HIGH VOLT
Test with the best.®

HiRES LOCATOR

- Immediate breakdown localization in power cables
- Testing and long-term monitoring
- Factory and on-site use

HiRES LOCATOR

FACTS IN BRIEF

Fig. 1 **Transient recorder HiRES Locator**

The localization of a breakdown during HV testing in the factory or on site is very time and cost-intensive. Even more so if the breakdown occurs on a cable system in service.
With the breakdown localization system HiRES Locator it is possible to accurately locate a breakdown in a cable immediately at the moment of the breakdown event.

HiRES Locator is a very versatile device and can be used for many different applications:

- AC and DC power cables with a length of up to 200 km and more
- Cables in the MV, HV and EHV ranges
- Land cables and submarine cables
- Single phase to three phase cable systems

Advantages of the HiRES Locator include the immediate and automatic evaluation of the travelling waves generated by the breakdown itself. Therefore, there are no additional testing requirements and no additional ageing or damaging of the cable by repeated electrical stress.
This also means that the original breakdown pattern is preserved and essential information for analysis can be obtained. Simultaneous measurements at both cable ends increase the measuring accuracy compared to measurement at just one cable end (see *Fig. 5*).

HV TESTING IN THE FACTORY

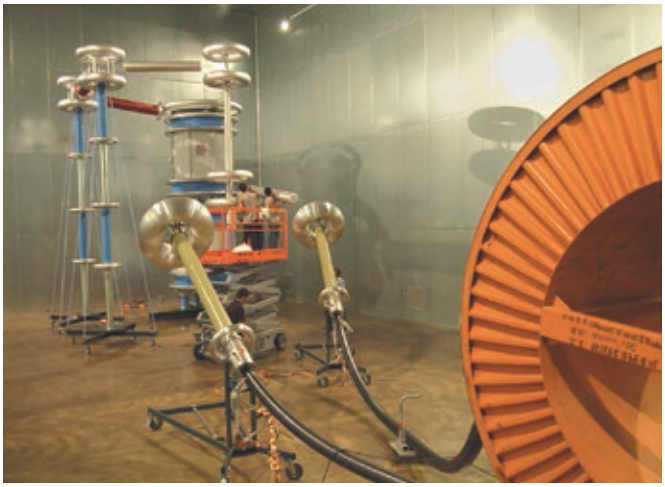

Fig. 2 **Factory cable testing with HiRES Locator and AC resonant test system WRM**

In its application for HV testing of power cables in the factory the HiRES Locator can be used with any suitable high voltage test system for factory testing of power cables, e.g. a test system made by HIGHVOLT or another manufacturer.

If the test system is manufactured by HIGHVOLT, the software for breakdown localization is integrated into the software architecture of the control system. For maximum flexibility the HiRES Locator can also be used as stand-alone device independently from the test system.

For HV test systems made by HIGHVOLT the HV divider of the test system is used as decoupling unit for the HiRES Locator (see *Fig. 5*, case a).

In order to increase the measuring accuracy, the measurement can be carried out at both cable ends. In this case, a transient recorder HiRES Locator with two measuring channels is used (see *Fig. 5*, case b).

The HiRES Locator can either be installed inside the housing of the control and measuring system or can be designed as stand-alone unit.

BENEFITS

- IMMEDIATE BREAKDOWN LOCALIZATION ON POWER CABLES
- NO ADDITIONAL TESTS FOR BREAKDOWN LOCALIZATION REQUIRED
- REDUCTION OF BREAKDOWN COSTS THROUGH SHORTER DOWNTIME
- SUITABLE FOR USE WITH ANY ADEQUATE HIGH VOLTAGE SOURCE
- RECORDING AND EVALUATION OF THE ORIGINAL BREAKDOWN EVENT
- PRESERVATION OF BREAKDOWN PATTERN

HV TESTING ON SITE

Fig. 3 **On-site cable testing with HiRES Locator and AC resonant test system WRV 83/260 T**

The transient recorder HiRES Locator can be used with any suitable high voltage test system for on-site testing of power cables, e.g. an AC resonant test system WRV T, a DC test system GPM or a third party test system.

The use of the divider as decoupling unit and the possibilities of software integration of the HiRES Locator are identical to the factory testing application.

