



Megger[®]



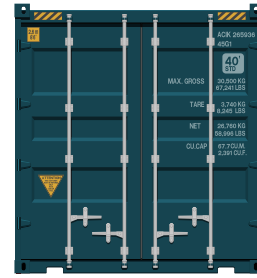
**MAINTENANCE OF THE
TRANSMISSION GRID**

Cable fault location on long HVAC and HVDC land and subsea cables

2026-07-08

EN
ENGLISH

All solutions at a glance



Devices / applications		R30 2.0 system	R550	TELEFLEX VX V2
Product description		High voltage fault location system for vehicles	Containerised high-end cable fault location system	Long-range TDR (Time Domain Reflectometer)
CABLE	AC land cables (110...380 kV)	★★★	★★★	★★★
	AC inter-array cables (30...69 kV)	★★★	★★★	★★★
	AC subsea cables (110...230 kV)	★★★	★★★	★★★
	DC subsea cables	★	★★★	★★
	DC interconnectors (± 525 kV)	★	★★★	★
	DC land cables	★	★★★	★★
	Cable lengths	long cables	very long cables	long cables
APPLICATION	Fault identification	✓	✓	-
	Fault prelocation	✓	✓	✓
	Fault pinpointing	✓	✓	-
	Fault conversion	✓	✓	-
	Route tracing / Line location	✓	-	-
	Monitoring	-	-	-
FAULTS	High-resistance faults	✓	✓	-
	Low-resistance faults	✓	✓	✓
	Intermittent faults	✓	✓	-
	Sheath faults	✓	-	-
METHODS	DC breakdown detection (Hipot)	✓	✓	-
	Prelocation with TDR (radar)	✓	✓	✓
	Arc Reflection (ARM)	✓	✓	-
	Current decoupling (ICE)	✓	✓	-
	Voltage decoupling (DECAY)	✓	✓	-
	Surge (Thumping)	✓	✓	-
	4-wire bridge measurement	-	-	-
	Audio frequency method	-	-	-
	Sheath integrity	✓	-	-
INFO	★★★ fits perfectly ★★ fits well ★ fits in general ✓ applicable / supported	webpage →	details on page 12/13 →	webpage →
Method descriptions →				



NEW



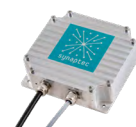
NEW



NEW



NEW: MONITORING



HVB10	BIFRÖST	HUMMINGBIRD	MAGTRACK	GREENLIGHT
Compact high-voltage bridge and sheath fault locator	High-performance high voltage bridge	High-performance audio frequency generator	Tracking and fault location system for subsea cables	Permanent passive monitoring system for fibre-optic cables
★★★★	★★★★	★★★★	-	★★★★
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-	★★★★	★★★★	★★★★	-
-	★★★★	★★★★	★★★★	-
★	★★★★	★★★★	-	-
long cables	very long cables	very long cables	very long cables	very long cables
✓	✓	-	-	-
✓	✓	-	-	-
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webpage →	details on page 14/15 →	details on page 16/17 →	details on page 18/19 →	details on page 08/09 →

