

# X-STREAM Enhanced XEGK - Compact Gas Analyzer

- Up to three component gas analyzer featuring NDIR/UV/VIS photometer, paramagnetic and electrochemical O<sub>2</sub>, thermal conductivity, and moisture sensors
- Enhanced performance with IntrinzX technology
- Modern communication capabilities including web-browser functionality
- Outstanding reliability with a three-year warranty

## Features

The X-STREAM Enhanced 1/2 19 in. analyzer combines powerful analytical technology with modern communication functionality to face your analytical problem.

### Analytical flexibility

The X-STREAM platform enables the combination of up to four channels of non-dispersive infrared, ultraviolet, visible photometers (NDIR/UV/VIS), thermal conductivity (TCD), trace moisture (tH<sub>2</sub>O), paramagnetic, and electrochemical oxygen (pO<sub>2</sub>/eO<sub>2</sub>) detectors.

### Enhanced performance

With the X-STREAM photometer technology, the analyzer provides a measuring accuracy that allows improving your process while also reducing the total cost of ownership by:

- Large dynamic ranges
- Very low temperature dependency
- Outstanding long-term stability
- Simplified calibration

### Three-year warranty

All important parts and the complete analyzer are run through a variety of test procedures, including long-term stability and temperature behavior. This enables us to provide a three-year warranty for the analyzer, excluding sample-wetted parts and externally connected electronics.



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## Modern communication

The X-STREAM Enhanced offers a unique web-browser interface that features:

- World wide access through the internet without installation of additional software
- E-mail notification on alarms and events or with daily report
- Complete remote configuration

X-STREAM Enhanced analyzers provide four status signal relay outputs (according to NAMUR NE 107), MODBUS TCP protocol over Ethernet and RTU over serial (RS232/485) communication. Onboard SD card and USB ports enable storage of:

- Data, calibration, and event logger files
- Analyzer configuration file

A pre-engineered DeltaV module features easy integration into your DeltaV environment via ModbusRTU over serial interface. ProfibusDP is also supported by a ModbusRTU-ProfibusDP gateway.

## Tools

The X-STREAM Enhanced analyzer software provides several tools that make complex process systems easier and avoid additional expenses for third-party equipment:

- Programmable Logic Controller (PLC) for control of sample handling and sample lines
- Calculator for virtual measurements
- Analog inputs for integrating external measurements into the powerful X-STREAM Enhanced environment

### Ease of use

The instrument has an graphic display and is operated manually by six keys. Clear text messages (available in several languages) and industry-standard symbols provide information about the measurement and the analyzer status.

### Options in a 1/2 19 in. enclosure

- Sample gas pump
- Flow measurement with alarm
- Valve block
- Pressure sensor
- Digital input/output cards or analog input card
- Internal or external wide range power supply

### Worldwide approvals

CE, CSA-C/US, and c-Tick approvals allow global installation of X-STREAM compact gas analyzers.

### Applications

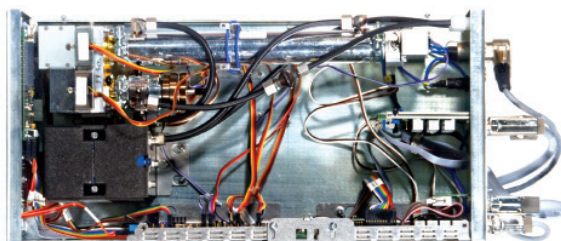
- Gas purity and air separation units
- Biogas and landfill
- Automotive emissions (ICE)
- Continuous Emission Monitoring Systems (CEMS)



Tabletop version



Rack version



Interior view, showing one NDIR, one NDUV bench, one paramagnetic O<sub>2</sub> cell, analog and relay outputs, digital inputs, and serial interface.

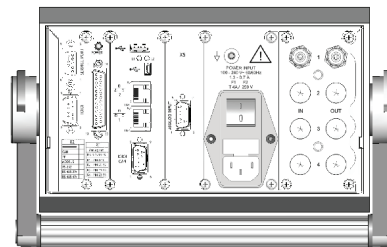


Web browser showing measured concentrations and secondaries.

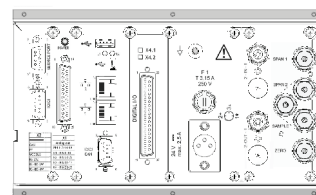
### Process-approved sensors

Solvent-resistant, corrosion-resistant, and infallible containment solutions are available.