A second transient recorder HiRES Locator including decoupling unit can be used to increase the measuring accuracy, allowing simultaneous measurement at the far end of the cable (see *Fig. 5*, case c).

ONLINE MONITORING

Fig. 4 **Online monitoring with HiRES Locator**

When using the HiRES Locator as a monitoring device, no separate high voltage source is required. The transient recorder is equipped with an uninterruptible power supply and is permanently connected to the transmission grid while the cable system is in operation.

A suitable decoupling device with sufficient bandwidth must be used.

The compact design of the HiRES Locator allows close installation to a cable termination in a substation.

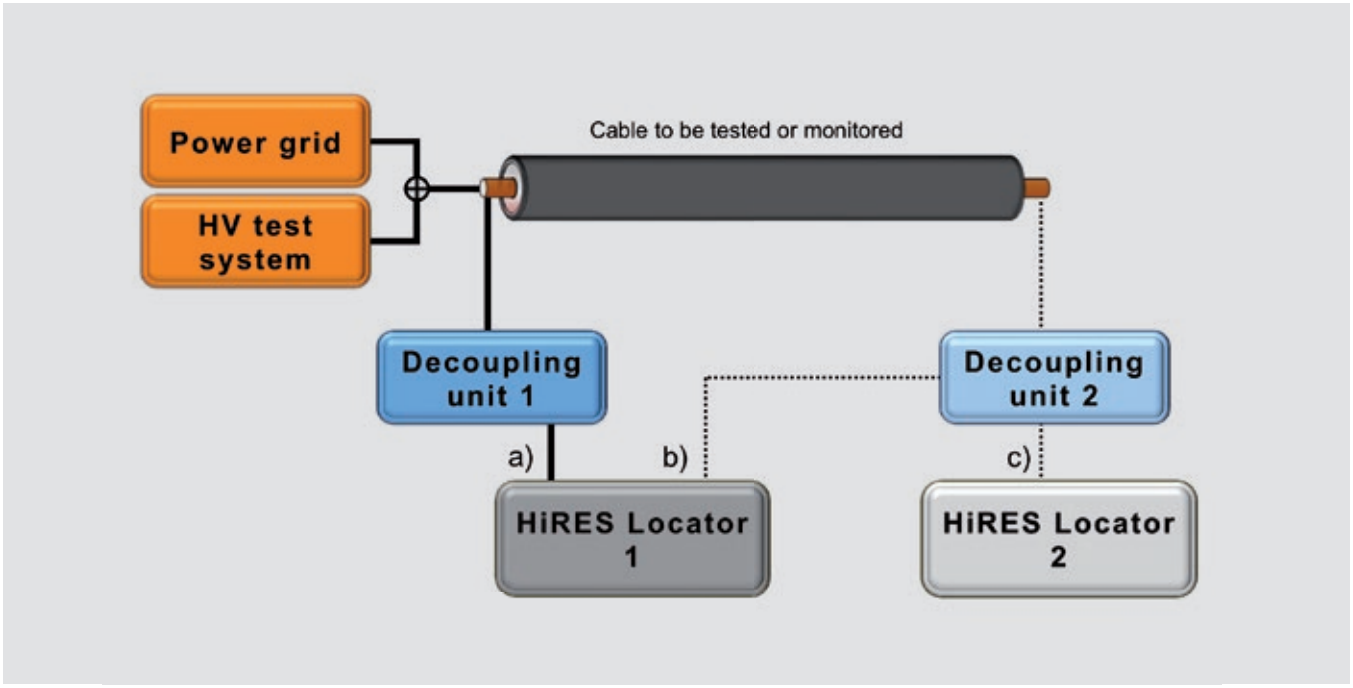

Fig. 5 **Functional principle of the HiRES Locator (representation of one phase in a three-phase cable system; measurement optionally possible at both cable ends)**

SYSTEM AND COMPONENTS

The measuring system comprises two main components: the transient recorder HiRES Locator and a decoupling element (e.g. HV measuring divider, UHF sensor). The recorder features an inbuilt industrial computer with a special software application for recording and evaluating the signal generated by the breakdown. The data can be visualized by an external display via DVI interface.

