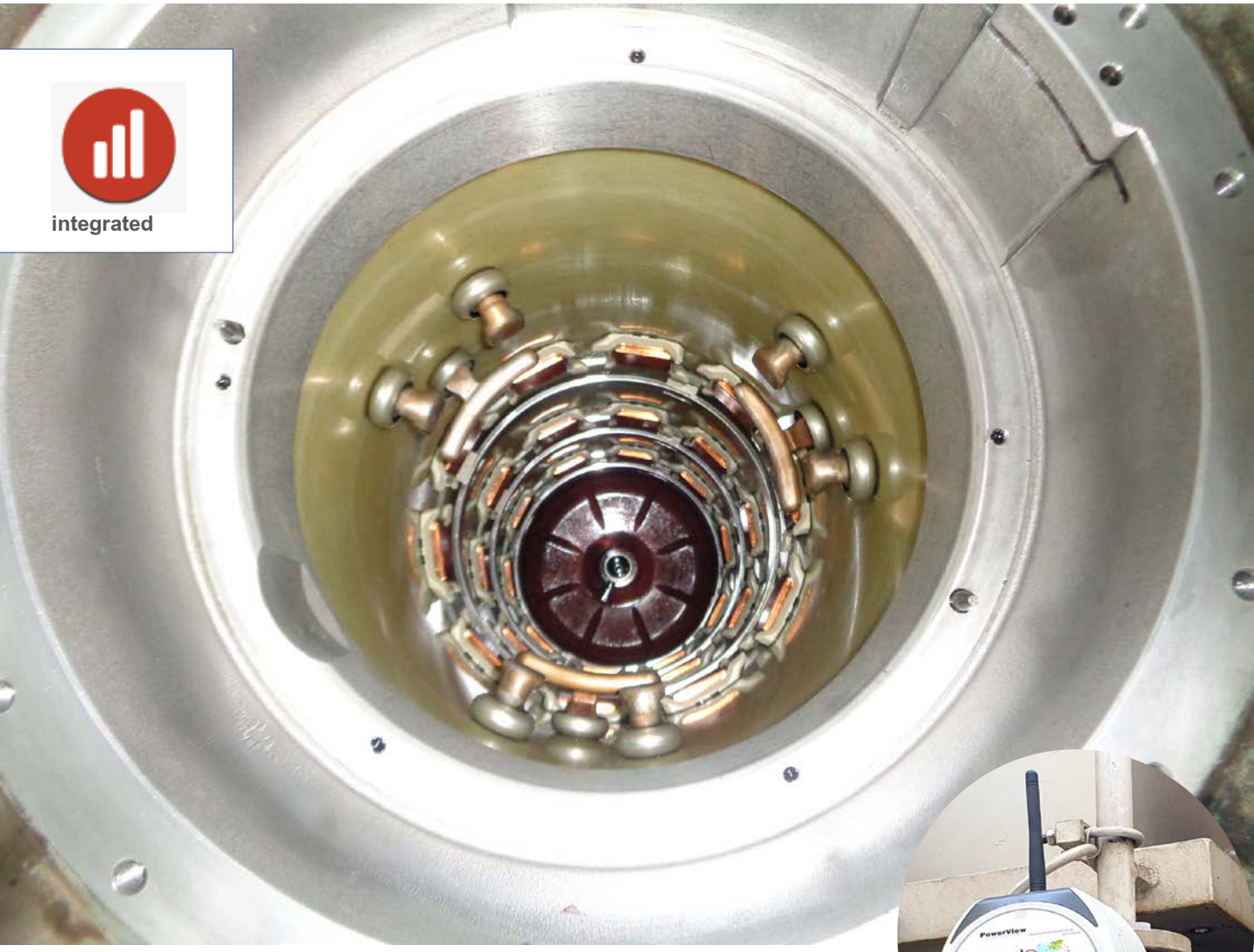
Transformer OLTC Fault gas Detection & Monitoring

integrated



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PowerView
Testing & Monitoring Equipment

Pioneering the future of power testing and monitoring

OLTC Fault Gas Monitoring

Multi Fault gas detection

Detection of Hydrogen ,Methane, Acetylene Ethane, Ethylene for fault detection and classification plus moisture

Easy installation and powerful software for data analysis

Less than 1 hour installation, ultra long-range wireless communication and most advanced software

Description

The OLTC Fault gas monitoring is an early fault detection and monitoring unit which is designed for natural breathing On load tap changer to prevent serious faults in the earlier stage , plan outage and repair and evaluate asset condition It is capable of monitoring hydrogen gas generation, methane generation, ethane and ethylene moisture and complete gas pressure

Gasses formation

Gases in oil are created by breaking the molecular bonds of oil molecules caused by electrical stress, partial discharges, hot spots, oxidation, decomposition of insulation, etc.).
Molecules of insulating oil in high voltage equipment break down under the influence of the thermal and electrical stresses to produce gases

In OLTC Hydrogen (H2) is generated by partial discharges, arcing and in normal service caused by stress from electrical field,
Acetylene (C2 H2) is generated by arcing. Methane (CH4) is generated at higher temperatures though generation starts at relatively low temperature (approx. 150 ˚C). Ethylene, (C2 H4) is generated by higher temperatures (300 ˚C and higher). Ethane (C2 H6) is also generated by higher temperatures (300 ˚C and higher).

