World leaders in SF6, Oil Analysis and Handling Products

Energy Maintenance Technologies Ltd.
Introduction

Asset Protection: People + Plant = Protect, Preserve + Enhance

EMT supply a range of SF6 and oil testing instrumentation, consumables, and training packages to end users. Our consultative approach backed by training and education means that challenges are resolved with real solutions that not only meet the end goal but also deliver a host of additional benefits, which will significantly improve handling practices adopted by maintenance personnel.

Scientific Approach = World Leading Technology for SF6

EMT can help you get the most from your valuable assets by discussing and developing practical issues and concerns of end users, with products developed specifically to meet the needs of utility managers. EMT can help you get the most from your valuable assets by discussing and developing practical issues and concerns of end users, with products developed specifically to meet the needs of utility managers.

Global Reach = Local Sales + Support

EMT has been in the electricity utility asset protection business for over 50 years. We have offices in over 70 countries, and many of the world’s largest utility companies, SF6 asset suppliers, and gas suppliers have chosen EMT for their asset protection needs.

Need Kane
Managing Director
SF6 Testing & Maintenance

EMT delivers the most advanced and complete range of SF6 analysis and handling products, aligned to global trends in the electricity generation, transmission and distribution sectors. These products monitor the health and longevity of critical assets in high voltage systems and facilitate the effective management of maintenance, operation and planning.

Pioneers in SF6 Analysis...

- Plant availability and reliability amounts to efficiency and profitability. Therefore, insulating gas analysis can be most effective when applied to a number of routine testing and maintenance programmes.
- Identify the location of internal flashover faults.
- Identify the appropriate method for disposal of contaminated gas.
- Avoid the unnecessary internal inspection of equipment.
- Profile the long term behaviour of switchgear and instrument transformers.
- Determine contact and Teflon cone wear.
- Verify gas quality/condition after filling (including moisture, air and SF6 content).
- Determine the condition of individual items of equipment following abnormal system events.
- Determine the condition of the gas prior to opening a compartment or applying other test devices to ensure that appropriate gas handling measures/protective measures for staff and instruments are not destroyed by contaminated gas.

Why measure SF6?

- SF6 is a major greenhouse gas. Measuring, monitoring and capturing SF6 is an important step in ongoing substation maintenance programmes.
- Identify the location of internal flashover faults.
- Identify the appropriate method for disposal of contaminated gas.
- Avoid the unnecessary internal inspection of equipment.
- Profile the long term behaviour of switchgear and instrument transformers.
- Determine contact and Teflon cone wear.
- Verify gas quality/condition after filling (including moisture, air and SF6 content).
- Determine the condition of individual items of equipment following abnormal system events.
- Determine the condition of the gas prior to opening a compartment or applying other test devices to ensure that appropriate gas handling measures/protective measures for staff and instruments are not destroyed by contaminated gas.

EMT SF6 Analysers give you...
- Effective controls on SF6 inventory and usage.
- Accurate monitoring and transparency of information.
- Improved handling practices and standards.
- Compliance with regulations.
- Enhanced safety.
- Maximum asset utilisation.
- Minimum environmental impact.
- Reduced maintenance costs.
- Highest performance measurement technologies.

Why measure SF6?

Plant availability and reliability amounts to efficiency and profitability. Therefore, insulating gas analysis can be most effective when applied to a number of routine testing and maintenance programmes.
The Zerowaste® is the world’s first SF6 impurity gas analyser to combine the following features:

- Simultaneous SF6 measurement of up to 11 parameters
- Advanced infrared absorption technology with high sensitivity and selectivity
- Modular design that allows for easy addition of more sensors
- Fully portable design with battery operation for up to 8 hours
- Small amount of SF6 gas sample used (just 250cc's)
- The fastest 'Pump Back' SF6 analyser
- The lightest 'Pump Back' SF6 analyser
- The most accurate SF6 analyser with advanced multi sensor Hi/Lo ppm technology
- The most out of our assets
- EMT helps us to get the most out of our assets

EMT offers a complete range of analysis and handling instruments designed to meet the varying application requirements of testing & maintenance in SF6 gas filled equipment. Our technologies are used in EMT networks of substation and circuit breakers around the world for the analysis and testing of all parameters associated with SF6 gas purity.

The Zerowaste® 3 Gas Analyser provides a cost effective alternative to laboratory-standard measurement to the field. It brings the laboratory to the field, like results. The “Zerowaste® 3 Gas Analyser” provides a cost effective alternative to laboratory-standard measurement to the field. It brings the laboratory to the field, like results.

In the zero Red SF6 Analyser measures SF6 purity, H2O and SO2 in a simple to use field portable analyser with laboratory like results.

Zerowaste® 3 Gas Analyser

EMT offers a complete range of analysis and handling instruments designed to meet the varying application requirements of testing & maintenance in SF6 gas filled equipment. Our technologies are used in EMT networks of substation and circuit breakers around the world for the analysis and testing of all parameters associated with SF6 gas purity.

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Features of the EMT Zerowaste® IR SF6 Analyser

- Auto Operation: Connect and Walk Away!
- Safe Distance Working
- Fully Portable
- AC or 8 hours battery operated, even during gas recycling
- Pre Set IEC and CIGRE Methods - Red/Green = Fail/Pass
- Small Amount of SF6 Gas Sample Used
- Leak Detection Probe Option

- Multi Analysis Operation
- Safe Distance Working
- Fully Portable
- AC or 8 hours battery operated, even during gas recycling
- Pre Set IEC and CIGRE Methods - Red/Green = Fail/Pass
- Small Amount of SF6 Gas Sample Used
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- Multi Analysis Operation
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- Multi Analysis Operation
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- Small Amount of SF6 Gas Sample Used
- Leak Detection Probe Option
Technical Specification - Zerowaste®

