

X-STREAM Flameproof Gas Analyzer

APPLICATIONS

- Refining, petrochemical and chemical process analysis and control
- Hydrogen, ammonia and fertilizer production
- Metallurgical manufacturing, hardening and heat treatment processes
- Quality control of natural gas production and distribution
- Safety measurement for flammable mixtures
- Hydrogen cooling of gas turbines

FEATURES

- Wall mountable NEMA 4X/IP66 painted cast aluminum housing
- ATEX and CSA-C/US approved for Class I, Zone 1, Group IIB+H₂ hazardous areas
- Single or dual channel analyzer
- Supports NDIR, UV, VIS, paramagnetic and electrochemical O₂, and thermal conductivity detectors
- NDIR: robust microflow and solid-state detectors
- NDUV/VIS: vacuum diode detector for stability and long life
- O₂: fast response paramagnetic and electrochemical oxygen sensor with long-term stability
- TC: aluminum and quartz-coated stainless steel thermal conductivity cells
- Solvent-resistant, corrosion-resistant and intrinsically safe measuring cells and stainless steel tubing are available
- Easy access for maintenance and repair
- Extended ambient temperature range: -20 to +50 °C (-4 to +122 °F)
- Tropicalization for high ambient humidity
- Analog and digital I/O, and Ethernet or serial interface with Modbus communication
- Status signal relay outputs according to NAMUR
- Integrated thermostatically controlled compartment for physical components
- Separation of physics and electronics with purge enables measurement of corrosive and toxic gases
- Autocalibration via internal or external valve block
- Barometric pressure compensation, internal sampling pump and flow sensor

ROSEMOUNT®
Analytical



DESCRIPTION

The X-STREAM series of gas analyzers offers single and dual channel analysis utilizing infrared, ultraviolet and visible (NDIR/UV/VIS) photometry, paramagnetic and electrochemical oxygen, and thermal conductivity sensor technologies.

X-STREAM analyzers can measure up to 2 components and the measuring principles may be ordered in any combination. The physical benches are installed in their own compartment separated from the electronics. Optional thermostatic control enables measuring lower sample gas concentrations and at higher dew points. A purge can be added for handling corrosive and toxic gases to protect the electronics and to provide operator safety.

The instrument has an alphanumeric display protected by impact-tested safety glass and is operated by 6 keys without the need to open the enclosure. Clear text messages (available in 5 languages) and front panel LEDs provide information about the measurement and analyzer status.

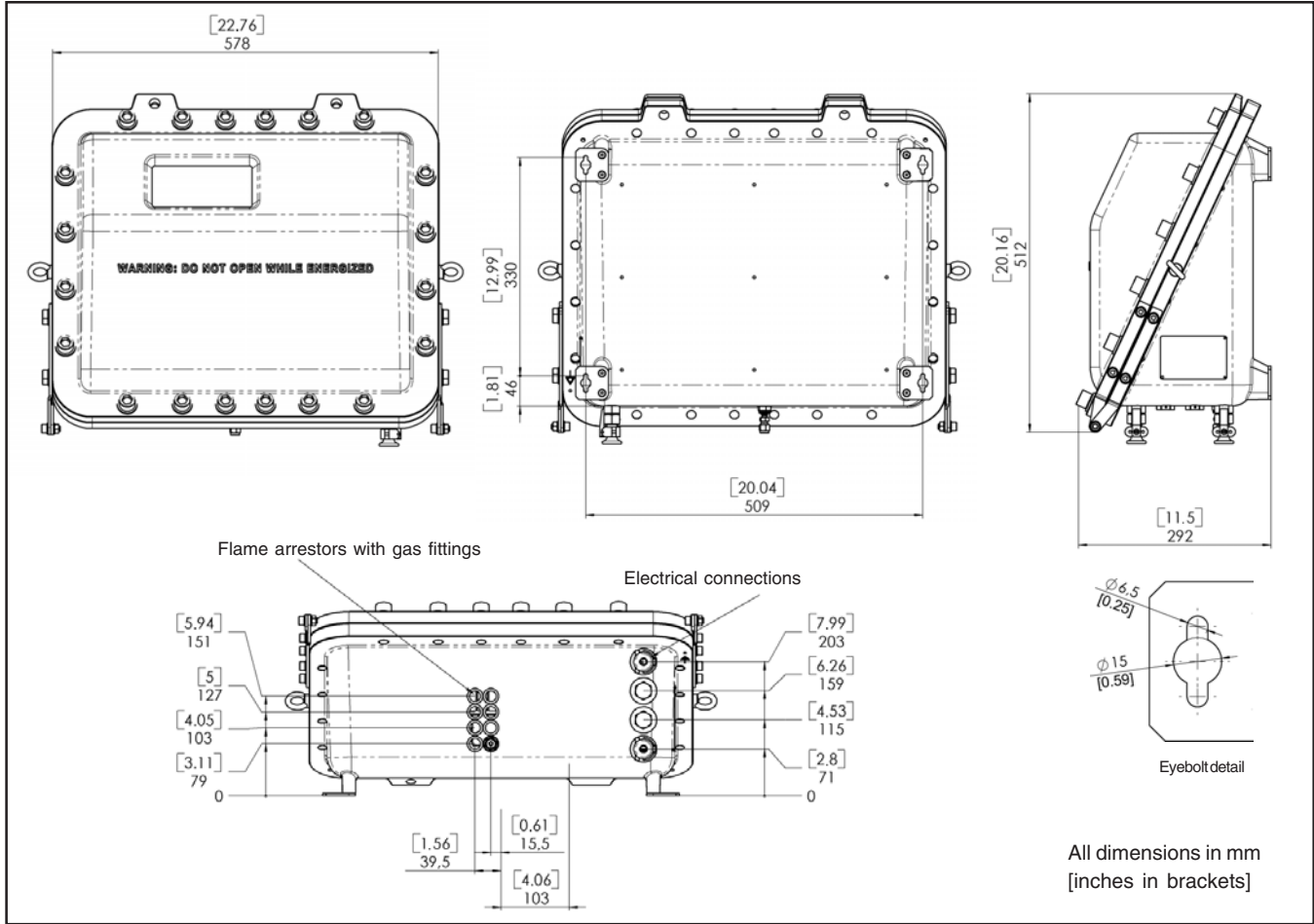
X-STREAM analyzers, equipped with an internal wide range power supply for all world areas, offer analog outputs, status signal relay outputs (according to NAMUR NE 107) and Modbus communication over an Ethernet or serial interface. Digital inputs and outputs are optionally available.

