ZEROWASTE SF6 Analyser
Portable Infra Red SF6 Condition Monitoring System

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The EMT SMART Combination for ZEROWASTE SF6 Condition Monitoring

Biography

Neil Kane Managing Director

• Analytical Chemist and MBA

• Member of the CIGRE working group B3WG 25/30 Committee on SF6 Analysis

• UK Technical Committee Representative on SF6 for IEC/TC/GEL10

• 30 years experience in the Electricity Industry for Insulating Oil and SF6 Analysis

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The EMT SMART Combination for ZEROWASTE SF6 Condition Monitoring

• EMT is a science-based innovation leader and manufacturer of SF6 monitoring, emission and handling instruments for SF6 gas insulated equipment.

• The protection of People, Power Plant Assets and the Environment are at the forefront of our product development.

• Industry challenges are resolved with simple, practical solutions which not only exceed the fundamentals of SF6 maintenance regulations (IEC/CIGRE/ASTM etc), but deliver a host of additional benefits.
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• CIGRE, IEC and ASTM standards define the minimum SF6 moisture and purity level

• Common by-products include Sulphur Dioxide (SO2), Hydrogen Fluoride (HF), Hydrogen Sulphide (H2S), Carbon Tetrafluoride (CF4) and Carbon Monoxide (CO).

• Regulatory requirements governing SF6 compartments require both scheduled gas monitoring and the reporting of the annual amount of SF6 gas usage and leakage.
Quality SF6 analysis serves three main purposes:

1. To ensure that the SF6 condition for the intended service at the time of commissioning, or at any other moment of manipulation with the SF6 are within specification, set by global governing bodies, CIGRE, IEC and ASTM.

2. To diagnose SF6 related deteriorated conditions of any equipment during it’s service.

3. To ensure proper Health, Safety and Environmentally correct handling with used SF6 gas.
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Advanced infrared absorption technology

= precise identification and quantification of decomposition products
= laboratory performance results for field diagnostic testing
= zero drift, no contamination, no cross interference
= accurate monitoring and transparency of information
= regulatory compliance
= reduced maintenance time and costs
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Simultaneous SF6 measurement of up to 11 parameters
(1, 2, 3+ gas or multiple gas analysis in any combination)

- H2O: 347 ppm
- SF6: 98.4%
- CF4: 0.7%
- CO: 14 ppm
- SO2: 11.7 ppm
- HF: 17.6 ppm
- Air: 0.86%
- H2S: 0 ppm

= flexibility to changes in SF6 strategy/regulation requirements
= reduced maintenance and upgrade costs
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Light
• weighing 15Kg/33lbs
• portable and practical
• improved handling practices

Fast On Site Calibration
• 5 minute field calibration/per cycle, with a one button operation system
• analyze up to 5 fast samples on the same SF6 gas automatically
• simple user-friendly interface
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Fully portable AC or battery operated
- minimum 8 hours of operation, including gas pump back/recycling and multiple pump backs
- no additional transport costs getting equipment to sites

Minimum amount of gas used
- 250cc’s of SF6 and enough gas storage for up to 5 normal sampling cycles
- stability programming infrared technique allows for reproducible results
- minimum environmental impact
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Unaffected by corrosive by-products
- materials of construction impervious to corrosive arc by-products, which can withstand high concentrations of corrosive decomposition products without causing damage to the analyser
- increase longevity of the analyser, further reducing maintenance cost

Analysis of sample prior to sample storage
- samples SF6 before entering the holding tank, so no chance of contamination from previous SF6 samples
- improves handling practices and standards and meets regulatory compliance
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Optional SF6 leak detection probe
• an upgradeable and configurable option

= saves bringing another leak detector to the job
= reduced maintenance costs
= minimum environmental impact
Connection of ZEROWASTE to SF6 Circuit Breaker

DN20 to Male Swagelok Quick Release Adaptor Fitting

Female Swagelok Quick Release fitting at end of 2 metre braided hose

DN7 Male to Gas Sampling Port on ZEROWASTE

IR Zerowaste SF6 Analyser

SF6 Smartfill
The EMT SMART Combination for ZEROWASTE SF6 Condition Monitoring

The Zerowaste

• accurate monitoring and transparency of information
• effective controls on SF6 inventory and usage
• enhanced safety
• improved handling practices and standards
• compliance with regulation

= environmentally responsible SF6 maintenance procedures
## Technical Specification

### Gases Measured and Options

<table>
<thead>
<tr>
<th>Gas</th>
<th>Range</th>
<th>Repeatability</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF6 Purity</td>
<td>0-100%</td>
<td>+/-0.5% FS¹</td>
</tr>
<tr>
<td>Dewpoint</td>
<td>-60 - 20°C</td>
<td>+/-0.5°C at -30°C</td>
</tr>
<tr>
<td>HF</td>
<td>0-200ppm</td>
<td>+/-5% FS¹</td>
</tr>
<tr>
<td>SO2 Lo</td>
<td>0-150ppm</td>
<td>+/-2% FS¹</td>
</tr>
<tr>
<td>SO2 Hi</td>
<td>0-500ppm</td>
<td>+/-2% FS¹</td>
</tr>
<tr>
<td>CF4 Lo</td>
<td>0-4000ppm</td>
<td>+/-2% FS¹</td>
</tr>
<tr>
<td>CF4 Hi</td>
<td>0-65%</td>
<td>+/-1% FS¹</td>
</tr>
<tr>
<td>CO</td>
<td>0-1000ppm</td>
<td>+/-5% FS¹</td>
</tr>
<tr>
<td>HS2</td>
<td>0-100ppm</td>
<td>+/-5% FS¹</td>
</tr>
<tr>
<td>R12</td>
<td>0-250ppm</td>
<td>3% of FS¹</td>
</tr>
<tr>
<td>AIR</td>
<td>0-50%</td>
<td>1% of FS¹</td>
</tr>
</tbody>
</table>

FS¹: Full Scale (of Measuring Range)

### SF6 Leak Detection

- Detection Limit: 3 gm/year
- Technology: NDIR

### Screen

- Type: TFT
- Size: 4.3" 16:9 (wide aspect ratio)
- Resolution: 480 x 272 dots
- Transmission Mode: TN/Transmissive/Normally White
- Dot Pitch: 0.198 x 0.198
- Colours: 24 bit
- Touchscreen: Integrated resistive touch panel
- Backlight: White LED PWM
- Luminance: 350Cd/m² (Typ.)

### Memory

- Type: Flash EEPROM
- Capacity: 1000 results

### Battery

- Operating Time: >8 hours
- Charger Input: 100-240V - 50/60Hz

### PC Communications

- Type: USB
- Class: HID
- Connector: Mini AB

### Gas Pressure

- 0.5 to 10 bar (7 to 145 PSI)

### High Pressure Option

- Bar = 0.5 to 12 Bar
- PSI = 7 to 174 PSI

### Operating Environmental Conditions

- Temperature Range: -20 to 40°C
- Humidity: 0-95%RH non-condensing

### Physical Specifications

- Weight: 15kg (33lbs)
- Maximum Dimensions: L500 x W300 x D470 mm (19.11" x 12" x 18.5")
SF6 Emissions Regulation and Controls will only get tougher. Where legislative drivers and SF6 quality measurement matter, EMT will continue to develop innovative products which provide improved protection for People, Power Plant Assets and the Environment

Thank you for your time
Any Questions?