<table>
<thead>
<tr>
<th>Gases Measured and Options</th>
<th></th>
<th></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°C to +20°C</td>
<td>+/-0.5°C at -30°C</td>
</tr>
<tr>
<td>HF</td>
<td>0.200 ppm</td>
<td>+/-0.5% FS1</td>
</tr>
<tr>
<td>CO2 Lo</td>
<td>0.150 ppm</td>
<td>+/-2% FS1</td>
</tr>
<tr>
<td>SO2 Lo</td>
<td>0.150 ppm</td>
<td>+/-2% FS1</td>
</tr>
<tr>
<td>CF4 Lo</td>
<td>0.150 ppm</td>
<td>+/-2% FS1</td>
</tr>
<tr>
<td>CO</td>
<td>0.100 ppm</td>
<td>+/-0.5% FS1</td>
</tr>
<tr>
<td>H2S</td>
<td>0-150 ppm</td>
<td>+/-2% FS1</td>
</tr>
<tr>
<td>R12 Lo</td>
<td>0-4000 ppm</td>
<td>+/-2% FS1</td>
</tr>
<tr>
<td>H2S Hi</td>
<td>0-500 ppm</td>
<td>+/-2% FS1</td>
</tr>
<tr>
<td>CF4 Hi</td>
<td>0-65 ppm</td>
<td>+/-1% FS1</td>
</tr>
<tr>
<td>CO2 Hi</td>
<td>0-100 ppm</td>
<td>+/-2% FS1</td>
</tr>
<tr>
<td>CO</td>
<td>0-50%</td>
<td>+/-1% FS1</td>
</tr>
<tr>
<td>HF</td>
<td>0-200 ppm</td>
<td>+/-5% FS1</td>
</tr>
<tr>
<td>CO2 Lo</td>
<td>0-100 ppm</td>
<td>+/-5% FS1</td>
</tr>
<tr>
<td>H2S</td>
<td>0-100 ppm</td>
<td>+/-5% FS1</td>
</tr>
<tr>
<td>CF4 Lo</td>
<td>0-4000 ppm</td>
<td>+/-5% FS1</td>
</tr>
<tr>
<td>H2S Hi</td>
<td>0-500 ppm</td>
<td>+/-5% FS1</td>
</tr>
</tbody>
</table>

**Gas Pressure:** 0.5 to 10 bar (7 to 145 PSI)

**Memory:** Type: Flash EEPROM

**Capacity:** 1000 results

**High Pressure Options:**
- Sol: 0.5 to 12 Bar
- PSI: 7 to 174 PSI

**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 Card:**
- Type: Flash EEPROM
- Capacity: 1000 results

**Physical Specifications:**
- Weight: 15kg (33lbs)
- Maximum Dimensions: 500 x 300 x 470 mm (19.11” x 12” x 18.5”)

**Gas Leak Detection**
- Detection Limit: 3 g/day/year
- Technology: NDIR

**Aviation**
- Type: VIT
- 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.)

**Operating Environmental Conditions**
- Temperature Range: -20ºC to +50ºC (-4°F to +122°F)
- Humidity: 0-95%RH non-condensing

**Power**
- Battery: Operating Time: >8 hours
- Charger Input: 100-240V - 50/60Hz
- Bar = 0.5 to 12 Bar
- PSI = 7 to 174 PSI

**Battery**
- Operating Time: >8 hours

**Charger Input:**
- 100-240V - 50/60Hz

**Zerowaste® Moisture Perfect Hose Vacuum Drying Function**

The largest source of error when performing a dew point measurement is produced by moisture embedded in the hose lining.

Given a gas measurement, the moisture in the hose diffuses into the gas stream. The gas on which the measurement is being performed may need to flow for some time before the moisture level in the gas stream has reached an equilibrium equivalent to the moisture content of the gas stream.

The operator of SF6 measuring equipment requires reliable and repeatable data in a reasonable time frame.

The vacuum feature means that the hose can be pre-evacuated so that moisture and other contaminants present, can be removed prior to the start of the measurement cycle.

The “Moisture Perfect Hose Vacuum Drying Function” generates a vacuum of approximately 800mbar inside the hose.

This is equivalent to reducing the pressure down to 200mbar (20kPa from 1 bar).

This product is available as an additional feature with new Zerowaste® units or as an opposite retrofit fitted to existing units.

A Firmware upgrade is required to add the “Moisture Perfect Hose Vacuum Drying Function” to menu options. Technical notes are available upon request.

**EMT Zerowaste®: Direct Comparison of SF6 Moisture Results from 1000ppmV to 5-ppmV H2O with NEW EMT Moisture Perfect Hose Vacuum Drying Function vs Normal Sampling without Vacuum Drying**

Enhance your SF6 Analysis - “Moisture Perfect Hose Vacuum Drying Function” for the Zerowaste® - the addition of this feature has been shown to improve the repeatability of moisture readings in tests on hoses of 2m and 10m lengths.
Introducing the world’s first SF6 Continuous Monitoring System for 24/7/365 monitoring of SF6 installations.

Zerowaste® CMS SF6 Continuous Monitoring System

Would you like to know what’s happening to the condition of the SF6 gas in your assets, GIS and circuit breakers? In the event of an unexplained fault with one of your SF6 assets, would you want access to continuous real time data on events leading up to and following a fault or arc breakdown?

What was not possible can now be standard practice with the Zerowaste® CMS — a welcome addition to the most advanced family of SF6 measurement technologies from EMT.

Benefits of the Zerowaste® CMS:
- Automatic sampling and analysis of SF6 gas, based on user-selectable intervals from 10 minutes to 10 hours between sampling sessions, and up to 5 samples measured in each session
- Unique drying function – the CMS removes moisture/H2O on pump back
- Automatic SF6 pump back at the end of each set of measurements or when the internal storage is full
- 2GB data management for integration with local and other reporting formats
- On site calibration capability
- Measurement of SF6 quality 24 hours per day, 7 days per week, 365 days per year
- Measurement of 10+ SF6 quality parameters including SF6 purity, Dewpoint, SF6, H2, CF4, CO, H2S, R12, Air
- Utilizes advanced patented infra red SF6 measurement technology
- Unique design enables measurement of highly corrosive SF6 breakdown products without damaging the analyzer
- 12 hour emergency battery backup in case of power failure
- Fully portable, can be transported and installed on-site in minutes.