- Exhaust measurements for burner efficiency
- Natural gas production and distribution
- Metall hardening
- Oil and gas refining



Rear panel layout with AC supply, standard gas in and outlets, USB, Ethernet, optional analog inputs, and front panel frame with handle (portable).



Rear panel layout with DC supply, USB, Ethernet, valve block, and optional digital I/O board (rack version).

**Note!**

Rear panels layouts are exemplarily only. Actual layout depends on the analyzer configuration.

## Specifications

### Lowest and highest ranges available for different gases (excerpt)

In total, the X-STREAM family of process gas analyzers can detect more than 60 gases. The following table is an example of the most commonly used gases. Contact your Emerson representative for information on configurations or gases that are not listed.

**Table 1 Gas Components and Measuring Ranges, Examples**

Gas component		Principle	Special specs or conditions	Standard specs (Table 2 – 4)	Enhanced specs (Table 2 and 4)	
			Lowest range	Lowest range	Lowest range	Highest range
Acetone <sup>1</sup>	CH <sub>3</sub> COCH <sub>3</sub>	IR		0–400 ppm	0–800 ppm	0–5000 ppm
Acetylene	C <sub>2</sub> H <sub>2</sub>	IR		0–3 %	0–6 %	0–100 %
Ammonia	NH <sub>3</sub>	IR		0–300 ppm	0–600 ppm	0–100 %
Argon	Ar	TCD		0–50 %	0–100 %	0–100 %
Carbon dioxide	CO <sub>2</sub>	IR	0–5 ppm <sup>4</sup>	0–50 ppm	0–100 ppm	0–100 %
Carbon monoxide	CO	IR	0–10 ppm <sup>4</sup>	0–50 ppm	0–100 ppm	0–100 %
Ethane	C <sub>2</sub> H <sub>6</sub>	IR		0–1000 ppm	0–2000 ppm	0–100 %
Ethanol <sup>1</sup>	C <sub>2</sub> H <sub>5</sub> OH	IR		0–1000 ppm	0–2000 ppm	0–5000 ppm
Ethylene	C <sub>2</sub> H <sub>4</sub>	IR		0–400 ppm	0–800 ppm	0–100 %
Helium	He	TCD		0–10 %	0–20 %	0–100 %
Hexane <sup>1</sup>	C <sub>6</sub> H <sub>14</sub>	IR		0–300 ppm	0–600 ppm	0–10 %
Hydrogen <sup>3</sup>	H <sub>2</sub>	TCD		–	0–5 %	0–100 %
Methane	CH <sub>4</sub>	IR		0–300 ppm	0–600 ppm	0–100 %
Methanol <sup>1</sup>	CH <sub>3</sub> OH	IR		0–1000 ppm	0–2000 ppm	0–5000 ppm
n-Butane	C <sub>4</sub> H <sub>10</sub>	IR		0–800 ppm	0–1600 ppm	0–100 %
Nitrogen dioxide <sup>1</sup>	NO <sub>2</sub>	UV		0–250 ppm	0–500 ppm	0–5000 ppm
Nitrogen monoxide	NO	IR		0–250 ppm	0–500 ppm	0–100 %
Nitrous oxide	N <sub>2</sub> O	IR		0–100 ppm	0–200 ppm	0–100 %
Oxygen	O <sub>2</sub>	Electrochem.		0–5 %	–	0–25 % <sup>2,5</sup>
Oxygen	O <sub>2</sub>	Paramagn.		0–1 %	0–2 %	0–100 %
Propane	C <sub>3</sub> H <sub>8</sub>	IR		0–1000 ppm	0–2000 ppm	0–100 %
Propylene	C <sub>3</sub> H <sub>6</sub>	IR		0–400 ppm	0–800 ppm	0–100 %
Sulfur dioxide	SO <sub>2</sub>	UV		0–130ppm	0–250 ppm	0–1 %
Sulfur dioxide	SO <sub>2</sub>	IR		0–1 %	0–2 %	0–100 %
Sulfur hexafluoride	SF <sub>6</sub>	IR		0–20 ppm	0–50 ppm	0–2 %
Toluene <sup>1</sup>	C <sub>7</sub> H <sub>8</sub>	UV		0–1000 ppm	0–2000 ppm	0–1 %
Water vapor <sup>1</sup>	H <sub>2</sub> O	IR		0–1000 ppm	0–2000 ppm	0–3 %
Water vapor, Trace <sup>1</sup>	H <sub>2</sub> O	Capacitive		0–100 ppm	–	0–3000 ppm <sup>5</sup>

<sup>1</sup> Dew point below ambient temperature.

