- **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

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**Dissolved Oxygen Analyzer**

Models 4640 & 4645

(including Water Wash Versions 4642 & 4647)

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**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.

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.

**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.

**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.
Dissolved Oxygen Analyzer
Models 4640 & 4645 (incorporating Water Wash Versions 4642 & 4647) SS/4640_9

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

<table>
<thead>
<tr>
<th>Rating</th>
<th>250V AC</th>
<th>250V DC max.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3A AC</td>
<td>3A DC max.</td>
</tr>
</tbody>
</table>

| 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 (4 1/2 lb)

Models 4645 & 4647
Panel-mount (1/4 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 (3 1/4 lb)

Panel cut-out: 92 ±0.03 mm x 92 ±0.03 mm
(3.62 ±0.03 in. x 3.62 ±0.03 in.)
Sensing System
Select the required model number from those shown below.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Ordering Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensor type</strong></td>
<td></td>
</tr>
<tr>
<td>8012-170 sensor capsule</td>
<td>9408-700*</td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td></td>
</tr>
<tr>
<td>Typically 20s for 90% of a step-change of oxygen</td>
<td>Floating ball system</td>
</tr>
<tr>
<td>concentration at 20°C (68°F)</td>
<td>complete with support</td>
</tr>
<tr>
<td><strong>Temperature compensation</strong></td>
<td></td>
</tr>
<tr>
<td>Automatic correction by means of an integral Pt100</td>
<td></td>
</tr>
<tr>
<td>resistance thermometer.</td>
<td></td>
</tr>
<tr>
<td><strong>Operating temperature</strong></td>
<td>9408-705*</td>
</tr>
<tr>
<td>0 to 40°C (104°F)</td>
<td>Floating ball kit</td>
</tr>
<tr>
<td><strong>Operating pressure</strong></td>
<td>comprising a complete</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>9408-700 (metric)</td>
</tr>
<tr>
<td><strong>Minimum liquid velocity</strong></td>
<td>system minus the 3m</td>
</tr>
<tr>
<td>30cm/s</td>
<td>(10 ft) support arm,</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>which can be obtained</td>
</tr>
<tr>
<td>±0.2mg/l or ±2% saturation within ±10°C (±5°F) of</td>
<td>from local stockists.</td>
</tr>
<tr>
<td>the calibration temperature in the range 0 to</td>
<td>Included within the kit</td>
</tr>
<tr>
<td>35°C (32° to 95°F)</td>
<td>is a tube of suitable</td>
</tr>
<tr>
<td><strong>Materials of construction</strong></td>
<td>solvent cement which</td>
</tr>
<tr>
<td>Support arm – ABS plastic</td>
<td>is used to secure the</td>
</tr>
<tr>
<td>Pistonation collar – polypropylene.</td>
<td>3m (10 ft) support</td>
</tr>
<tr>
<td>Mounting bracket – stainless steel</td>
<td>arm</td>
</tr>
<tr>
<td><strong>Mounting</strong></td>
<td>9408-760*</td>
</tr>
<tr>
<td>Pipe mount OD 50mm (2 in.)</td>
<td>Floating ball kit</td>
</tr>
<tr>
<td><strong>Connection cable</strong></td>
<td>comprising a complete</td>
</tr>
<tr>
<td>Part no. 0233828 – 10m (32.5ft) fitted as standard,</td>
<td>9408-700 (imperial)</td>
</tr>
<tr>
<td>Maximum length 100m (325ft) via junction box</td>
<td>system minus the 3m</td>
</tr>
<tr>
<td>(customer supply)</td>
<td>(10 ft) support arm,</td>
</tr>
<tr>
<td><strong>Support arm</strong></td>
<td>which can be obtained</td>
</tr>
<tr>
<td>Required with kits 9408-750 and 9408-760:</td>
<td>from local stockists.</td>
</tr>
<tr>
<td>ABS plastic OD 50mm (2 in.)</td>
<td>Included within the kit</td>
</tr>
<tr>
<td>Wall thickness 3.3mm (0.13 in.)</td>
<td>is a tube of suitable</td>
</tr>
<tr>
<td>Pressure rating 10bar (145 psi).</td>
<td>solvent cement which</td>
</tr>
<tr>
<td></td>
<td>is used to secure the</td>
</tr>
<tr>
<td></td>
<td>3m (10 ft) support</td>
</tr>
</tbody>
</table>

*Note for Water Wash version: substitute ‘2’ for the last digit (i.e. 9408-702, 752 or 762)
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
30 cm/s (11.8 in/s)

Accuracy
±0.2 mg/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 (32.5 ft) fitted as standard. Maximum length 100m (325 ft) 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)

Submersible System 9408-600

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
30 cm/s (11.8 in/s)

Accuracy
±0.2 mg/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

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)
Overall Dimensions

Dimensions in mm (in.)

Models 4640 and 4642 Wall-mount Versions

Models 4645 and 4647 Panel-mount Versions
Electrical Connections

Models 4640 and 4642 Wall-mount Versions
Dissolved Oxygen Analyzer
Models 4640 & 4645 (incorporating Water Wash Versions 4642 & 4647)

...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

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

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.