InVue® Dissolved Oxygen Sensor

Installation and use manual

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CAUTIONS AND WARNINGS

Before assembling, installing, or running the DOX, heed the following:

CAUTION: The DOX is a sensitive electronic device. Rough handling may cause damage. Do not drop.

WARNING:

- **Touching live electrical parts can cause fatal shocks and severe burns. Incorrectly installed or improperly grounded equipment is a hazard.**

- **Do not touch live electrical parts.**
- **Properly ground the system before use. Plug the power supply into a properly wired receptacle.**
- **Follow local electrical codes and the guidelines when installing the IN. Failure to do so may create an electrical shock hazard. Shock hazards can exist even when equipment is properly installed. The operator should be properly trained and follow established safety practices.**

SAFE DISPOSAL

When disposing of any component of the DOX sensor, observe the local and national requirements for the disposal of electrical and electronic equipment.

INVUE DISSOLVED OXYGEN SENSOR (DOX)

The InVue DOX sensor uses optical fluorescence-based technology to measure dissolved oxygen in liquids.

Applications	Cu plating within semiconductor Formulated BEOL Cleans Monitoring N_2 Purge for tool error Monitoring distilled water
Dissolved concentration range/calibration	0.02 to 10 ppm
Resolution	0.015 ppm
Analog output for concentration	0.01V @ 0.02 ppm 5.0V @ 10 ppm
Outputs, three total	Two 0 – 5V Outputs: Concentration Temperature One digital: Switches from 5V to 0V upon alarming of sensor end-of-life (25% remaining)
Oxygen consumption	None
Measurement vs. flow rate	Measurement is independent of flow rate
Temperature compensation	Real time
Calibration	Performed during annual sensor luminophore replacement GUI software guided
Consumable parts	Sensor luminophore: Typically lasts one year Field replaceable
Wetted surface materials	Silicone, PTFE, or Perfrez®

WORKFLOW

NOTES:
The most common installation is wiring the DOX to an analog device to monitor a manufacturing process.

Users may also interact with the DOX through the provided *DO_Connect* software. This requires wiring an RS-232 connection as well.

Prepare	Unpack
Install	Determine best location Mount sensor Attach fluid lines Connect electrical cables Optional: Wire RS-232 device to DOX Install and open *DO_Connect* software
Operate	Monitor oxygen concentration and temperature via analog outputs and/or GUI interface
Maintain	Replace luminophore as instructed

USER-SUPPLIED TOOLS AND EQUIPMENT

Supplies required for completing the installation.

User supplied	Notes
Fluid lines, installation tools, and fittings to attach lines to DOX fittings	Standard end connections: Fine thread Flaretek®, PrimeLock®, or Super 300 Type Pillar®
0-5V analog measurement device	
24 VDC power supply	
Basic wiring tools	

OPTIONAL SUPPLIES

Optional supplies	Notes
Computer running any version of MS Windows®	Users may wire DOX via RS-232 to access data and settings through the supplied software.
DO_Connect software	

INSTALLING THE DOX IN LINE

The sensor is mounted in line with the process fluid stream using the end connections on either side of the body.

CHOOSING A LOCATION

Environmental requirements

Process chemical temperature	15 to 60°C (60 to 122°F)
Ambient temperature	25° ±5°C (77 ±9°F)

Flow

Direction	DOX is bidirectional
Line pressure	0 to 5.5 bar (0 to 40 psig)

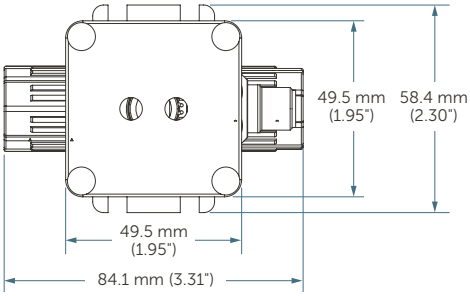
OTHER FLOW CONSIDERATIONS

For best performance, maintain adequate flow so that sediment and bubbles do not collect on the sensor.

