Data Sheet
SS/4640_9

Dissolved Oxygen Analyzer

Models 4640 & 4645
(incorporating Water Wash Versions 4642 & 4647)

- **Unique oxygen sensors**
  – unrivalled reliable operation, long life and minimum maintenance
- **Sensor life indicator**
  – indicates sensor performance
- **Second current output and Modbus™ communication**
  – enables simultaneous retransmission of both dissolved oxygen and temperature
- **Comprehensive diagnostics facility with in-built software protection**
  – ensures security and confidence in operation
- **Salinity and atmospheric pressure correction capability as standard**
  – enhances the flexibility of application
- **Water-Wash option**
  – minimizes maintenance whilst maintaining performance
- **IP66/NEMA4X**
  – reliable operation in demanding environments
- **English, French, German and Spanish software**
  – simple, user-selection of display language

A high specification dissolved oxygen analyzer offering advanced functionality, simple operation and reliability in harsh environments

4640 Series Dissolved Oxygen Analyzer

The ABB 4640 Series Dissolved Oxygen Analyzer comprises a transmitter and a sensing system to accurately and reliably measure and transmit the dissolved oxygen value in a range of water monitoring applications.

The 4640 Series Analyzer offers high performance and advanced functionality in a compact, cost-effective package. It is rugged and reliable for safe operation in harsh environments, simple to install and use, and requires minimum maintenance.

Sensor System

To meet your requirements there are a number of sensor systems. The 9408 Series are available as a floating ball (which can also be ordered in a kit form for convenience) – primarily used in sewage treatment and in three different lengths of dip system. To complete the capability a 76 Series flow system for in-line applications is also available. The key factor in all the systems is the sensor capsule which is proven to have an unrivalled performance, for longevity, quality and reliability.

The 4600 Series Universal Transmitter

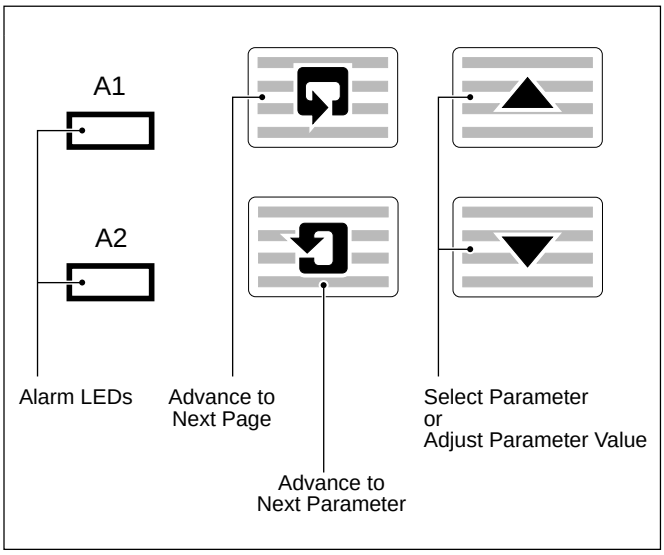
The 4600 Series Universal Transmitter provides the operator interface and communications to other devices. The signal from the sensing system is converted by the transmitter and the information is presented on a large, custom-designed, easy-to-read, back-lit liquid crystal display (LCD) as a dissolved oxygen value in percent saturation or ppm.

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 supervisory system.

Available in wall-mount or ¼ DIN panel-mount 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 five language software package, to display information in one of English, French, German, Italian or Spanish languages.



Instrument Key Pads

Easy Installation, Commissioning and Maintenance

The compact panel- or wall-mount 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 easy to set.

Water-Wash Option

To prevent fouling of the oxygen sensor, clean water is forced through the system at user-configurable intervals. Maintenance periods can be extended significantly by using this feature, lowering the cost of ownership and optimizing performance.