Connection sets on page 5 →

METHODS – DESCRIPTIONS

Application / Method	Description
Fault identification DC hipot, Insulation test, and Breakdown test	Differentiate and classify the main insulation fault (high-resistance, low-resistance) by insulation resistance measurement and by charging with ramped DC to ignite it and measure the breakdown voltage.
Fault prelocation	Determine the distance to the fault and the best starting point for pinpointing.
Time domain reflectometry (TDR / Cable radar)	Runtime-based impedance measurement with high-frequency low-voltage impulses travelling through the insulation; distance-dependent de-attenuation counteracts the exponential attenuation of long cables to improve the visibility of distant reflections
TDR fingerprinting	Set of reference traces recorded at commissioning and after each repair; new trace captured during a fault event; fault locating by before/after comparison
TDR burning	Reference trace recorded before burning and after burning; fault locating by before/after comparison
Arc Reflection Method (ARM)	Industry-standard HV prelocation method; superposition of LV reference trace and HV fault trace, BestPicture Multishot capturing 32 fault traces at a time and picking the best one, superior performance with inductive or active arc reflection filter, physical range limitation approx. 40 km
Current decoupling (ICE)	Alternative to ARM; travelling wave current method, physical range limitation approx. 80 km
Voltage decoupling (Decay)	Alternative to ARM; travelling wave voltage method, physical range limitation approx. 80 km
Voltage drop method	4-wire measurement with HV bridge, connecting to the faulted cable and at least one healthy auxiliary cable, jumper cable at the far end
Fault pinpointing Surging (Thumping)	Determine the exact fault position on route – transmitter energises, receiver detects
Coincidence method for high-resistance faults	Surging (Thumping) using a surge generator (thumper) plus combined magnetic-acoustic surge wave receiver (digiPHONE+2)
Audio frequency method for low-resistance faults	Audio frequency generator (HUMMINGBIRD) plus magnetic field probe (MAGTRACK)
Fault conversion	Changing the impedance of the fault
DC burning	Igniting the fault and driving significant current through it
Sheath integrity	Testing the oversheath for damage
Testing	Measurement with DC voltage
Prelocation	Measurement with high voltage bridge
Pinpointing	Voltage gradient method using pulsed DC plus digital earth fault locator (ESG NT2)

CONNECTION ACCESSORIES – EXAMPLES

BIFRÖST (High-voltage bridge)

The 4-wire bridge measurement requires two connections to the faulted cable at the near end, two connections to at least one healthy cable at the near end, and one jumper cable between poles at the far end.

These are examples of custom test leads which are suitable for HV terminations:

- HV leads, length of 180 m **1**
- Far end HV jumper cable, 180 m **2**
- Kelvin clamp, universally compatible and adjustable (70 mm clamping width) **3**

1



2



3



NEW

PLEASE NOTE: Test leads for the BIFRÖST are typically project-specific and customised – please contact the factory to discuss options and details.

TELEFLEX VX V2 (Cable radar / TDR)

TDR measurements on HV cables require a dedicated connection set to minimise impedance mismatches at the terminations. Without it, insufficient pulse energy can be injected into the cable, significantly reducing the effectiveness of the TDR measurement.

4



5



- Cable reel version **4**
- Version with bag **5**

Fault location HV LAND CABLES

AC



Cable fault prelocation

Faults	System solution	Single portable device
High-resistance faults	R30 2.0	-
Low-resistance faults	R30 2.0	BIFRÖST / HVB10 / TELEFLEX VX V2
Sheath faults	R30 2.0	BIFRÖST / HVB10

Cable fault pinpointing and tracing

Faults	Transmitter	Receiver
High-resistance faults	R30 2.0	digiPHONE+2
Low-resistance faults	R30 2.0	FERROLUX plus FLG
Sheath faults	R30 2.0 / HVB10	ESG NT2

TIP: 'First aider!'

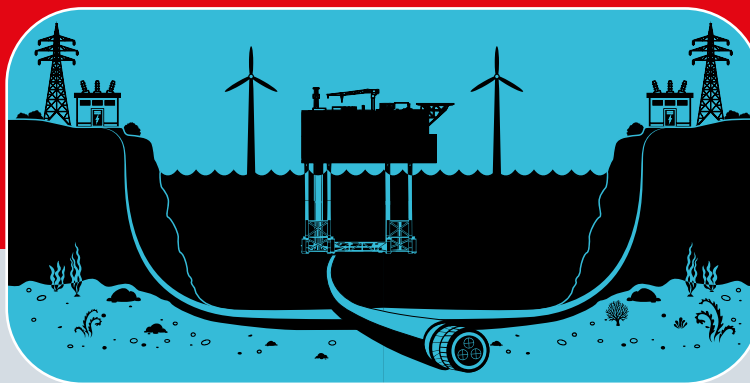
For typical HVAC land cables, a portable unit can serve as an effective first responder when a full HV fault location system is not immediately available. It does not replace an R30, which remains the complete solution for HV/EHV fault location. However, if the fault breakdown voltage is within the portable unit's output range (e.g. below 40 kV DC), prelocation may already be possible.

TDR measurements, especially with a cable fingerprint, can narrow down the fault position, while the surge generator may enable pinpointing. A portable first responder such as the STX40 can therefore save valuable time by locating suitable faults before the R30 arrives.



