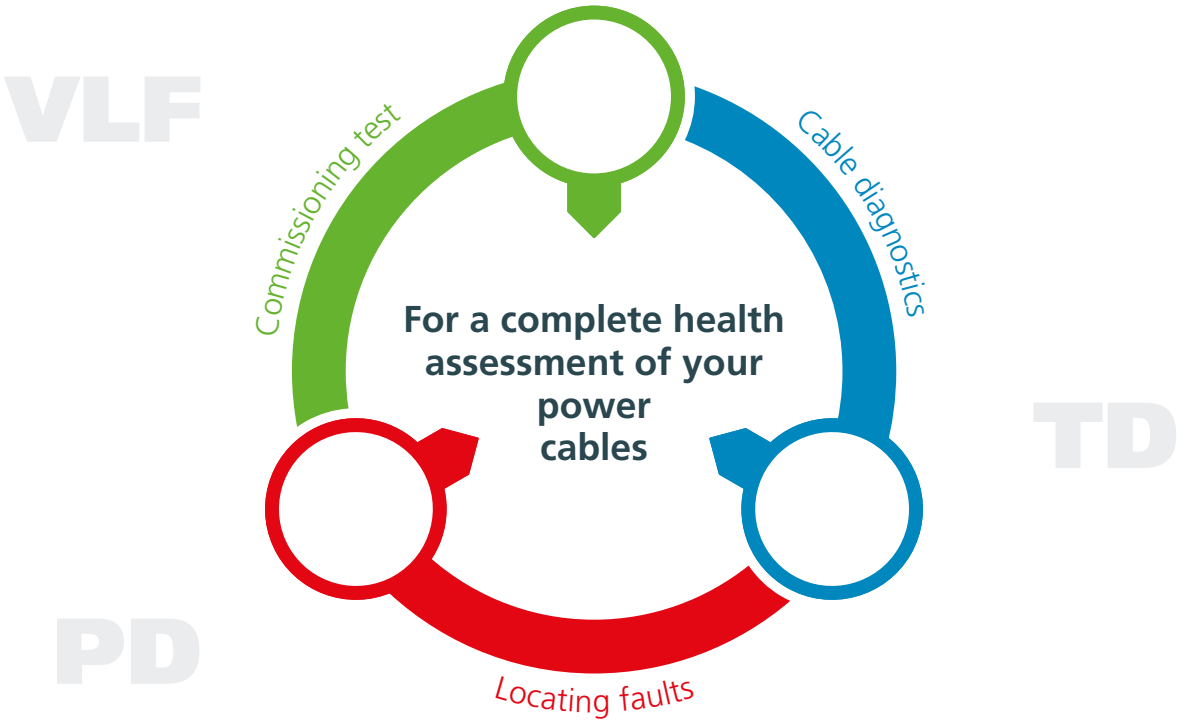
Commissioning testing, cable diagnostics and cable fault location on wind turbines, photovoltaic systems, underground and long submarine cables

THE COMPLETE 360° SOLUTION

Commissioning tests, cable diagnostics and fault location on wind turbines and PV systems

Power cables form the backbone of our energy supply chain, now more than ever when considering the ongoing ‚green' transition of power grids and the fast expansion of renewables. Keeping these cables in good condition is essential for ensuring cost-efficient and reliable operation over many years. Inspecting the outer sheath is the easiest way to obtain valuable information about the condition of a cable. If the sheath is intact, water cannot enter the cable and there is no risk of the dielectric being weakened by moisture. It is also advisable to perform additional partial discharge (PD) measurements using near-line-frequency voltage waveshapes, in order to discover local defects such as workmanship issues in joints. To assess the ageing of the main insulation of service-aged cables, tan delta (TD) measurements complete the overall picture of the cable.

Megger offers tailored solutions for testing, diagnostics and fault location on AC and DC offshore and onshore cable systems. Their optimised safety technology allows for the stored energy to be discharged safely even when the cables are very long, thereby providing both the equipment and the operating personnel with maximum protection.



Unscheduled downtimes and delays in commissioning incur high costs

It may take days or weeks for a wind farm or solar power station to be ready for operation again after a cable has been damaged. The outage costs for a 100 MW offshore plant can add up to as much as €200 000 per day. It is therefore of the utmost importance to locate and repair the damage as quickly as possible.