The NEMA 4X/IP66 design allows operation in harsh industrial environments.

ATEX and CSA-C/US type approvals allow global installation of X-STREAM flameproof analyzers in Zone 1 hazardous areas without the need for pressurization systems.

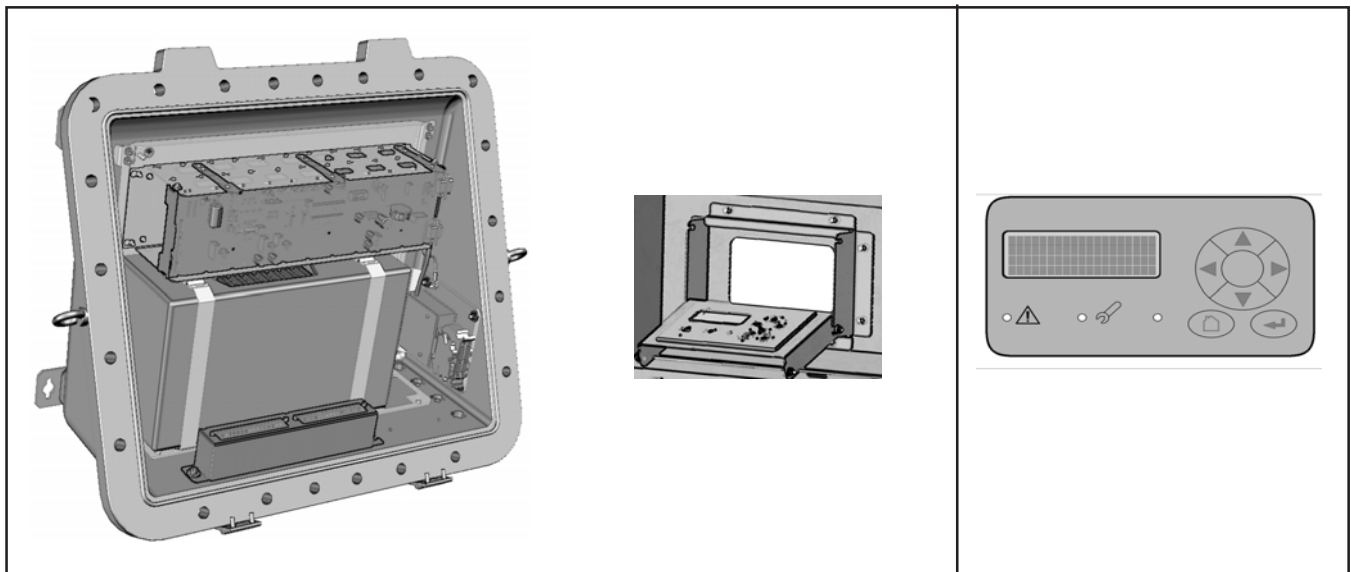
X-STREAM gas analyzers are also available as rack mountable, tabletop and field housing (with optional pressurization systems) variations: see product data sheets 103-910.A01 and 103-910F.A01 for detailed information.

