

R30 2.0 – 110 kV and 150 kV Solution for fault location on HV cables, long cables and paper cables



For illustration purposes only, your configuration may vary

R30 fault location base unit 110 kV

General characterisation	
Topology Highly centralised and highly automated, digital, software-based cable fault location system with options for the functional integration of cable testing with Very Low Frequency (0.1 Hz VLF)	
Automation Automatic switching with motorised HV switches for HV mode selection, HV mode execution and HV range selection in all operating modes of fault location and VLF testing	
Controls Via one single control unit for most operating modes and system functions	
Graphical User Interface (GUI)	Piechart (GUI Version 7)
Operation	Turn & Click single rotary knob (jog dial) on control unit
Operating system	Linux
Data management	MeggerBook Lite
Data synchronisation	USB
Control unit	
Display	Industrial grade TFT colour panel with LED backlighting
Antiglare	Yes
Multi-touch	Yes
LCD size	39.6 cm (15.6 inch)
Aspect ratio	16:9
Resolution	1920 x 1080 Full HD
Luminance	450 cd/m ²
Safety	
Compliance	CE conformance; EN 61010, EN 50191, VDE 0104, VDE 0105, DGUV 203-034 (BGI 891)
Discharge and earthing unit	60 kJ, equivalent to the energy stored in a 10 µF capacitance charged to 110 kV DC fast-acting: discharge time constant <1 sec
System status	Live monitoring and indication
Inherent safety	Yes, immediate earthing in case of power loss
F-U safety interlock	Reference earth to vehicle chassis for monitoring of protective earth incl. voltage-time integral, monitoring of station earth and touch potentials
F-Ohm safety interlock	Connection monitoring for operational earth (HV return)
Safety functions	Front panel: mains on/off, lockout-tagout key switch, emergency stop, residual voltage indicator, HV on, HV off; Control unit: rotary knob (jog dial)
Safety devices	System earthing status indicator lights, mains input protection device NAS60, HV compartment monitoring via door contacts, external safety device
Mains input monitoring	Overvoltage protection, undervoltage protection, residual current device (RCD)
Defined wiring	Yes, distribution panel inside of the system
Isolation transformer	5 kVA

