

Testing, diagnostics and
fault location on power cables

Megger[®]

**Find all your cable faults and
maintain your network
to prevent outages.**



We are setting the standards

We are the world's leading provider of measurement technology in the field of cable fault location, testing and diagnostics. In order to increase the reliability of your cable networks and systems, our products offer the highest level of accuracy, innovative technologies and unique user-friendliness and reliability. Our systems find cable faults that cannot be detected by other devices and thus ensure maximum security of supply and reduced costs.



Cable test van systems – designed for your needs.

System descriptions from page 50 onwards

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CABLE TESTING

Megger's cable test solutions are comprehensive, with a focus on portability, usability and reliability. Cables can be highly capacitive, so testing the insulation at a standardized test frequency of 0.1 Hz often requires a significant power output from the test equipment. Many cable test systems are therefore quite large as a result.

Our experience in testing, knowledge of cables and cable test methods fuel our designs to address this, resulting in the most efficient solutions and best-in-class performance.





VLF SINE 34 kV / 45 kV / 62 kV

Test systems for medium voltage cables

FEATURES

- Wide range of VLF systems for all type of applications
- Testing in accordance to international standards and guidelines such as IEEE 400.2 and IEC 60502-2
- VLF, DC and sheath testing in one unit
- Expendable with tan delta or partial discharge (PD) measurement
- Maximum user-safety through automatic discharge of test object and earth-loop monitoring

Very Low Frequency test sets are used to verify the dielectric integrity of the cable under test, be it for commissioning/ acceptance testing or for maintenance testing. VLF Sineoidal and VLF Cosine Rectangular (CR) are the two most common and standardized wave shapes used for VLF testing. Whereas VLF Sineoidal test sets can be used for testing of short cable lengths, the VLF CR units can test long cables or multiple phases in parallel, and this with almost same dimensions and weight. Megger is the only provider which can supply both technologies and even a combination of both technologies (TDM series). Additional testing capabilities such as Tan Delta (internal or external) and PD measurement can also be added to gain more information about the insulation condition of medium voltage cables. All VLF test units from Megger can also be used for sheath testing and sheath fault pinpointing.

TECHNICAL DATA	VLF Sine 34 kV	VLF Sine 45 kV	VLF Sine 62 kV
VLF test voltage	0 to 34 kV _{peak}	0 to 45 kV _{peak}	0 to 62 kV _{peak}
Frequency	0.01 to 0.1Hz	0.01 to 0.1Hz	0.01 to 0.1Hz
Wave form	Sine	Sine	Sine
Testing cable capacitance @U _{max}	0.6 µF @ 0.1Hz 5 µF max*	0.6 µF @ 0.1Hz 10 µF max*	1 µF @ 0.1Hz 10 µF max*
Optional tan delta measurement	external	internal / external	internal / external
DC test voltage	0 to ± 34 kV	0 to ± 45 kV	0 to ± 62 kV
Sheath testing	0 to 5 / 10 kV	0 to 5 / 10 / 20 kV	0 to 5 / 10 / 20 kV
Sheath pinpointing test voltage	0 to 5 / 10 kV	0 to 5 / 10 / 20 kV	0 to 5 / 10 / 20 kV
Pulse rate	1:3 / 1:4	1:2 / 1:3 / 1:4	1:3 / 1:4
Output current	0 to 14 mA	0 to 20 mA	0 to 40 mA
Dimension (W x D x H)	520 x 450 x 300 mm	544 x 520 x 416 mm	544 x 520 x 416 mm
Weight	25 kg	50 kg	60 kg

*at reduced voltage and/or frequency

RECOMMENDED ACCESSORIES

- tan delta diagnostics (internal or external)
- Partial discharge diagnostics with PDS 62-SIN
- Transport cases (offshore/ onshore)
- ESG NT for sheath fault pinpointing

VLF Sine 34 kV

The VLF Sine 34 kV is a compact, robust and portable VLF sine wave test system for medium voltage cables. With its output voltage of 34 kV_{peak} it is ideally suited to perform withstand testing on cables rated up to 15 kV. For diagnostic applications it is suited for cables up to the 23 kV class.

FEATURES

- High test capacity of 5 μ F at maximum test voltage
- Single-button operation
- Integrated safety system
- Continuous duty-cycle



VLF Sine 34
Datasheet

VLF Sine 45 kV

The VLF Sine 45 kV, with optional integrated tan delta, is a compact system for commissioning and condition analysis of medium-voltage cables. With its output voltage of 45 kV_{peak} it is ideally suited to perform withstand testing on cables rated up to 25 kV. For diagnostic applications it is suited for cables up to the 36 kV class.

FEATURES

- Multifunctional unit, withstand testing and dielectric loss measurement in one system
- Internal tan delta with automatic result interpretation
- Maximum user safety thanks to integrated safety system
- Simple field operation, no external laptop required



VLF Sine 45
Datasheet

VLF Sine 62 kV

The VLF Sine 62 kV, with optional integrated tan delta, is the smallest and lightest system on the market with internal tan delta measurement. With its output voltage of 62 kV_{peak} it is ideally suited to perform withstand testing on cables rated up to 36 kV. For diagnostic applications it is suited for cables up to the 45 kV class.

FEATURES

- For performing cable tests, cable diagnostics and sheath fault pinpointing
- Most compact and lightest device in its class on the market
- Internal tan delta with automatic result interpretation
- Maximum user safety thanks to integrated safety system
- Simple field operation, no external computer required



VLF Sine 62
Datasheet

VLF CR 28 ... 60 kV

High power test systems for medium voltage cables

FEATURES

- VLF test, DC test and sheath test in one device
- High test capacity for standard-compliant testing of all three phases at the same time
- Integrated discharge system and breakdown detection
- Leakage current measurements for evaluation of the cable insulation quality
- Expendable to a full PD diagnostic system via the PDS 60 PD coupler
- Optional: Transport case available for offshore use

VLF CR (cosine-rectangular) is a Megger patented waveform approved by IEC & IEEE. Portable VLF CR models can test high capacitances up to 5 μF @ 0.1 Hz, and are suitable for testing longer cables at standardized frequency or simultaneous testing of all three phases. Solutions are available from portable units to powerful systems with 25 μF testing capacity at maximum test voltage.

TECHNICAL DATA	VLF CR 28 kV	VLF CR 40 kV	VLF CR 60 kV
VLF test voltage	0 to 28 kV _{RMS}	0 to 40 kV _{RMS}	0 to 60 kV _{RMS}
Frequency	0.1 Hz	0.1 Hz	0.1 Hz
Wave form	CR	CR	CR
Testing cable capacitance @U _{max}	5 μF	2.4 μF (basic model) 4.8 μF (plus model)	1 μF (basic model) 2 μF (plus model) 6.5 μF (HP model)
DC test voltage	0 to 28 kV	0 to 40 kV	0 to 60 kV
Sheath testing	2 to 10 kV	2 to 10 kV	2 to 10 kV
Sheath pinpointing Test voltage	2 to 10 kV	2 to 10 kV	2 to 10 kV
Pulse rate	1:3 / 1:4 / 1:9	1:3 / 1:4 / 1:9	1:3 / 1:4 / 1:9
Output current measurement	0 to 12 mA	0 to 7 mA	0 to 5 mA / 0 to 16.7 mA (HP)
Dimension (W x D x H)	550 x 700 x 420 mm	550 x 1100 x 420 mm (basic & plus model) 1350 x 1250 x 1100 mm (HP model)	
Weight	25 + 25 kg	55 kg + 48 kg	85 kg + 48 kg (basic & plus model) 380 kg (HP model)
Portable	Yes	Yes	Yes (basic & plus model) Van mounted (HP model)

RECOMMENDED ACCESSORIES

- Partial discharge diagnostics with PDS 60
- Transport cases (offshore/ onshore)
- ESG NT for sheath fault pinpointing

VLF CR 28...60 kV

The portable VLF CR systems VLF CR 28...60 kV are high power test sets that allow standard compliant testing at 0.1Hz. Aside from cable and sheath testing, the test systems can also be used for precise pinpointing of sheath faults. The VLF CR 28 is suited for cables rated up to 15 kV, the VLF CR 40 up to 23 kV and the VLF CR 60 up to 36 kV.

FEATURES

- High test capacity at standardized frequency of 0.1 Hz
- Portable thanks to two part design
- Can be expanded to a PD diagnostic system with the PD coupler PDS 60
- Integrated discharge system



VLF CR 28...60
Datasheet

VLF CR 60-HP

The VLF CR system VLF CR 60-HP is a high power test set that allows standard compliant testing at 0.1 Hz of very long cables (up to 33 km at maximum test voltage). This unit is ideally suited, if installed in a container, for offshore wind farm testing (36 kV class up to $3 U_0$).

FEATURES

- High test capacity at standardized frequency of 0.1 Hz
- Can test up to 33 km cable at maximum output voltage
- Van or container mounted
- Integrated discharge system



