

# 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

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- 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



# 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.



# The EMT SMART Combination for ZEROWASTE SF6 Condition Monitoring



- CIGRE, IEC and ASTM standards define the minimum SF6 moisture and purity level
- Common by-products include Sulphur Dioxide (SO<sub>2</sub>), Hydrogen Fluoride (HF), Hydrogen Sulphide (H<sub>2</sub>S), Carbon Tetrafluoride (CF<sub>4</sub>) 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.



# ZEROWASTE SF6 Analyser For Condition Monitoring



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 its service.
3. To ensure proper Health, Safety and Environmentally correct handling with used SF6 gas.



# The EMT SMART Combination for ZEROWASTE SF6 Condition Monitoring



## Advanced infrared absorption technology

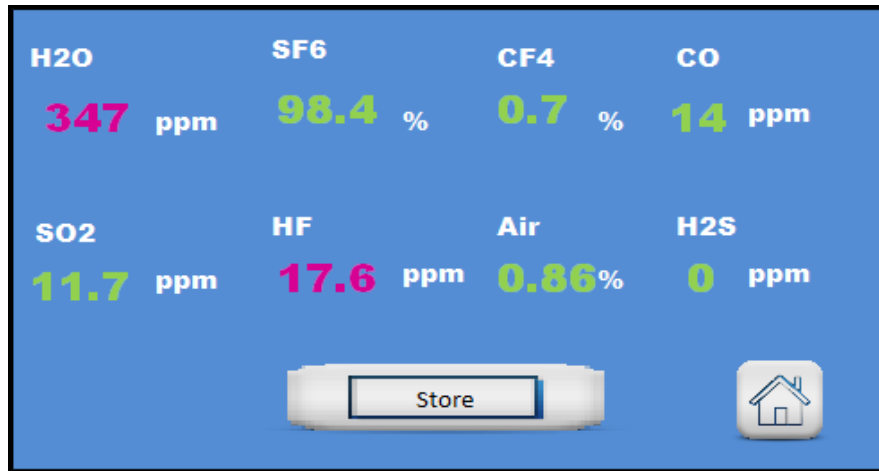
- = precise identification and quantification of decomposition products
- = laboratory performance results for field diagnostic testing
- = zero drift, no contamination, no cross interference
- = **accurate monitoring and transparency of information**
- = **regulatory compliance**
- = **reduced maintenance time and costs**



# The EMT SMART Combination for ZEROWASTE SF6 Condition Monitoring



Simultaneous SF6 measurement of up to 11 parameters  
(1, 2, 3+ gas or multiple gas analysis in any combination)



= flexibility to changes in SF6 strategy/regulation requirements  
= reduced maintenance and upgrade costs



# The EMT SMART Combination for ZEROWASTE SF6 Condition Monitoring



## 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





# The EMT SMART Combination for ZEROWASTE SF6 Condition Monitoring



## 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



# The EMT SMART Combination for ZEROWASTE SF6 Condition Monitoring



## 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

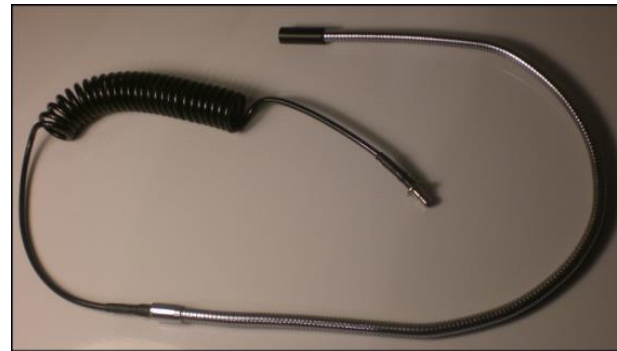
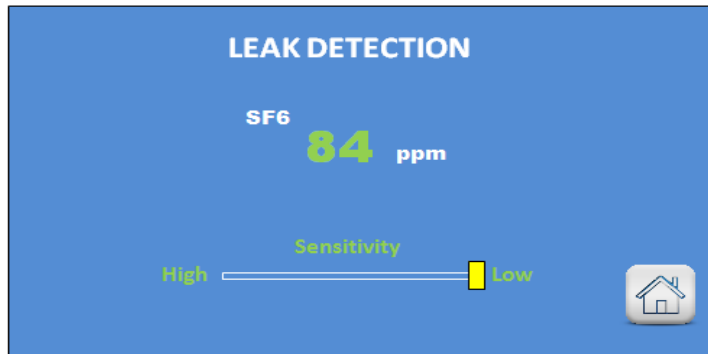


# The EMT SMART Combination for ZEROWASTE SF6 Condition Monitoring



## Optional SF6 leak detection probe

- an upgradeable and configurable option



= saves bringing another leak detector to the job

= **reduced maintenance costs**

= **minimum environmental impact**

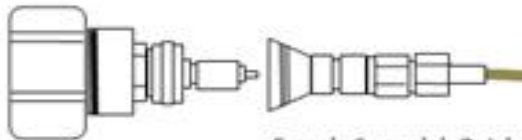


# Connection of ZEROWASTE to SF6 Circuit Breaker



DN20 Sampling Port on 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



# 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	Gas	Range	Repeatability
	SF6 Purity	0-100%	+/-0.5% FS <sup>1</sup>
	Dew point	-60 - 20°C	+/-0.5°C at -30°C
	HF	0-200ppm	+/-5% FS <sup>1</sup>
	SO2 Lo	0-150ppm	+/-2% FS <sup>1</sup>
	SO2 Hi	0-500ppm	+/-2% FS <sup>1</sup>
	CF4 Lo	0-4000ppm	+/-2% FS <sup>1</sup>
	CF4 Hi	0-65%	+/-1% FS <sup>1</sup>
	CO	0-1000ppm	+/-5% FS <sup>1</sup>
	HS2	0-100ppm	+/-5% FS <sup>1</sup>
	R12	0-250ppm	3% of FS <sup>1</sup>
AIR	0-50%	1% of FS <sup>1</sup>	

FS<sup>1</sup>: 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)
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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?**