Superior technology and quality from the world leader in oxygen measurement

**User-friendly**
- language options
- selectable system analysis
- comprehensive diagnostics
- includes reference air supply

**Reliable**
- steel enclosure
- NEMA 4X/IP66
- proven track record
Introduction

The ZDT Analyzer/Alarm Unit is a versatile microprocessor-based oxygen analyzer designed to meet the requirements of high-temperature combustion control applications, utilizing high-quality zirconia oxygen probes, for energy management.

The high temperature version of the ZDT Unit is designed to operate with the ZGP2 oxygen probe – see separate data sheet SS/ZGP2.

In the event of probe thermocouple failure the temperature of the process can be preset in the ZDT Unit.

The standard analyzer has high/low alarm relays and a single linear or logarithmic isolated retransmission. Display features include %O₂, cell temperature, cell mV, alarm set points, calibration sequence diagnostics and output settings.

The analyzer provides oxygen readout with computation based on the probe mV signal. The mV output signal is Nernstian in form and follows the equation:

\[ E(\text{mV}) = 0.0496 \times T \left( \log_{10} \frac{P_0}{P_1} \right) + C \text{ (mV)} \]

Where:
- \( T \) = Absolute temperature (°K)
- \( P_0 \) = Partial pressure reference O₂ (air)
- \( P_1 \) = Partial pressure sample O₂
- \( C \) = Cell constant
- 0.0496 = Faraday's Gas Constant

Reference air for the ZGP2 probe can be supplied by an optional integral pump within the ZDT, or by external regulated instrument air. Flow rate of the integral pump is approximately \( 1\text{ min}^{-1} \) (0.264 galls min \(^{-1}\)).

Construction and Operation

The ZDT Unit is housed in a sheet steel enclosure, environmentally protected to NEMA 4X (IP66).

The analyzer is based on the proven 4600 Series transmitter with a two-line display and four tactile membrane switches. The measured value display-line is a 5-digit, 7-segment green back-lit LCD while the information display-line is a 16-character, single-line, dot-matrix, green back-lit LCD.

The information display can be user-programmed for display in English, French, German or Spanish language.

The \( \uparrow \) switch enables movement from the ‘Operating Page’ to the oxygen calibration sequence. Use of the appropriate security code allows further access to the pages for ‘Set Up Outputs’ and ‘Electrical Calibration’. The \( \downarrow \) switch is used to select the various programming pages while the \( \uparrow \) and \( \downarrow \) switches change programmable values.

In the Oxygen Calibration Page a User Code is required to proceed beyond the diagnostic information to the calibration sections.
High Temperature Zirconia Oxygen Analyzer
ZDT–GP Series

Schematic Diagram

Overall Dimensions – Analyzer

Dimensions in mm (in.)

Fixing Centers
434 (17.1)

403 (15.9)

453 (17.8)

252 (9.92)

227 (8.9)

133 (5.2)

150 (5.9)

5 (0.2)

4 x 9.5 OD (3/8) holes for M8 fixing

ZDT Oxygen Analyzer

Retransmission Output

Power Supply

Alarm
Specification – Analyzer

Display

**Measured value**
5-digit x 7-segment back-lit LCD

**Information**
16-character, single line, dot matrix, back-lit LCD

**Parameters**
- %O₂ (0 to 25%)
- Cell temperature
- Cell mV

Two O₂ alarm set points – alarm 2 can be configured as a common failure alarm for any of the following:
- THC open circuit
- Cell under temperature
- Calibration failed
- Power failure

Accuracies

**System accuracy** *

**Display resolution**
±1 digit

**Display**
- ≤2% of reading
- or ±0.1 O₂ whichever is greater

**Retransmission**
- ± ± 2% of reading
- or ±0.1% O₂ whichever is greater

**Error due to power supply variation**
- Less than 0.1% for +6%–20% variation from nominal supply voltage

* ZDT Unit with a ZGP2 probe when calibrated against a certified test gas

Environmental Data

**Operating temperature limits**
- –5° to 55°C (23° to 131°F) all functions
- –20° to 70°C (–4° to 158°F) retransmission

**Storage temperature limits**
- –25° to 55°C (–13° to 131°F)

**Operating humidity limits**
- Upto 95% RH non-condensing

Power Supply

**Voltage requirements**
- 100 to 130V, 200 to 260V 50/60Hz

**Power consumption**
- 110VA

**Insulation**
- Mains to earth (line to ground) 2kV RMS

Outputs and Set Points

**No. of relays**
- Two

**Relay contacts**
- Single pole changeover
  - Rating: 250V AC 250V DC max.
  - 3A AC 3A DC max.
- Loading (non-inductive)
  - 750VA 30W max.
- (inductive)
  - 75VA 3W max.

**Insulation**
- 2kV RMS contacts to earth (ground)

**No. of set points**
- Two

**Set point adjustment**
- Programmable

**Set point hysteresis**
- ±1% of set point (fixed)

**Local set point annunciation**
- Red LED
Retransmission
One fully isolated retransmission
Programmable for any range within
0 to 25% O₂ (linear)
(5% minimum span)
0.01 to 25% O₂ (logarithmic)
(Programmable for any two decades within 0.01 to 25%)

Output current
0 to 10mA, 0 to 20mA or 4 to 20mA programmable

Resolution
0.1% at 10mA, 0.05% at 20mA

Max. load resistance
750Ω (20mA max.)

Output loop test
Output loop test at 0%, 25%, 50%, 75% and 100% of output span

Mechanical Data
Mounting
Wall-mount

Protection
NEMA 4X (IP66)

Dimensions
252mm (9.9 in.) wide x 453mm (17.8 in.) high x 150mm (5.9 in.) deep.

Weight
9kg (19.8 lb) approx.
**Electrical Connections**

- **Mains Supply**: 100 to 130V or 200 to 260V, 50/60Hz
- **Relay 1**: Brown, Blue, Braided Blue, White, Blue
- **Relay 2**: Brown, Blue, Braided Blue, White, Blue
- **Heater Drive**: Red, Blue, Braided Blue
- **Retransmission**: White, Blue
- **Cell**: White, Blue
- **Thermocouple**: White, Blue

<table>
<thead>
<tr>
<th>Type of Thermocouple</th>
<th>Compensating Cable</th>
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<tbody>
<tr>
<td>Ni-Cr/Ni-Al (Type K)</td>
<td>EN 60584.3</td>
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<tr>
<td>Pt/Pt-13% Rh (Type R)</td>
<td>Green</td>
</tr>
<tr>
<td>Pt/Pt-10% Rh (Type S)</td>
<td>Orange</td>
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</tbody>
</table>

Legend:
- N/C: Normally Closed
- N/O: Normally Open
- +: Positive
- -: Negative
- Case: Green, White, Orange
## Ordering Information

<table>
<thead>
<tr>
<th>High Temperature Zirconia Oxygen Analyzer – ZDT–GP Series</th>
<th>ZDT/GP–EN Rev. 1</th>
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<tbody>
<tr>
<td><strong>Probe Type</strong></td>
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<td><strong>Thermocouple Type</strong></td>
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<td>110V 50/60Hz</td>
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