

Testing, diagnostics and
fault location on power cables

Megger[®]

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



EN
English

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 52 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 NT2 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 µF 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

- Performs cable withstand testing, cable diagnostics, and sheath fault pinpointing
- Smallest and lightest unit on the market in its class
- Unique user-experience thanks to large colour-touch display
- Automatic result interpretation as per latest IEEE 400.2 standard
- Highest safety thanks to analogue residual voltage indicator



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 NT2 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



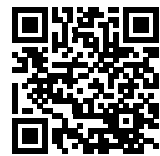
VLF CR SERIES
Datasheet

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

Megger
PDS 60



Application is remote-controlled

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.

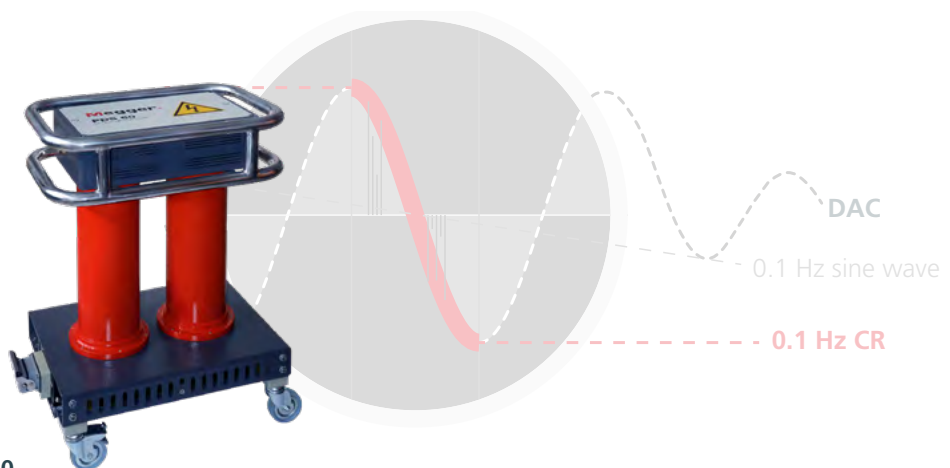
The TDS series are available in two versions, 40 and 60 kV.

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 Sinusoidal only. The PDS 62-SIN has been designed for all Megger VLF Sinusoidal 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





Watch the product video of HV DAC 300 (3:04 min)






Watch the customer video of HV DAC 300 (3:25 min)





Watch the explanatory video of HV DAC 300 (4:00 min)





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



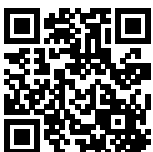
FEATURES

- 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

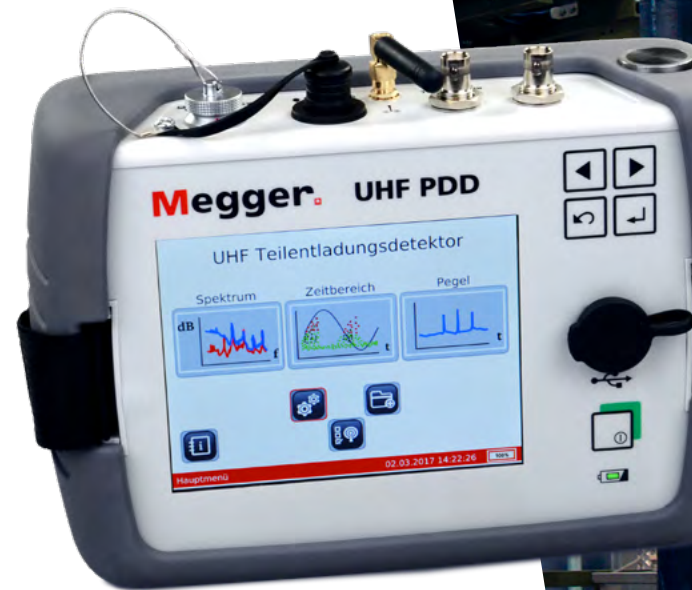
Handheld online PD substation surveying system

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, resulting from the failure of the cable's main insulation, leads to immediate and costly system outages. This significantly impacts supply reliability metrics such as SAIDI and SAIFI, and places considerable pressure on field crews to quickly locate the fault. Due to the variety of different cable faults, fault location requires a diverse array of methods and technologies. It is crucial to have solutions that offer a broad spectrum of techniques, similar to a big toolbox, to be able to adapt flexibly to different fault scenarios.