Fault location HV SUBSEA CABLES

AC



Cable fault prelocation

Faults	System solution	Single portable device
High-resistance faults	R30 2.0	-
Low-resistance faults	R30 2.0	BIFRÖST / HVB10 / TELEFLEX VX V2

Cable fault pinpointing and tracing

Faults	Transmitter	Receiver
High-resistance faults	R30 2.0	Hydrophones
Low-resistance faults	HUMMINGBIRD	MAGTRACK

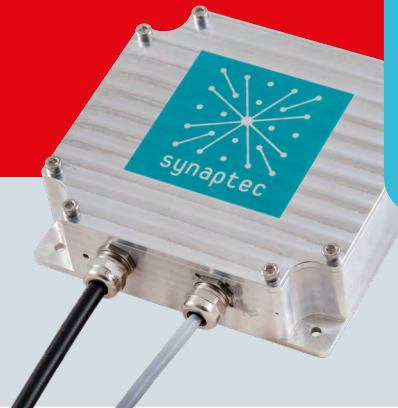
R30 2.0 – benefits at a glance

- All fault-location methods in a single integrated system – no second unit to call in
- Convenient user interface with a high degree of automation – less operator effort, fewer mistakes, shorter training
- System was engineered for HV/EHV solid dielectric cables (XLPE, EPR) and paper cables (PILC, MIND)
- Available as mobile vehicle-installed system, namely as cable test van, transportable container or trailer, to reach anywhere the cable network is road-accessible
- Quick mobilisation and short setup times for fast operational readiness on site
- Also available as stationary system – a fixed, containerised solution permanently sited inside of a substation or converter station



Monitoring HV LAND & SUBSEA CABLES

AC



Brochure

DES – Distributed Electrical Sensing

Greenlight® improves availability and reduces outages by monitoring all joints and terminations, where most cable failures occur. It provides operators with permanent and continuous monitoring of these critical locations, giving early warning of damage and abnormal behaviour, reducing maintenance costs and manual effort.

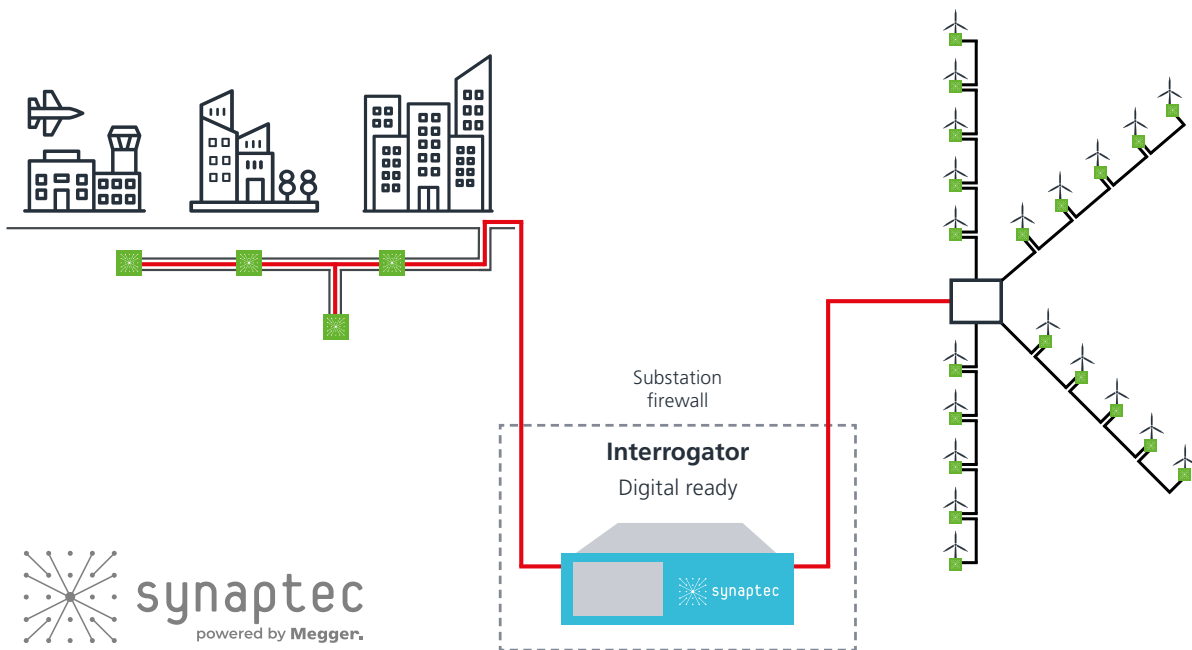
Passive sensing avoids the need for control power or other infrastructure at these remote monitoring locations, making it simple and cost-effective to automate reliable and accurate monitoring of these critical assets.

