Honeywell

The DL5000 Equilibrium Dissolved Oxygen Probe 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. Bottom line—an accurate, reliable, maintenance-free, Dissolved Oxygen measurement.

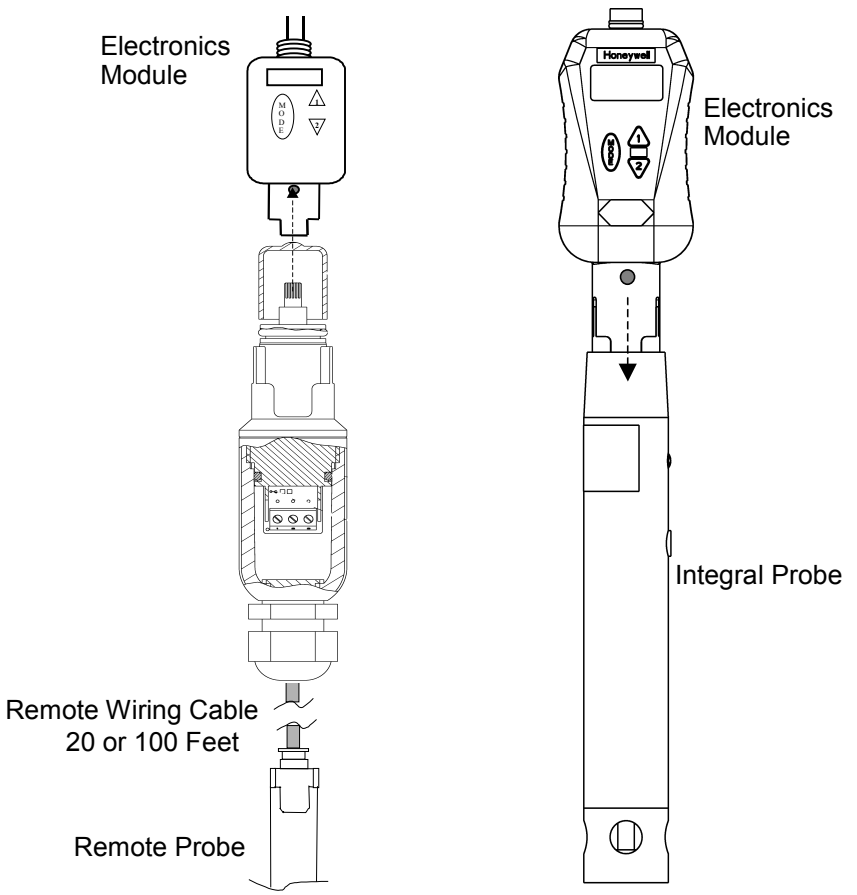
Description

The DL5000 is housed in either a stainless steel or PVC casing. It can be ordered as an integral unit to be used with the DL 424 or 425 sensor module or as a remote probe with a cable. The remote DL5000 probe can be used with:

- The DirectLine 424 or 425 sensor module in new installations
- An existing Honeywell 7020 Series DO Analyzer

Applications

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



Features

- Unique equilibrium probe technology
- 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

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 DL424/425 sensor module to give the concentration of dissolved oxygen in the solution.
The reactions are:

At cathode:

$$0_2 + 4H^+ + 4e^- \rightarrow 2\ H_20$$

At anode:

$$2\ H_20 \rightarrow\ 0_2 + 4H^+ + 4e^-$$

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.

Specifications

DL5000 Series Probe	
Response Time	90% in 60 seconds (after probe warm-up)
Oxygen Consumption	Negligible
Operating Temperature Range	2-60C (35.6-140F); must not freeze
Storage Temperature Range	2-60C (35.6-140F)
Maximum Flow	300 mL/min. with flow chamber; no dependence on stirring or flowrate
Maximum Pressure	PVC: 207 kPa (30 psig) SS: 345 kPa (50 psig)
Calibration	Air and sample
Dimensions	219 mm x 34 mm OD (8.62” x 1.315” OD), 1” NPT pipe size, 6.1 m (20 ft) waterproof cable, 30.48m (100 ft) cable available for ppm applications
Weight	PVC: 0.6 kg (1.24 lb) SS: 1.5 kg (3.5 lb)
Probe Accuracy:	ppm: ±0.2 ppm at calibration conditions after stabalization ppb: ±2 ppb or 5% of reading after stabilization, whichever is greater.
Interferences	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.
Probe to Analyzer Maximum Distance	ppm: 30.4 m (100 ft) ppb: 6.08 m (20 ft)

Model Selection Guide

Instructions

- Select the desired key number. The arrow to the right marks the selection available.
- Make one selection from Table I using the column below the proper arrow.
  A dot ( ) denotes unrestricted availability.

Key Number ⌐ _ _ _ _ _ _ ¬ - **I** ⌐ _ _ _ ¬ - **II** ⌐ _ _ _ _ ¬

KEY NUMBER

DESCRIPTION:	Selection	Availability PPB ↓	PPM ↓
DL5000 Dissolved Oxygen Probe - Parts Per Billion	DL5PPB		
DL5000 Dissolved Oxygen Probe - Parts Per Million	DL5PPM		

TABLE I - Probe Construction:

Material of Construction	Mounting	Cable Length			
PVC	Integral	None	100	•	•
316 Stainless Steel			200	•	
PVC	Remote	20'	300	•	•
316 Stainless Steel			400	•	
PVC	Remote	100'	700	•	•

TABLE II - Options

Tagging	None	00_ _	•	•
	Linen Customer I.D. Tag: 3 lines w/22 characters/line	LN_ _	•	•
	Stainless Steel Customer I.D. Tag 3 lines w/22 characters/line	SS_ _	•	•
Extended Warranty Against Manufacturing Defects	Standard Warranty	_ _00	•	•
	1 Year Extended Warranty	_ _W2	•	•
	2 Years Extended Warranty	_ _W3	•	•

Accessories and Replacement Parts:

Description	Part Number
Probe Mounting Kits Wastewater submersion - galvanized iron fittings for 1-1/2" pipe handrail mounting	31063324
Pure water, flow through -1/4" OD tube connections.	
For PVC Probe:	51452187-001
For SS Probe:	51452187-002
Process, in-line - to mount directly in the sample line with 3/4" 3/4" NPT tap	
For PVC Probe:	51452226-001
For SS Probe:	51452226-002
Replacement O-ring - for in-line and flow-through mounting	30669860-017
Junction Box, cast iron 3/4" NPT	31316260
Extension cable 26 gage, 5-conductor, shielded (specify length)	51452215-001