

# The DL5000 Dissolved Oxygen Probe

ppm - mg / Liter.  
ppb -  $\mu\text{g}$  / Liter

## Specification

### Overview

The DL 5000 Dissolved Oxygen probe is based on a unique equilibrium probe technology. This patented equilibrium probe technology is based on the partial pressure of oxygen rather than the diffusion rate of oxygen through the probe membrane.

The materials of construction combined with this unique design result in a no-internal-maintenance probe that is independent of process flow and fouling because the anode is not consumed. Bottom line—an accurate, reliable, maintenance-free, Dissolved Oxygen measurement requiring less re-calibration.



### Description

The DL5000 is housed in either a stainless steel or PVC casing. It can be ordered as a remote probe to be used with the UDA2182 analytical Analyzer, or an integral / remote probe for use with Direct Line DL 424 or 425 transmitters. The remote DL5000 probe can be used with:

- UDA 2182 Analyzer to replace withdrawn 7020 series units
- DirectLine 424 or 425 sensor module in new installations.

### Connections

Both PVC and stainless steel probes are available with an integral cable. This option provides the cable potted into the probe. The cable and cell are one entity and cannot be separated. This option can be used with all mountings. In addition to the integral cable option, the stainless steel probes are also available with a quick disconnect option. This probe comes with a Turck® receptacle potted into the top which mates with a cable. (Must be purchased from Honeywell.) The probe and cable are separate entities. This option can only be used in in-line applications.

### Applications

Typical **ppb** applications include power plant and semi-conductor applications for corrosion detection or dearator efficiency. Typical **ppm** applications include aeration, effluent, stream and aquaculture monitoring for compliance and control.

### Features

- Unique equilibrium probe technology.
- ppm – mg/L and ppb  $\mu\text{g}$ /L Sensors.
- Unaffected by fouling or changes in sample flow
- Reduced maintenance costs - no periodic replacement of anode or electrolyte
- Heavy duty membrane – eliminates replacement requirements
- Rugged PVC or 316 stainless steel construction
- Immersion, insertion or flow –through mountings
- Process temperature measurement, display and re-transmission with UDA2182
- Immersion, In-line and Flow-through attachments available.
- Simple time and cost effective Air Calibration initiated by UDA2182 or DirectLine software.
- Probe Bias test and optimization with UDA 2182
- 20 foot (6.1m) or 100 foot (30.48m) analyzer to probe separation distance.
- Accessories for In-line and Flow-through applications
- Quick disconnect option for stainless steel probes.

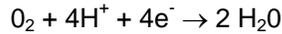
**Probe Operating Principle**

The Honeywell dissolved oxygen probe includes permanent anode, cathode and reference electrodes surrounded by a permanent electrolyte and membrane.

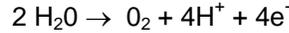
When the probe is immersed in a sample, oxygen diffuses through the membrane and is reduced at the cathode. Simultaneously, an equal amount of oxygen is generated at the anode. The diffusion continues until the partial pressure of oxygen on both sides of the membrane is equal and balanced. The current necessary to maintain this equilibrium is converted by the Direct Line DL424/425 sensor module or UDA 2182 analyzer to give the concentration of dissolved oxygen in the solution.

The reactions are:

*At cathode:*



*At anode:*

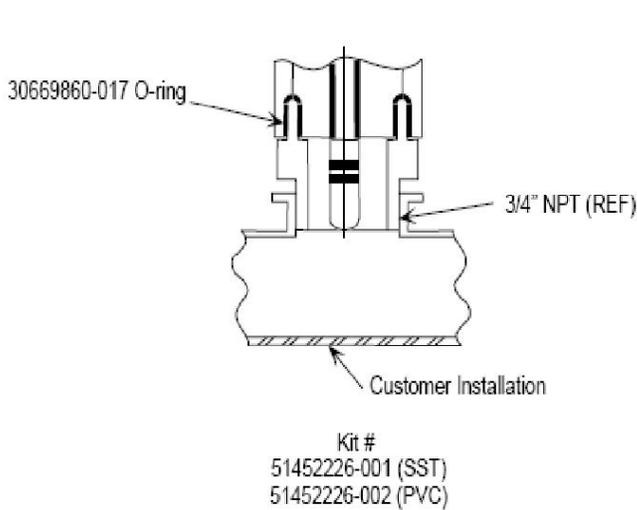


Combining these reactions, it can be seen that no oxygen is consumed, no water is produced, and no net reaction occurs. Electrodes, electrolyte and membrane are permanent with no internal maintenance ever required with the Honeywell probes.