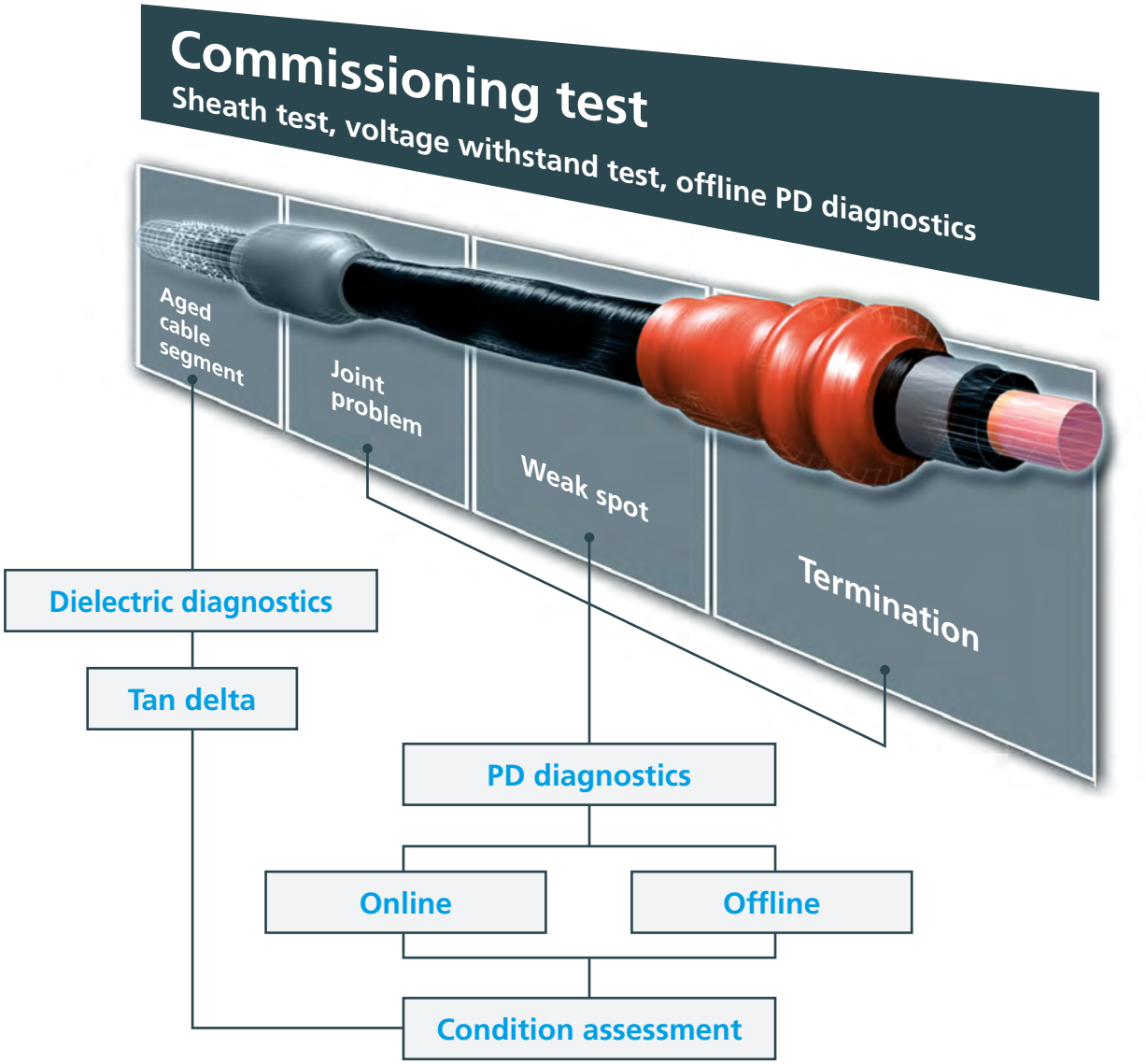
POWER GENERATION RENEWABLES
OFFSHORE SOLAR
TRANSMISSION E-MOBILITY
ONSHORE DISTRIBUTION
PV WIND INFRASTRUCTURE

COMMISSIONING TEST AND DIAGNOSTICS

After installation, during periodic maintenance, after repair, at the end of the warranty period, or at asset handover

In accordance with DIN-VDE, CENELEC, IEC and IEEE

Before a wind turbine or photovoltaic system is commissioned, the cable installation going to the substation must be tested according to relevant standards. The same applies after repairs have been carried out. This allows to detect weak spots in terminations and joints or damage to the main insulation and outer sheath at an early stage, meaning, they can be remedied by way of preventive maintenance before resulting in high repair costs, significant loss of generation revenue or even liability incidents. Carrying out a voltage withstand test as well as a diagnostics test to assess the condition of the cables – especially right before end of warranty – provides an effective approach to comprehensive commissioning testing.



