

# 888 SULFUR RECOVERY TAIL GAS ANALYZER



## RELIABILITY

AMETEK's third-generation tail gas analyzer, takes reliability to the next level by providing solutions to the three most common external failure modes:

- Automatic flow control for proactive response to adverse process conditions
- Flange temperature alarm for early warning of poor-quality steam
- Extended ambient temperature range to 60°C (140°F)

## MAINTENANCE/SERVICE

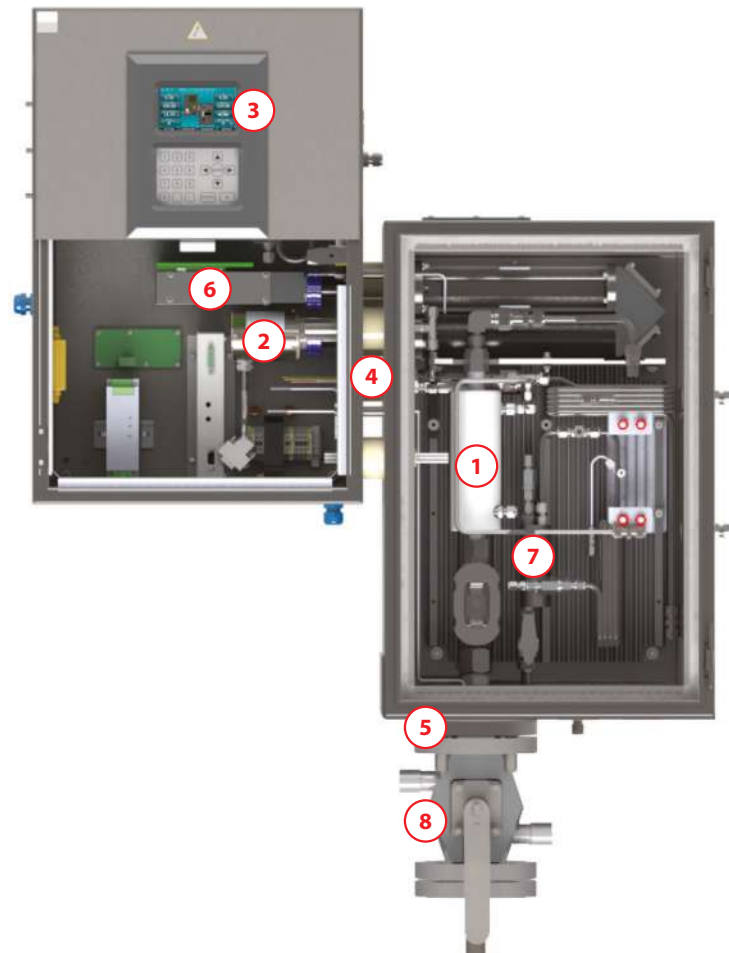
We listened to customer feedback from operations, analyzer technicians and process engineers:

- Smart diagnostic models identify, communicate, and react to potential problems
- 2X over range measurement allows an informed response to process upsets
- Worldwide factory support in over 50 countries

## SAFETY

Hazardous operation improvements, with the analyzer technician in mind:

- Close-coupled and easily accessible, but process isolated demister
- Complete isolation from the process with double block valves
- Remote PC web-enabled interface



### 1 Demister

The heart of the sample handling is an improved sulfur demister. The 888 uses the proven sample handling technique of a "reflux" demister with double demister pads (316SS top and PTFE bottom). The demister pads are held in place on a shaft with retention rings to withstand the optional hot condensate "steam blowback" for ammonia salts. The demister is connected with vacuum compression O-ring fittings, easily accessed, requiring only minutes to disassemble and service.

### 2 Xenon flash lamp

The 888 uses a pulsed xenon flash lamp as the broad band UV source. This lamp is an improved version of the field proven design used in the 880 Tail Gas Analyzer. The lamp is operated in a pulsed mode to extend the lamp life time. Automated validation zero gas measurements are used to compensate for the long-term effects of decreasing lamp output and the accumulation of process residue on gas cell windows.

