

Dissolved Oxygen Sensor

- LARGE ELECTROLYTE RESERVOIR allows up to twelve months and often longer between refills.
- OPTIONAL MOUNTING BRACKET allows easy removal of the sensor from an aeration basin without the use of tools.
- MODULAR PRESSURE COMPENSATOR AND MEMBRANE RETAINER simplify recharging and membrane replacement.
- MEMBRANE RETAINER REPLACEMENT AND RECHARGING require no tools.



FEATURES AND APPLICATIONS

The Rosemount Analytical Model 430 Dissolved Oxygen Sensor, used with the Model 1181 Dissolved Oxygen Analyzer, measure oxygen levels in a variety of applications. The most widely used application is the secondary phase of the waste treatment process where a critical dissolved oxygen level must be maintained for the digestive process to occur. Other applications include water quality monitoring in natural bodies of water such as rivers and streams, or any location where adequate oxygen content is important to sustain aquatic life.

The Model 430 Dissolved Oxygen Sensor is constructed of PVC with an oxygen permeable membrane made with Teflon¹. This membrane is held in place with a membrane retainer.

OPERATION

As oxygen passes through the Teflon membrane an oxygen dependent electrochemical reaction takes place between the gold cathode and silver anode in the presence of the electrolyte. The resultant current flow between these elements is proportional to the quantity of oxygen which has entered the sensor.

Temperature and pressure compensation are both standard features on the Model 430. Temperature compensation is necessary for two reasons: First, the solubility of oxygen in water decreases with an increase in temperature; secondly, the permeability of the Teflon membrane and the oxygen diffusion rate increase as the temperature increases. For these

reasons, it is important for a dissolved oxygen measurement to be accompanied by an accurate temperature measurement. Temperature compensation is accomplished by means of a thermistor located in the sensor housing, and its associated circuitry in the analyzer.

Pressure compensation is a mechanical rather than electronic correction. It is important for the tension on the Teflon membrane to remain constant at all times, even with sample pressure changes. Fluctuations in membrane tension affect its diffusion characteristics. By means of a pressure compensator the pressure on the sample side of the compensator membrane is transmitted to the electrolyte reservoir so the pressure on both sides of the membrane remains equal. In this manner, sample pressure changes do not affect the diffusion rate of oxygen through the membrane.

The Teflon membrane is held in place by a retainer. A water-tight seal is made with an O-ring between the membrane and sensor reservoir. Membrane replacement is rarely required, but in those situations when it is necessary, the procedure can be performed quickly and easily.

Since oxygen diffuses through the Teflon membrane at a faster rate than through the sample, it is necessary to continuously maintain a fresh sample in front of the membrane. A stream velocity of approximately 1.5 feet per second (0.5 m/s) is required to ensure that a fresh sample is in contact with the membrane at all times.

¹ Teflon is a registered trademark of E. I. du Pont de Nemours and Company.

AVAILABLE MODELS

The Model 430-01 and -02 Sensors are flow through assemblies. The sensor is supplied in a 1-1/2 in. PVC tee for installation into a process line.

The Model 430-03 Submersible Sensor is for use in those applications where the required flow velocity can be maintained without the use of an agitator. When the measurement is being made in a stagnant pond or other media where the minimum velocity of 1.5 FPS cannot be maintained, the Model 430-04 must be selected. This model is designed for submersible use and is provided with its own agitator to ensure adequate flow velocity at the membrane.

The Models 430-03 and 04 may be provided with an optional mounting bracket assembly. This bracket is constructed of light weight aluminum and can be adjusted to satisfy virtually any aeration basin mounting requirement. Once installed, the probe can be removed without the use of tools. A single locking pin holds the assembly rigidly in place but allows it to be easily removed for inspection or cleaning.

SPECIFICATIONS

Process Connection: 430-00/01 1-1/2 in. socket fitting

Wetted Materials: HOUSING - PVC

MEMBRANE - Teflon

PRESSURE COMPENSATOR - Neoprene

Temperature Compensation: 0 to 50°C (32 to 122°F)
Automatic

Sample Pressure: 0-50 psig (345 kPa abs),
Submersible to 200 ft (61 m)

