

# Model TS4000H

Intelligent Sensor For Toxic Gas Detection



General Monitors



## 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 chloride, 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 TS4000H is certified as explosion-proof with intrinsically safe sensor inputs for use in hazardous locations.

The microprocessor-based electronics incorporated in the interface module processes information from the sensor (EC cell) site 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.



Sensor Specifications		
SENSOR TYPE	Electrochemical cell	
MEASURING RANGES	Ammonia	0-50, 0-100 ppm
	Carbon Monoxide	0-100, 0-500 ppm
	Chlorine*	0-10, 0-20 ppm
	Chlorine Dioxide*	0-3 ppm
	Hydrogen	0-500 ppm
	Hydrogen Chloride*	0-20 ppm
	Hydrogen Sulfide	0-20, 0-50, 0-100 ppm
	Nitric Oxide	0-100 ppm
	Nitrogen Dioxide	0-20 ppm
	Oxygen	0-25% v/v
Sulfur Dioxide	0-20, 0-100 ppm	
REPEATABILITY	±2 % of full scale, except ±0.2 ppm for ClO <sub>2</sub> , or ±1% v/v for O <sub>2</sub> .	
ZERO DRIFT	< 5% per year	
RESPONSE TIME (WITH 100% FS GAS APPLIED)	CO, H <sub>2</sub> , NO <sub>2</sub>	T90 < 30 s
	H <sub>2</sub> S	T90 < 45 s
	NO, SO <sub>2</sub>	T90 < 10 s
	HCl	T90 < 100 s
	Cl <sub>2</sub> , ClO <sub>2</sub> , NH <sub>3</sub>	T90 < 60 s
	O <sub>2</sub>	T90 < 15 s
CLASSIFICATION	<b>Base Unit</b>	
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 D Ex db IIB + H <sub>2</sub> T5 Gb, Ex tb IIIC T100°C Db (-40°C ≤ Ta ≤ +70°C)	
	<b>Interface Module</b>	
CSA	Ex d ia IIB + H <sub>2</sub> T5	
ATEX/IECEx	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, Inmetro and CE Marking. HART registered. SIL 2 suitable (FM).	
Environmental Specification		
OPERATING TEMPERATURE RANGE	All gases other than H <sub>2</sub> S, O <sub>2</sub> , and NH <sub>3</sub> : -6°F to 122°F (-21°C to 50°C) (for H <sub>2</sub> S, O <sub>2</sub> , and NH <sub>3</sub> ): -40°F to 122°F (-40°C to 50°C)	
STORAGE TEMPERATURE RANGE		
TS4000H	-40°F to 185°F (-40°C to 85°C)	
EC CELLS	32°F to 68°F (0°C to 20°C)	
EC CELLS (CO, H <sub>2</sub> , NH <sub>3</sub> & O <sub>2</sub> )	60°F to 80°F (16°C to 27°C)	
OPERATING HUMIDITY RANGE*	15% to 90% RH, non-condensing	
PRESSURE RANGE	Atmospheric ±10%	

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	
<b>BASE UNIT</b>	
LENGTH	6.3 in (161 mm)
HEIGHT	3.2 in (81 mm)
WIDTH	4.3 in (110 mm)
WEIGHT	5.5 lbs (2.5 kg) - AL; 14.1 lbs (6.38 kg) - SS
MOUNTING HOLES	5.0 in (127 mm) center to center
HOUSING	Aluminum alloy or stainless steel
<b>INTERFACE MODULE</b>	
LENGTH	6.37 in (162 mm)
DIAMETER	1.75 in (44 mm)
WEIGHT	1.0 lbs. (0.45 kg)
MOUNTING	3/4" NPT
HOUSING	Anodized aluminum A356-T6
Electrical Specifications	
<b>INPUT POWER</b>	20-36 VDC 24 VDC nominal @ 0.120 A
<b>RELAY RATINGS</b>	8 A @ 250 VAC / 8 A @ 30 VDC res. max.
<i>OPTIONAL</i>	(3x) SPDT - Warning, Alarm & Fault
<b>POWER CONSUMPTION</b>	Start-up: 125 mA Normal: 120 mA
<b>ANALOG SIGNAL</b>	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
<b>EMC</b>	EN 61000-6-4, EN 50270
<b>STATUS INDICATORS</b>	Three-digit LED display with gas concentration, Warn and Alarm LED's, calibration prompts, fault codes, and setup options
<b>BAUD RATE</b>	2400, 4800, 9600, or 19200 BPS
<b>HART</b>	HART 6, HART Device Descriptor available.
<i>OPTIONAL</i>	AMSaware
<b>FAULTS MONITORED</b>	Calibration errors, data memory errors
<b>CABLE REQUIREMENTS</b>	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)
<b>STANDARD CONFIGURATION</b>	<b>TS4000H-1-0-03-01-1</b> (CO, without relays, without Modbus, without HART)

\* 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.

‡ Under HART, AO value can be either 3.5 mA or 1.5 mA, depending on user selection.