frida and frida TD
BAUR VLF tester and diagnostics devices

MWT

truesinus

Monitored Withstand Test MWT in accordance with IEEE 400

- **MWT with tan δ**
- **Full MWT with tan δ and PD test (with the PD-TaD 62)**

The new cable condition evaluation generation

- Cable testing and dissipation factor diagnostics in one device
- Easy and quick test setup
- Automatic testing and diagnostic sequences
- Compact dimensions and lightweight

The portable BAUR frida and frida TD devices are used

- for testing medium-voltage cables and electrical equipment (generators, transformers and switchgear)
- for cable sheath testing
- for cable diagnostics (frida TD):
  - Dissipation factor measurement and Monitored Withstand Test with tan δ
  - Partial discharge measurement*
  - Full Monitored Withstand Test with tan δ and partial discharge measurement*

The **VLF testing** makes it possible to locate insulation faults in plastic- and paper-insulated mass-impregnated cables in the shortest of testing times without impairing the quality of the surrounding insulating material.

The **dissipation factor diagnostics** with 0.1 Hz VLF truesinus® provides differentiated information on the ageing condition of paper-insulated mass-impregnated and PE/XLPE cables. In the case of PE/XLPE cables, the dissipation factor measurement is capable of differentiating between new, slightly or severely "water tree"-damaged cables. This makes it possible to prioritise the need to replace cables.

The **Monitored Withstand Test with tan delta** combines the cable testing and dissipation factor measurement, allowing an accurate and comprehensive assessment of the cable condition. In addition, there is minimum load on the cable due to the optimised test duration.

* in combination with the BAUR PD-TaD 62 PD diagnostics system.

Features

frida and frida TD

- Testing and diagnostics on long cable routes by load-dependent frequency selection (0.01 – 0.1 Hz)
- Max. test voltage 24 kV_{rms} / 34 kV_{peak}
- Voltage shapes: VLF truesinus®, VLF square wave voltage and DC voltage
- VLF truesinus® test technology enables load-independent, reproducible sinusoidal high voltage
- Cable testing according to: DIN VDE 0276-620/621 (CENELEC HD 620/621), IEEE 400-2012, IEEE 400.2-2013, IEC 60060-3
- Cable sheath testing according to IEC 60502/ IEC 60229
- Voltage withstand test on electrical equipment according to IEEE 433

frida TD

- Dissipation factor testing of electrical equipment and medium-voltage cables up to 20 kV
- Highly precise dissipation factor measurement with precision of 1 x 10^{-4}
- Detection of leakage currents using VSE box (option)
- Better overview of the cable condition thanks to Full Monitored Withstand Test (Full MWT) in combination with PD-TaD 62

  See page 2 for available methods and combinations of methods
- Fully automated and individually programmable diagnostic sequences incl. evaluation

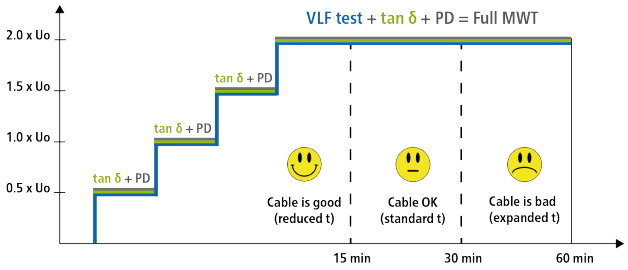
General Information

- Data transfer via USB interface
- Management of test and measurement data with Excel-based Diagnostic Reporter application
- Automatic discharge unit
- Optionally expandable
  - frida: to a PD diagnostics system
  - frida TD: to a PD and full MWT diagnostics system

BAUR GmbH · Raiffeisenstraße 8, 6832 Sulz, Austria · T +43 (0)5522 4941-0 · F +43 (0)5522 4941-3 · headoffice@baur.at · www.baur.eu

Full Monitored Withstand Test

Combination of methods for more significant information



With the BAUR frida TD VLF tester and diagnostics device and in combination with the PD-TaD 62 PD portable diagnostics system, you can measure dielectric losses and test the cable route for partial discharges during the VLF cable testing. This combination of methods is called **Full MWT** and provides significantly more information than the cable test alone. While the cable test shows whether the cable system can withstand a load over a specified test duration, the dissipation factor measurement enables an evaluation of the condition of the cable insulation. Moreover, a partial discharge measurement shows and locates the PD faults precisely. The highlight of MWT is the condition-based test duration: Provided it is permitted, the test duration can be shortened, which in turn lowers costs. This way, the cable is only exposed to the increased test voltage for the required duration.