Key benefits:

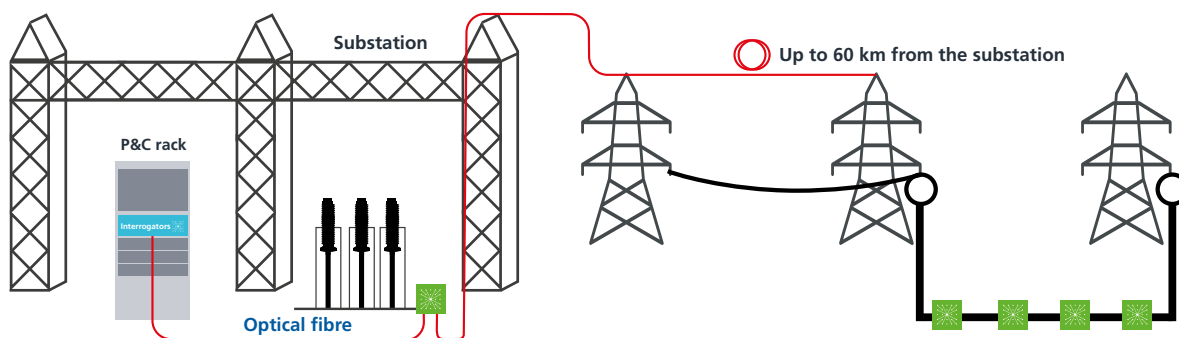
- **Early warning** – Supports operators in early cable fault or damage identification, enabling early intervention, avoiding costly outages and unscheduled maintenance.
- **Cost-effective** – A low cost / high return solution for monitoring health, damage, and degradation in power cables and their joints and terminations, regardless of their number distance.
- **No maintenance** – Uses passive sensors which operate over distances of up to 60 km from the substation and do not require control power, maintenance, or recalibration.
- **Easily deployed** – Small, non-invasive, and easy to retrofit. Works with any HV cable (underground or subsea, i.e. solid-bonded and cross-bonded cable architectures).



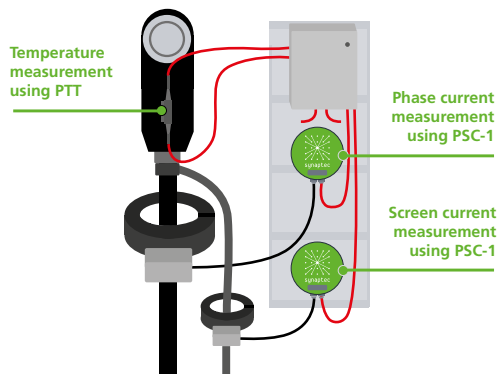
Greenlight® – underground cable condition monitoring



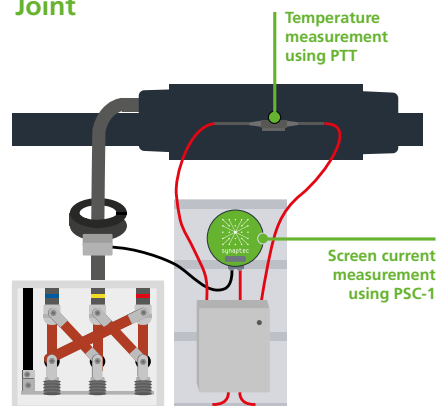
Greenlight® – offshore cable condition monitoring



