HYBRID GAS DENSITY MONITOR

Mechanical combined with electronic SF₆ gas monitoring

 Combined technology: local switching / read-out and remote signal
 Continuous analog signal
 Ready for SF₆ gas management trending systems
 Very compact all-in-one device
 Maintenance-free



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Hybrid Gas Density Monitor 878X

The Hybrid Gas Density Monitor combines the advantages of the proven mechanical monitor based on the superior reference chamber with the unique electronic gas density sensor. The combined technology has local switches / read-out and allows remote surveillance and trend analysis. The very compact all-in-one-device with a single pressure port operates reliable and maintenance-free under harsh conditions indoors and outdoors. It is accurate over a wide range of temperature and altitude.



Operating principle of the reference chamber

The gas density of SF_6 compartments is compared via a bellows system with the gas density in a reference gas chamber in the monitor. If the density of the gas alters, the bellows system actuates one or more micro switches. If the gas temperature and therefore its pressure changes, the same pressure difference occurs also in the reference

chamber. No false alarm is triggered due to temperature-induced pressure changes. Up to three galvanically isolated micro switches actuate different alarm signals. An optional SF₆ indicator provides visual inspection of the SF₆ gas density as gas pressure at 20 °C (see graph below).

SF₆ tank side
metal bellow
reference gas
switching rod
micro switch
display



Graphic: The density monitors are filled at works to the customer's density specification (variant with three micro switches is shown).



Graphic: Lines representing constant SF6 gas density (isochores): Changes in pressure and temperature with constant volume.

Operating principle of the electronic gas density sensor

The constant resonant frequency of a quartz oscillator under vacuum is compared with the resonant frequency of an identical quartz situated in the sample gas. The difference in the resonant frequency is proportional to the density of the sample gas. This difference is processed into an analogue output signal.



Functional diagram: Analogue signal output



SF₆ gas pressure at 20 °C



Finit element stress analysis of an oscillation tuning fork



Electrical connections and wiring diagram



Up to three galvanically isolated micro switches actuate different alarm signals.



Technical data	
Principle	Reference gas measurement and oscillating quartz measurement
Material Measurement system	Sensor: 1.4435, 1.4404, 1.4471, (AISI316L, AISI316) Sensor housing: 1.4435, 1.4404
Material Pressure connection	1.4435, 1.4404, 1.4471 (AISI316L, AISI316)
Housing	AlSi10Mg
Ambient temperature	-40+80°C
Measuring range	01.1 MPa (mechanical monitoring); 00.85 MPa (electronic monitoring)
Display	SF₀ indicator dial (optional)
Hysteresis	< 15 kPa
Accuracy micro switch	\pm 10 kPa (filling pressure: < 650 kPa)/ \pm 12 kPa (filling pressure: > 1 MPa) at -30 +50 °C
Accuracy of indicator	Within numeralised range ±10 kPa @ 20 °C
Accuracy of sensor	±1.0 % FS typ., ±1.8 % FS max.
Electrical connection	Plugable terminal screw connector 0.2 2.5 mm ²
Ratings of micro switches	AC 250V 10(1.5)A DC 250V 0.1 (0.05)A DC 220V 0.25 (0.2)A DC 110V 0.5 (0.3)A DC 24V 2 (1)A
Sensor supply	1032VDC
Degree of protection	IP65
Service	Check micro switch setpoint after 5 years
Weight	~1.05 kg





For other available pressure connections: See data sheet www.trafag.com/H72502



