



# DF-310E Process Oxygen Analyzer

## Standard Features & Specifications

Effective: April 2010

### Performance

**Accuracy:** (at constant conditions)  
 Standard Models: the greater of +/-3% Reading or 0.5% of Range  
 High Resolution Models: the greater of +/-3% of Reading or 0.02% of Range (except for the 0- 100 ppm range: the greater of +/-3% of reading or 50ppb; for the 0-50 ppm range: the greater of +/-3% of reading or 10ppb)

**Oxygen Sensitivity:**  
 Minimum Detectable Change 3 ppb (310E-H0050M model)  
 Low Detection Limit 3 ppb (310E-H0050M model)

**Response Time**  
 Responds instantaneously to O2 change. Typically less than 10 seconds to read 90% of a step change.  
 (Equilibrium time depends on specific conditions.)

**Range:** Ranges are available from 0.5ppm to 25%

**Ambient Operating Temperature:**  
 32° to 113°F (0° to 45°C)

### Background Gas Compatibility

**Basic Sensor:**  
 All inert and passive gases including N<sub>2</sub>, H<sub>2</sub>, CO, freons, hydrocarbons, etc.  
**Sensor with Stab-EL Option:**  
 Neutralizes trace contaminants including acids such as CO<sub>2</sub>, H<sub>2</sub>S, Cl<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>, etc. (Consult Delta F for concentration limits)

### Gas Sample Conditions

**Sample Pressure**  
 Operating Limits:  
 0.2 to 1.0 psig (1.03 to 1.08 BarA) - Standard  
 15-25 psig with welded sample inlet (orifice restricted)  
 2.0 psi vacuum to 0.2 psig (0.88 to 1.03 BarA) use pump  
 1.0 to 10 psig (1.08 to 1.7 BarA) use valve (optional) or regulator (optional)  
 Above 10 psig (1.7 BarA) use regulator  
**Sensor overpressure damage limit:** 10 psig (1.7 BarA)

**Return Pressure:** Atmospheric Vent (optimal)  
**Limits:** +5 psig (1.36 BarA) to -5 psig (0.67 BarA)  
**Flow Rate:** 0.5 to 1.5 SCFH (0.24 to 0.7 slpm)  
**Temperature (Gas Sample):** 0° to 150° F (-17.8° to 66°C)  
**Moisture:** No limits (avoid condensation)  
**Oil/Solvent Mist:** <0.5 mg/ft3 (standard)  
 >0.5 mg/ft3 - use filter  
**Solid Particles:** <2 mg/ft3 (standard)  
 >2 mg/ft3 - use filter

### Gas Flow System

**Construction Materials:** 300 Series stainless steel  
**Gas Connections:** 1/8" compression tube fittings  
 1/4" VCR compatible (optional except standard for 310E-H0050M)

### Construction

**Enclosure:** NEMA 1 - General Purpose  
 Remote NEMA 4, NEMA 7 or sensor bracket (optional)  
**Weight:** 10 lbs. (4.52 kg) (NEMA 1)  
**Dimensions:** 8.32" W x 7.75" H x 7.91" D  
 (21.1 cm W x 19.7 cm H x 20.1 cm D)

### Electrical

**Power Input:** 22-28 VDC, 1 Amp (max) or 110 VAC or 220

**Output Signals:** Non-Isolated 0-5, 10 VDC  
 Isolated 4 to 20 mA DC (optional)  
 User adjustable to 10% of Full Scale to Full Scale (Std Res)  
 User adjustable to 1% of Full Scale to Full Scale (High Res)  
 User selectable Output Freeze during Calibration

**Alarms, audible/visual:** 4 Oxygen (optional) (adjustable set-point)  
 Electrolyte Condition (standard)  
 Temperature (optional)  
 Low Flow (optional)

**Alarm Relays:** 4 independently assignable to Alarms, In-Calibration, Sensor Off and Expanded Range Scale

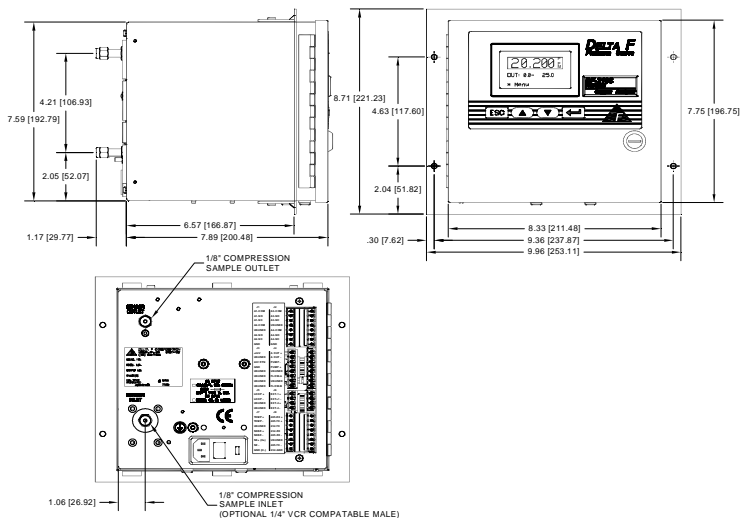
**Alarm Relay Rating:** 0.3 Amps at 30 VDC  
 Failsafe Action

**Back Lighted Display:** Supertwist LCD graphics

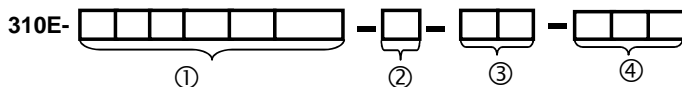
**Certifications:** CE Conformance  
 CSA LV Certified

### Dimensions

### General Purpose - NEMA 1 Enclosure



# DF-310E Process Oxygen Analyzer Configurations and Options



Build your analyzer by selecting one option from numbers 1-4, then add on part numbers for all additional options.

