

A full-page photograph of a male worker in a blue hard hat and safety harness. He is wearing a gas detector on his forehead and holding a handheld gas detector device with a probe, testing a large industrial flange. The background shows industrial piping and structures under a clear blue sky.

**Gas Detection and  
Monitoring Solutions  
FOR LIFE**

**Détection de Gaz :  
Instruments &  
Solutions POUR LA VIE**

**Gaserkennungs-  
und Überwachung-  
Lösungen FÜR DAS LEBEN**

**INDUSTRIAL  
SCIENTIFIC**

*The Gas Detection People*

# WELCOME TO INDUSTRIAL SCIENTIFIC

Since being founded in 1985, Industrial Scientific has sought to make a contribution to this world by helping people return home from work at the end of the day...alive. We recognize that, at any given time, tens of thousands of people are betting their lives on the collective work we do as a company .

That being said, it is important to know what drives your supplier of gas detection equipment and solutions. Here at Industrial Scientific, we are driven by three things.

The first is Our Mission – *Preserving human life on, above, and below the Earth. Delivering highest quality, best customer service...every transaction, every time.* What we do – preserving human life – shapes our expectations towards the output. It must be of highest quality and exceed the expectations of our customers. We invest aggressively in capital equipment and business systems to ensure this. We partner with the best suppliers we can find. We don't let anything out of our factories that we wouldn't bet our own lives on.

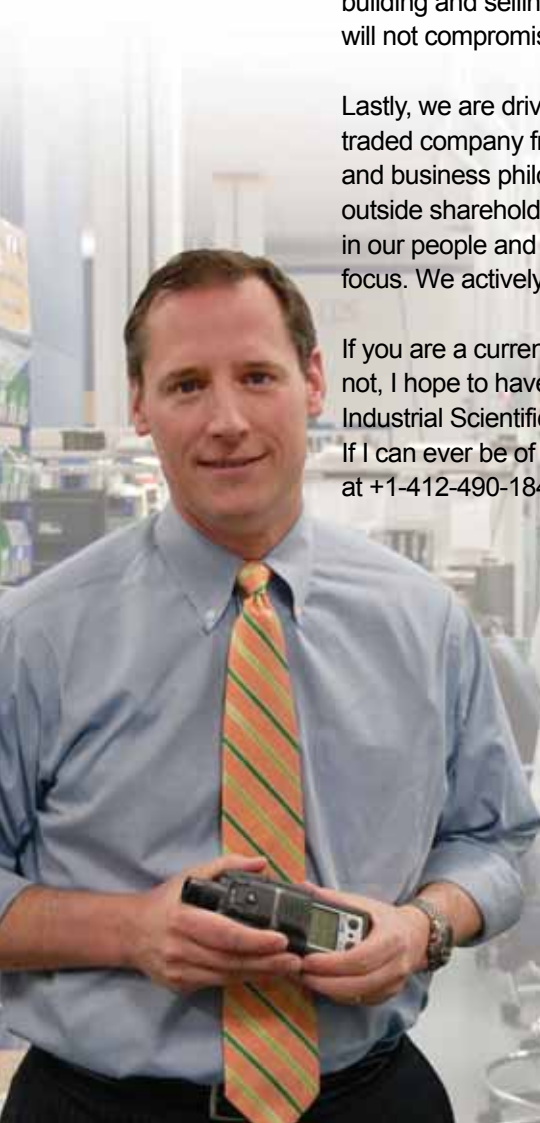
The second is our Employees First business philosophy . We believe good performance is the result of doing the right things for employees first, customers second and shareholders third. Only when we have the best people in the world, working with the best tools, can we truly deliver the best performance for our customers. If we serve our customers well, we will live another day as a company. It all starts, though, with the individuals designing, building and selling the solutions you and your people bet your lives on. We will not compromise by serving you with anything but the best people.

Lastly, we are driven by our independence. Industrial Scientific was a publicly-traded company from 1993 to 1999. As a public company, we felt our mission and business philosophy were in opposition to the demands of Wall Street and outside shareholders. As a private company, we have been able to reinvest in our people and our systems, and make decisions with a better long-term focus. We actively work to keep Industrial Scientific strong and independent.

If you are a current customer, thank you for your business and partnership. If not, I hope to have the opportunity to demonstrate what the great people of Industrial Scientific are capable of doing to help you create a safer workplace. If I can ever be of any assistance, please do not hesitate to contact me directly at +1-412-490-1842 or at [jmcelhattan@indsci.com](mailto:jmcelhattan@indsci.com). Thank you.



Justin McElhattan  
President and Chief Executive Officer





## WHY INDUSTRIAL SCIENTIFIC?

### Quality Assurance

- ISO9001-2000 Quality System Certified
- CSA – Category Certified
- Third Party Certifications – for intrinsic safety, susceptibility to electromagnetic and radio frequency interference, ingress protection and performance

### Global Presence

- Manufacturing facilities in USA, France and China
- Offices in many countries throughout the world
- Distribution network established worldwide
- Established international accounts – references available

### Guaranteed For Life

- Lifetime Warranty on most portable monitors
- Service Guarantee on all factory repairs
- One year warranty on all fixed-point systems and accessories

### Ease of Use and Serviceability

- One-button operation and calibration on most monitors
- Microprocessor-controlled operation
- Easy sensor replacement and calibration in the field
- Local servicing available through authorized distributors

### Environmentally Friendly

- Complete recycling process for returned and decommissioned instruments
- Recycling program for sensors, PC boards and batteries
- Compliant with WEEE and RoHS

### Durability and Reliability

- Durable stainless steel or high impact composite construction on portable monitors
- NEMA 4X fiberglass, cast aluminum or stainless steel construction on fixed monitoring systems
- Superior Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI) shielding

### State-of-the-Art Product Testing Laboratory

- Tests simulate harsh industrial environments for product design verification
- Rigorous testing for RFI, EMI, water and dust ingress, vibration and drop effects, temperature and humidity
- Ensures product reliability and durability
- 548.64 sq. meter in-house lab is unique to the industry

### Flexible Programs

- On-site product demonstrations
- Training courses available at corporate headquarters or customer's site
- Interactive computer-based and Web-based training
- Variety of options for purchase and after sale service

*Industrial Scientific's Global Gas Detection and Monitoring Solutions are application oriented for every customer we serve.*

### Customer Applications

- Oil & Natural Gas Producers
- Diversified Manufacturers
- Utilities
- Petroleum or Ethanol Refiners
- Chemical Manufacturers
- Municipalities
- Metal Producers
- Mines
- Fire Rescue
- Construction
- Aviation
- Agriculture or Farming
- Pharmaceutical Manufacturers
- Pulp and Paper Manufacturers
- Food And Beverage Production
- Service Providers
- . . . and others

### Need the best solution for your application?

Visit [www.indsci.com](http://www.indsci.com) for our help desk and your nearest location.



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## CERTIFICATIONS

	Multi-Gas Monitors				Single-Gas Monitors		
Gas Detector	MX6 iBrid™	Ventis™ MX4	BM25	M40	GasBadge® Pro	GasBadge® Plus	T40 Rattler
UL							
MSHA		(Pending)					
CSA							
AUSTRALIA		(Pending)					
ATEX							
IECEX							
GOST (Russia)		(Pending)					
INMETRO		(Pending)					

Certain limits apply to the number of sensor configurations. Call for details.



## Don't Buy Gas Detectors

*Subscribe to Gas Detection as a Service*

iNet® keeps people safe by providing visibility into alarms, exposure and usage. It keeps gas detectors working without costly and time-consuming maintenance. And you don't have to buy the gas detectors when you subscribe to iNet. Instead, you receive Gas Detection as a Service.

### How Gas Detection as a Service Works



iNet customers reduce their instrument fleet by an average of ~20% because of limited downtime.

### iNet gives you help from The Gas Detection People

Gas detection is probably not core to what you do. But, it's all that we do. It's what we love to do. With iNet, we can help you to:

- Overcome staffing shortages
- Increase productivity



### iNet® gives you a safer workplace

On average, gas detectors in the iNet fleet go into high alarm once every ten days. Do you know how many high alarms your facility had? iNet gives you information and tools to fix problems before they happen. For example, iNet increases safety by helping you to:

- Use data more effectively
- Boost equipment reliability
- Prove compliance

### iNet gives you cost savings

The purchase price is only part of a gas detector's total cost. You have to maintain it. You have to wait for it to be serviced. iNet eliminates unnecessary costs. Specifically, iNet helps you to:

- Optimize your fleet size
- Cut unnecessary ownership and maintenance costs
- Increase productivity
- Standardize your equipment training

### iNet Control

**Keeps You Informed ...  
Puts You in Control**

iNet Control is the first hosted software for managing gas detector fleets. This service is included with every iNet subscription and provides visibility into alarms, maintenance and usage. Users may view trend graphs or sensor-level detail for each gas detector. iNet Control also allows users to compare the health of their gas detection program to industry averages.



Detailed views identify the source of potential problems so you can take action, and save lives.



### iNet DS

**The iNet DS docking station connects directly to the Internet via an Ethernet interface. It does not require installation of any software or server hardware at the customer site.**

#### Features include:

- Plug-and-play installation
- Seamless gas detector fleet configuration and manageability using iNet Control on any PC web browser
- Automatic instrument firmware upgrades
- Mobile operation



### iNet InSite

**You own the gas detectors which keep your people safe, and have the staff needed to maintain and service them.**

iNet InSite is a plug-and-play docking station solution that provides the critical data and analytics needed to keep your people safer. With a fixed monthly subscription to iNet InSite, users can:

- Configure and manage their gas detection fleet with unlimited access to iNet Control, a web-based application accessible from any PC web browser
- Receive the iNet DS docking stations at no additional cost
- Gain practical insight into their gas detection program using trends, performance metrics and custom reports



U.S. Patent #6,442,639  
International Patent #WO0182063

- Automates instrument calibration, record-keeping, diagnostics and recharging
- Stand-alone Instrument Docking Stations (IDS)
- Link up to 100 IDSs
- Dock hundreds of instruments
- Multilingual display
- One centralized database

The DS2 Docking Station™ provides the ultimate flexibility for managing your gas monitors wherever you use them. Ethernet connectivity enables you to link up to 100 stand-alone Instrument Docking Stations (IDSs) from anywhere in your facility and relay the data back to one central database for total instrument management. A graphical user interface tool allows an administrator to view operations on each Docking Station from a network computer, making it easy to track instruments, print reports, set events and change parameters for any location. The DS2 gives you all of the benefits of consistent automated calibration, record keeping, battery recharging, and instrument diagnostics for your monitors to limit your liabilities and safety hazards.

Each individual IDS features a multilingual display, three status LEDs, a keypad and an audible alarm to provide important instrument details at a single glance. The DS2, which can be easily grouped into 'clusters' of up to 5 units to share calibration gas, also offers optional iGas® capability to automatically identify calibration gas cylinder concentrations, lot numbers, and expiration dates on the system. Whether you manage one gas monitor or an entire fleet, the DS2 provides superior cost-savings and flexibility.

## SPECIFICATIONS

### COMPATIBLE MONITORS SUPPORTED:

MX6 iBrid™, Ventis™ MX4, GasBadge® Pro, GasBadge® Plus.



### CASE:

Impact-resistant composite with radio frequency interference (RFI) protection

### DIMENSIONS:

24.8 cm x 16.3 cm x 22.9 cm (9.75" h x 6.40" w x 9.00" d)

### INPUT:

115/230 VAC, 50/60 Hz. 12 VDC

### OPERATING TEMPERATURE:

0°C to +50°C (32° F to +122°F)

### COMMUNICATION:

10bT Ethernet support, RJ-45 Category 5 connection

### DISPLAY:

128 x 64 Dot Matrix LCD – Multilingual modes allow selections in English, Spanish, French and German languages

### PUMP FLOW RATE:

500 ml/minute @ 80" H<sub>2</sub>O

### GAS INPUTS:

3 separate inputs on each IDS. Ability to share up to 14 discrete gases for calibration when IDSs are clustered together.

