TFS1
Hydrocarbon Composition Analyzer

GC Performance
No Helium Required
1 Second Response
C1-(nC4+nC5), iC5
CO2, %H2S
No calibration required

The TFS1 from Envent Engineering Ltd is an all-optical analytical platform using a TFS (tunable filter spectroscopy) sensor developed by Precisive LLC. The TFS1 offers GC like speciation at unparallelled speed and requires no carrier gas. The TFS1 uses infrared absorption to measure methane, ethane, propane, butanes pentanes, carbon dioxide and % level H2S.

Using a unique wavelength-sweeping tunable filter spectrometer, fast update rates at 1 second intervals are performed for C1-C3 plus NC4nC5, and iC5 analysis. Sampling is with a flow-through cell, suitable for continuous, on-line, 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 of this All-Optical Package

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

- "First principle" measurement
- No periodic calibration required
- No consumables (IR source @ 1.5years)
- 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 interferences
- Remote & completely unattended operation

Applications

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

Package Options

- **TFS1 Class 1 Division 1 in an explosion proof enclosure**
- **TFSYP Class 1, Division 1 Y purged Nema 4X enclosure**
- **TFS-2 Class 1, Division 2 Nema 4X enclosure**
- **TFSP General Purpose Portable**

Powered by Precisive

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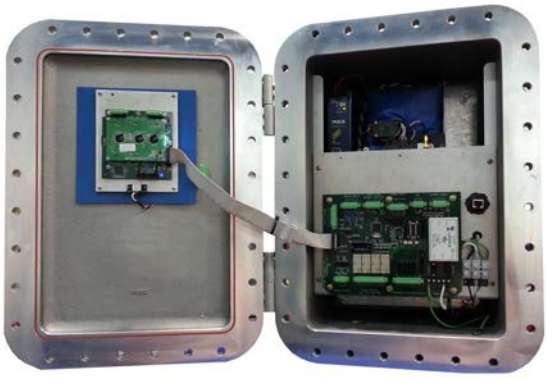
TFS Specifications

Model TFS Typical Measurement Ranges (recipe #253)

Methane (CH4):	0-100%
Ethane (C2H6):	0 – 25%
Propane (C3H8):	0 – 25%
i-Butane (C4H10):	0 – 10%
n-Butane (C4H10): + n-Pentanes (C5H12)	0 – 10%
i-Pentanes	0 – 5%
Carbon Dioxide (CO2):	0 - 100%
Hydrogen Sulfide (H2S)	0 - 100%



TFS-1

Component Channels
8 components (consult factory for additional components)

Accuracy
Methane (80-100%): +/- 0.2%, Methane (0 – 80%): +/- 0.5%
Other hydrocarbons: +/- 0.2%, H2S +/-0 .2% or 1% of reading whichever is greater, CO2 .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 N2)

Span calibration
Permanent Factory Calibration (note user component corrections factors can be written to system)

TFS-YP & TFS-2

Update time
1 second – 5 seconds typical, software configurable
(longer averaging time improves precision)

Sampling
Technique: Flow through cell (100ml internal volume)
Flow rate: 0.1 – 2 LPM (typical)
Pressure: 0 – 2 psig (standard) consult factory for higher pressures
Sample temp: 0 – 60 C note cell is maintained at 60 deg C
Connections: ¼" Swagelok

Power
24 VDC (Optional 120/240 VAC, 75 peak 35 watts nominal)

Outputs
TCP Modbus (standard) no display blind transmitter

Additional Features with Optional Envent Electronic platform
128x64 Backlit 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
Optional analog expander board with 8 additional 4-20 ma analog outputs and 4 relays

TFS-P

Electrical

TFS1	Class I Division 1 groups B,C,D
TFS-YP	Class I Division 1 groups B,C,D with Y purge
TFS-2	Class I Division 2 groups B,C,D
TFS-P	General Purpose

Dimensions and Weight

TFS1	24"H X 18"W X 12"D	135 lbs (approx)
TFS-YP	24"H x 16"W X 6"D	60 lbs (approx)
TFS2	24"H x 16"W X 6"D	60 lbs (approx)
TFS P	20"H x 12"W X ^"D	35 lbs (approx)

About Precisive LLC
Precisive is dedicated to bringing lab-accurate analysis to the point of need in a variety of natural & Biogas pipeline quality, process reaction, and emissions monitoring applications. Founded in 2007, Precisive is headquartered in greater Boston MA, USA. www.precisive-instruments.com

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