



GENERAL MONITORS
Protection for life.

MODEL TS4000H

Intelligent Sensor For Toxic Gas Detection



Features

- Integral galvanic isolation
- Event logging
- One person adjustment-free calibration
- 4-20 mA output
- Warning, Alarm, and Fault Relays
- Sensor life indication
- Modbus and HART user interface

Benefits

- Design permits hot swapping of electrochemical sensors, simple installation with low cost of ownership
- Stores fault, gas check, calibration, and alarm event history
- Uses a magnetically activated, non-intrusive, calibration method
- Industry standard output for remote alarm and fault indication
- Provides local alarm capability
- Reduces downtime by providing an estimate of remaining sensor life
- Provides complete status and control capability in the control room

Description

The 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 chloride, hydrogen sulfide, nitric oxide, nitrogen dioxide, oxygen deficiency, ozone, 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 of the interface module process information at the sensor site and communicate detected gas values to the base unit for data control and display. In addition, the TS4000H 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 TS4000H is certified as explosion-proof with intrinsically safe sensor inputs for use in hazardous locations. It can also be used for general-purpose, non-hazardous applications.

Applications

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



MODEL TS4000H

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 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% by volume
Ozone	0-1 ppm
Sulfur Dioxide	0-20, 0-100 ppm

Repeatability: ±2 ppm or ±10% of reading whichever is greater for all gases except ±20% for NH₃, O₃ and ClO₂ and ±1% FS for O₂

Zero Drift: < 5% per year

Typical Response Time:

(with 100% FS gas applied)
 CO, H₂S, NO₂: T90 < 30 sec,
 NO, SO₂: T90 < 10 sec,
 HCl: T90 < 100 sec,
 Cl₂, ClO₂: T90 < 60 sec,
 NH₃, O₃: T90 < 90 sec,
 O₂: T90 < 15 sec

Classification: Class I, Div 1 & 2, Groups B, C & D, Class II, Div 1 & 2, Groups E, F & G, Class III Ex d ia IIB + H₂ T5, Type 4X w/remote interface module, EEx d mb ib IIC (-40°C ≤ Ta ≤ +75°C)

Accessories: Flow block, splash guard, plastic junction box, aluminum junction box, multi-channel controller, calibration kits

Warranty: One year (cell), Two years (electronics)

Approvals: CSA, ATEX, GOST, and CE Marking. SIL 2 suitable. FM certified to IEC 61508.

Environmental Specifications

Operating Temperature Range:

(for all gases other than H₂S and NH₃):
 -4°F to 122°F (-20°C to 50°C)
 (for H₂S): -40°F to 122°F (-40°C to 50°C)
 (for NH₃): -40°F to 104°F (-40°C to 40°C)

Storage Temperature Range:

Base unit and interface module: -4°F to 185°F (-20°C to 85°C)
 EC Cells: 32°F to 68°F (0°C to 20°C)
 EC Cells (CO & O₂): 60°F to 80°F (16°C to 27°C)

Operating Humidity Range*:

15% to 90% RH, non-condensing

Pressure Range: Atmospheric ±10%

*Electrochemical cells are sensitive to changes in humidity, particularly at temperatures above 25°C. For these applications, consult our factory.
 † 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.

Mechanical Specifications

Base Unit

Length: 6.4 in (161 mm)
Height: 3.4 in (86 mm)
Width: 4.1 in (104 mm)
Weight: 5.5 lbs (2.5 kg)
Mounting Holes: 5.0 in (127 mm) center to center

Interface Module

Length: 6.37 in (162 mm)
Diameter: 1.75 in (44mm)
Weight: 1.0 lbs. (.45 kg)
Mounting: 3/4" NPT
Housing: Anodized aluminum

Electrical Specifications

Input Power: 20-36 VDC
 +24 VDC @ 0.120 amps

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

Power

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

Analog Signal: 0-22 mA (500 Ohms 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

RFI/EMI

Protection: EN 55011, 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: HART 6, HART Device Description (Optional) Language 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 Ohms max): 14 AWG - 9000 ft (2740 m)

Max. distance between base unit and interface module: 14 AWG - 2000 ft (600 m)

Wireless

Communication: Available with ELPRO Technologies wireless transmitters

Standard

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

Specifications subject to change without notice.

Represented by:

General Monitors Worldwide



www.generalmonitors.com
www.gmitoxics.com

Lake Forest, CA

26776 Simpatica Circle
 Lake Forest, California 92630
 Tel: +1-949-581-4464
 Fax: +1-949-581-1151
 Email: info@generalmonitors.com

Houston, TX

9776 Whithorn Drive
 Houston, Texas 77095
 Tel: +1-281-855-6000
 Fax: +1-281-855-3290
 Email: gmhou@generalmonitors.com

Ireland

Ballybrit Business Park
 Galway
 Republic of Ireland
 Tel: +353-91-751175
 Fax: +353-91-751317
 Email: info@gmil.ie

Singapore

No. 2 Kallang Pudding Road
 #09-16 Mactech Building
 Singapore 349307
 Tel: +65-6748-3488
 Fax: +65-6748-1911
 Email: genmon@gmpacifica.com.sg

United Arab Emirates

P.O. Box 61209
 Jebel Ali
 Dubai
 United Arab Emirates
 Tel: +971-4-8143814
 Fax: +971-8-4480051
 Email: gmme@generalmonitors.ae

United Kingdom

Heather Close
 Lyme Green Business Park
 Macclesfield, Cheshire
 United Kingdom, SK11 0LR
 Tel: +44-1625-619583
 Fax: +44-1625-619098
 Email: info@generalmonitors.co.uk