VOLTAGE / POWER

Testing and diagnostic equipment for high-voltage cables
Compact and transportable, for quick and easy installation onsite, e.g. in substations

HV DAC

VLF CR

High-performance test equipment for very long cables
Perfectly suited for a seaworthy installation in a maritime transport container

PORTABLE DEVICES

MOBILE SYSTEMS

TDM / TDS / VLF SINE

VLF testers with high test capacity
Easy to move around thanks to a two-part design

Coupler for detecting partial discharges
Available as an accessory for all VLF test equipment

PDS PD coupler

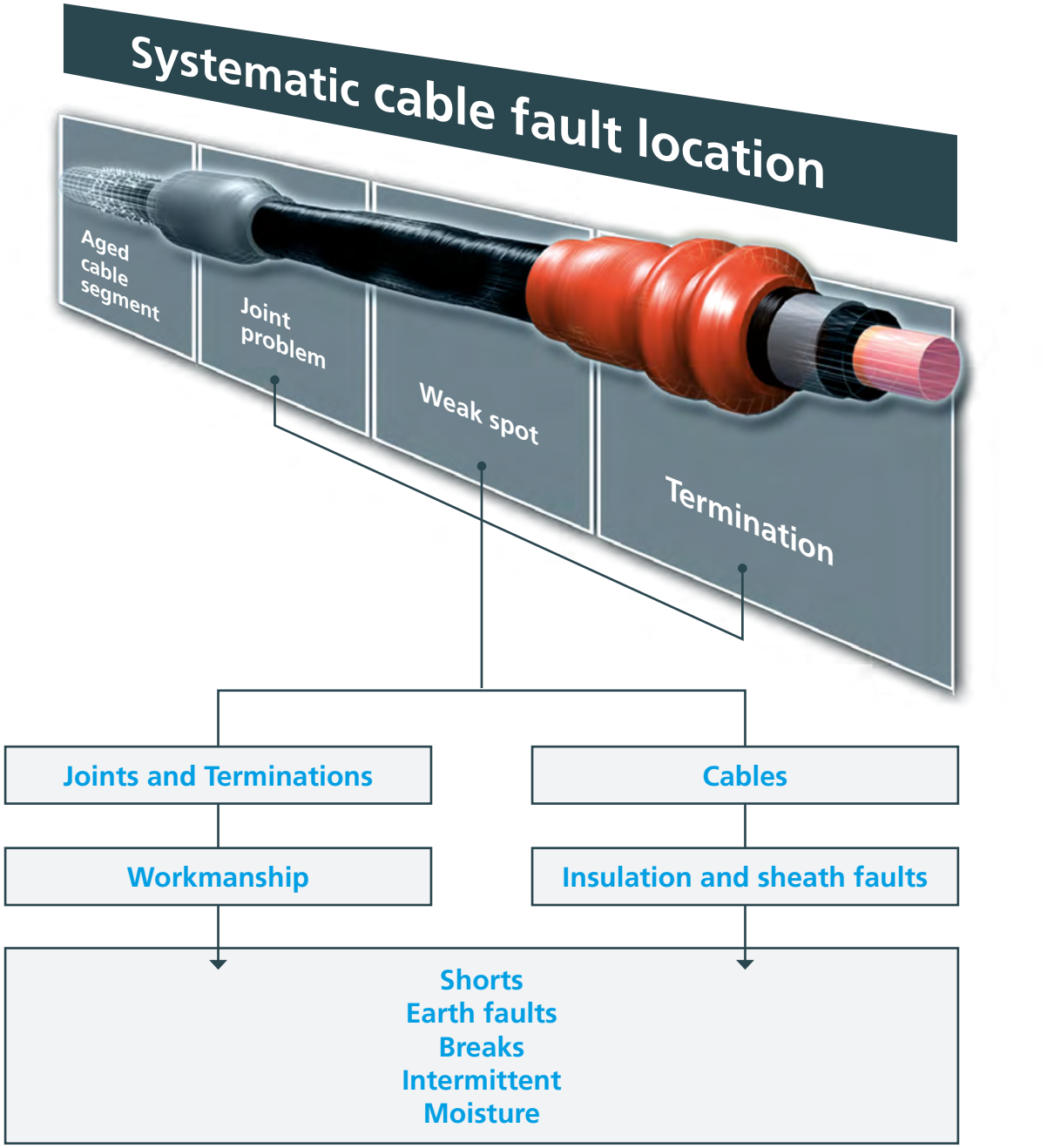
TELEFLEX VX

High end TDR for recording fingerprint traces

CABLE LENGTH

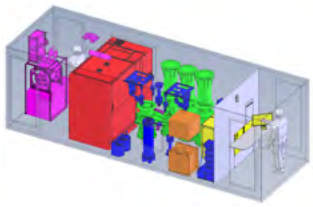
SYSTEMATIC CABLE FAULT LOCATION ON LONG SUBMARINE AND UNDERGROUND CABLES

Assembly errors and external damage caused by third parties are the most common failure modes of cables. Cable faults are associated with long downtimes and operators' losses can easily run into the millions. Investing in suitable fault location equipment and having the equipment readily available if faults occur reduces downtimes significantly. Due to such time savings the investment will pay for itself very quickly.



VOLTAGE / POWER