VLF CR 60-HP
Datasheet



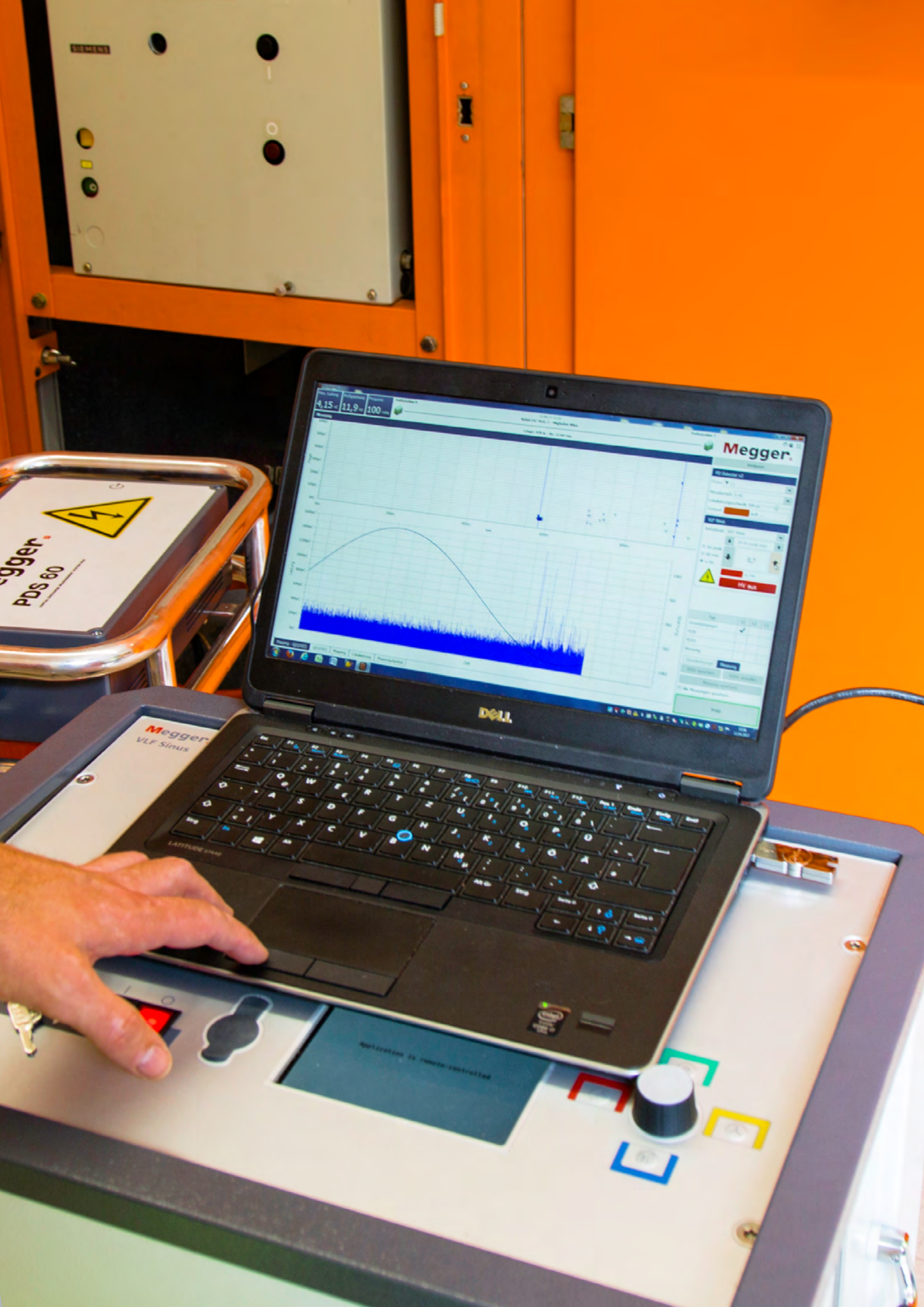
For customised solutions like VLF test sets with $25 \mu\text{F} @ 60 \text{ kV}_{\text{RMS}}$
please go to page 66/67

CABLE DIAGNOSTICS

The main goal of Megger diagnostic technologies is to avoid service interruptions during network operation in medium voltage, high voltage and extra high voltage cable systems. Service interruptions are primarily caused by damage to the cable resulting from poor cable laying, workmanship failures on accessories and age-related deterioration in joints, terminations and cable insulation.

With Megger diagnostic systems, it is possible to verify the quality of a new cable system and assess its condition before a cable is put into operation. Potential issues and damage caused by poor installation can be detected and corrected at the commissioning stage, while all components are still accessible. This avoids future network failures and the subsequent costs that would otherwise be incurred.

Another way to save costs is to efficiently replace cables based on their condition. For critical cables that are already in operation, permanent or periodic condition analysis can identify potential faults, so that planned, condition-based maintenance work can be carried out. This avoids unplanned outages and again, the associated costs that would otherwise be incurred by network failure.



Megger

DELL

Megger
VLF Sinus

LATITUDE E9410

Application is remote-controlled



SIEMENS

MV DAC-30

PD diagnostics system for medium voltage cables

FEATURES

- Safest operation thanks to fully isolated design
- Uses well proven DAC excitation voltage for PD measurements
- Real-time data evaluation and display of results
- Two part design for easy transportation
- Ideally suited for cables rated up to 23 kV

Partial discharge (PD) activity is an indication of an incipient fault in the insulation and is one of the best “early warning” indicators of deterioration in medium and high voltage cables. The MV DAC-30 unit can identify, evaluate and locate partial discharge in both cable insulation and accessories according to IEC 60270 and IEEE 400.3/4. One of the major benefits of the DAC waveform is the similarity with the 50/60 Hz power frequency. Data can directly be correlated and decisions can be made, this in contrary to VLF Sine 0.1 Hz, over here it is not possible.

One of the unique features of the MV DAC-30 is that the HV unit consists of a voltage source with an internal PD detector. Unlike with other PD measurement systems, the cable under test is the only accessible live component when testing with the MV DAC30, making it the safest unit on the market.



MV DAC-30
Datasheet

RECOMMENDED ACCESSORIES

- Diagnostic connection set and test bushings
- Transport cases
- PD-free connection cable

TECHNICAL DATA

	MV DAC-30
Voltage range	3 ... 30 kV _{peak}
DAC frequency	20 Hz ... 500 Hz
Testable load capacitance	10 µF
PD measuring range	2 pC ... 100 nC
System noise level	< 2 pC
Charge evaluation	According to IEC60270
PD Localization	
Range	0 ... 16 km / V/2 = 80 m/µs
Accuracy	1% of cable length
Resolution	±1 pC / ±1 m
Weight	
HV module	45 kg
Control module	30 kg
Dimension (W x D x H)	56 x 42 x 100 cm



TDS NT SERIES

High power test & diagnostics combination for MV cables

FEATURES

- Two proven voltage wave shapes, VLF CR and DAC, in one device
- High test capacitance enables standard compliant VLF 0.1 Hz cable testing and diagnostics on long cables or multiple phases in parallel
- Non-destructive PD diagnostics by means of proven DAC voltage (acc. IEEE 400.4)
- 50/60 Hz slope technology for a direct comparison with the power frequency
- Two-piece design allows for portable and easy transport
- Leakage measurement
- Real-time data evaluation and display of results

Network operators can now get faster and significantly more reliable information about the quality and the condition of their cables. For the first time, it has become possible to immediately locate faults in underground cables during the actual PD measurement. With the 50/60 Hz Slope Technology a withstand test with VLF cosine-rectangular voltage (VLF CR) and PD diagnosis with damped alternating voltage (DAC) is combined in one unit, the TDS NT series. This allows an efficient and integrated solution for precise inventory of the network infrastructure. Important to mention is that the PD measurement data, gained with the VLF CR or with the DAC test voltage, can be compared directly with the 50 / 60 Hz network voltage. This facilitates reliable decision making.

Apart from PD diagnostics the TDS NT series can also be used for simple VLF withstand testing, DC testing, sheath testing and sheath fault pinpointing. Making it a universal system for both cable testing and diagnostics.

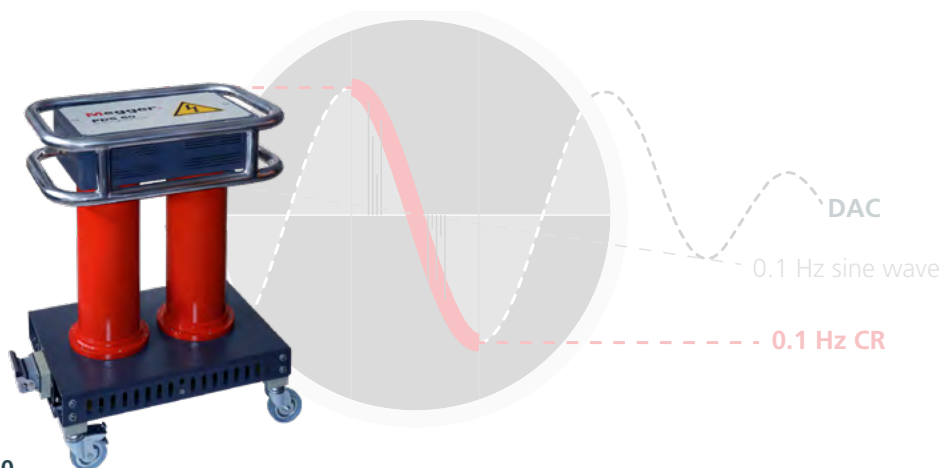
The TDS series are available in two versions, 40 and 60 kV.

RECOMMENDED ACCESSORIES

- Diagnostic connection set and test bushings
- Transport cases
- PD-free connection cable



TDS NT 40 / 60



TECHNICAL DATA	TDS 40	TDS 60
Output voltage		
VLF	3 ... 40 kV _{RMS}	3 ... 60 kV _{RMS}
DAC	3 ... 40 kV _{peak}	3 ... 60 kV _{peak}
DC	3 ... ±40 kV	3 ... ±60 kV
Output current	7 mA	5 mA
Leakage current measurement	0 ... 7 mA, resolution 10 µA	0 ... 5 mA, resolution 10 µA
Frequency		
VLF	0.1 Hz cosine-rectangular	
DAC	20 ... 500 Hz	
Testable cable capacitance VLF		
Basic version	2.4 µF / 40 kV _{RMS} @ 0.1 Hz	1 µF / 60 kV _{RMS} @ 0.1 Hz
Plus version	4.8 µF / 40 kV _{RMS} @ 0.1 Hz	2 µF / 60 kV _{RMS} @ 0.1 Hz
Testable cable capacitance DAC	5 µF / 40 kV _{peak} 10 µF max.	2 µF / 60 kV _{peak} 10 µF max
Sheath test / fault pinpointing	Testing: 3 ... 10 kV Pinpointing: 3 ... 10 kV Pulse 1:3 / 1:5 / 1:9	
Weight (depending on options fitted)	approx. 55 + 48 kg	approx. 85 + 48 kg
Dimension (W x D x H), divided in two devices	550 x 1100 x 420 mm	550 x 1100 x 420 mm



TDS NT
Datasheet

TECHNICAL DATA	PD DETECTOR PDS 60
Voltage	
Operation	max. 60 kV _{RMS}
Type	VLF Sine, VLF CR or DAC
Sensitivity range	2 pC ... 100 nC
PD self-noise level	< 2 pC
PD localization	
Measuring range	0 ... 16000 m / v/2= 80 m/µs
Precision	1% of the cable length
Resolution	±1 pC / ±1 m
Weight	30 kg
Dimension (W x D x H)	39 x 54 x 76 cm
PD calibrator (IEC 60270 compliant)	
Measuring range	100 pC ... 100 nC
Power supply	9 V block battery
Software	easyGO principle, integrated cable database, fully automatic evaluation



PDS 60
Datasheet

TDM SERIES

High power test & diagnostics combination for MV cables

FEATURES

- Cable testing, cable diagnostics and sheath testing in one device
- Available in two voltage levels and different application packages
- Portable as well as van-mount version
- Enables standard compliant high power VLF testing at 0.1 Hz (up to 7.8 μF @ 36 kV_{RMS} and 5 μF @ 54 kV_{RMS})
- Internal Tan Delta measurement with automatic result interpretation according IEEE 400.2
- PD diagnostics using VLF sine wave, Damped AC or 50/60 Hz Slope technology voltages
- Real-time data evaluation and display of results
- PD and TD monitored withstand testing

TDM series is a revolutionary breakthrough in testing and diagnostics of MV cables. The patented concept addresses the utilities increasing need for flexibility in use of test and measuring equipment based on the type of application. Market trends such as increasing length of MV cable systems are fully addressed.

