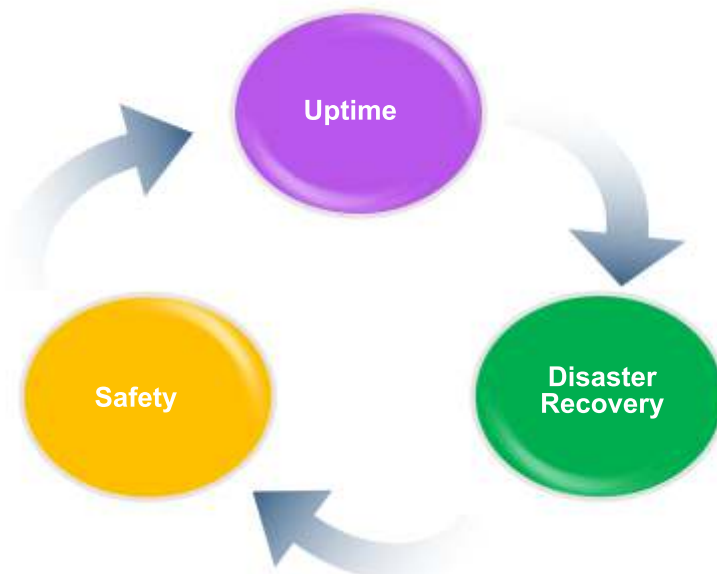


GIM

GAS INSULATION MONITOR

(GIM-630 / GIM-450)



GIM-630 (GAS INSULATION MONITOR)

Sf6 gases are widely used gases for GIS substation and the AIS substation circuit breakers. It is one of the best insulation mediums for the circuit breakers. But by using the Sf6 we have to maintain some of the quality and the safety protocols for the smooth operation of the Circuit breakers. Without maintain that we can face below problems

- **SF6 Purity Issue:-**

SF6 gas plays a key role in switchgears and the percentage of gas purity has a direct effect on the switching. Commercially, SF6 is supplied in pressurized bottles or liquid tanks. The gas of these bottles has a minimum degree of purity of 99.9% and may possess the following impurities according to IEC 60376:

- Carbon tetra fluoride (CF4) <0.03%
- Oxygen + nitrogen (air) <0.03%
- Trace water
- CO2 trace

The arc generated at time of the contactor operation the sf6 atom is divide in Sulphur and fluoride. If the oxygen is mixed with Sulphur, it creates SO2, hydrogen combine with Fluoride create HF. That is critical situation. The purity analysis of gas is vey important so that we ensure the quality of gas .

- **Equipment Failure:-**

A leak in gas-insulated equipment means there is less gas to protect it from the effects of electrical arcs. The results are lost signals, short circuits, malfunctions, and, ultimately, equipment failure that compromise safety and operations. Even a 10% gas loss can permanently damage insulators, shields, arcing contacts, and main contacts.

With equipment failure comes repairs and replacements, expensive in terms of both time and money. There could also be property damage, such as fires, and extended power outages resulting from poorly insulated equipment — potentially a public relations nightmare.

Leaks also allow moisture to enter gas-insulated equipment. This is a major problem as the presence of water not only decreases insulation, but also combines with SF6 gas to create toxic byproducts that corrode metal and create more leaks

- **EHS (Empolyee Health and safety):-**

SF6 is nontoxic and poses no direct risks to people or animals. It fact, this gas is used in medical diagnostics. However, due to its heavier weight, escaped SF6 can settle in low-lying areas and displace the oxygen there. This can cause respiratory problems in personnel working in trenches and pits, especially when breathed in large quantities.

- **Green House Effect**

Carbon dioxide is the most abundant greenhouse gas (GHG), but it doesn't come close to SF6 in terms of potency. This fluorinated gas can last in the atmosphere for 3,200 years before it is broken down by UV rays, and is 22,800 times more effective than CO2 at trapping infrared radiation in the atmosphere, according to the Environmental Protection Agency. In fact, SF6 has the highest Global Warming Potential (GWP) of any known gases.

Taurus came up with solution package which can avoid all the above problem and give the complete solution for the sf6 gases. GIM (Gas Insulation Monitor):

GIM package consist of below unique parts

1. 6100 SF6 Gas analyser
2. SF6 Gas Recovery & Transfer units with inline filtration
3. SF6 Gas Leak Detector

1. SF6 Gas Analyser 6100:

The Rapidox SF6 6100 Pump Back is a fully-automatic zero-emissions SF6 gas analyser, designed for controlling and monitoring the quality and purity of gas used in high voltage switchgear, circuit breakers and transformers. Exceptional accuracy and stability are provided when measuring the purity of SF6 gas, through specially selected sensors. The modular configuration allows for up to eight compatible gases to be analysed, simultaneously, using one analyser. The Rapidox is fully compatible with mixtures of SF6 CF4, N2 and air, together with toxic contamination gases such as SO2, HF, H2S and CO. The unit also measures the water content of the gas in dewpoint or ppm to ensure dryness is acceptable.