The HiRES Locator can easily be integrated into the customer's LAN. Remote support by the HIGHVOLT service team can be performed via the Remote and Diagnostics Access module (RDA). The hard- and software is designed for fast installation and commissioning of the HiRES Locator. No adjustments with respect to cable type, decoupling unit or environment are required.

All measuring channels are protected against overvoltages. When used for monitoring applications the special housing protects the HiRES Locator against harsh environmental conditions.

During HV tests in the factory and on-site, capacitive high voltage dividers are typically used for measurements on AC cables. Resistive dividers are required for DC cables. These measuring dividers must offer sufficient bandwidth for the transient processes that occur during the measurement.

In its application as a monitoring device a suitable decoupling unit certified for the use in the transmission grid is required.

Based on Cigré recommendations and practical experiences, a Time Domain Reflectometry (TDR) Performance Check has to be carried out in case the propagation velocity is unknown. Additionally, the distortions, wave refractions and reflections are checked. The necessary components for the TDR Performance Check consist of a source and an adjustable spark gap. On demand, these components can be added to HIGHVOLT's scope of supply in order to complete the HiRES Locator package.

TECHNICAL PARAMETERS

Table 1 **Basic specification**

Sampling rate	up to 250 MS/s
Resolution	14 bit
Uncertainty of breakdown localization	Cable lengths up to 500 m: ≤ ± 1 m Cable lengths from 500 m up to 200 km: ≤ ± 1 % of cable length
Possible cable lengths	up to 200 km

Number of measuring channels	up to 4*)
Interfaces	USB, Ethernet, DVI
Dimensions of base device L x W x H (approx.)	485 x 395 x 225 mm
Weight of base device (approx.)	10 kg (without extension cards)

*) extendable upon customer's request

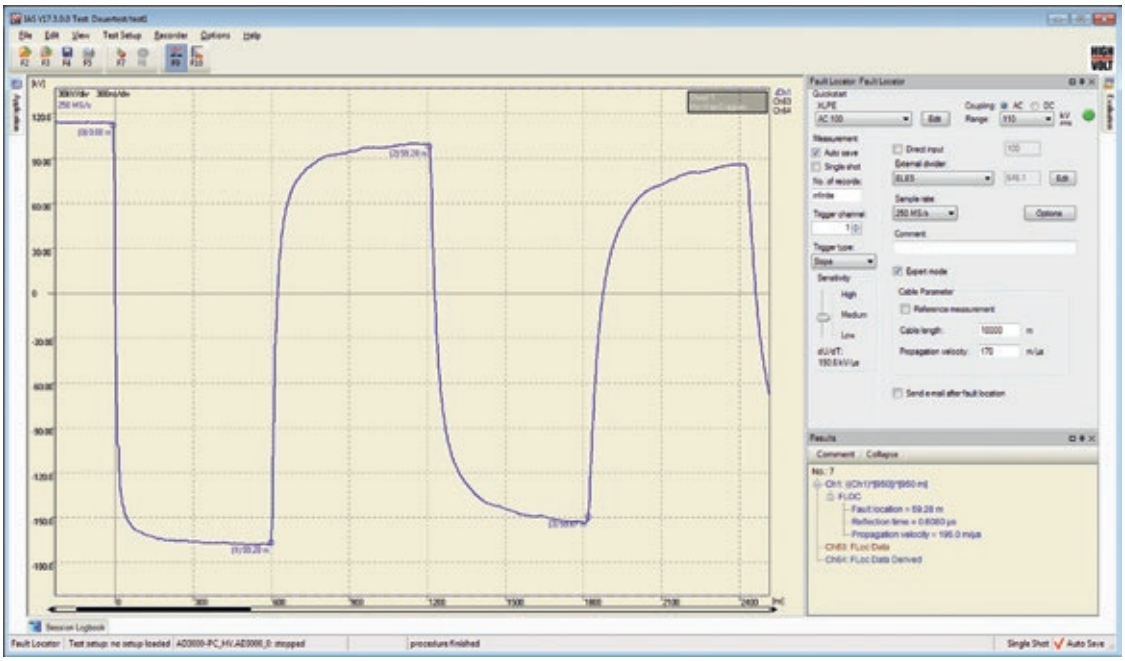

Fig. 6 **Screenshot of the software for breakdown localization IAS LOC**

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