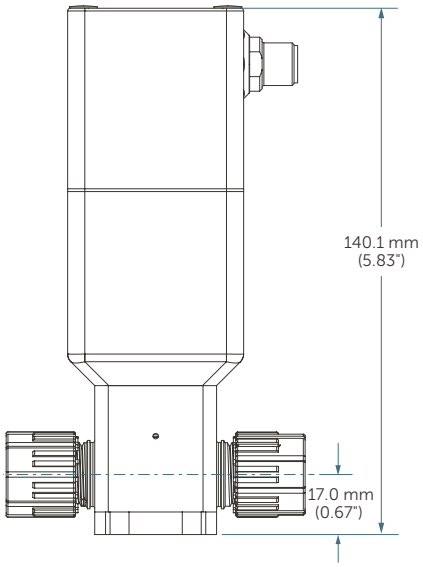
DIMENSIONS

⅜" Super 300 Type Pillar

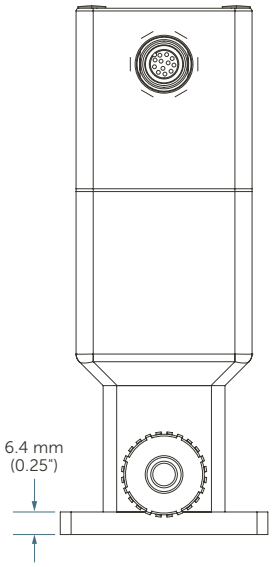
Top View



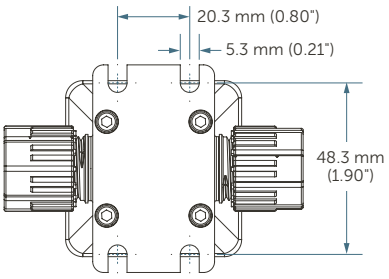
Side View



Front View

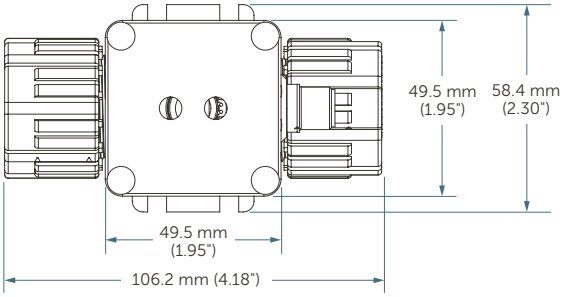


Bottom View

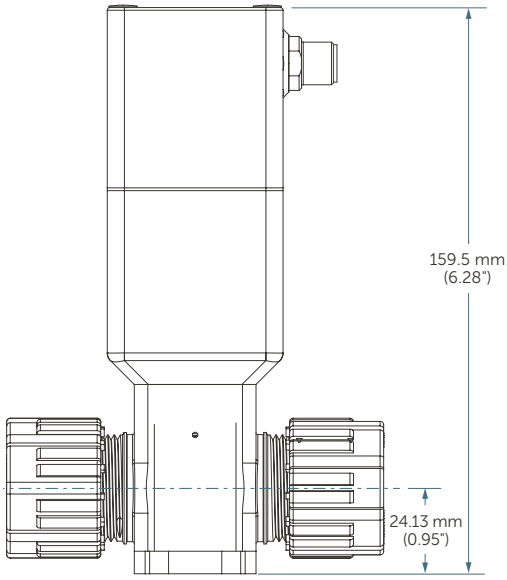


¾" Super 300 Type Pillar

Top View



Side View



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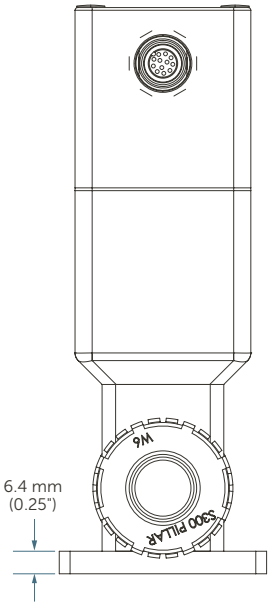
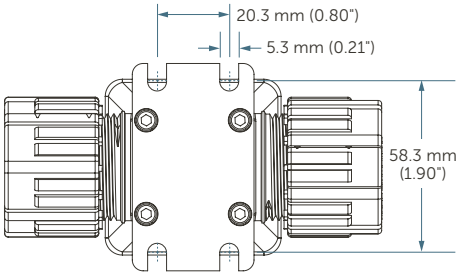


Bottom View



MOUNTING DOX

Orientation

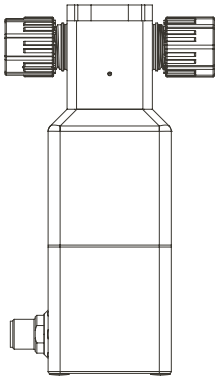


Figure 1. Preferred orientation

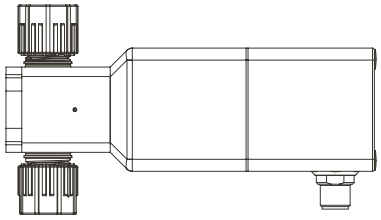


Figure 2. Recommended orientation for application without bubbles or sediment

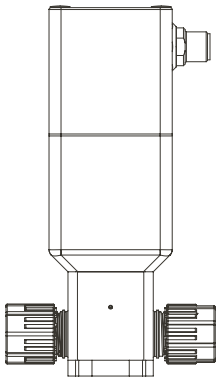


Figure 3. Alternate orientation for applications where sediment might exist

ATTACHING FLUID LINES

Attach tubes using standard procedure for Teflon® connections.