In non vacuum type Acetylene and hydrogen are normally generated between switching operations but Methane , ethane and Ethylene are generally indicating thermal fault . In the arching spot the center temperature can reach thousand degrees Celsius. The oil molecules on this spot are totally degraded. After finishing of the arching molecules are regrouped and hydrogen and acetylene are the bypass product. Few millimeters from the plasma arch the temperature reduces. This relation between the gases is constant if the gases are generated by the arcs only. If there is another source of thermal fault gases, such as an overheated contact, the relation will change, and a fault can be detected in an early stage before any severe faults occur.

Gas generation in Vacuum types is extremely small compared to non-vacuum types since the main gassing source, the arc, is isolated in the vacuum interrupters. Only sparking from commutating contacts and heating from transition resistors and, for some types, also change-over selectors produces gases. This makes also faults such as arcing and high PD-levels possible to detect. Overheating will also be possible to detect at an earlier stage.

Ultra long wireless communication And low power consumption

Wireless communication at ultra long range of several tenths of kilometers

Measurement Technology

Generally, fault gases are normally present in some levels in OLTC (due to arching). Increased gas generation above limit thresholds is generally related to oil is imposed to excessive electrical and thermal stress (due to evolving fault). As the fault generation accelerates more gasses are released. Some small portion of the gases gets dissolved in the oil (depending on the oil solubility coefficient).

There complete installation can be completed in couple of hours without any permanent modifications of the OLTC tank.

After the mechanical installation, the system can be easily integrated in a central monitoring. The sensor can be powered form network or batteries which should be replaced every 5 years, The monitoring is completely wireless, and no cable installations are necessary for power supply or data communication .

The system was designed to operate at extremely cold and warm environments and is shock and vibration resistant.

Alarms, notifications and reporting

Fully customizable alarms , email and SMS notification and trending

Technical specification

Low ownership smart substation integration

Cheapest ownership cost and installation due to ultra low power consumption and wireless communication.

Most advanced reporting and communication protocols

Detection and measurement range H2 **Detection and measurement range Methane** **Measurement range Ethane and Ethylene**	**Up to 40000 ppm** **Up to 50.000 ppm** **Up to 30.000 ppm**
Accuracy	±5 % of range for H2 and methane and , ±10 % of range for Ethane / Ethylene
Min resolution	±50ppm
Minimum detection limit	50 ppm_v
Cross sensitivity	No cross sensitivity to T, P and RH
Response time	20 sec
Warm-up time	5 sec
Total gas pressure monitoring range	gas Sensor with moisture and pressure analyzer
Operating temperature (electronics)	**-40 ... +70 °C**
Storage temperature	-50 ... +80 °C
Operating humidity	0 ... 100 %RH, condensing
Pressure tolerance	80-120 HPa
Power supply	Batteries 3.5 V
Batteries lifetime with factory settings (1 sample/h)	5 years
IECEx Quality Assessment Report	**IEC 80079-34:2018**
ATEX Quality Assurance Notification	2014/34/EU
RoHS (2 & 3) Compliant	2011/65/EU & 2015/863
China RoHS Compliant	SJT/T 11363 & 11364
REACH Compliant	EC 1907/2006 (33 & 67)

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Test	Specification	Summary of Test Conditions
High Temperature Operating	IEC 60068-2-2	1000 Hours @ 85*C
Low Temperature Operating	IEC 60068-2-1	1000 Hours @ - 50*C
Drop	IEC 60068-2-31	1-meter drop onto concrete
Shock	IEC 60068-2-27	50G peak/11ms half sine pulse, 3 axes (positive and negative pulses)
Vibration	IEC 60068-2-6	31 Hz – 150 Hz (2G acceleration) 1 hour per axis, 3 axes
Sand/Dust	MIL-STD-810G Method 510.5	Sand: 150-600 um SO2 particle size, 23 m/s nom, velocity, 5 hrs @70*C per axis, 3 axes Dust: Red China Clay, 1.5 m/s nom, velocity, 6 hrs @ 70*C per axis, 3 axis
EMC: Radiated Immunity	IEC/EN 61000-4-3	80 MHz – 2.7 GHz up to 10 V/m
EMC: Magnetic Immunity	IEC/EN 61000-4-8	30 A/m, 3 axes
EMC: Electrostatic Discharge	IEC/EN 61000-4-2	Up to 4kV on ground plane, up to 8kv corona discharge

Ordering information

Ordering code	**Description**
101-1626	Battery powered
101-1627	Mains supply

PowerView
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