Model 9437
Low and High Level Dissolved Oxygen Monitor

A compact, competitively priced low level dissolved oxygen monitoring system

Monitors both high and low dissolved oxygen concentrations
— making it suitable for measurement during two-shift and base-load operations on power stations

Fastresponse
— reacts to rapid changes in plant operation

Disposable sensor and no routine maintenance
— gives low running costs

Comprehensive diagnostics facility with in-built software protection
— ensures security and confidence in operation
Introduction
The high costs involved in replacing damaged equipment coupled with the need to extend the periods between plant overhauls has resulted in increased importance being placed on preventative maintenance. This principle has been extended to maintaining the quality of feed water running through the process system in order to reduce corrosion damage to boilers and related equipment.

One of the major forms of boiler damage is oxidative corrosion. This occurs when oxygen dissolved in the process water comes into contact with the metal surfaces inside the boiler. During these conditions, electrolytic action establishes a potential difference between the oxygen and metal which, if allowed to continue, causes severe pitting and the eventual failure of the metal components.

This type of damage can be prevented if close attention is paid to oxygen levels and remedial action taken in the event of these levels rising. Because oxygen levels tend to vary considerably during the load cycle of a plant, an analyzer is required that can cope with both high and low levels of dissolved oxygen and which is able to respond rapidly enough to enable the efficiency of deaerator and dosing systems to be checked.

General Information
The ABB 9437 Dissolved Oxygen Monitor uses a Mackereth type sensor to accurately measure the levels of dissolved oxygen in process feed water. It has been designed specifically for on-line use in power generation and related process plant.

The Model 9437 is an accurate, reliable instrument which requires practically no maintenance and measures oxygen concentrations between the ranges 0 to 20.0μg/kg, and 0 to 20.0mg/kg. It comprises a 9437 Series transmitter, a Model 9437-010 sensor flow cell and a Model 9435-300 dissolved oxygen sensor, plus interconnecting cable available in lengths of 3, 5, 10, 20 or 30m.

The 9437 Series Transmitter
The 9437 Series transmitter provides the operator interface and communications to other devices. The signal from the sensing system is converted by the transmitter and the information is presented on a large, custom-designed, easy-to-read, backlit liquid crystal display (LCD) as a μg/kg or mg/kg value.

A process retransmission signal and two alarm relay outputs are provided as standard, while an optional RS485 serial interface allows the transmitter to be easily incorporated into the ABB PC30, or other Modbus™ compatible supervisory system.

Available in wall-mounting or 1/4 DIN panel-mounting versions, the transmitter is protected to IP66, ensuring reliable operation in the most demanding situations. The same level of protection is maintained during programming and calibration.

User Friendly Operation
An easy to read display is used in conjunction with the four tactile membrane key pads to prompt the user through the programming procedures. Included as standard is a four language software package, to display information in English, French, German or Spanish.

Easy Installation, Commissioning and Maintenance
The compact transmitter allows flexible and easy installation. The unique LCD is easy to read in all light conditions. Used in conjunction with the membrane key pad it prompts the user through the set up procedure. Range, alarm levels, set point adjustments and system calibration are easily set.
Sensor System
The sensing system employs the well proven 9435-300 disposable capsular sensor mounted in a compact flow cell which also houses a Pt1000 temperature sensor.

The sample flow path in the cell is designed so that rapid response is ensured while membrane erosion by particles in sample is avoided.

Dissolved Oxygen Sensor
The sensor is a disposable galvanic cell comprising a lead anode and a silver cathode in an alkaline electrolyte. The cell reactions are:

at the anode;
\[ \text{Pb} \rightarrow \text{Pb}^{2+} + 2e^- \]

at the cathode;
\[ \text{O}_2 + 2\text{H}_2\text{O} + 4e^- \rightarrow 4\text{OH}^- \]

When exhausted, the capsular sensor can be quickly and easily replaced. Sensor life is dependent on process conditions.
Components of 9437 Dissolved Oxygen Monitor

Interconnecting Cable (Maximum length 30m)