## ① Range Options

### PPM Ranges

**\*\*MODEL NUMBERS\*\***

PPM Range	Standard Resolution	Price	High Resolution	Price
0 to 10,000	S10000		H10000	
0 to 5,000	S05000		H05000	
0 to 1,000	S01000		H01000	
0 to 500	S00500		H00500	
0 to 100	S00100		H00100	
0 to 50	S00050		H0050M	

### Percent Ranges

**\*\*MODEL NUMBERS\*\***

% Ranges	Standard Resolution	Price	High Resolution	Price
0 to 25%	S00P25		H00P25	
0 to 10%	S00P10		H00P10	
0 to 5%	S000P5		H000P5	

(Choose Only 1 Option)

## ② Sensor Options

### B Basic Sensor

### S Stab-El Sensor System

Enables operation with trace levels of acid gas or any ionic contamination (within limits-consult factory for guidelines)

## ③ Sensor Mounting Options (Note 1 & Choose only 1 option)

### LS Local Sensor in Benchtop Cabinet

### NB Remote Sensor with Baseplate Bracket (NO flowmeter)

### RB Remote Sensor on Wall Mount Bracket with flowmeter

### R4 Remote NEMA 4 Sensor with flowmeter

### R7 Remote NEMA 7 Sensor with flowmeter

(H2 Rated (UL) Flame Arrestors)

## ④ Power Input Options

### 024 22-28 VDC Input, 1Amp (max)

### 110 110 VAC, 50/60 Hz

### 220 220 VAC, 50/60 Hz

### General Purpose Cabinet Mounting

### 310-PM Panel Mount (9.97"Wx8.71"Hx6.58"D)

### 310-PM-R Panel Mount for DF-350 (POA) cutout

### 310-RM 19" Rack Mount (19"Wx8.71"Hx6.58"D)

### 310-DRM 19" Rack Mount for two DF-310's

### 310-KL Key Lock

### Outputs

### 310-RS232 RS232 Two-Way Serial Communications

### 310-RS485 RS485 Two-way Serial Communications

### 310-4-20 Isolated 4-20mA DC output

### 310-2-20 Isolated 4-20mA DC output with a live zero at 4 mA and sensor off or disconnected at 2mA

### 310-ERS-OUT Expanded Range Scale

Additional user selectable range scale for analog output once primary range is exceeded. (Requires optional relay contact for Range ID)

### Notes:

1. Remote sensors not available with CE Certification
2. Recommended when measuring combustible gases, such as H2
3. For use with system status indicators and optional alarms
4. Not available with on-board pump, 310-P
5. Not available with 310-BAT

### Alarms (Audible/Visual only)

### 310-OA2 Two Oxygen Alarms

### 310-OA4 Four Oxygen Alarms

### 310-FA Low Flow Alarm

### 310-TA Temperature Alarm

### Relay Contacts <sup>Note 3</sup> (Independently assignable)

### 310-RLY1 One SPDT Relay Contact

### 310-RLY2 Two SPDT Relay Contacts

### 310-RLY3 Three SPDT Relay Contacts

### 310-RLY4 Four SPDT Relay Contacts

### Plumbing

### 310-P Pump w/ Down Stream Control Valve

Diaphragm pump for negative pressures to 2.0 psi vacuum (0.88 Bar), or outlet vent back pressure to 3.0 psig (1.2 Bar) (not compatible with NT-SSOL)

### 310-PR Pressure Regulator

Out-board 316L Stainless Steel Pressure Regulator, 3000 psig inlet capacity; 28 in Hg vac-15 psig adjustable outlet pressure

### 310-HPR High Purity Pressure Regulator

### 310-HPR-MNT High Purity Regulator Mounting

Welded tube assembly and bracket for mounting 310-HPR regulator to analyzer cabinet

### 310-WSI Welded Sample Inlet w/VCR compatible fittings

(standard on 310-H0050M Range)

### 310-SSOL Stainless Steel Outlet Line <sup>Note 2,4</sup>

### 310-FH Stainless Steel Filter

(Not available with 310-WSI)

### 310-FCV Upstream Flow Control Valve

(Not available with 310-H0050M or with 310-WSI)

### Miscellaneous

### 310-Y04 Scale Factor

Required for accurate read-out of oxygen in background gases other than N2, such as HE, H2, hydrocarbons or mixtures

### 310-PASS Password Protection

### 310-BAT Supplemental Battery Input Power

Permits portable operation independent of AC power

### 310-XTC-RS Extension Cable per foot (for remote sensors)

### 310-SSTAG Stainless Steel Tags

### 310-RSH Remote Sensor Enclosure Heater

### 310-EXT-SNSROFF External Control of Sensor On/Off

### 310-EXT-PUMPOFF External Control of Pump

### 310-N2CP Case Purge for Combustible Applications <sup>Note 5</sup>

(NT-SSOL Required with this option; not compatible with 310-PM)

### 310-ZPK Type Z Purge Protection System for R4 Option

Enables use in Class I/II, Div. 2 areas (Use with N4 only) <sup>Note 5</sup>

### 310-SFE Standard Filter Element (particle size >1 micron)

### 310-FFE Fine Filter Element (particle size <1 micron)

### DF E-Lectrolyte Blue Electrolyte

### DF-RSA Replenishment Solution