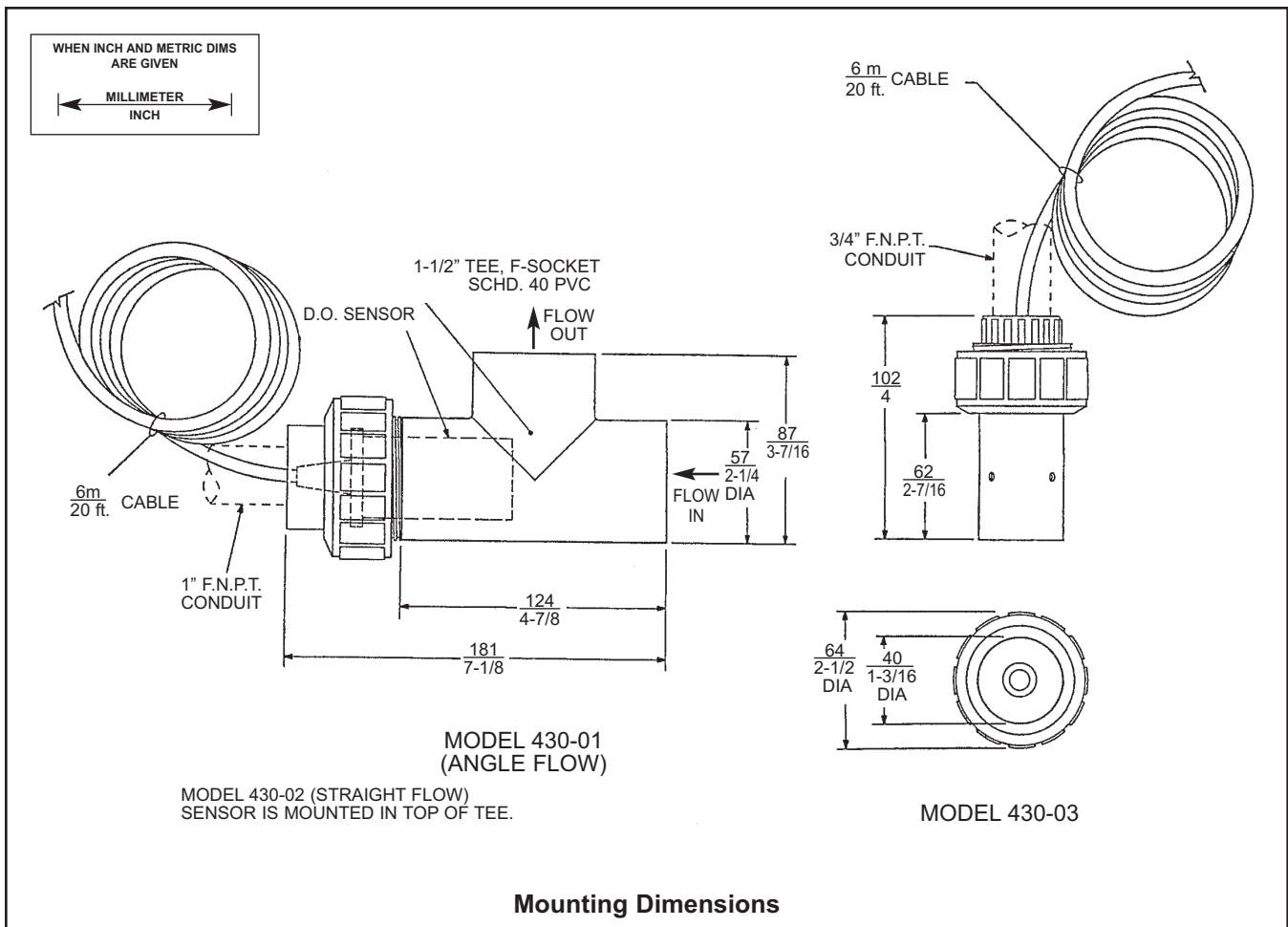
Agitator Power Requirement: (Model 430-04 only)
115 Vac \pm 10%, 60 Hz (0.2 amp)