### 3 AMEVision/digital communications

AMEVision is an icon-driven graphical interface with a color display for local communication with the analyzer. It provides screens showing trending functions, predictive

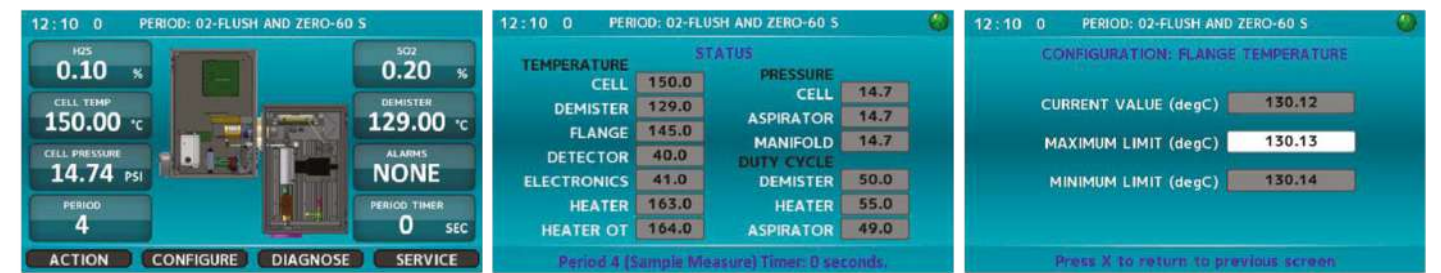
maintenance indicators, analog output verification, time-stamped alarm/event log and more. In addition, the 888 has a remote PC web browser-enabled interface (no software required) over TCP/IP Ethernet.

### 4 Thermal management

A highly effective thermal insulating barrier, extruded aluminum convection heater and advanced thermal management algorithms reduce the internal temperature of the electronics enclosure by 15°C (27°F) without the need for external cooling. The result is an industry-first 60°C (140°F) specification for ambient temperature and a 75% improvement in electronics life. The 888 is suitable for installation in hot climates, requiring only a simple sunshade.

### 5 Flange temperature RTD and alarm

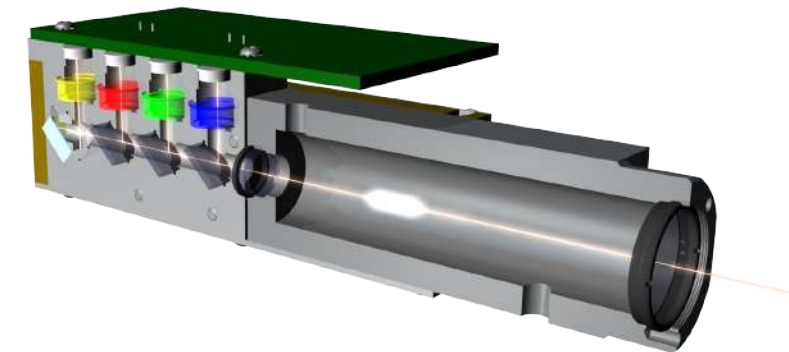
An embedded RTD in the process connection flange provides an alarm for poor quality steam. This advanced warning eliminates unexpected plugging.



AMEVision digital communication

### 6 Photometer

The 888 UV photometer uses four separate detectors each measuring a different narrow range of UV wavelengths. The light from the sample cell is divided into four separate channels using a combination of beam splitters and mirrors. The intensity information from each of the four detectors is used to calculate the H<sub>2</sub>S and SO<sub>2</sub> concentrations using a factory-established calibration. The temperature of the photometer is carefully controlled to optimize the accuracy and precision of the reported concentrations. During the zero and span cycle an automated multi-point photometric span calibration is performed on each of the four channels. The source pulse sequencing is automatically varied to create an intensity calibration for each detector channel. The 888 is uniquely capable of automatic intensity calibration, but the optical system can also be diagnosed with a removable filter.



888 Photometer

### 7 Auto flow control

The 888 monitors the pressure differential between the process and the sample aspiration and automatically adjusts the flow rate relative to the process pressure. During startup, shutdown, turn down, plugged rundowns and any time there is entrained sulfur leaving the final condenser, the flow rate can be minimized which reduces sulfur mist take-up.

### 8 Steam jacketed process connection valve

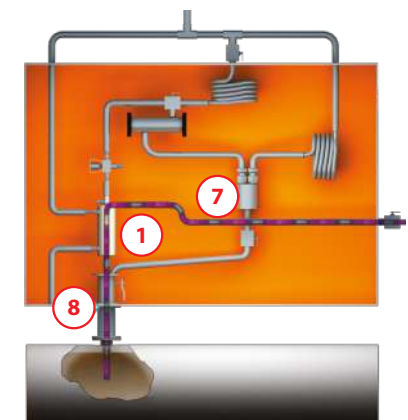
The 888 has the same footprint and steam jacketed ball valve that was used for the 880 analyzer. The steam jacket is a monocoque design and is rated for a cantilever force up to a force 5 hurricane wind. An 888 analyzer can be swapped over from an 880 installation while the process is on line, with zero egress of process gas in less than eight hours.