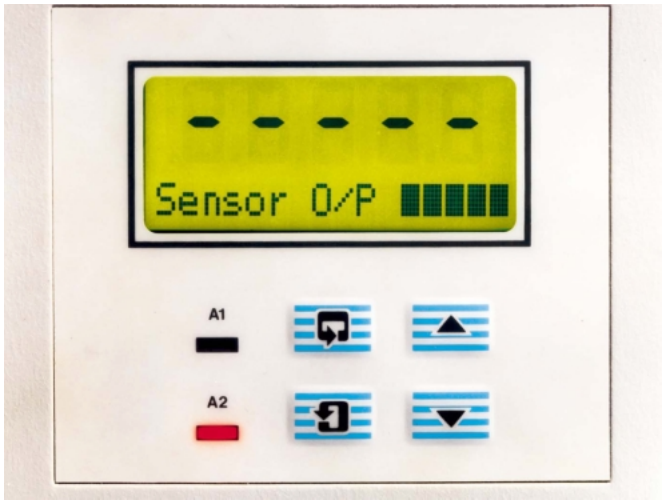
Confidence in Service

To complement the well-proven design and unrivalled accuracy and reliability in service of the dissolved oxygen sensor, the entire sensing loop is regularly self monitored for short circuits and temperature element faults. The instrument incorporates a non-volatile memory, eliminating the need for battery back-up, and line voltage supply filtering to minimize the effects of mains-borne interference.

Sensor Life Indicator

This unique feature provides information on the sensor condition and enables maximum use of the sensor before replacement.

Replacement is a simple operation that can be carried out in a few minutes.



Sensor Life Indicator

Specification

Display

Measured value

5-digit x 7-segment back-lit LCD

Information

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

Ranges

Programmable 0 to 200% saturation, 0 to 20mg/l

Resolution

0.1% saturation, 0.01% ppm

Accuracy

±1% saturation, 0.1% ppm

Temperature compensation

0° to 40°C (32° to 104°F) automatic via Pt100 resistance

Salinity correction

Automatic over the range 0 to 40% parts per thousand

Environmental Data

Operating temperature limits

–20° to 55°C (–4° to 130°F)

Storage temperature limits

–25° to 70°C (–13° to 158°F)

Operating humidity limits

Up to 95%RH non-condensing

Power Supply

Voltage requirements

100 to 130V or

200 to 260V 50/60Hz

Power Consumption

<10VA

Error due to power supply variations

Less than 2% for +6% –20% variation from nominal supply voltage

Insulation

Mains to earth (line to ground) 2kV RMS

Outputs and Set Points

No. of Relays

Two – one used for water wash on models 4642 and 4647

Set point adjustment

Programmable

Set point differential

±1% of span

Relay contact

Single pole changeover

Rating	250V AC 3A AC	250V DC max. 3A DC max.
Loading: (non-inductive)	750VA	30W max.
(inductive)	750VA	3W max.

Insulation

2kV RMS contacts to earth (ground)

No. of set points

Two

Set point adjustment

Programmable

Set point hysteresis

±1% fixed

Local set point annunciation

Red LED

Retransmission

No. of retransmission signals

One fully isolated, supplied as standard
Second retransmission output optional

Output current

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

Accuracy

±0.25% FSD or ±0.5% reading

Resolution

0.1% at 10mA, 0.05% at 20mA

Minimum range

0 to 3 ppm or 30% saturation

Maximum range

0 to 20 ppm or 200% saturation

Maximum load resistance

750Ω (20mA max.)

Serial communication

RS485 (optional extra)

Mechanical Data

Models 4640 & 4642

Wall-mount

Protection	IP66/NEMA4X
Dimensions	160mm (6.30 in.) wide x 214mm (8.43 in.) high x 68mm (2.68 in.) deep
Weight	2kg (4½ lb)

Models 4645 & 4647

Panel-mount (¼ DIN)

Protection	IP66/NEMA4X front
Dimensions	96mm (3.78 in.) wide x 96mm (3.78 in.) high x 191mm (7.52 in.) deep
Weight	1.5kg (3¼ lb)

Panel cut-out: $92\ ^{+0.8}_{-0}$ mm x $92\ ^{+0.8}_{-0}$ mm
($3.62\ ^{+0.03}_{-0}$ in. x $3.62\ ^{+0.03}_{-0}$ in.)

