

Extend transformer life with confidence

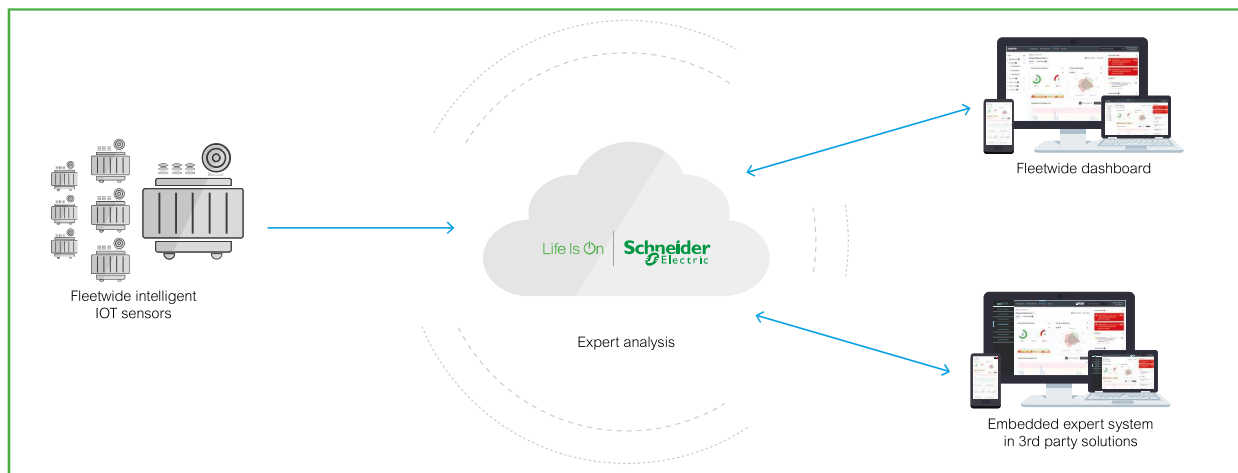
EcoStruxure™ Transformer Expert

IOT monitoring and online health analysis

- State-of-the-art accurate transformer monitoring
 - Water in oil, temperature, vibration, acoustic and RF noise, option for hydrogen
- Automated online analysis
 - Temperature, water content of paper profiling for top, bottom, and hotspot
 - Partial discharge and vibration trends
 - DP assessment and forecast
 - IEEE, IEC, Rogers, Doernenberg, Duval methods
- Fleetwide dashboard and configurable alerts
- Easy 30-minute installation with automated communications
- Low-cost software-as-a-service
- Life-long replacement warranty and software upgrades

Benefits

- **Track operating state** and trends mapped against safe limits
- **Forecast end-of-life** based on the insulation aging rate with current loading and moisture levels
- **Assess short and long-term risk** with recommendations based on industry standards
- **Determine optimum conditions** for maximum asset utilization over life with sophisticated scenario tools