### DS2 COMPUTER REQUIREMENTS (MIN):

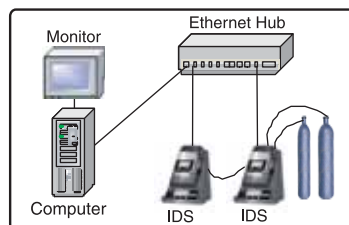
For 1-8 IDS units: Dedicated Pentium III, 800 MHz, 256 MB RAM, 4GB available disk space, Windows® 2000 Professional, Windows® XP Professional operating system, one Cat5E Ethernet network adapter, fixed IP address

For 9-100 IDS units: Dedicated Pentium III, 800 MHz, 256 MB RAM, 4GB available disk space, Windows® 2000 Standard Server, Windows® 2003 Server operating system, one Cat5E Ethernet network adapter, fixed IP address



## ORDERING INFORMATION

## SMALL INSTALLATION SCENARIO

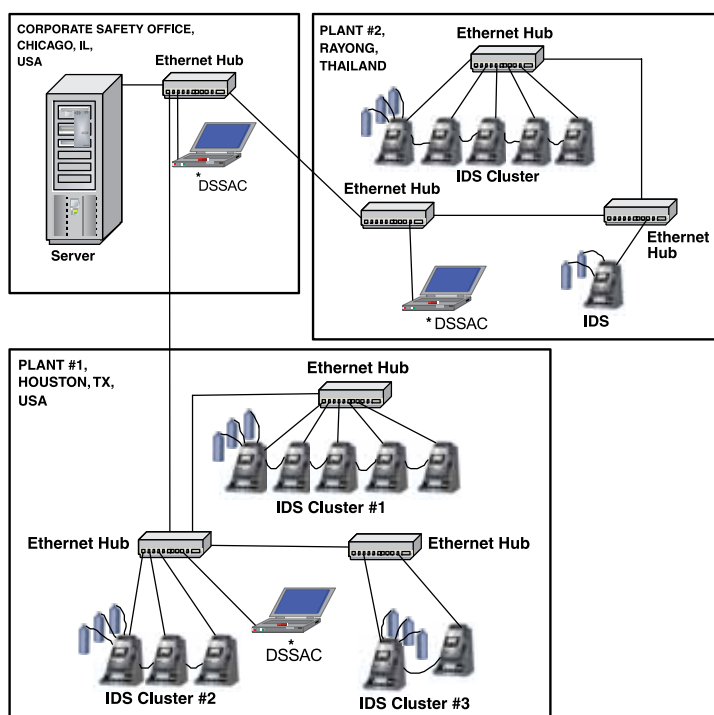


## SINGLE-LOCATION COMPANY

Illustrates one DS2 installation on a stand-alone Ethernet, with 2 IDSs in a cluster sharing 2 cylinders of calibration gas.

Instrument data is available at the local level.

## LARGE INSTALLATION SCENARIO



## MULTI-LOCATION COMPANY

Illustrates multiple IDS cluster installations at multiple sites all tied together on a common company Ethernet, sharing a common database. Each cluster of IDSs share calibration gas. Instrument data can be accessed at the plant level as well as by the corporate safety office.

PART NUMBER	DESCRIPTION
18106724-ABC+	DS2 Instrument Docking Station (IDS) for MX6 iBrid™
18108630-ABC+	DS2 Instrument Docking Station (IDS) for Ventis™ MX4
18105551-ABC+	DS2 Instrument Docking Station (IDS) for iTX
18106302-ABC+	DS2 Instrument Docking Station (IDS) for GasBadge® Pro
18107698-ABC+	DS2 Instrument Docking Station (IDS) for GasBadge® Plus
18106543-4	GasBadge® Pro/DS2 Laptop Turnkey System++
18106543-5	MX6/DS2 Laptop Turnkey System++
17153596-EUR-FR	DS2 Server, European, French Version+++
17153596-EUR-EN	DS2 Server, European, English Version+++
18105684	iGas® Reader
18105841	Demand Flow Regulator w/ iGas® Pressure Switch (for 58L, 103L and 34L aluminum cylinders)
18105866	Demand Flow Regulator, 600 CGA w/ iGas Pressure Switch (for 34L steel cylinders)
18105833	Demand Flow Regulator, 590 CGA w/ iGas Pressure Switch (for 552L cylinders)
18105858	Demand Flow Regulator, 330 CGA w/ iGas Pressure Switch (for 650L cylinders)
18102509	Demand Flow Regulator, 5/8 UNF (for 58L, 103L and 34L aluminum cylinders)
18103564	Demand Flow Regulator, 600 CGA (for 34L steel cylinders)
18103549	Demand Flow Regulator, 590 CGA (for 552L cylinders)
18103556	Demand Flow Regulator, 330 CGA (for 650L cylinders)
18105924	5-Port Gas Regulator Manifold Clamp
18105932	6-Port Gas Regulator Manifold
17113887	Ethernet Cable, 5' (Cat5E network cable)
17113895	Ethernet Cable, 10' (Cat5E network cable)
17113903	Ethernet Cable, 25' (Cat5E network cable)
17113911	Ethernet Crossover Cable, 5' (Cat5E network cable)
17113929	4-Port Ethernet Router
17113945	5-Port Ethernet Hub
17113952	16-Port Ethernet Hub
17113960	24-Port Ethernet Hub

## + Ordering Information

A = 0

B = number of iGas® Readers

C = Power Cord Option 0 - US 1 - UK 2 - EU 3 - AUS 4 - ITA 5 - DEN 6 - SWZ

++ Includes (1) DS2, Computer (installed software: Windows® XP Professional, DSS and DSSAC), monitor, keyboard, mouse, 5-port Ethernet hub and cables.

+++ Includes keyboard and mouse. Monitor not included. DS2 not included.



# iBRiD™ MX6



**Get ready to see hazardous levels of oxygen, toxic and combustible gas, and volatile organic compounds (VOCs) like never before.**

The MX6 iBrid™ is more than an intelligent hybrid of Industrial Scientific's best monitoring technologies. It's the first gas monitor to feature a full-color LCD display screen.

The display improves safety with clear readings in low-light, bright-light or anywhere in between. Whether the work is outside, inside or underground, it's easy to see what gas hazards lurk in the immediate work environment.

And a color display is more than eye-catching. It allows the user to step through instrument settings and functions with an intuitive menu and the instrument's five-way navigation button. It even supports the option of on-board graphing for easily interpreted direct readings and recorded data.

- 24 sensor options
- PID and infrared sensor options
- "Plug-and-Play" field-replaceable sensors
- Diffusion mode or internal sampling pump versions
- Up to 6 gases monitored simultaneously
- Full-color graphic LCD is highly visible in a variety of lighting conditions
- Simple, user-friendly, menu-driven navigation
- Five-way navigation button
- Powerful, 95 dB audible alarm
- Durable, concussion-proof overmold
- Infrared communications port (not shown)

Plus, the MX6 iBrid is our most rugged instrument ever. It carries a lifetime warranty and is fully compatible with our DS2 Docking Station™ and iNet™.

## ASPIRATED MX6

- The aspirated version can remotely draw samples from a distance of 30.5 meters (100 feet).

## SPECIFICATIONS

### CASE MATERIAL:

Lexan/ABS/Stainless Steel w/protective rubber overmold

### DIMENSIONS:

135 mm x 77 mm x 43 mm (5.3" x 3.05" x 1.7") – diffusion version

### WEIGHT:

409 g (14.4 oz) typical – diffusion version

### DISPLAY/READOUT:

STN Color Graphic LCD

### POWER SOURCE/RUN TIMES:

Rechargeable Lithium-ion (Li-ion) Battery Pack (24 hours typical) – diffusion version  
 Rechargeable, Extended-Range Lithium-ion (Li-ion) Battery Pack (36 hours typical) – diffusion version  
 Replaceable AA Alkaline Battery Pack (10.5 hours typical) – diffusion version

### OPERATING TEMPERATURE RANGE:

-20°C to 55°C (-4°F to 131°F) typical

### OPERATING HUMIDITY RANGE:

15% to 95% non-condensing (continuous) typical

### SENSORS:

Combustible gas/Methane – Catalytic Diffusion/Infrared  
 Oxygen and Toxic gases – Electrochemical  
 CO<sub>2</sub> – Infrared  
 VOCs – 10.6 eV Photolionization

### MEASURING RANGES:

Combustible Gas – 0 to 100% LEL in 1% or 10 ppm increments – Catalytic (0 to 100% LEL in 1% increments – Infrared)  
 Methane – 0 to 5% of volume in 0.01% increments – Catalytic (0 to 100% of volume in 1% increments – Infrared)  
 Oxygen – 0 to 30% of volume in 0.1% increments  
 Carbon Monoxide – 0 to 1,000 ppm in 1 ppm increments (0 to 9,999 ppm in 1 ppm increments optional)  
 Hydrogen Sulfide – 0 to 500 ppm in 0.1 ppm increments  
 CO/H<sub>2</sub>S – Carbon Monoxide – 0 to 500 ppm in 1 ppm increments  
 – Hydrogen Sulfide – 0 to 200 ppm in 0.1 ppm increments  
 Hydrogen, Nitric Oxide – 0 to 1,000 ppm in 1 ppm increments  
 Chlorine – 0 to 100 ppm in 0.1 ppm increments  
 Nitrogen Dioxide, Sulfur Dioxide – 0 to 100 ppm in 0.1 ppm increments  
 Hydrogen Cyanide, Hydrogen Chloride – 0 to 30 ppm in 0.1 ppm increments  
 Ammonia – 0 to 100 ppm in 1 ppm increments\*  
 (\*Ammonia range to be changed to 0 to 500 ppm in Q2 2011)  
 Chlorine Dioxide – 0 to 1 ppm in 0.01 ppm increments  
 Phosphine – 0 to 5 ppm in 0.01 ppm increments (0 to 1,000 ppm in 1 ppm increments optional)  
 Carbon Dioxide – 0 to 5% of volume in 0.01% increments  
 VOCs (general) – 0 to 2,000 ppm in 0.1 increments

### CERTIFICATIONS:

UL: Class I, Groups A,B,C,D T4; Class II, Groups F,G; AEx ia d IIC T4  
 CSA: Class I, Groups A,B,C,D T4; Ex d ia IIC T4  
 MSHA: CFR30, Part 18 and 22, Intrinsically safe for methane/air mixtures  
 IECEx/ATEX: Ex ia d I/IIC; IP65 (IP64 pump version) Equipment Group and Category: II 2G / I M1 (I M2 w/IR sensor); EN 60079-29-1; EN 50104  
 ANZEx: Ex ia s Zone 0 I, IP64 Asp., IP65 Dif. Ex ia s Zone 0 IIC T4  
 INMETRO: BR-ExdiaIIC T4  
 GOST-R: PBExiadl X / 1ExiadIIC T4 X



## ORDERING INFORMATION

MX6 BASE UNIT	SENSORS OPTIONS	BATTERY OPTIONS	VERSION OPTIONS	LANGUAGE OPTIONS
<b>Supplied with Monitor:</b> universal charger, nylon carrying case, belt clip, calibration cup, wrist strap, maintenance tool, manual, quick start guide, calibration tubing, dust filter/water stop (aspirated), calibration fitting (aspirated), sample tubing (aspirated).	<b>Combustible Gases:</b> LEL (Pentane) LEL (Methane) CH <sub>4</sub> IR (0-100% vol.) CH <sub>4</sub> (0-5%) Hydrocarbons IR (0-100% LEL)	Li-ion	Diffusion	English
	<b>Volatile Organic Compounds:</b> PID	Li-ion/Ext. Range	Pump	French
		Alkaline		Spanish
	<b>Toxic Gases:</b> H <sub>2</sub> S O <sub>2</sub> NO <sub>2</sub> CO CO/H <sub>2</sub> S NH <sub>3</sub> Cl <sub>2</sub> ClO <sub>2</sub> PH <sub>3</sub> CO High SO <sub>2</sub> HCl HCN H <sub>2</sub> PH <sub>3</sub> High NO CO/H <sub>2</sub> low interference CO <sub>2</sub> IR	Li-ion MSHA/AUS		German
		Li-ion/Ext. Range MSHA/AUS		Italian
		Alkaline MSHA/AUS		Dutch
		Li-ion GOST		Portuguese
		Li-ion/Ext. Range GOST		Indonesian
		Alkaline GOST		Russian
				Polish
				Czech

Build and price your MX6 online with the MX6 instrument builder.