The TDM series is available in two voltage levels, one optimized for 20 kV networks (TDM 4540) and one for 30 kV networks (TDM 6260). Different application packages are available for both voltage levels. Most upgrades are possible at any time without checking or returning the equipment back to the factory. Most combinations are available both as a stand-alone device and as van-mount version.





TECHNICAL DATA
(maximum configuration)

	20 kV networks (TDM 4540)	30 kV networks (TDM 6260)
Output voltage		
VLF Sine	0 ... 45 kV _{peak}	0 ... 62 kV _{peak}
VLF CR	0 ... 45 kV _{RMS}	0 ... 60 kV _{RMS}
DC	0 ... ± 45 kV	0 ... ± 62 kV
DAC	0 ... 40 kV _{peak}	0 ... ± 60 kV _{peak}
Output current	12 mA	23 mA
Leakage current measurement	0 ... 20 mA, resolution 10 µA	0 ... 20 mA, resolution 10 µA
Testable capacity (@ U_{max})		
VLF Sine	0.6 µF @ 0.1 Hz 10 µF max	1 µF @ 0.1 Hz 10 µF max
VLF CR	5 µF @ 0.1 Hz (40 kV _{RMS})	4.4 µF @ 0.1 Hz (60 kV _{RMS}) 7.8 µF @ 0.1 Hz (36 kV _{RMS})
DAC	5 µF @ 0.1 Hz (40 kV _{peak})	4.6 µF @ 0.1 Hz (60 kV _{peak})
Sheath testing / pinpointing	0 to 5 / 10 / 20 kV	0 to 5 / 10 / 20 kV
Internal Tan Delta diagnostics		option
Partial discharge measurement		option

APPLICATION

	TDM 45	TDM 4540	TDM 62	TDM 6260
VLF testing short cables	■	■	■	■
VLF testing long cables		■		■
Tan Delta (TD) diagnostics	with TD option	with TD option	with TD option	with TD option
Partial discharge (PD) diagnostics with VLF Sinusoidal	with PD option	with PD option	with PD option	with PD option
Partial discharge diagnostics with DAC and 50 Hz Slope technology		with PD option		with PD option

PDS 62-SIN

Partial Discharge detection and localisation system

FEATURES

- Partial discharge diagnostics with VLF Sineoidal voltage up to $62\text{kV}_{\text{peak}}$
- With 14.5 kg – the lightest PD measuring unit on the market
- Real-time data evaluation and display of results, no post processing needed
- General and localized Phase Resolved PD (PRPD) pattern display for defect type recognition

Apart from PD couplers which are suited for all types of excitation voltages Megger also offers PD couplers which are suited for VLF Sineoidal only. The PDS 62-SIN has been designed for all Megger VLF Sineoidal testers up to $62\text{ kV}_{\text{peak}}$. With its weight of 14.5 kg the PDS 62-SIN is the lightest PD measuring unit on the market.



PDS 62-SIN
Datasheet

TECHNICAL DATA	PDS 62-SIN
Voltage	
Operation	max. $62\text{ kV}_{\text{peak}}$
Type	VLF sine 0.01 to 0.1 Hz
Sensitivity range	2 pC ... 100 nC
PD self-noise level	< 2 pC
PD localization	
Measuring range	0 ... 16000 m / $v/2 = 80\text{ m}/\mu\text{s}$
Precision	1% of the cable length
Resolution	$\pm 1\text{ pC} / \pm 1\text{ m}$
Weight	14.5 kg
Dimension (W x D x H)	36 x 33 x 64 cm
PD calibrator (IEC 60270 compliant)	
Measuring range	100 pC ... 100 nC
Power supply	9 V block battery
Software	easyGo principle, integrated cable database, fully automatic evaluation

RECOMMENDED ACCESSORIES

- Diagnostic connection set and test bushings
- Transport cases
- PD-free connection cable

TAN DELTA DIAGNOSTICS

Dielectric loss measurement
on medium voltage cables

FEATURES

- Automatic result interpretation acc. to IEEE 400.2
- Optional leakage current correction
- Internal and external systems available

Tan delta measurements allows the operator to precisely determine a cable's condition. Integral aging effects, such as the degree of humidity and "water treeing" can be simply recognised and quantified, making the tan delta diagnostics the ideal instrument for monitoring cable conditions.



TAN DELTA
DIAGNOSTICS
Datasheet

Megger provides three solutions for tan delta diagnostics, the external tan delta attachment is a high precise unit which functions with all Megger VLF testers. In addition Megger also provides VLF units with internal tan delta facility, the VLF Sine 45-TD/ TDM45-P-TD and the VLF Sine 62-TD/ TDM62-P-TD.

TECHNICAL DATA	Ext. tan delta	VLF Sine 45-TD	VLF Sine 62-TD
Internal/ external	external	internal	internal
Voltage range	up to 62 kV _{peak}	up to 45 kV _{peak}	up to 62 kV _{peak}
Operating frequency	0.01 to 0.1Hz	0.01 to 0.1Hz	0.01 to 0.1Hz
tan delta accuracy	10 ⁻⁴	10 ⁻³	10 ⁻⁴
tan delta resolution	10 ⁻⁶	10 ⁻⁴	10 ⁻⁵
Power supply	battery operated	via VLF unit	via VLF unit
Data communication	wireless to laptop	via VLF unit	via VLF unit
Weight	12 kg	50 kg (incl. VLF)	60 kg (incl. VLF)



HV DAC SERIES

Test and diagnostic system for high voltage cables

FEATURES

- Cable withstand test and PD diagnostic in one single system
- Acceptance testing of newly installed cable
- Condition monitoring of in-service cables to check the aging of the cable
- Automatic display and evaluation of results during the test
- Transportable and compact
- Short set-up times allowing to respond quickly on changing weather conditions

Having accurate data is essential for reliable asset management to extend the life of assets and minimise operational costs. PD in High voltage cables indicates a progressive breakdown in insulation that may at some point become critical resulting in an unplanned outage. The costs of unplanned outages in the transmission network are extremely high so asset managers need to optimise their condition assessment and predictive maintenance regimes.

The HV DAC-200 and HV DAC-300 apply damped AC voltage techniques to the cable installation, as part of a maintenance regime or the commissioning of new high voltage cables up to 230 kV. HV DAC systems can easily identify, evaluate and locate partial discharges faults in cable insulation and cable accessories of all types in both new and aged high voltage power cables. The DAC frequency of the test voltage is close to nominal AC voltage service condition, therefore all PD measurements are evaluated and comparable to the power frequency. PD inception voltage (PDIV) and PD extinction voltage (PDEV) also can be easily determined.

TECHNICAL DATA

	HV DAC-200
Output Voltage DAC	18-141 kV _{RMS} / 25-200 kV _{peak}
Commissioning cable	up to 132 kV
Commissioning standard	IEC 60840 / IEEE 400.4
PD testing standard	acc. to IEC 60270
Software	For operation, evaluation & reports
Frequency range	20Hz – 300Hz
Capacity range	0.035µF - 8µF 200m – 40 km @ 0.2 µF/km
Charging current	20 mA
PD range and resolution	2 pC – 100 nC & ± 1pC
Weight	950 kg (incl. flight cases)

RECOMMENDED ACCESSORIES

- Support capacitor for testing short cables
- PD-free connection tubes in different lengths and diameter



Please watch the video
HV DAC 300 (3:04)
uk.megger.com/hv-dac



HV source

HV switch



HV DAC 200
Datasheet



HV DAC 300
Datasheet

HV DAC-300

18-212 kV_{RMS} / 25-300 kV_{peak}
up to 230 kV

IEC 62067 / IEEE 400.4

acc. to IEC 60270

For operation, evaluation & reports

20Hz – 300Hz

0.035 μ F - 8 μ F
200m – 40 km @ 0.2 μ F/km

12.5 mA

2 pC – 100 nC & \pm 1pC

1100 kg (incl. flight cases)



Inductance

Coupling capacitor



PD SCAN

Medium voltage switchgear
substation surveying system



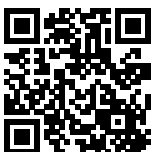
FEATURES

- Universal application range thanks to wide variety of sensors (internal/ external)
- Automatic evaluation and interpretation of the data
- Easy to use via touch screen and key pad
- Integrated camera/ QR code scanner
- PD localization via external TEV Sensor

The PD Scan is a handheld, pre-screening tool suitable for on-line detection of PD activity in MV cables and plant. PD activity is widely regarded as an indication of incipient faults in the insulation and seen as one of the best 'early warning' indicators of the deterioration of medium and high voltage insulation. Faults in MV plant are in most cases cost expensive. A breakdown in e.g. a termination can lead to damage of the entire cubicle. In addition faults in MV plant can lead to long outage times. With help from the PD scan such faults can be prevented.

As of its large color touchscreen and simple guidance the PD Scan belongs to the easiest to use handheld online PD units on the market. Furthermore features like QR code scanner, TEV PD localisation mode, its wide variety of sensors with auto recognition function and some unique software features make the unit a versatile tool. Therefore it should be part of the toolbox for all maintenance and service teams doing work in MV substations.