The modern approach to fault location is a fully automated sequence in multiple steps. The first step tries to identify the type of fault through insulation testing and breakdown testing with a ramped DC voltage. This is followed by the second step, the application of prelocation methods, such as cable radar/TDR or the inductive arc reflection method (ARM), to find the distance to the fault. The final step is the precise pinpointing of the fault position using advanced devices like the magnetic-acoustic surge wave receiver digiPHONE².

Megger, building on the legacy of HDW Elektronik and SebaKMT, is the industry's forerunner and global leader in the manufacturing of cable fault location solutions. Our portfolio includes both portable devices and fault locating systems on skids, in vans, in trailers, and in containers. Megger's products empower field crews around the world to locate faults quickly and safely, without further compromising the integrity of the healthy parts of the cable. Designed to the highest safety standards, Megger devices minimise hazards and risks to users.





SWG32

Conventional surge generator (thumper)

FEATURES

- Three surge voltage levels: 8 kV, 16 kV, and 32 kV
- Surge energy in two versions: Either 1750 J or 3500 J, in each of the three stages
- Robust and fast-acting discharge unit
- Expansion for prelocation with cable radar/ TDR and Arc Reflection upon request



SWG Datasheet

SPG5-1000-1 AND SFX32

Portable cable fault location systems

The SPG5-1000-1 is an automated, portable fault location device for low voltage cables. It comes with a 5 kV DC source (DC hi-pot), two stages for surging (thumping) and can be used for fault conversion, prelocation and pinpointing. Instead of using a cable radar/TDR, the distance to the fault is determined with the ICEplus method. The user-friendly single rotary knob operation and the use of motorised switches make the SPG5 a convenient tool in the day to day work of cable technicians. The device is also suitable for branched low voltage networks with T- and Y-joints (splices).

The well-established SFX32 is distinguished by its high reliability in the field and its steady success over the years has made it the most commercially successful portable device for cable fault location worldwide. It is a semi-automatic solution for medium and low voltage cables, featuring three surge voltage levels of 8 kV, 16 kV and 32 kV, and an adequate surge energy of 1750 J. The premier Teleflex SX-1 is used as its sit-on-top cable radar/TDR. Note: The legacy SebaKMT products SFX8, SFX12, and SFX16 have been discontinued.



SPG5-1000-1
Datasheet



SFX32
Datasheet



E-TRAY: CONTROLLER + SOFTWARE

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

- M-THUMP5-1000
- EZ-Thump 3 Dual, EZ-Thump 4, EZ-Thump 12
- Smart Thump 16-20, Smart Thump 25-30

Innovative UX concept

The E-TRAY was originally introduced by HDW Electronics in 2010 as a digital hardware and software solution for the purpose of radically streamlining cable fault location. Its operation concept was unique in the market upon its release, and over a decade later no competitor has caught up to it yet.

All E-TRAY products have an identical graphic user interface, and software version regardless of the product or language.

E-TRAY
EASY-2-USE **GUI**
automated
INTUITIVE

User-friendly and automated

The E-TRAY's main focus is the by far biggest group amongst field crews: less experienced users and outright laymen. Instead of overwhelming users with methods and parameters, the E-TRAY reduces complexity by showing only relevant information, and by following only a narrowed-down and pre-defined decision tree.

The E-TRAY software guides users through the entire fault location process using a pull-through sequence. This allows users to direct most of their attention on finding the fault without needing in-depth knowledge about individual fault location methods and without having to remember the cumbersome operation as known from outdated manual analogue units.

