

973-SF₆ Analyzer

Laboratory Precision - Field Ready



- ▶ SF₆ gas specific analyzer
- ▶ Measurement of humidity: Dew/Frost Point, ppm_v and ppm_w
- ▶ SF₆ purity: %Vol. SF₆
- ▶ Optional SO₂ measurement: ppm_v concentration
- ▶ Gas containment system with automatic pump back; No gas loss
- ▶ Fundamental measuring principle
- ▶ Dew/Frost Point results at SF₆ compartment or standard pressure
- ▶ Full color touch screen user interface
- ▶ User verifiable calibration
- ▶ Simple to set up, use and maintain
- ▶ Easily transportable
- ▶ Supplied complete with robust transport case

Protect Your SF₆ Equipment

Prevent costly repairs

Sulfur-hexafluoride (SF₆) is used as a dielectric in high power Gas Insulated Equipment (GIE) such as breakers, switches, transformers and transmission lines. SF₆ is normally a highly stable, non-reactive gas, even in the presence of high energy discharge such as the make or break of a switch. While SF₆ alone is the preferred gas within the GIE, water vapor (H₂O) always finds its way in through permeation and by desorption from the GIE's internal components. While water vapor and SF₆ are normally non-reactive with each other, in the presence of a high energy discharge, hydrogen and oxygen of the water vapor may react with the sulfur and fluorine of the SF₆ to create hydrofluoric acid (HF), sulfuric acid (H₂SO₄) and sulfur dioxide (SO₂), compounds corrosive to the internal workings of the GIE. Since SF₆ with low water vapor content (low humidity) significantly reduces the potential for creation of these corrosive compounds, the RH Systems 973-SF₆ gas analyzer is a critical component to any GIE preventative maintenance program.

Total Solution for SF₆ Measurement

One instrument for all your SF₆ measurements

The 973-SF₆ is an advanced analyzer for measurement of humidity, purity, compartment pressure and SO₂ concentration (optional) in SF₆ gas insulated equipment. With its internal gas containment/recovery system, the 973-SF₆ provides the best measurement solution available within a single instrument.



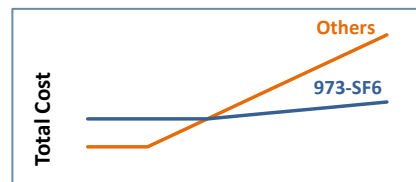
Chilled Mirror Technology

Based on physics for reliable measurement

A polished mirror surface is cooled to the point at which condensation forms on the mirror surface. The temperature is then measured. Since this condensation temperature is specific to water vapor concentration, highly precise results are achieved without the use of humidity sensors. Chilled mirror technology makes the 973-SF₆ the most accurate and reliable humidity measuring instrument in the industry.

Lower Cost of Ownership

No drift means less frequent calibration



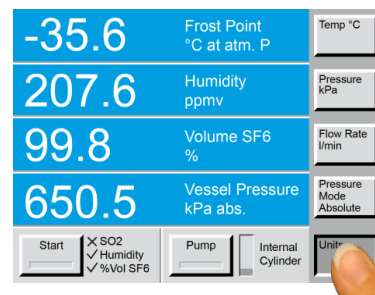
Unlike capacitive sensor-based systems that rapidly

and continually drift far out of specification, the 973-SF₆ chilled mirror technology relies on the drift-free physical principles of condensation. While sensor-based systems may have a lower initial acquisition cost, their ongoing costs for humidity sensor replacement, recalibration, and the lower reliability of their measurements, make the 973-SF₆ the most cost effective option.

Intuitive User Interface

Easy to use in the field

With the intuitive, interactive display, measurement results are clearly presented on the full color

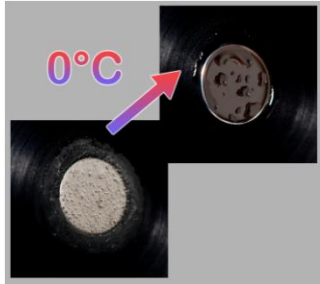


touch screen in the units of choice and held on the display for user notation. Results can easily be transferred directly to Microsoft Excel using the supplied software and cable. The 973-SF₆ data is compatible with all standard procedures issued by manufacturers and standards organizations including CIGRE and IEC.