Wall-mounting Transmitter

Panel-mounting Transmitter

9435-300 Sensor

Flow cell assembly with integral temperature sensor
Specifying — Flowcell

**Mounting**
Vertically, using the built-in fixing bracket

**Measuring ranges**
Programmable within the ranges 0 to 20.0μg/kg and 0 to 20mg/kg

**Scaling**
μg/kg, mg/kg or ppb, ppm

**Accuracy**
±5% of reading or ±1μg/kg, whichever is the greater

**Response time**
90% of a step change in 1 minute

**Resolution**
0.1 μg/kg

**Stability**
±5% of reading or ±1μg/kg per week, whichever is the greater

**Temperature compensation**
5 to 55°C automatic using Pt1000 resistance thermometer

**Salinity correction**
Preset within the range 0 to 80ppt

**Barometric pressure correction**
Preset within the range 500 to 800mm Hg

**Sample flow**
100 to 500ml/min

**Sample pressure**
Maximum 2bar

**Sample temperature**
5 to 55°C (41 to 131°F)

**Sensor ambient temperature**
0 to 55°C (32 to 131°F)
Low and High Level Dissolved Oxygen Monitor
Models 9437

DS/9437–EN Rev. H

Specification — Transmitter

Transmitter Display
Measured value
5-digit x 7-segment back-lit LCD

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

Insulation, contacts to earth
2kV RMS

Set Points and Relays
No. of set points
Two

Set point adjustment
Programmable

Set point hysteresis
±1% of FSD (fixed)

Local set point annunciation
Red LED

No. of relays
Two

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

Retransmission
No. of retransmission signals
One, fully isolated
Optional second current output

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

Maximum load resistance
500Ω (20 mA maximum)

Serial communication
RS422/RS485 (optional, with one current output signal)

Power Supply
Voltage requirements
100 to 130V or
200 to 260V 50/60 Hz

Power Consumption
< 10VA

Error due to power supply variations
Less than ±2% for +6% –20% variation from nominal supply voltage

Insulation, mains to earth
2kV RMS
**Environmental Data**

**Operating temperature limits**
-20 to 55°C (–4 to 131°F)

**Operating humidity limits**
Up to 95% RH non-condensing

**Storage temperature limits**
- Flowcell: –25 to 70°C (–13 to 158°F)
- Sensor: 0 to 55°C (32 to 131°F)
- Transmitter: –25 to 70°C (–13 to 158°F)

**Protection**

**Flowcell**
- IP65

**Transmitter**
- Panel-mounting: IP66/NEMA4X
- Wall-mounting: IP66/NEMA4X front

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**Mechanical Data**

**Mounting**
- Wall-mounting or Panel-mounting

**Overall dimensions**
- Flowcell (without unions): 97 x 80 x 108.6mm (3.82 x 3.15 x 4.28 in.)
- Transmitter Wall-mounting: 160 x 214 x 68mm (6.29 x 8.43 x 2.68 in.)
  - Panel-mounting: 96 x 96 x 191mm (3.78 x 3.78 x 7.52 in.)
  - Panel cut-out: 92 x 92mm (3.62 x 3.62 in.)

**Weights**
- Flowcell (with sensor fitted): 0.75kg (1.65 lb)
- Transmitter Wall-mounting: 2kg (4.41 lb)
  - Panel-mounting: 1.5kg (3.31 lb)

**Sample connections**
- Compression fitting to accept either 6mm OD tubing
  - or 1/4 in. OD tubing
Installation Options
The adjacent Figure A shows the recommended system with a sample isolation valve V1 and a flow meter, where the dissolved oxygen sensor remains in the flowcell during calibration in air. An extra valve (V2) is fitted to drain the sample from the flowcell prior to calibration.

Figure B shows a simple system with a sample line isolation valve (V1). In this arrangement the oxygen sensor is removed from the flowcell for calibration in air.

Flow Cell Installation Details
Overall Dimensions

Wall-mounting Transmitter

Panel-mounting Transmitter
Electrical Connections

Wall-mounting Transmitter

Panel-mounting Transmitter

*Note. 2\textsuperscript{nd} retransmission output available when RS485 serial communications not used.
## Ordering Information

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<th>Dissolved Oxygen Monitor</th>
<th>9437/00</th>
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<td><strong>Standard</strong></td>
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<td>Standard 6mm fitting</td>
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