Termination

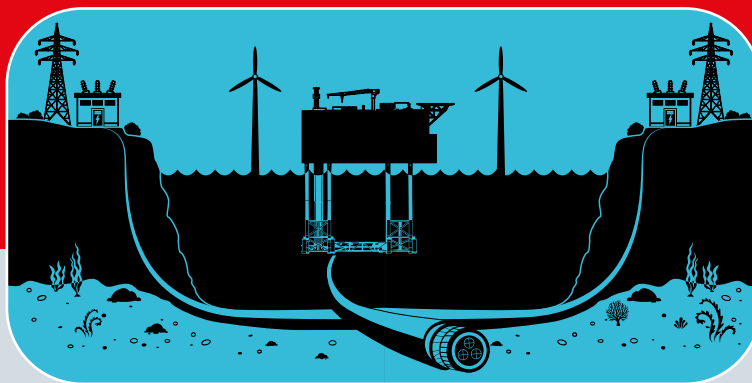


Joint



Fault location HV SUBSEA CABLES

DC



Cable fault prelocation

Faults	System solution	Single portable device
High-resistance faults	R550	-
Low-resistance faults	R550	BIFRÖST / TELEFLEX VX V2

Cable fault pinpointing and tracing

Faults	Transmitter	Receiver
High-resistance faults	R550	Hydrophone
Low-resistance faults	HUMMINGBIRD	MAGTRACK

digiPHONE+2 NTRX set



Datasheet
- digiPHONE+2
- ESG NT2
- FERROLUX



Datasheet
- FLG12



Fault location HV LAND CABLES



Cable fault prelocation		
Faults	System solution	Single portable device
High-resistance faults	R550	-
Low-resistance faults	R550	BIFRÖST / TELEFLEX VX V2
Sheath faults	BIFRÖST	
Cable fault pinpointing and tracing		
Faults	Transmitter	Receiver
High-resistance faults	R550	digiPHONE+2
Low-resistance faults	FLG12	FERROLUX
Sheath faults	BIFRÖST	ESG NT2

Sentrisense – monitor your AC/DC overhead power lines (real-time insights from the conductors)



Sentrisense supports four key applications:
Dynamic Line Rating (DLR), Asset Health Monitoring (AHM),
Incident Detection, and Pole & Tower Monitoring.

Together, they help utilities increase grid visibility,
improve safety, and make better operational decisions.



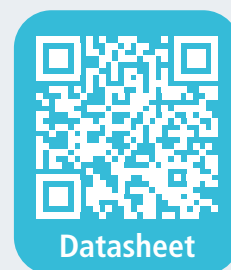
Measurements:

- **Line Temperature** – Helps increase ampacity while reducing the risk of overheating
- **Current (A)** – Real-time load measurement
- **Inclination & Sag** – Detects structural strain or anomalies
- **Vibration frequency** – Flags fatigue, galloping, or wire theft



Product details

R550 CONTAINER



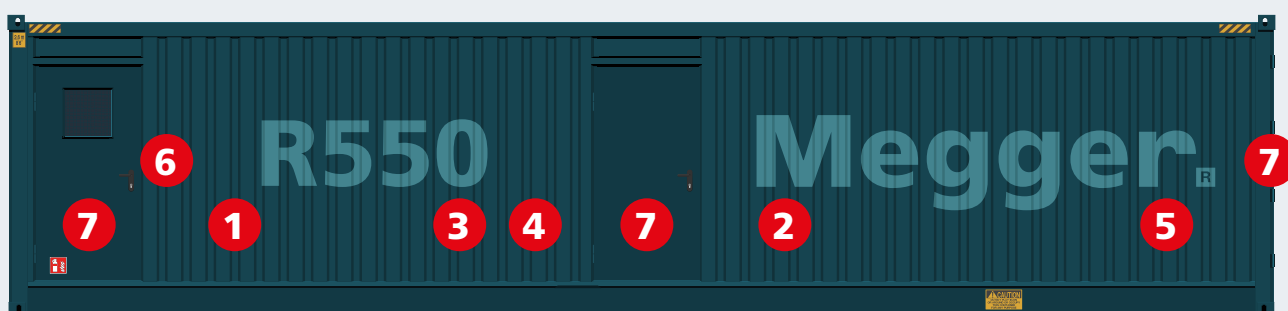
Centrally controlled automated system for EHV and HVDC cables

The R550 is a high-end cable fault location system tailored for locating faults on subsea cables, long EHV cables and HVDC interconnectors, incorporating all available fault locating methods.