2. SF6 Gas Recovery & Transfer units with inline filtration

The Greenhouse warming potential of SF6 is very high. During its use, it is very essential to limit its emissions in the atmosphere. Here with introducing SF6 Handling Unit SFX to serve / handle large quantity of SF6 Gas. This SFX Unit is equipped with Recovery Unit and 70Ltr/150Ltr/300 Ltr 35/50 Bar. Cylindrical Storage Tank. Complete unit is assembled on 8" Heavy Duty Wheel base Cart for easy operation in Substation area. This includes initial recovery, evacuation, and refilling or transfer of residual gas in empty Cylinder.



3. SF6 Gas Leak Detector:-

The revolutionary new "Generation X" line of TIF refrigerant leak detectors brings you tomorrow's technology today. We not only changed the way our leak detectors look, but the way to look at leak detectors. Innovative MPC circuitry and Advanced Digital Signal Processing monitor the sensing tip up to 2000 times per second. Automatic reset, true mechanical pump, and visual indicators (TIF XP-1 and TIF RX-1) speed and simplify leak searches. A completely re-designed sensing tip increases sensitivity, improves reliability, and lasts twice as long as its predecessor. This results in fewer comebacks, less hassle, and lower maintenance costs. We are so confident in the design and quality of these detectors.



The detail product catalogue as below.

SF6 6100 PUMP BACK

The Rapidox SF6 6100 Pump Back is a fully-automatic zero-emissions SF6 gas analyser, designed for controlling and monitoring the quality and purity of gas used in high voltage switchgear, circuit breakers and transformers.



Exceptional accuracy and stability are provided when measuring the purity of SF6 gas, through specially selected sensors. The modular configuration allows for up to eight compatible gases to be analysed, simultaneously, using one analyser. The Rapidox is fully compatible with mixtures of SF6 CF4, N2 and air, together with toxic contamination gases such as SO2, HF, H2S and CO. The unit also measures the water content of the gas in dewpoint or ppm to ensure dryness is acceptable.

The Rapidox SF6 6100 is housed neatly into a tough Peli transport case supplied with special tongue and groove self sealing couplings, which are compatible with famous brands. Once powered and connected, the Rapidox automatically removes a small quantity of gas from the electrical equipment, controlled with an auto gas pressure sensing function. A vacuum purge cycle and internal gas storage system ensures that no air can contaminate the gas sample and that no SF6 gas is able to escape during the testing period.



All measured gases are analysed and data-logged simultaneously with only a few minutes required to achieve a stable reading. A powerful 35 bar compressor, with a separate lithium battery power supply, then returns the gas to the electrical equipment at high pressure. Results are displayed on screen and printed using the inbuilt thermal printer. The Rapidox has multiple safety features built in to ensure the cycle is completed correctly without gas loss or cross contamination.

The analyser is pre-programmed with all current IEC and CIGRE test configurations, with the ability to create customised test parameters.

Though highly configurable to suit individual customer requirements, the Rapidox SF6 6100 Pump Back has a number of standard features to enhance

- Modular sensor choice
- 7" full-colour touchscreen
- Vacuum line purge
- Walk away timer
- Auto abort function
- Auto clean function
- Fully automatic testing and data logging
- Gas cylinder testing mode
- Multi language
- Vehicle charger
- Inbuilt CIGRE & IEC Tests

SF6 Gas

SF6 is an extremely stable, non-flammable and highly electronegative gas with excellent dielectric properties. It is commonly used in medium and high-voltage electrical equipment as an electrical insulator, arc-quenching and cooling medium.

However, SF6 is classified as a greenhouse gas and must be kept within a closed circuit to avoid any deliberate release into the atmosphere. The international Kyoto agreement protocol has mandated reductions to harmful emissions amongst its member states.

For the power transmission and distribution network, SF6 technology remains essential. To protect personnel, equipment and the environment regular SF6 analysis should be adopted within the maintenance schedule. The early identification of any decomposition products and moisture within the SF6 gas will help avoid unnecessary shutdowns,

Accessories



1



2



3

- 1 Calibration Kit and Service
- 2 Gas Recovery Bag
- 3 Tongue and Groove Self Sealing Couplings

SF6 GAS RECOVERY & TRANSFER UNITS WITH INLINE FILTRATION MODEL : SFX - 12 C T 300



Key Features:

1. 100 % Oil Less Compression
2. SF6 Gas Recovery Up to Desired Vacuum Level (< 50 mbar).
3. Inline Separate Standalone Filter.
4. Recovery of SF6 Gas direct to Auxiliary Empty Cylinder up to 50Bar.

