PRIMEON
Single-phase cable fault location and cable testing system

Fault Location Module

General system character	
Type Centrally controlled, fully automated, fully integrated, digital, software-operated fault location system with options for full integration of VLF testing, TanDelta diagnostics and partial discharge diagnostics	
Controls	
User interface	Turn & click piechart
Operation	Via one central control unit Multi-touch, single rotary knob
Operating system	Linux
Control units	
Display	Industrial grade TFT colour panel
Backlight	LED
Antiglare	Yes
Multi-touch	Yes
LCD size	10.1'' (CU 10-FL) or 15.6'' (CU 15-FL, -FLPD)
Resolution	1200 x 800 WXGA or 1920 x 1080 Full HD
Automation Automated switching with software-controlled motorised HV switches for HV mode selection, HV mode execution and HV range selection in all operating modes of fault location, VLF testing, TanDelta measurement and PD diagnostics	
Safety	
Compliance	EN 61010, EN 50191, VDE 0104, VDE 0105, DGUV 203-034 (BGI 891); CE conformance
System status	Live monitoring and indication
Inherent safety	Yes, immediate discharging and earthing in case of power loss
F-U safety interlock	Reference earth to vehicle chassis for protective earth monitoring with voltage-time integral, station earth monitoring and touch potential monitoring
F-Ohm safety interlock	Connection monitoring for operational earth (HV Return)
Safety functions	Hardwired directly on control unit; HV on, HV off, lock-out tag-out key switch, emergency stop, On-Off
Safety devices	System earthing status indicator lights, mains input protection device NAS16, HV compartment monitoring via door contacts, external safety device
Mains input monitoring	Overvoltage protection, undervoltage protection, residiual current device, main breaker
Defined wiring	Yes, dedicated distribution panel for vehicle installations
Isolation transformer	3.6 kVA

Cable fault location	
Technologies - DC test (hipot) and insulation test for fault identification - Radar and HV methods (ARM, ICE, Decay) for fault prelocation - Burning for fault conversion - Surge generator (thumper) for fault pinpointing - Voltage gradient method (step voltage method) for sheath fault testing and pinpointing	
Fault identification	
DC test (hipot)	0 … 40 kV, I_n = 50 mA continuous, I_{max} = 850 mA
Insulation test	0 … 20 kV in voltage ranges of 5 / 10 / 15 / 20 kV Measuring range 100 Ω … 650 MΩ
Breakdown detection	0 … 40 kV
Cable radar (Time Domain Reflectometry, impulse echometry)	
Radar type	Teleflex® RDR, physically and functionally fully integrated
Pulse generation	Bipolar
Pulse magnitude	± 100 V adjustable in 2 steps
Pulse width	20 ns … 10 µs
Pulse power	Unrestricted continuous operation and unrestrictedly fast pulse repetition with full power pulse of 10 µs at ± 100 V into any cable impedance
Third-party certification	Yes, pulse generation has been tested and DAkkS-certified
Dynamic range	115 dB
ProRange	Yes, +40 dB exponential distance-dependent de-attenuation
Data rate	533 MHz
Measuring range X_R	20 m … 320 km at VOP = 80 m/µs
Signal gain Y_G	Adjustable 0 … 100%
Resolution	0.1 m at VOP = 80 m/µs
Accuracy	0.1%
Timebase accuracy	< 50 ppm
Velocity of propagation	10 … 149.9 m/µs, can be expressed in m/µs or ft/µs or nominal
Output impedance	50 Ω
Compensation	No dedicated internal compensation necessary
HV prelocation	
ARM Best Picture Multishot	
Technology	Arc reflection method as per the original 1965 patent; overlay and direct comparison of two distinct radar traces, one recorded by the Teleflex® RDR as low voltage reference trace, and another one recorded by the Teleflex® RDR as high voltage fault trace after the fault has been ignited by capacitor discharge through an arc reflection filter
Surge voltage	0 … 32 kV in multiple ranges
Arc reflection filter	Inductive, for superior arc ignition and arc stabilisation purposes
Multishot	Teleflex® RDR captures 32 HV fault traces per ARM surge
Best Picture	Teleflex® RDR analyses all 32 Multishot traces, picks the best one and directly displays it to the user
ICE	
Technology	Impulse current decoupling; Teleflex® RDR captures the impulse current component of the travelling wave which is initiated after the fault has been ignited by capacitor discharge
Surge voltage	0 … 32 kV in multiple ranges
Decay	
Technology	Voltage decoupling; Teleflex® RDR captures the voltage component of the travelling wave which is initiated after the fault has been ignited by DC charging
Voltage	0 … 40 kV