[www.indsci.com/MX6builder.aspx](http://www.indsci.com/MX6builder.aspx)

MOST COMMON INSTRUMENT CONFIGURATIONS	
PART NUMBER	DESCRIPTION
MX6-K1230101	MX6 - LEL, CO, H <sub>2</sub> S, O <sub>2</sub> , Li-ion
MX6-K0230101	MX6 - LEL, H <sub>2</sub> S, O <sub>2</sub> , Li-ion
MX6-K1030101	MX6 - LEL, CO, O <sub>2</sub> , Li-ion
MX6-K0030101	MX6 - LEL, O <sub>2</sub> , Li-ion
MX6-K123R211	MX6 - LEL, CO, H <sub>2</sub> S, O <sub>2</sub> , PID, Ext. Li-ion, Pump
MX6-K1235101	MX6 - LEL, CO, H <sub>2</sub> S, O <sub>2</sub> , SO <sub>2</sub> , Li-ion
MX6-K0235101	MX6 - LEL, H <sub>2</sub> S, O <sub>2</sub> , SO <sub>2</sub> , Li-ion
MX6-0000R211	MX6 - PID, Ext. Li-ion, Pump
COMMON INDUSTRY CONFIGURATIONS	
MX6-KJ53R211	MX6 - LEL, CO/H <sub>2</sub> S, O <sub>2</sub> , SO <sub>2</sub> , PID, Ext. Li-ion, Pump Petroleum Refining
MX6-K103Q211	MX6 - LEL, CO, O <sub>2</sub> , CO <sub>2</sub> , Ext. Li-ion, Pump Brewing/Bottling/Wineries
MX6-KJ835101	MX6 - LEL, CO/H <sub>2</sub> S, O <sub>2</sub> , SO <sub>2</sub> , ClO <sub>2</sub> , Li-ion Pulp/Paper
MX6-K673R211	MX6 - LEL, O <sub>2</sub> , NH <sub>3</sub> , Cl <sub>2</sub> , PID, Ext. Li-ion, Pump HazMat
MX6-M1030401	MX6 - CH <sub>4</sub> (%), CO, O <sub>2</sub> , Li-ion (MSHA/AUS) Mining
MX6-M1D34401	MX6 - CH <sub>4</sub> (%), CO, O <sub>2</sub> , NO <sub>2</sub> , NO, Li-ion Ext. (MSHA/AUS) Mining (Diesel Applications)



- Stand-alone operation
- Link up to 100 IDS modules – dock thousands of instruments
- Automatic instrument calibration, record keeping, diagnostics and recharging
- Utilizes one central database
- Multilingual display
- iNet™ compatible

OPTIONAL ACCESSORIES	
PART NUMBER	DESCRIPTION
MX6KIT-0000R211	MX6 Kit - PID, Ext. Li-ion, Pump
MX6KIT-K1230211	Confined Space Kit, 4-gas w/Pump
MX6KIT-K123R211	Confined Space Kit, 4-gas/PID w/Pump
18106724-ABC+	DS2 Docking Station™ for MX6 <b>+ Ordering Information</b> A = Wireless Option (currently unavailable) 0 – none B = number of iGas® Readers C = Power Cord Option (0 – US, 1 – UK, 2 – EU, 3 – AUS, 4 – ITA, 5 – DEN, 6 – SWZ)
18106765	SP6 Motorized Sampling Pump Module
18107078	MX6 Constant Flow Hand Aspirated Pump
18107086	MX6 Datalink Assembly – Software included
18106971	MX6 Replacement Battery Charger
18107094	MX6 Battery Charger/Datalink, Universal
18107011	MX6 Battery Charger, 12V
18107136	MX6 Battery Charger, 5-Unit
18107243	MX6 Truck-Mount Charger, 12V
18107250	MX6 Truck-Mount Charger, (hard-wired)
17131038-1	Rechargeable Li-ion Battery Pack (UL/CSA/ATEX/IECEX/INMETRO/GOST)
17131038-2	Rechargeable Li-ion Ext. Battery Pack (UL/CSA/ATEX/IECEX/INMETRO/GOST)
17131038-4	Rechargeable Li-ion Battery Pack (MSHA/AUS)
17131038-5	Rechargeable Li-ion Ext. Battery Pack (MSHA/AUS)
17131046-3	Alkaline Battery Pack (UL/CSA/ATEX/IECEX/INMETRO/GOST)
17131046-6	Alkaline Battery Pack, MSHA/AUS
18106856-0	Hard Leather Carrying Case, Diffusion
18106856-1	Hard Leather Case, Diffusion (no display window)
18106880-0	Hard Leather Carrying Case, Aspirated
18106880-1	Hard Leather Case, Aspirated (no display window)
18106831	Nylon Carrying Case, MX6 (supplied w/MX6 diffusion)
18106864	Nylon Carrying Case, MX6/SP6 (supplied w/MX6 aspirated)
17095746	MX6/iTX/VX500 Maintenance Tool
17128489	Calibration Cup, MX6 iBrid™



Configured for your safety, the highly configurable and iNet-compatible Ventis™ MX4 takes your gas detection program to the next level. From Industrial Scientific, the Gas Detection People.

- Configure for diffusion applications or with an integral sampling pump for sample draw applications
- Detect from one to four gases with a wide range of sensor options
- Gain visibility of the instrument in darker environments with a tough, "Safety Orange" overmold
- Realize true portability with multi-gas protection in single-gas size
- Utilize the diffusion monitor for 20 hours with a rechargeable lithium-ion extended range battery pack
- Discover a better way to do gas detection when operating the Ventis on iNet™

Introducing the Ventis MX4 — a compact, multi-gas monitor available in both aspirated and diffusion versions. Both highly configurable and iNet compatible, the Ventis meets your gas detection needs with ease. It is the ideal instrument for monitoring one to four gases in confined spaces and nearly any other potentially hazardous environment.

This lightweight instrument is available with a bright "safety orange" overmold providing visibility in darker environments. An extended range lithium-ion battery pack provides up to 20 hours of continuous monitoring when using the diffusion version. Best of all, the Ventis is compatible with iNet and our DS2 Docking Station.

**Case Material:**

Polycarbonate w/ protective rubber overmold

**Dimensions:**

103 mm x 58 mm x 30 mm (4.1" x 2.3" x 1.2") - diffusion lithium-ion battery version (typical)

172 mm x 67 mm x 66 mm (6.8" x 2.6" x 2.6") - aspirated lithium-ion battery version (typical)

**Weight:**

182 g (6.4 oz) - diffusion lithium-ion battery version (typical)

380 g (13.4 oz) - aspirated lithium-ion battery version (typical)

**Operating Temperature Range:**

-20°C- 50°C (-4°F-122°F) typical

**Operating Humidity Range:**

15%-90% non-condensing (continuous) typical

**Display/Readout:**

Backlit Liquid Crystal Display (LCD)

**Power Source/Run Time:**

Rechargeable Lithium-ion Battery Pack

(12 hours typical @ 20°C) - diffusion version

Rechargeable Extended-Range Lithium-ion Battery Pack

(20 hours typical @ 20°C) - diffusion version

Replaceable AAA Alkaline Battery Pack

(8 hours typical @ 20°C) - diffusion version

Rechargeable Lithium-ion Battery Pack

(12 hours typical @ 20°C) - aspirated version

Replaceable AAA Alkaline Battery Pack

(4 hours typical @ 20°C) - aspirated version

**Alarms:**

Ultra-bright LEDs, loud audible alarm (95 dB at 30 cm), and vibrating alarm

**Sensors:**

Combustible gases/methane - Catalytic Diffusion

O<sub>2</sub>, CO, H<sub>2</sub>S, NO<sub>2</sub>, SO<sub>2</sub> - Electrochemical

**Measuring Ranges:**

Combustible Gases:	0-100% LEL in 1% increments
Methane (CH <sub>4</sub> ):	0-5% of vol. in 0.01% increments
Oxygen (O <sub>2</sub> ):	0-30% of vol. in 0.1% increments
Carbon Monoxide (CO):	0-1,000 ppm in 1 ppm increments
Hydrogen Sulfide (H <sub>2</sub> S):	0-500 ppm in 0.1 ppm increments
Nitrogen Dioxide (NO <sub>2</sub> ):	0-150 ppm in 0.1 ppm increments
Sulfur Dioxide (SO <sub>2</sub> ):	0-150 ppm in 0.1 ppm increments

**Certifications:**
**UL**

Class I, Division 1, Groups A B C D, T4

Class II, Groups F G (Carbonaceous & Grain Dust)

AEx d ia IIC T4

IP66

IP67

**ATEX**

Ex d ia I Mb / Ex d ia IIC T4 Gb;

Equipment Group and Category I M2 and II 2G

IP66

IP67

**IECEX**

Ex d ia IIC T4 Gb

IP66

IP67

**CSA**

Class I, Division 1, Groups A B C D, T4

C22.2 No. 152 for %LEL reading only

Ex d ia IIC T4



## ORDERING INFORMATION

BASE INSTRUMENT	SENSOR OPTIONS	BATTERY OPTIONS	VERSION OPTIONS	AGENCY CERTIFICATIONS	COLOR OPTIONS	REFERENCE GUIDE LANGUAGE	
<b>Supplied with Monitor:</b> Calibration Cup (Ventis), Calibration Tubing, Sample Tubing (Ventis with Pump), Service Tool, Ventis MX4 Reference Guide	<b>Combustible Gases (sensor position 1):</b> LEL (Pentane) LEL (Methane) CH <sub>4</sub> (0-5%)	Lithium-ion Battery Pack	Ventis	UL/CSA	Black	English * (1)	Russian (9)
		Lithium-ion Extended Range Battery Pack*	Ventis with Pump**	ATEX/IECEX	Safety Orange	French * (2)	Polish (A)
	<b>Toxic Gases (sensor position 2 &amp; 3):</b> CO      H <sub>2</sub> S SO <sub>2</sub> NO <sub>2</sub>	Alkaline Battery Pack	Ventis with Pump and Conversion Kit**			Spanish (3)	Czech (B)
						German * (4)	Chinese (C)
	<b>Oxygen (sensor position 4):</b> O <sub>2</sub>					Italian (5)	Danish (D)
						Dutch (6)	Norwegian (E)
						Portuguese (7)	Finnish (F)
							Swedish (G)

\*Required for units with a Pump  
 \*\*Requires Extended Range Battery Pack  
 \* Instrument language can be configured to English, French or German.  
 If one of these languages is selected, instrument will be configured to that language.

Build and price your Ventis online with the Ventis MX4 instrument builder.