Technical Specification - Zerowaste® CMS

<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°C - 20°C</td>
<td>+/-0.5ºC at -30ºC</td>
</tr>
<tr>
<td>H2</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>H2S</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>

Technical Specification - Zerowaste® CMS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>15kg (33lbs)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>L500 x W300 x D470 mm (19.11&quot; x 12&quot; x 18.5&quot;)</td>
</tr>
<tr>
<td>Gas Pressure</td>
<td>0.5 to 10 bar (7 to 145 PSI)</td>
</tr>
<tr>
<td>Measurement Intervals</td>
<td>from 10-600 minutes</td>
</tr>
<tr>
<td>Battery</td>
<td>Operating Time: &gt;8 hours</td>
</tr>
<tr>
<td></td>
<td>Change Input: 100-240V - 50/60Hz</td>
</tr>
</tbody>
</table>

Data Example of Zerowaste® SF6 Continuous Monitoring System
The Asserolyz-IRTM is the world’s first SF6 impurity gas analyser to combine the following:

- SF6 measurements remotely, bringing interference-free laboratory performance to the field.
- The most advanced multi-parameter, infra red SF6 gas analyser delivering high performance.
- The lightest and ultimate in portability...

**Features**

- Innovative modular design that allows the measurement of the largest number of gases offered in the market.
- Up to 11 parameters measured simultaneously within 5 minutes.
- Uses advanced infrared absorption technology to measure SF6, H2, SO2 and CF4 in addition to CO2, O2 and SF6 with back-up absorption, allowing laboratory-standard measurement in the field.
- Fully upgradeable to Zerowaste® plus additional SO2, CO and H2S with electrochemical cell, bringing SF6, H2O, HF , R12 and CF4 in addition to SF6, H2O and SO2 in a simple to use field portable analyser.

**Benefits**

- Leak Seeker Option
- With Less SF6 Waste
- Giving the Best Overall Performance
- Improved handling practices and standards
- Reliable maintenance console
- No contamination or red shift. Delivering stable, reproducible results the Asserolyz-IRTM outperforms any SF6 gas analyser.

**Asserolyz-IR™ 3 Gas Analyser**

EMT offers a complete range of analyser and handling instruments designed to meet the varying application requirements of testing & Maintenance in SF6 gas filled equipment.

Our technologies are used in EMT networks of switchgear and circuit breakers around the world for the analysis and testing of all parameters associated with SF6 gas quality. EMT offers 3 Gas Analysis on 2 of its models: Asserolyz-IRTM and Zerowaste®.

The “Asserolyz-IRTM 3 Gas Analyser” delivers highly accurate results and analysis precisely in laboratory-based instruments, to power industry on-site plant applications.

Light weight, easy to use operation combined with accurate, fast measurement together with very low gas usage and high data storage capacity, the “Asserolyz-IR™ 3 Gas Analyser” provides a cost effective solution for measuring SF6 quality.

**Technical Specification - Asserolyz-IRTM**

<table>
<thead>
<tr>
<th>Gas</th>
<th>Range</th>
<th>Resolutability</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF6 Purity</td>
<td>0-100%</td>
<td>+/-0.2% FS1</td>
</tr>
<tr>
<td>Dewpoint</td>
<td>0-2000 ppm</td>
<td>+/-5% FS1</td>
</tr>
<tr>
<td>MR</td>
<td>0-500 ppm</td>
<td>+/-5% FS1</td>
</tr>
<tr>
<td>SO2 lo</td>
<td>0-750 ppm</td>
<td>+/-3% FS1</td>
</tr>
<tr>
<td>SO2 Hi</td>
<td>0-1500 ppm</td>
<td>+/-5% FS1</td>
</tr>
<tr>
<td>CF4 lo</td>
<td>0-500 ppm</td>
<td>+/-2% FS1</td>
</tr>
<tr>
<td>CF4 Hi</td>
<td>0-1500 ppm</td>
<td>+/-5% FS1</td>
</tr>
<tr>
<td>CO2</td>
<td>0-1000 ppm</td>
<td>+/-5% FS1</td>
</tr>
<tr>
<td>H2S hi</td>
<td>0-300 ppm</td>
<td>+/-1% FS1</td>
</tr>
<tr>
<td>H2S lo</td>
<td>0-150 ppm</td>
<td>+/-1% FS1</td>
</tr>
<tr>
<td>CO</td>
<td>0-150 ppm</td>
<td>+/-1% FS1</td>
</tr>
<tr>
<td>Air</td>
<td>0-150 ppm</td>
<td>+/-1% FS1</td>
</tr>
<tr>
<td>CF4 Hi</td>
<td>0-900 ppm</td>
<td>+/-2% FS1</td>
</tr>
<tr>
<td>CF4 Lo</td>
<td>0-2000 ppm</td>
<td>+/-2% FS1</td>
</tr>
</tbody>
</table>

**Dewpoint**

- Operating temperature: -20°C to +50°C, -(4°F to +122°F) gas flow of 1 litre (250cc) per minute, and input gas pressure of up to 10 bars, this analysis is undertaken every 5 minutes.

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- Operating temperature: -20°C to +50°C, -(4°F to +122°F) gas flow of 1 litre (250cc) per minute, and input gas pressure of up to 10 bars, this analysis is undertaken every 5 minutes.

**Lightening**

- All the SF6 in (4) lbs (0.198 x 0.198) 0.198 x 0.198 Dot Pitch
- TN/Transmissive/Normally White Transmission Mode
- 480 x 272 dots Resolution
- 4.3” 16:9 (wide aspect ratio) Size
- 0.198 x 0.198 Dot Pitch
- Full Scale (of Measuring Range) 0-500ppm +/-2% FS1
- 0-150ppm +/-2% FS1
- 0-95% RH non-condensing Humidity
- -60ºC to 20ºC +/-0.5ºC at -30ºC Dewpoint
- -30ºC to 20ºC (<4°F to +122°F) gas flow of 1 litre (250cc) per minute, and input gas pressure of up to 10 bars, this analysis is undertaken every 5 minutes.

**Memory**

- 1000 results Capacity

**Gas Pressure**

- 5-100 Bar (7.3-1450 PSI)

**Environment**

- -20ºC to +50ºC (-4ºF to +122ºF)

**Dimensions**

- 22.25” x 8.0” x 3.25” (instrument only)
- 25.0” x 17.0” x 7.0” (maximum case dimensions)
- 22.25” x 8.0” x 3.25” (environment only)
- 14” x 14” x 8.9” (instrument only)
- 23.0” x 11.7” x 7.0” (maximum case dimensions)

**Weight**

- 1.8kg (4lbs)
A low cost solution for compliance with environmental SF6 regulations, the EMT APM works with existing SF6 analysers at a fraction of the cost of buying new equipment.