Solution for fault location on HV cables, long cables and paper cables

Toolbox philosophy for cable fault location	
One toolbox, many tools: Maximising versatility, flexibility, and effectiveness of fault locating for field personnel	
DC test (DC hipot) with breakdown detection and insulation test for fault identification;	
TDR/Cable radar and HV methods (ARM, ICE, Decay) for fault prelocation;	
Burning for fault conversion;	
Surge generator (thumper) for fault pinpointing;	
DC test and voltage gradient method (step voltage method) for sheath fault testing and sheath fault pinpointing	
General configuration and high voltage system output	
Voltage class 110 kV	
Exclusively three phase (R30 3-110)	
HV DC source, Fault identification	
DC test (DC hipot)	0 ... 110 kV, $I_n = 10$ mA continuous at 110 kV, $I_{max} = 290$ mA
Insulation test	0 ... 1 kV in voltage ranges of 6 / 500 / 1000 V Measuring range 1 Ω ... 2 G Ω ; for capacitance 0 ... 19.9 μ F
Breakdown detection	0 ... 110 kV
Cable radar (time domain reflectometry, impulse echometry)	
TDR/Cable radar model	Teleflex® VX V2, physically and functionally fully integrated
Impulse generation	Unipolar
Impulse magnitude	150 V, adjustable
Impulse width	20 ns ... 10 μ s
Impulse power	Unrestricted continuous operation and unrestrictedly fast pulse repetition with full power pulse of 10 μ s at 150 V into any cable impedance
Third-party certification	Yes, impulse generation has been tested and DAKS-certified by accredited third-party laboratory
Dynamic range	115 dB
ProRange	Yes, +40 dB exponential dynamic distance-dependent de-attenuation
Data rate	533 MHz
Measuring range X_R	20 m ... 1280 km at VOP = 80 m/ μ s
ProRange	Yes, +40 dB exponential distance-dependent de-attenuation
Data rate	533 MHz
Measuring range X_R	20 m ... 1280 km at VOP = 80 m/ μ s
Signal gain Y_G	0 ... 100%, adjustable
Resolution	0.1 m at VOP = 80 m/ μ s
Accuracy	0.1%
Timebase accuracy	< 50 ppm (equivalent to < 0.005 %)
Hardware filters	4500 kHz, 2100 kHz, 1000 kHz, 450 kHz, 250 kHz
Velocity of propagation	10 ... 149.9 m/ μ s, can be expressed in m/ μ s or ft/ μ s or nominal (nvp)
Output impedance	50 Ω
Compensation	No dedicated internal compensation needed
ARM trigger	Adaptive, with automatic adjustment (Delta-U, L to H edge)
HV prelocation	
ARM — implemented as inductive-active double surge ARM Multishot	
Technology	The Arc Reflection Method in the R30 utilises a double discharge mechanism alongside a unique arc reflection filter. The technique is executed in a sequential two-step process comprising of the acquisition, superposition, and direct assessment of two distinct Time Domain Reflectometry (TDR) traces. The first, recorded by the Teleflex® VX V2, is the low voltage reference. The second, is the high voltage fault trace obtained subsequent to fault ignition. This ignition is achieved by the main capacitor discharge through an active arc reflection filter which ensures optimal ignition and best stabilisation of the arc at the fault position when a secondary, high-energy discharge from an auxiliary capacitor is released. The effectiveness of the double surge surpasses the sum of the individual energies stored in the capacitors, leading to the best possible prelocation results of any ARM version.
Surge voltage of main capacitor	0 ... 25 kV / 0 ... 50 kV 2500 J
Double surge auxiliary capacitor	12 kV 2000 J
Total prelocation effectiveness	Better than 4500 J (> 2500 J + 2000 J)
Arc reflection filter	Inductive-active, for the best technically achievable arc ignition and arc stabilisation
Multishot feature	Yes, Teleflex® VX V2 captures 15 HV fault traces per ARM shot
BestPicture automation feature	Not available; user selects best-of-15 fault trace manually by himself

Solution for fault location on HV cables, long cables and paper cables

ICE	
Technology	Impulse current decoupling; Teleflex® VX V2 captures the impulse current component of the travelling wave which is initiated after the fault has been ignited by capacitor discharge
Surge voltage	0 ... 3 / 0 ... 6 / 0 ... 12 / 0 ... 25 / 0 ... 50 kV
Decay	
Technology	Voltage decoupling; Teleflex® VX V2 captures the voltage component of the travelling wave which is initiated after the fault has been ignited by DC charging
Voltage	0 ... 110 kV
Fault pinpointing	
Coincidence method (magnetic-acoustic pinpointing of main insulation faults)	
Surge generator (Thumper)	R30
Voltage ranges	Standard version: 5 stages 0 ... 3 kV 2000 J 0 ... 6 kV 2000 J 0 ... 12 kV 2000 J 0 ... 25 kV 2500 J 0 ... 50 kV 2500 J
Surge rate (Thump rate)	Adjustable; 3 ... 10 sec, single surge (single thump)
Recommended receiver	digiPHONE+2
Fault conversion	
Burning	
Technology	High frequency burner
Burn-down current	0 ... 110 kV, I_{max} 290 mA
Cable sheath testing	
Sheath fault testing	0 ... 20 kV DC in voltage ranges of 5 / 10 / 20 kV
Sheath fault pinpointing	Voltage gradient method (step voltage method)
Pulsed DC voltage	0 ... 5 kV; 0 ... 10 kV; 0 ... 20 kV; I_{max} 290 mA
Pulse sequences	0.5:1, 1:3, 1:4, 1:6, 1:12
Weight	
Standard version	Three phase configuration starting at 1000 kg
Environmental	
Operating temperatures	HV unit: -25°C ... +55°C (-13°F ... +131°F) Operator room: 0° ... +55°C (32°F ... 131°F)
Storage temperatures	-25°C ... +70°C (-13°F ... +156°F)
Mains input	
Input voltage	230 V ± 10%, 50 Hz
Power consumption	< 5 kVA
Connections and test leads	
HV system output for 110 kV three-phase configuration	
Economy 3x1	3x single-phase T4 HV cable drum Evo-type, 50 m or 80 m, manual
Professional 3x1	3x single-phase T4 HV cable drum Evo-type, 50 m or 80 m, motor-driven
Premium 3x1 DS	3x single-phase T4 HV cable drum SR 98 Kiel, 50 m or 80 m, motor-driven, dual slipping HV & HVR
LV auxiliary functions	
Economy	1x mains input cable drum, 50 m, manual, Schuko with NAS60 1x protective earth cable drum, 50 m, manual 1x 15 m reference earth lead for F-U safety interlock
Comfort	1x mains input cable drum, 50 m, belt pull, Schuko with NAS60 1x protective earth cable drum, 50 m, belt pull 1x 15 m reference earth lead for F-U safety interlock
Professional	1x mains input cable drum, 50 m, motor-driven, Schuko with NAS60 1x protective earth cable drum, 50 m, motor-driven 1x 15 m reference earth lead for F-U safety interlock