The Greenhouse warming potential of SF6 is very high. During its use, it is very essential to limit its emissions in the atmosphere.

Herewith introducing SF6 Handling Unit SFX to serve / handle large quantity of SF6 Gas.

This SFX Unit is equipped with Recovery Unit and 50Ltr/70Ltr/150Ltr/300Ltr, 35/50Bar Cylindrical Storage Tank.

Complete unit is assembled on 8" Heavy Duty Wheel base Cart for easy operation in Substation area.

This includes initial recovery, evacuation, and refilling or transfer of residual gas in empty cylinder.

REFRIGERANT LEAK DETECTORS



TIFXP-1A

TIFXP-1A Leak Detectors

The revolutionary new “Generation X” line of TIF refrigerant leak detectors brings you tomorrow’s technology today. We not only changed the way our leak detectors look, but the way to look at leak detectors. Innovative MPC circuitry and Advanced Digital Signal Processing monitor the sensing tip up to 2000 times per second. Automatic reset, true mechanical pump, and visual indicators (TIF XP-1 and TIF RX-1) speed and simplify leak searches.

A completely re-designed sensing tip increases sensitivity, improves reliability, and lasts twice as long as its predecessor. This results in fewer comebacks, less hassle, and lower maintenance costs. We are so confident in the design and quality of these detectors.

- Microprocessor controlled circuit with Advanced Digital Signal Processing.
- Detects SF6 & ALL halo genated refrigerants.
- Certified to SAE J1627.
- Variable frequency audible alarm.
- CE approval.
- UL classified.
- Constant power indication.
- Cordless and portable; operates on two C-cell batteries.
- 14" (35.5 cm) flexible stainless steel probe with liner.
- Carrying case included, optional holster.
- Optional reference leak source.

TIFXP-1A

- Tri-color, six-segment visual leak size indicator displays 18 alarm levels.
- Seven levels of sensitivity adjustment provide an increase of up to 64x.
- Battery test function with true voltage indication.
- Mute feature silences audible alarm.
- True mechanical pump provides positive airflow through sensing tip.
- One touch reset.
- Tactile keypad controls.
- Three-year warranty.

Replacement Parts (all models)

TIFXP-2 – Maintenance kit (3 tips, 3 protectors).

TIFXP-5A – Battery cover.

SPECIFICATION OF GIM

PART NO. SF6 6100 PUMP BACK SPECIFICATION

Specification	
Ambient Operating Conditions	-10°C to +55°C, 10-90% RH, 800-1100mbara
Warm-up Time	3-4 minutes at 20°C
Voltage (Charging)	90-260 VAC, 50/60Hz
Battery Life	Up to 8 hours. 4-6 hour charge
Sample Connections	Special tongue and groove self sealing couplings (compatible with famous brands)
Data Outputs	Excel compatible data via USB memory stick
Data Storage	4GB internal data storage allowing for approximately 1 year of continuous monitoring
Compressor	Up to 35 Bar with up to 25 cycles per battery charge
Measurement Time	8 minutes
Pressure Range	0.5-35 Bar; displayed on screen
Gas Flow Rate	0.5l.min ⁻¹
Max Inlet Pressure	35 Bar gauge
Display	7" (180mm) full-colour LCD touch screen interface with soft menu keys
Printer	Integrated thermal printer allows output of results on demand
Analyser Dimensions	270mm(H) x 560mm(W) x 450mm(D)
Weight	21kg (total instrument and case)

The modular configuration allows for up to eight compatible gases to be analysed simultaneously with one analyser.

SENSOR		ACCURACY		LIFE	SENSOR TYPE
SF₆ Sulphur Hexafluoride	0-100%	±0.5% accuracy	Every 12 months	> 5 years	Infrared (IR)
H₂O Dew Point	-60°C to ±20°C dp @ Patm (10 - 24,000ppmV) Reading is corrected to either RT or 20°C	±2°C dp of reading	Every 12 months by Sensor Exchange	2-3 years	Polymer
SO₂ Sulphur Dioxide	0-100ppm OR 0-500ppm	±2% full-scale	Every 12 months	2-3 years	Electrochemical
HF Hydrogen Fluoride	0-30ppm	±2% full-scale	Every 12 months (Using HCl gas)	2-3 years	Electrochemical
Cf₄* Tetrafluoromethane	0-80%	±1% of full reading	N/A	N/A	(measured by balance of SF ₆ + Air reading)
H₂S Hydrogen Sulphide	0-100ppm	2% full-scale	Every 12 months	2-3 years	Electrochemical
CO Carbon Monoxide	0-1,000ppm	2% full-scale	Every 12 months	2-3 years	Electrochemical
Air / N₂ Nitrogen	0-100%	full-scale based on oxygen component	Every 12 months	2-3 years	Electrochemical O ₂ scaled to read as Air or Nitrogen

*** For analysers containing a CF₄ sensor, the measurement of Air is also a requirement. All sensor replacements to be carried out by Cambridge Sensotec or approved repair agents.**

PART NO. SF6 GAS RECOVERY & TRANSFER UNITS WITH INLINE FILTRATION SPECIFICATION (SFX)

APPLICATION

SFX Unit has facility for

Recovery of SF6 Gas from Compartment and store directly to SF6 Gas Storage Tank or Cylinder with inline filtration. No SF6 emission to atmosphere.

