GENERAL MONITORS

Protection for life.

MODEL S4000CH

Intelligent Sensor
for Combustible Gas Detection

Features

- Compatible with Automatic Remote Gas Calibrator

- Event logging

- HART and Modbus communication

- 4-20 mA output

- Warning, Alarm & Fault Relays

- Calibration, Calibration Check, Setup Modes

- Remaining sensor life indication

Benefits

- Fully automatic calibration

- Stores fault, gas check, calibration, and alarm event history

- Provides complete status and control capability in the control room

- Industry standard output for remote alarm and fault indication

- Provides local alarm capability

- Simplifies operation and maintenance

- Reduces downtime by providing an estimate of remaining sensor life

Description

The Model S4000CH Intelligent Sensor is a microprocessor-based transmitter designed for use with General Monitors' catalytic bead sensors. The unit features one person calibration and can virtually self-calibrate by simply activating a magnetic switch and applying gas. It is designed to monitor combustible gases and vapors within the lower explosive limit (LEL) and provide status indication and alarm outputs.
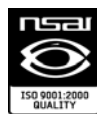
All of the Model S4000CH electronics are contained within an explosion-proof housing so that sensor information can be processed at the sensor site. The detector uses a 4-20 mA analog output signal that is proportional to 0 to 100% LEL gas concentration at the sensor. In addition, the Model S4000CH includes warning, alarm, and fault relay contacts that can be used to indicate an alarm or fault condition and dual redundant Modbus or HART communication. Configurations with relays, Modbus, and HART are available to meet many needs.

The Model S4000CH also includes a three-digit LED display. This local display continuously indicates gas concentrations during normal operation or in the Gas Check Mode, calibration prompts during Calibration Mode, display codes during the Setup Mode, and eight fault codes.

The Model S4000CH has four different operating modes. First, a normal operating mode in which alarms are active and the display and 4-20 mA readings are proportional to the gas concentration at the sensor. Second, a gas check mode that allows the user to apply a gas and check the sensor response while alarm outputs are inhibited. Third, a calibration mode in which gas is applied to the sensor to calibrate the unit. Finally, a setup mode which allows the user to review or change setup options such as relay settings, calibration level, and Modbus parameters.

Selecting Setup Mode on the Model S4000CH is accomplished by using the magnetic switch or HART or Modbus command. Options include:

- Calibration level
- Energized/de-energized relays
- Latching/non-latching relays
- Alarm set points for relays
- Baud rate, data format, and address for each Modbus channel

MODEL S4000CH

System Specifications

Sensor Type: Continuous diffusion, low temperature catalytic bead

Sensor Life: 3 to 5 years

Accuracy: ±3% LEL up to 50% LEL
±5% LEL ≥ 51% LEL

Zero Drift: Less than 5% of full scale per year

Response Time: T_{50} <10 s T_{90} <30 s with 100% LEL methane applied

Measuring Ranges: 0-100% LEL

Modes: Calibration, gas check, setup

Electrical Classification:

CSA/FM Class I, Division 1, Groups B, C & D; Class I, Zone 1, $IIB+H_2$, T6, Type 4X (T_{amb} = -40°C to +75°C)

ATEX II 2 G EEx d $IIB+H_2$ T5, IP66 (T_{amb} = -40°C to +70°C)

Warranty: Two years

Approvals: CE Marking, CSA, FM, ATEX approved. Complies with ANSI/ISA 12.13.01-2000 and EN61779-1,-4, HART registered, SIL 2 / 3 suitable

Environmental Specifications

Operating Temperature Range:
Electronics -40°F to 167°F (-40°C to 75°C)
Standard Sensor -65°F to 200°F (-55°C to 93°C)
High Temp Sensor -65°F to 400°F (-55°C to 200°C)

Storage Temperature Range: -58°F to 185°F (-50°C to 85°C)

Operating Humidity Range: 5% to 100% RH, non-condensing

Mechanical Specifications

Length: 6.4 inches (161 mm)

Height: 3.4 inches (86 mm)

Width: 4.1 inches (104 mm)

Weight: 5.5 lbs. (2.5 kg)

Mounting Holes: 5.0 inches (127 mm) (center to center)

Electrical Specifications

Input Power: 24 VDC nominal, 20 to 36 VDC 250 mA max.

Relay Ratings: *(Optional)* 8A @ 250 VAC / 8A @ 30 VDC res. max. (3x) SPDT - Warning, Alarm & Fault

Analog Signal: 0-20 mA (650 Ohms max. load)
Malfunction   0 mA†
Gas Check/Calibrate 1.5 mA‡
Setup mode   1.5 mA‡
Zero reading   4 mA ± .05 mA
0-100% LEL   4-20 mA
Over-range   20-22 mA

RFI/EMI Protection: Complies with EN50270, EN61000-6-4

Status Indicators: Three-digit LED display with gas concentration, Warn and Alarm LED's, calibration prompts, fault codes, and setup options

RS-485 Output: *(Optional)* Dual redundant Modbus RTU, suitable for linking up to 128 units or up to 247 units with repeaters

Baud Rate: 2400, 4800, 9600, or 19200 BPS

HART: *(Optional)* HART 6, HART Device Description Language available. AMSAware

Faults Monitored: Calibration error, sensor error, low DC supply, EEPROM, EPROM, setup error, gas check time exceeded, switch error, ARGC, internal error

Cable Requirements: Three-wire shielded cable. Max. distance between S4000CH and power source @ 24 VDC nominal (20-Ohm loop):
    14 AWG - 2303 ft (702 m)

Max. distance for analog output (650 Ohms max):
    14 AWG - 9000 ft (2740 m)

Wireless Communication: Available with ELPRO Technologies wireless transmitters

Standard Configuration: **S4000CH-1-0-01-1**
4-20 mA, standard aluminum sensor

Specifications subject to change without notice.

Represented by:

Publication #: DS-S4000CH-B1110

† Under HART, current values can be either 3.5 mA or 1.25 mA, depending on user selection. ‡ Under HART, current value can be either 3.5 mA or 1.5 mA, depending on user selection.