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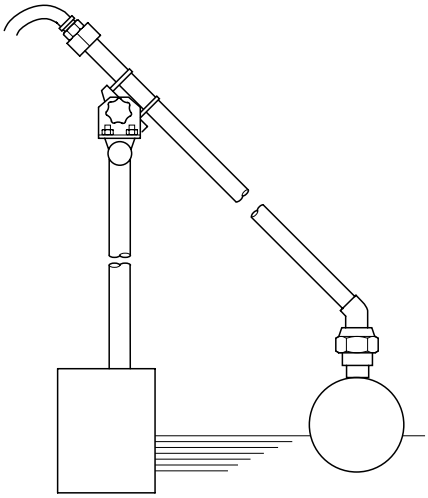
Sensing System

Select the required model number from those shown below.



Specification

Sensor type
8012-170 sensor capsule

Response
Typically 20s for 90% of a step-change of oxygen concentration at 20°C (68°F)

Temperature compensation
Automatic correction by means of an integral Pt100 resistance thermometer.

Operating temperature
0 to 40°C (104°F)

Operating pressure
Atmosphere

Minimum liquid velocity
30cm/s

Accuracy
±0.2mg/l or ±2% saturation within ±10°C (±5°F) of the calibration temperature in the range 0 to 35°C (32° to 95°F)

Materials of construction
Support arm – ABS plastic
Flotation collar – polypropylene.
Mounting bracket – stainless steel

Mounting
Pipe mount OD 50mm (2 in.)

Connection cable
Part no. 0233828 – 10m (32.5ft) fitted as standard. Maximum length 100m (325ft) via junction box (customer supply)

Support arm
Required with kits 9408-750 and 9408-760:
ABS plastic OD 50mm (2 in.)
Wall thickness 3.3mm (0.13 in.)
Pressure rating 10bar (145 psi).

Ordering Information

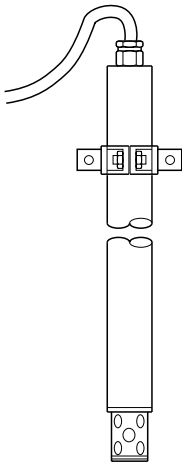
9408-700*
Floating ball system complete with support arm, mounting bracket and all other accessories

9408-750*
Floating ball kit comprising a complete 9408-700 (metric) system minus the 3m (10 ft) support arm, which can be obtained from local stockists. Included within the kit is a tube of suitable solvent cement which is used to secure the 3m (10 ft) support arm

9408- 760*
Floating ball kit comprising a complete 9408-700 (imperial) system minus the 3m (10 ft) support arm, which can be obtained from local stockists. Included within the kit is a tube of suitable solvent cement which is used to secure the 3m (10 ft) support arm

***Note for Water Wash version**:
substitute ‘2’ for the last digit
(i.e. 9408-702, 752 or 762)

Floating Ball System 9408-700/750/760



Specifications

Sensor type
8012-170 sensor capsule

Response
Typically 20s for 90% of a step change of oxygen concentration at 20°C (68°F)

Temperature compensation
Automatic correction by means of an integral Pt100 resistance thermometer

Operating temperature
0 to 40°C (32° to 104°F)

Operating pressure
Atmospheric

Minimum liquid velocity
30cm/s (11.8 in/s)

Accuracy
±0.2mg/l or ±2% saturation within ±10°C (±5°F) of the calibration temperature in the range 0 to 35°C (32° to 95°F)

Materials of construction
Polypropylene

Mounting
Wall mount bracket

Connection cable
Part no. 0233-828 – 10m (32.5ft) fitted as standard. Maximum length 100m (325ft) via junction box (customer supply)

Ordering Information

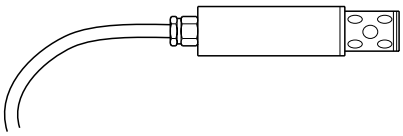
9408-710*
1m (39 in.) system complete

9408-720*
2m (78 in.) system complete

9408-730*
3m (118 in.) system complete

***Note for Water Wash version**:
substitute '2' for the last digit
(i.e. 9408-712, 722 or 732)

Dip System 9408-710/720/730



Specifications

Sensor type
8012-170 sensor capsule

Response
Typically 20s for 90% of a step change of oxygen concentration at 20°C (68°F)