<sup>2</sup> Higher concentrations decrease sensor lifetime.

<sup>3</sup> Special "refinery" application with 0–1 % H<sub>2</sub> in N<sub>2</sub> available.

<sup>4</sup> See [Table 5](#).

<sup>5</sup> Standard specs only.

## Standard and enhanced performance specifications

Table 2 IR/UV/VIS, TCD – Standard and Enhanced Measurement Performance Specifications

	NDIR/UV/VIS		Thermal Conductivity (TCD)	
	Standard spec	Enhanced spec	Standard spec	Enhanced spec
Detection limit ( $4\sigma$ ) <sup>1 4</sup>	≤ 1 %	≤ 0.5 %	≤ 1 %	≤ 0.5 %
Linearity <sup>1 4</sup>	≤ 1 %		≤ 1 %	
Zero-point drift <sup>1 4</sup>	≤ 2 % per week	≤ 1 % per week	≤ 2 % per week	≤ 1 % per week
Span (sensitivity) drift <sup>1 4</sup>	≤ 0.5 % per week	≤ 1 % per month	≤ 1 % per week	
Repeatability <sup>1 4</sup>	≤ 0.5 %		≤ 0.5 %	
Response time ( $t_{90}$ ) <sup>3</sup>	4 s ≤ $t_{90}$ ≤ 7 s <sup>5</sup>		15 s ≤ $t_{90}$ ≤ 30 s <sup>6</sup>	
Permissible gas flow	0.2–1.5 l/min.		0.2–1.5 l/min. <sup>11</sup>	
Influence of gas flow <sup>1 4</sup>	≤ 0.5 %		≤ 1 % <sup>11</sup>	
Maximum gas pressure <sup>9</sup>	≤ 1500 hPa abs. (≤ 7 psig)		≤ 1500 hPa abs. (≤ 7 psig)	
Influence of pressure <sup>2</sup>				
– At constant temperature	≤ 0.10 % per hPa		≤ 0.10 % per hPa	
– With pressure compensation <sup>7</sup>	≤ 0.01 % per hPa		≤ 0.01 % per hPa	
Permissible ambient temperature	0 to +50 °C (32 to 122 °F)		0 to +50 °C (32 to 122 °F)	
Influence of temperature <sup>1 12</sup> (at constant pressure)				
– On zero point	≤ 1 % per 10 K   ≤ 0.5 % per 10 K		≤ 1 % per 10 K   ≤ 0.5 % per 10 K	
– On span (sensitivity)	≤ 5 % (0 to +50 °C / 32 to 122 °F)		≤ 1 % per 10 K	
Thermostat control	none		none <sup>10</sup>	
Warm-up time <sup>6</sup>	15 to 50 minutes <sup>5</sup>		approx. 50 minutes	

Note! 1 psi = 68.95 hPa

<sup>1</sup> Related to full scale.

<sup>2</sup> Related to measuring value.

<sup>3</sup> From gas analyzer inlet at gas flow of 1.0 l/min (electronic damping = 0 s).

<sup>4</sup> Constant pressure and temperature.

<sup>5</sup> Dependent on integrated photometer bench.

<sup>6</sup> Depending on measuring range.

<sup>7</sup> Pressure sensor is required.

<sup>9</sup> Limited to atmospheric if internal sample pump.

<sup>10</sup> Thermost. controlled sensor: 75 °C (167 °F).

<sup>11</sup> Flow variation within ± 0.1 l/min.

<sup>12</sup> Temperature variation: ≤ 10 K per hour.

Table 3 Trace Moisture – Standard Measurement Performance Specifications

	Trace moisture (tH <sub>2</sub> O)
Measurement range	-100 to -10 °C dew point (0 - 100 ... 3.000 ppm)
Measurement accuracy	±2 °C dew point
Repeatability	0.5 °C dew point
Response time ( $t_{95}$ )	5 min (dry to wet)
Operating humidity	0 to 100 % relative humidity
Sensor operating temperature	-40 to +60 °C
Temperature coefficient	Temperature compensated across operating temperature range
Operating pressure	Depending on sequential measurement system, see analyzer specification <sup>1</sup> max. 1500 hPa abs / 7 psig
Flow rate	Depending on sequential measurement system, see analyzer specification <sup>1</sup> 0.2 to 1.5 l/min

<sup>1</sup> If installed in series to another measurement system, e. g. IR channel.