Fault identification // Insulation resistance, DC breaktown test



Fault prelocation // Cable radar/TDR, Arc Reflection ARM



Fault conversion (if needed) // Burning



Advanced prelocation // Burn Arc Reflection, current decoupling ICE

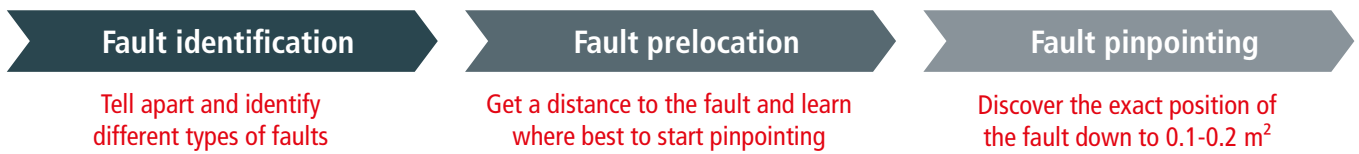


Fault pinpointing // Magnetic-acoustic coincidence method, voltage gradient method

User guidance and assistance

The E-TRAY software pulls users through a standardised decision tree which consists of the classic fault location sequence in three major steps: fault identification, fault prelocation, fault pinpointing.

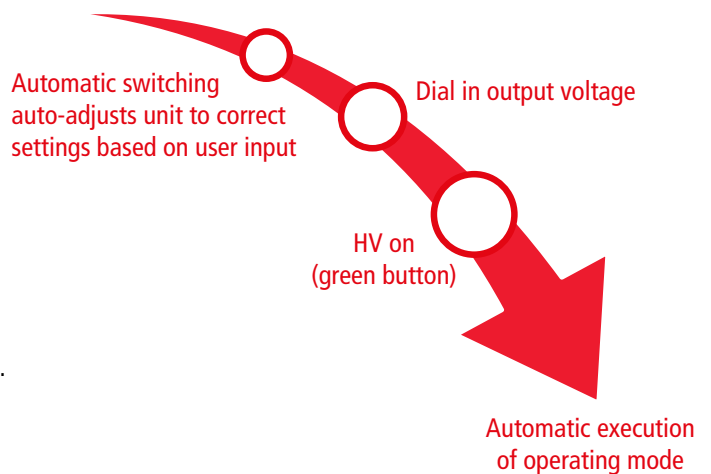
The software always proposes the next logical action. The user need not to select but just to confirm the next step. No further adjustments are needed. To address experienced users, there is an expert mode giving full access to all parameters and settings.



Uniform operation

Know one, know them all. All E-TRAY products operate identically, offering a standardised high voltage turn-on sequence across the board. Once a user becomes familiar with one E-TRAY product, they can easily use any other product from the E-TRAY family.

The training burden on personnel is significantly reduced, and onboarding new people to a crew is quick and effortless.



Physical and functional integration

The E-TRAY is based on the integration of all essential components that a modern cable fault location system must have. This includes DC source, discharge and earthing device, surge generator, TDR/ cable radar, inductive arc reflection filter, sensor for current decoupling etc. Physical integration means that all of those components are mounted and wired inside of the one and the same enclosure. Functional integration means that all of those components are operated in an automated fashion by the common controller.

Fault Location System	Robust and inherently-safe discharge and earthing unit
HV DC source (DC hi-pot)	Motorised switching
Surge generator (thumper)	Inductive ARM filter
Cable radar (TDR)	HV prelocation (TDR-based and transient)

M-THUMP5-1000

Innovative portable fault location unit for LV and MV cables

The M-THUMP5 portable cable fault locating system provides safe, efficient, and extremely easy-to-use solutions for quickly identifying, prelocating, and pinpointing various types of cable faults in low and some medium voltage power cables. The M-THUMP5 was developed to meet the requirements for typical low and lower medium voltage distribution cable fault location markets. The unit features a light weight aluminium enclosure, equipped with handles as a portable unit, or as a permanently installed vehicle mount unit.