Standard end connections	Fine thread Flaretek PrimeLock Super 300 Type Pillar
Custom	Site-dependent

WIRING DOX

1. Attach cable connector to connector on DOX. Align keyway before tightening nut. Do not overtighten nut.

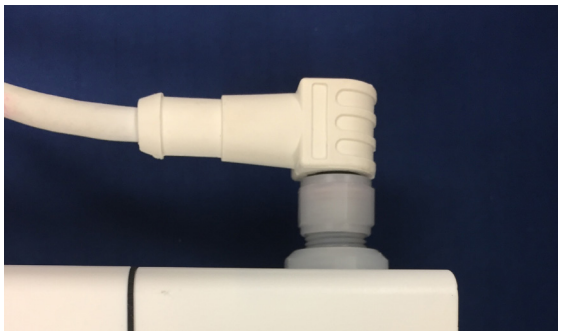


Figure 4. Attach cable

2. Connect opposite side of electrical cable per the DOX cable pin-out table below.

Label	Color	Function
01	White	Temperature output, 0-5V
02	Brown	RS-232 GND
03	Green	RS-232 RXD
04	Yellow	RS-232 TXD
05	Gray	Temperature GND
06	Pink	Concentration output, 0-5V
07	Blue	Concentration output GND
08	Red	+24 VDC
09	Orange	Alarm out
10	Tan	Not used
11	Black	24 VDC GND
12	Violet	Not used

3. Connect to power and observe readout on analog device.

Typical installation is complete.

INSTALLING DO_CONNECT SOFTWARE (OPTIONAL)

The *DO_Connect* software is used for settings, data collection, and diagnostics.

1. Download and install the *DO_Connect* software onto a system running any version of MS Windows.
2. The software adds a *DO_Connect* shortcut to the desktop.
3. Click to launch the software.

CONNECTING TO A SENSOR

1. Select *Connect New Sensor*.
2. The software searches for DOX active ports. Select the *Serial Port* from the drop-down list.
3. Device address: Defaults to 3. Do not change.
4. Press *Select a COM Port to Connect*.
5. The display shows the data from the sensor.

Connecting Additional Sensors

1. Select *Connect New Sensor*.
2. The software searches for DOX active ports. Select a *Serial Port* from the drop-down list.
3. The data from the added sensor appears in a new tab.

OPERATION

MEASUREMENT TAB

The Measurement tab shows the current readings of temperature and dissolved oxygen.

Data Collection Box

- Use the drop-down menu to set the time scale at which measurements are displayed.
- Use the Pause/Start toggle button to stop and start data collection.

DATA LOGGING TAB

1. Specify a directory and file name for data collection.

   NOTES:
   - **The default directory is DOXData.**
   - **The default file name has the prefix DOConnect Log File.**
   - **The date is appended to any file name.**

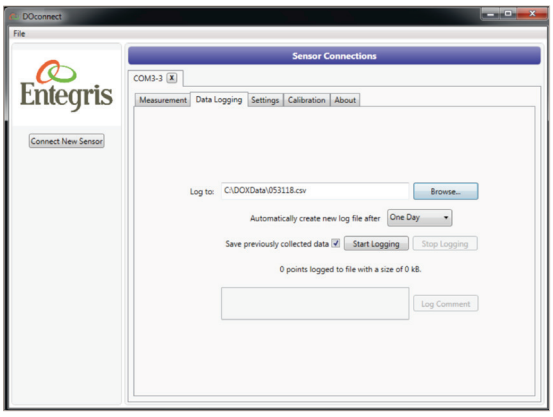
2. Specify when to create a new log file:
   - One day
   - One week

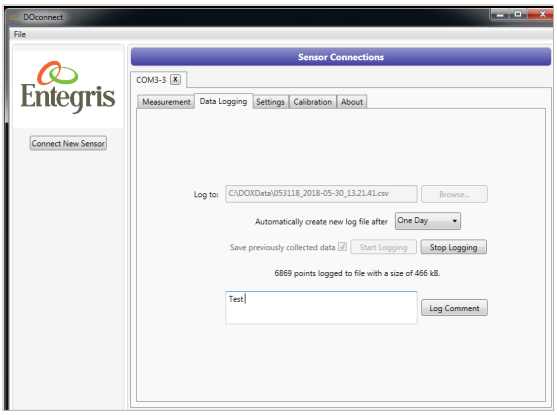
3. Select whether to save the previously collected data.