TECHNICAL DATA	PD SCAN
Type of sensor	TEV (internal/ external) AA (internal/ external) HFCT (external) Temp/ Hum (external)
Display	3.5" color touchscreen
Interfaces	USB Type-C, Lemo, Bluetooth
Memory	internal
Power supply USB charger Internal battery Battery life	Input voltage 100 ... 240 V, 50/60 Hz, Output voltage 5 V / 2.2 A Li-Ion 3.6 V DC / 3.35 Ah > 8 hours
Dimensions	220 x 91 x 35 mm
Weight	410 g



PD SCAN
Datasheet



Please watch the video
PD SCAN (1:16)
uk.megger.com/pdscan





UHF PD DETECTOR

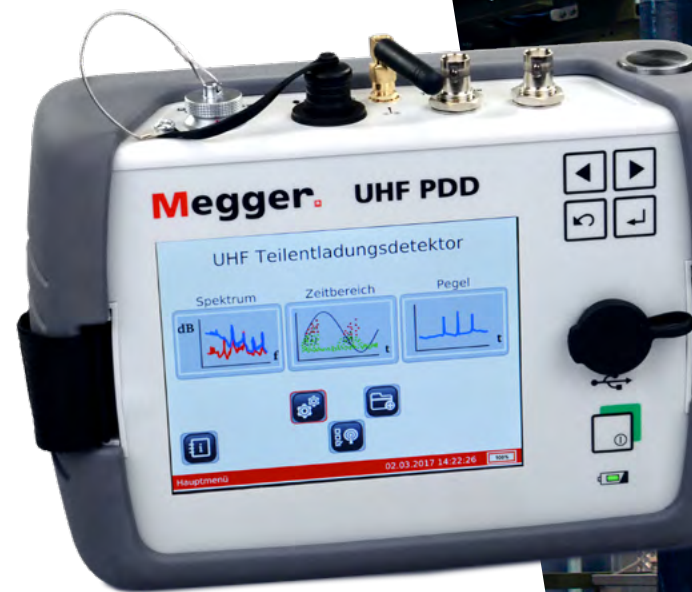
Handheld online PD substation surveying system

FEATURES

- Quick online surveying of PD activity in medium and high voltage network
- Prevent costly outages and long maintenance times
- Ideal tool for quick non-invasive surveys
- Large color touch-screen for easy operation
- Dual channel system for direct comparison between two sensors
- Synchronization with power frequency

The UHF PD Detector is the ideal tool for periodic non-invasive surveys in MV and HV substations and can identify defects in an early stage. It should therefore be part of the toolbox for all maintenance and service teams. Thanks to the high measuring bandwidth, UHF measurements can accurately measure local online PD activity in frequencies above those of common disturbances. The UHF PD Detector can be used to identify partial discharge emanating from various HV assets including cable terminations, voltage transformers, surge arresters and transformer bushings.

TECHNICAL DATA	UHF PDD
Frequency range	
UHF	150 ... 1000 MHz
RF	100 kHz ... 70 MHz
Sensitivity	-90 dBm
Display	6" color touchscreen
Internal memory	10 GB
Power supply	
Charger	Input voltage 100 ... 240 V, 50/60 Hz, output voltage 12 VDC
Internal battery	Li-Ion 7.4 V/ 12.25 Ah
Battery life	>10 hours
Dimensions	25 x 19 x 10 cm
Weight	1.9 kg



UHF C1 termination sensor (optional)



Please watch the video
UHF PD DETECTOR (1:44)
uk.megger.com/uhf



UHF PDD
Datasheet



REV 41
11/04

Megger.

CABLE FAULT LOCATION

A cable fault is a failure of the most vital component inside of a power cable, the bulk insulation between center conductor and neutral. This will inevitably cause an unexpected and expensive in-service outage which negatively impacts key performance indicators like SAIDI and SAIFI. Underground fault locating crews in utility companies and service contractors around the world are under tremendous pressure to find faults as quickly as possible, and doing that as safely as possible. Due to the different nature of the various different types of faults, Cable Fault Location (CFL) is a troubleshooting process: methods and technologies applicable to a certain type of fault might not be useful on other faults. Therefore, to be effective, it is imperative to have not just a single tool at hand but an entire toolbox of methods and technologies. That way, a crew in the field can react appropriately to any fault, even in difficult conditions.

The modern fault locating approach is a heuristic process in three steps using highly integrated, digitally controlled and fully automated fault location systems. Those systems contain a number of components: a so-called surge wave generator with a multi-stage capacitor for cap discharge (surging, thumping), a high voltage DC source, a set of filters and couplers, and a radar (time domain reflectometer, TDR).

The first step when trying to find a fault is to identify the type of fault. Learning the type of fault will already narrow down the choice of viable methods in subsequent steps.

Secondly, by applying so-called prelocation methods, an approximate distance to the fault can be determined. For decades now the undisputed industry standard and state-of-the-art technology for prelocation is Megger's Arc Reflection Method (ARM) which is highly effective on extruded cables (XLPE, EPR) and which is able to find up to 9 out of 10 typical faults.

Subsequently in a third step, based on the previous prelocation results the exact position of the fault must be determined by pinpointing using pinpointing devices like Megger's magnetic-acoustic digiPHONE².

Build on the achievements of HDW Elektronik and SebaKMT, Megger has become the world's leading manufacturer and powerhouse in Cable Fault Location equipment. Using state-of-the-art technologies, Megger's innovative products enable fault locating crews around the world to locate cable faults quickly, without causing damage to the remaining healthy parts of the cable. Since safety is paramount, Megger's equipment is designed to be the safest in the industry.





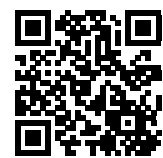
SWG 32

Traditional surge wave generators

FEATURES

- Surge voltage up to 32 kV and output up to 3500 J
- Multi-stage capacitor for high energy even on faults with lower breakdown voltages
- May be expanded into a fully fledged fault locating system by adding an external ARM filter and TDR

Surge wave generators are a common tool in cable fault locating and form the building block of sophisticated fault locating systems and cable test vans.



[SWG Datasheet](#)

SPG 5-1000 AND SFX 32

Portable cable fault location systems

The SPG 5-1000 is a portable fault location system for DC testing, conditioning, prelocation and pinpointing faults in 5 kV distribution systems. Using an easy-to-use single rotary knob interface and the patented ICE+ method, operators have a modern and precise tool especially in branched low voltage networks.

The very established SFX 32 is a true workhorse and the most commercially successful series of portable fault locating equipment in the world. The unit is semi-automatic and available in three voltage stages at a decent energy rating. Main applications are medium voltage and low voltage cables. The sit-on-top TDR is the excellent Teleflex SX-1. SFX 8, SFX 12 and SFX 16 have been discontinued.



[SPG Datasheet](#)



[SFX 32 Datasheet](#)



STX40

Portable cable fault location system

FEATURES

- True portable outdoor-ready unit, IP 43
- Easy to use software interface via a single rotary knob
- Fully automated operation via motorised switching
- Surge/Thump energy 2,000 Joule
- DC testing up to 40 kV, surging/thumping up to 32 kV, burning up to 40 kV
- Latest cable radar/TDR technology functionally fully integrated: Teleflex® RDR
- Multishot with 32 traces and Best Picture feature
- HV prelocation: ARM, ICE, Decay
- Inductive ARM filter for improved fault finding performance
- Built-in safety interlocks for earth connection monitoring (F-Ohm) and touch potential monitoring (F-U)



[Datasheet STX40](#)

The STX40 is the most powerful and most modern portable fault location system in the market. It is ideally suited for proof testing, analysing, prelocating and pinpointing of faults on extruded low voltage and medium voltage XLPE- and EPR-insulated cables. With its 40 kV DC source and a potent high frequency burner it is also highly capable and effective on PILC cables as well.

The STX40 is fully automated with motorised HV switches controlled by either the rotary knob or the industry-grade colour touchscreen.

The STX is the only system in its class with 7 fault locating methods built-in:

- Insulation testing
- Time Domain Reflectometry (Radar)
- HV DC testing (DC hipot)
- Burning
- TDR-based and transient HV prelocation
- Surging/Thumping in multiple voltage stages
- Sheath testing and sheath fault pinpointing





The challenge of paper cables

Old paper-lead cables pose a big challenge when fault locating due to their different physical design compared to modern solid dielectric cables: Instead of having to deal with carbon and air, like in faulted XLPE- or EPR-insulated cables, PILC cables are made of lapped paper layers impregnated with mass or oil. Breaking down a liquid insulation medium, igniting and stabilising an arc in a fluid, and capturing useful fault traces with the radar is all far more difficult on paper cables than on solid dielectric cables. In particular, breakdown voltages of high resistance faults may be very high, and low resistance faults do occur significantly more often. Consequentially, to be truly effective on paper cables, the fault location unit must have a high DC voltage, sufficient energy for cap discharge, and a number of modern TDR features. With its 40 kV DC hipot, 2000 Joules at 32 kV, and a radar with Best Picture Multishot as well as ProRange de-attenuation, STX is well-equipped to be successful in finding faults even on PILC cables.



Unbeatable combination:
With the STX40 and the digiPHONE*2 NT set you have the best option for pinpointing cables faults and sheath faults (see the next page).



DIGIPHONE+2

Pinpointing with magnetic-acoustic surge wave receiver

FEATURES

- Acoustic-magnetic pinpointing
- Highest acoustic noise immunity
- Automatic filtering of interference signals
- Automatic adjustment of all parameters, no adjustment required
- Cable compass: shows the actual cable route position and always helps you to stay on track
- Optional: Bluetooth® headphones



Datasheet
digiPHONE+ 2 Series

The digiPHONE+ 2 marks the next step in pinpointing of cable faults with the coincidence method. It is the refined successor of the orange digiPHONE+, the world's best-selling surge wave receiver.

Thanks to the optimised acoustic sensors, noise is reduced, and the bang of the cable fault is amplified and can be heard even clearer. In combination with the high-quality wireless headphones, the advanced Active Noise Cancelling function, which filters additional noise from the outside, is optionally available.



You can connect wired and wireless headphones to digiPHONE+2 at the same time. This makes it easier to train new staff.

DIGIPHONE+2 NT SET

Sheath fault location using voltage gradient method

In addition to acoustic-magnetic pinpointing of insulation faults, this set can also be used to pinpoint cable sheath faults using the voltage gradient method (step voltage method).

FEATURES

- Automatic suppression of extraneous potentials
- Automatic adaptation to the measuring voltage
- Automatic detection of the pulse
- Automatic zero point adjustment
- Measurement sensitivity in μV range



The digiPHONE+2 NT and NTRX sets already have wireless ANC headphones included.

