OptiFinder *ExpertHub*

Rapid acoustic PD localization for transformer factory acceptance testing

The OptiFinder ExpertHub is designed to find and localize partial discharge (PD) during transformer factory acceptance testing (FAT) within one working shift . It uses a planned array of 16 or 32 passive, EMI-immune optical sensors to capture synchronized acoustic activity around the transformer tank. Test engineers can review phase-resolved activity, inspect the underlying acoustic data and calculate the probable source position, without repeatedly moving the sensor array between test sequences.

THE PURPOSE OF THE OPTIFINDER EXPERTHUB IS TO:

- Localize partial-discharge sources identified during FAT to a targeted physical repair area.
- Reduce repeated test cycles of energizing, making safe, moving sensors and re-testing.
- Preserve engineering evidence: phase-resolved activity, waveforms, frequency content and TDMS data.
- Generate a consistent PD Data & Localization Report for test management, engineering and repair teams.

SENSOR | ORPD 040 V5

The ORPD 040 IP-68 rated sensor is designed to perform in harsh conditions. It offers superior protection against dust and moisture, ensuring reliable operation. The sensor is passive, non-metallic and immune to electromagnetic interference, with no power requirement at the sensing location.



PERFORMANCE

Full frequency range	1 kHz to 475 kHz
Sensitivity	Down to 2 pC
Amplitude of the Pencil Lead Break Test (PLB) Ref nm/ (1pm)	92–96 dB

ENVIRONMENTAL

Operating temperature	–40 to 140 °C
Degree of protection	NEMA-6P*, IP-68*

* Performance verified through internal testing to NEMA 6P and IP68 standards; certification pending.

PHYSICAL

Dimensions	Sensor to 33 x 33 x 24 mm; splice box 175 × 58 × 29 mm
Sensor core	High-performance thermoplastic
Housing material	High-performance thermoplastic (sensor); polycarbonate (splice box)
O-ring	EPDM 70 shore A
Standard sensing cable length	15 m standard, can be customized
Cable jacket	Sensor to splice box: High Strength EZH cable jacket, 3 mm
Cable bend radius	18 mm
Connectors	MTP
Pull force strength	Up to 20 kg
Mounting	Magnetic clamp or cable straps

One working shift refers to the ExpertHub localization workflow after the planned sensor array has been installed. Total FAT duration depends on the customer's test programme and transformer. Localization accuracy of up to 15 cm applies under validated conditions.

INTERROGATOR

The OptiFender Interrogator is Optics11's next-generation, 16 and 32- channel fiber-optic interrogator designed to work seamlessly with the company's passive acoustic ORPD 040 v5 sensors. Engineered for harsh, high-voltage environments, it delivers continuous, real-time condition data with zero electromagnetic interference and no onsite calibration.



PERFORMANCE

Sampling resolution	1.05 µs
Signal resolution	16 bit
Multiplexing capability	16 or 32 sensors
Signal acquisition	True simultaneous

ENVIRONMENTAL

Operating temperature	–5 to 50 °C
Storage temperature	–5 to 50 °C
Maximum humidity	85 % (non-condensing)
Maximum altitude	2000 m

LASER

Operating mode	Continuous wave (CW)
Laser classification	1M
Wavelength range	1527.6 nm – 1565.5 nm (tuneable)
Internal optical power range	6 dBm – 13.5 dBm
Optical power at output ports	–3 dBm (±1 dB)

PHYSICAL

Dimensions (W × L × H)	480 × 361 × 265 mm (19-inch rack, 6U)
Max. weight	12 kg
Input voltage	220–240 VAC or 110–120 VAC
Input voltage frequency	50–60 Hz
Input power (32 ch)	50 W (max)
Main fuse	250 VAC, 5 A, 5 mm × 20 mm
Data port Ethernet	RJ-45
Trigger/Clock BNC inputs	LVTTL 2.5 V input (5 V tolerant), input impedance 100 kOhm; V(T–) = 0.45–1.0V high to low; V(T+) = 1.0–1.7 V low to high
Optical ports	MTP

ACCESSORIES

The ExpertHub system is supplied with the deployment, service and transport accessories required for FAT operation.

Sensor deployment
Mounting and cabling for the planned sensor array: magnetic clamps (v1.1) and strap solutions, acoustic-coupling material, MPO/MTP trunk cables (100 m or more), fanout cables (1.5 m), extension cables (15 m), splice boxes and cable-management items.

Field service items
Optical-interface cleaning and maintenance supplies (cleaning pens, wipes, IPA).

Connectivity items
Power cords, power-distribution unit, Ethernet switch and Ethernet cables for the test-bay installation.

Travel equipment
Rugged Peli cases for secure transportation of the interrogator, sensors and accessories.

System supplied
Common equipment: ExpertHub interrogator, ExpertHub software licence, optical and multifiber cabling, optical-interface cleaning equipment, acoustic-coupling equipment, cable-management equipment, rugged transport cases, power-distribution equipment, power cords, Ethernet switch and Ethernet cables. Configuration-dependent equipment: 16 or 32 ORPD 040 sensors, sensor clamps and splice boxes. Additional-cost option: a Windows laptop configured for ExpertHub operation.