VLF truesinus® - A voltage shape for all methods and method combinations

VLF truesinus® is the only voltage shape that enables both the reliable voltage tests as well as precise dissipation factor and partial discharge measurements. Unlike other voltage shapes, the VLF truesinus® voltage is load-independent, symmetrical and continuous. This is a prerequisite for high precision as well as reproducibility and comparability of measurement results.

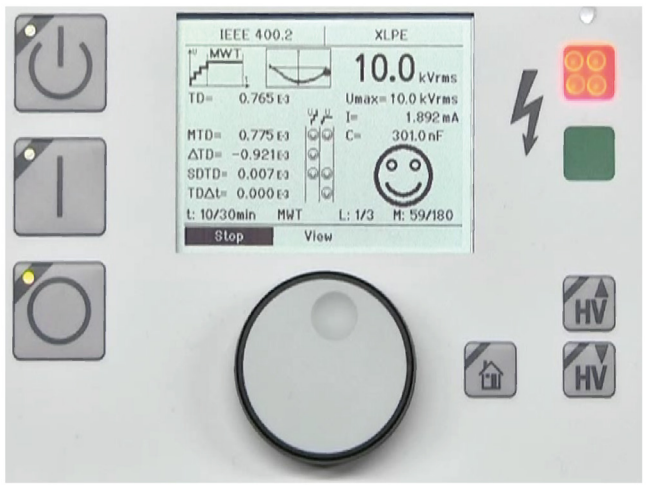
Available methods and combinations of methods

Method	Significance and benefits	BAUR equipment
VLF testing	▪ Easy voltage test (Verdict: Pass / Fail)	frida
tan δ measure-ment	▪ Evaluation of the dielectric condition of the insulation, indication of PD	frida TD
PD test	▪ Diagnostics of local weak points and their location	frida & PD-TaD 62
Simultaneous tan δ and PD measurement	▪ Combination of statements of a tan δ measurement and PD measurement ▪ Shorter test duration with simultaneous tan δ and PD measurement ▪ Better detection of hidden faults (e.g. moist joints) through conditioning of weak points and simultaneous monitoring of tan δ values and PD activities	frida TD & PD-TaD 62
MWT with tan δ	▪ Evaluation of the dielectric condition of the insulation, indication of PD ▪ Intelligent withstand voltage test ▪ Shorter test duration for cables in good condition	frida TD & PD-TaD 62
VLF cable testing with parallel PD test	▪ Localisation of faults in the cable insulation ▪ Intelligent withstand voltage test	frida & PD-TaD 62
Full MWT (VLF cable testing with parallel dissipa-tion factor and partial discharge testing)	▪ Evaluation of the dielectric condition of the insulation, indication of PD ▪ Localisation of faults in the cable insulation ▪ Intelligent withstand voltage test with shorter test duration for cables in good condition ▪ Shorter test duration with simultaneous tan δ and PD measurement ▪ Better detection of hidden faults (e.g. moist joints) through conditioning of weak points and simultaneous monitoring of tan δ values and PD activities	frida TD & PD-TaD 62

Technical data

Output voltage	
Frequency range	0.01 – 0.1 Hz
VLF truesinus®	1 – 24 kV_{rms} (34 kV_{peak})
VLF square wave voltage	1 – 34 kV
DC voltage	±1 – 34 kV
Resolution	0.1 kV
Accuracy	1%
Load range (VLF testing)	1 nF – 8 µF
Output current	
Measurement range	0 – 14 mA
Resolution	1 µA
Accuracy	1%
Max. capacitive load	0.5 µF at 0.1 Hz, 24 kV_{rms} / 34 kV_{peak} 1 µF at 0.05 Hz, 24 kV_{rms} / 34 kV_{peak} 8 µF at 0.01 Hz, 18 kV_{rms} / 25 kV_{peak}
Dissipation factor measurement (frida TD)	
VLF truesinus®	1 – 24 kV_{rms}
Load range	10 nF – 8 µF
Resolution	1 x 10^{-6}
Accuracy	1 x 10^{-4}
Measurement range	1 x 10^{-4} – 21 000 x 10^{-3}
tan d measuring frequency	0.01 – 0.1 Hz
Automatic detection and compensation of leakage currents	with VSE box (optional)