FEATURES

- 9 fault locating technologies in one box
- 3 fault location technologies for branched LV cables
- E-TRAY software with automated pull-through guidance
- System voltage up to 6.6 kV



Check out all the features

M-Thump5 Datasheet



TECHNICAL DATA	M-THUMP5-1000	EZ-THUMP series	SMART THUMP series
Outdoor capable	IP53	IP53	IP53
Max. DC voltage	5 kV	3 kV / 4kV /12 kV	20 kV / 30 kV
Max. current	500 mA	94 mA / 47mA / 12 mA	60 mA / 40 mA
Insulation resistance	Yes	Yes	Yes
Max. surge voltage	5 kV	3 kV / 4kV /12 kV	16 kV / 25 kV
Max. surge energy	1000 J	500 J	1500 J / 1600 J
HV prelocation	ARM, ICE, ARM Live Burning	ARM	ARM, ICE
F-Ohm safety interlock	Yes	Yes	Yes
F-U safety interlock	Yes (optional)	-	-

EZ-THUMP SERIES, SMART THUMP SERIES

Small and intermediate size fault location units for outdoor use

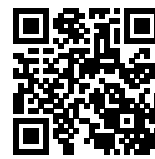
The EZ-Thump and Smart Thump series are fault location systems in the compact and intermediate power class. They embody Megger's modern, digital solution for identifying, prelocating and pinpointing faults on different cable types. The units have been tailored to outdoor use in harsh conditions at the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



STX40

Most powerful and most modern mobile cable fault location system

The STX40 is the most advanced solution of portable cable fault location technology available in the market. It is expertly designed to address the complexities of faults in XLPE- and EPR-insulated power cables. Featuring a 40 kV high-voltage DC source and a highly effective high-frequency burner, this unit is also uniquely equipped to meet the challenges associated with PILC and MIND cables.

Emphasising a digital, software-based and automated design with motorised switching, the STX40 leaves behind the outdated analogue and manual instruments from the past. The graphical user interface of the STX40 is designed for simplicity and efficiency, incorporating a single rotary knob and an industrial-grade display, which significantly boosts the efficiency and performance of field crews.



Datasheet STX40

FEATURES

- **Toolbox philosophy and full integration:** Identification, prelocation, pinpointing and conversion of faults all in one unit
- **Offers 7 different built-in fault locating techniques:**
 1. Insulation test, 2. DC test (DC hi-pot), 3. Cable radar/TDR, 4. HF burning, 5. TDR-based and transient HV prelocation, 6. Surging (Thumping) in multiple voltage ranges, 7. Sheath test and sheath fault pinpointing
- **Unsurpassed outdoor-ready design with exceptional all-terrain mobility:** IP43 rainproof and weather-resistant, extreme temperature resilience, bright sunlight-readable display, lightweight yet robust, optimally balanced center of gravity, large pneumatic tyres, adjustable handlebar
- **Impressive usability:** Easy to navigate software-based graphical user interface with single rotary knob control
- **Automation like a cable test van:** Fully automated operation via motorised switching of all HV modes and all voltage ranges
- **Highest safety in the industry:** Safety interlocks for monitoring of station earth and touch potentials (F-U), as well as earth connections (F-Ohm)
- **DC test (DC hi-pot) up to 40 kV, surging (thumping) up to 32 kV, high-frequency burning up to 850 mA, and considerable surge energy of 2000 J**
- **Built-in HV prelocation: ARM, ICE, Decay**
- **Functionally fully integrated and latest cable radar/TDR technology:** Teleflex® RDR with bipolar impulse generation
- **ARM Multishot feature with 32 fault traces and best-of-32 BestPicture feature**
- **Inductive ARM filter for superior fault finding performance**
- **Sheath fault pinpointing utilising the step voltage method (voltage gradient method) with a pulsed DC output for the ESG earth fault locator**



Addressing the challenges of paper cables

Paper-impregnated lead-covered (PILC) and mass-impregnated non-draining (MIND) cables, with their many layers of lapped paper and oil/mass insulation, present substantial challenges in fault locating compared to modern solid dielectric cables. Breaking down liquid insulation, igniting and stabilising arcs in fluid, and capturing good fault traces with cable radar/TDR is significantly more complex in paper cables than in XLPE- and EPR-insulated solid dielectric cables. In PILC and MIND cables, high resistance faults typically show higher breakdown voltages, while low resistance faults occur more frequently. Designed to meet these specific challenges, the STX features a 40 kV high-voltage DC output and an 850 mA high-frequency burner, along with 2000 Joules of energy at 32 kV. Its state-of-the-art built-in cable radar/TDR, equipped with bipolar impulse generation, BestPicture Multishot, and ProRange de-attenuation, ideally supplements the high voltage capabilities for successfully finding faults in paper cables.