High performance cable fault location system
Can be integrated into a seaworthy maritime transport container. Stationary systems at each end of the cable significantly improve the measuring accuracy on very long cables



Offshore container

CENTRIX / R30

Centrally controlled cable test van
Suitable for all cable networks up to transmission level. Flexible to meet customers' needs; can even be integrated into small vans

MOBILE & STATIONARY SYSTEMS
PORTABLE DEVICES

STX 40

Mobile cable fault location system
Offers the same ease of use, performance and safety features as a cable test van – while being lightweight and taking up little space

HVB 10

High-precision high-voltage measuring bridge for very long cables
For detecting sheath damage and main insulation faults in situations where TDR-based measurement methods currently run into their limits, e.g. with very long submarine cables or cross bonding

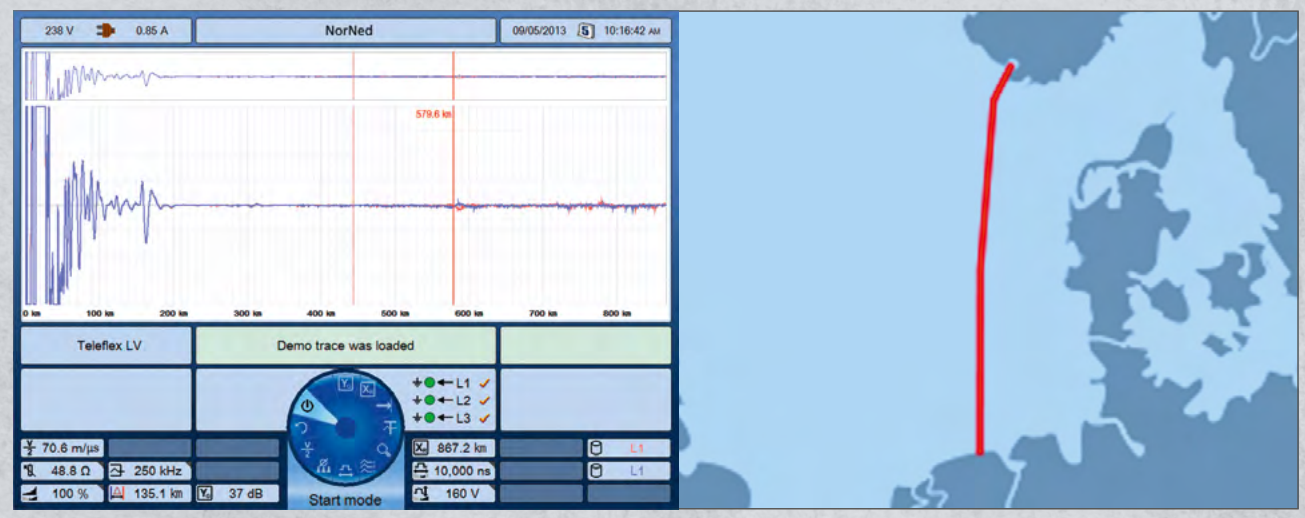
Sheath fault location system
For detecting sheath damage which will lead to failures in the long term due to moisture ingress

MFM 10

CABLE LENGTH

REFERENCE 1

World record!
The Teleflex VX radar performed with great success on a 580 km long submarine cable between Norway and the Netherlands