DIMENSIONS



USER INTERFACE REMAINS OPERABLE WITH DOOR OPEN

FRONT PANEL



SAMPLE GAS COMPONENTS AND MEASURING RANGES (standard configurations*)

Gas component *		Lowest measuring range	Highest measuring range
Acetone	CH ₃ COCH ₃	0 - 1,000 ppm	0 - 3%
Acetylene	C ₂ H ₂	0 - 3%	0 - 100%
Ammonia	NH ₃	0 - 250 ppm	0 - 100%
Argon	Ar	0 - 50%	0 - 100%
Carbon dioxide	CO ₂	0 - 100 ppm	0 - 100%
Carbon monoxide	CO	0 - 100 ppm	0 - 100%
Ethylene	C ₂ H ₄	0 - 400 ppm	0 - 100%
Helium	He	0 - 10%	0 - 100%
Hexane	C ₆ H ₁₄	0 - 500 ppm	0 - 9,000 ppm
Hydrogen	H ₂	0 - 2% ****	0 - 100%
Methane	CH ₄	0 - 1,000 ppm	0 - 100%
n - Butane	C ₄ H ₁₀	0 - 800 ppm	0 - 100%
Nitrogen dioxide	NO ₂	0 - 100 ppm	0 - 1,000 ppm
Nitrogen monoxide	NO	0 - 250 ppm	0 - 100%
Nitrous oxide	N ₂ O	0 - 1%	0 - 100%
Oxygen (electrochemical)	O ₂	0 - 5%	0 - 25% ***
Oxygen (paramagnetic)	O ₂	0 - 1% *****	0 - 100%
Propane	C ₃ H ₈	0 - 1,000 ppm	0 - 100%
Propylene	C ₃ H ₆	0 - 4,000 ppm	0 - 100%
Sulfur dioxide	SO ₂	0 - 100 ppm	0 - 100%
Sulfur hexafluoride	SF ₆	0 - 1,000 ppm	0 - 5,000 ppm
Toluene	C ₇ H ₈	0 - 1,000 ppm	0 - 1.2%
Vinyl chloride	C ₂ H ₃ Cl	0 - 2%	0 - 2%
Water vapor**	H ₂ O	0 - 1%	0 - 5%



* Other components and configurations on request
 ** Dew point below ambient temperature
 *** Higher concentrations decrease sensor lifetime

**** Special "refinery" application with 0 - 1% H₂ in N₂ available
 ***** Specification for lowest range to be verified

ELECTRICAL SPECIFICATIONS

Input	Cable glands or conduit adapters, internal terminals	Input voltage	85 - 264 V \sim , 47 - 63 Hz
Rated voltage	100 - 240 V \sim , 50/60 Hz	Input current	2 - 1 A

SPECIFIC DATA

Compliances 	CSA-C/US, EN61326, EN 61010-1, NAMUR  II 2 G Ex d IIB+H ₂ T4 FTZU 06 ATEX 0186
Measuring components	More than 60 gases are detectable, e.g.: NO, NO ₂ , SO ₂ , CO, CO ₂ , CH ₄ , C ₆ H ₁₄ , SF ₆ , H ₂ O, N ₂ O, O ₂ , NH ₃ , R134a, H ₂ , etc.
Gas Connections	Stainless steel 6/4 mm, 1/4"; for more options c.f.
Electrical Connections	ATEX: Certified cable glands / blanking elements; CSA: Certified adapters for conduits (3/4" NPT) / blanking elements
Enclosure Protection	NEMA 4X, IP66 acc. EN 60529 for outdoor installation, protected against direct sunlight; tropicalization available
Humidity (non-condensing)	< 90% r.h. @ 20°C (68°F) < 70% r.h. @ 40°C (104°F)
Weight	Up to 63 kg (139 lbs) depending on configuration
Options	Integrated flow sensor, barometric pressure sensor, thermostated box for physical components (60°C / 140°F), sampling pump and/or solenoid valve blocks for autocalibration

SIGNAL OUTPUTS, INTERFACES

2 analog signal outputs

(optically isolated):

- 4 - 20 mA (R_B ≤ 500 Ω) or
- 0 - 20 mA (R_B ≤ 500 Ω)

3 status relays (NAMUR NE 107):