Solution for fault location on HV cables, long cables and paper cables

TDR/Cable radar output (dedicated TDR-LV connection)	
Economy	1x three-phase coaxial measurement cable, 50 m, manual
Comfort	1x three-phase coaxial measurement cable, 50 m, belt pull
Professional	1x three-phase coaxial measurement cable, 50 m, motor-driven
External safety device EN 50191	
Economy	1x ESE signalling cable, 15 m, with external socket and storage compartment
Extended	1x ESE signalling cable, with external socket and cable reel, 50 m, manual

System expansions for the base unit 110 kV – optional packages for cable fault location

FL1 Utility location	
Audio frequency generator	
Purpose	Transmitter for cable route tracing/GPS surveying and pinpointing of low resistance faults
Technology	Class D amplifier for maximum active power
System integration	Integrated into R30 safety system. Signal transmission into cable under test via motorised HV switches and 110 kV HV system output.
Power output	200 W
Number of Frequencies	3
Multi-frequency mode	Yes, 3 frequencies can be transmitted into the cable simultaneously
Current flow direction	Yes, SignalSelect feature can measure the direction of current flow
Recommended receiver	digiPHONE+2 NTRX set; alternatively: Ferrolux RX or CARLOC
FL2 Fault conversion	
Resonance burn-down unit with TDR-based prelocation	
Technology	T22/13B resonance burner with continuously variable output over its full voltage range and without any predefined, fixed voltage-current ranges; no manually switching by the user needed; automatic regulation to always maintain the optimal operating point for maximum active power delivery into the fault over its full voltage range; smooth, uninterrupted burn-down process from full voltage to 0 V short-circuit; does not use a 50 Hz burn transformer, does not use an outdated half-wave rectifier
System integration	Integrated into R30 safety system. Burn current injected into cable under test via motorised HV switches and 110 kV HV system output.
Voltage and current	0 ... 15 kV DC; I_{max} 25 A
Prelocation	0 ... 15 kV DC ARM Live Burning (Burn Arc Reflection); Similar to ARM with capacitor discharge, ARM Live Burning obtains, superimposes and compares two TDR traces. After the low voltage reference trace has been established, the high voltage fault trace is initiated through DC charging by the burn-down unit, leading to fault ignition at the breakdown voltage. Subsequently, the burn-down unit maximises the active power delivery to maintain the continuous activity of the arc. The TDR actively measures impedances changes within the cable under test, allowing for real-time/live observation. The process keeps going until the software recognises the distinctive TDR signature of a low resistance state, at which point the ARM Live Burning is stopped and the fault position is identified and flagged.
FL3 Sheath integrity	
MFM10 sheath fault location unit	
Technology	High voltage bridge applying the 4-wire voltage drop method; suitable for sheath testing, sheath fault prelocation and sheath fault pinpointing
Voltage	10 kV DC
Current (voltage range)	750 mA (0.4 kV) ; 200 mA (1.5 kV) ; 60 mA (5 kV) ; 30 mA (10 kV)
Discharge capability	10 μ F
FL4 High voltage surge and prelocation	
Module for surging (thumping) and prelocating at very high voltage and with high energy	
Coincidence method (magnetic-acoustic pinpointing of main insulation faults)	
Surge generator (Thumper)	R30 SU100
Voltage ranges 0 ... 100 kV	Single stage 4000 J
Surge rate (Thump rate)	Adjustable; 3 ... 10 sec, single surge (single thump)
Recommended receiver	digiPHONE+2
Prelocation	100 kV current decoupling (ICE)

