

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.

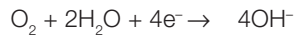
Dissolved Oxygen Sensor

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;



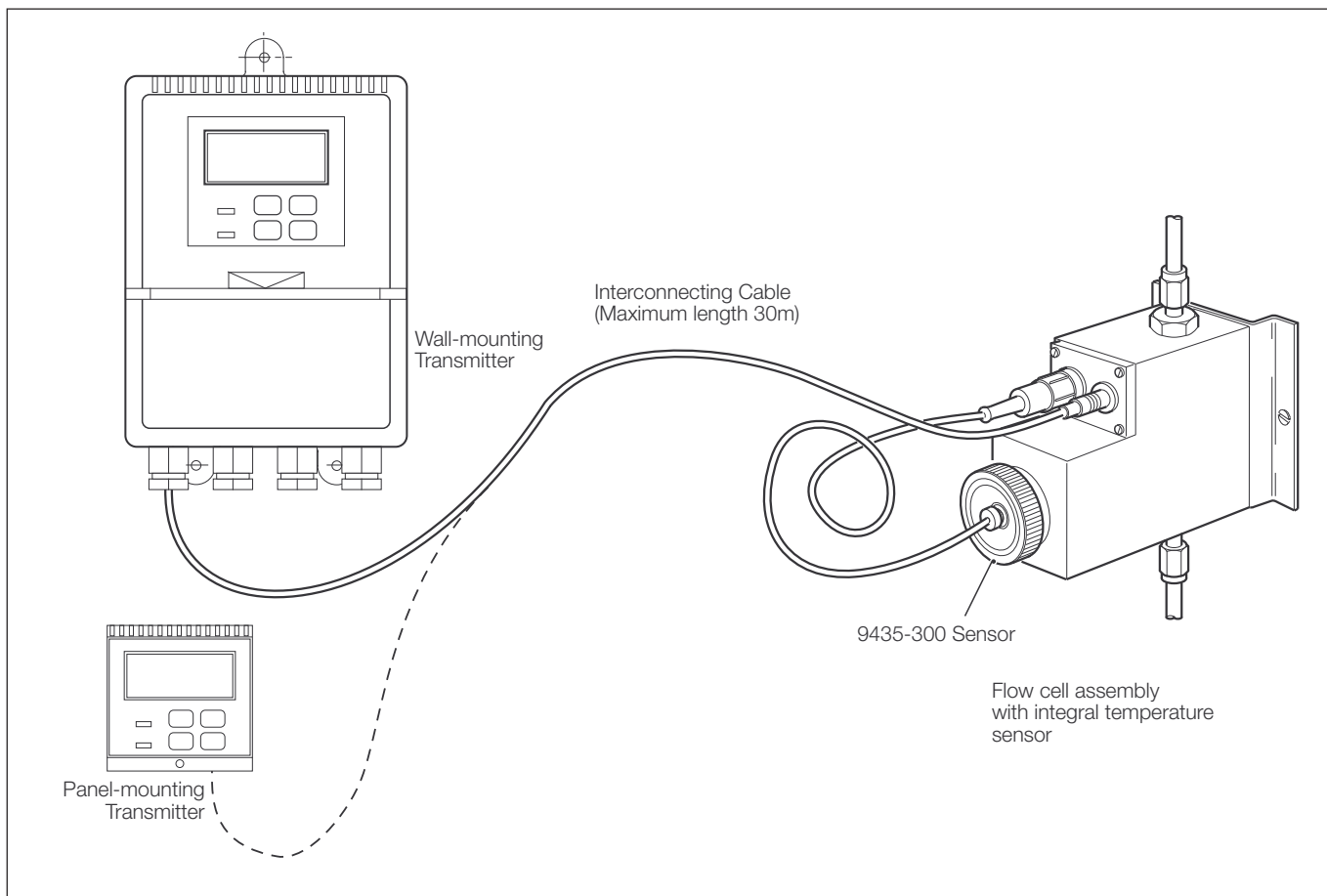
at the cathode;



When exhausted, the capsular sensor can be quickly and easily replaced. Sensor life is dependent on process conditions.