Unbeatable combination:
With the STX40 and the digiPHONE+2 NT or NTRX 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 the 50 Hz step voltage probe

In addition to acoustic-magnetic pinpointing of insulation faults, this set can also be used to pinpoint cable sheath faults using the 50 Hz step voltage probe. With this new method, it is now possible to detect cable faults while the power is still on and households are still connected.

FEATURES

- Automatic suppression of external potentials
- Automatic adaption to the voltage level
- Automatic detection of the pulse rate
- Automatic zero adjustment
- Very high measuring sensitivity in the 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)



TELEFLEX

Time domain reflectometers (TDRs), portable cable radars

Cable 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, cable radars/TDRs may also be used for various high voltage prelocation methods. The Teleflex® series has been designed to be the best performing instruments in the market and can be used either as standalone portable unit or as vehicle-mounted unit as part of certain cable test van products.



TECHNICAL DATA	Teleflex SX-1	Teleflex VX-PT V2
Operation mode	Single rotary knob, touchscreen, AC & battery	Single rotary knob, touchscreen, only AC
Measuring range @ 80m/μs	160 km	1280 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 inch	15 inch
Data rate	533 MHz	533 MHz
Mounting	Standalone or with surge generator	Standalone or with surge generator
Channels	2-phase	3-phase
Protection class	IP65 closed, IP54 open	IP65 closed, IP54 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-PT V2
Datasheet



TDR2050

Dual channel handheld TDR



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-PT V2 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-PT V2 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). Indentifiable 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 ± 10% 49...61 Hz ≤ 70 VA
Transmission pulse power	Nominal value ≥ 300 / 7500 W
Peak pulse voltage	at Z = 300 Ω ≥ 300 / 1500 V
Pulse width	10 μs und 20 μs, switchable
Output impedance	300 Ω
Triggering	Internal (pulses triggered every 0.5 s)
Filter transmission range	≤ 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 ± 20 % ≤ 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	≤ 93 % at 30 °C
Protection class	IP 54

OVERVIEW LINE LOCATION SYSTEMS

Tracing and Pinpointing

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



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 Probe: 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



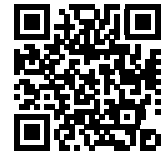
Ferrolux
Datasheet



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)



Carloc
Datasheet

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.

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 de-energised and energised (live) cables

The absolutely clear and unambiguous identification of a power cable before cutting or jointing is of great importance for safety. Any mistakes can result in significant property damage, personal injury or even death of the cable technician. Additionally, an incident will often cause unplanned in-service outages for connected customers. The CI/LCI system has been developed to make the task of cable identification and selection considerably safer and easier.



CI/LCI
Datasheet



FEATURES

- Inexpensive solution
- Identification and selection of cables
- Well-proven system in the market
- Easy to use
- Safe to operate
- Very small and lightweight
- Rated IP54

CI	LCI
<i>for medium voltage cables</i>	<i>for low voltage cables</i>
<i>de-energised cables</i>	<i>energised (live) cables</i>



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

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.