**APM Auto SF6 Pump Back Module – Zero SF6 Emissions**

Are you considering changing your existing SF6 analyser to comply with new regulations on zero SF6 emissions?

Do you have a fleet of SF6 analysers (RGA, WHA, COSA, GE units or others) which do not pump back measured SF6 after analysis?

Do you have problems sourcing SF6 capture and disposal vessels?

The APM Auto SF6 Pump Back Module is portable, self contained, efficient and simple to use, and allows you to keep your existing fleet of SF6 analysers as an asset WITHOUT the large capital cost associated with buying a new fleet of compliant pump back SF6 analysers.

**Advantages of the APM Auto SF6 Pump Back Module:**
- Designed for use with the Asserolyz-IR™ SF6 gas analyser and any other non-pump back SF6 gas analysers.
- Collects and stores measured SF6 gas after analysis.
- Stored SF6 gas can be pumped back to any SF6 compartment or sample/waste vessel.
- Optional Hose Vacuum Drying Function.
- Fully portable operation that works with or without AC supply for up to 50 pump backs.
- housed in a robust IP67 rated Peli case complete with lid organiser for accessories.

**Technical Specification - APM**

<table>
<thead>
<tr>
<th>External Dimensions</th>
<th>Length</th>
<th>Width</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>430mm (16.9&quot;)</td>
<td>224mm (8.8&quot;)</td>
<td>341mm (13.4&quot;)</td>
</tr>
<tr>
<td>Case Type</td>
<td>Peli Case 1430</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP Rating</td>
<td>IP67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>10kg (22lbs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery</td>
<td>Operating Time: 16 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Charger Input: 100-240V - 50/60Hz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessories</td>
<td>Battery charger, inlet regulator, detachable black carrying strap</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
With constantly changing regulations governing SF6 inventory and usage, measurement and control is essential. This smart solution significantly improves upon SF6 gas handling practices used throughout the industry worldwide.

**Features**

- **Accurate Measurement**
  - Precise measurement and control of SF6 gas used in the filling and topping-up operations of electricity substation maintenance, utilises a traffic light system for indication during fill/top-up.

- **Complete Traceability**
  - Automatic datalogging with USB connectivity, records show exactly how much SF6 gas has been used during these procedures. When finished, it shows the end pressure and total SF6 gas utilised.

- **Portable and Fully Automated**
  - WiFi connectivity for remote operation and GPRS/MiFi (mobile WiFi). Battery operated for at least 5 hours. With set parameters and simple operation - press “Go” and Smartfill carries out its filling and topping-up protocols with complete automation and precision.

- **No Waste - No Leakage**
  - Fills and tops up equipment with the exact amount of SF6 gas required.

**Benefits**

- Effective control on SF6 inventory and usage.
- Accurate monitoring and transparency of information.
- Improved handling practices and standards.
- Compliance with regulations.
- Enhanced safety.
- Maximum asset utilisation.
- Minimum environmental impact.
- Reduced maintenance costs.

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**Smartfill Layout and Connections**

- **1.** Inlet SF6 gas, Swagelok ½" female quick coupling, max pressure 10 Barg.
- **2.** Battery / VDC power adaptor.
- **3.** Fuse, max T6.3A.
- **4.** Emergency button, will disconnect the power to the positive shuts-off valve, no SF6 gas flow possible. An alarm in the software will occur.
- **5.** 2 tone buzzer, for top-up finished and alarm. Sound level SPL: 92dB.
- **6.** HMI, touchscreen - highly visible, even in direct sunlight.
- **7.** On/off switch.
- **8.** Port A, 6 pins connector for Traffic light or other auxiliary option.
- **9.** USB connector, for saving report files.
- **10.** Outlet SF6 gas, Swagelok ½" female quick coupling, max pressure 10 Barg.
## Technical Specification - Smartfill

### Operation
- **Max flow rate**: 18 Kg/h - 70 Kg/h
- **AC power**: 110/230VAC – 50/60Hz
- **Enclosure IP rating**: 68
- **Portable**: 2 hours

### Accuracy
- **Flow**: 1% of FS
- **Pressure sensors**: 0.5% FS
- **Max inlet pressure**: 10 Barg (145 PSI)
- **Min inlet pressure**: 2 Barg (29 PSI)

### Safety
- **Emergency button**: Closes inlet valve and triggers HMI, an alarm email is sent (only in case internet connection is unavailable)
- **Relief valve**: Opens at 11 Barg (159.5 PSI)
- **Positive shutoff**: Closes when communication fails for 60 seconds
- **Indication when filling**: Traffic light flashes orange
- **Indication when filling**: Sends email or text/SMS when AC power fails (option)

### Operating Temperature Range
- **Range**: -20°C to +40°C (-4°F to +104°F)

### USB Drive
- 8 GB maximum, USB 2.0 compliant, 2 GB recommended

### Power Supply
- **AC power**: 110/230VAC – 50/60Hz
- **Portable**: 2 hours

### SmartWeigh®

Would you like the additional assurance of an integrated weigh scale facility as well as the traceability of mass flow control in one simple SF6 handling device?

Do you demand accuracy and precision in the filling and topping up of SF6 compartments and breakers?

Are safety and reliability paramount to your SF6 filling and topping up operations?

The Smartfill SmartWeigh® delivers all this and more...

### Dynamic Control
- 96x16 pixel available for iOS, Android, WP8/Blackberry, PC and Mac

### Hoses
- **Braided hoses**: Swagelok/PTFE - Pressure tested to 100 Barg (1,450 PSI)

### Certification
- **Braided hoses**: Swagelok/PTFE - Pressure tested to 100 Barg (1,450 PSI)

### Weight
- **20kg (44lbs)**

### SmartWeigh® Start Screen with Icon

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The ongoing service & support that we’ve received from EMT’s Customer Support Team has been second to none.

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Would you need to measure SF6 inventory and usage compliantly and with complete traceability?
The SmartWeigh® meets the CARB USA requirements for SF6 inventory measurement procedures.