Solution for fault location on HV cables, long cables and paper cables

FL5 Branched networks	
Loop On Loop Off prelocation method for moderately branched networks	
Technology	Comparison of various measurements obtained with three-phase current decoupling (ICE-3)
Modes	Loop On Loop Off, three phase ICE form 1, three phase ICE form 2
FL6 High power discharge unit	
Improved discharge and earthing unit to handle longer HV cables	
Technology	Robust and fast-acting high power discharge unit utilising solid state dissipation elements
Nominal energy	225 kJ, equivalent to the energy stored in a 20 μ F capacitance charged to 150 kV DC
Fast action	Discharge time constant <5 sec for quick dissipation of energy stored in the cable under test

System expansions – Optional packages for cable testing

VLF cable testing, in accordance with VDE 0276, CENELEC HD 620/621, IEC 60060, IEC 60502, IEEE 400.2		
Testing PROFESSIONAL	54	70
Technology	0.1 Hz VLF Cosine-Rectangular	
System integration	Functionally fully integrated, operation via R30 control unit	
Voltage	0 ... 54 kV _{RMS}	0 ... 70 kV _{RMS}
Test load, Testing capacity	5 μ F at 54 kV _{RMS} and 0.1 Hz 8 μ F at 36 kV _{RMS} and 0.1 Hz 21 μ F at 18 kV _{RMS} and 0.1 Hz	5 μ F at 70 kV _{RMS} and 0.1 Hz 7.7 μ F at 54 kV _{RMS} and 0.1 Hz 13.9 μ F at 36 kV _{RMS} and 0.1 Hz 34.7 μ F at 18 kV _{RMS} and 0.1 Hz

150 kV version

Solution for fault location on HV cables, long cables and paper cables

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new pictures in progress

R30 fault location base unit 150 kV

General characterisation	
Topology Highly centralised and highly automated, digital, software-based cable fault location system with options for the functional integration of cable testing with Very Low Frequency (0.1 Hz VLF)	
Automation Automatic switching with motorised HV switches for HV mode selection, HV mode execution and HV range selection in all operating modes of fault location and VLF testing	
Controls Via one single control unit for most operating modes and system functions	
Graphical User Interface (GUI)	Piechart (GUI Version 7)
Operation	Turn & Click single rotary knob (jog dial) on control unit
Operating system	Linux
Data management	MeggerBook Lite
Data synchronisation	USB
Control unit	
Display	Industrial grade TFT colour panel with LED backlighting
Antiglare	Yes
Multi-touch	Yes
LCD size	39.6 cm (15.6 inch)
Aspect ratio	16:9
Resolution	1920 x 1080 Full HD
Luminance	450 cd/m ²
Safety	
Compliance	CE conformance; EN 61010, EN 50191, VDE 0104, VDE 0105, DGUV 203-034 (BGI 891)
Discharge and earthing unit	225 kJ, equivalent to the energy stored in a 20 µF capacitance charged to 150 kV DC fast-acting: discharge time constant <5 sec
System status	Live monitoring and indication
Inherent safety	Yes, immediate earthing in case of power loss
F-U safety interlock	Reference earth to vehicle chassis for monitoring of protective earth incl. voltage-time integral, monitoring of station earth and touch potentials
F-Ohm safety interlock	Connection monitoring for operational earth (HV return)
Safety functions	Front panel: mains on/off, lockout-tagout key switch, emergency stop, residual voltage indicator, HV on, HV off; Control unit: rotary knob (jog dial)
Safety devices	System earthing status indicator lights, mains input protection device NAS60, HV compartment monitoring via door contacts, external safety device
Mains input monitoring	Overvoltage protection, undervoltage protection, residual current device (RCD)
Defined wiring	Yes, distribution panel inside of the system
Isolation transformer	5 kVA