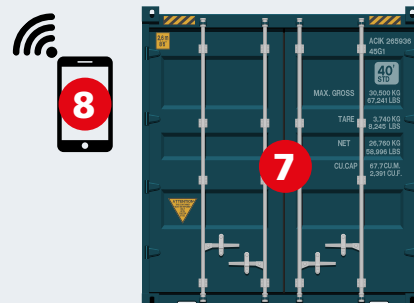
Because the system is digital, automated and centrally controlled, instead of analogue, manual and electro-mechanical, it provides the highest level of usability for any user level, especially for infrequent users.

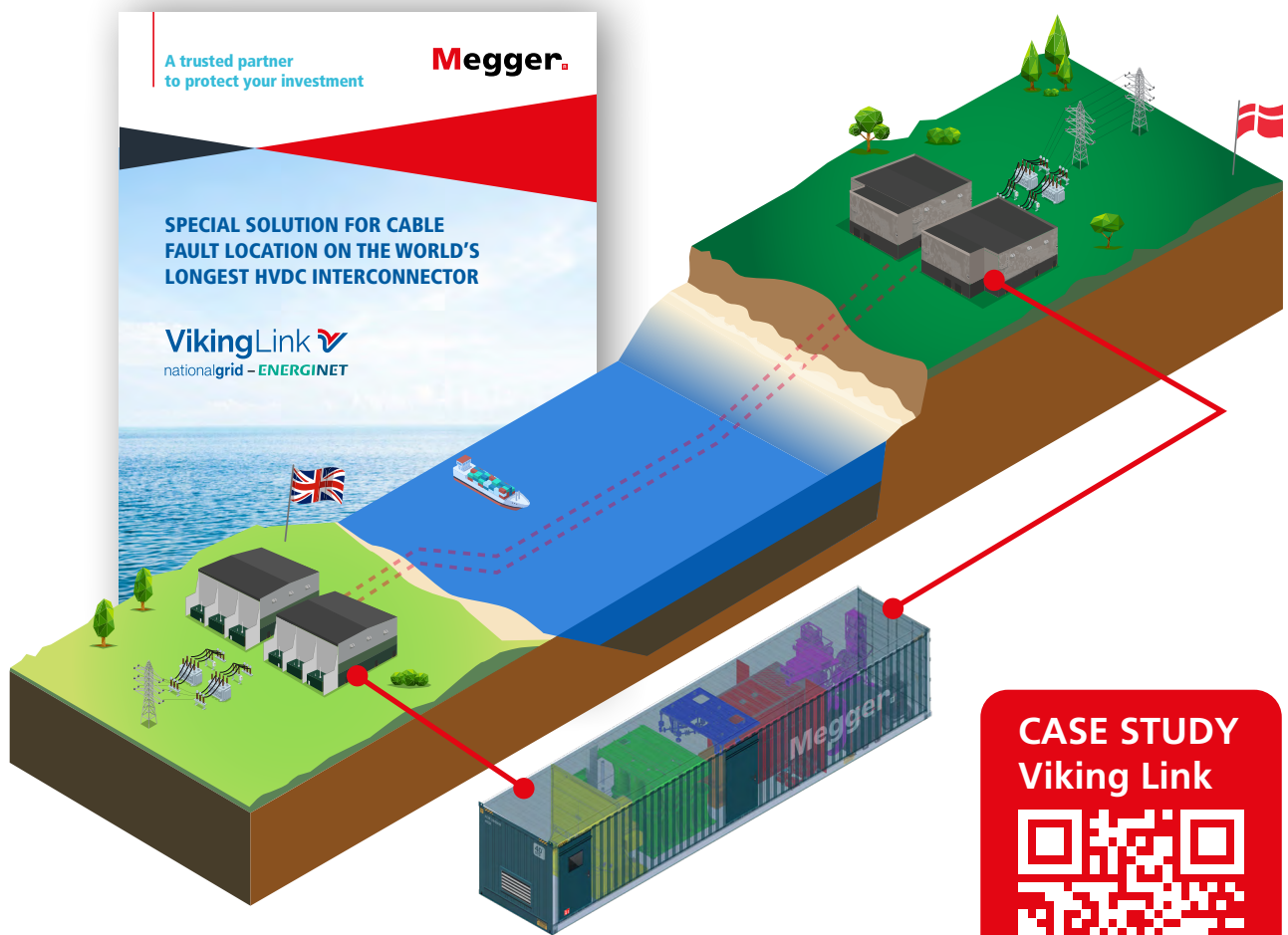
Its most important safety feature is the fast-switching discharge device, while the high voltage unit comes with an output of up to 150 kV DC and the high performance unit up to 20 kW.

