

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
Capable



Highlights

- ATEX, IECEx, UKCA, TR CU 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 H₂ or He)
- IP55 or IP66 enclosure options
- Light guide to NAMUR 44 standard
- 2 x 4...20 mA outputs and Modbus RTU over RS485 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 CO₂/H₂ 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 Capable Option

The XTC601 can now be purchased meeting the requirements of IEC 61508 (SIL2 Capable). 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
- 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.

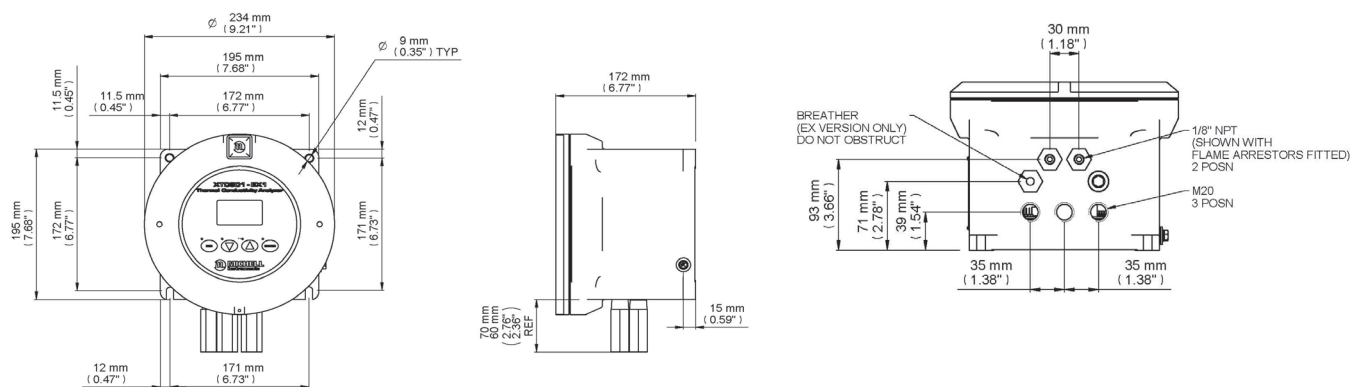


Application Software

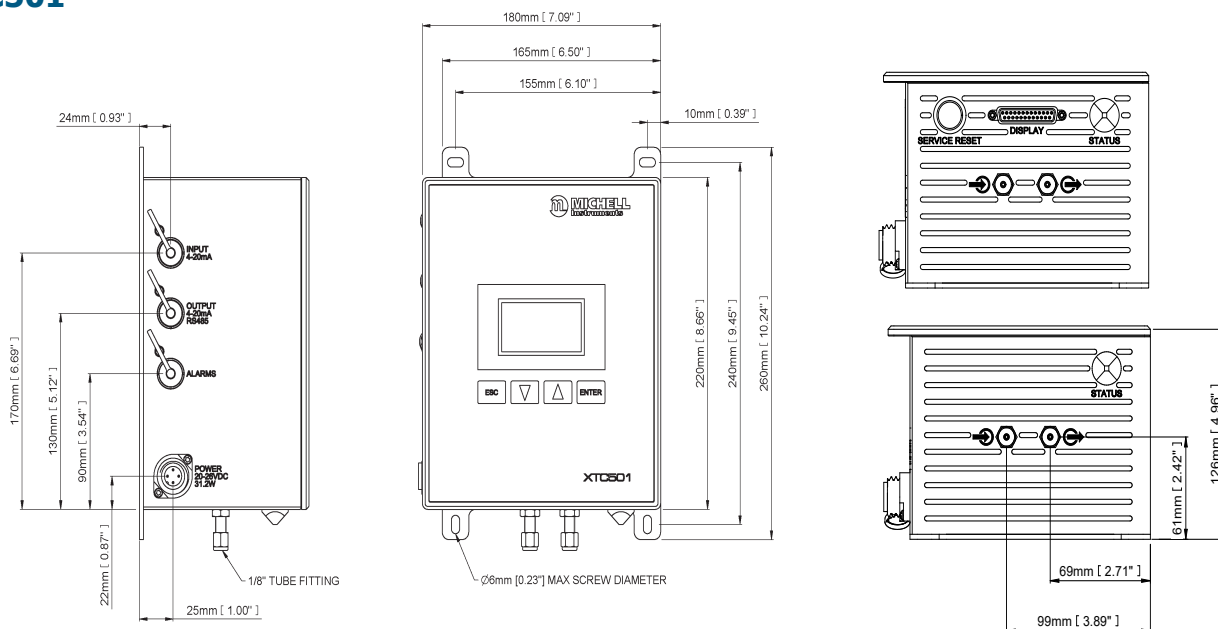
The XTC application software will allow the user remote access to the unit. This includes displaying the target gas concentration, alarms, graphs, changing parameters and even remote calibration.