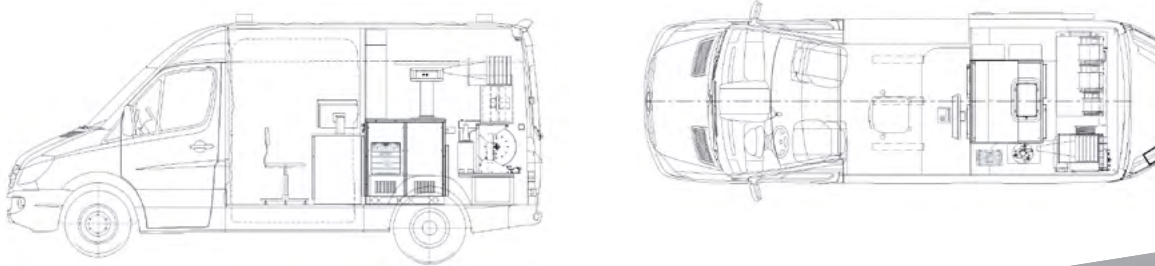
PVS100i
Datasheet

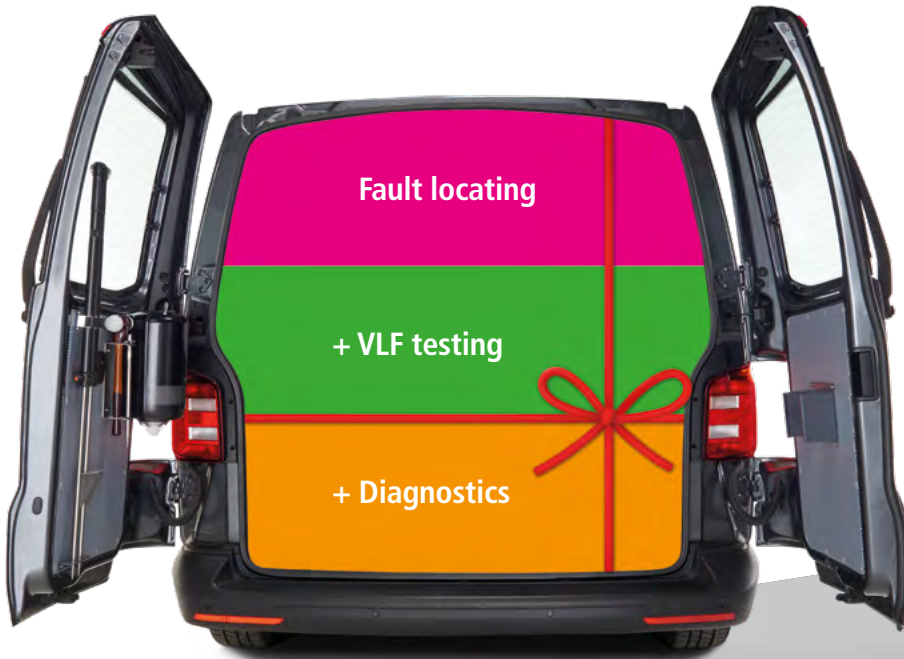


CABLE TEST VANS

Megger's cable test vans offer great user convenience, reliability and efficiency. Customers may choose between various standardised 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 1100 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® RDR cable radar/TDR, prelocation, surging (thumping) and pinpointing, fault conversion (burning) and sheath testing
- Surging (thumping) up to 4000 J
- Large 21.5 inch industrial-grade control unit
- Linux-based software for best 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, 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 as they are good solutions, but we recommend better solutions with 0.1 Hz Cosine Rectangular and Damped AC for obtaining results fully comparable with 50/60 Hz.



PRIMEON

Centrally controlled and automated 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 cable radar/TDR technology integrated
- Integrated prelocation: ARM, ICE, Decay, IFL mode, LV TDR mode
- BestPicture Multishot with 32 fault traces and best-of-32 analysis
- Inductive ARM filter for superior fault finding performance
- Available with additional fault locating packages, e.g., fault conversion, utility location, sheath test
- 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