DIGIPHONE+2 NTRX SET

Cable tracing with detection
of current direction

In addition to the functions of the NT set, this set offers the possibility of routing and line location.

FEATURES

- Cable compass for determining the cable position
- Continuous display of laying depth and current intensity
- Current direction detection
- Frequency scan
- Special probe location mode
- Don't forget about the transmitter!
Available audio frequency generators:
12 W, 50 W, or 200 W (van-only)



E-TRAY

Megger's E-Tray concept was introduced to the market place as an innovative and smart generation of Cable Fault Location equipment, going beyond the available state of the art equipment. The focus is directed to ease of use, so that users in the field can concentrate their efforts on the actual fault finding instead of struggling with operating overly complicated equipment. The unique feature of the Graphics User Interface (GUI) can be best understood during a demo, when the operator is pulled through the entire fault locating process by the software without having to know its individual steps. In addition it also provides suggestions to the user in special fault locating situations.

FEATURES

- **There is one identical front panel and one identical Graphic User Interface (GUI) for all E-Tray products**
- **There is one identical software version for all products and all languages**
- **All components of a modern cable fault location system (Surge Wave Generator, Time Domain Reflectometer, coil-type Arc Reflection Filter, hipot, burner, and sheath testing) are fully integrated and automated**

That means, all E-Tray units are operated in the same exact way and have a unique high voltage turn-on sequence, which can be individually configured by the customer to emulate either the typical US or European process. Any customer who knows one product of the E-Tray family knows them all. The software has a standard three-step fault location sequence built in and always proposes the next logical step – if the customer accepts, no adjustments are required by the user. This significantly increases the simplicity of both the user interface and the necessary training burden on personnel. The software also includes built-in advanced routines to help the user interpreting test results, for example pre-location with automatic recognition of open, short and cable end, distance to fault calculation, and automatic save and time & date stamp of all fault traces.

For layman and advanced users the E-Tray GUI offers different menu styles, allowing to customize the availability of 20 TDR functions and features. Therefore, any unit can be tailored exactly to the individual needs of any customer.

The E-Tray family currently consists of the following products:

EZ-Thump 4
EZ-Thump 12
EZ-Thump 3 Dual
Smart-Thump 16-20
Smart-Thump 25-30
EZ-Restore

EZ-THUMP SERIES, SMART-THUMP SERIES

Portable cable fault locators for outdoor use

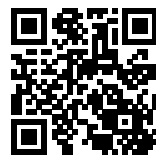
The EZ-Thump and Smart-Thump series are fault location systems in the compact and intermediate power class. They embody Megger's modern, digital solution for identifying, prelocating and pinpointing faults on different cable types. The units have been tailored to outdoor use in harsh conditions at the best possible power-to-weight ratio. Main applications are low voltage and medium voltage cables.



EZ-Thump
3 kV / 4 kV
Datasheet



EZ-Thump 12 kV
Datasheet



Smart-Thump 16-20
Datasheet



Smart-Thump 25-30



TELEFLEX

Time domain reflectometers (TDRs), radars

Radars (time domain reflectometers) can determine the distance to the fault by measuring runtimes and impedance changes in the cable. In conjunction with a surge wave generator, radars may also be used for various high voltage prelocation methods. The Teleflex series has been designed to be the best performing radars in the world and can be used either as standalone portable unit or vehicle-mounted as part of a cable test van.



TECHNICAL DATA	Teleflex SX-1	Teleflex VX V2
Operation mode	Single rotary knob, touchscreen, AC & battery	Single rotary knob, touchscreen, only AC
Measuring range @ 80m/μs	160 km	1,280 km
Measurement modes	TDR, IFL	TDR, IFL
Supported HV methods	ARM, ICE, Decay, ARM Live Burning	ARM, ICE, Decay, ARM Live Burning
Pulse amplitude	50 V, fixed	150 V, adjustable
Resolution	0.1m @ 80 m/μs	0.1m @ 80 m/μs
ARM trigger	Automatic	Automatic
ARM Multishot	15 traces per shot	15 traces per shot
Memory	2 GB	16 GB
User interface	easyGO	easyGO
Communication	USB	USB, Ethernet
Display	10.1"	15"
Data rate	> 400 MHz	> 400 MHz
Mounting	portable or van-mounted	portable or van-mounted
Channels	2-phase	3-phase
Protection class	IP 65 closed, IP 54 open	IP 65 closed, IP 54 open
Weight	7.8 kg	18 kg
Dimension (W x D x H)	362 x 305 x 195 mm	483 x 295 x 200 mm



Teleflex SX-1
Datasheet



Teleflex VX V2
Datasheet



TDR2050

Dual channel handheld TDR



TDR2050
Datasheet

FEATURES

- CAT IV 600 V input protection
- IP 54 rating offers real life working
- Auto set up mode for instant, easy use
- AutoFind and FindEnd functions helps find the fault fast
- Trace tagging facility that allows a name to be saved with the trace
- Distance dependent gain to counteract signal attenuation
- Step function to improve detection of near end faults and illegal taps

Designed for the location of faults in low voltage electrical power supply cables, the TDR2050 is tough. Its rugged and advanced design is dust and weatherproof to IP 54, so it is ready to work in the real world. Safety is paramount in LV networks so the unit is rated to CAT IV 600V and supplied with fused test leads as standard. Ease-of-use features such as auto-setup help new users start fault locating quickly and safely, and the auto-find function assists in interpreting the traces to find the distance to fault.

Expert users can override the auto function, permitting manual fine-tuning for more difficult faults. Megger's new screen layout allows the operator to overlay traces, providing further assistance in the location of faults such as comparing good and bad cores.

TECHNICAL DATA	TDR2050
Range	10 ... 20.000 m
Operation modes	Step and Pulse TDR selections Dual channel
Accuracy	±1% of range ±1 pixel at 0.67 VF
Resolution	1% of range
Velocity factor Propagation velocity V/2	Variable from 0.2 to 0.99 in steps of 0.01 30 ... 148 m/μs
Pulse widths	2; 6; 20; 40; 60; 100; 200; 400; 600; 800; 1000; 2000; 4000; 5000; 6000 ns
Pulse amplitude	up to 20 V
Cable Impedance	25, 50, 75, 100, 125, 140 ohm + AUTO
Dimension (W x D x H)	290 mm x 190 mm x 55 mm
Weight	1.7 kg
Display	800 x 480 px, colour graphics LCD, sunlight readable
Battery	Li-ion rechargeable battery, 12 hours typical battery life
Operating temperature	-15 °C to +50 °C
Storage temperature	-20 °C to +70 °C

OVERHEAD LINE TESTING SYSTEM

System for safely operating Teleflex VX on high voltage overhead transmission lines

FEATURES

- Easy to set up
- Great resolution at close and long ranges
- Line-up of filters to protect personnel and hardware from dangerous induced currents
- Very high energy TDR pulses for extremely long distance measurements up to 2000 km

This system, consisting of a Teleflex VX and a filter device, is able to measure impedance irregularities on de-energized high voltage transmission lines with at least one earth wire (shield wire). Identifiable irregularities include shorts and opens as well as breaks and certain in-between conditions. The system is the only available option to safely connect a TDR to an overhead power line, and it is used for a broad range of applications, e.g. accurate fault location, preventive inspection during commissioning or after repair before re-energizing circuits, phase identification, periodic checks to see changes against a fingerprint trace. The special design of the system using a filter device and a fuse link avoids damage to the equipment and eliminates risks for the user caused by hazardous induced currents and voltages.



Overhead line testing system Datasheet

TECHNICAL DATA	OVERHEAD LINE TESTING SYSTEM
Mains voltage	230 V \pm 10% 49...61 Hz \leq 70 VA
Transmission pulse power	Nominal value \geq 300 / 7500 W
Peak pulse voltage	at Z = 300 Ω \geq 300 / 1500 V
Pulse width	10 μ s und 20 μ s, switchable
Output impedance	300 Ω
Triggering	Internal (pulses triggered every 0.5 s)
Filter transmission range	\leq 3 dB
Filter ranges	10 ... 100 kHz, 10 ... 300 kHz 10 ... 1,000 kHz, 10 ... 2,000 kHz
Temperature	max. 90 °C
Inductivity	20 mH \pm 20 % \leq 0,5 Ω
Overcurrent protection	40 A fuse wire in the feed cable
Connection type	Single phase
Dimensions	600 x 400 x 260 mm
Weight	48 kg
Relative humidity	\leq 93 % at 30 °C
Protection class	IP 54

OVERVIEW LINE LOCATION SYSTEMS

Tracing and Pinpointing

Megger cable location systems allow you to quickly and reliably trace cables, identify the exact route, and obtain a comprehensive view of the cable network.



TECHNICAL DATA	EASYLOC	FERROLUX FLG12	FERROLUX FLG50
Application	Power and Telecomm cable and pipe location	Power and Telecomm cable and pipe location	Power and Telecomm cable and pipe location
Output power	0,1 W; 0,5 W and 2 W	0 ... 12 W	0 ... 50 W
Active frequencies	100 / 120 Hz 8 / 33 kHz	491 / 512 / 640 / 982 Hz 8,44 / 9,82 / 33 kHz	491 / 512 / 640 / 982 Hz 8,44 kHz
Passive frequencies	Radio: 15 kHz ... 23 kHz 50 Hz ... 250 Hz Easyloc TX / Sonde: 33 kHz	Radio: 15 kHz ... 23 kHz 50 Hz / 60 Hz / 100 Hz / 120 Hz	Radio: 15 kHz ... 23 kHz 50 Hz / 60 Hz / 100 Hz / 120 Hz
Receiver techniques	Maximum	Minimum Maximum Super-Maximum	Minimum Maximum Super-Maximum
Measured parameters	-	Loop impedance, current, voltage	Loop impedance, current, voltage
Depth measurements	Cable: 0.3 m ... 5 m Sonde: 0.3 m ... 7 m	0,1 m ... 5 m	0,1 m ... 5 m
Current measurements	-	1 mA ... 400 A / 180 A / 20 A	1 mA ... 400 A / 180 A / 20 A
Cable selection/identification	-	optional	optional
Internal memory	-	Data recording with graphic display	Data recording with graphic display
Protection class	Receiver: IP 56 IP 67 (below the battery case) Transmitter: IP54	IP 54	IP 54
Operating time	Receiver: > 40 h Transmitter: > 40 h	Receiver: >13 h Transmitter: 2.5 h bei 10 W	Receiver: >13 h Transmitter: >1 h @ 50 W or >5 h @ 10 W
Dimensions receiver	100 x 670 x 260 mm	230 x 70 x 100 mm	230 x 70 x 100 mm
Dimensions transmitter	260 x 255 x 140 mm	250 x 120 x 170 mm	410 x 335 x 175 mm
Weight receiver	2.5 kg	1.9 kg	1.9 kg
Weight transmitter	2.6 kg	2.9 kg	14 kg

FERROLUX® SYSTEM

Location of cables and pipes



Please watch the video
FERROLUX (1:51)



The FERROLUX® cable locating system is the perfect solution for your daily routine tasks. Locate and route cables and pipes. Determine their depth and store the information directly in the device. By the use of an external GPS receiver, the location data can also be stored.

