Model **TS4000H**

Intelligent Sensor For Toxic Gas Detection

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**Applications**

- Agriculture – Fertilizer Production
- Automotive Plating Processes, Engine Test Cells
- Chemical Plants
- Food and Beverage
- Oil & Gas
- Pharmaceuticals
- Primary Metals Processing
- Pulp and Paper
- Utilities
- Wastewater Treatment Plants

**Features & Benefits**

- Integral galvanic isolation permits hot swapping of electrochemical sensors
- Simple installation with low cost of ownership
- Event logging stores fault, gas check, calibration, and alarm event history.
- Magnetically activated, non-intrusive method allows one-person, adjustment-free calibration
- HART and Modbus communication provide complete status and control capability in the control room
- Industry standard 4-20 mA output for remote alarm and fault indication
- Warning, alarm and fault relays provide local alarm capability
- Remaining sensor life indication reduces downtime by providing estimate of remaining sensor life

**Description**

The General Monitors TS4000H is a 24 VDC-powered toxic gas detector comprised of a base unit, interface module, and electrochemical cell (sensor). The TS4000H monitors a variety of toxic gases in the parts per million (ppm) range, including: ammonia, carbon monoxide, chlorine, chlorine dioxide, hydrogen, hydrogen sulfide, nitric oxide, nitrogen dioxide, oxygen deficiency, and sulfur dioxide. Configuring the TS4000H to detect a specific target gas is accomplished by simply installing a new sensor and calibrating.

The microprocessor-based electronics incorporated in the interface module processes information from the sensor (EC cell) and communicates the detected gas values to the base unit for data control and display. In addition, the TS4000H includes warning, alarm and fault relay contacts, Modbus and HART communications. These outputs can be used to indicate an alarm or fault condition. Configurations with relays, Modbus and HART are available to meet many needs. The TS4000H is certified as explosion-proof with intrinsically safe sensor inputs for use in hazardous locations.

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Because every life has a purpose...
# Sensor Specifications

**SENSOR TYPE**  
Electrochemical cell

**MEASURING RANGES**

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Measuring Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonia</td>
<td>0-50, 0-100 ppm</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>0-1, 0-500 ppm</td>
</tr>
<tr>
<td>Chlorine*</td>
<td>0-3 ppm</td>
</tr>
<tr>
<td>Chlorine Dioxide*</td>
<td>0-3 ppm</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>0-500 ppm</td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td>0-20, 0-50, 0-100 ppm</td>
</tr>
<tr>
<td>Nitric Oxide</td>
<td>0-100 ppm</td>
</tr>
<tr>
<td>Nitrogen Dioxide</td>
<td>0-20 ppm</td>
</tr>
<tr>
<td>Oxygen</td>
<td>0-25% v/v</td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>0-20, 0-100 ppm</td>
</tr>
</tbody>
</table>

**REPEATABILITY**  
±0.2 % of full scale, except ±0.2 ppm for ClO2 or ±1% v/v for O2.

**ZERO DRIFT**  
< 5 % per year

**RESPONSE TIME**  
(with 100% FS gas applied)

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO, H2, H2S, NO2</td>
<td>T90 &lt; 30 s</td>
</tr>
<tr>
<td>NO, SO2</td>
<td>T90 &lt; 10 s</td>
</tr>
<tr>
<td>Cl2, ClO2, NH3</td>
<td>T90 &lt; 60 s</td>
</tr>
<tr>
<td>O2</td>
<td>T90 &lt; 15 s</td>
</tr>
</tbody>
</table>

**CLASSIFICATION**

**CSA**

Class I, Div 1 & 2, Groups B, C & D; Class II, Div 1 & 2, Groups E, F & G; Class III, Type 4X.

**ATEX/IECEx**

II 2 G Ex d iIB + H2, T5 Gb, Ex tb IIIa T100°C Db (-40°C ≤ Ta ≤ +70°C)

**Interface Module**

Ex d ia IIB + H2, T5  
II 2 G Ex db mb ib IIC Gb (-40°C ≤ Ta ≤ +75°C)

**ACCESSORIES**

Flow block, splash guard, junction boxes, multi-channel controller, calibration kits

**WARRANTY**

One year (cell), two years (electronics)

**APPROVALS**

CSA, ATEX, GOST, IECEx and CE Marking.

HART registered. SIL 2 suitable (FM).

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Note: This Bulletin contains only a general description of the products shown. While uses and performance capabilities are described, under no circumstances shall the products be used by untrained or unqualified individuals and not until the product instructions including any warnings or cautions provided have been thoroughly read and understood. Only they contain the complete and detailed information concerning proper use and care of these products. Specifications subject to change without notice.

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### Mechanical Specifications

**BASE UNIT**

| Length | 6.3 in (161 mm) |
| Height | 3.2 in (81 mm)  |
| Width  | 4.3 in (110 mm) |

**WEIGHT**

| Weight  | 5.5 lbs (2.5 kg) – AL; 14.1 lbs (6.38 kg) – SS |
| MOUNTING HOLE | 5.0 in (127 mm) center to center |

**HOUSING**

Aluminum alloy or stainless steel

**INTERFACE MODULE**

| Length | 6.37 in (162 mm) |
| Diameter | 1.75 in (44 mm)  |
| WEIGHT  | 1.0 lbs. (0.45 kg) |

**HOUSING**

3/4” NPT  
Anodized aluminum A356-T6

**Electrical Specifications**

**INPUT POWER**

20-36 VDC  
24 VDC nominal @ 0.120 A

**RELAY RATINGS**

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

**POWER CONSUMPTION**

- Start-up: 125 mA  
- Normal: 120 mA

**ANALOG SIGNAL**

0-22 mA (500 Ω max. load)  
Fault: 0 mA  
Calibration: 1.5 mA  
Setup mode: 1.5 mA  
Detection range: 4-20 mA  
Over-range: 20-21.7 mA

**EMC**

EN 50081-2, EN 50270

**STATUS INDICATORS**

Three-digit LED display with gas concentration, Warn and Alarm LED’s, calibration prompts, fault codes, and setup options

**BAUD RATE**

2400, 4800, 9600, or 19200 BPS

**HART**

Optional  
HART 6, HART Device Descriptor available.  
AMSaware

**FAULTS MONITORED**

Calibration errors, data memory errors

**CABLE REQUIREMENTS**

Three-wire shielded cable. Max. distance between TS4000H and power source @ 24 VDC nominal: 14 AWG - 3430 ft (1040 m)  
Max. distance for analog output (500 Ω max): 14 AWG - 9000 ft (2740 m)  
Max. distance between base unit and interface module: 14 AWG - 2000 ft (600 m)

**STANDARD CONFIGURATION**

TS4000H-1-0-03-01-1  
(CO, without relays, without Modbus, without HART)

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* Electrochemical cells are sensitive to changes in humidity, particularly at temperatures above 25°C. For these applications, consult our factory.
† Under HART, AO values can be either 3.5 mA or 1.25 mA, depending on user selection.
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**Corporate Headquarters:**

**MSA**  
1000 Cranberry Woods Drive  
Cranberry Township, PA 16066  
United States  
+1-724-776-8600  
info.us@MSAsafety.com

**Design Center:**

**General Monitors**  
26776 Simpatica Circle  
Lake Forest, CA 92630  
United States  
+1-949-581-4464  
info.gm@MSAsafety.com

**Additional locations can be found on our web site:**

www.MSAsafety.com