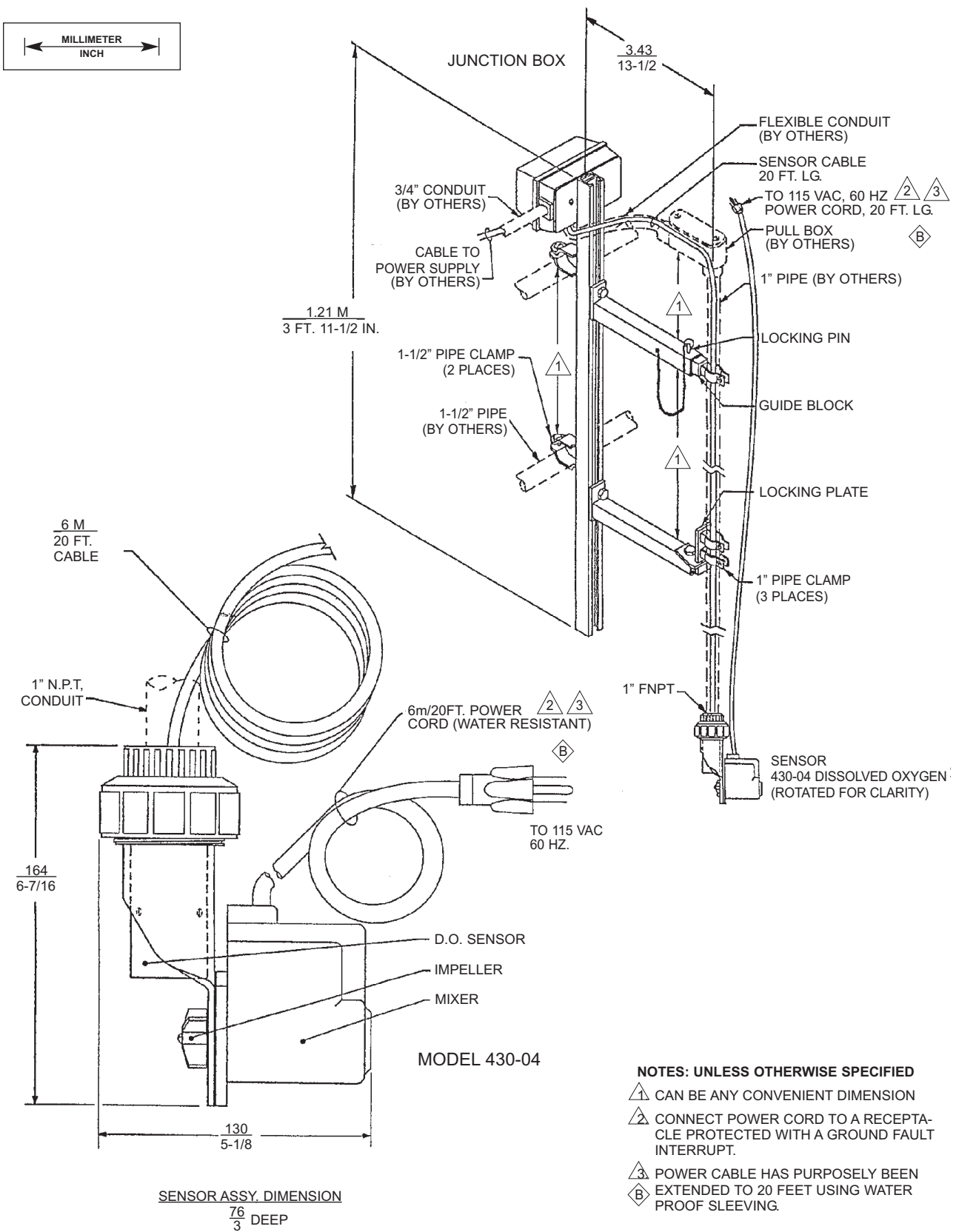
Cable Length: 6.1 meters (20 ft) on sensor and agitator

Maximum Cable Length: 305 meters (1000 ft)

Operating Time Between Electrolyte Recharge:
Approx. 12 months, depending upon application

Sample Flow Requirements for Models 430-01,-02,-03:
1.5 ft per second (0.5 m/s),
1 gallon per minute (3.79 liter/min)





Mounting Dimensions

ORDERING INFORMATION

The Model 430 Dissolved Oxygen Sensor: Includes PVC body with integral, oxygen-permeable membrane of TEFLON¹. Temperature and pressure compensators included. Compatible with Models 803 and 1181DO.

MODEL 430		DISSOLVED OXYGEN SENSOR
CODE	MOUNTING HARDWARE	
01	1-1/2 in. PVC flow cell, 90° flow	
02	1-1/2 in. PVC flow cell, 180° flow	
03	PVC union with 3/4 in. FNPT for submersion service	
04	PVC union with 1inch FNPT and agitator with 20 ft. cable for submersion. Agitator motor requires 115 VAC power only.	
CODE	ACCESSORIES (OPTIONAL)	
11	Stainless steel tag (specify marking)	
14	Handrail mounting bracket (P/N 1000857) for use with junction box (see Code 17 below).	
15	Handrail mounting bracket (P/N 1000856) for use with Model 803	
17	Weatherproof, NEMA 4X junction box (P/N 22719-02)	
430	01	EXAMPLE

NOTES:

Recommended interconnecting cable from sensor to transmitter is Belden 8434 or equivalent, available from Rosemount Analytical as P/N 9200074. Specify length.

¹Reg. U.S. Pat. Office for Dupont's fluorocarbon resins.



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