[www.indsci.com/ventisbuilder](http://www.indsci.com/ventisbuilder)

## MOST COMMON INSTRUMENT CONFIGURATIONS

PART NUMBER	DESCRIPTION
VTS-K1231101y0z	Ventis - LEL, CO, H <sub>2</sub> S, O <sub>2</sub> , Li-ion, Desktop Charger, Black
VTS-K1232110y1z	Ventis - LEL, CO, H <sub>2</sub> S, O <sub>2</sub> , Li-ion, Desktop Charger/Datalink, Safety Orange
VTS-K1232111y0z	Ventis - LEL, SO <sub>2</sub> , H <sub>2</sub> S, O <sub>2</sub> , Li-ion, Auto Charger, Black, Soft Case
VTS-K1031100y1z	Ventis - LEL, CO, O <sub>2</sub> , Li-ion, Auto Charger, Safety Orange
VTS-K1032110y1z	Ventis - LEL, CO, NO <sub>2</sub> , O <sub>2</sub> , Li-ion, No Charger, Black, Soft Case
VTS-K1032111y0z	Ventis with pump - LEL, CO, H <sub>2</sub> S, O <sub>2</sub> , Ext. Li-ion, Desktop Charger, Safety Orange
VTS-K5231101y0z	Ventis with pump - LEL, CO, H <sub>2</sub> S, O <sub>2</sub> , Ext. Li-ion, Desktop Charger, Black, Soft Case
VTS-K5232110y1z	Ventis with pump - LEL (Methane), CO, H <sub>2</sub> S, O <sub>2</sub> , Ext. Li-ion, Desktop Charger, Black, Hard Case with Display Window
VTS-K1431100y1z	Ventis with pump - LEL, SO <sub>2</sub> , H <sub>2</sub> S, O <sub>2</sub> , Ext. Li-ion, Desktop Charger, Safety Orange
VTS-K1432111y0z	Ventis - LEL, CO, NO <sub>2</sub> , O <sub>2</sub> , Ext. Li-ion, Charger, Aspirated, Safety Orange, UL/CSA

y = Certification: 1 = UL/CSA, 2 = ATEX/IECEX; z = Language for included Reference Guide



## CONFINED SPACE KITS

PART NUMBER	DESCRIPTION
VK-K123211xy1z	Ventis Confined Space Kit - LEL, CO, H <sub>2</sub> S, O <sub>2</sub>
VK-K103211xy1z	Ventis Confined Space Kit - LEL, CO, O <sub>2</sub>
VK-K023211xy1z	Ventis Confined Space Kit - LEL, H <sub>2</sub> S, O <sub>2</sub>
VK-K003211xy1z	Ventis Confined Space Kit - LEL, O <sub>2</sub>

x = Instrument Color; y = Instrument Approval; z = Reference Guide Language

**Ventis Confined Space Kits Include:** Choice of Aspirated Ventis MX4 monitor, universal charger, soft carrying case, service tool, reference guide, calibration tubing, dust filter/water stop, calibration fitting, sample tubing, calibration gas (appropriate mix) with regulator, rugged Pelican® case.

## OPTIONAL ACCESSORIES

PART NUMBER	DESCRIPTION
18108630-0BC	DS2 Docking Station™ for Ventis™ MX4 B = Quantity of iGas® Reader: 0 = None 1 = 1 iGas® Reader 2 = 2 iGas® Readers 3 = 3 iGas® Readers C = Power Cord: 0 = US, 1 = UK, 2 = EU, 3 = AUS, 4 = ITA, 5 = DEN, 6 = SWZ
18108631-AB	V-Cal™ Calibration Station A = Instrument Type: 0 = Diffusion, 1 = Aspirated B = Power Cord: 0 = US, 1 = UK, 2 = EU, 3 = AUS, 4 = ITA, 5 = DEN, 6 = SWZ
18107664-ABC	V-Cal™ 6 Unit Calibration Station AB = Number of Diffusion (A) and Aspirated (B) Instruments 06 = 0 Diffusion and 6 Aspirated 33 = 3 Diffusion and 3 Aspirated 60 = 6 Diffusion and 0 Aspirated C = Power Cord: 0 = Universal with US, UK, EU, AUS Plug Adapters
18107763	Serial data dot matrix printer for V-Cal™ – 120 VAC powered
18108191	Single-Unit Charger
18108209	Single-Unit Charger/Datalink
18108651	Single-Unit Automotive Charger, 12VDC
18108652	Single-Unit Truck-Mount Charger, 12VDC, with Cigarette Adapter
18108653	Single-Unit Truck-Mount Charger, 12VDC, Hard Wired
18108650-A	6-Unit Charger – A = Power Cord: 0 = US, 1 = UK, 2 = EU, 3 = AUS, 4 = ITA, 5 = DEN, 6 = SWZ
18108830	Ventis Hand Pump (manual bulb)
18108175	Ventis Diffusion Soft Carrying Case, Li-ion Battery
18108183	Ventis Diffusion Soft Carrying Case, Ext. Range Batteries
18108813	Ventis Diffusion Hard Carrying Case with Display, Li-ion Battery
18108814	Ventis Diffusion Hard Carrying Case with Display, Ext. Range Batteries
18108810	Ventis Aspirated Soft Carrying Case
18108811	Ventis Aspirated Hard Carrying Case with Display
17134461	Replacement Sensor, Oxygen (O <sub>2</sub> )
17134479	Replacement Sensor, Hydrogen Sulfide (H <sub>2</sub> S)
17134487	Replacement Sensor, Carbon Monoxide (CO)
17134495	Replacement Sensor, Combustible Gas (LEL/CH <sub>4</sub> )
17134503	Replacement Sensor, Nitrogen Dioxide (NO <sub>2</sub> )
17143595	Replacement Sensor, Sulfur Dioxide (SO <sub>2</sub> )
17148313-1	Replacement Ext. Range Li-ion Battery Pack, UL/CSA/ATEX/IECEX
17150608	Replacement Alkaline Battery Pack
17152828-01	Ventis Conversion Kit, Aspirated to Diffusion, Black, UL/CSA/ATEX/IECEX
17152828-11	Ventis Conversion Kit, Aspirated to Diffusion, Safety Orange, UL/CSA/ATEX/IECEX



- Interchangeable "smart" sensors monitor oxygen or any one of many toxic gases
- One year datalogging capacity (minimum)
- Standard STEL and TWA
- Docking Station™ compatible
- Lifetime warranty
- HbCo detection option available



Built to Industrial Scientific's highest quality and reliability standards, GasBadge® Pro provides a lifetime of gas hazard protection with more features than any other single gas monitor available. Interchangeable "smart" sensors enable the GasBadge Pro to be quickly adapted to monitor unsafe levels of oxygen or any one of the following toxic gases: carbon monoxide, hydrogen sulfide, nitrogen dioxide, sulfur dioxide, chlorine, chlorine dioxide, phosphine, ammonia, hydrogen cyanide and hydrogen.

GasBadge Pro communicates directly via an infrared interface to optional accessories like the Docking Station™, Datalink and infrared printer to further simplify and automate calibration, function (bump) testing and data downloading. Standard STEL and TWA readings, and datalogging of up to one year of survey data are featured along with an event-logger that records the past 15 alarm events.

Housed in a rugged enclosure, the monitor is immune to RF, water resistant and extremely durable. A protective concussion-proof overmold protects the unit from extreme abuse in a variety of harsh industrial environments. Its simple and intuitive four-button navigation allows easy access to setup, operation and calibration functions. Lifetime warranty.

## SPECIFICATIONS

### CASE:

Rugged, water-resistant polycarbonate shell with protective concussion-proof overmold. RFI resistant.

### DIMENSIONS:

9.4 cm x 5.08 mm x 2.79 mm (3.7" x 2" x 1.1" )

### WEIGHT:

85 g (3 oz.)

### SENSORS:

CO, H<sub>2</sub>S, O<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>

### MEASURING RANGES:

CO: 0-1,500 ppm in 1 ppm increments  
 H<sub>2</sub>S: 0-500 ppm in 0.1 ppm increments  
 O<sub>2</sub>: 0-30% by volume in 0.1% increments  
 NO<sub>2</sub>: 0-150 ppm in 0.1 ppm increments  
 SO<sub>2</sub>: 0-150 ppm in 0.1 ppm increments  
 NH<sub>3</sub>: 0-100 ppm in 1 ppm increments\*  
 (\*NH<sub>3</sub> range to be changed to 0 to 500 ppm in Q2 2011)  
 Cl<sub>2</sub>: 0-100 ppm in 0.1 ppm increments  
 ClO<sub>2</sub>: 0-1 ppm in 0.01 ppm increments  
 PH<sub>3</sub>: 0-10 ppm in 0.01 ppm increments  
 HCN: 0-30 ppm in 0.1 ppm increments  
 H<sub>2</sub>: 0-2,000 ppm in 1 ppm increments

### DISPLAY:

Custom LCD with graphical icons for easy use  
 Segmented display for direct gas readings  
 Backlight for low light conditions  
 "Go/No Go" display mode  
 Peak reading indication

### ALARMS:

User selectable low and high alarms  
 Ultra-bright LEDs, loud audible alarm (95 dB) and vibrating alarm

### BATTERY RUNTIME:

User replaceable 3V, CR2 Lithium battery, 2,600 hour run time, typical

### EVENT-LOGGER:

Continually on. Logs last 15 alarm events, stamping how long ago the event occurred, the duration of the event, and the peak reading seen during the event. Event-logger can be viewed on PC or printed directly from the instrument to an infrared printer.

### TEMPERATURE RANGE:

-40° to 60°C (-40° to 140°F), typical

### HUMIDITY RANGE:

0-99% RH (non-condensing), typical

### IP RATING:

Third-party certified IP64

### CERTIFICATIONS:

UL/cUL: Class I, Groups A,B,C,D T4; Class II, Groups E,F,G;  
 Class I, Zone 0, AEx ia IIC T4  
 CSA: Ex ia IIC T4  
 ATEX: Ex ia I/IIC T4; Equipment Group and Category: II 1G / I M1  
 IECEx: Ex ia IIC T4  
 ANZEx: Ex ia I/IIC T4  
 Russia: GOST-R  
 INMETRO:

## ORDERING INFORMATION

PART NUMBER	DESCRIPTION
18100060-1	GasBadge® Pro – Carbon Monoxide (CO)
18100060-2	GasBadge® Pro – Hydrogen Sulfide (H <sub>2</sub> S)
18100060-3	GasBadge® Pro – Oxygen (O <sub>2</sub> )
18100060-4	GasBadge® Pro – Nitrogen Dioxide (NO <sub>2</sub> )
18100060-5	GasBadge® Pro – Sulfur Dioxide (SO <sub>2</sub> )
18100060-6	GasBadge® Pro – Ammonia (NH <sub>3</sub> )
18100060-7	GasBadge® Pro – Chlorine (Cl <sub>2</sub> )
18100060-8	GasBadge® Pro – Chlorine Dioxide (ClO <sub>2</sub> )
18100060-9	GasBadge® Pro – Phosphine (PH <sub>3</sub> )
18100060-B	GasBadge® Pro – Hydrogen Cyanide (HCN)
18100060-C	GasBadge® Pro – Hydrogen (H <sub>2</sub> )
18100060-G	GasBadge® Pro – Carbon Monoxide/Low Hydrogen Interference (CO/H <sub>2</sub> Null)
<b>OPTIONAL ACCESSORIES</b>	
18106302-ABC+	GasBadge® Pro DS2 Docking Station™ A = Wireless Option (currently unavailable) [0 (none)] B = number of iGas Readers C = Power Cord Option (0 – US, 1 – UK, 2 – EU, 3 – AUS, 4 – ITA, 5 – DEN, 6 – SWZ)
18106260	GasBadge® Datalink - Software included
18106500	GasBadge® Constant-Flow Hand Aspirated Pump
17121963	GasBadge® Neck Lanyard w/Safety Release
18106484	GasBadge® Pro Nylon Carrying Case
18106492	GasBadge® Pro 2-unit Nylon Carrying Case
17124504	Replacement water/dust sensor barriers (5 count)
17124033	Calibration Cup, GasBadge® Plus/Pro
18106666	Co Response Kit with GasBadge® Pro Monitor
18106674	Co Breath Sampler for GasBadge® Pro Monitor

**All GasBadge® Pro Monitors Include:** attached suspender clip, calibration adapter and tubing, and operating instructions.



