

SEC SIGNATURE ETO MONITOR TRAINING

SENSOR ELECTRONICS CORPORATION

SEC SIGNATURE ETO MONITOR SIGETO1420597

- PRODUCT INTRODUCED TO ETHYLENE OXIDE STERILIZATION INDUSTRY IN 2001.
- OVER 850 UNITS IN FIELD WORLDWIDE
- INSTALLED ON STERILIZATION CHAMBERS USING VARIOUS STERILANT GASES
 - 100 % ETO
 - ETO / CO2
 - OXYIFUME
 - PROPYLENE OXIDE

GENERAL INFORMATION

- OPERATES ON 24 VDC
- SOURCED A 4-20 MA OUTPUT TO CONTROL SYSTEM
- EXPLOSION PROOF ALUMINUM HOUSING
- INFRARED SENSING TECHNOLOGY
- LIFE EXPECTANCY GREATER THAN 10 YEARS



SPECIFICATIONS

Model: SEC Signature Process Gas Analyzer Ethylene Oxide P/N SIGETO-142-0597

Range (adjustable) Ethylene Oxide 0 – 2000 mg/liter Max. 0 – 500 mg/l Min.

Detection Method: Infrared Optical / Diffusion

Construction: Housing is anodized aluminum with sapphire windows.

Rating: Class 1, Division 1, Groups B,C,D CSA (Canadian Standards Association)

RFI/EMI Protection: EN-50081-1 EN-50082-1

Accuracy: +/- 5% measured value or +/- 3% full scale (whichever greater)

Repeatability: +/- 3%

Operating Temperature Rating: -40° to +70°C at 0 to 99% RH (non-condensing)

Operating Pressure: 1 PSIA – 55 PSIA

Altitude: 0 - 2000 Meters

Operating Voltage: 24 VDC. Operating range 18 to 32 VDC measured at the detector head.

Output (analog): 4-20 mA (Non-isolated, sourcing) 1000 Ohm load (Max.) at 24 VDC supply voltage.

Output (digital): Interactive PC Link

Average Power Consumption at 24 VDC: 6 watts

Current Draw at 24 VDC: 250 mA (average) 450 mA (peak)

Mechanical connection: 3/4" NPT male

Electrical connection: 3/4" NPT male

Weight: 18 ounces

Wire Connections: Red wire (+ 24 VDC) Black wire (D.C. common) Blue wire (4-20 mA output signal) White wire (Calibration / digital interface)

Installation Category: Cat. I, Pollution Degree 2

Approvals: CSA/NRTL Class 1, Division 1 Groups B,C,D (-40C to 50C)

FEATURES

- CONTINUOUS MONITORING GAS VAPORS
- INFRARED SENSOR MID INFRARED SPECTRUM
- EXPLOSION PROOF
- COMPACT LIGHTWEIGHT
- FAST RESPONSE TIME
- SIMPLE CALIBRATION BY END USER
- SELF COMPENSATING OPTICAL CHAMBER
- LINEAR OUTPUT
- UNAFFECTED BY PRESSURE
- HEATED OPTICS
- NO MIRRORED SURFACES
- SELF DIAGNOSTICS

- DIRECT INSTALLATION ON STERILIZATION CHAMBER
- SEC SIGNATURE MEASURES GAS VAPOR DENSITY
- 0 20 MA OUTPUT
- IMMUNE TO POISONING AND ETCHING
- LIFETIME GREATER THAN 10 YEARS
- TOLERANCE AND ACCURACY

TOLERANCE IS +/-2%. ACCURACY: +5% OF READING OR +3% FULL SCALE WHICHEVER VALUE IS GREATER.

APPLY ACCURACY FOR ANY FOUND READINGS.

TOLERANCE IS THE READING AFTER THE INSTRUMENT IS CALIBRATED, THEN TESTED WITH GAS A SECOND TIME. THE TOLERANCE IS +/- 2% WHEN TESTING A CALIBRATED INSTRUMENT.

ZERO GAS READINGS +/- 7 MG/L SPAN GAS READINGS +/- 38 MG/L.



Micromachined Black Body

process environments.



TYPICAL INSTALLATION







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CONTROL SYSTEMS



CONTROL SYSTEM GRAPHS







MAINTENANCE HYDROPHOBIC FILTERS



HYDROPHOBIC FILTERS

- TOP PHOTO VERY DIRTY FILTERS
- REPLACEMENT FILTERS WITH PART NUMBERS
- SENSOR WITH REPLACEMENT FILTERS







CALIBRATION

BENCH TOP CALIBRATION FIRST ZERO THE SENSOR WITH CLEAN AIR OR NITROGEN APPLY 70 % VOLUME ETHYLENE BALANCE NITROGEN TO SPAN CALIBRATE THE SENSOR. 70 % VOLUME ETHYLENE IS THE EQUIVALENT OF 500 MG/L ETHYLENE OXIDE.