Solution for fault location on HV cables, long cables and paper cables

Toolbox philosophy for cable fault location	
One toolbox, many tools: Maximising versatility, flexibility, and effectiveness of fault locating for field personnel	
DC test (DC hipot) with breakdown detection and insulation test for fault identification;	
TDR/Cable radar and HV methods (ARM, ICE, Decay) for fault prelocation;	
Burning for fault conversion;	
Surge generator (thumper) for fault pinpointing;	
DC test and voltage gradient method (step voltage method) for sheath fault testing and sheath fault pinpointing	
General configuration and high voltage system output	
Voltage class 150 kV	
Exclusively single phase (R30 1-150)	
HV DC source, Fault identification	
DC test (DC hipot)	0 ... 150 kV, $I_n = 8$ mA continuous at 150 kV, $I_{max} = 250$ mA
Insulation test	0 ... 1 kV in voltage ranges of 6 / 500 / 1000 V Measuring range 1 Ω ... 2 G Ω ; for capacitance 0 ... 19.9 μ F
Breakdown detection	0 ... 150 kV
Cable radar (time domain reflectometry, impulse echometry)	
TDR/Cable radar model	Teleflex® VX V2, physically and functionally fully integrated
Impulse generation	Unipolar
Impulse magnitude	150 V, adjustable
Impulse width	20 ns ... 10 μ s
Impulse power	Unrestricted continuous operation and unrestrictedly fast pulse repetition with full power pulse of 10 μ s at 150 V into any cable impedance
Third-party certification	Yes, impulse generation has been tested and DAKKS-certified by accredited third-party laboratory
Dynamic range	115 dB
ProRange	Yes, +40 dB exponential dynamic distance-dependent de-attenuation
Data rate	533 MHz
Measuring range X_R	20 m ... 1280 km at VOP = 80 m/ μ s
ProRange	Yes, +40 dB exponential distance-dependent de-attenuation
Data rate	533 MHz
Measuring range X_R	20 m ... 1280 km at VOP = 80 m/ μ s
Signal gain Y_G	0 ... 100%, adjustable
Resolution	0.1 m at VOP = 80 m/ μ s
Accuracy	0.1%
Timebase accuracy	< 50 ppm (equivalent to < 0.005 %)
Hardware filters	4500 kHz, 2100 kHz, 1000 kHz, 450 kHz, 250 kHz
Velocity of propagation	10 ... 149.9 m/ μ s, can be expressed in m/ μ s or ft/ μ s or nominal (nvp)
Output impedance	50 Ω
Compensation	No dedicated internal compensation needed
ARM trigger	Adaptive, with automatic adjustment (Delta-U, L to H edge)
HV prelocation	
ARM — implemented as inductive-active double surge ARM Multishot	
Technology	The Arc Reflection Method in the R30 utilises a double discharge mechanism alongside a unique arc reflection filter. The technique is executed in a sequential two-step process comprising of the acquisition, superposition, and direct assessment of two distinct Time Domain Reflectometry (TDR) traces. The first, recorded by the Teleflex® VX V2, is the low voltage reference. The second, is the high voltage fault trace obtained subsequent to fault ignition. This ignition is achieved by the main capacitor discharge through an active arc reflection filter which ensures optimal ignition and best stabilisation of the arc at the fault position when a secondary, high-energy discharge from an auxiliary capacitor is released. The effectiveness of the double surge surpasses the sum of the individual energies stored in the capacitors, leading to the best possible prelocation results of any ARM version.
Surge voltage of main capacitor	0 ... 25 kV / 0 ... 50 kV 2500 J
Double surge auxiliary capacitor	12 kV 2000 J
Total prelocation effectiveness	Better than 4500 J (> 2500 J + 2000 J)
Arc reflection filter	Inductive-active, for the best technically achievable arc ignition and arc stabilisation
Multishot feature	Yes, Teleflex® VX V2 captures 15 HV fault traces per ARM shot
BestPicture automation feature	Not available; user selects best-of-15 fault trace manually by himself