- Stand-alone Instrument Docking Stations (IDS) available for use with all GasBadge® Pro gas monitors
- Link up to 100 IDS modules – dock thousands of instruments
- Graphical user interface to monitor facility-wide network
- Automatic instrument calibration, record keeping, diagnostics and recharging
- Utilizes one central database
- Multilingual display



**Nylon  
Carrying  
Case**



### **GasBADGE® DATALINK**

- Instantly download alarm events and instrument details
- Quickly and easily configure instrument preferences







- Low-cost CO, H<sub>2</sub>S, O<sub>2</sub>, NO<sub>2</sub> or SO<sub>2</sub> monitoring
- 2-year continuous monitoring
- PPM or % by volume readout
- Extremely water resistant – third-party certified IP66/67
- Audible, vibrating and visual alarms,
- 2-year warranty
- Automatic self test and user-activated test
- Docking Station™ and iNet™ Compatible



GasBadge® Plus is a two-year, maintenance-free, single gas monitor ideal for personal protection from unsafe levels of carbon monoxide, hydrogen sulfide, oxygen, nitrogen dioxide or sulfur dioxide. The unit's compact size and light weight allow it to be worn comfortably with a variety of clip attachments, and the top-mounted sensor provides continuous and unobstructed protection even when placed in a shirt pocket.

The rugged enclosure is extremely durable and resistant to water and radio frequency interference. A protective concussion-proof overmold protects the unit from extreme abuse in a variety of harsh industrial environments. The large LCD display features a graphical interface and can be set up to show both gas type and direct gas readings, or just the gas type. The instrument's two-button operation allows for easy navigation and setup, which can be password-protected for added security.

Continuous event-logging is a standard feature for the GasBadge Plus with the past 15 alarm events recorded. Optional Cal Plus™ calibration station and datalink accessories enable easy instrument maintenance, configuration and data downloading. Two year warranty.

## SPECIFICATIONS

### CASE:

Rugged, water-resistant polycarbonate shell with protective concussion-proof overmold. RFI resistant.

### DIMENSIONS:

81.3 mm x 48.3 mm x 27.9 mm (3.2 h x 1.9 w x 1.1" d)

### WEIGHT:

72 g (2.5 oz.)

### SENSORS:

CO, H<sub>2</sub>S, O<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>

### MEASURING RANGES:

CO range: 0-1,500 ppm in 1 ppm increments  
 H<sub>2</sub>S range: 0-500 ppm in 0.1 ppm increments  
 O<sub>2</sub> range: 0-30% by volume in 0.1% increments  
 NO<sub>2</sub> range: 0-150 ppm in 0.1 ppm increments  
 SO<sub>2</sub> range: 0-150 ppm in 0.1 ppm increments

### DISPLAY:

Custom LCD with graphical icons for easy use  
 Segmented display for direct gas readings  
 Backlight for low light conditions  
 Go/No Go" display mode  
 Peak reading indication

### ALARMS:

Vibrating, 90 dB audible and ultra-bright LED visual alarms. High/low, STEL, TWA and low battery alarms. Flow alarm indicator when used with optional SP40 pump.

### BATTERY RUNTIME:

Lithium, non-replaceable

### RUNTIME:

Maintenance-free operation for 2 years

### EVENT-LOGGER:

Continually on. Logs last 15 alarm events, stamping how long ago the event occurred, the duration of the event, and the peak reading seen during the event. Event-logger can be viewed on PC or printed directly from the instrument to an infrared printer.

### TEMPERATURE RANGE:

-40° to 60°C (-40° to 140°F), typical

### HUMIDITY RANGE:

0-99% RH (non-condensing), typical

### IP RATING:

Third-party certified IP66/67

### APPROVALS:

UL and cUL: Class I, Div 1, Groups A,B,C,D; T4; Class I, Zone 0, AEx ia IIC T4; Class II, Groups E,F,G  
 CSA: Class I, Div 1, Groups A,B,C,D; T4; Ex ia IIC T4  
 ATEX: Ex ia I Ma/Ex ia IIC T4 Ga;  
 Equipment Group and Category: I M1 and II 1G;  
 EMC: EN50270  
 ANZEx: Ex ia I/IIC T4  
 IECEX: Ex ia IIC T4  
 Russia: GOST-R  
 INMETRO:  
 MSHA: Intrinsically safe for methane/air mixtures only



## GASBADGE<sup>PLUS</sup> DATALINK

- Instantly download alarm events and instrument details
- Quickly and easily configure instrument preferences



2-unit Nylon Carrying Case



Nylon Carrying Case

## ORDERING INFORMATION



CALPLUS™

With the new Cal Plus™ Calibration Station, calibrating and bump testing the GasBadge® Plus Monitor has never been easier or more cost-effective. The Cal Plus features simple, two-button operation allowing the user to quickly and easily calibrate or function (bump) test the instrument. The large LCD display and LED indicators then show whether or not the instrument passed or failed the desired function.

The Cal Plus is also available with a built-in dot-matrix printer that automatically prints calibration and bump test reports to provide permanent documentation of instrument serial numbers, pass/fail indications, bump test readings and full span readings for the GasBadge® Plus.

A PC is not required to operate this stand-alone system, making the unit extremely portable and flexible. For a space-saving alternative the unit can be mounted to a wall along with an optional calibration gas cylinder holder.

When used with a PC, alarm events, instrument details, and calibration and bump test reports are automatically downloaded via a standard USB connection for quick and easy data collection or instrument configuration.



**Cal Plus™ Calibration Station w/on-board dot matrix printer**

PART NUMBER	DESCRIPTION
18100050-1	GasBadge® Plus – Carbon Monoxide (CO)
18100050-2	GasBadge® Plus – Hydrogen Sulfide (H <sub>2</sub> S)
18100050-3	GasBadge® Plus – Oxygen (O <sub>2</sub> )
18100050-4	GasBadge® Plus – Nitrogen Dioxide (NO <sub>2</sub> )
18100050-5	GasBadge® Plus – Sulfur Dioxide (SO <sub>2</sub> )
<b>OPTIONAL ACCESSORIES</b>	
18106500	GasBadge® Constant-Flow Hand Aspirated Pump
17121963	GasBadge® Neck Lanyard w/Safety Release
18106401	GasBadge® Plus Nylon Carrying Case
18106419	GasBadge® Plus 2-unit Nylon Carrying Case
17124504	Replacement water/dust sensor barriers (5 count)
18106260	GasBadge® Datalink
18107698-ABC+	DS2 Instrument Docking Station™ (IDS) for GasBadge® Plus A = Wireless Option (currently unavailable) [0 (none)] B = number of iGas Readers C = Power Cord Option (0 – US, 1 – UK, 2 – EU, 3 – AUS, 4 – ITA, 5 – DEN, 6 – SWZ)
18106344-0X*	Cal Plus™ Calibration Station (calibration gas and regulator not included)
18106344-1X*	Cal Plus™ Calibration Station w/on-board dot matrix printer (calibration gas and regulator not included)
17117714	Serial data thermal printer with infrared interface (battery powered only)
17117722	Serial data dot matrix printer, 120 VAC powered
17127044	Replacement Ribbon for Cal Plus Internal Printer (Epson ERC-22)
17135518	Replacement Printer Paper Roll (57 mm x 48 mm x 25 m)
17124033	Calibration Cup, GasBadge® Plus/Pro
18102163	Calibration Gas – Carbon Monoxide, 100 ppm, 103L
18100859	Calibration Gas – Hydrogen Sulfide, 25 ppm, 58L
18102219	Calibration Gas – Nitrogen Dioxide, 5 ppm, 58L
18102222	Calibration Gas – Sulfur Dioxide, 5 ppm, 58L
17124348	Wall/Desk Mount Cylinder Holder
18102509	Demand Flow Regulator for 58L/103L/34L aluminum cylinders

\* Ordering Information – X = Power Cord (0 – US, 1 – UK, 2 – EU, 3 – AUS)

All GasBadge® Plus Monitors Include: attached suspender clip, belt clip, calibration adapter, and operating instructions.



**DS2**  
DOCKING STATION™

- Stand-alone Instrument Docking Stations (IDS) available for use with all GasBadge® Plus gas monitors
- Link up to 100 IDS modules – dock thousands of instruments
- Automatic instrument calibration, record keeping, diagnostics and recharging
- Utilizes one central database
- Multilingual display

**MONITOR SUPPORTED:**

GasBadge® Plus (all versions)

**CONFIGURATIONS:**

Single Unit  
Single Unit with Internal Printer

**DIMENSIONS:**

7.6 cm x 23.6 cm x 19.3 cm (3" x 9.3" x 7.6") - (Single-Unit)

7.6 cm x 37 cm x 19.3 cm (3" x 14.55" x 7.6") - (Single-Unit with Printer)

**GAS INLETS:**

One fresh air, one gas cylinder

**PUMP FLOW RATE:**

0.25 LPM

**INPUT:**

Universal AC power supply; 110/240 VAC

**COMMUNICATION:**

On-board LEDs give status indication (pass, fail). Multilingual LCD display shows Cal Plus™ status and set-up menus. Real-time readings on GasBadge® Plus display during calibration.

**INTERNAL MEMORY:**

Stores up to 200 bump test and calibration reports before overwrite. Reports contain serial number, time, date, sensor information, pass/fail, span values and bump values (for bump tests). Memory will retain information when power is off.



## “Plug and Play” Sensors Available:

**O<sub>2</sub>, CO, H<sub>2</sub>S, %LEL, SO<sub>2</sub>,  
NO, NO<sub>2</sub>, HCN, HCl, Cl<sub>2</sub>, ETO, PH<sub>3</sub>,  
AsH<sub>3</sub>, SiH<sub>4</sub>, CO<sub>2</sub>, H<sub>2</sub>, NH<sub>3</sub>, PID, XP IR**

- Longer lifetime with the XP IR sensor
- Intrinsically safe detector
- Powerful audible alarm (103 dB @ 1m)
- Ultra-bright flashing signal (viewable at 360°)
- Run time up to 170 hours
- Over 4-month datalogging capacity
- Easily transportable: less than 7 kilos
- Aspirated version available



The BM25 packs the benefits of a fixed system area monitor into a rugged, user-friendly and transportable instrument. It was designed to detect one to five gases for mobile or temporary work applications, team protection, area surveillance, or places where fixed detection systems are not suitable.

Powered by a NiMH battery pack, the BM25 offers up to 170 hours of continuous run time. Other standard features include STEL and TWA values, as well as a datalogging capacity of over four months.

Multiple units can be grouped using optional alarm transfer kits. This protects larger areas by transferring alarms from one BM25 to the next. An intrinsically safe trickle charger is also available for long-term area monitoring in classified zones.

The BM25 is durable and versatile. It is suitable for a wide range of industries including refineries and pharmaceutical production. Applications include turnaround work sites, rig overhauls and fence-line surveillance.

