WESTERN RESEARCH®

# Model 931 Single-Gas Analyzer

## Benefits

- No-moving-parts design
- Optional detectors available (IR or thermal conductivity)
- Sample return to process (with HAG probe option)
- Minimal sample conditioning
- Dual-bean, dual-wavelength design
- Class I, Division 1 and ATEX II 2 G Hazardous Area Rating

## The Need

The Model 931 is a rugged, single-component photometric gas analyzer housed in an explosion-proof package designed for a variety of gas monitoring and process control applications. Whether it's reliable high concentration $H_2S$ analysis for feed-forward control of modern SRU plants, monitoring of sour gas pipelines, or process control of SRU tail gas treating plants, this single gas analyzer is the best choice for reliable, field-proven, and rugged single-species measurement applications.

The Model 931 analyzer system is available with a heated cell option to avoid any hydrocarbon or water condensation. A fully integrated AMETEK Process Instruments sample system ensures reliable dew point control without running the risk of plugging, contaminating, or flooding the analyzer. Many process applications require the detection of species which do not absorb ultraviolet light. The Model 931 / 932 can incorporate two infrared measurements and a thermal conductivity sensor to allow for the measurement of additonal species such as hydrogen, hydrocarbons, carbon dioxide and / or water vapor. These sensors are incorporated with the UV photometer and utilize the same proven flow and sample system. Typical applications include the measurement of hydrogen and $H_2S$ (and optionally COS and $CS_2$) in amine-based tail gas treaters, $SO_2$ breakthrough form cobalt molybdate catalyst beds, as well as other sulfur recovery plant applications such as feed forward control by measuring hydrcarbons, $H_2S$ and or carbon dioxide in acid plant inlet gas.

No matter what the need is, this flexible, low-maintenance analyzer design is the answer to many of today's complex process control requirements.

## The Measurement

The Western Research® Model 931 uses AMETEK's proprietary high-resolution UV technology in a dual-beam, dual-wavelength configuration and no-moving-parts design. Instead of using a filter/chopper wheel to alternate between measure and reference wavelengths, the Model 931 uses a fixed optical configuration and pulsed UV lamps. This design leads to increased light throughput, reduced noise levels, and reduced maintenance. The dual-beam configuration, combined with the reference measurement, ensures low noise performance with minimal baseline and span drift.

Resolution of better than 0.02nm is achieved with high-intensity, low-energy hollow cathode UV source lamps. These lamps emit UV radiation at precise wavelengths, providing construction of the UV lamp determines the wavelength of interest, making it possible to configure this analyzer to measure many components that absorb UV/VIS energy. This high resolution design enables unparalleled linearity over a wide dynamic range (less than 1% deviation over 3 to 4 orders of magnitude), which leads to simple, robust data analysis.

The Model 931 analyzer utilizes two onboard micro-processors that provide concentration calculations, data processing, temperature control, calibration and sophisticated self-diagnostics.

## Applications

- Amine-based tail gas treating ($H_2S$/COS + optional $H_2$)
- SRU feed gas analysis ($H_2S$ + optional HC)
- Well head gas
- Sour gas pipelines

# Model 931 Single Gas Analyzer

WESTERN RESEARCH®

## Performance Specifications

**Methodology:** Dual wavelength, high resolution, non-dispersive UV/VIS

**Full Scale Ranges:** ppm and % vol are standard, other ranges are available

**Standard Range**

$H_2S$: 0 to 4,000 ppm min. to 0 to 100% max.
Other components and ranges are available upon request. Other components may include $NH_3$, COS, $CS_2$ and $SO_2$

**Accuracy**:

Standard range (UV): ±1% of full scale
Optional (TCD) $H_2$ sensor for TGTU applications: ±2% of full scale
Optional (IR) sensor for THC, $CO_2$: application specific, consult factory