The FERROLUX® combines the location techniques (identification of the direction of the signal flow) and audio-frequency methods in one instrument.

FEATURES

- Perfect ergonomics and light weight for comfortable operation
- Live measurement of cable depth and signal current strength
- Signal select feature for unambiguous identification of targeted cable
- Cable locating with left-right arrows and guidance line
- Automatic or manual frequency selection
- Multi-frequency operation – three frequencies at the same time
- Powerful transmitter with integrated rechargeable battery

RECOMMENDED ACCESSORIES

Mini antenna IFA (for cable selection)

Transmitter clamp UZ 50, UZ 100

Transmitter Ferrolux FLG12



"Earth fault" sensor set
Optional expansion set for sheath fault location
via voltage gradient method



FLG12
Transmitter

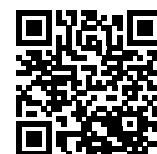
Mini antenna IFA

UZ 100
Transmitter clamp

Ferrolux Rx
Multifunctional
control unit with
route sensor IFS



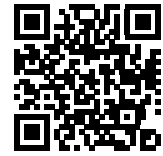
Ferrolux
Datasheet



FLG12
Datasheet

EASYLOC

Tracing of cables and pipes



Easyloc
Datasheet

FEATURES

- Safe and fast preparation of construction sites
- Avoid cable damage and inconvenient delays
- Depth measurement at the push of a button, even without a transmitter
- 33 kHz – compatible with other location systems
- Large display with simple menu guidance and automatic backlight

Speed up civil engineering work and minimise the risk of accidents – thanks to the Megger Easyloc you know the location of the underground pipes and cables! The Easyloc locating system has been specially developed for quick and easy checking of of underground utility plans. Thanks to the considerably simplified locating process, line damage can be avoided and the use of earthmoving equipment can be optimized. It is therefore the ideal locating system for civil engineering and road construction companies, municipalities (building yard, road maintenance department) as well as gardening and landscaping companies.



TECHNICAL DATA	Easyloc Basic	Easyloc Standard	Easyloc Plus	Easyloc Cam
Passive Frequencies	Radio: 15 kHz ... 23 kHz, Power: 50 Hz ... 250 Hz, Easyloc Tx / Sonde: 33 kHz			Power: 50 Hz / 60 Hz
Active Frequencies	33 kHz	33 kHz	100 Hz /120 Hz 8 kHz 33 kHz	512 Hz 640 Hz 33 kHz (only sondes)
Depth measurement	⊘	Cables: 0.3 m ... 5 m Sondes: 0.3 m ... 7 m	Cables: 0.3 m ... 5 m Sondes: 0.3 m ... 7 m	Sondes: 0.3 m ... 7 m
Output power	0.1 W 0.5 W Continuous and pulsed signal (switchable)	0.1 W 0.5 W Continuous and pulsed signal (switchable)	0.1 W 0.5 W 2 W Continuous and pulsed signal (switchable)	⊘
Application	Cable location	Cable location	Cable and pipe location	Sonde and camerahead location



CARLOC

Line tracing and locating system

FEATURES

- High contrast display for good readability during the day and at night
- Current-direction display for clear identification of the line
- Transmitter with two output signals to distinguish between neighboring lines
- IP 65 for dusty, dirty and wet working environments
- 100 freely adjustable transmitter frequencies (from 50 Hz to 200 kHz)

The Carloc line location system gets you to your destination quickly and safely. With the combination of intelligent signal processing and flexible operating modes, you save time and money. Thanks to AIM technology, the best possible frequency is suggested to you from 100 adjustable frequencies.



Carloc
Datasheet

MODEL COMPARISONS

	CARLOC	CARLOC PLUS
Number of frequencies	Up to 100	Up to 100
Ability to add / configure frequencies Uses configuration software to add/subtract frequencies.	✓	✓
Current direction display Gives the direction of the current to help identify target line.	✓	✓
Bluetooth® connection For GPS devices	-	✓
Ambient noise technology Measures noise and suggests the best frequencies to use.	-	✓
Receiver / transmitter communication Remotely control the transmitter from the receiver.	-	✓
Offset depth Displays depth and offset distance when target line is obscured.	-	✓
Dual output with optional dual leads Connects to two target lines at one time – switch from one lead to the other from the receiver.	-	✓
Battery life Receiver 30 hours, transmitter 100 hours.	✓	✓
Transmitter with 5 W (optional with Li-Ion Akku) For standard applications	✓	✓
Transmitter with 12 W (optional with Li-Ion Akku) Recommended for longer and deeply laid cables, as well as for sheath fault location	✓	✓



5 W or 12 W.
Choose your transmitter
power



Optional adapter
for marker location



Shockproof



dustproof



splashproof



temperature-resistant

PIL 8

Phase identification in earthed and shortcircuited medium voltage cables

For phase identification on medium-voltage cables, VDE 0105 Part 1 (EN 501110-1) points out that safety measures must be taken if the short-circuit prescribed at the end of the cable must be cancelled with simultaneous grounding.

With the phase identification device PIL 8 there is the possibility to maintain the short-circuit and grounding and still identify the individual phase conductors. The cell where the cable to be mounted ends can remain closed.



[PIL 8 Datasheet](#)

FEATURES

- Maintenance free transceiver clamps
- Suitable for any type of switch gear
- Easiest operation
- Absolute safe phase identification

CI/LCI

Reliable cable selection for energised and de-energised cables

The clear identification of a cable before cutting or assembly is an absolutely safety-relevant task. A false statement can have life-threatening consequences for the assembler and cause outages for the connected customers.

For simple and safe readout, Megger has developed the CI cable readout system. The CI TX transmitter generates pulses of up to 100 A and, by limiting the pulse voltage to 55 V, is below the dangerous touch voltage according to the safety requirements of VDE 0100.

With the processor-controlled evaluation of the CI RX receiver, pulse shape, polarity, amplitude and frequency are evaluated via a flexible readout clamp, resulting in an absolutely reliable statement.



[CI/LCI Datasheet](#)



FEATURES

- Inexpensive cable identifier system
- Easy to operate
- Save handling
- Smallest dimensions
- Twisted field sensor
- For live and voltage-free cables



PVS100i

Secure and reliable phase identification during network operation

FEATURES

- Phase identification at all voltage levels in real time
- GPS connection and GPS Cache (1 h buffer)
- Measurement on LV, HV and capacitive test points
- Easy to operate via touch display
- Eliminates safety hazards
- Saves time and money

NEW:
With integrated
4G modem



Whether you are restructuring a network, planning new network systems or performing switching operations, precise phase identification is essential for the safe and reliable operation of a network.

The PVS 100i assists you in checking the phase quickly and precisely. It helps you to avoid faulty switching, eliminates safety risks, reduces operation expenses, prevents a one-sided load of the network and improves the service.

The PVS 100i system not only offers energy providers safety-related advantages but also economic benefits, making it an essential piece of equipment.



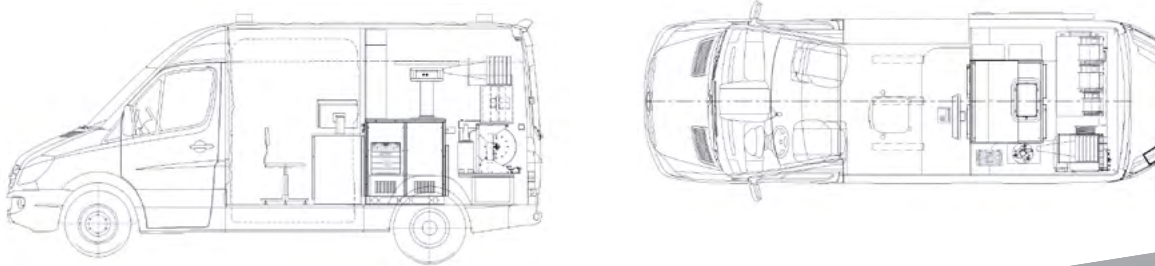
PVS100i
Datasheet

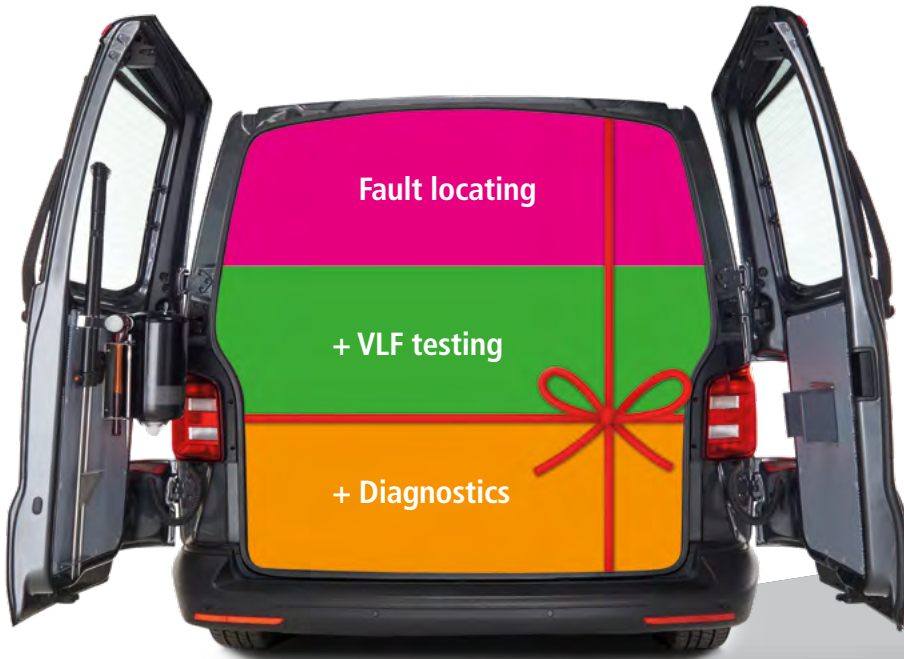


CABLE TEST VANS

Megger's cable test vans offer great user convenience, reliability and efficiency. Customers may choose between various standardized solutions, however, tailoring a system to highly individual demands is always possible and one of Megger Germany's core competencies.

