XTC Series

Binary Gas Analyzers in Safe or Hazardous Areas

A range of linear and stable thermal conductivity analyzers for measurement of binary gas mixes such as Air in Hydrogen (H2 purity) or Carbon Dioxide in Methane (Biomethane). The sensor is housed in either a wall-mounted IP55 case suitable for indoor use (XTC501) or a rugged IP66 casing (XTC601), making it suitable for a wide range of applications. The XTC601 is available in an Ex d protected variant suitable for hazardous area installations.

SIL2 Rated

Highlights

- ATEX, IECEx, TC TR Ex & cQPSus rated
- Touch-screen display allows calibration or adjustment without a hot works permit (XTC601)
- Low cost of ownership due to minimal maintenance
- Measurement ranges from 0–1% to 0–100%
- Accuracy of better than ±1% full scale (for H_2 or He)
- IP55 or IP66 enclosure options
- Light guide to NAMUR 44 standard
- 2 x 4–20 mA outputs and Modbus RTU over RS485 protocol as standard

Applications

- Hydrogen coolant in electricity turbines
- Hydrogen Generation by electrolysis
- Product quality in air separation plants
- Syngas production
- Helium recovery
- Fuel cell research
- Product quality such as Air in Argon for double glazing

XTC Series Binary Gas Analyzers

Technology

Thermal Conductivity

All gases have a unique Thermal Conductivity. This property can be used to determine the proportion of a gas in a binary or pseudo-binary mixture.

The XTC Binary Gas Analyzer utilizes the difference in thermal conductivity to accurately measure the target gas in a single background or a background mixture of fixed proportions.

The analyzer offers stable and repeatable measurements. This is particularly important in safety applications such as CO_2/H_2 membrane monitoring.

Measurement Principle

The measuring principle employs matched thermistors in a Wheatstone Bridge configuration. One thermistor is in the sample cell and the other is in a sealed reference chamber. The whole assembly is temperature controlled to ensure an isothermal environment. This provides an accurate and stable platform for measuring the target gas concentration.

SIL2 Option

The XTC601 can now be purchased meeting the requirements of IEC61508 SIL2. A supplementary SIL manual will be supplied with the analyzer allowing the user to integrate the unit into their functional safety system.

Features

High Sensor-Stability Reduces Calibration Costs

The sensor design largely eliminates drift associated with other comparable devices, improving the stability of the measurement. This allows longer calibration intervals and reduces both labour and consumable costs.

Reliable Long-Term Performance

The non-depleting thermal conductivity sensor has no moving parts, and is therefore not affected by vibration or movement. This makes it suitable for remote and offshore installations and offers a low cost of ownership.

Easy Installation with Local Display

The analyzers are either IP55 or IP66 and can be installed very close to the sample point. This provides many benefits such as:

- Faster overall speed of response (for safety)
- Less sample line or cabling (saves cost)
- Greater choice of installation points (flexibility)

Outputs:

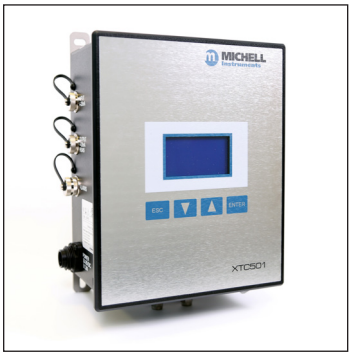
The Analyzers are supplied with the following as standard:

- Two 4–20 mA outputs
- Modbus RTU over RS485 protocol
- Two alarm relays for concentration
- mA can be driven High or Low according to NAMUR when cell temperature is not stable.

Flexible Packaging

The XTC Series binary gas analyzers are suitable for Safe (GP) or Hazardous (EX) Area classification depending on the individual customer's needs. This allows the user to determine the price to feature ratio that best suits each installation.

XTC601 (EX1, GP1 or GP2)
The analyzer provides a local HMI for the user to access all the functions of the analyzer through the glass via capacitive buttons. As well as displaying the target gas concentration, there is a status bar showing messages. The user can scroll through the front screens to see a graph of the latest period (user defined), min and max values, reading from an external sensor and alarm history.