Temperature compensation
Automatic correction by means of an integral Pt100 resistance thermometer

Operating temperature
0 to 40°C (32° to 104°F)

Operating pressure
Atmospheric

Minimum liquid velocity
30cm/s (11.8 in/s)

Accuracy
±0.2mg/l or ±2% saturation within ±10°C (±5°F) of the calibration temperature in the range 0 to 35°C (32° to 95°F)

Materials of construction
Polypropylene.

Connection cable
Part no. 0233-828
Maximum length 100m

Ordering Information

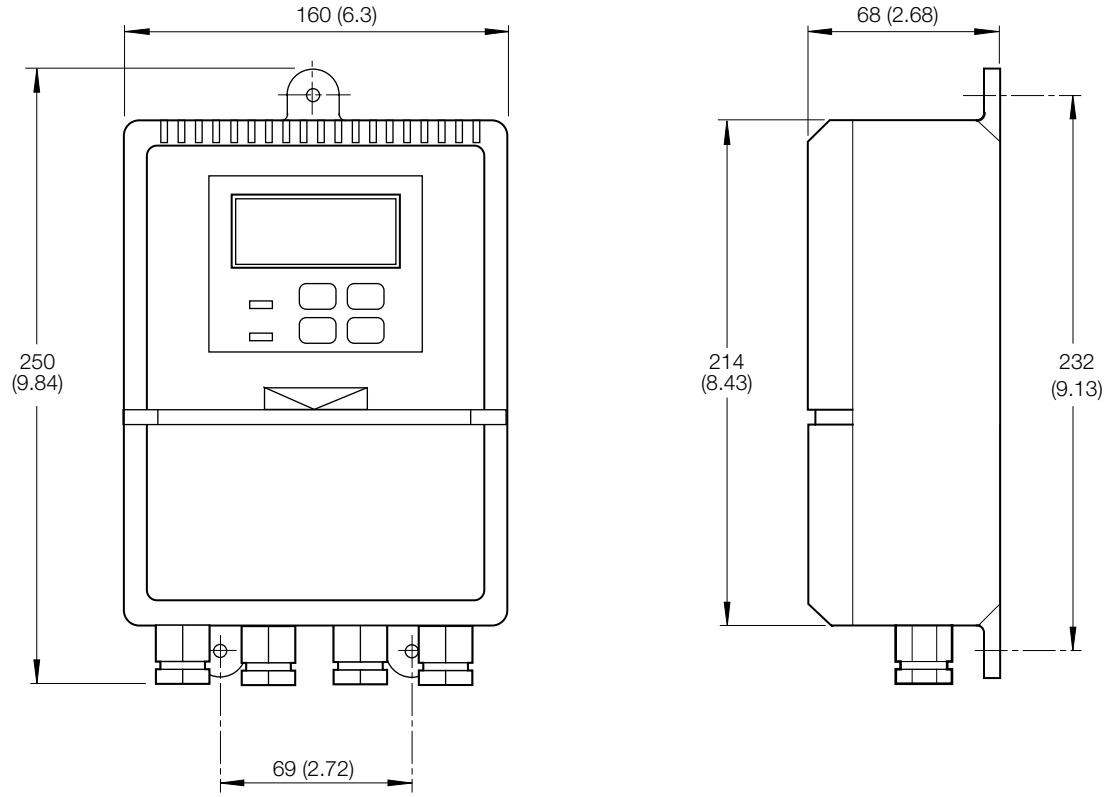
9408-600*
Submersible system complete with 8m (26 ft) of connection cable. Extension cable up to a maximum length of 100m (300 ft) (part no. 0233-828)

