Envent Engineering Ltd.

ENVENT MODEL TFSP

Portable Hydrocarbon Composition Analyzers

The TFSP from Envent Engineering Ltd is an all-optical analytical platform using a Precisive® TFS (tunable filter spectroscopy) sensor from MKS Instruments. The TFSP offers GC like speciation at unparalleled speed and requires no carrier gas. The TFSP uses infrared absorption to measure methane, ethane, propane, butanes, pentanes, CO_2 and % level H_2S.

Using a unique wavelength-sweeping tunable filter spectrometer, fast update rates at 1 (one) second intervals are performed for C1-nC6 analysis, $\%CO_2$ and $\%H_2S$ analysis. Recipe: 253 other components available. Sampling is with a flow-through cell, suitable for continuous, online, unattended operation. The analyzer does not require carrier gas, fuel gases, or on-site calibration gas. The standard system configuration provides measurements of up to 100% methane, 25% ethane, 25% propane, 10% butanes and 5% pentanes. Diatomic compounds such as nitrogen, oxygen, and hydrogen are not measured and are combined and reported as inerts. Other ranges and/or additional gases are available. Contact factory for additional info.

Features

- **Fast one second response**
- **No carrier gas required**

- "First principle" measurement
- No periodic calibration required
- No consumable (IR source @ 1.5 years)
- Low power DC operation (AC available)
- No instrument ;air required
- BTU, Wobbe index and density outputs
- Minimal sample conditioning required
- Linear response throughout range
- Pressure and temperature compensated
- No interference's
- Remote & completely unattended operation
- Optional measurement recipes available

Applications

- Natural Gas including Wobbe, BTU
- LNG/LPG/BOG
- Sulfur Plant Feed (Acid Gas)
- Plant Inlet
- Truck/Ship/Rail Car Unloading Terminal
- Portable/Temporary Analysis
- Fuel Gas Monitoring
- Pipeline Blending
- Flare Gas Monitoring

Package Options

TFS-P-SS	General Purpose Portable in Nema 4x enclosure
TFS-P-TC	General Purpose Portable in Transport case

- **GC Performance**
- **No Helium Required**
- **1 Second Response**
- **C1-nC6**
- **$\%CO_2$**
- **$\%H_2S$**
- **BTU and Wobbe**
- **No Calibration Required**

Powered by Precisive® mks

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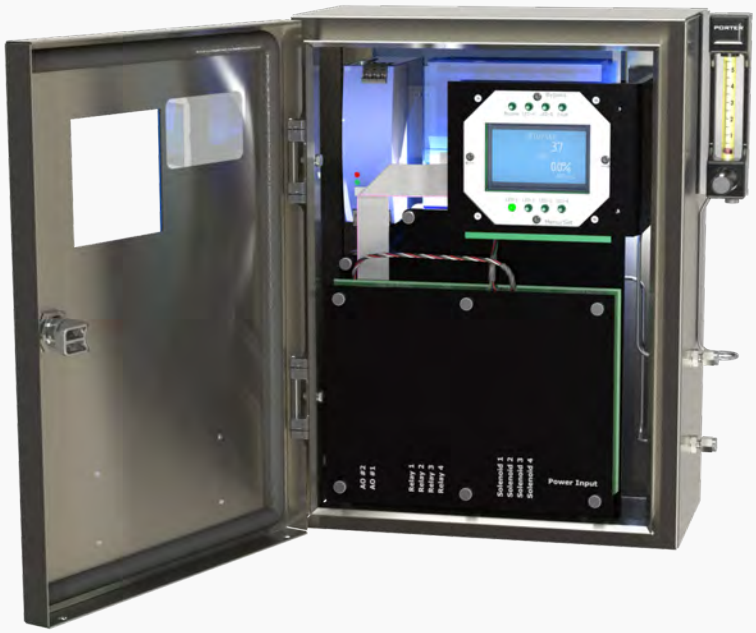
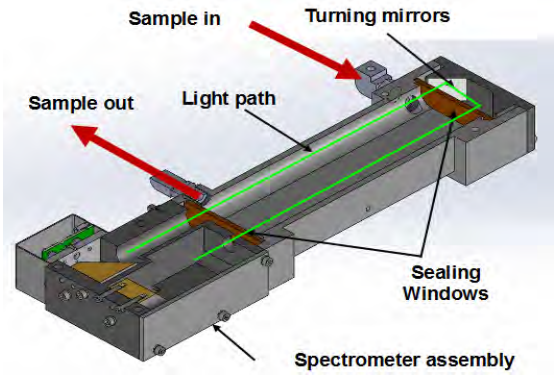


TFSP-SS (Stainless Steel) Handle not Illustrated

TFSP-TC (Transport Case)

SPECIFICATIONS

Measurement Ranges	Methane (CH_4):	0 – 100%
	Ethane (C_2H_6):	0 – 25%
	Propane (C_3H_8):	0 – 25%
	i-Butane (C_4H_{10}):	0 – 10%
	n-Butane (C_4H_{10}) + n-Pentane (C_5H_{12}):	0 – 10%
	i-Pentane (C_5H_{12}):	0 – 5%
	Carbon Dioxide (CO_2):	0 – 100%
	Hydrogen Sulfide (H_2S):	0 - 100%
Component Channels	8 components (consult factory for additional components)	
Accuracy	Methane (80-100%): ± 0.2%, Methane (0 – 80%): ±0.5% Other Hydrocarbons: ± 0.2%, H_2S ± 0.2% or 1% of reading, whichever is greater. CO_2: +/- 0.2%	
Repeatability	0.01% / 0.05% (repeatability based upon 5-second averaging)	
Zero Drift	Less than ±0.2% (absolute) per week (zero on air or N_2)	
Span Calibration	Permanent Factory Calibration (not user component corrections factors can be written to system)	
Update time	1 second – 5 seconds typical, software configurable (longer averaging time improves precision)	
Sampling	Technique: Flow through cell (100 ml internal volume) Flow Rate: 0.1 – 2 LPM (typical) Pressure: 0 – 2 psig (standard) consult factory for higher pressures. Sample Temp: 0 – 50ºC note cell is maintained at 60ºC. Connections: ¼" Swagelok	
Power	24 VDC (Optional 120/240 VAC, 75 peak 35 watts nominal)	
Outputs	2 x 4 to 20 ma Analog, RS-485 Modbus, Fault (dry contact) 128 x 64 Back-lit graphical display with scrolling menu Dual isolated 4-20 ma loop powered analog outputs 4 additional 5 amp SPDT alarm relays 4 solid state solenoid drivers for stream switching 4 dry contact inputs Internal archive storage via Envent HMI "ICE" Platform Modbus serial RS-232 and RS-485	
Electrical	General Area Classification	
Dimensions	TFSP Stainless Steel 50.8 x 30.5 x 20.3 cm 15kg (approx) TFSP Transport Case 59.8 x 36.5 x 27 cm 14kg (approx) TFSP Stainless Steel 20" x 12" x 8" 35 lbs (approx) TFSP Transport Case 23.6" x 14.4 x 10.6" 31 lbs (approx)	



About Precisive® TFS from MKS Instruments

The Precisive TFS is an innovative optical analyzer that provides real-time gas analysis in the natural gas and hydrocarbon processing industries, including refineries, hydrocarbon processing plants, gas-to-power machines, biogas processes and fuel gas transportation and metering, while delivering customers a substantially lower total cost of ownership.

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