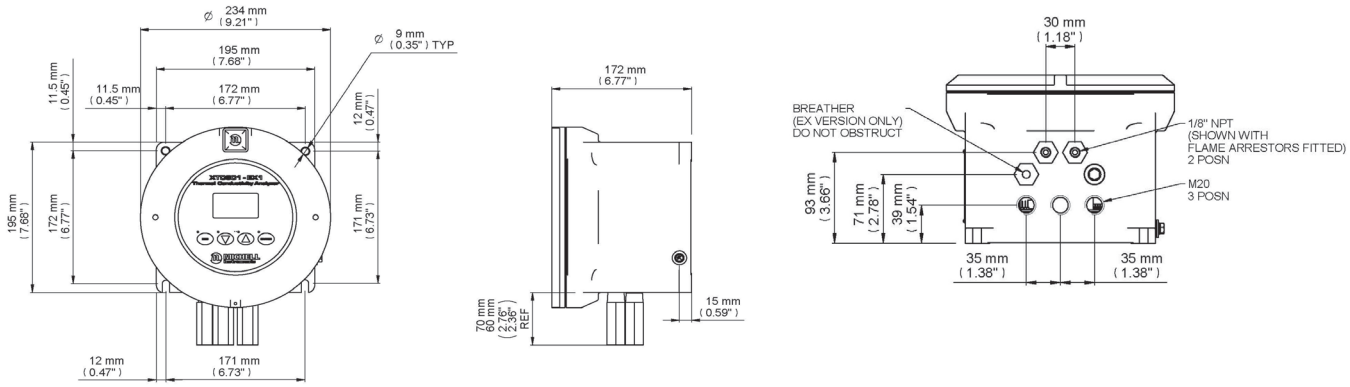
XTC501 (GP1)
This analyser is suitable for light industrial applications and shares all the same features and benefits in a lightweight IP55-rated wall-mounted enclosure. All electrical connections are accessible without opening the case and all mating connectors are supplied.

XTC501 (GP2)
The base model binary gas analyzer without integrated display for customers with a local control system. An optional remote display is available for set-up, diagnostics and calibration for clients with multiple units.

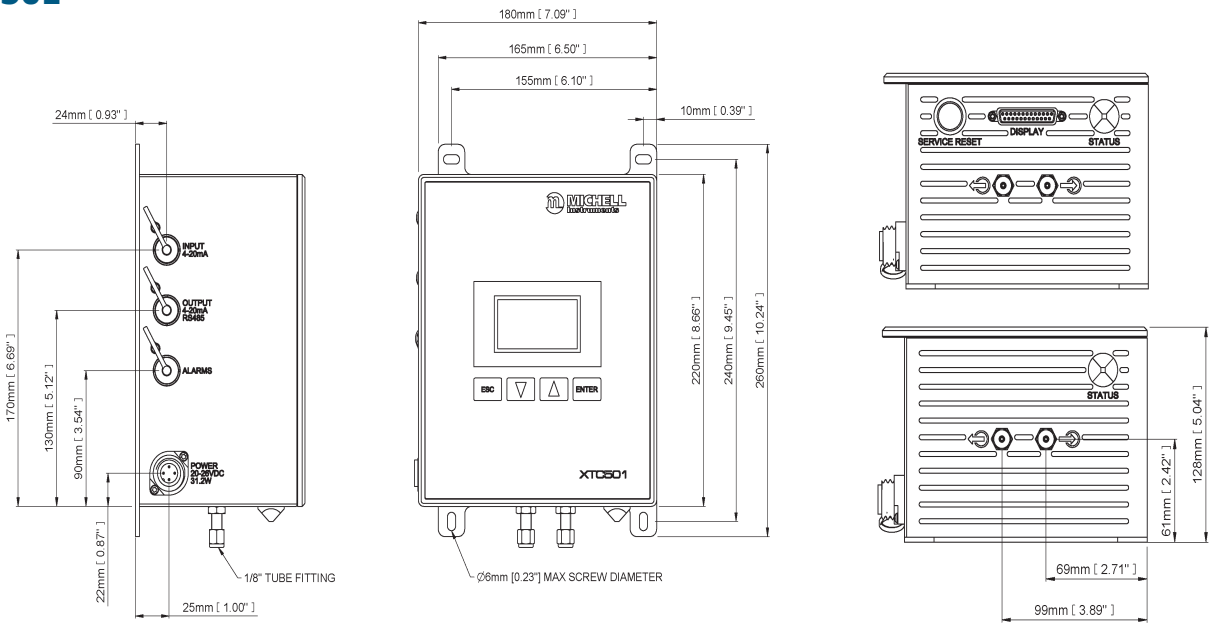
Application Software
The XTC application software will allow the user remote access to the unit. This includes displaying the target gas concentration, alarms, graphs, changing parameters and even remote calibration.

