



# DF-320E Class 1 Div. 2 (Zone 2) 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 320E-H00100: +/-3% Reading or 50 ppb)

**Oxygen Sensitivity:**  
 Minimum Detectable Change 3 ppb (320E-H0050M model)  
 Low Detection Limit 3 ppb (320E-H0050M model)

**Response Time**  
 Responds instantaneously to O<sub>2</sub> 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 (optional)  
*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/ft<sup>3</sup> (standard)

>0.5 mg/ft<sup>3</sup> - use filter

**Solid Particles:** <2 mg/ft<sup>3</sup> (standard)

>2 mg/ft<sup>3</sup> - 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 320E-H0050M)

### Construction

**Enclosure:** NEMA 1 - General Purpose  
**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 mADC (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

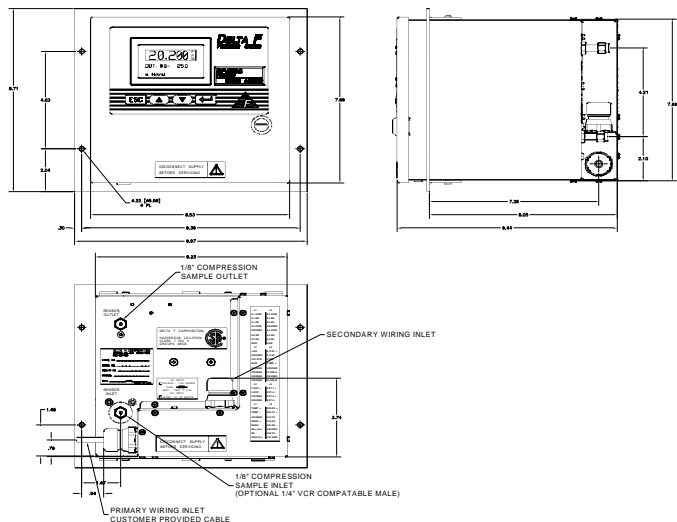
**Alarm Relay Rating:** 0.3 Amps at 30 VDC  
 Failsafe Action

**Back Lighted Display:** Supertwist LCD graphics

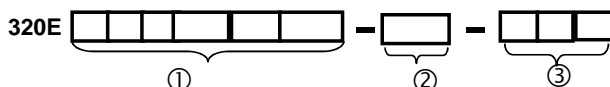
**Certifications:** Class 1, Division 2, Groups A, B, C, D  
 CSA Certification (Internal Sensor Only)  
 CE Conformance  
 Suitable for use in Zone 2 hazardous areas in Europe in accordance with the ATEX directive

### Dimensions

### General Purpose - NEMA 1 Enclosure



## DF-320E Class 1 Div. 2 (Zone 2) 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		H00050M	

#### 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	

### ② Sensor Options (Choose Only 1 Option)

#### B Basic Sensor

#### S Stab-EI Sensor System

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

### ③ 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

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

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

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

320-DRM 19" Rack Mount for two DF-320's

320-KL Key Lock

#### Outputs

320-RS232 RS232 Two-Way Serial Communications

320-RS485 RS485 Two-way Serial Communications

320-4-20 Isolated 4-20mA DC output

320-2-20 Isolated 4-20mA DC output with a live zero at 4 mA and sensor off or disconnected at 2mA

320-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 H<sub>2</sub>
3. For use with system status indicators and optional alarms
4. Not available with on-board pump, 310-P

#### Alarms (Audible/Visual only)

320-OA2 Two Oxygen Alarms

320-OA4 Four Oxygen Alarms

320-FA Low Flow Alarm

320-TA Temperature Alarm

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

320-RLY1 One SPDT Relay Contact

320-RLY2 Two SPDT Relay Contacts

320-RLY3 Three SPDT Relay Contacts

320-RLY4 Four SPDT Relay Contacts

#### Plumbing

320-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)

320-PR Pressure Regulator

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

320-HPR High Purity Pressure Regulator

320-HPR-MNT High Purity Regulator Mounting

Welded tube assembly and bracket for mounting 320-HPR regulator to analyzer cabinet

320-WSI Welded Sample Inlet w/VCR compatible fittings

(standard on 320-H0050M Range)

320-SSOL Stainless Steel Outlet Line Note 2,4

320-FH Stainless Steel Filter

(Not available with 320-WSI)

320-FCV Upstream Flow Control Valve

(Not available with 320-H0050M or with 320-WSI)

#### Miscellaneous

320-Y04 Scale Factor

Required for accurate read-out of oxygen in background gases other than N<sub>2</sub>, such as HE, H<sub>2</sub>, hydrocarbons or mixtures

320-PASS Password Protection

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

320-SSTAG Stainless Steel Tags

320-EXT-SNSROFF External Control of Sensor On/Off

320-EXT-PUMPOFF External Control of Pump

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

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

DF E-Lectrolyte Blue Electrolyte

DF-RSA Replenishment Solution