Net Safety™ ST3 XChem Toxic Gas Sensor

Millennium II Series Sensors
Overview

The Net Safety ST3 XChem series of electrochemical toxic gas sensors provide high specificity, fast response, and long life. All Net Safety ST3 XChem Toxic Gas Sensors are part of the universal Millennium II Gas Detection platform and are compatible with Net Safety M21, M22, and M2B Transmitters. These sensors employ SimpleClick sensor element design.

- Low power consumption.
- Sensor end-of-life diagnostic.
- Two-year sensor warranty.
- Field-selectable gas ranges.
- Plug-and-play sensor design: the transmitter automatically recognizes sensor configuration.
- Long range (over 2,000 ft./600 m) sensor separation through digital communication between transmitter and sensor.
- Designed to perform in the most extreme industrial environments.

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Features

Sensor end-of-life diagnostic
As part of their normal lifecycle, electrochemical sensors must be monitored and replaced regularly. The end-of-life diagnostic automatically determines the health of the sensor cell and provides a fault condition alert when the sensor needs to be replaced.

Single or dual channel transmitter
You can use one or two toxic gas sensors, combustible gas sensors, or both with a single Net Safety Millennium II Transmitter to mix and match sensor types. This option offers greater flexibility and eliminates the need to purchase multiple gas-specific detectors.

Plug and play design
The sensors are factory calibrated. Net Safety Millennium II Transmitters automatically recognize a newly-installed sensor and upload its specific configuration profile.

Improved triple electrode design
The sensor's sensing element uses robust materials on sensing, reference, and counter electrodes to ensure long life and enhanced performance.

Advanced environmental immunity
Each sensor is temperature compensated to its target gas and to its field-selected gas concentration range to provide accurate and stable gas concentration readings. An advanced diffusion process controls humidity as gases pass through a specialized hydrophobic barrier.
Ordering information

The starred options (*) represent the most common options and should be selected for best delivery. The non-starred options are subject to additional delivery lead time.

**Table 1: Net Safety ST3 XChem Toxic Gas Sensor Product Ordering Information**

The starred offerings (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

<table>
<thead>
<tr>
<th>Model</th>
<th>Product description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ST320A-100-ASSY</td>
<td>Aluminum, hydrogen sulfide (H₂S), 0-20/50/100 ppm field-selectable</td>
<td>★</td>
</tr>
<tr>
<td>ST341A-25-ASSY</td>
<td>Aluminum, oxygen (O₂) deficiency, 0-25% by volume</td>
<td>★</td>
</tr>
<tr>
<td>ST360A-1000-ASSY</td>
<td>Aluminum, carbon monoxide (CO), 0-500/1000 ppm field selectable</td>
<td>★</td>
</tr>
</tbody>
</table>

**Typical model number: Net Safety ST320A-100-ASSY**

**Table 2: Net Safety ST3 Gas Sensor Accessories Ordering Information**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>JB-MPD-S</td>
<td>Termination box - digital output - stainless steel</td>
</tr>
<tr>
<td>JB-MPD-A</td>
<td>Termination box - digital output - aluminum</td>
</tr>
<tr>
<td>CCS-1</td>
<td>Calibration cup</td>
</tr>
</tbody>
</table>
## Dimensional drawing

**Figure 1: Net Safety ST3**

1. Aluminum shown

### Table 3: Dimensions in Inches (Millimeters)

<table>
<thead>
<tr>
<th>Letter</th>
<th>Aluminum housings</th>
<th>Stainless steel housings</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6.3 (160)</td>
<td>5.9 (150)</td>
</tr>
<tr>
<td>B</td>
<td>5.6 (142)</td>
<td>5.1 (130)</td>
</tr>
<tr>
<td>C</td>
<td>5.4 (137)</td>
<td>4.6 (117)</td>
</tr>
<tr>
<td>D</td>
<td>9.7 (246)</td>
<td>8.9 (226)</td>
</tr>
<tr>
<td>E</td>
<td>6.0 (152)</td>
<td>6.0 (152)</td>
</tr>
<tr>
<td>F</td>
<td>5.7 (145)</td>
<td>5.8 (147)</td>
</tr>
<tr>
<td>G</td>
<td>2.6 (66)</td>
<td>2.6 (66)</td>
</tr>
<tr>
<td>H</td>
<td>2.9 (74)</td>
<td>2.9 (74)</td>
</tr>
<tr>
<td>I</td>
<td>4.1 (103)</td>
<td>3.9 (100)</td>
</tr>
<tr>
<td>J</td>
<td>0.157 (4)</td>
<td>0.157 (4)</td>
</tr>
</tbody>
</table>
Specifications