***Note for Water Wash version**:
substitute '2' for the last digit
(i.e. 9408-602)

Submersible System 9408-600

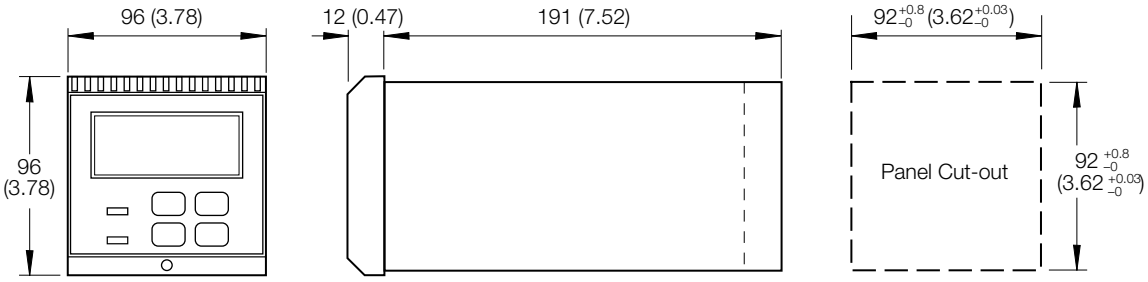
Overall Dimensions

Dimensions in mm (in.)



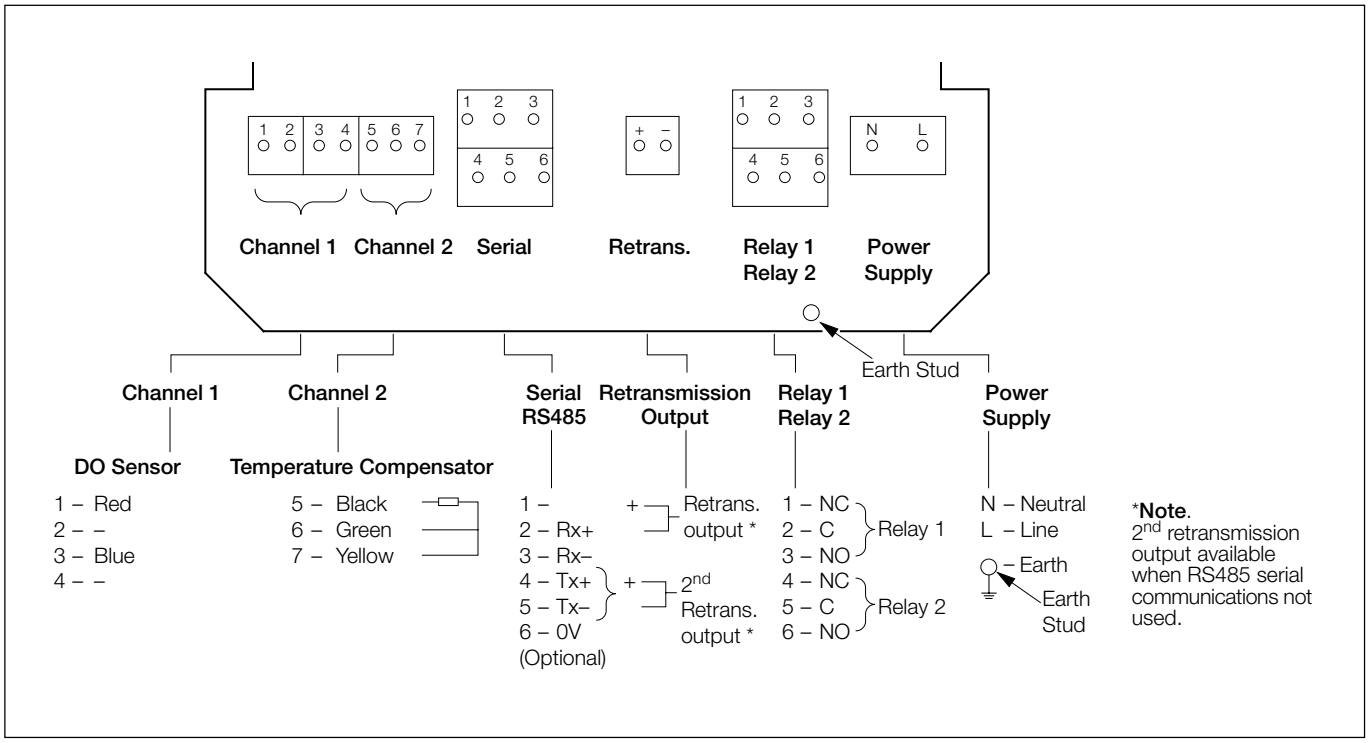
Models 4640 and 4642 Wall-mount Versions

Dimensions in mm (in.)