Note! 1 psi = 68.95 hPa

**Table 4 Oxygen - Standard and Enhanced Measurement Performance Specifications**

	Oxygen sensors		
	Paramagnetic (pO <sub>2</sub> )		Electrochemical (eO <sub>2</sub> )
	Standard spec	Enhanced spec	
Detection limit (4σ) <sup>1 4</sup>	≤ 1 %	≤ 0.5 %	≤ 1 %
Linearity <sup>1 4</sup>	≤ 1 %		≤ 1 %
Zero-point drift <sup>1 4</sup>	≤ 2 % per week	≤ 1 % per week	≤ 2 % per week
Span (sensitivity) drift <sup>1 4</sup>	≤ 1 % per week	≤ 0.5 % per week	≤ 1 % per week
Repeatability <sup>1 4</sup>	≤ 0.5 %		≤ 1 %
Response time (t <sub>90</sub> ) <sup>3</sup>	< 5 s		approx. 12 s
Permissible gas flow	0.2–1.5 l/min		0.2–1.5 l/min.
Influence of gas flow <sup>1 4</sup>	≤ 2 % <sup>9</sup>		≤ 2 %
Maximum gas pressure <sup>7</sup>	≤ 1500 hPa abs. (≤ 7 psig) <sup>11</sup>		≤ 1500 hPa abs. (≤ 7 psig)
Influence of pressure <sup>2</sup>			
– At constant temperature	≤ 0.10 % per hPa		≤ 0.10 % per hPa
– With pressure compensation <sup>6</sup>	≤ 0.01 % per hPa		≤ 0.01 % per hPa
Permissible ambient temperature	0 to +50 °C (32 to 122 °F)		5 to +45 °C (41 to 113 °F)
Influence of temperature <sup>1 10</sup> (at constant pressure)			
– On zero point	≤ 1 % per 10 K   ≤ 0.5 % per 10 K		≤ 1 % per 10 K
– On span (sensitivity)	≤ 1 % per 10 K		≤ 1 % per 10 K
Thermostat control	none <sup>8</sup>		none
Warm-up time	Approx. 50 minutes		-

Note! 1 psi = 68.95 hPa

<sup>1</sup> Related to full scale.

<sup>2</sup> Related to measuring value.

<sup>3</sup> From gas analyzer inlet at gas flow of 1.0 l/min (electronic damping = 0 s).

<sup>4</sup> Constant pressure and temperature.

<sup>5</sup> Reserved for future use.

<sup>6</sup> Pressure sensor is required.

<sup>7</sup> Limited to atmospheric if internal sample pump.

<sup>8</sup> Thermost controlled sensor: 60 °C (140 °F).

<sup>9</sup> For ranges 0–5...100 % and flow 0.5...1.5 l/min.

<sup>10</sup> Temperature variation: ≤ 10 K per hour.

<sup>11</sup> No sudden pressure surge allowed.

**Note 1!**

Not all data listed are applicable to all analyzer versions (e.g. 60 °C thermostat controlled box is not available for electrochemical and trace oxygen).

**Note 2!**

For NDIR/UV/VIS measurements, take into account that sample gas may diffuse or be released by leakages into the analyzer enclosure. If existent in the analyzer surroundings, the component to be measured may enter the enclosure. Concentrations then may increase inside the enclosure. High concentrations of the component to be measured inside the enclosure may influence the measurement by unintended absorption, which could cause drift of the measurement. A remedy for this issue is to purge the housing with gas not containing the component of interest.

**Note 3!**

Measurement principles or composition of sample gas may limit the available options for a specific analyzer configuration concerning e. g. sample handling options or tubing materials.

## Special performance specifications for gas purity measurements (ULCO and ULCO<sub>2</sub>)

Table 5 Special Performance Specifications for Gas Purity Measurements

	0–10...< 50 ppm CO 0–5...< 50 ppm CO <sub>2</sub>
Detection limit (4 $\sigma$ ) <sup>1 2</sup>	< 2 %
Linearity <sup>1 2</sup>	< 1 %
Zero-point drift <sup>1 2 3</sup>	< 2 % resp. < 0.2 ppm <sup>9</sup>
Span (sensitivity) drift <sup>1 2 4</sup>	< 2 % resp. < 0.2 ppm <sup>9</sup>
Repeatability <sup>1 2</sup>	< 2 % resp. < 0.2 ppm <sup>9</sup>
Response time (t <sub>90</sub> ) <sup>7</sup>	< 10 s
Permissible gas flow	0.2–1.5 l/min.
Influence of gas flow <sup>1 2</sup>	< 2 %
Maximum gas pressure <sup>10</sup>	≤ 1500 hPa abs. (≤ 7 psig)
Influence of pressure <sup>5</sup>	
– At constant temperature	≤ 0.1 % per hPa
– With pressure compensation <sup>8</sup>	≤ 0.01 % per hPa
Permissible ambient temperature	+15 to +35 °C (59 to 95 °F)
Influence of temperature <sup>6</sup> (at constant pressure)	
– On zero point	< 2 % per 10 K resp. < 0.2 ppm per 10 K <sup>9</sup>
– On span (sensitivity)	< 2 % per 10 K resp. < 0.2 ppm per 10 K <sup>9</sup>
Thermostat control	None