- Dry contact ratings: 1 A, 30 V

Communication interface:

- Ethernet with Modbus TCP or
- RS 485 / RS 232C with Modbus RTU

Digital I/O (optional):

- 7 digital inputs (for remote control) max. 30 VDC, 2.3 mA, common ground
- 8 digital outputs (e.g. concentration thresholds, valve status notification) max. 30 VDC, 30 mA, "open collector", common ground

PERFORMANCE SPECIFICATIONS

	NDIR/UV/VIS	Oxygen Sensor (PO ₂ and EO ₂)	Thermal Conductivity
Detection limit	≤ 1% ^{1 4}	≤ 1% ^{1 4}	≤ 2% ^{1 4}
Linearity	≤ 1% ^{1 4}	≤ 1% ^{1 4}	≤ 1% ^{1 4}
Zero-point drift	≤ 2% per week ^{1 4}	≤ 2% per week ^{1 4}	≤ 2% per week ^{1 4}
Span (sensitivity) drift	≤ 1% per week ^{1 4}	≤ 1% per week ¹	≤ 1% per week ^{1 4}
Repeatability	≤ 1% ^{1 4}	≤ 1% ^{1 4}	≤ 1% ^{1 4}
Response time (t ₉₀)	4 s ≤ t ₉₀ ≤ 7 s ^{3 5}	< 5 s ^{3 6} / approx. 12 s ^{3 9}	5 s ≤ t ₉₀ ≤ 20 s ^{3 7}
Permissible gas flow	0.2 - 1.5 l/min.	0.2 - 1.0 l/min ⁶ / 0.2 - 1.5 l/min. ⁹	0.2 - 1.5 l/min. (± 0.1 l/min)
Influence of gas flow	≤ 0.5% ^{1 4}	≤ 2% ^{1 4}	≤ 1% ^{1 4 13}
Maximum gas pressure ¹⁷	≤ 1,100 hPa abs. (≤ 1.45 psig)	≤ 1,100 hPa abs. (≤ 1.45 psig) ¹⁶	≤ 1,100 hPa abs. (≤ 1.45 psig)
Influence of pressure			
– At constant temperature	≤ 0.10% per hPa ²	≤ 0.10% per hPa ²	≤ 0.10% per hPa ²
– With pressure compensation ⁸	≤ 0.01% per hPa ²	≤ 0.01% per hPa ²	≤ 0.01% per hPa ²
Permissible ambient temperature	-20 to +50°C (-4 to +122°F)	-20 to +50°C (-4 to +122°F) ¹⁰	-20 to +50°C (-4 to +122°F)
Influence of temperature (at constant pressure)			
– On zero point	≤ 1% per 10 K ¹	≤ 1% per 10 K ¹	≤ 1% per 10 K ^{1 15}
– On span (sensitivity)	≤ 5% (0 to +50°C) ^{1 11 15}	≤ 1% per 10 K ^{1 15}	≤ 1% per 10 K ^{1 15}
Thermostat control ^{12 14}	Optionally 60°C (140°F)	55/60°C (131/140°F) ⁶ / None ⁹	75°C (167°F) ¹²
Warm-up time ^{12 14}	15 to 50 minutes ⁵	Approx. 50 minutes ⁶	Approx. 15 minutes

¹ Related to full scale

² Related to measuring value;
1 psi = 68.95 hPa

³ From gas analyzer inlet at 1.0 l/min gas flow (electronic damping = 2 s)

⁴ Constant pressure and temperature

⁵ Dependent on integrated photometer bench

⁶ Paramagnetic oxygen measurement (PO₂)

⁷ Depending on measuring range

⁸ Pressure sensor is required

⁹ Electrochemical oxygen measurement (EO₂), not for use with sample gas containing FCHC's

¹⁰ Electrochemical oxygen measurement (EO₂):
+5 to +40°C (41 to 104°F)

¹¹ Starting from +20°C (68°F) to 0°C (32°F)
to +50°C (122°F) to +20°C (68°F)

¹² Sensor / cell only

¹³ Flow variation within ± 0.1 l/min

¹⁴ Optional thermostatically controlled box with 60°C (140°F)

¹⁵ Temperature variation: 10 K in 1 h

¹⁶ No sudden pressure surge for PO₂ allowed

¹⁷ Pressure up to 1,500 hPa abs. (7 psig) can be achieved by adding a breather using a gas outlet with a flame arrestor and sintered metal filter, c.f.

All data provided above is verified during the manufacturing process for each unit by the following tests:

- Linearization and sensitivity test
- Long term drift stability test
- Climate chamber test
- Cross interference test (if applicable)

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