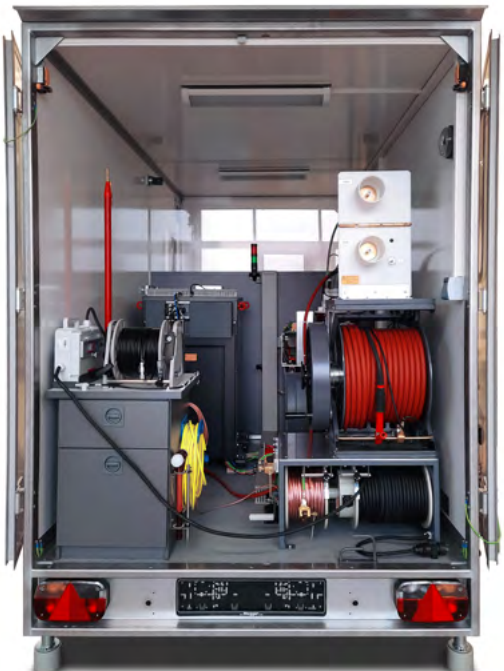
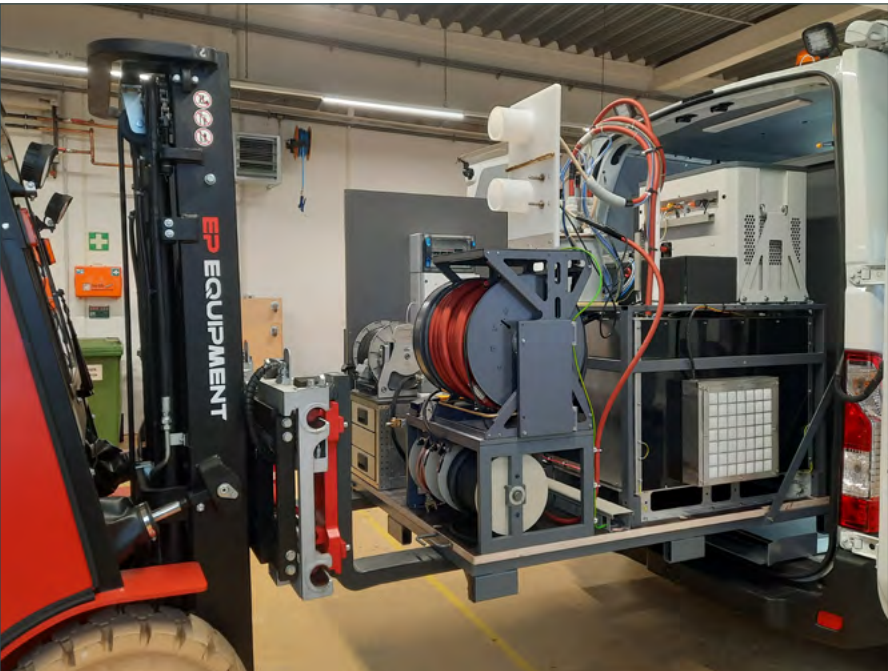


PRIMEON does fit into many different types of vehicles



Vans, Pickup trucks, Trailers, Containers, Electric cars

PRIMEON
Datasheet



R30 2.0

The gold standard for high voltage transmission-type cables



R30 2.0
Datasheet

FEATURES

- Most functions centrally controlled
- Sophisticated safety system incl. amongst other things F-Ohm, F-U and the most capable discharge unit of all cable test vans in the market
- HV DC: Either 110 kV or 150 kV; extension to 400 kV optionally available
- 50 kV inductive-active double-surge ARM incl. Multishot feature
- Surging (thumping) up to 100 kV with 4000 J and transient prelocation with ICE up to 100 kV
- 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 motorised, 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 cable 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 4000 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.





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 main insulation faults
- Detection of multiple faults
- Detection, storage and indication of last events
- easyGO operation via rotary knob and touch screen
- Rugged IP53 PELI trolley case
- Only one single removable HV connection cable
- Max. test 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.

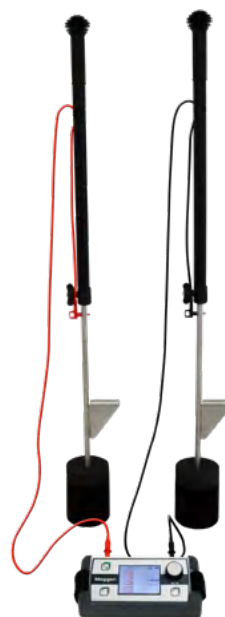
RECOMMENDED ACCESSORIES

19" version for vehicle installation

ESG NT2 earth fault probe for DC voltage gradient method

HV connection cable 10 m / 15 m / 20 m

Audio frequency option with 8.44 kHz



ESG NT2
Datasheet



ESG NT2 set for voltage gradient method (step voltage method)

HVB10

High voltage bridge for long cables up to 200 km

FEATURES

- Localisation of main insulation faults and sheath faults
- Voltage drop method
- Advantages over current balancing bridges
- Completely independent of the parameters of the auxiliary conductors and the jumpers 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
- Internal discharge capability of 25 μ F
- Testing on cables up to 200 km



HVB10
Datasheet

HVB10 is a highly accurate HV bridge designed to prelocate main insulation faults 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.