   NOTE: By default, when a new data collection period starts, *DO_Connect* saves the previous log file. If you do not want to save previous logs, unclick the box *Save Previously Collected Data*.

4. Select *Start Logging*.
   - *DO_Connect* displays the number of points logged and file size.
   - The *Log Comment* box becomes available for entering notes.

5. To end collection and close the file, select *Stop Logging*.





SETTINGS TAB

1. **Oxygen:** Select *Oxygen* measurement units from the drop-down menu.

   NOTE: DO NOT CHANGE THE OXYGEN OFFSET. This setting affects the factory calibration. The Oxygen and Temperature Offsets are only used for installations running multiple DOX sensors. Contact Entegris Field Service.

2. Set the analog outputs to scale for the 0 – 10V output. Examples:
   - Output 0V = 0 ppm
   - Output 5V = 5 ppm

3. Click the *GET* button to activate.

4. **Temperature:** Select *Temperature* measurement units from the drop-down menu.

   NOTE: DO NOT CHANGE THE TEMPERATURE OFFSET. This setting affects the factory calibration. Contact Entegris Field Service.

5. Set the analog outputs to scale for the 0 – 10V output. Examples:
   - Output 0V = 15°C
   - Output 5V = 60°C
6. Click the *SET* button to activate.
7. **DO Spot** status: The DOX sensor performs analysis to calculate the status and approximate lifetime of the Dissolved Oxygen Spot.

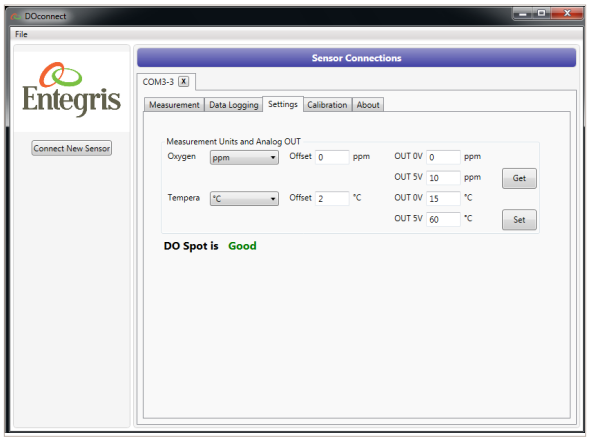
If the sensor has more than an approximate 75% lifetime then:

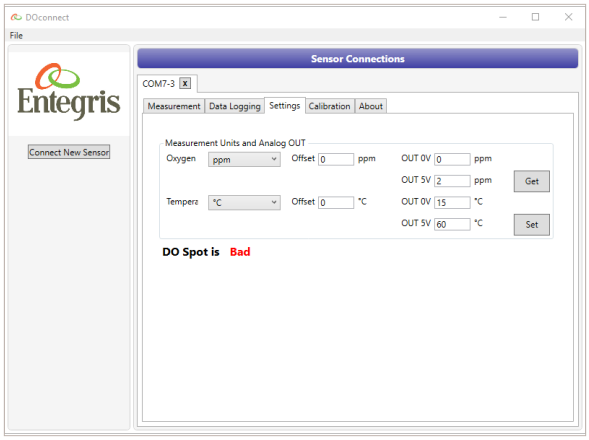
- Software will show that the *DO Spot is Good.*
- Alarm output pin is at 0.V

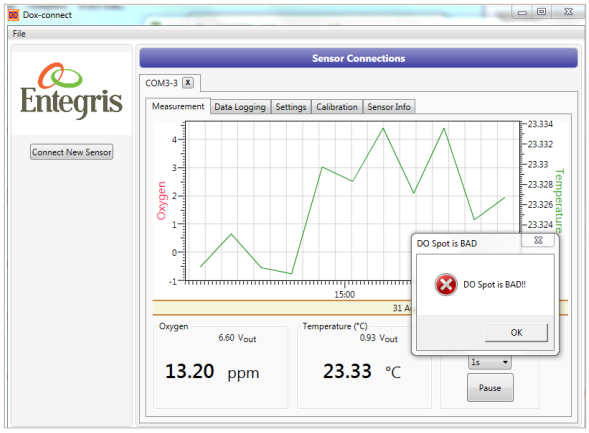
If there is less than 25% lifetime left in the sensor, then:

- The software shows a pop-up window indicating a *DO Spot is Bad.*
- Alarm output pin is at 5V.