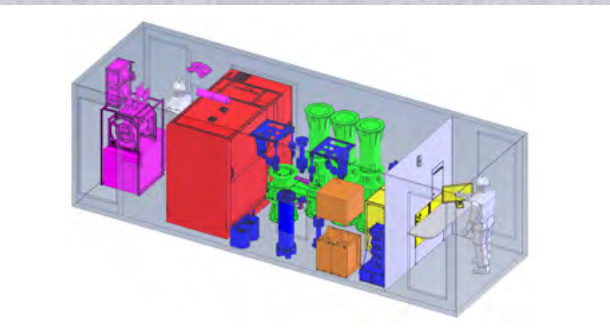
For the first time, a 580 km submarine cable has been successfully measured over its entire physical length using a radar or time domain reflectometer. The NorNed HVDC submarine cable is one of the longest submarine cables in the world and runs from Norway to the Netherlands. Precise fault location technology like this is already of vital importance for operating the NorNed cable and generally all other submarine cables in an economical way.

TDR technology is a valuable tool for prelocating faults on cables. Measuring cables longer than 50 km, however, poses a considerable challenge for TDRs. Operators of long submarine cables, which are becoming more and more popular to transport power between different countries, are therefore particularly interested in finding a solution to this long range problem, since hardly any solutions for locating faults on cables of this type have been available to date.

The TDR tester with an extended range is optimised for working on long cables

REFERENCE 2

Pioneering and applying latest technology to have success in challenging cable fault scenarios



The construction of offshore grid connections and long underground cables is progressing steadily. However, faults in submarine cables differ greatly from those in underground cables, because it is not possible to exactly pinpoint faults in submarine cables under water. Nevertheless, those cable faults must be remedied in record time. For this, Transmission System Operator TenneT contracted the KOOPMANN Group to collaborate with Megger in the development of a suitable concept. The result is revolutionary: A container full of high-tech cable fault location equipment that can be transported over land, over water and even in the air. With the help of Megger's decades of experience in cable fault location, cable testing and diagnostics, this innovative high-performance testing system makes it possible to offer new, trendsetting solutions in the offshore sector and for long AC and DC cables.

In addition to the offshore container solution, the KOOPMANN Group also owns several Megger cable test and diagnostics vehicles, including the cable test van known as 'The Beast' equipped with the currently most powerful VLF system capable of 25 µF at 0.1 Hz and 60 kV RMS. This allows to test cables of up to 100 km length. Furthermore, the built-in 60 kV surge generator is suitable for finding faults on medium- and high-voltage cables.

The control room in the container offers enough space for several people

The excellent performance of the last few years – with more than 30 offshore operations and a 100% detection rate – shows that our expert test engineers have chosen the right technology.

Oliver Nicolai
Head of Sales
KOOPMANN Group

Seaworthy measuring container

REFERENCE 3

Unbeatable sheath fault location...

The company Hennig KMFO has been a specialist in cable testing according to VDE standards for several decades. A new wind farm needed to be connected to the local grid of a municipal utility, and the utility company demanded a thorough withstand and sheath fault test to be carried out beforehand. This proved to be fortunate because the testing regime immediately revealed variousl sheath problems ground faults on the cables.

... whether in a wind farm or PV system

REFERENCE 4

Reliably protecting wind farms against cable faults

wpd windmanager is the first wind farm operator who have got their own cable test van. Since then we have been locating cable faults in those wind farms entrusted to us, as well as diagnosing defects and weak spots long before they would fail. We are thereby protecting investors from expensive asset damage, ensuring profits and return on investment. We chose Megger due to the special technologies employed in cable fault location and diagnostics.

Oliver Klausch
Head of Technical Management at wpd windmanager

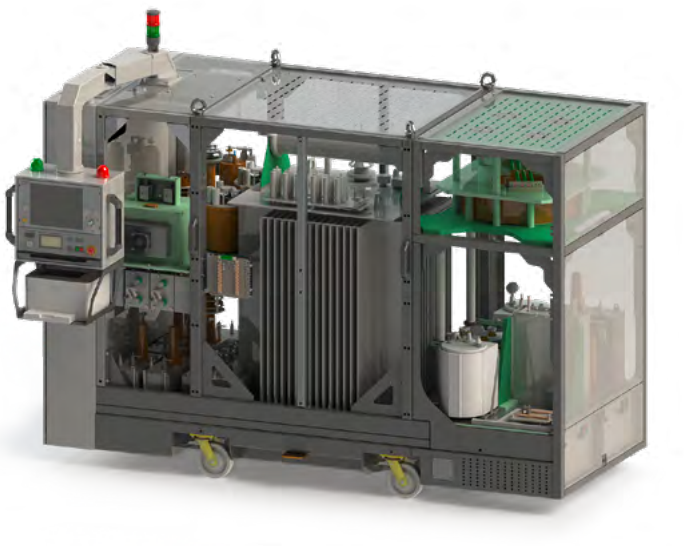
"Innovative measurement technology, in conjunction with great support from Megger, helps us obtain meaningful measurement results."

wpd windmanager

SPECIAL & CUSTOMISED SYSTEMS

Special applications need individual solutions. Worldwide.