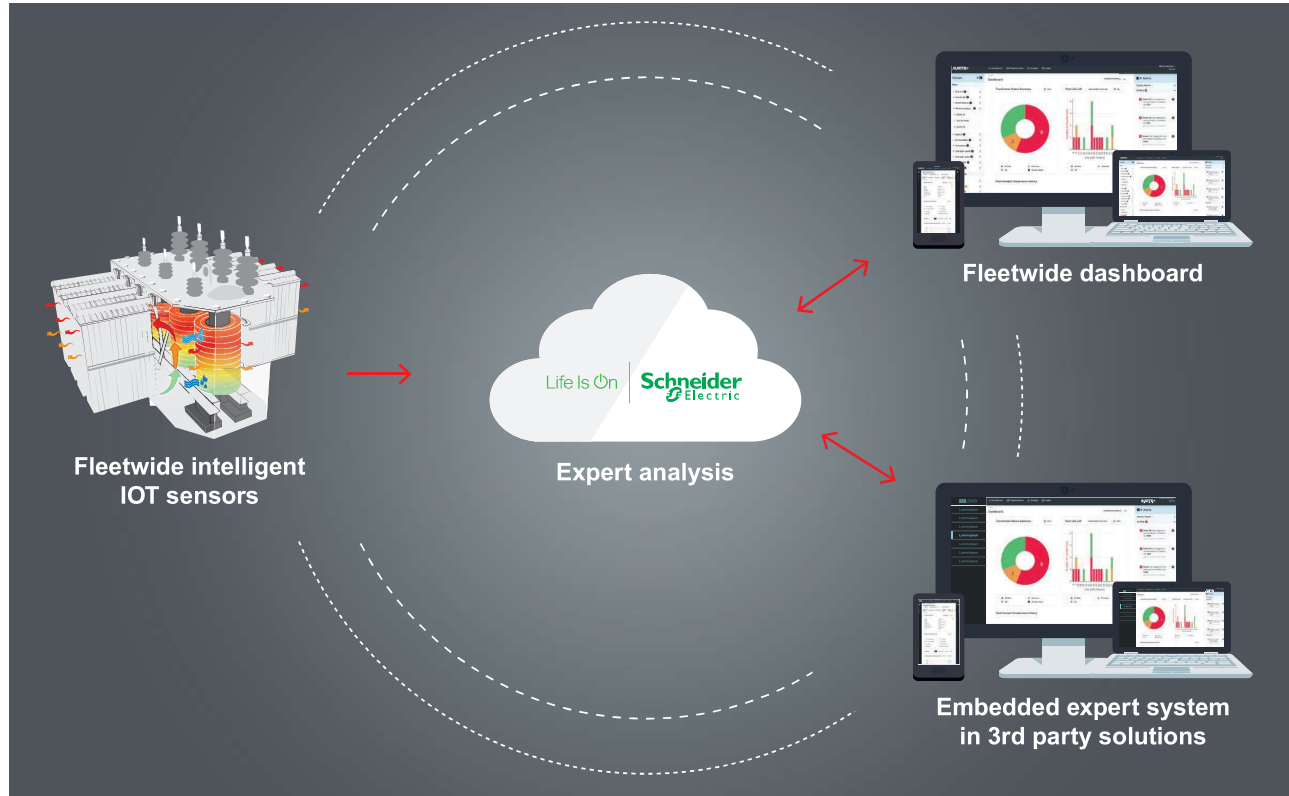


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Transformer condition monitoring



Affordable transformer insulation health analysis

- State-of-the-art accurate transformer monitoring and alerts
 - Water in oil, temperature, vibration, acoustic and RF noise
- Automated online risk analysis and recommendations
 - Excessive water saturation of oil
 - Moisture ingress
 - Volatile gases
 - PD trend
 - Insulation aging rate
- Assess, track and forecast insulation state and life left
 - Water content of paper profiling
 - Oil saturation
 - DP determination and forecast
- Sophisticated scenario analysis
 - Model the impact of changing loads and cooling configurations
- Fleetwide dashboard with unlimited free users
- Easy 30 minute installation with automated communications
- Life-long warranty and software upgrades

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Schneider Electric Industries SAS

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F92506 Rueil-Malmaison Cedex

Transformer insulation health

Detailed operating temperature analysis

Assess current state. Create scenarios to forecast the impact of changing loads.

Detailed moisture in oil analysis

Track moisture levels and movement.

Detailed moisture in paper analysis

Track trends. Plan for dryout. Assess risk of high moisture.

Critical oil status reporting

METHANE CH4 Epm	CARBON MON. CO ppm	CARBON DIO. CO2 ppm	ETHYLENE C2H4 ppm	ETHANE C2H6 ppm	ACETYLENE C2H2 ppm
200	3800	18	0.5	0.5	
150	3000	13	0.5	0.5	
150	3200	11	0.5	1	
350	2500	50	65	1	
311-570	2300-4000	51-100	86-100	2-9	
>401-1000	571-1400	4001-10000	101-200	101-150	10-35
>1000	>1400	>10000	>200	>150	>35

Automated volatile gas IEEEE/IEC analysis.

Standards-based risk assessment

OVERALL RISK: ■ OPERATING RISK: ■ VULNERABILITY RISK: ■ SOLID INSULATION RISK: ■ HAZARD RISK: ■

INSIGHTS

CONCERN
Very High Water Content of Paper: 3.5 %
Threshold: 3.5% (For Kraft Paper)
2% (For Thermally Upgraded Kraft Paper)

CONDITION INDEX
Solid insulation: ■

DATE OF EVENT
23-Nov-2020

The transformer cellulose insulation is assessed as having very high water content (WCP). This increases the transformer susceptibility to bubbling, water droplet formation, and accelerated aging and increases the risk of failure in the event of rapid load changes.

Risk analysis insights and recommendations.