**Operation/Application**
Gas cylinder weighing

**Weighing Range**
0-300lbs
0-136Kg

**Accuracy**
- SmartWeigh® Weigh Scale ≤0.1 (% of Span)
- Smartfill Mass Flow Controller (MFC)
  - Flow: 1% of FS
  - Pressure sensors: 0.5% FS
  - Maximum pressure: 10 barg (145 PSI)
  - Minimum pressure: 2 barg (29 PSI)

**Protection – Enclosure Rating**
Peli Case NEMA 4 (IP65)

**Display**
- Weight is shown on Smartfill display when connected

**Power Supply**
- AC power 110/230VAC – 50/60Hz and battery

**Operating Temperature Range**
-20°C to +40°C (-4°F to +104°F)

**Weight**
21Kg (46lbs)

**Case Construction**
Peli case with integrated SmartWeigh® scales compartment

**Dimensions**
1300 x 950 x 840 (mm) (51.1” x 37.4” x 33.1”)

The 24/7 leak manager...
Smartfill - Continuous SF6 Top-Up Manager

A unique SF6 “live topping up” device, designed for managing leakage of SF6 from circuit breakers and other plant, minimises SF6 released in exceptional circumstances, where the asset has to remain in service and operational.

**Features**
- **Auto Top-up**
  - In a scheme “live topping up” the unit is continually attached to the gas zone in order to manage the gas pressure within a small pressure range i.e. 3.3 - 3.4 Bar. “Auto top-up” will occur when pre set alarm pressure levels drop below the lower limit.
- **Automated Pressure**
  - Maintained pressure in between upper and lower limits preferably just above alarm level
- **Remote Start Up**
  - The unit is remotely operable able to start the top-up remotely via WiFi (optional)
- **Data Logging**
  - Text message sent to operator upon completion.
  - Data including operator, site, equipment, mass and time is sent to ftp web server automatically (optional)
- **Automated Shut Down**
  - The unit shuts off when target pressure is reached
- **Fail Safe**
  - Pipe work has a check valve at the zone end, pressure comparison either side and shut down.
  - There is also a safety relief valve within the unit
- **Portable**
  - Easily transported, weighing 20kg (44lbs).

**Benefits**
- Effective controls on SF6 inventory and usage
- Accurate monitoring and transparency of information
- Improved handling practices and standards
- Compliance with regulation
- Enhanced safety
- Maximum asset utilisation
- Minimum environmental impact
- Reduced maintenance costs
- 24/7 topping up.
Concept

The Smartfill Continuous Top-Up Manager is designed for minimising unwanted release of SF6 into the environment.

In the event of exceptional circumstances where the asset, e.g. switchgear has to remain in service without repair, the unit can be continually attached to a gas zone and maintain the pressure between a comparatively small range, e.g. 3.2-3.3 Bar. Using the Continuous Top-Up Manager results in a noticeable reduction in SF6 usage, therefore saving SF6 costs and inventory.

**Traffic light**
The Smartfill is supplied with a traffic light system. Using this traffic light gives information on the Smartfill’s status without the need of opening the lid or using remote control.

**Hose Connections CTU**
Only hoses supplied with the CTU should be used with the unit. These are unique with sensors installed which are calibrated in combination with the specific Smartfill CTU, and are therefore not interchangeable!

The supplied pair of hoses consists of two types, one for the inlet and one for the outlet. The outlet hose is fitted with a non-return valve and a pressure sensor.

Modifying the hoses, or extending them, could result in malfunctioning. In case other hoses are needed, contact EMT.

**Technical Specification - Continuous Top-Up Manager (CTU)**

**Operation**

- **Max Flow rate:** 18 Kg/h-70 Kg/h
- **39.6 lbs/hr - 154.3 lbs/hr**
- **Smallest deviation:** 0.5 Barg (7 PSI)
  - Example:
    - Fill Pmin 3.0 Barg (43.5 PSI)
    - Top-up to Pmax 3.5 Barg (50.7 PSI)
- **Maximum pressure:** 10 Barg (145 PSI)

**Accuracy**

- **MFC 1% of FS**
- **Pressure sensors 0.5% FS**
- **Max inlet pressure:** 10 Barg (145 PSI)
- **Min inlet pressure:** 2 Barg (29 PSI)

**Safety**

- **Emergency button will close inlet valve and trigger HMI, an alarm email is sent**
- **Relief valve, opens at 11 Barg (159.5 PSI)**
- **Positive shared hoses when communications fails for 60 seconds**
- **Indication when filling, traffic light flashes orange**
- **Sends email when AC power fails (option)**
- **Outlet hose pressure is monitored at beginning and end**

**Remote Control**

- **VT screen available for:** iOS, Android, MFI BlackBerry, PC and Mac

**Weight**

- **20kg (44lbs)**

**Power Supply**

- **AC power:** 110/230VAC - 50/60Hz
- **Enclosure IP rating – 68**
- **Portable – 2 hours**

**USB Drive**

- **8 GB maximum, USB 2.0 compliant, 2 GB recommended**

**Log File Size**

- The maximum size per log file is +/- 100kb

**Operating Temperature Range**

- **20°C to +40°C (-4°F to +104°F)**

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**Diagram**

The Smartfill will automatically start each time pressure runs under lower limit.
Options and Accessories

EMT can provide connection to any SF6 compartment

**EMT Universal Fittings Kit (EMT Part Number: EMTFIT)**

- Complete kit containing fittings required for the connection of SF6 gas analysers to most commercially available SF6 switchgear and circuit breakers, housed in a robust portable case.
- Suitable for the following manufacturers:
  - ABB
  - Siemens
  - Schneider
  - Hyundai
  - Hyosung including all DN range
  - Hanson
  - Staubli
  - Malmqvist.

We can supply fittings for the following manufacturers:

- ABB
- Siemens
- Schneider
- Hyundai
- Hyundai, including all DN range
- Hanson
- Staubli
- Malmqvist

**Zerowaste® Charger (EMT Part Number: EMTCHRG-01)**

- A universal battery charger is provided with UK, US and European interchangeable mains plug.
- The charger also accepts a standard “type of I”mains cable as shown below and plug provided (if preferred).
- The Zerowaste® can be used as AC powered by the battery charger connected to the power socket or DC powered by a 12v battery.
- The battery charger is designed to charge the lead acid battery.
- The Zerowaste® is also supplied with a mains cable in the charger plug.