Solution for fault location on HV cables, long cables and paper cables

ICE	
Technology	Impulse current decoupling; Teleflex® VX V2 captures the impulse current component of the travelling wave which is initiated after the fault has been ignited by capacitor discharge
Surge voltage	0 ... 3 / 0 ... 6 / 0 ... 12 / 0 ... 25 / 0 ... 50 kV
Decay	
Technology	Voltage decoupling; Teleflex® VX V2 captures the voltage component of the travelling wave which is initiated after the fault has been ignited by DC charging
Voltage	0 ... 150 kV
Fault pinpointing	
Coincidence method (magnetic-acoustic pinpointing of main insulation faults)	
Surge generator (Thumper)	R30
Voltage ranges	Standard version: 5 stages 0 ... 3 kV 2000 J 0 ... 6 kV 2000 J 0 ... 12 kV 2000 J 0 ... 25 kV 2500 J 0 ... 50 kV 2500 J
Surge rate (Thump rate)	Adjustable; 3 ... 10 sec, single surge (single thump)
Recommended receiver	digiPHONE+2
Fault conversion	
Burning	
Technology	High frequency burner
Burn-down current	0 ... 150 kV, I_{max} 250 mA
Cable sheath testing	
Sheath fault testing	0 ... 20 kV DC in voltage ranges of 5 / 10 / 20 kV
Sheath fault pinpointing	Voltage gradient method (step voltage method)
Pulsed DC voltage	0 ... 5 kV; 0 ... 10 kV; 0 ... 20 kV; I_{max} 250 mA
Pulse sequences	0.5:1, 1:3, 1:4, 1:6, 1:12
Weight	
Standard version	Single phase configuration starting at 1100 kg
Environmental	
Operating temperatures	HV unit: -25°C ... +55°C (-13°F ... +131°F) Operator room: 0° ... +55°C (32°F ... 131°F)
Storage temperatures	-25°C ... +70°C (-13°F ... +156°F)
Mains input	
Input voltage	230 V ± 10%, 50 Hz
Power consumption	< 5 kVA
Connections and test leads	
HV system output for 150 kV single-phase configuration	
Economy 1x1	1x single-phase T4 HV cable drum, 50 m or 80 m, manual
Professional 1x1	1x single-phase T4 HV cable drum, 50 m or 80 m, motor-driven
LV auxiliary functions	
Economy	1x mains input cable drum, 50 m, manual, Schuko with NAS60 1x protective earth cable drum, 50 m, manual 1x 15 m reference earth lead for F-U safety interlock
Comfort	1x mains input cable drum, 50 m, belt pull, Schuko with NAS60 1x protective earth cable drum, 50 m, belt pull 1x 15 m reference earth lead for F-U safety interlock
Professional	1x mains input cable drum, 50 m, motor-driven, Schuko with NAS60 1x protective earth cable drum, 50 m, motor-driven 1x 15 m reference earth lead for F-U safety interlock

Solution for fault location on HV cables, long cables and paper cables

TDR/Cable radar output (dedicated TDR-LV connection)	
Economy	1x three-phase coaxial measurement cable, 50 m, manual
Comfort	1x three-phase coaxial measurement cable, 50 m, belt pull
Professional	1x three-phase coaxial measurement cable, 50 m, motor-driven
External safety device EN 50191	
Economy	1x ESE signalling cable, 15 m, with external socket and storage compartment
Extended	1x ESE signalling cable, with external socket and cable reel, 50 m, manual

System expansions for the base unit 150 kV – optional packages for cable fault location