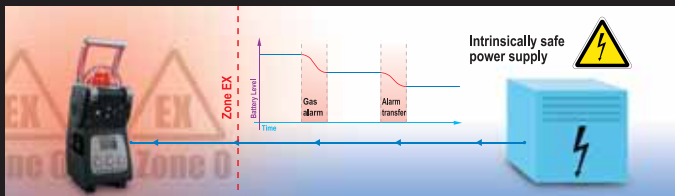
### Stand alone



### Alarm transfer and safety perimeter



### Trickle charge for long term area monitoring





**SPECIFICATIONS****CASE MATERIAL:**

Impact resistant polycarbonate

**DIMENSIONS:**

470 mm x 180 mm x 190 mm (16.7" x 7.1" x 7.5")

**SENSORS:**

Combustible Gas – Catalytic Diffusion

Methane, Propane, Butane, Isobutane, LPG, Ethanol, Pentane – Infrared

Oxygen and Toxic Gases – Electrochemical

CO<sub>2</sub> – Infrared

Isobutylene – PID

**WEIGHT:**

6.8 kg (15 lbs)

**DISPLAY:**

Graphic liquid crystal display w/backlight

**DATALOGGING CAPACITY:**

700 hours w/5 gases

**MEASURING RANGES:**

Combustible Gases: 0-100% LEL in 1% increments

Methane: 0-100% LEL in 1% increments – Infrared

Methane: 0-100% of volume in 1% increments – Infrared

Propane: 0-100% LEL in 1% increments – Infrared

Butane: 0-100% LEL in 1% increments – Infrared

Isobutane: 0-100% LEL in 1% increments – Infrared

LPG: 0-100% LEL in 1% increments – Infrared

Ethanol: 0-100% LEL in 1% increments – Infrared

Pentane: 0-100% LEL in 1% increments – Infrared

Oxygen: 0-30% of volume in 0.1% increments

Carbon Monoxide: 0-1,000 ppm in 1 ppm increments

Hydrogen Sulfide: 0-100 ppm in 1 ppm increments

Hydrogen: 0-2,000 ppm in 1 ppm increments

Sulfur Dioxide: 0-30 ppm in 0.1 ppm increments

Chlorine: 0-10 ppm in 0.1 ppm increments

Nitrogen Dioxide: 0-30 ppm in 0.1 ppm increments

Nitric Oxide: 0-300 ppm in 1 ppm increments

Hydrogen Chloride: 0-30 ppm in 0.1 ppm increments

Hydrogen Cyanide: 0-10 ppm in 0.1 ppm increments

Ammonia: 0-1,000 ppm in 1 ppm increments

Phosphine: 0-1 ppm in 0.01 ppm increments

Arsine: 0-1 ppm in 0.01 ppm increments

Silane: 0-50 ppm in 0.1 ppm increments

Ethylene Oxide: 0-30 ppm in 0.1 ppm increments

Carbon Dioxide: 0-5% of volume in 0.1% increments

Isobutylene: 0-2,000 ppm in 1 ppm increments

**AUDIBLE ALARM:**

103 dB @ 1 meter

**VISUAL ALARM:**

Ultrabright LED beacon visible 360 degrees

**OPERATING TEMPERATURE RANGE:**

-20°C to 50°C (-4°F to 122°F) typical

**OPERATING HUMIDITY RANGE:**

15%-95% non-condensing (continuous) typical

**POWER SOURCE (RUN TIME):**

NiMH (170 hours, typical)

**RECHARGE TIME:**

4.5 hours, typical

**CERTIFICATIONS:**

ATEX: II 1 G / EEx ia IIC T4

I M1 / EEx ia I

or (when used with IR flameproof sensor)

II 2 G / EEx ia d IIC T4

I M2 / EEx ia d I

IECEx: Ex ia IIC T4 / Ex ia I

or (when used with IR flameproof sensor)

Ex ia d IIC T4 / Ex ia d I

6514842-ABCDEF	A-E (Available Sensors)		F
<b>Supplied with monitor:</b> Instruction manual, calibration adapter, universal input charger, maintenance tool.	CO	HCN	Diffusion
	H <sub>2</sub> S	H <sub>2</sub>	Pump
	O <sub>2</sub>	NO	
	NO <sub>2</sub>	ETO	
	SO <sub>2</sub>	CO/High	
	NH <sub>3</sub>	CO/H <sub>2</sub> S	
	Cl <sub>2</sub>	LEL	
	ClO <sub>2</sub>	CO <sub>2</sub>	
	PH <sub>3</sub>	SiH <sub>4</sub>	
	HCl	ASH <sub>3</sub>	
	PID	XPIR	

**MOST COMMON INSTRUMENT CONFIGURATIONS**

PART NUMBER	DESCRIPTION
6514842-K12300	BM25 - LEL, CO, H <sub>2</sub> S, O <sub>2</sub>
6514842-K02300	BM25 - LEL, H <sub>2</sub> S, O <sub>2</sub>
6514842-K10300	BM25 - LEL, CO, O <sub>2</sub>
6514842-K00300	BM25 - LEL, O <sub>2</sub>
6514842-K03J50	BM25 - LEL, O <sub>2</sub> , CO/H <sub>2</sub> S, SO <sub>2</sub>
6514842-K02350	BM25 - LEL, H <sub>2</sub> S, O <sub>2</sub> , SO <sub>2</sub>
6514842-K103Q0	BM25 - LEL, CO, O <sub>2</sub> , CO <sub>2</sub>
6514842-K67300	BM25 - LEL, NH <sub>3</sub> , Cl <sub>2</sub> , O <sub>2</sub>
6514842-K09J30	BM25 - LEL, PH <sub>3</sub> , CO/H <sub>2</sub> S, O <sub>2</sub>
6514842-K12301	BM25 - LEL, CO, H <sub>2</sub> S, O <sub>2</sub> , Pump
6514842-K02301	BM25 - LEL, CO, H <sub>2</sub> S, Pump
6514842-013Q00	BM25 - CO, O <sub>2</sub> , CO <sub>2</sub>
6514842-010Q00	BM25 - CO, CO <sub>2</sub>

**OPTIONAL ACCESSORIES**

WLOGUSB	BM25 Datalink Adapter Kit (Software w/USB Adapter Cable)
6321388	BM25 Tripod
6315862	BM25 Alarm Transfer Kit (Cable length = 25 m)
6315863	BM25 Alarm Transfer Kit (Cable length = 50 m)
6315864	BM25 Alarm Transfer Kit (Cable length = 100 m)
6311085	BM25 Intrinsically Safe Trickle Charge Kit (Cable length = 25 m): one IS power supply and wiring arrangements
6311089	BM25 Intrinsically Safe Trickle Charge Kit (Cable length = 50 m): one IS power supply and wiring arrangements
6311093	BM25 Intrinsically Safe Trickle Charge Kit (Cable length = 100 m): one IS power supply and wiring arrangements and wiring arrangements


<http://www.indsci.com/BM25/>



- 1 to 4 gas monitoring for O<sub>2</sub>, H<sub>2</sub>S, CO & combustible gases
- 18-hour runtime with lithium-ion battery
- Includes vibrating, 90 dB audible, and LED visual alarms
- Two-year, all inclusive warranty

Industrial Scientific is pleased to offer the M40, a versatile multi-gas monitor capable of detecting CO, H<sub>2</sub>S, O<sub>2</sub>, and combustible gases for a wide variety of hazardous and confined space applications.

The M40 is housed in a rugged, impact-resistant case to provide superior performance and durability in harsh environments and resistance to radio-frequency and electromagnetic interference. Its four-button interface provides simple, intuitive operation and calibration, and the M40's five-second "Off" feature prevents unintentional shut-offs. The unit's compact size and economical price make it an ideal personal monitoring instrument.

Other standard features include a vibrating alarm, lithium-ion battery, peak/hold readings, large LCD, 75 hour datalogging capacity, and belt clip. An optional compact parasitic sampling pump enables remote sampling from up to 50 feet away. The M40 carries a two-year warranty.



## SPECIFICATIONS

### CASE:

High-visibility, impact resistant composite – RFI, EMI and ingress protection tested and approved

### DIMENSIONS:

10.9 cm x 6.22 cm x 3.48 cm (4.30"h x 2.45"w x 1.37"d)

### WEIGHT:

244 g (8.6 ounces)

Weight with pump: 326 g (11.6 ounces)

### SENSORS:

Combustible Gases – Catalytic Diffusion

Oxygen and Toxic Gases – Electrochemical

### MEASURING RANGES:

Combustibles 0 to 100% LEL in 1% increments

Methane 0 to 5% of volume in 0.1% increments (M40•M only)

Oxygen 0 to 30% of volume in 0.1% increments

Carbon Monoxide 0 to 999 ppm in 1 ppm increments

Hydrogen Sulfide 0 to 500 ppm in 1 ppm increments

The M40 features LEL over-range protection

### POWER SOURCE:

Rechargeable lithium-ion integral battery

### RUNTIME:

18 hour – instrument (non-alarm)

12 hour – instrument with pump (non-alarm)

### DISPLAY:

Large LCD provides simultaneous and continuous readout of up to all four gases. Large, high-contrast characters, graphic icons and unique amber backlight provide clear display visibility in low-light conditions.

### ALARMS:

Vibrating, 90 dB audible and ultra-bright LED visual alarms. High/low, STEL, TWA and low battery alarms. Flow alarm indicator when used with optional SP40 pump.

### DATALOGGING:

Up to 75 hours of datalogging capability

### TEMPERATURE RANGE:

-20° to 50°C (-4° to 122°F)

### HUMIDITY RANGE:

15 to 95% RH, typical, 0 to 99% RH intermittent (non-condensing)

### IP RATING:

IP64

### CERTIFICATION:

UL: Class I, Groups A,B,C,D T4; Class I, Zone 1, AEx ia d IIC T4

CSA: Class I, Groups A,B,C,D T4

MSHA (M40•M only): Intrinsically safe for Methane/Air mixtures only

ATEX: EEx ia d IIC T4; Equipment Group and Category II 2G

IECEX: EEx ia d IIC T4

ANZEx: Ex ia s Zone 0 IIC T4

Russia: GOST-R

INMETRO: BR - Ex ia d IIC T4

PART NUMBER	DESCRIPTION
18105437-01111*	M40 – Four gas configuration for O <sub>2</sub> , LEL, CO, H <sub>2</sub> S
18105437-01110*	M40 – Three gas configuration for O <sub>2</sub> , LEL, H <sub>2</sub> S
18105437-01101*	M40 – Three gas configuration for O <sub>2</sub> , LEL, CO
18105437-00110*	M40 – Two gas configuration for H <sub>2</sub> S, LEL
18105437-01100*	M40 – Two gas configuration for O <sub>2</sub> , LEL
18105437-00100*	M40 – Combustible gas configuration for LEL only
18105437-11111+	M40 and Pump Combination for O <sub>2</sub> , LEL, CO, H <sub>2</sub> S
18105437-11110+	M40 and Pump Combination for O <sub>2</sub> , LEL, H <sub>2</sub> S
18105437-11101+	M40 and Pump Combination for O <sub>2</sub> , LEL, CO
18105437-11100+	M40 and Pump Combination for O <sub>2</sub> , LEL
18105437-10100+	M40 and Pump Combination for LEL
M40-KIT-11111**	M40 Confined Space Kit (with Pump) – O <sub>2</sub> , LEL, CO, H <sub>2</sub> S
M40-KIT-11101**	M40 Confined Space Kit (with Pump) – O <sub>2</sub> , LEL, CO
M40-KIT-11110**	M40 Confined Space Kit (with Pump) – O <sub>2</sub> , LEL, H <sub>2</sub> S
<b>OPTIONAL ACCESSORIES</b>	
18105973-ABX++	M•Cal406™ – Six-Unit Calibration Station
18105965-10X++	M•Cal401™ – Single-Unit Calibration Station (with M40 Bay)
18105965-01X++	M•Cal401™ – Single-Unit Calibration Station (with M40/SP40 Bay)
18105460	SP40 Sampling Pump
18106062	M40 Constant-Flow Hand Aspirated Pump
18105528	M40 Datalink – Software included
18105478	M40 Nylon Carrying Case
18105486	M40/SP40 Combination Carrying Case
18106393	Single Unit Compact Charger, Universal
18105502	Single Unit Automotive Charger, 12 VDC
18105510	Six-Unit Charger
18106229-1	M40 Truck-Mount Charger, (hard-wired)
18106229-2	M40/SP40 Truck-Mount Charger, 12V
18106237-1	M40 Truck-Mount Charger, (hard-wired)
18106237-2	M40/SP40 Truck-Mount Charger, (hard-wired)
17092941	Metal Belt Clip
17107582	Suspender Clip
18106070	CO Breath Sampler for M40
17108622	Calibration Cup, M40

**++M•Cal™ Calibration Station Ordering Information –**  
 A = # of M40 Bays (0-6), B = # of M40/SP40 Bays (0-6)  
 X = Power Cord (0 = N. Amer., 1 = U.K., 2 = Eur, 3 = AUS)

M40 Multi-Gas Monitor shown with optional SP40 Sampling Pump attached



**All monitors include\*:**  
 compact charger, calibration cup, tubing, leather carrying case, suspender clip, instruction manual

**All monitor/pump combinations include\*:**  
 compact charger, calibration cup, tubing, suspender clip, instruction manual, combo monitor/pump leather carrying case

**All confined space kit combinations include\*\*:**  
 compact charger, calibration cup, tubing, utility case, gas cylinder, suspender clip, regulator valve, water barrier assembly, filter, instruction manual, combo monitor/pump leather carrying case



**M40 Datalink**



**The M40 Confined Space Kits provide all the equipment you need to operate and maintain the M40 Multi-Gas Monitor in everyday confined space applications.**





- Stand-alone operation. No PC is required.
- Calibration
- Function (bump) testing
- Battery recharging
- Simple, two-button operation

The M•Cal™ Calibration Station is capable of calibrating, function (bump) testing, and charging the M40 instrument as well as the M40/SP40 instrument/pump combination. Available in single-unit, and six-unit versions, the M•Cal™ can be ordered in any configuration of bays for M40 or M40/SP40 combinations. A serial connector provides simple connection to a serial data printer for hard-copy printouts of each calibration and bump test.