The 9435-300 Disposable Sensor



Components of 9437 Dissolved Oxygen Monitor

Specification — 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)

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

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)

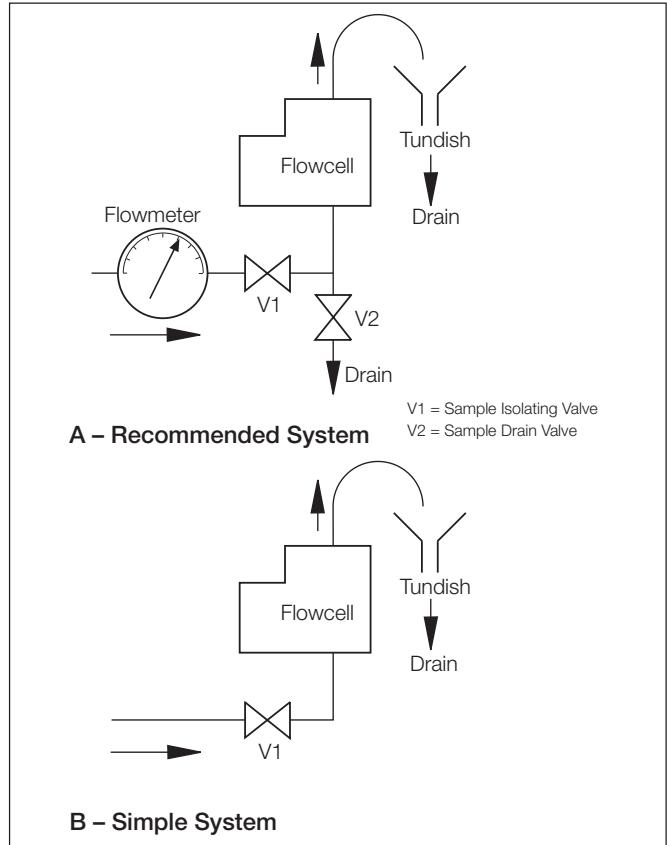
Sample connections

Compression fitting to accept
either 6mm OD tubing
or 1/4 in. OD tubing

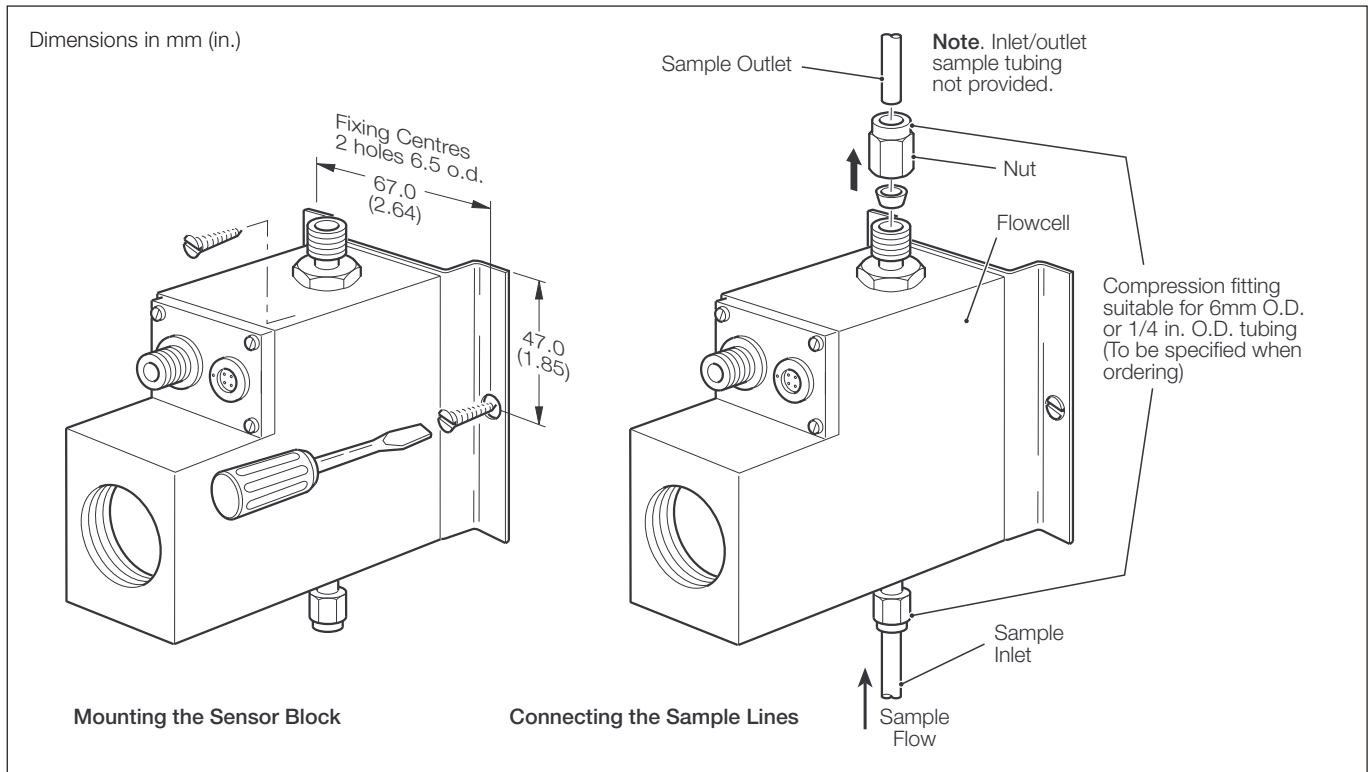
Installation Options

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.