RECOMMENDED ACCESSORIES

ESG NT2 earth fault probe for DC voltage gradient method
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 traditional current balancing bridge methods (Murray loop etc.) 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 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

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 FAULT SNIFFER 2 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 FAULT SNIFFER 2. 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.



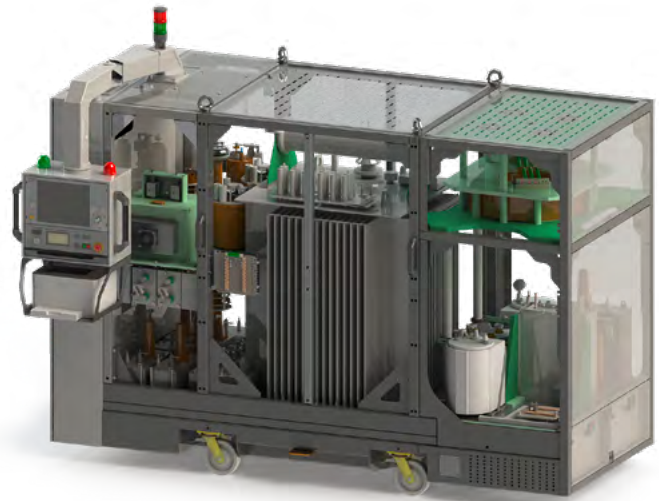
Please watch the video
FAULT SNIFFER 2 (2:02)



SPECIAL & CUSTOMISED SYSTEMS

Special applications need individual solutions. Worldwide.

Working in partnership with our customers, Megger has provided many customised 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 $60 \text{ kV}_{\text{RMS}} @ 0.1 \text{ Hz}$

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 320 μF , very short discharge time constant)

High power surge generators with more than 6000 J and no duty cycle restrictions (please contact us for higher surge energy)

High power audio frequency generators and submarine solutions for route tracing and pinpointing on long HVAC and HVDC 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

A tremendous benefit to purchasing any test instrument from Megger is that we won't disappear after your purchase! We do have broad and in-depth technical expertise, application knowledge and experience in the field which we can all share with you.

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

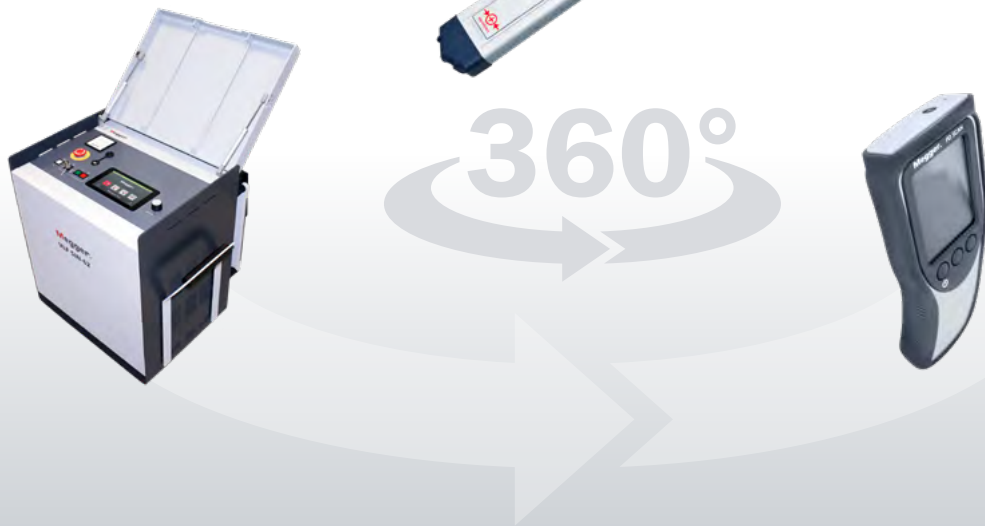
Product and application training can also be offered at your premises or in specialist training facilities around the world. More information on course availability and other technical resources can be found on our website www.megger.com.



Trainings with high practical value!



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