#### SPECIFICATIONS

##### MONITORS SUPPORTED:

M40 Software versions 4.0 and higher

##### CONFIGURATIONS:

M40 only version  
M40/SP40 pump version  
Six-unit versions (all configurations)

##### DIMENSIONS:

10.24 cm x 15.24 cm x 17.78 cm (4.03" x 6" x 7") - (Single-Unit)  
12.5 cm x 31.06 cm x 33.02 cm (4.92" x 12.23" x 13") - (Six-Unit)

##### GAS INLETS:

One fresh air, one gas cylinder

##### PUMP FLOW RATE:

0.25 LPM

##### INPUT:

Universal AC power supply; 110/240 VAC

##### COMMUNICATION:

On-board LEDs give status indication (pass, fail, charging). Real-time readings on M40 display during calibration.

##### INTERNAL MEMORY:

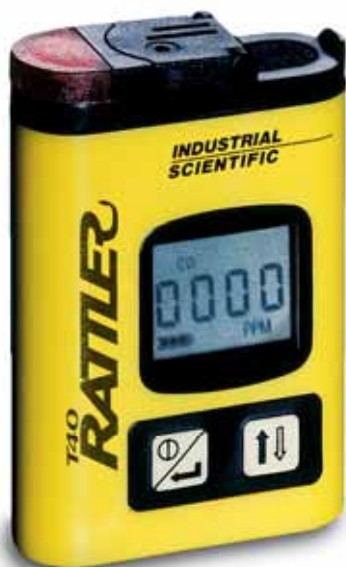
Stores up to 150 bump test and calibration reports before overwrite. Reports contain serial number, time, date, sensor information, pass/fail, span values and bump values (for bump tests). Memory will retain information when power is off.

PART NUMBER	DESCRIPTION
18105965-10X+	M•Cal401 – Single-unit, M40 bay
18105965-01X+	M•Cal401 – Single-unit, M40/SP40 bay
18105973-06X+	M•Cal406 – Six-unit, with six M40/SP40 bays
18105973-15X+	M•Cal406 – Six-unit, with one M40 bay and five M40/SP40 bays
18105973-24X+	M•Cal406 – Six-unit, with two M40 and four M40/SP40 bays
18105973-33X+	M•Cal406 – Six-unit, with three M40 and three M40/SP40 bays
18105973-42X+	M•Cal406 – Six-unit, with four M40 and two M40/SP40 bays
18105973-51X+	M•Cal406 – Six-unit, with five M40 bays and one M40/SP40 bay
X = Power Cord (0 = N. Amer., 1 = U.K., 2 = Eur, 3 = AUS) (*Note A+B = 6)	
OPTIONAL ACCESSORIES	
17117722	Serial Data Dot Matrix Printer – 120-230 VAC
17119843	Replacement Cable for M•Cal to PC Interface, 6' Null Modem F/F
17118118	Replacement Power Supply
M40-KIT-DFR0000	M•Cal™ Accessory Kit (demand flow regulator, calibration gas cylinder, tubing)
18102187	Calibration/Bump Gas, 58L (100 PPM CO, 25 PPM H <sub>2</sub> S, 25% LEL pentane, O <sub>2</sub> )
18102242	Calibration/Bump Gas, 58L (100 PPM CO, 25 PPM H <sub>2</sub> S, 50% LEL methane, O <sub>2</sub> )
17124348	Wall/Desk Mount Cylinder Holder
18102509	Demand Flow Regulator for 58L/103L/34L aluminum cylinders

Optional M•Cal401 Calibration Station shown with M40/SP40 Bay



The six-unit M•Cal406™ Calibration Station



The T40 Rattler™ is a low-cost, **maintenance-free** single gas monitor designed to protect personnel from dangerous hydrogen sulfide or carbon monoxide gas exposure in the most extreme conditions. Despite its compact size, the T40 Rattler™ includes features usually found only in larger multi-gas monitors – including a large, **liquid crystal display (LCD)**, **internal vibrating alarm**, **audible/visual alarms** and simple **push-button operation**.

The monitor continuously displays ambient CO or H<sub>2</sub>S readings in PPM and will alert the user when gas concentrations exceed the preset low or high levels. Added features include adjustable alarm setpoints, calibration gas values, and choice of text-only display selected by the user through a simple, push-button routine. The T40 Rattler™ also has a **peak/hold** feature to show the highest reading during a shift and includes a patented **flip-cap calibration** adapter for quick and simple calibration. The T40 Rattler™ operates for up to 1,500 hours on a single “AA” battery (included) and is covered by a **two-year warranty** from the date of manufacture.

#### SPECIFICATIONS

##### CASE:

High visibility, impact-resistant composite with radio frequency interference (RFI) protection.

##### DIMENSIONS:

86 mm x 58 mm x 19 mm (3.375" x 2.3" x .75")

##### WEIGHT:

98 g (3.5 oz.)

##### SENSORS:

CO, H<sub>2</sub>S – Electrochemical

##### MEASURING RANGES:

Carbon Monoxide	0-999 ppm in 1 ppm increments
Hydrogen Sulfide	0-500 ppm in 1 ppm increments

##### ALARMS:

Adjustable low and high alarm setpoints

##### Power Source (Runtime):

Replaceable “AA” alkaline battery (approx. 1,500 hours typical)

##### TEMPERATURE RANGE:

-4°F to 122°F (-20°C to 50°C) typical

##### HUMIDITY RANGE:

15 to 95% RH typical

##### APPROVALS:

UL and cUL:	Class I, Groups A, B, C, D
CSA:	Ex ia IIC T4
ATEX:	EEx ia IIC T4; Equipment Group and Category II 2G
IECEx:	Ex ia IIC T4
ANZEx:	Ex ia IIC T4

PART NUMBER	DESCRIPTION
18105247	T40 Rattler – Hydrogen Sulfide (H <sub>2</sub> S)
18105254	T40 Rattler – Carbon Monoxide (CO)
18105874	T40 Nylon Carrying Case

**All Rattler T40 Monitors Include:** Battery (installed), additional battery, maintenance tool and instruction manual.



The T40 Rattler's compact design allows it to fit comfortably in a shirt pocket, a tool belt or on a hard hat.



SENSOR	MULTI-GAS MONITORS				SINGLE-GAS MONITORS		
	MX6 iBrid™	Ventis™ MX4	BM25	M40	GasBadge® Pro	GasBadge® Plus	T40 Rattler
Oxygen (O <sub>2</sub> )	•	•	•	•	•	•	
LEL Sensor (%LEL) - Catalytic Bead [HP]	• ★	• ★	• △	• ★			
	up to five sensors	and up to two of the following	and up to two of the following	or any of the following	or any of the following	or any of the following	any of the following
Ammonia (NH <sub>3</sub> )	•		•		•		
Arsine (ASH <sub>3</sub> )			•				
Carbon Dioxide (CO <sub>2</sub> ) - Infrared (IR) [HP]	• □		• □				
Carbon Monoxide (CO)	•	•	•	•	•	•	•
CO High	•		•				
CO/H <sub>2</sub> Null							
CO/H <sub>2</sub> low interference	•				•		
CO/H <sub>2</sub> S (COSH)	•		•				
Chlorine (Cl <sub>2</sub> )	•		•		•		
Chlorine Dioxide (ClO <sub>2</sub> )	•		•		•		
Ethylene Oxide (ETO)			•				
Hydrocarbons (0-100% LEL) - Infrared (IR) [HP]	• □						
Hydrogen (H <sub>2</sub> )	•		•		•		
Hydrogen Chloride (HCl)	•		•				
Hydrogen Cyanide (HCN)	•		•		•		
Hydrogen Sulfide (H <sub>2</sub> S)	•	•	•	•	•	•	•
Methane (0-5% Vol) - Catalytic Bead [HP]	• ★★	• ★★					
Methane (0-100% Vol) - Infrared (IR) [HP]	• □						
Nitric Oxide (NO)	•		•				
Nitrogen Dioxide (NO <sub>2</sub> )	•	•	•		•	•	
Phosphine (PH <sub>3</sub> )	•		•		•		
Phosphine High (0-1,000 ppm)	•						
Silane (SiH <sub>4</sub> )			•				
Sulfur Dioxide (SO <sub>2</sub> )	•	•	•		•	•	
PID for VOCs (Volatile Organic Compounds) [HP]	•		•				

## NOTES:

- Sensor Not Available
- Sensor Available
- Maximum of one Infrared (IR) Sensor per instrument (MX6)
- ★ Factory Calibrated to Pentane (typically) or Methane (optionally)
- ★★ Maximum of one Catalytic Bead Sensor per instrument
- △ Factory calibrated to Methane
- [HP] Maximum of two High Power Sensors per instrument, but just one IR sensor (MX6)

Certain limits apply to the number of sensor configurations.



## SENSOR REFERENCE CHART

INSTRUMENT	OXYGEN (O <sub>2</sub> )	%LEL/ METHANE (CH <sub>4</sub> )	CARBON MONOXIDE (CO)	CARBON MONOXIDE (H <sub>2</sub> NULL)	HYDROGEN SULFIDE (H <sub>2</sub> S)	SULFUR DIOXIDE (SO <sub>2</sub> )	CHLORINE (Cl <sub>2</sub> )	CHLORINE DIOXIDE (ClO <sub>2</sub> )	AMMONIA (NH <sub>3</sub> )	NITROGEN DIOXIDE (NO <sub>2</sub> )	NITRIC OXIDE (NO)	HYDROGEN CYANIDE (HCN)	HYDROGEN CHLORIDE (HCl)	PHOSPHINE (PH <sub>3</sub> )
MX6 iBrid™	17124975-3	17124975-K (Pentane)	17124975-1	17124975-G*	17124975-2	17124975-5	17124975-7	17124975-8	17124975-6	17124975-4	17124975-D	17124975-B	17124975-A	17124975-9
Ventis™ MX4	17134461	17134495	17134487		17134479	17143595				17134503				
GasBadge® Pro	17124983-3		17124983-1	17124983-G*	17124983-2	17124983-5	17124983-7	17124983-8	17124983-6	17124983-4	17124983-D	17124983-B		17124983-9
BM25	6313780	6313969*	6313787		6313788	6313822	6313809	6313841	6313800	6313801	6313802	6313805	6313804	6313810
M40	17117730	17050788	17112160		17112152									

**MX6 also could have:**

CO (high): 17124975-H  
 LEL (Methane): 17124975-L  
 CO<sub>2</sub> (IR): 17124975-Q  
 H<sub>2</sub>: 17124975-C  
 CH<sub>4</sub> (0-5%): 17124975-M  
 PID: 17124975-R  
 CO/H<sub>2</sub>S: 17124975-J  
 CH<sub>4</sub> (IR): 17124975-N  
 PH<sub>3</sub> (high): 17124975-E  
 HC (IR): 17124975-P

**BM25 also could have:**

\*%LEL: 6313888 (S/N prior to June 08)  
 H<sub>2</sub>: 6313803  
 PID: 6313998 (Available for Europe, Please call for information)  
 CO/H<sub>2</sub>S: 6313823  
 ETO: 6313821  
 CO<sub>2</sub>: 6313818  
 CO (high): 6313826  
 SiH<sub>4</sub>: 6313808  
 AsH<sub>3</sub>: 6313811  
 IR Sensor - 0-100% LEL CH<sub>4</sub> (5% vol): 6 314 064:  
 IR Sensor - 0-100% LEL CH<sub>4</sub> (4.4% vol): 6 314 065  
 IR Sensor - 0-100% LEL C<sub>3</sub>H<sub>8</sub>: 6 314 087  
 IR Sensor - 0-100% LEL C<sub>4</sub>H<sub>10</sub>: 6 314 088  
 IR Sensor - 0-100% LEL Isobutane: 6 314 089  
 IR Sensor - 0-100% LEL LPG: 6 314 090  
 IR Sensor - 0-100% LEL Ethanol: 6 314 091  
 IR Sensor - 0-100% Vol. CH<sub>4</sub>: 6 314 092

**GasBadge Pro also could have:**

H<sub>2</sub>: 17124983-C

\* Low Hydrogen Interference



Regulators provide the proper flow rate for calibrating your Industrial Scientific instrument. Always make certain to use the appropriate regulator for the application as recommended in the Instruction Manual.