Note! 1 psi = 68.95 hPa

<sup>1</sup> Related to full scale.

<sup>2</sup> Constant pressure and temperature.

<sup>3</sup> Within 24 h; daily zero calibration requested.

<sup>4</sup> Within 24 h; daily span calibration recommended.

<sup>5</sup> Related to measuring value.

<sup>6</sup> Temperature variation: ≤ 10 K per hour.




<sup>7</sup> From gas analyzer inlet at gas flow of 1.0 l/min.

<sup>8</sup> Barometric pressure sensor is required.

<sup>9</sup> Whichever value is higher.

<sup>10</sup> Limited to atmospheric if internal sample pump.

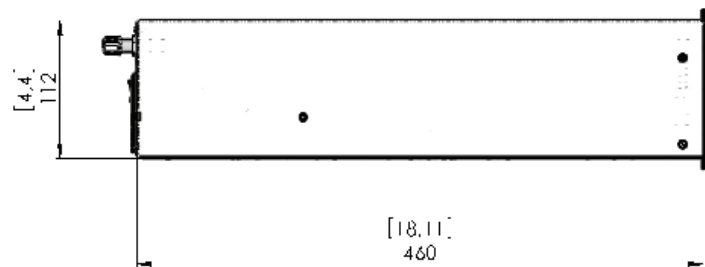
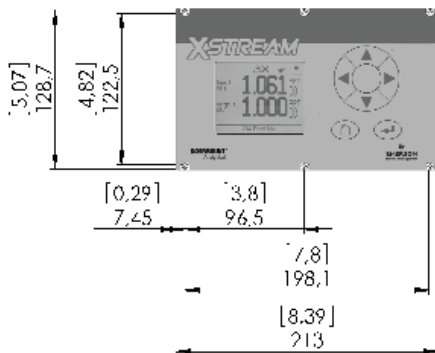
## General specifications

Compliances	EN 61010-1, EN 61326, NAMUR, CSA-C/US, C-Tick			
Gas Connections	PVDF: 6/4 mm; Stainless steel: 6/4 mm or 1/4 in.; for more options c.f.			
Rated voltage	100–240 V $\sim$ , 50/60 Hz	or	DC 24 V	
Rated input current	2–1 A	or	2.5 A	
Power input	IEC mains appliance	or	3-pin XLR connector	
Signal Connections	Submin connectors, RJ45, USB			
Enclosure Protection	IP 20 acc. EN 60529 for indoor installation, protected against direct sunlight			
Humidity (non-condensing)	< 90 % r.h. @ 20 °C (68 °F) < 70 % r.h. @ 40 °C (104 °F)			
Weight	Approx. 8... 12 kg (7.6...26.5 lbs) depending on configuration			
Options	Integrated flow measurement(s) with alarm(s), barometric pressure sensor, case purge, sampling pump(s), and/or solenoid valve block(s) for autocalibration			

## Signal in and outputs, interfaces

Analog signal outputs	1–4, individually optically isolated 4(0)–20 mA ( $R_s \leq 500 \Omega$ ) 1 as standard, 2–4 as option
Relay outputs	4 status relays acc. NAMUR NE 107 or e.g. concentration thresholds, valve status notification dry contacts: 1 A, 30 V
Communication interface	Ethernet with Modbus TCP RS 485 / 232C with Modbus RTU 2 USB ports
Digital I/O (optional)	7 digital inputs (for remote control); max. 30Vdc, 2.3 mA, common ground 9 additional relay outputs (e.g. concentration thresholds, valve status notification, flow alarm, range ID) dry contacts: 1 A, 30 V
Analog signal inputs (optional)	2 analog inputs 0–1(10) V ( $R_{in} = 100 \text{ k}\Omega$ ) or 4(0)–20 mA ( $R_{in} = 50 \Omega$ )

## Dimensions



Rack mountable version.

All dimensions in mm  
[inches in brackets]

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