Product Dimensions

XTC601



XTC501



Related Industrial Products

Minox i

Intrinsically Safe Oxygen Transmitter

XTP601

Oxygen Analyzer

Easidew PRO I.S.

Process Dew-Point Transmitter

GPR-1200

Portable Trace Oxygen Analyzer

Technical Specifications

Product	XTC601	XTC501
Performance Specifications		
Measurement Technology	Thermal Conductivity sensor	
Measured Gases	Air, Ar, CH_4, CO_2, H_2, He, or N_2	
Background Gas	Analyzer is calibrated in the background gas of the process.	
Gas Requirements	Non-condensing sample with particles <3µm	
Measurement Range	Selectable from 0–1% up to 0–100%, 50–100% up to 98–100% (see order code sheets)	
Display Resolution	0.01% 0.1% for XTC spans > 10%	
Display Type	Backlit LCD (not on 501-GP2 model)	
Intrinsic Error (Accuracy)	< ±1% of span or ±0.05% H_2 or He, whichever is greater < ±2% of span (for all other gas mixtures and ranges)	
Response Time (T90)	< 50 seconds for most gas combinations < 20 seconds H_2 or He	
Repeatability	±0.2% of span	
Linearity	±1% of span	
Zero Stability	±0.5% of span per month	
Span Stability	±0.5% of span per month	
Sample Flow Rate (General Purpose)	100 to 500 ml/min (0.25 to 1.0 scfh)	
Sample Flow Rate (Ex Version)	270 to 330 ml/min (0.57 to 0.7 scfh)	N/A
Sample Flow Effect (Calibrated at 300 ml/min)	< 1% of span for flows within stated range	
Sample Pressure	A fixed pressure of 0.75 to 1.5 Bar A (10 to 20 psi A) (unit must be calibrated at the same pressure as sample)	
Maximum Safe Pressure	1 barg	
Sample Temperature	A constant temperature of 5 to 45°C	
Sample Cell Temperature	+50°C	
Electrical Specifications		
Analog Inputs	1 off mA input for an external sensor (can be displayed on the screen) 1 off mA input to act as an active compensation for the process conditions	
Analog Outputs	2 off 4-20 mA outputs (powered with 24V excitation voltage)	
Output Ranges	Primary range is set to the calibrated range of the instrument. The second is user-selectable	
Alarms	2 off single pole changeover relays for concentration (250 V, 5 A max)	
Datalogging	Digital communications can be used to log the output from the analyzer on an external device	
Digital Communications	Modbus RTU over RS485 Protocol	
Power Supply	24 V DC, 1.5 A max	
Operating Conditions		
Ambient Temperature	+5 to +60 °C	+5 to +40 °C
Mechanical Specifications		
Warm-up Time	< 25 minutes (at 20°C ambient)	
Stabilization Time	5 minutes	
Wetted Materials	316 stainless steel, borosilicate glass, platinum, (plus O-ring)	
Dimensions (w x d x h)	234 x 234 x 172mm	260 x 180 x 128mm
Weight	9.7 kg	Approx. 3kg
O-Ring Materials	Viton, Silicone or Ekraz	Viton
Gas Connection	1/4" NPT Female (GP1) 1/8" NPT Female (Ex & GP2)	1/8" Swagelok
Ingress Protection	IP66, NEMA 4	IP55
Hazardous Area Classification		
ATEX	II 2GD Ex d IIB +H2 T6 Gb Ex tb IIIC T85°C Db IP66	N/A
IECEx	Ex d IIB +H2 T6 Gb Ex tb IIIC T85°C Db IP66	N/A
Temperature Ranges for ATEX and IECEx as per O-Ring Type	Silicon: Ta O-ring = -40°C to +60°C Viton: Ta O-ring = -15°C to +60°C Ekraz: Ta O-ring = -10°C to +60°C	N/A
cQPSus	Class I, Division 1, Groups B,C,D T6	N/A
TC TR Ex	1Ex d IIB+H2 T6 Gb	N/A

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Michell Instruments adopts a continuous development programme which sometimes necessitates specification changes without notice.
Issue no: XTC Series_97440_V6.1_NL_0920