Hydrogen sulfide (H₂S) electrochemical sensor
Part number: ST320(A/S)-100-ASSY

Performance specifications

Response time
T20: 10 seconds
T50: 15 seconds
T90: 36 seconds

Accuracy
±3 ppm or 10% of reading, whichever is greater

Detection range
0-20/50/100 ppm (field-selectable)

Zero drift
<5% full scale annually

Repeatability
<1% full scale

Calibration frequency
Three months

Electromagnetic compatibility (EMC)
EN 50270: 2006

Physical specifications

Enclosure material
- AL6061 aluminum
- SS316 stainless steel

Environmental
- Operating temperature limits: -40 to +140 °F (-40 to +60 °C)
- Storage temperature limits: -40 to +140 °F (-40 to 60 °C)
- Humidity limits: 15 - 90% relative humidity, non-condensing
- Ingress protection rating: IP64

Functional specifications

Sensor separation
Up to 2,000 ft. (600 m) with 18 AWG cabling
Required transmitters
- Net Safety Millennium II M2B
- Net Safety Millennium II M21
- Net Safety Millennium II M22

Warranty
Two years

Carbon monoxide (CO) electrochemical sensor
Part number: ST360(A/S)-1000-ASSY

Performance specifications
Response time (without accessories)
T20: 10 seconds
T50: 15 seconds
T90: 30 seconds

Accuracy
32 °F to 122 °F (0 °C to 50 °C): ±13 ppm or 5% of reading, whichever is greater
-4 °F to 32 °F (-20 °C to 0 °C): ±32 ppm or 17% of reading, whichever is greater

Detection range
0 - 500/1000 ppm (field-selectable)

Zero drift
< 5% full scale annually

Repeatability
< 3% full scale

Calibration frequency
3 months

Electromagnetic compatibility (EMC) compliance
EN 50270: 2006

Physical specifications
Enclosure
Weight
Stainless steel: 3.5 lb. (1.4 kg)
Aluminum: 1 lb. (0.4 kg)

Enclosure material
AL6061 aluminum
SS316 stainless steel

August 2019
Environmental specifications

**Operating temperature limits**  -4 to 122 °F (-20 to 50 °C)
**Storage temperature limits**  37 to 68 °F (3 to 30 °C)
**Humidity limits**  15 - 90% relative humidity, non-condensing
**Ingress protection rating**  IP64

Functional specifications

**Sensor separation**
Up to 2,000 ft. (600 m) with 18 AWG cabling

**Required transmitters**
- Net Safety Millennium II M2B
- Net Safety Millennium II M21
- Net Safety Millennium II M22

**Warranty**
Two years

Oxygen (O\(_2\)) deficiency electrochemical sensor

Part number: ST341(A/S)-25-ASSY

Performance specifications

**Response time (without accessories)**
T20: 7 seconds
T50: 10 seconds
T90: 20 seconds

**Accuracy**
±0.5% volume

**Detection range**
0-25% volume

**Zero drift**
< 5% full scale annually

**Repeatability**
< 3% full scale

**Calibration frequency**
Three months
Electromagnetic compatibility (EMC) compliance
EN 50270:2006

Physical specifications

Enclosure

Weight
Stainless steel: 3.5 lb. (1.4 kg)
Aluminum: 1 lb. (0.4 kg)

Enclosure material
AL6061 aluminum
SS316 stainless steel

Environmental specifications

Operating temperature limits
-4 to 122 °F (-20 to 50 °C)

Storage temperature limits
32 to 68 °F (0 to 20 °C)

Humidity limits
15-90% relative humidity, non-condensing

Ingress protection rating
IP64

Functional specifications

Sensor separation
Up to 2,000 ft. (600 m) with 18 AWG cabling

Required transmitters
Use only the following transmitters:
- Net Safety Millennium II M21-AH-A/S
- Net Safety Millennium II M21-AHR-A/S

Warranty
Two years

Product certifications

Installing in North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division-marked equipment in Zones and Zone-marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

North America

Markings
Class 1, Division 1, Groups BCD T5
Ex d IIB+H2 T5
Class 1, Zone 1, AEx d IIB+H₂ T5 Gb
IP64

IECEx

Markings
Ex d IIB+H₂ T5 Gb
IP64