**Asserolyz-IRTM Battery Charger (EMT Part Number: EMTCHRG-02)**

- The Asserolyz-IRTM uses an internal Lithium Ion battery pack.
- A universal battery charger is provided with UK, US and European interchangeable mains plug.
- The Asserolyz-IRTM battery charger should not be used to charge the lead acid battery in the Zerowaste® SF6 analyser.

**Low Pressure Operating Option (0.1 Bar) (EMT Part Number: LowP Option)**

- EMT offers a low pressure operating option that will allow gas samples with pressures as low as 0.1 bar to be measured by the Zerowaste®.
- An additional internal pump is fitted that draws the sample gas into the sensor compartment. The low pressure option can be retro-fitted to existing units.

**12 Bar High Pressure Operating Option (EMT Part Number: IR 12 Bar Option)**

- EMT offers a high pressure operating option that will allow gas samples with high pressures to flow at a maximum of 12 bar.
- The gas sampling inlet manifold is replaced with a high pressure manifold capable of handling a higher gas pressure. The pressure is monitored by a pressure transducer that has a range up to 12 bar. The internal pump that pumps back the gas can also be replaced by a compressor pump that is capable of pumping gas to the SF6 compartment with pressures as high as 12 bar.

**Sample Hose (EMT Part Number: IR Hose)**

- EMT Zerowaste® and Asserolyz-IRTM use a 2m sample hose.
- The sample hose has an inner PTFE tube with an internal diameter of 2mm through which the gas flows.
- The hose is protected with a braided steel outer sheath.
- The hose is terminated in a DN7 male fitting (for connection to the Zerowaste® Gas Sampling port and a ½” Quick Connect Female Swagelok fitting for connection to the gas insulated switchgear (via an EMT adaptor fitting).
- Additional hose lengths are available upon request up to 10 Metres (30 Feet).

**Funnel for Filter Refill (EMT Part Number: IR FNL)**

- A funnel is used to fill the external filter tube with filter material – used with Asserolyz-IRTM and Zerowaste®.

**Spare Parts**

- **Leak Detection Probe (EMT Part Number: IR Leak)**
  - The flexible probe is provided with all units ordered with leak detection option. It goes into the Filter Port at the Instrument through a coiled tube that is extendable to 1 metre.

- **Carry Case (EMT Part Number: IR Case)**
  - The carry case protects the Asserolyz-IRTM during transportation and travel and has moulded sections to accommodate the Asserolyz-IRTM as well as all accessories.
  - A large pocket, fitted to the lid, is also provided to accommodate tubing and other components for use with the instrument.
EMT assero Oil Analysis & Handling

At EMT, we can help you get the most from your valuable asset by discussing your issues and providing appropriate cost effective solutions to meet your needs. Whether your requirement is portable or geographically constrained, we have a wealth of experience and knowledge gained through partnerships with industry professionals. We are confident that we can help you achieve your asset management objectives.

Our range of Oil and SF6 handling products are world leading technologies, developed with industry professionals from around the world with many years of experience in this field, so that our clients can make a more informed choice.

Our team of experienced professionals have spent many years developing answers to the problems faced within this industry and we are confident that we will have a solution that suits your needs.

Analysis plays a vital role in determining the condition of transformers and other assets. Monitoring the condition of the oil can help prevent sudden faults whilst protecting and preserving the general condition of the plant, and should therefore be part of any predictive maintenance programme.

EMT’s portfolio for oil analysis and handling ensures the best possible conditions for the avoidance of transformer deterioration. Products included in this range are the H20P Portable Moisture in Oil Meter and TAN (Total Acid Number) Titrator.

assero H20P - The very best for moisture in oil.

assero H20P Portable Moisture in Oil Meter

For the very best results from your moisture in oil analysis, the assero H20P has been developed in response to many comments from our customers in laboratories and in the field, to develop a portable, robust, easy to use and highly accurate moisture meter for the measurement of down to 1ppm H20 in insulating oil.

The microprocessor controlled assero H20P has a built-in battery and optional carry case, provides the sensitivity required by the laboratory and also the ease of use and portability required by the field personnel and so earns its 5-year warranty.

Easy to use

Simple to programme so that only a single button needs to be pressed for the analysis, everything else is automatic.

The unique hermetically sealed glassware design is designed to eliminate any outside atmospheric moisture getting into the cell, allowing the highest sensitivity and performance on the market. The “quick-connect” system hermetically seals the glassware without the use of expensive grease or Teflon sleeves allowing trouble free assembly, maintenance and disassembly.

Results & Records

The built-in high speed printer provides a hard copy of results and allows duplicate print outs if required. Results can also be downloaded via the Results Manager software package onto a pc spreadsheet format.

Spares & Accessories

The assero H20P is supplied ready for operation. A comprehensive glassware pack including electrodes, glass titration vessel, leads, syringe, printer paper, etc, is supplied as standard. A calibration certificate and 5 year warranty is also provided.

Reagents

Specially formulated to provide optimum performance with all makes and models of coulometric Karl Fischer titrators, our unique reagents provide improved sample miscibility and solubility. assero H20P reagents are packaged in single-shot screw top bottles containing 100ml anode reagent and 5ml easy-snap ampoules of cathode reagent. A standard carton contains 8 anode charges and 8 cathode charges. The reagent pack comprises 8 x 100ml anode reagent and 8 x 5ml cathode reagent.

assero H20P - The very best for moisture in oil.

EMT came highly recommended by one of our business partners also in ESI. Their people were both professional and knowledgeable.
The assero TAN Total Acid Number titrator exclusively available from Energy Maintenance Technologies (EMT) Ltd has been designed to offer maximum specifications and features whilst being priced at a very competitive level. The titrator conforms to ASTM D664 for determination of acidic constituents in petroleum products, lubricants and transformer insulating oils.