The development of our systems is based on unique, innovative technologies as well as rich feedback from customers in the field. The result is always a product which sets new benchmarks in cable fault location and cable diagnostics performance, allowing you to keep the power on.



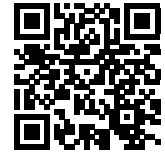


STX40
INSIDE



CENTRIX Evolution

The number 1 of cable test vans. Worldwide.



CENTRIX Evolution
Datasheet

FEATURES

- Made in Germany
- Most successful centrally controlled system in the market
- By now more than 1,000 vans in the field since the global market release of Centrix in 2006
- High quality furniture with durable materials
- Enormous degree of customization: Upon customer request systems may be extensively project-engineered and can be tailored to highly individual needs
- Proven fault location technology: 80 kV DC, Teleflex radar, prelocation, surging (thumping) and pinpointing, fault conversion (burning) and sheath testing
- Surging (thumping) up to 4,000 J
- Large 21.5" industrial-grade control unit
- Linux-based software for great stability, robustness, data security and cybersecurity, superior to Windows-based solutions
- Comes with the most sophisticated commercially available safety system incl. F-Ohm, F-U and a powerful discharge unit (SafeDischarge)
- VLF testing with high test capacitance at 0.1 Hz, necessary for working on long cables and for testing all three phases in parallel
- Testing and Diagnostics based on sinewave technology as an entry-level solution
- Testing and Diagnostics based on advanced near-power-frequency waveshapes (Cosine Rectangular, Damped AC) for best results when doing PD testing as well as monitored withstand testing with accompanying PD trending
- Connectivity package: system remote control, remote access via TeamViewer, smartphone app



Even after more than 15 years in the market Centrix is still the leading centrally controlled cable test van system. Centrix combines cable fault location with options for cable testing and diagnostics. The either single phase or three phase system is operated via a smartphone-inspired multi-touch graphic user interface. For fault location purposes all existing prelocation methods are available, for example inductive ARM Multishot, ARM Conditioning, ICE, Decay, Decay Plus, ARM Live Burning (Burn Arc Reflection), Loop On Loop Off (or differential ICE), ARM Charging, etc.

The current Centrix version, CENTRIX Evolution, may be configured as a complete testing and diagnostics solution with VLF, tan-Delta and PD measurement, complemented by its 80 kV DC testing function. For more than 20 years now, monitored VLF withstand testing with accompanying PD trending and IEC60270-compliant PD diagnostics was recommended to be carried out with near line frequency waveshapes, namely Cosine Rectangular and damped oscillating voltage (DAC). PD testing with sinewave voltage is possible but generally discouraged due to performance and validity issues.

Any additional equipment to do line location, route tracing, pinpointing and cable selection can be installed inside of the cable test van and will be tucked away safely in their corresponding mounts.

Overall, CENTRIX Evolution is the holistic, safe and reliable solution for commissioning and proactive, preventive and condition-based maintenance. The connectivity package and the MeggerBook software allow for sophisticated remote control features, remote access via TeamViewer, GPS mapping, GIS data import/export and therefore for location-based data storage, protocolling and most efficient cable fault location.



Upon customer request: Sinewave-based testing and diagnostics available as entry-level solution

Note: 0.1 Hz sine VLF can suffer from performance and validity issues, and, on average, does not provide results comparable to 50/60 Hz or near-line-frequency waveshapes. This has been observed in numerous field measurements since 2004 and has been published in papers and case studies many times. Therefore, we offer sinewave solutions but recommend solutions with 0.1 Hz Cosine Rectangular and Damped AC for obtaining results fully comparable with 50/60 Hz.



R30 2.0

The gold standard for high voltage transmission-type cables



R30 2.0
Datasheet

FEATURES

- Most functions centrally controlled via Teleflex®
- Sophisticated safety system incl. amongst other things F-Ohm, F-U and the most capable discharge unit of all cable test vans
- HV DC: Either 110 kV or 150 kV; extension to 400 kV optionally available
- 50 kV inductive double-surge ARM Multishot
- Surging/thumping up to 100 kV with 4,000 J and transient prelocation with ICE up to 100 kV
- Combination with VLF, tan delta and PD diagnostics possible
- Resonance burner, tone frequency generator and sheath fault testing optionally available



R30 is the most successful high voltage cable fault location and cable testing system in the market, and in its newest iteration, R30 2.0, it has been upgraded from a modular system to a nearly fully centrally controlled system. It was originally designed for the high demands associated with fault location on 66 kV and 110 kV high voltage cables as well as extra high voltage cables rated up to 550 kV. Nevertheless, it is perfectly fine to use R30 on medium voltage cables, paper-lead cables and low voltage cables, too.

A motorized, gas-insulated high voltage switch was a novelty and considerable innovation when R30 was initially released, and is still state-of-the-art. The concept was received so well by technicians and engineers, that software-controlled, automated switching directly spawned the development of the first fully centrally controlled cable test van a few years later. R30 anticipated this development and is still the go-to product for working on HV transmission cables.

R30 2.0 embodies Megger's toolbox philosophy and provides various different methods and technologies to treat high resistance faults, low resistance faults and intermittent faults with a high degree of flexibility. On top of that, the system comes with a number of unique features not available in other cable test vans. Aside from its HV DC capability of either 110 or 150 kV, R30 is equipped with the best performing radar/TDR-based prelocation: The Arc Reflection Method, today the industry's standard method, has been implemented in an inductive-active setup, thus able to find even most difficult faults which other methods or other implementations of ARM will not be able to find. While commonly available surge generators typically top out at 32 kV, R30 provides surging (thumping) and prelocation up to 50 kV.

A well-composed number of options allow customers to tailor R30 2.0 even more to HV applications, for example:

- 100 kV surging (thumping) with 4,000 J
- 100 kV prelocation with ICE
- 15 kV resonance burner with burn arc reflection
- Tone frequency generator for line location and route tracing
- Unit for sheath fault testing and sheath fault pinpointing

Moreover, R30 2.0 is the only system in the market which takes major safety aspects into account associated with fault location on very long offshore and onshore DC and AC cables: For very demanding applications such as cable lengths of 100 to 900 km (60 to 560 mi) R30 may be equipped with one of a series of high power discharge units. These discharge units have been certified by a third-party test lab and combine a short discharge time constant with a superior duty cycle for extensive prolonged testing.



PRIMEON

Fully integrated, automated and centrally controlled cable fault location and cable testing system for small and very small vehicles

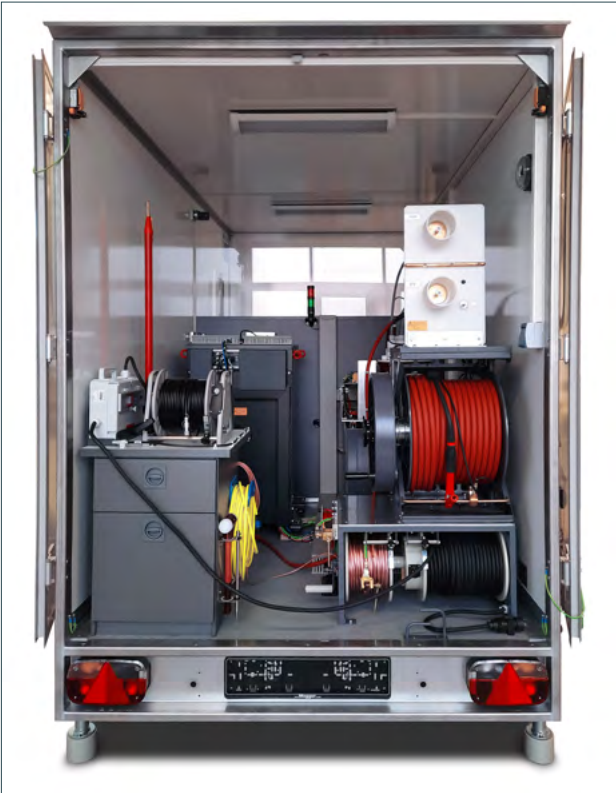
FEATURES

- State-of-the-art system for small vehicles with very limited payload and space
- Clear and straightforward software-based graphic user interface (GUI)
- Toolbox philosophy: 7 fault location methods built-in to be flexible in the field
- Suitable for low voltage cables, medium voltage cables and paper-lead cables
- 40 kV DC, surging (thumping) in multiple stages up to 32 kV
- High frequency burner up to 40 kV
- Teleflex® RDR, latest radar/TDR technology integrated
- Integrated prelocation: ARM, ICE, Decay, IFL mode, LV TDR mode
- Best Picture Multishot with 32 fault traces
- Inductive ARM filter for improved fault finding performance
- Available with additional fault locating options, e.g. power burner, line location and sheath testing
- Available with sinewave-based entry-level solutions for testing and diagnostics
- Available with powerful testing and diagnostics solutions based on advanced waveshapes like Cosine Rectangular and Damped AC for near line frequency results and non-destructive condition assessment



PRIMEON
Datasheet

PRIMEON fits into many different types of vehicles –
4x4 Ranger, trailer solution, ... no problem!