1. Evacuation of Air & Moisture till 0 mbar Abs (-1 bar) Vacuum from Compartment prior to filling of Sf6.
2. Filling/Charging of SF6 to compartment with précised pressure control.
3. One can use 99.5 % Gas from Cylinder - No Left Over Gas in Cylinder.
4. SF6 Gas Cylinder Consolidation.

SPECIFICATION & FEATURES

- The Unit has mainly two compartment one recovery unit and the second is storage tank.
- Complete unit is MS Fabricated with powder coated finish for long lasting rust proof performance.
- 440 V, 50 Hz 3 Phase supply with permanent 5 meter be detachable power cord.
- Separate Electrical Panel with standard power and control gears. Front mounted process selection switches and indication.
- A 100% Oil Less Direct Drive 12m³/hr Compressor having compression capacity in both stage i.e. in liquid and vapour up to 50 Bar.(optional compressor of 5.8 m³/hr & 15 m³/hr available).
- Direct Drive Vacuum Compressor of capacity 5.8m³/hr.
- Inbuilt 40m³/hr Direct Drive Vacuum pump – allows vacuum up to 0 mbar Abs (-1 bar). Vacuum pump motor 2 HP, 1500 rpm, TEFC motor.(optional Vacuum pump of 60 m³/hr & 100 m³/hr available)
- Vacuum pump is equipped with anti-suck back valve to prevent reverse flow of oil towards compartment in case of power failure.
- Separate Digital Absolute indicator with range of 0 to 700 mbar for Vacuum level measurement and hold function.
- Specially designed SF6 Refrigerated Condenser to aid in liquefaction.
- Particle Filter – 1 Micron Fiber Media with replaceable cartridge.
- Drier Filter – Sealed Molecular sieve filter to remove moisture and arcing by products.
- Permeation resistant hoses: 5 meter long complete with Quick Release Coupling DN20 at one end and other end suitable to DN20 type SF6 Connectors.
- Digital Pressure Indicator for Recovery, Storage and Vacuum process.
- Separate Isolation Valve and Easy to read 4" Pressure indicator on Storage Tank and DN20 pipe lines ; High pressure auto reset safety pressure release valve.
- Mounted on 8" rubber wheel with steerable trolley - provides efficient mobility in switchyard area.
- Recovery Unit Chases - Totally Enclosed Fan Cooled system makes possible to work at ambient of 45 °C.
- All Internal pipeline of Copper and Brass Fittings, with Non Return Valve to prevent back flow.

OPTIONAL FEATURES

- Vacuum Pump with high capacity (40m³/hr ; 100m³/hr) for faster evacuation.
- On Board Storage tank of 50Ltr/300 Ltr (300Ltr optional) ; 600 Ltr for easy operation.
- Weigh scale for accurate measurement during recovery and refilling.
- Fully automatic operation with PLC touch based control and monitoring.
- Stainless Steel fitting and piping for robust corrosion free equipment.



PART NO. REFRIGERANT LEAK DETECTORS SPECIFICATION (TIF XP-1/RX-1)

Power Source	3V DC; 2 "C" cell alkaline batteries
Ultimate Sensitivity	TIFXL-1A - Less than 0.4 oz./yr. (11g/yr.) TIFRX-1A - Less than 0.25 oz./yr. (7g/yr.) TIFXP-1A - Less than 0.1 oz./yr. (3 g/yr.)
Sensing Tip Life	Approx. 20 hours
Operating Range	30° to 125° F (0° to 52° C)
Battery Life	TIFRX-1A and TIFXP-1A – Approx. 30 hrs. TIFXL-1A – Approx. 40 hrs.
Duty Cycle	Continuous
Response Time	Instantaneous
Reset Time	One second
Warm-up Time	Approx. 2 seconds
Unit Weight	1.2 lbs. (560 grams)
Unit Dimensions	9" x 2.25" x 2.25" (22.9 cm x 5.7 cm x 5.7 cm)
Fixed Probe Length	14" (35.5 cm)

Acknowledgement

1. Cambridge Sensotec - SF6 Analyser
2. Mechfield - SF6 Gas Recovery & Transfer Units With Inline Filtration
3. TIF - SF6 Leak Detector



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