The R550 is capable of identifying, prelocating, pinpointing and, if necessary, converting all kinds of high resistance and low resistance faults.



- 1 High-voltage unit
- 2 High-performance unit
- 3 High-energy discharge unit
- 4 High-voltage surge unit
- 5 Connection compartment
- 6 Control room incl. air conditioning
- 7 Access points, hatches, and doors
- 8 Remote access and remote control via LTE





761 km – Viking Link world record
in TDR measurement (Megger 2023)

Product details

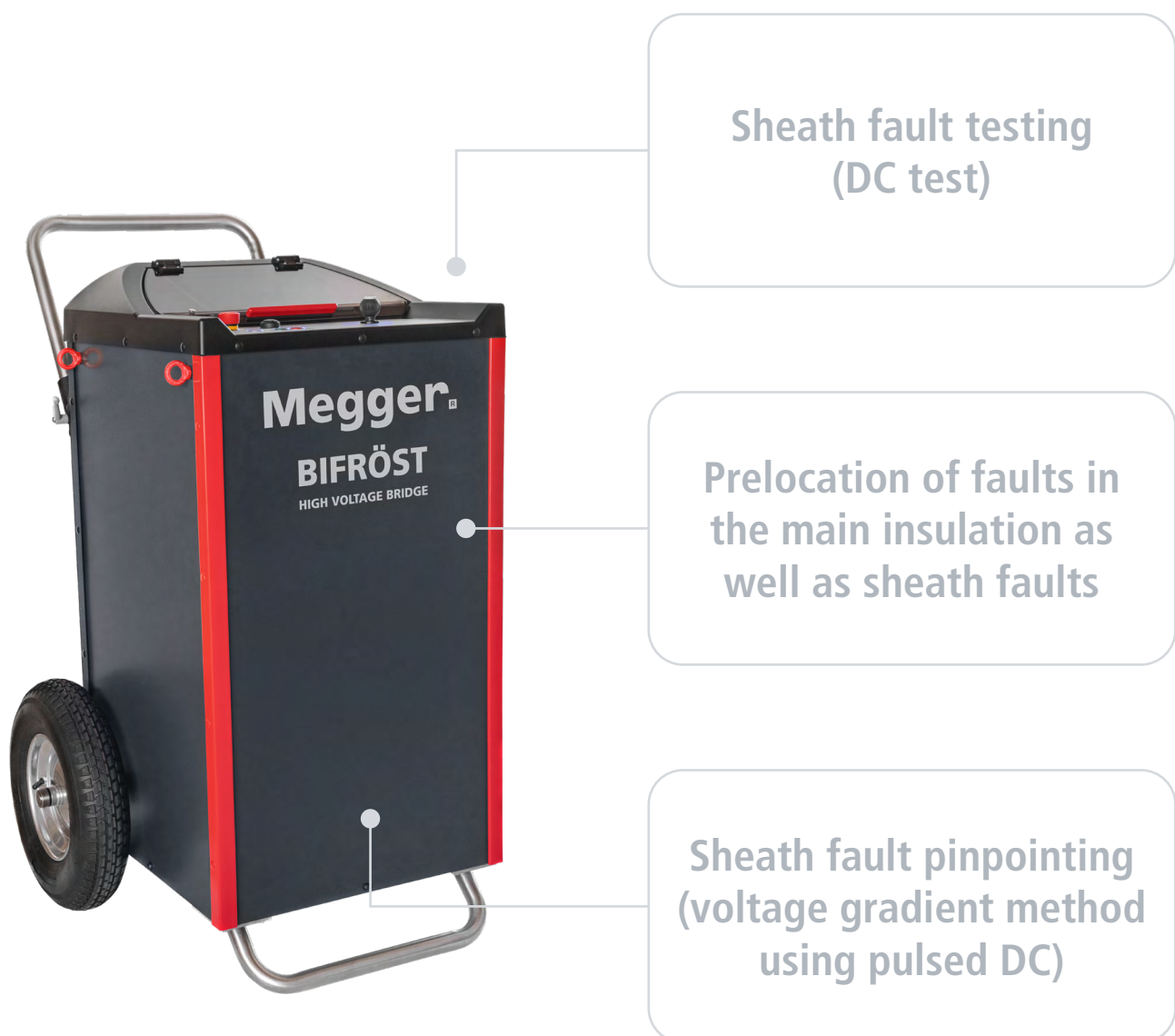
BIFRÖST



High-performance high voltage bridge

The BIFRÖST is a 20 kV DC high-voltage bridge designed for long cables, in particular for HVAC and HVDC cables up to 550 kV, including subsea cables and interconnectors.

It utilises the proven voltage drop method for prelocation in a classic four-wire connection with either one or two auxiliary wires.





Benefits at a glance



Discharge unit

Extremely safe operation due to its internally integrated very robust and fast discharge unit designed for long cables. The discharge capability is 750 μF .



Burning

If faults need to be conditioned for better results, the integrated high-frequency burn mode is capable of delivering burn currents up to 850 mA.



Software

Software-based user interface with single "turn & click" rotary knob control. Cable segmentation via cable editor, incl. segment temperature.



Connections

- Long test leads available to cover distances between poles in the converter stations
- Long jumper cables available to set up the far end of the cable for the 4-wire bridge measurement
- Universal clamp: fits on all commercially available styles of EHV end termination from the OEMs

NEW: PAGE 5

Product details

HUMMINGBIRD



High-performance audio frequency generator