SPECIAL EQUIPMENT

- SHEATH FAULT LOCATION SYSTEM
- HIGH VOLTAGE BRIDGE
- IMPEDANCE METER
- LOW VOLTAGE INSTRUMENTS

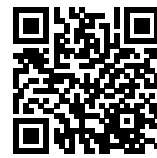


MFM10

Battery operated sheath fault location system

FEATURES

- Testing, prelocation and pinpointing of cable sheath faults
- Test voltage up to ± 10 kV DC
- High adjustable current up to 750 mA, also suitable for burning
- Improved prelocation with voltage drop method
- Highest accuracy by bi-polar measurement
- Fault locating of high-resistive faults inside cables
- Detection of multiple faults
- Detection, storage and indication of last events
- easyGO operation via jogdial and touch screen
- Solid IP 53 PELI trolley case
- Only one single removable HV connection cable
- Max. test object capacity 10 μ F



MFM10
Datasheet

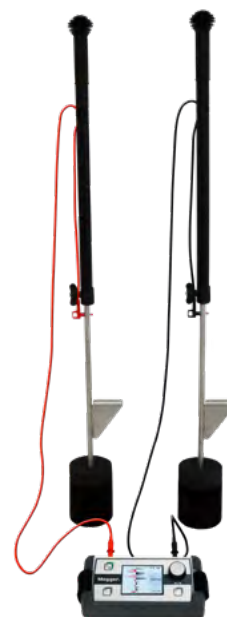
Sheath faults can occur due to poor cable laying or damage during installation. A sheath fault may not be detected until the cable is already in operation, and at this point they can become real cable faults later down the cable's lifecycle. It is therefore important to identify and address these faults as quickly as possible before they can become real faults.

The fully automatic MFM10 is a testing device for the prelocation and pinpointing of cable sheath faults. The unit works with the easyGO principle, which gives the operator a fast, easy and reliable tool to evaluate this kind of fault. The unit includes evaluation of measured data to interpret the fault location.

It also has voltage drop and bipolar prelocation methods to ensure that external galvanic and thermo-electric influences are eliminated, which increases the accuracy and quality of the measurement.

RECOMMENDED ACCESSORIES

- 19" version for vehicle installation
- ESG NT ground fault locator for DC voltage gradient method
- HV connection cable 10 m / 15 m / 20 m
- Audio frequency option with 8.44 kHz



ESG NT set for voltage gradient
method

HVB10

High voltage bridge for long cable up to 200 km

FEATURES

- Localization of cable faults and sheath faults
- User-friendly voltage drop method:
- Technically superior to older methods
- Completely independent of the parameters of the auxiliary conductors and the bridges at the far end
- Automatic measurement sequence
- Bipolar measurement to eliminate external influences
- Detection and display of incorrect connections
- Pluggable HV connection cable
- easyGO operation via rotary knob and touch screen
- Capacitance measurement up to 25 μF
- Testing on cables up to 200 km



HVB10
Datasheet

HVB10 is a highly accurate HV bridge designed to prelocate cable and sheath faults, perform sheath testing and pinpoint sheath faults, especially on long high voltage cables.

With its high resolution, intermittent fault detection function, and load adaptation for faster cable charging, the HVB10 is the ideal tool for finding sheath faults early and accurately by identifying poor cable laying practices and checking contractor work before connecting to the utility's network.

The HVB10 prelocates core-to-core and core-to-screen faults, but it also provides the sheath fault location functions from the MFM10, sheath testing, prelocation and pinpointing with pulsed DC, and optional audio frequency operation.

RECOMMENDED ACCESSORIES

- ESG NT earth fault probe for DC step voltage
- Audio frequency option with 8.44 kHz
- HV connecting clamp set for large dimensions

Did you know?

MFM10 and HVB10 are based on the principle of the voltage drop method. Compared to the conventional measuring bridge method (Murray method) the voltage drop method offers enormous advantages:

- more accurate prelocation results
- lower error sensitivity
- faster measurement, without additional inputs
- deviations of shield and conductor impedances do not influence on the measurement result



NIM 1000

Impedance meter

FEATURES

- **Compact and portable instrument for field use**
- **Easy operation with direct display of all measurement parameters**
- **Highest test current up to 1000 A**
- **Single and three-phase application**
- **Measures the grid impedance up to the 10th harmonic**
- **Automatic long-term measurement**
- **USB for test report and screenshot generation**
- **Bright color display**

The NIM 1000 mains impedance meter is used to measure the mains impedance in low-voltage networks. The network is tested at the connection point under near-operational conditions with up to 1000 A for current carrying capacity. Potential weak points are made visible.

The NIM 1000 can be used both event-oriented to determine the cause of unstable network voltage and preventively for control measurements (e.g. before and after a network conversion). In this way, a consistently good supply quality can be ensured and downtimes can be minimized. Typical preventive tasks are in particular the measurement of the network impedance at the connection point, tests for decentralized power generation, preliminary clarification for industrial customers or verification during acceptance.



NIM 1000
Datasheet



FAULT SNIFFER 2

Cable fault pinpointing
in low voltage networks



FEATURES

- Can be used on straight or branched networks
- Reliable avoidance of unnecessary excavations
- Fast and easy location of the fault spot
- Handy size, easy to transport
- Accurate to approximately a decimeter
- Detection of fault gases from a large distance
- Sensitive to several gases, suitable for any insulation material



Fault Sniffer 2
Datasheet

Save time and money. With the FaultSniffer2 you can go on cable fault location yourself. Find cable faults quickly and safely, without using service providers or a cable test van. Consumers can stay on the grid! Most cable faults result in burns of the cable sheath. The resulting gases are sucked in and detected by the vacuum technology of the FaultSniffer2. The evaluation of the data is done in real time and gives you a graphical representation of the burning gas concentration. The cable fault is located at the point of highest measured gas concentration. In most cases, this will be at a joint. NOTE: Sniff the known joint locations first.



Please watch the video
FAULT SNIFFER 2 (2:02)

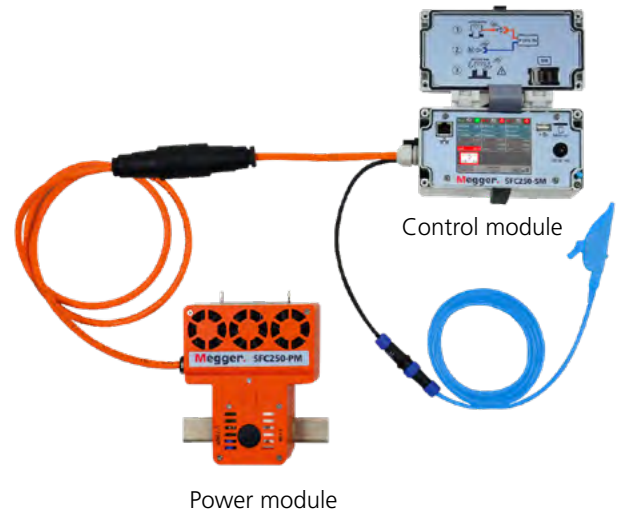


SMARTFUSE 2

Monitoring and fault location
in low voltage grids

FEATURES

- Real-time monitoring and analysis of current and voltage progression
- Early warning of impending grid overload
- Automatic restoration of power supply
- Minimised downtimes
- Cable fault location with households connected
- **NEW:** easyGO mode, the simple fuse mode for fast start-up
- **NEW:** automatic warning of high fault current during commissioning
- **NEW:** integrated 4G modem



SmartFuse2, a multifunctional electronic fuse system up to 250 A load current, is Megger's new solution in the low-voltage network, available as a 1-phase or 3-phase system.

SmartFuse2 consists of up to three power modules and a control module, and is so compact that the distribution panel can be closed after installation. Safety posts are not necessary.



NEW:
With integrated
4G modem



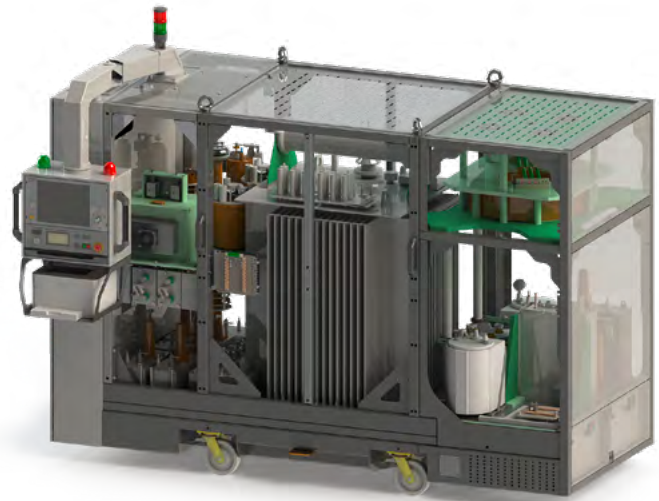
SmartFuse 2
Datasheet



SPECIAL & CUSTOMIZED SYSTEMS

Special applications need individual solutions. Worldwide.

Working in partnership with our customers, Megger has provided many customized solutions for special applications over the years. As experts and designers of the most comprehensive range of test equipment in this field, Megger is best placed to offer a tailor-made package solution for any cable test and 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 deep pool of experience and background knowledge are always willing to discuss different solutions for high-end applications.

Write to baunach@megger.com



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SERVICES

OFFSHORE WINDFARM SUPPORT

SEACAT ENDEAVOUR

RESERVED ZONE

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In addition to the major manufacturing sites for the cable infrastructure, Megger has 25 sales offices and distributors in over 100 countries around the world. Please visit our website www.megger.com to get in touch with us.

TRAINING & SUPPORT

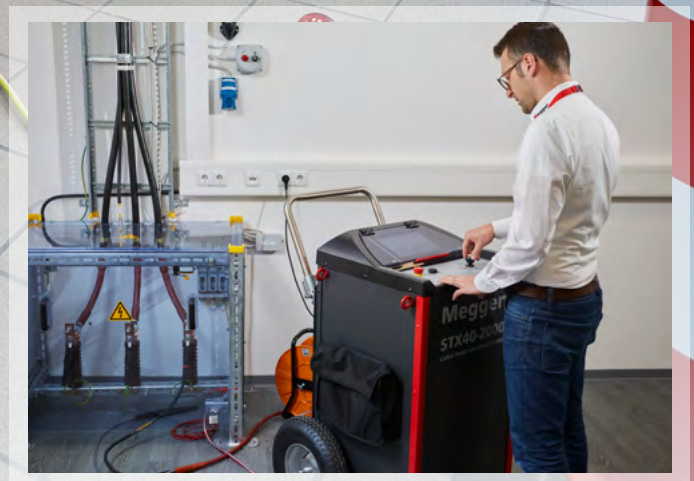
An additional benefit to purchasing any test instrument from Megger is the breadth and depth of the technical knowledge and experience that we can share with you.

We have invested heavily in creating a local support network of engineers to provide a rapid response and who understand your application and needs.

Product and application training can also be offered at your premises or in specialist training facilities around the world. More information on course availability and other technical resources can be found on our website www.megger.com.



Trainings with high practical use!



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360°



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