### Hot air and condensate steam blowback

The 888 does not wait for the plug, it reacts to the root cause. Incomplete combustion of ammonia in the SRU process reacts with the sulfur compounds to form ammonia salts, which can plug the demister. These salts are not removed by air blowback, but they are water soluble. Hot condensate steam blowback provides a steam propelled blast of hot water to dissolve any salts that have accumulated within the demister. The 888 is also equipped with anti-clogging hot air blowback features that are automatically initiated if plugging is detected by the smart diagnostics.

### 888 Sulfur Recovery Tail Gas Analyzer

AMETEK Process Instruments has been the leader in tail gas analysis for over 40 years, with more than 1,100 installed 880 NSL analyzers and more than 100 million hours of run time. The 888, the successor of the 880 NSL, uses field-proven and highly reliable UV technology to accurately monitor the H<sub>2</sub>S and SO<sub>2</sub> concentrations in sulfur recovery tail gas. This compact, rugged analyzer mounts directly on the process pipe, eliminating the complexity and safety issues of fiber optic coupled photometers. The 888 is the evolution of a well-proven formula. All the best elements of the iconic 880 NSL are still there: lamp life between 3-5 years, no shelter required, and steam blowback for ammonia salts.



Steam blowback flow

# 888 Sulfur Recovery Tail Gas Analyzer

## PERFORMANCE SPECIFICATIONS

<b>Methodology</b>	Non-dispersive UV
<b>Measurement range</b>	SO <sub>2</sub> : 0-1%; H <sub>2</sub> S: 0-2% (standard output range) air demand, excess H <sub>2</sub> S or excess SO <sub>2</sub> (as control outputs)
<b>Accuracy</b>	H <sub>2</sub> S and SO <sub>2</sub> : ±1% of full scale
<b>Reproducibility</b>	±1% of full scale
<b>Speed of response</b>	90% in less than 15 seconds, typical
<b>Calibration</b>	Automatic multi-point photo span validation
<b>Sample flow</b>	2 L/min typical
<b>Outputs (analog and digital)</b>	Four 4-20 mA, self-powered (24 VDC), linear, 1000 ohms load proportional to H <sub>2</sub> S, SO <sub>2</sub> , and either excess H <sub>2</sub> S or ratio Four programmable relay contacts (30 VAC, 60 VDC, 10 VA, resistive load) RS485 Serial Communication Port, two-wire
<b>Inputs</b>	One isolated digital input, contact closure; 5 VDC @ 2.5 mA
<b>Communication</b>	RS485 serial port, Ethernet, Modbus. Remote dial-in capabilities available with AMETEK web-enabled software
<b>Ambient shaded temperature</b>	-20 to 60°C (-5 to 140°F)
<b>Customer-supplied items</b>	2" 150# or DIN equivalent RF stainless steel flange connection
<b>Ingress protection</b>	IP65 (NEMA 4X)
<b>Enclosure material</b>	316 stainless steel
<b>Physical dimensions (W x H x D)</b>	Zone 1: 113.8 x 99.3 x 32.1 cm (44.8 x 39.1 x 12.6 in.) Class I Division 2: 91.4 x 99.3 x 32.1 cm (36 x 39.1 x 12.6 in.)
<b>Approximate weight</b>	Zone 1: 110 kg (242.5 lbs.) Class I Division 2: 99 kg (218 lbs.)
<b>Electrical</b>	120 or 240 VAC 50/60 Hz 500W, single phase
<b>Instrument air/nitrogen</b>	380 to 520 kPa (55-75 psig)
<b>Steam pressure</b>	620 to 792 kPa (90-115 psig) for optional jacketed ball valve and 210 to 345 kPa (30-50 psig) for optional blow back
<b>Approvals and certifications</b>	UL/CSA: Class I, Division 2, Groups A, B, C, D ATEX: II 2G Ex d pxb IIC T3 Gb IECEX: Ex d pxb IIC T3 Gb Russia (CU 1Ex db pxb IIC T3 Gb X) Complies with all relevant European directives

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