The HUMMINGBIRD transmitter provides the required signal when using the audio-frequency method for tracking cables and for pinpointing low-resistance faults. It is ideally suited for long cables, specifically long subsea cables and HVDC interconnectors.

The generated audio-frequency signal is associated with a magnetic field that can be detected by ROV-mounted subsea receiver systems such as Magtrack.



Transmitter for sending modulated current signals on power cables

Designed for long cables, mainly subsea cables and HVDC interconnectors



Works in conjunction with ROV-mounted subsea tracking systems such as Magtrack



Benefits at a glance



Transmitter

Generates the signals for the audio-frequency method which can be used for cable tracking and pinpointing of low-resistance faults.



Power

High signal strength thanks to high power output with up to 40 kW and 100 A. The power is adjustable by setting voltage and current individually.



Frequencies

Frequency range of 10 to 40 Hz optimised for subsea conditions. The frequency is adjustable in steps of 1 Hz.



Connection

25 m long 2x 25 mm² test leads to reach even very tall EHV end terminations

Product details

MAGTRACK



Tracking and fault locating system for subsea cables – using ROV

MAGTRACK is a cable-tracking system that uses four compact sensors, each integrating a 3-axis fluxgate magnetometer and an inclinometer. It accurately detects cable position, traces the cable route and determines burial depth.

The system is typically installed at the front and rear of an ROV or trencher, enabling accurate determination of cable slope and position.

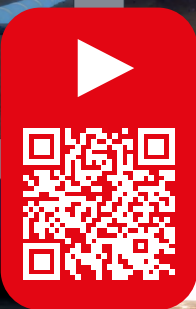
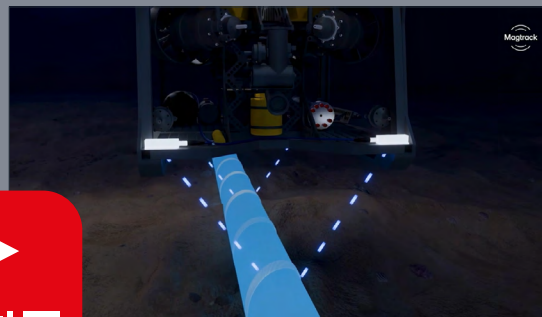
Designed for and compatible with all existing ROVs worldwide

Suitable for both deep-sea and shallow-water applications



Sensors with roll and pitch compensation

Low power consumption



Questions?
We are happy to assist you.



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