Fault pinpointing	
Coincidence method (magnetic-acoustic pinpointing of main insulation faults)	
Surge generator (Thumper)	STX
Voltage ranges 0 … 8 kV 0 … 16 kV 0 … 32 kV optionally 0 … 4 kV	Standard version: 3 stages; Extended version: 4 stages 2,000 J 2,000 J 2,000 J 1,100 J
Surge rate (Thump rate)	Adjustable: 3 … 10 sec (6 … 20 surges p. min), single surge (single thump)
Charging time	3 seconds at maximum output of 32 kV
Recommended receiver	digiPHONE+2
Fault conversion	
Burning	
Technology	High frequency burner
Burn-down current	0 … 5 kV, 850 mA; 0 … 10 kV, 400 mA; 0 … 20 kV, 200 mA; 0 … 40 kV; 100 mA
Cable sheath testing	
Sheath fault testing	0 … 20 kV DC in voltage ranges of 3 / 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} 850 mA
Pulse sequences	0.5:1, 1:3, 1:4, 1:6
Weight	
Standard version	Starting at 125 kg
Environmental	
Operating temperatures	-20°C … +55°C (-4°F ... +131°F); with diagnostics 0° … +55°C in operator room
Storage temperatures	-40°C … +70°C (-40°F ... +158°F) HV unit
Mains input	
Input voltage	230 V ± 10%, 50 Hz (120 V, 60 Hz)
Power consumption	< 3 kVA
System connections and test leads	
HV system output	
Economy 50	1x single-phase T4 HV cable drum, 50 m, manual
Professional 50	1x single-phase T4 HV cable drum, 50 m, motor-driven
Valley Forge	1x HV adapter cable for T1 cable reels Valley Forge and HDW, 4 m
LV auxiliary functions	
Economy 50	1x mains input cable drum, 50 m, manual, Schuko with NAS16 1x protective earth cable drum, 50 m, manual 1x 15 m reference earth lead for F-U safety interlock
Comfort 50	1x mains input cable drum, 50 m, belt pull, Schuko with NAS16 1x protective earth cable drum, 50 m, belt pull 1x 15 m reference earth lead for F-U safety interlock
Radar output (dedicated TDR-LV connection)	
Economy 50	1x three-phase coaxial measurement cable, 50 m, manual
Comfort 50	1x three-phase coaxial measurement cable, 50 m, belt pull
External safety device	
Economy 15	1x ESE signalling cable, 15 m, with external socket and storage compartment
Economy 50	1x ESE signalling cable, 50 m, with external socket and storage compartment

System expansions – Optional packages for cable fault location

Teleflex® Unleashed	
Performance upgrade for the Teleflex® RDR radar	
Pulse magnitude	± 250 V adjustable in 4 steps
Pulse width	20 ns … 30 µs
Pulse power	Unrestricted continuous operation and unrestrictedly fast pulse repetition with full power pulse of 30 µs at ± 250 V into any cable impedance
Third-party certification	Yes, pulse generation has been tested and DAkkS-certified
Measurement range X_R	20 m … 1280 km
Advanced denoising	Yes
Next-gen averaging	Yes, 3 modes
Signature Boost	Yes
Utility location	
Audio frequency generator	
Technology	Class D amplifier, physically and functionally integrated and automated
Power output	250 W
Number of Frequencies	5
Recommended receiver	digiPHONE+2 NTRX set; alternatively: Ferrolux RX or CARLOC
Fault conversion	
Burn-down unit with radar-based prelocation	
Technology	Resonance burner; continuously variable output over its full range, no tap positions, no diode couplers, no manual switching, integrated into PRIMEON safety system
Voltage and current	0 … 15 kV DC; I_{max} 25 A
Prelocation	ARM Live Burning (Burn Arc Reflection); 0 … 15 kV
Sheath integrity	
Coming soon	

System expansions – Optional packages for cable testing and cable diagnostics

VLF Cable testing	
Testing BASIC	
Technology	0.1 Hz VLF Sine
System integration	Functionally fully integrated into PRIMEON system
Voltage	0 … 62 kV_{peak} (0 … 44 kV_{RMS})
Test load	1 µF at standard-compliant frequency of 0.1 Hz and full output of 62 kV_{peak} 10 µF at lower voltage/frequency
Testing PROFESSIONAL Coming soon	
Cable diagnostics	
Diagnostics BASIC	
Technology	0.1 Hz VLF Sine with built-in dielectric loss factor measurement
System integration	Functionally fully integrated into PRIMEON system
Voltage	0 … 62 kV_{peak} (0 … 44 kV_{RMS})
TanDelta measurement	Internal; suitable for MV cables rated up to 36 kV
TanDelta accuracy	10^{-4}
TanDelta resolution	10^{-5}
Automatic evaluation	Yes, built-in evaluation of results as per IEEE 400.2
Diagnostics ADVANCED Coming soon	
Diagnostics PROFESSIONAL Coming soon	
Diagnostics ULTIMATE Coming soon	

SALES OFFICE
Megger Germany GmbH
Dr.-Herbert-Iann-Str. 6
D-96148 Baunach
T +49 9544 68-0
E team.international@megger.com

PRIMEON_DS_EN_V01
www.megger.com
ISO 9001