**Features:**
- Simple to use for new users to TAN
- Fast and precise results (5 min max)
- Built in pre-programmed TAN method
- Measurement down to 0.001mg/g
- Results in mg KOH/g
- Compact and light - weighs less than 5 kg
- Data Logger for the last 50 titration results
- Transmission of results to printer or PC
- High precision 10ml syringe
- Resolution 1/40,000 of syringe vol (0.25ul).

**Calculation modes**
- Weight/weight, user programmable
- Weight/dilution ratio, user programmable
- Volume/density, user programmable
- Volume/volume, user programmable

**Display formats**
- μg, mg/kg, ppm, %

**Print formats**
- μg, mg/kg, ppm, %

**Statistics**
- max, mean, min values upto 99 runs

**Method storage**
- 10 user programmable methods

**USB output**
- USB Flash Drive

**Sample ID**
- number
- User programmable

**Printer**
- 42 character high speed thermal printer

**Stirrer speed**
- Microprocessor controlled

**Dimensions & Weight**
- 250 x 245 x 120 mm, 3kg
- Max. 25g per minute
- Max. current: 40mA
- Drift compensation: Automatically controlled
- Start delay time: 0 – 30 minutes, user selectable
- End delay time: 0 – 30 minutes, user selectable
- Power supply: 90-240V AC, 47-63 Hz. 12V DC car adapter/internal battery

**Measuring range (typical)**
- 1μg – 10mg water

**Moisture range**
- 1 ppm – 100% water

**Method storage**
- 10 user programmable methods

**Volume/volume, user programmable
**

**Transmission of results to printer or PC**
- High pressure 10ml syringe
- Measurement down to 0.001mg/g
- Results in mg KOH/g

**Sample ID**
- number
- User programmable

**Printer**
- 42 character high speed thermal printer

**Stirrer speed**
- Microprocessor controlled

**Dimensions & Weight**
- 250 x 245 x 120 mm, 3kg

**Calendar/clock**
- Analysis time & date print out

**Battery low indicator**
- Display & print out indication

**Power supply**
- 90-240V AC, 47-63 Hz. 12V DC car adapter/internal battery

**Titrating method**
- Coulometric Karl Fischer titration

**Calculation modes**
- Weight/weight, user programmable
- Weight/dilution ratio, user programmable
- Volume/density, user programmable
- Volume/volume, user programmable

**Display**
- Visual display/print out/acoustic beep

**Heating range (possible)**
- 95 – 105°C water

**Moisture range**
- 1 ppm – 100% water

**Max. sensitivity**
- 0.1 μg

**Max. titration speed**
- 2.5 μg per minute

**Max. current**
- 40mA

**Drift compensation**
- Automatically controlled

**Stirrer speed**
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- Automatically controlled

**Start delay time**
- 0 – 30 minutes, user selectable

**End delay time**
- 0 – 30 minutes, user selectable

**Precise measurement**
- 10-100μg, 100pg, 1μg, 10pg, above 1mg ± 5%
Technical Specification - assero TAN

### Non-volatile Memory

- 3 titration programs depending on TAN content, blank titrations, check/correction weekly

### Languages

- English, Spanish, French, Italian

### Display

- Graphical backlit LCD: 128 x 64 dots

### Keypad

- Membrane, 7 keys, guaranteed up to 6 million strikes per key

### Syringe Volume

- Standard syringe: 10 ml

### Resolution

- 1/6000 of syringe volume (0.2 ul)

### Dispensing Accuracy

- ± 0.2 % for volumes higher than 10 % of syringe

### Dispensing Reproducibility

- ± 0.1 % for volumes higher than 10 % of the syringe

### Liquid Contact Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syringe</td>
<td>Borosilicate glass and PTFE</td>
</tr>
<tr>
<td>Electrovalve</td>
<td>PTFE and KEL-F. Tubes: PTFE</td>
</tr>
<tr>
<td>Differential vs</td>
<td>Differental measurement: 2 BNC connectors.</td>
</tr>
<tr>
<td>External keyboard</td>
<td>For external keyboard, miniDIN connector.</td>
</tr>
<tr>
<td>RS232C bidirectional</td>
<td>RS232C bidirectional for PC or printer, telephone connector.</td>
</tr>
<tr>
<td>Stirrer control</td>
<td>Stirrer control: On/Off and speed, RCA connector.</td>
</tr>
<tr>
<td>Power supply</td>
<td>110 – 240 V AC, 50-60 Hz</td>
</tr>
<tr>
<td>Electrical safety</td>
<td>Meets EC, EN 61010.</td>
</tr>
<tr>
<td>EMC</td>
<td>Meets EC, EN 50081-2 and EN 50082-2</td>
</tr>
<tr>
<td>Permitted</td>
<td>Operating: 10 – 40 °C. Storage: 10 – 50 °C</td>
</tr>
<tr>
<td>Permissible</td>
<td>Relative humidity: 90 % max.</td>
</tr>
<tr>
<td>Enclosure</td>
<td>ABS and enamelled steel</td>
</tr>
<tr>
<td>Physical parameters</td>
<td>Weight: 4 kg approx.</td>
</tr>
<tr>
<td></td>
<td>Dimensions: 130 x 160 x 300mm</td>
</tr>
</tbody>
</table>

### Technical Specifications

- Transformer Oil Purification and Reprocessing Equipment:
  -  Insulating Oil Reprocessing
  -  Filtering and Regeneration equipment

- SF6 Gas Servicing Equipment:
  -  Reprocessing
  -  Filtering and Refilling equipment

- SF6 Training:
  - Our staff are certified in accordance to EC 305/2008.

- Seminar and Training programmes:
  - Delivered to improve knowledge of the most up to date technologies for ESI asset protection plus competency assessment, training and certification.

### What we offer:

- Transformer Oil Purification and Reprocessing Equipment:
  - Reconditioning, Recycling and Implementation equipment.

- SF6 Gas Servicing Equipment:
  - Reprocessing
  - Reconditioning and Recycling equipment

- SF6 Training:
  - Our staff are certified in accordance to EC 305/2008.