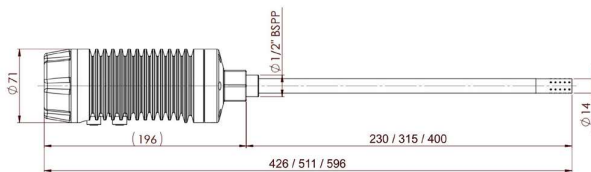
DP determination and forecast

Correlate oil test results and observed dynamic response. Forecast life left and model changes.

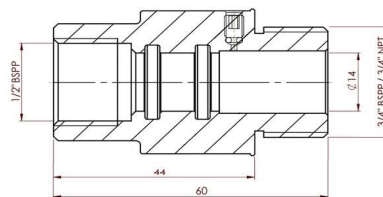
EcoStruxure Transformer Expert intelligent sensor



Sensor measurements	Water Activity, aw (Relative Humidity)	Measurement Range: 0 – 100 % Accuracy: < 2.0 % (20 – 95 % a _w) at 0 to 100 °C
	Oil Temperature	Measurement Range: -30 to 125 °C Accuracy: < ±0.5 °C at 0 to 110 °C, < ±2 °C otherwise
	External Tank Temperature	Measurement Range: -40 to 100 °C Accuracy: ±3 °C 10 M cable supplied
	Vibration / Acoustic PD Activity	50 – 2400 Hz (Tank and connected components) Correlated multi-band UHF, targeting PD activity inside tank
Measurement period		5 minutes
Data storage		8 GB
Connectivity		3G / 4G all available networks (standard) Wi-Fi (option)
Local communication		RS485 (for local connection to optional H2 sensor only)
Probe length		230 mm (option) 315 mm (standard) 400 mm (option)
Sensor power supply		18 – 42 V DC < 5 W 5-pin male M12 all-weather connector Fuse, MOV and reverse polarity protected
Lv mains din power supply option (included with standard product)		Single width DIN rail mount 24V, 15 Watt 110 – 370 V DC 85 – 264 V AC
Lightning protection		Fuse/MOV/TVS Diode
Weather rating (excluding lv mains din power supply)	Ambient Temperature Maximum Sensor Oil Pressure Humidity IP Rating	-30 to 60°C 60 PSI, 4 bar 0 - 100 % RH non-condensing 67
Low voltage cable		10 m low voltage cable with 5-pin female M12 all-weather connector
Adapter		Double O-ring seal with bleed valve ¾" BSPP or ¾" NPT thread options
Hardware warranty		Life-long replacement on failure Under subscription



EcoStruxure Transformer Expert intelligent sensor



Adapter (enlarged)

→ Transformer

EcoStruxure Transformer Expert hydrogen option



Optional hydrogen sensor

- Designed for power and distribution transformers
 - Solid state sensor
 - Continuous hydrogen monitoring and tracking
- Fully integrated with EcoStruxure Transformer Expert
 - Track hydrogen ppm correlated with temperature
- Smart analysis algorithms
- Integrated dashboard reports
 - Potential faults, recommendations, and insights
- Factory calibrated
 - No field calibration required
- Low-cost software-as-a-service

Sensor measurements	Measurement Accuracy Range	25 - 5,000 ppm
	Accuracy	20% of reading or 25 ppm (whichever is greater)
	Repeatability	10% of reading or 15 ppm (whichever is greater)
	Response Time	< 60 minutes
	Operating Temperature (Ambient)	-40°C to +70°C
	Storage Temperature	-40°C to +85°C
	Oil Temperature Range	-40°C to +105°C
	Cross-sensitivity to H2O, CO2, C2 H2, C2 H4, CO, etc.	<1%
Local communication	RS485 to EcoStruxure Transformer Expert	
Sensor power supply	9-48 VDC, 10 Watt supplied by EcoStruxure Transformer Expert	
Humidity & corrosion resistance	Class C5M Marine rated; salt-water condensing IEC 60068-2	
Ingress protection	IP68; 25 feet water for 14 days	
Shock	30g, shock duration 18ms (IEC 60068-2-27)	
Vibration	3-axis Sinusoidal, Wideband and Random [Simulated Long-Life] IEC 60068-2-11	
Supplied hardware	Brass Hydrogen option dual splitter External temperature sensor with 10m cable and M12 connector with additional cable for hydrogen sensor	
Dimensions	40 x 40 x 150mm	
Hardware warranty	Life-long replacement on failure while under subscription	

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