Diagnostic Reporter	
Used to process and evaluate test and measurement logs, based upon MS Excel, version from MS Excel 2007	
General	
Input voltage	100 – 260 V, 50/60 Hz
Power consumption	Max. 300 VA
Reverse voltage protected	up to 13 kV
Degree of protection	IP54 (in closed state)
Data interface	USB 2.0
Dimensions (W x H x D)	438 x 456 x 220 mm
Weight (incl. HV test lead)	Approx. 22 kg
Ambient temperature (operational)	-10°C to +50°C
Storage temperature	-20°C to +60°C
Safety and EMC	CE-compliant in accordance with Low Voltage Directive (2014/35/EU), EMC Directive (2014/30/EU), EN 60068-2-ff Environmental testing
User interface available in 13 languages	Czech, Chinese (CN), Chinese (TW), Dutch, English, French, German, Italian, Korean, Polish, Portuguese, Russian, Spanish



frida standard delivery

- BAUR frida VLF tester, incl.
  - HV connection cable, 5 m (fix mounted)
  - GDR 40-136 discharge and earth rod
  - Earth cable, 5 m, with earth terminal
  - Mains supply cord, 2.5 m
  - Diagnostic Reporter and video tutorial on USB drive
  - User manual
  - Pocket guide

frida TD standard delivery

- BAUR frida TD VLF tester and diagnostics device, incl.
  - HV connection cable, 5 m (fix mounted)
  - BAUR tan delta kit
  - GDR 40-136 discharge and earth rod
  - Earth cable, 5 m, with earth terminal
  - Mains supply cord, 2.5 m
  - Diagnostic Reporter and video tutorial on USB drive
  - User manual
  - Pocket guide

Options

- PD-TaD 62 portable PD diagnostics system
- GDR 40-136 discharge and earth rod
- External emergency off unit with signal lamps, 25 m or 50 m cable length

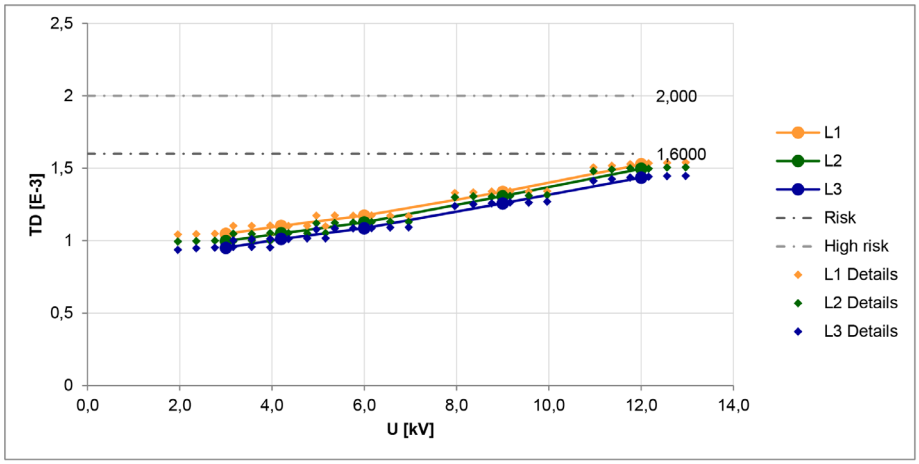
Options

- VSE connection set (for the detection and compensation of leakage currents)
- PD-TaD 62 portable PD diagnostics system
- GDR 40-136 discharge and earth rod
- External emergency off unit with signal lamps, 25 m or 50 m cable length

Diagnostic Reporter – Sample log (extract)

Ramp-up

Ramp-up curve



Ramp-up measurement results

Voltage	0,5 * U0 3,0 kV			0,7 * U0 4,2 kV			1,0 * U0 6,0 kV			1,5 * U0 9,0 kV			2,0 * U0 12,0 kV		
	MTD [E-3]	ΔTD [E-3]	SDTD [E-3]	MTD [E-3]	ΔTD [E-3]	SDTD [E-3]	MTD [E-3]	ΔTD [E-3]	SDTD [E-3]	MTD [E-3]	ΔTD [E-3]	SDTD [E-3]	MTD [E-3]	ΔTD [E-3]	SDTD [E-3]
L1	1,046		0,002	1,102	0,279	0,002	1,173	0,235	0,002	1,337	0,329	0,004	1,527	0,381	0,013
L2	0,998		0,002	1,050	0,265	0,002	1,126	0,252	0,005	1,307	0,362	0,005	1,496	0,379	0,010
L3	0,950		0,008	1,012	0,308	0,005	1,086	0,247	0,006	1,257	0,342	0,011	1,435	0,355	0,014