User Verifiable Calibration

Be confident in your measurement

Field check the 973-SF₆ calibration at any time using the built-in Ice Test function. For this automatic test, the mirror cools to below 0°C, causing water vapor from the air to condense and freeze on the mirror surface. The mirror then begins to warm just above 0°C. While observing the mirror, simply press the on-screen button to



indicate the precise moment at which the ice melts. The 973-SF₆ measures the actual mirror temperature at that very moment and provides a pass/fail indication.

Easy to Maintain

Minimal training, field serviceable

Maintenance is limited to only occasional mirror cleaning and physical inspection of gas hoses. Automated tests for measurement integrity, pumping capability, and leaks allow the system to be easily verified in the field.



Containment System with Pump Back

Environmentally friendly, zero-loss system

The 973-SF₆ includes an integrated gas collection cylinder, allowing all measurements to be made with zero loss of SF₆ gas.

During measurement, the 973-SF₆ pumps the sample gas from the GIE, through the measuring head and into the internal storage cylinder. When finished, the gas is automatically pumped back into the original gas compartment. Optionally, it may be held within the 973-SF₆ for later pump back into a waste cylinder.

The 973-SF₆ incorporates a completely sealed, high-pressure pump and gas path for precise, zero-emission measurements.

SO₂ Concentration

An additional health check for your GIE



As an option, the 973-SF₆ is now available with integrated, industry standard chemical-based SO₂ measurement – another indicator of potential problems within gas-insulated equipment. The measurement cell is conveniently located on the rear panel for easy user replacement when needed (about every two years). Low cost, pre-calibrated, interchangeable modules make this swap-out a simple, two minute field operation.

Robust and Transportable

Made especially for field use

Highly compact, the 973-SF₆ is supplied complete with a robust, shock-resistant case for use on site and for



transportation. Sample lines and the most common DN8 and DN20 fittings are included. Alternative fittings are available to suit almost any SF₆ installation.

Laboratory Precision! Field Ready!

The 973-SF₆ is the gas analyzer of choice for all the major switch-gear manufacturers thanks to its precision, repeatability and long term stability.

Measuring range:			
Frost/Dew Point	-50...+20 °C		
Humidity content by volume	40...20'000 ppm _v		
Humidity content by weight	5...2'500 ppm _w		
Volume SF ₆	80...100%		
Inlet pressure	100...1'000 kPa abs.		
Accuracy:			
Frost/Dew Point	± 0.5 °C		
ppm _v / ppm _w	± 1 ppm +6% of reading		
Volume SF ₆	± 0.5%		
Pressure	± 3 kPa		
Standard Features:			
Digital I/O	RS-232		
Thermoelectric mirror cooling	3-stage		
Mirror temperature sensor	RTD (Pt-100)		
LCD display with touch screen	5.7"		
Internal gas tubes	Stainless Steel 316L / FEP		
Gas connections	Quick connect fitting (Swagelok® QM Series)		
Couplings	Dilo DN8 (VK/F-02/8) and DN20 (VK/F-02/20)		
External sample gas tube	6 m stainless steel armored PTFE tubing		
ORIS	Optimum Response Injection System		
Transport Case	Custom fit foam lined Peli 1620		
Power Cable	2.5 m		
Operating instructions	English, French or German		
Calibration certificate	Pressure calibration, 2-point dew/frost point, 3-point volume %SF ₆		
Optional:			
Internal SO ₂ -Module	Range:	0...100 ppm _v	or 0...500 ppm _v
	Linearity:	< 2% of range	< 2% of range
	Sensitivity drift:	< 4% / year	< 2% / month
	Response time:	< 30 s (0 to 20 ppm _v)	T ₉₀ < 20s
Additional Information:			
Supply voltage	100-120 VAC / 200-240 VAC, 50/60 Hz (auto switching)		
Supply voltage fluctuations	up to ± 10% of nominal voltage / Overvoltage category II		
	Rated pollution degree 2		
Power consumption	200 Watt		
Pump back pressure max.	900 kPa		
Cooling	Air		
Operation Temperature	-10 °C...+40 °C		
Storage Temperature	-20 °C...+50 °C		
Humidity	Maximum relative humidity 98% RH, non-condensing		
Outdoor use	Permissible, instrument must be protected against exposure to water.		
Altitude	Up to 2'000 m		
Weights & Dimensions:			
	Instrument	with Transport Case	
Width	420 mm	650 mm	
Height	155 mm	370 mm	
Depth	390 mm	510 mm	
Weight	16.5 kg	32 kg	

We reserve the right to change design or technical data without notice.