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  - Delivered to improve knowledge of the most up to date technologies for ESI asset protection plus competency assessment, training and certification.
onsite hv ag offers a wide range of products in the categories of Cable Testing and Diagnostics, Coil and Winding Insulation Diagnostics, and Transformer Diagnostics. The onsite hv group consists of several companies located in Switzerland: onsite hv solutions ag in Luzern, is an international organization of independent companies with a team of highly qualified specialists, providing knowledge of modern on-site solutions to distribution and transmission utilities. onsite hv international ag, is a distributor for innovative test and diagnostic tools to the Electrical Energy Industry and is a reliable partner for utilities, power suppliers and grid operators as well as producers of equipment for electrical grids.

Power cable testing and diagnosis
Cable Testing and Diagnosis is an effective way to ensure the quality of a new or existing underground power cable system. This can be critical for underground applications and networks in mining and environmental protection, applicable for medium and high voltage power cables.

Winding and coil insulation diagnostics
Oil and Winding Insulation of electrical machines can be tested and diagnosed with our insulation test measurement systems.

Transformer diagnostics
Condition diagnosis of on-load tap changes in power transformers with dedicated dynamic resistance measurement system.

Enervac Corporation of Canada
World leader in the manufacture and development of processing and recovery systems for insulating Oil and SF6 Gas. Enervac’s range of high performance filtration and reprocessing equipment extends the life of the remaining fluid or SF6 with transformers, circuit breakers, or switchgear, removing contaminants including Carbon Black, Sulfur, Particulates and Breakdown products which enable the user to re-use the equipment rather than replacing it new or for SF6, the environmental challenge of dealing with the associated waste management costs. Enervac’s unique “corrosive sulphur” removal system for Transformer oils is widely regarded as the leading technology in the oil analysis field.

Sulfur hexafluoride (SF6) is an excellent gaseous dielectric for high voltage power applications. It has been used extensively in high voltage circuit breakers and other switchgear employed by the power industry. Applications for SF6 include gas-insulated transmission lines and gas insulated power distribution substations. The combined electrical, physical, chemical and thermal properties offer many advantages when used in power switchgear. Some of the outstanding properties of SF6 which make it so interesting in power applications desirable are:

- high dielectric strength
- unique arc-quenching ability
- good thermal conductivity

However advantageous the above properties are, Sulfur Hexafluoride is considered a fully fluorinated compound (FFC). Since FFC’s have atmospheric lifetimes of up to 50,000 years, these potent greenhouse gases could substantially and, essentially, permanently to global warming if emissions continue to grow, for example. Let’s compare the global warming potential of CO2 and SF6. CO2 has a global warming potential of 1, whereas SF6 has a global warming potential of 24,000. Also, over the past year or so, the price of some SF6 gas has increased significantly. Due to the above reasons, SF6 is used mostly in applications that allow reclamation as opposed to using it on equipment that requires release of the gas, only to be re-filled with virgin SF6. ENERVAC produces a complete line of SF6 recovery and test equipment, from full sized gas reclaimers down to small decomposition detectors.

Enervac Corporation of Canada
World leader in the manufacture and development of processing and recovery systems for Insulating Oils and SF6 Gas. Enervac’s range of high performance filtration and reprocessing equipment extends the life of the remaining fluid or SF6 with transformers, circuit breakers, or switchgear, removing contaminants including Carbon Black, Sulfur, Particulates and Breakdown products which enable the user to re-use the equipment rather than replacing it new or for SF6, the environmental challenge of dealing with the associated waste management costs. Enervac’s unique “corrosive sulphur” removal system for Transformer oils is widely regarded as the leading technology in the oil analysis field.

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Service, Support, Repair and Recalibration

EMT deliver the very best instruments available on the market backed by the strongest support team in the industry.

Consulting, Seminars & Training

Having a high profile within the power delivery community has been instrumental to our positioning as a global market leader.

Training and Demonstrations

EMT invite all Utilities Maintenance Personnel to attend a 1 Day Oil and SF6 seminar. Please contact us to discuss your preferences.

All courses can be tailored to individual requirements.

AGENDA: (Please tick your preferences)

☐ SF6 Analysis and Topping Up Systems
☐ Advances in Transformer Oil Regeneration
☐ Moisture & Acidity Measurement Technologies
☐ SF6, Zerowaste and Smartfill EMT Products

 training invitation

1 Day Oil and SF6 Seminars for Electricity Maintenance Personnel!

With over 40 years experience delivering high voltage acceptance testing of electrical high voltage apparatus. Their unique design approach has resulted in the development of highly regarded measuring instruments which have set new standards in the electrical testing industry.

MEETING THE NEEDS OF THE POWER DELIVERY INDUSTRY

In critical mechanical and electrical equipment. Turn-key Monitoring (CBM), Quality Control and Leak Detection, for Non Destructive Testing (NDT), Condition Based Technology and Predictive Maintenance Solutions designs and manufactures Ultrasonic Systems, Inc.

Ultrasonic Leak Detection

Ultrasonic Leak-Detection

CTRL Systems designs and manufactures Ultrasonic Technology and Non-Destructive Maintenance Solutions, for Non-Destructive Testing (NDT), Condition-Based Monitoring (CBM), quality control and leak detection, in critical mechanical and electrical equipment. Turn-key implementation includes training, analysis software, data capture, and the system.

Raytech

Raytech GmbH has developed and produced mobile measuring instruments with Laboratory precision for the electrical testing industry, used for maintenance and acceptance testing of equipment. Highly regarded measuring instruments which have set new standards in the electrical testing industry.

Raytech HV Testing Equipment

Raytech GmbH

Raytech Ltd has established itself as one of the world’s leading civilian thermal imaging system manufacturers for a wide range of industries, commercial and governmental applications including predictive maintenance, non-destructive testing, research and development, temperature measurement and thermal testing.

Ultrasonic Leak-Detection

CTRL Systems, Inc. designs and manufactures Ultrasonic Technology and Predictive Maintenance Solutions; for Non-Destructive Testing (NDT), Condition-Based Monitoring (CBM), quality control and leak detection, in critical mechanical and electrical equipment. Turn-key implementation includes training, analysis software, data capture, and the system.

Thermal Imaging Systems

Guangzhou SAT Infrared Technology Co. Ltd (SATIR) is one of the world’s leading civilian thermal imaging system manufacturers for a wide range of industries, commercial and governmental applications including predictive maintenance, non-destructive testing, research and development, temperature measurement and thermal testing.

Thermal Imaging Systems