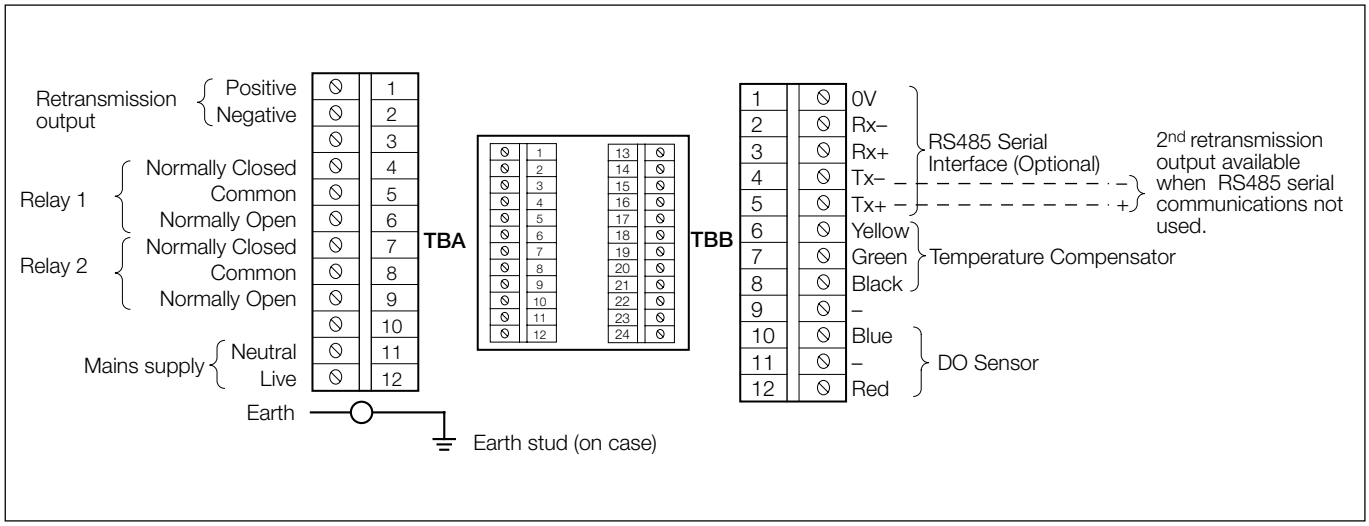
Models 4645 and 4647 Panel-mount Versions

Electrical Connections



Models 4640 and 4642 Wall-mount Versions

...Electrical Connections



Models 4645 and 4647 Panel-mount Versions

Ordering Information

To order a 4600 Dissolved Oxygen Analyzer select the Transmitter, Sensing System and Connecting Cables from the following information.

Transmitter

Dissolved Oxygen Analyzer Range 0 to 200% sat. or 0 to 20ppm, power supply 110V/240V/50/60Hz, high and low alarm relays		**464**	**X/**	**X**	**0 0**
Case	Wall-mounted IP66		0		
	Wall-mounted IP66 + Water Wash		2		
	Panel-mounted IP66 front		5		
	Panel-mounted IP66 front + Water Wash		7		
Output	Single isolated current output			5	
	Two isolated current outputs			8	
	Modbus serial data interface			7	

Sensor

Select the appropriate Sensor – see pages 6 and 7.

Connection Cable

Sensor connection cable part no. 0233-828 – 10m (32.5ft) fitted as standard.

Maximum length 100m (325ft) via junction box (customer supply).

The 4600 Series transmitters are so user-friendly and easy to program they are normally supplied with standard factory settings. If specific programming requirements are stated at the time of ordering, units can be despatched suitably customized.
Please apply to the nearest ABB Instrumentation office for details.

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