Partnering up with our customers, Megger has provided many customised solutions for special applications over the years. As second-to-none experts for the design of the most comprehensive range of test equipment in this field, Megger is the preferred choice for tailor-made turn-key solutions for any cable testing or cable fault location application.



High power VLF test sets for cables of up to 100 km at 60 kV_{RMS} @ 0.1 Hz

Fault conditioning and fault conversion on long DC and AC cables with 20 kW high power burner

Third-party lab certified high power discharge units for long subsea cables of up to 1,000 km length (more than 300 µF, very short discharge time constant)

High power surge generators with more than 6,000 J at 25 kV and no duty cycle restrictions (please contact us for higher surge energy)

Special solutions for line location and pinpointing on long high voltage onshore and offshore cables upon request

Tailored high performance solutions for offshore and onshore cable fault location and cable testing by combining, integrating and automating the above mentioned unique capabilities

Our research and development team with their wealth of experience and engineering know-how is always willing to discuss new solutions for high-end applications.
Write to baunach@megger.com


SEACAT
SERVICES
OFFSHORE WINDFARM SUPPORT
SEACAT ENDEAVOUR

FURTHER EQUIPMENT

Accessories for condition analysis

PD SCAN
Handheld device for online PD measurement in MV switchgear

UHF PDD
Ultra-high-frequency PD detector for online PD measurement on accessible terminations and joints in MV and HV systems and substations

DLRO
Micro-Ohmmeter for measuring very low resistance values of electrical connections and circuit breaker contacts

S1
Powerful insulation resistance tester up to 15 kV with noise suppression

Accessories for cable identification

CABLE IDENTIFIER CI/LCI
Reliable identification of live and non-live cables

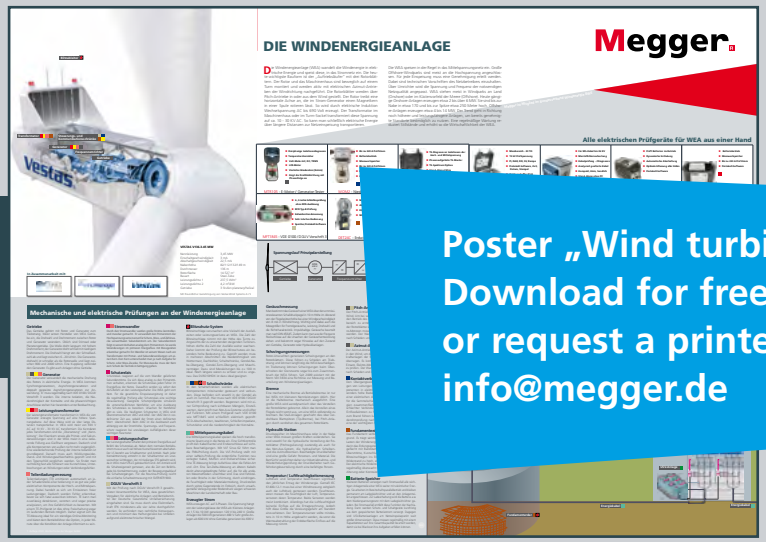
Accessories for fault location and line location

digiPHONE+2
Surge wave receiver for magnetic-acoustic pinpointing of faults

ESG NT
Digital earth fault detector with denoising for exact pinpointing of sheath faults by voltage gradient method (step voltage method)

FERROLUX
Cable route tracing and line location using audio frequency methods

And even more electrical test equipment specifically for wind turbines



Poster „Wind turbines“
Download for free via QR code or request a printed version from info@megger.de

PLEASE VISIT OUR VIRTUAL PRODUCT EXHIBITION

www.megger-cable.com

360°

Megger Germany GmbH · Dr.-Herbert-Iann-Str. 6 · D-96148 Baunach
Tel. +49 (9544) - 680 · Fax +49 (9544) - 2273
team.international@megger.com

www.megger.com

Megger

Technische Änderungen vorbehalten. ONSHORE-OFFSHORE_BR_EN_V01d.pdf
'Megger' ist eine eingetragene Marke. Copyright © 2021