If you see these errors, contact Entegris Field Service.







CALIBRATION TAB

Entegris Field Service use only.

ABOUT TAB

This tab provides basic information about the installed DOX sensor.

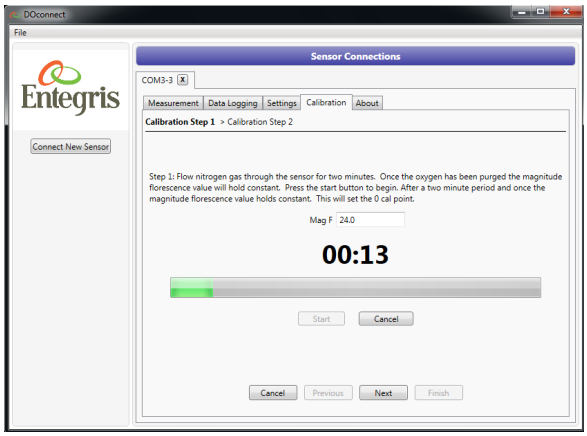
NOTES:

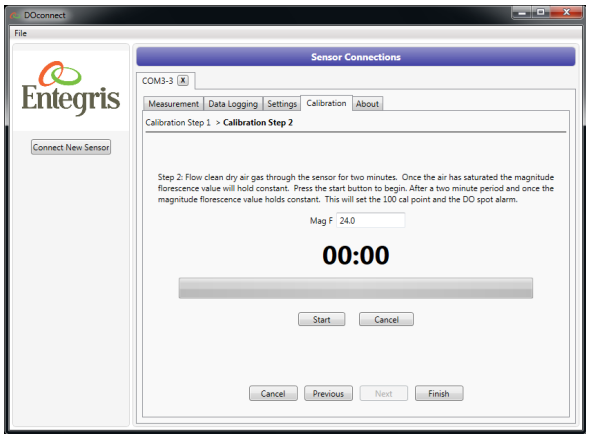
- **DO NOT PRESS the *Diagnostics* button. It is not functional in this version of the software.**
- **DO NOT PRESS the *Restore Factory Settings* button unless directed to do so by Entegris Field Service. It will remove all site-specific calibrations.**

CALIBRATION

NOTE: Entegris recommends that Entegris Field Service perform calibration. Contact Entegris Field Service before attempting calibration.

1. Select the *Calibration* tab.
2. Set the 0 cal point:
   - Flow nitrogen gas through the system for a minimum of 2 minutes to purge oxygen.
   - Continue to flow nitrogen gas and press *Start*.
   - Two-minute analysis begins.
   - When the magnitude florescence value holds constant, DOX sets the 0 cal point.
   - Discontinue nitrogen gas flow.
   - Press *Continue*.
3. Set the 100 cal point and DO spot alarm:
   - Flow clean dry air gas through the system for a minimum of two minutes to purge nitrogen.
   - Continue to flow clean dry air gas and press *Start*.
   - Two-minute analysis begins.
   - When the magnitude florescence value holds constant, DOX sets the 100 cal point and DO spot alarm.
   - Press *Finish*.





TROUBLESHOOTING

Contact Entegris Field Service.

MAINTENANCE

Entegris recommends that Entegris Field Service perform all maintenance.

Contact Entegris Field Service before attempting maintenance.

TECHNICAL SUPPORT

Regional Customer Service Center Numbers

Region	Telephone	Fax
North America	1 800 394 4083	1 800 763 5820
Germany	+49 351 795 97 0	+49 351 795 97 499
France	+33 4 76 35 73 50	+33 4 76 35 73 80
Israel	+972 73 221 00 00	+972 73 221 00 22
Japan	+81 3 5442 9718	+81 3 5442 9738
Malaysia	+60 4 427 4200	+60 4 641 3294
Korea	+82 31 8065 8300	+82 31 8065 8301
Taiwan	+866 3 571 0178	+866 3 572 9520
Singapore	+65 6745 2422	+65 6745 4477
China	+86 21 8023 6500	+65 21 5080 5598

LIMITED WARRANTY

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FOR MORE INFORMATION

Please call your Regional Customer Service Center today to learn what Entegris can do for you. Visit entegris.com and select the Contact Us link to find the customer service center nearest you.

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Entegris

Corporate Headquarters
129 Concord Road
Billerica, MA 01821
USA

Customer Service
Tel +1 952 556 4181
Fax +1 952 556 8022
Toll Free 800 394 4083