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 ranges > 10 % | |
| Display Type | Backlit LCD (not on 501-GP2 model) | |
| Intrinsic Error (Accuracy) | < ±1 % of range or ±0.05 % H ₂ or He, whichever is greater < ±2 % of range (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 range | |
| Linearity | ±1 % of range | |
| Zero Stability | ±0.5 % of range per month | |
| Range Stability | ±0.5 % of range per month | |
| Sample Flow Rate (General Purpose) | 100...500 ml/min (0.25...1.0 scfh) | |
| Sample Flow Rate (Ex Version) | 270...330 ml/min (0.57...0.7 scfh) | N/A |
| Sample Flow Effect | < 1 % of range for flows within stated range (calibrated at 300 ml/min) | |
| Sample Pressure | A fixed pressure of 0.75...1.5 bar A (10...20 psi A) (unit must be calibrated at the same pressure as sample) | |
| Maximum Safe Pressure | 1 barg (14.5 psig) | |
| Sample Temperature | A constant temperature of +5...+45/+55 °C (+41...+113/+131 °F) | A constant temperature of +5...+45 °C (+41...+113 °F) |
| Sample Cell Temperature | +50/+60 °C (+122/+140 °F) | +50 °C (+122 °F) |
| 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 | |
| Power Supply | 24 V DC, 1.0 A max | |
| Operating Conditions | | |
| Ambient Temperature | +5...+60 °C (+41 °F...+140 °F) +5...+50 °C (+41...+122 °F) cQPSus | +5...+50 °C (+41 °F...+122 °F) |
| Mechanical Specifications | | |
| Warm-up Time | < 25 minutes (at 20 °C ambient) | |
| Stabilization Time | 5 minutes | |
| Wetted Materials | 316L stainless steel, borosilicate glass, platinum, (plus O-ring) | |
| Dimensions (w x d x h) | 234 x 234 x 172 mm (9.21 x 9.21 x 6.77") | 260 x 180 x 128 mm (10.24 x 7.09 x 5.04") |
| Weight | 9.7 kg (21.3 lbs) | Approx. 3 kg (6.6 lbs) |
| 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/UKCA | II 2 G D Ex db IIB +H2 T6 Gb Ex tb IIIC T85 °C Db IP66 | N/A |
| IECEX | Ex db IIB +H2 T6 Gb Ex tb IIIC T85 °C Db IP66 | N/A |
| Temperature Ranges for ATEX/UKCA and IECEX as per O-Ring Type | Silicon: Ta O-ring = -40 °C...+60 °C * Viton: Ta O-ring = -15 °C...+60 °C * Ekraz: Ta O-ring = -10 °C...+60 °C * | N/A |
| cQPSus | Class I, Division 1, Groups BCD T6 Class II, Division 1, Groups EFG Class I, Zone 1, AEx/Ex db IIB+H2 T6 Gb Zone 21 AEx/Ex tb IIIC T85°C Db | N/A |
| TR CU Ex | 1Ex d IIB+H2 T6 Gb | N/A |

* Maximum temperature of +50 °C for North America, +55 °C for TR CU Ex (EAC).

Michell Instruments adopts a continuous development programme which sometimes necessitates specification changes without notice.
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