ON CHAMBER CALIBRATION

- ZERO CALIBRATE THE SENSOR WITH HUMIDITY IN THE CHAMBER PRIOR TO ETHYLENE OXIDE INJECTION
- SPAN CALIBRATE THE SENSOR TO THE CALCULATED IDEAL
 GAS LAW GAS CALCULATION.
 Pressure
 Number of moles

'=nR'

Gas constant

Volume

SENSOR CALIBRATION DESCRIPTION

IT IS RECOMMENDED THAT AN EMPTY CHAMBER STERILIZER CALIBRATION CYCLE BE ESTABLISHED AND RUN FOR CALIBRATING THE SEC SIGNATURE ETO MONITOR. THE CALIBRATION CYCLE CAN BE A NORMAL OR COMMON CYCLE ALREADY ESTABLISHED. THE MAIN DIFFERENCE IS THAT AFTER THE AFTER THE ETO MONITOR IS SPANNED, THE CYCLE CAN BE ABORTED (ELIMINATING THE ENTIRE ETO DWELL TIME). ONCE THE UNIT IS SPANNED THE CHAMBER CAN RUN THROUGH ITS NORMAL WASHES. THE SEC SIGNATURE IS SPANNED 10 TO 15 MINUTES INTO THE ETO DWELL TIME. THIS GIVES THE CHAMBER TIME TO EQUILIBRATE AND THE ETO CONCENTRATION TO STABILIZE. THE ETO CONCENTRATION DURING THE DWELL TIME IS A CALCULATED VALUE TYPICALLY BASED ON THE IDEAL GAS LAW.

THE SEC SIGNATURE IS LINEARIZED THROUGHOUT THE FULL SCALE RANGE OF 0-2000 MG/L. THE SEC SIGNATURE'S FULL SCALE RANGE IS A FUNCTION OF THE SPAN PROCEDURE. THE SPAN POINT IS THE 50% VALUE OF FULL SCALE (12 MA). IF THE IDEAL GAS LAW CONCENTRATION CALCULATION IS 550 MG/L AND THE SEC SIGNATURE IS SPANNED AT 550 MG/L THE SEC SIGNATURE'S RANGE IS THE FOLLOWING:

4 MA = 0 MG/L

12 MA = 550 MG/L

20 MA = 1100 MG/L

THE DEVICE RECORDING THE SEC SIGNATURE OUTPUT SHOULD BE RANGED ACCORDINGLY.

1). CONNECT SEC PC IR LINK TO SEC SIGNATURE. IF SEC SIGNATURE IS POWERED BY A POWER SUPPLY EXTERNAL FROM THE SEC PC IR LINK BOX, CONNECT THE DC COMMON AND WHITE WIRE ONLY TO THE SEC PC IR LINK BOX. IF YOU ARE USING THE SEC PC IR LINK BOX TO POWER THE SEC SIGNATURE FOLLOW THE WIRE OF THE SEC PC IR LINK BOX.

2). ESTABLISH COMMUNICATION BETWEEN THE PC AND THE SEC SIGNATURE, READ SERIAL NUMBER OF SEC SIGNATURE, IT WILL BE 30XXX. NOTE: THE PASSWORD FOR ZEROING AND SPANNING COMMANDS IS: sec

3). START THE CYCLE DURING THE HUMIDITY DWELL TIME, BEFORE ETO GAS INJECTION ZERO THE SEC SIGNATURE ETO MONITOR. USE THE "ZERO UNIT" COMMAND, IF PROMPTED FOR PASSWORD TYPE: sec

THE 4-20MA SIGNAL WILL DROP FOR A FEW SECONDS TO 2.2 MA AND RETURN TO 4 MA.

4). AS THE CYCLE ADVANCES TO ETO INJECTION THE ONCE THE GAS ENTERS INTO THE CHAMBER THE 4-20 MA SIGNAL WILL INCREASE. AFTER ETO INJECTION IS COMPLETE WAIT 10 TO 15 MINUTES FOR THE CHAMBER TO STABILIZE. MAKE SURE THE CHAMBER RECIRCULATION BLOWER IS ON. USE THE "SPAN UNIT" COMMAND TO SPAN THE SENSOR, PASSWORD IS SEC. THE 4-20 MA SIGNAL WILL DROP TO 2.0 MA FOR A FEW SECONDS WHILE THE SPAN PROCEDURE OCCURS. THEN THE 4-20 MA SIGNAL WILL GO TO 12 MA.

THE CALIBRATION IS COMPLETE, THE CYCLE CAN BE SAFELY ABORTED.



MOST COMMON PROBLEMS

- WATER CONDENSATION IN THE OPTICAL CHAMBER
 - TO RESOLVE THIS ISSUE ADD EXTERNAL HEAT SOURCE TO THE SEC SIGNATURE SENSOR

- ERRATIC READINGS DURING CYCLE. ETO READINGS WHEN NO GAS IS IN CHAMBER
 - CHECK O RINGS IN THE SEC
 SIGNATURE SENSOR FOR
 SHREDDING.
 - IF SHREDDED THE SEC SIGNATURE
 MUST BE SENT BACK TO SENSOR
 ELECTRONICS



TROUBLESHOOTING

USING PC LINK TO TROUBLE SHOOT THE SEC SIGNATURE SENSOR