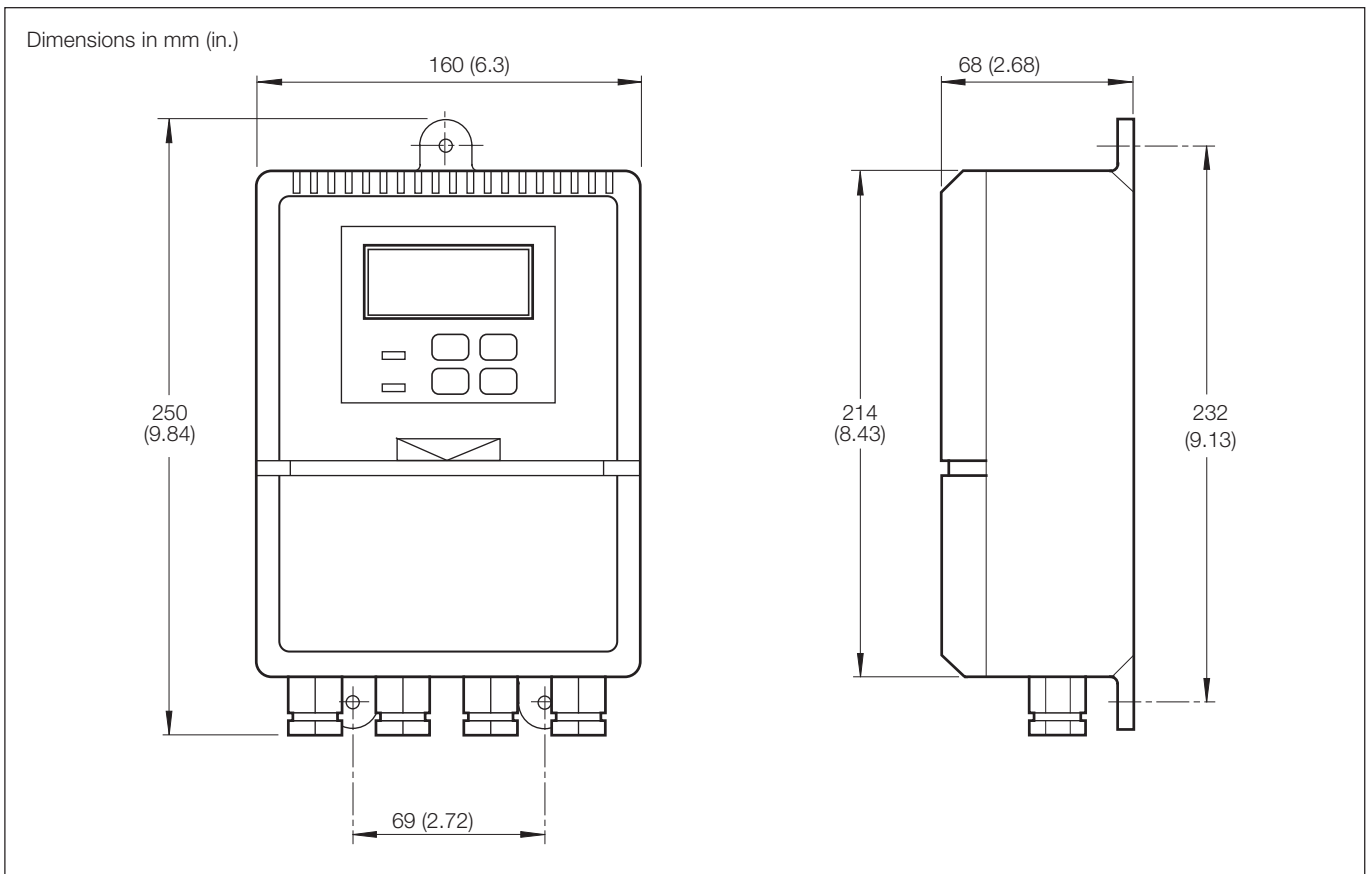


Flowcell Schematic Arrangements

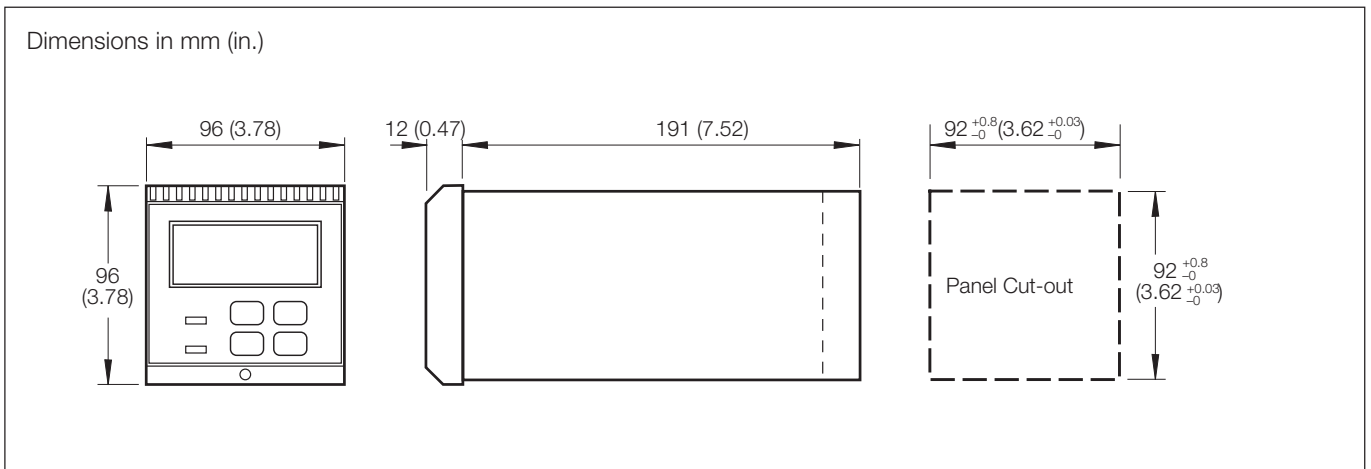


Flow Cell Installation Details

Overall Dimensions

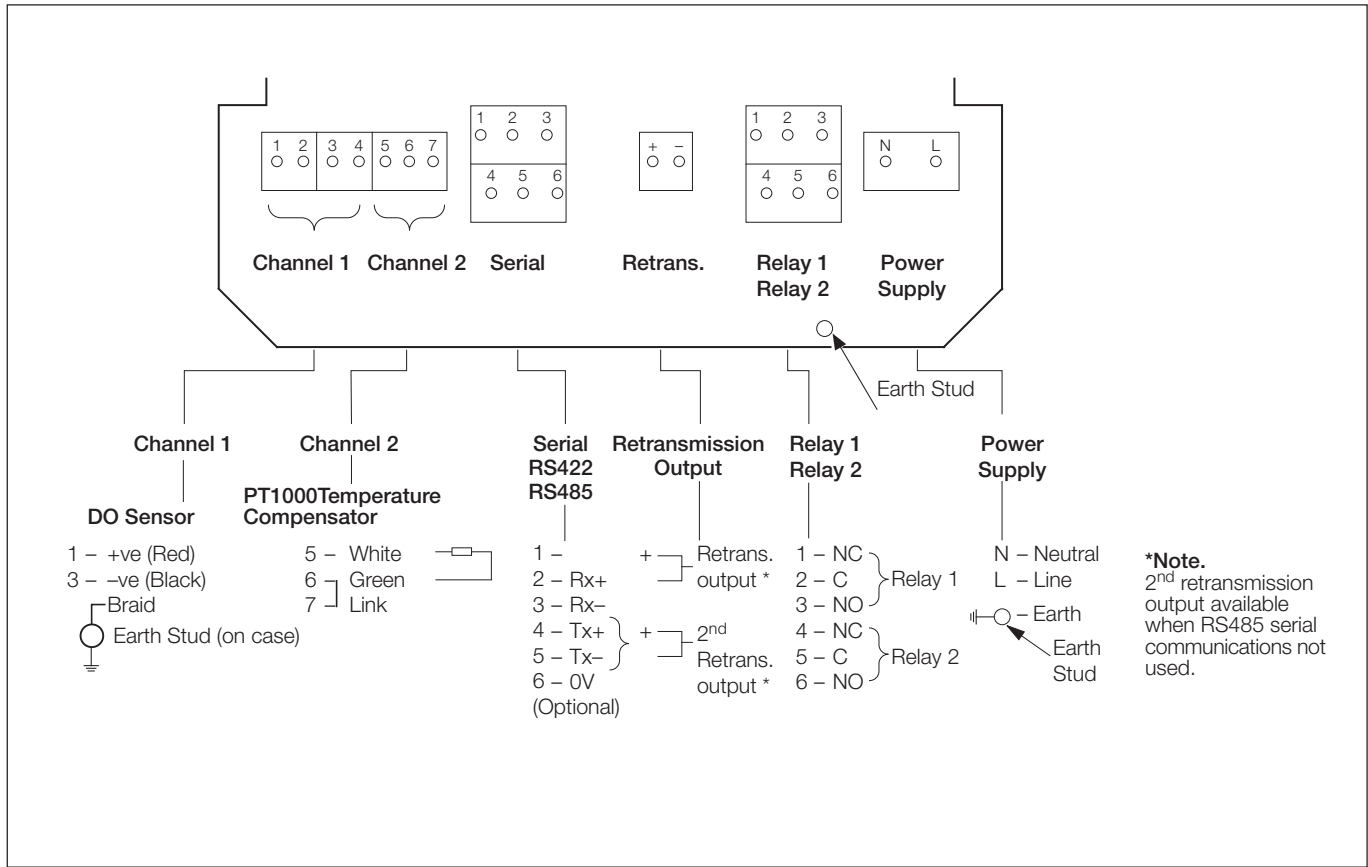


Wall-mounting Transmitter

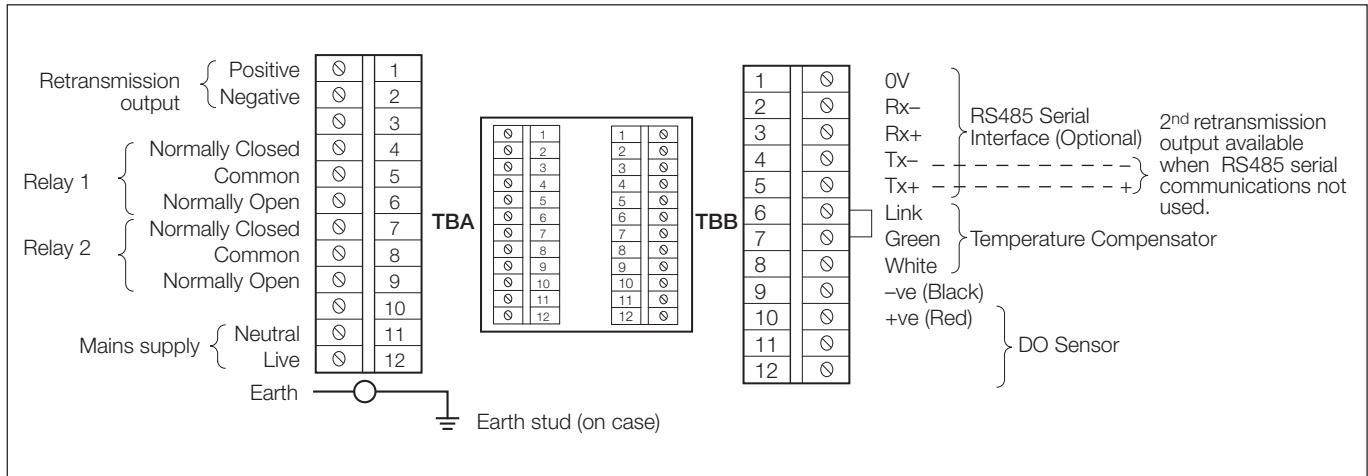


Panel-mounting Transmitter

Electrical Connections



Wall-mounting Transmitter



Panel-mounting Transmitter

Ordering Information

Dissolved Oxygen Monitor	9437/00	X	X	X	X	X
Standard						
Standard 6mm fitting		0				
Flow cell (6mm fitting) less capsule		1				
Standard 1/4 in. fitting		2				
Flow cell (1/4 in. fitting) less capsule		3				
Special		9				
Enclosure						
Wall-mounting			0			
Panel-mounting			1			
Output						
Current output only				0		
Current output + serial data interface (Modbus protocol)				1		
2 current outputs				2		
Special				9		
Cable length						
3m (9.75 ft)					0	
5m (16.25 ft)					1	
10m (32.4 ft)					2	
20m (65 ft)					3	
30m (97.5 ft)					4	
Special					9	
Language						
English						0
German						1
French						2
Spanish						3
Special						9

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3KXA494302R1001

DS/9437-EN Rev. H 12.2010