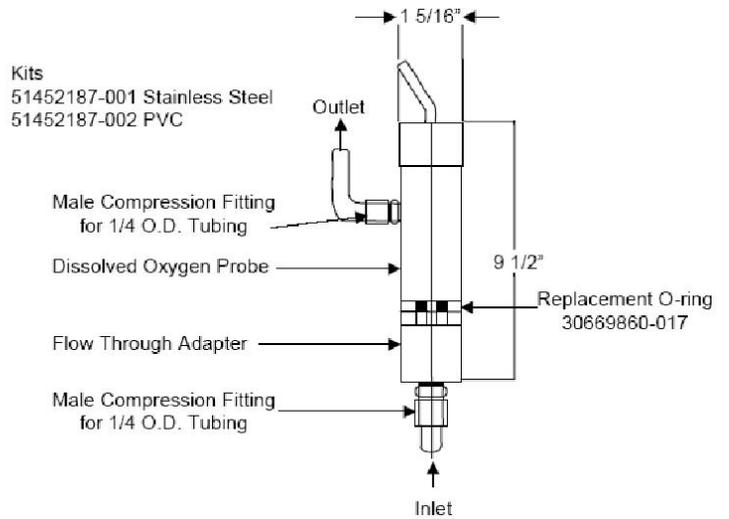
Conventional diffusion-type probes, on the other hand, work on either the galvanic or polarographic principle.

Both require a continuous oxygen transfer through the membrane in a 1-way reaction. They are highly dependent on sample flow past the membrane to replenish consumed oxygen and on consistent membrane cleanliness to give a constant diffusion rate of oxygen. Periodic electrode, electrolyte, and membrane maintenance is required with diffusion-type probes.

**Accessories**



**Process In – Line Fitting**



**Process Flow – Through Fitting must be used in ppb Applications**

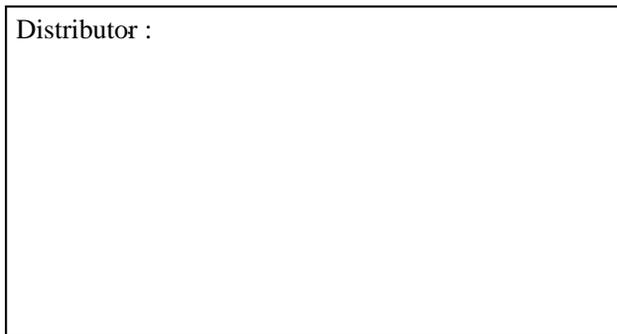
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**Specifications**

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<b>DL5000 Series Probe</b>	
<b>Response Time</b>	90% in 60 seconds (after probe warm-up)
<b>Oxygen Consumption</b>	Negligible
<b>Operating Temperature Range</b>	2-60C (35.6-140F); must not freeze
<b>Storage Temperature Range</b>	2-60C (35.6-140F)
<b>Maximum Flow</b>	300 mL/min. with flow chamber; no dependence on stirring or flowrate
<b>Maximum Pressure</b>	PVC: 207 kPa (30 psig) SS: 345 kPa (50 psig)
<b>Calibration</b>	Air and sample
<b>Dimensions</b>	219 mm x 34 mm OD (8.62" x 1.315" OD), 1" NPT pipe size
<b>Weight</b>	PVC: 0.6 kg (1.24 lb) SS: 1.5 kg (3.5 lb)
<b>Probe Accuracy:</b>	ppm: $\pm 0.2$ ppm at calibration conditions after stabilization ppb: $\pm 2$ ppb or 5% of reading after stabilization, whichever is greater.
<b>Interferences</b>	Dissolved Hydrogen (present in boiler water reactor nuclear power plant samples) can cause significant negative interference in measurement. Honeywell DO probe is not recommended for these types of applications.
<b>Approvals</b>	SS probe is manufactured to comply with ASME boiler and pressure vessel code Section 111, Div. 1, UG-101 CRN # 0F11607.5C  This CRN approval applies only to the SS probe.

Distributor :



For more information, contact Honeywell sales at 1-800-343-0228.

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**Honeywell**

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