FL1 Utility location	
Audio frequency generator	
Purpose	Transmitter for cable route tracing/GPS surveying and pinpointing of low resistance faults
Technology	Class D amplifier for maximum active power
System integration	Integrated into R30 safety system Signal transmission into cable under test via motorised HV switches and 150 kV HV system output.
Power output	200 W
Number of Frequencies	3
Multi-frequency mode	Yes, 3 frequencies can be transmitted into the cable simultaneously
Current flow direction	Yes, SignalSelect feature can measure the direction of current flow
Recommended receiver	digiPHONE+2 NTRX set; alternatively: Ferrolux RX or CARLOC
FL2 Fault conversion	
Resonance burn-down unit with TDR-based prelocation	
Technology	T22/13B resonance burner with continuously variable output over its full voltage range and without any predefined, fixed voltage-current ranges; no manually switching by the user needed; automatic regulation to always maintain the optimal operating point for maximum active power delivery into the fault over its full voltage range; smooth, uninterrupted burn-down process from full voltage to 0 V short-circuit; does not use a 50 Hz burn transformer, does not use an outdated half-wave rectifier
System integration	Integrated into R30 safety system Burn current injected into cable under test via motorised HV switches and 150 kV HV system output.
Voltage and current	0 ... 15 kV DC; I_{max} 25 A
Prelocation	0 ... 15 kV DC ARM Live Burning (Burn Arc Reflection); Similar to ARM with capacitor discharge, ARM Live Burning obtains, superimposes and compares two TDR traces. After the low voltage reference trace has been established, the high voltage fault trace is initiated through DC charging by the burn-down unit, leading to fault ignition at the breakdown voltage. Subsequently, the burn-down unit maximises the active power delivery to maintain the continuous activity of the arc. The TDR actively measures impedances changes within the cable under test, allowing for real-time/live observation. The process keeps going until the software recognises the distinctive TDR signature of a low resistance state, at which point the ARM Live Burning is stopped and the fault position is identified and flagged.
FL3 Sheath integrity	
MFM10 sheath fault location unit	
Technology	High voltage bridge applying the 4-wire voltage drop method; suitable for sheath testing, sheath fault prelocation and sheath fault pinpointing
Voltage	10 kV DC
Current (voltage range)	750 mA (0.4 kV) ; 200 mA (1.5 kV) ; 60 mA (5 kV) ; 30 mA (10 kV)
Discharge capability	10 µF
FL4 High voltage surge and prelocation	
Module for surging (thumping) and prelocating at very high voltage and with high energy	
Coincidence method (magnetic-acoustic pinpointing of main insulation faults)	
Surge generator (Thumper)	R30 SU100
Voltage ranges 0 ... 100 kV	Single stage 4000 J
Surge rate (Thump rate)	Adjustable; 3 ... 10 sec, single surge (single thump)
Recommended receiver	digiPHONE+2
Prelocation	100 kV current decoupling (ICE)

Solution for fault location on HV cables, long cables and paper cables

FL5 Branched networks	
Loop On Loop Off prelocation method for moderately branched networks	
Technology	Comparison of various measurements obtained with three-phase current decoupling (ICE-3)
Modes	Loop On Loop Off, three phase ICE form 1, three phase ICE form 2
FL7 Ultra high power discharge unit	
Improved discharge and earthing unit to handle longer HV cables	
Technology	Robust and fast-acting high power discharge unit utilising solid state dissipation elements
Nominal energy	844 kJ, equivalent to the energy stored in a 75 µF capacitance charged to 150 kV DC
Fast action	Discharge time constant <5 sec for quick dissipation of energy stored in the cable under test

System expansions – Optional packages for cable testing

VLF cable testing, in accordance with VDE 0276, CENELEC HD 620/621, IEC 60060, IEC 60502, IEEE 400.2		
Testing PROFESSIONAL	54	70
Technology	0.1 Hz VLF Cosine-Rectangular	
System integration	Functionally fully integrated, operation via R30 control unit	
Voltage	0 ... 54 kV _{RMS}	0 ... 70 kV _{RMS}
Test load, Testing capacity	5 µF at 54 kV _{RMS} and 0.1 Hz 8 µF at 36 kV _{RMS} and 0.1 Hz 21 µF at 18 kV _{RMS} and 0.1 Hz	5 µF at 70 kV _{RMS} and 0.1 Hz 7.7 µF at 54 kV _{RMS} and 0.1 Hz 13.9 µF at 36 kV _{RMS} and 0.1 Hz 34.7 µF at 18 kV _{RMS} and 0.1 Hz

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