**Repeatability:** Better than ±0.5% of full scale

**Linearity:** Better than ±1% of full scale for $H_2S$

**Zero Drift:** Better than ±2% of full scale, with auto zero disabled over 24-hour period

**Speed of Response:** Typically less than 30s to T90 (excluding sample system)

**Number of Gases:** one

**Zero Gas:** Nitrogen or instrument air

**Typical Sample Flow:** 2.5 L/min (5 SCFH)

**Sample Transport:** Application dependant (options include Heated Acid Gas probe)

**Outputs:** Up to 4 isolated 4-to-20 mA, loop or self-powered, 30 VDC Max; 4 non-isolated 1 to 5 VDC; 5 independent sets of SPDT, Form C, potential free alarm relay contacts, 2 A at 240 VAC

**Digital Communication:** RS485 Modbus port; RS232 / RS485 service port

**Utility Requirements:**

120 VAC (104 to 132 VAC), 47 to 63 Hz, <3A
240 VAC (207 to 264 VAC), 47 to 63 Hz, <2A

**Power Consumption:** 500 W max. (with heated probe and cell)

**Ambient Temperature:** 0 to 50˚C (32 to 122˚F)

**Physical Dimensions**: 1185 x 780 x 254 mm (46.65 x 30.7 x 9.97 in.)

**Weight:** Approximately 145 kg (320 lbs)

**Approvals and Certifications:**

CEC Class I, Division 1, Groups C&D; Ex dIIB T3
NEC Class I, Division 1, Groups C&D; AEx dIIB T3
ATEX II 2GEEx dIIB T3
Russian Ex Proof Certification; 1ExdIIBT3 X
Russian Gosstandart Pattern Approval
Complies with all relevant European directives

### Options

- Fully integrated, heated acid gas probe comes with heated aspirator and integrated sample and vent valves (see AMETEK Heated Acid Gas probe brochure for more details)
- Pressure compensation
- Heated cell for high water or acid dew point sampling
- Stream switching capability
- Optional thermal conductivity detector (TCD) for 0-5% or 0-10% $H_2$ for tail gas treating applications or 0 to 100% $H_2$ for hydrogen recycle applications
- Optional infrared cell / detector for 0-5% HC for SRU feed gas applications
- Optional infrared sensor for the measurement of hydrocarbons, carbon dioxide and/or water vapor with typical ranges from 0 to 2% to 0 to 100% by volume

**Optional: NEC Class I Div. 2 Groups B-D**


AMETEK®
**PROCESS INSTRUMENTS**
**WESTERN RESEARCH**
2876 Sunridge Way N.E., Calgary, AB T1Y 7H9
Ph. 403-235-8400, Fax 403-248-3550
www.ametekpi.com



***SALES AND MANUFACTURING:***

**USA - Delaware**
455 Corporate Blvd., Newark DE 19702 • Tel: +1-302-456-4400, Fax: +1-302-456-4444

**USA - Oklahoma**
2001 N. Indianwood Ave., Broken Arrow OK 74012 • Tel: +1-918-250-7200, Fax: +1-918-459-0165

**USA - Pennsylvania**
150 Freeport Road, Pittsburgh PA 15238 • Tel: +1-412-828-9040, Fax: +1-412-826-0399

***WORLDWIDE SALES AND SERVICE LOCATIONS:***

**USA - Texas**
Tel: +1-713-466-4900, Fax: +1-713-849-1924

**CHINA**
Beijing / Tel: 86 10 8526 2111, Fax: 86 10 8526 2141
Chengdu / Tel: 86 28 8675 8111, Fax: 86 28 8675 8141
Guangzhou / Tel: 86 20 8363 4768, Fax: 86 20 8363 3701
Shanghai / Tel: 86 21 5868 5111, Fax: 86 21 5866 0969

**FRANCE**
Tel: 33 1 30 68 89 20, Fax: 33 1 30 68 89 29

**GERMANY**
Tel: 49 21 59 91 36 0, Fax: 49 21 59 91 3639

**INDIA**
Tel: 91 80 6782 3200, Fax: 91 80 6782 3232

**SINGAPORE**
Tel: 65 6484 2388, Fax: 65 6481 6588




F-0183 Rev. 5 (0211)


*One of a family of innovative process analyzer solutions from AMETEK Process Instruments.*
*Specifications subject to change without notice.*