- (a) 18100933 - 34 L Regulator (1/2 L/min flow)
- (b) 18102509 - 58/103 L Demand Flow Regulator
- (c) 18103564 - 34 L Demand Flow Regulator
- (d) 18102260 - 552 L Regulator (1/2 L/min flow)
- (e) 18100883 - 58/103 L Regulator (1/2 L/min flow)
- (f) 18102155 - 58/103 L Ammonia Regulator
- (g) 18103580 - 58/103 L Bump Test Regulator

REGULATORS	
PART NUMBER	DESCRIPTION
18100933	(a) 34L Regulator (1/2L/min flow)
18102509	(b) 58/103L Demand Flow Regulator (and 34L Aluminum Cylinders)
18103564	(c) 34L Demand Flow Regulator, CGA 600
18103549	552L Demand Flow Regulator, CGA 590
18103556	650L Demand Flow Regulator, CGA 330
18104158	Demand Flow Regulator, CGA 660
18106708	Demand Flow Regulator, CGA 705
18102260	(d) 552L Regulator (1/2 L/min flow), CGA 590
18100883	(e) 58/103L Regulator (and 34L Aluminum Cylinders) (1/2 L/min flow)
18102155	(f) 58/103L Ammonia Regulator (1 L/min flow)
18103580	(g) 58/103L Bump Test Regulator w/Trigger
18103374	650L Regulator (1/2L/min flow), CGA 330
18104695	Regulator w/Bump Test Trigger, CGA 330
18104356	Regulator w/Bump Test Trigger, CGA 590
18105924	5-port Clamp-on Gas Manifold
18105841	58/103/34L Demand Flow Regulator w/iGas Pressure Switch
18105866	34L Demand Flow Regulator, 600 CGA w/iGas Pressure Switch
18105833	552L Demand Flow Regulator, 590 CGA w/iGas Pressure Switch
18105858	650L Demand Flow Regulator, 330 CGA w/iGas Pressure Switch
18106740	Demand Flow Regulator, 660 CGA w/iGas Pressure Switch
18106757	Demand Flow Regulator, 705 CGA w/iGas Pressure Switch
18101766	58/103L Regulator (1 L/min flow)

For best results, use only Industrial Scientific calibration equipment for regular instrument calibration and maintenance. All Industrial Scientific calibration cylinders are manufactured to the highest quality standards and include NIST traceable blend techniques, analytical leak testing of every cylinder, certified component concentrations and clearly marked lot numbers and expiration dates.

Replacement cylinders are available in a variety of sizes and concentrations for all gases detected by Industrial Scientific instruments. See chart on the following pages for ordering information.

Industrial Scientific Calibration Kits come equipped with everything necessary to keep your gas monitoring instruments operating accurately and reliably. Kits contain certified NIST-traceable (National Institute of Standards & Technology) span gases for safe, reliable instrument calibration. Complete kits are available for all installed sensors and include:

- Convenient Carrying Case
- Non-refillable Cylinders
- Flow Regulator



MISCELLANEOUS CALIBRATION EQUIPMENT	
PART NUMBER	DESCRIPTION
17041807	Calibration Log, (tablet of 50 sheets)
17050734	Calibration Log, TMX, LTX STX, (tablet of 50 sheets)
17045873	Calibration Label
17056326	Bump Cylinder Adapter for CO Breath Sampler
17037961	Carrying Case for 2 Cylinders (58/103 L)
18100149	Carrying Case for 2 Cylinders (34 L) w/0.5 LPM Regulator
17124348	Wall/Desk Mount Cylinder Holder
17113275	Cylinder Recycling Tool (58L, 103L)
17113283	Cylinder Recycling Tool (34L)

# CALIBRATION GAS CROSS REFERENCE CHART

Industrial Scientific offers a variety of calibration gas cylinders and kits, including convenient multi-gas blends or single gas cylinders. Use the following chart to order complete kits or replacement cylinders. When ordering cylinders, the shaded areas indicate compatible regulators (see complete regulator descriptions on page 24), while the • identifies which regulator is included in the associated kit. See “Notes” for supplementary information.

PART #	DESCRIPTION	0.5LPM Regulator 18100883	0.5LPM Regulator 18100933	Demand Flow Regulator		Demand Flow Regulator w/Gas Pressure Switch		VOL.	NOTES
				18102509	18103564	18105841	18105866		
18103937	CYL, 100 ppm CO, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 25% LEL Pentane							34L	aluminum
18102187	CYL, 100 ppm CO, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 25% LEL Pentane							58L	
18102189	KIT	•							
18103432	KIT			•					
18102343	CYL, 200 ppm CO, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 25% LEL Pentane							58L	
18102242	CYL, 100 ppm CO, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 2.5% Methane							58L	
18102275	KIT	•							
18105262	CYL, 50 ppm CO, 25 ppm H <sub>2</sub> S, 20.9% O <sub>2</sub> , 50% LEL Methane							58L	
18108035	CYL, 250 ppm CO, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 50% LEL Methane							58 L	
18105825	CYL, 200 ppm CO, 75 ppm H <sub>2</sub> S, 15% O <sub>2</sub> , 25% LEL Methane							11L	aerosol
18105536	CYL, 100 ppm CO, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 50% LEL Methane							34L	aluminum
18105635	CYL, 100 ppm CO, 50 ppm H <sub>2</sub> S, 16% O <sub>2</sub> , 50% LEL Methane	18103580						34L	Bump Gas - 2 yr.
18106179	CYL, 100 ppm CO, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 50% LEL Propane							58L	
18102186	CYL, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 25% LEL Pentane							58L	
18102188	KIT	•							
18102241	CYL, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 2.5% Methane							58L	
18102274	KIT	•							
18104331	CYL, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 40% LEL Methane							58L	
18103143	CYL, 50 ppm H <sub>2</sub> S, 16% O <sub>2</sub> , 50% LEL Methane	18103580						58L	Bump Gas - 2 yr.
18102764	CYL, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 50% LEL Propane							58L	
18104448	CYL, 50 ppm CO, 19% O <sub>2</sub> , 25% LEL Pentane							34L	w/CGA 600 fitting
18104463	CYL, 50 ppm CO, 19% O <sub>2</sub> , 25% LEL Pentane							103L	
18104455	CYL, 50 ppm CO, 19% O <sub>2</sub> , 50% LEL Pentane							103L	
18101576	CYL, 100 ppm CO, 19% O <sub>2</sub> , 25% LEL Pentane							103L	
18101568	KIT	•							w/103L Zero Air
18102269	KIT	•							
18101253	CYL, 100 ppm CO, 19% O <sub>2</sub> , 25% LEL Pentane							34L	w/CGA 600 fitting
18101295	KIT		•						w/34L Zero Ai
18105676	CYL, 100 ppm CO, 15% O <sub>2</sub> , 25% LEL Pentane							103L	
18102324	CYL, 250 ppm CO, 19% O <sub>2</sub> , 25% LEL Pentane							103L	
18102243	CYL, 50 ppm CO, 19% O <sub>2</sub> , 2.5% Methane							103L	
18102165	CYL, 100 ppm CO, 19% O <sub>2</sub> , 2.5% Methane							103L	
18102270	KIT	•							
18101246	CYL, 100 ppm CO, 19% O <sub>2</sub> , 2.5% Methane							34L	w/CGA 600 fitting
18101287	KIT		•						w/34L Zero Air
18107847	CYL, 100 ppm CO, 19% O <sub>2</sub> , 2.0% Methane							103L	
18105122	CYL, 50 ppm CO, 18% O <sub>2</sub> , 50% LEL Propane							103L	
18101238	CYL, 19% O <sub>2</sub> , 25% LEL Pentane							103L	
18101279	KIT 19% O <sub>2</sub> , 25% LEL Pentane, 25 ppm H <sub>2</sub> S, 103L	•							w/18100859 (58L)
18107995	CYL, 100 ppm CO, 2.5% CO <sub>2</sub> , 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 25% LEL Pentane							58L	
18103473	CYL, 100 ppm CO, 2.5% CO <sub>2</sub> , 19% O <sub>2</sub> , 25% LEL Pentane							103L	
18103317	KIT			•					w/103L Zero Air
18104521	CYL, 100 ppm CO, 5% CO <sub>2</sub> , 19% O <sub>2</sub> , 25% LEL Pentane							103L	
18104539	KIT			•					w/103L Zero Air
18106799	CYL, 25 ppm H <sub>2</sub> S, 5 ppm SO <sub>2</sub> , 19% O <sub>2</sub> , 25% LEL Pentane							58L	
18106807	CYL, 25 ppm H <sub>2</sub> S, 5 ppm SO <sub>2</sub> , 19% O <sub>2</sub> , 25% LEL Methane							58L	
18106914	CYL, 25 ppm H <sub>2</sub> S, 50 ppm CO, 18% O <sub>2</sub> , 32.4% LEL Methane							58L	
18106773	CYL, 100 ppm CO, 5 ppm NO <sub>2</sub> , 19% O <sub>2</sub> , 25% LEL Pentane							58L	
18106781	CYL, 100 ppm CO, 5 ppm NO <sub>2</sub> , 19% O <sub>2</sub> , 25% LEL Methane							58L	
18108571	CYL, 100 ppm CO, 5 ppm NO <sub>2</sub> , 19% O <sub>2</sub> , 2.5% LEL Methane							58L	
18108548	CYL, 100 ppm CO, 2.5% CO <sub>2</sub> , 19% O <sub>2</sub> , 2.5% LEL Methane							103L	
18105593	CYL, 25 ppm Ammonia							34L	aluminum
18102151	CYL, 25 ppm Ammonia							58L	
18102147	KIT	•							
78103868	CYL, 50 ppm Ammonia							58L	
18105734	CYL, 5 ppm Benzene							103L	
18105700	CYL, 5 ppm Butadiene							34L	w/CGA 600 fitting

NOTE: Calibration gas cylinder expiration times vary due to gas type. Please contact Industrial Scientific for detailed information.



# CALIBRATION GAS CROSS REFERENCE CHART

PART #	DESCRIPTION	0.5LPM Regulator 18100883	0.5LPM Regulator 18100933	Demand Flow Regulator		Demand Flow Regulator w/Gas Pressure Switch		VOL.	NOTES
				18102509	18103564	18105841	18105866		
18105767	CYL, 5 ppm Butadiene*							103L	
18106146	CYL, 300 ppm Carbon Dioxide							103L	
18106153	CYL, 1,000 ppm Carbon Dioxide							103L	
18102913	CYL, 2.5% Carbon Dioxide							103L	
18108118	CYL, 3% Carbon Dioxide							103L	
18103218	CYL, 5.0% Carbon Dioxide							34L	w/CGA 600 fitting
18103275	KIT				.				w/34L Zero Air
18104208	CYL, 5.0% Carbon Dioxide							103L	
18101493	CYL, 25 ppm Carbon Monoxide							34L	w/CGA 600 fitting
18106005	CYL, 25 ppm Carbon Monoxide							103L	
18100719	CYL, 50 ppm Carbon Monoxide							34L	w/CGA 600 fitting
18100750	KIT		.						w/34L Zero Air
18102230	CYL, 50 ppm Carbon Monoxide							103L	
18102665	CYL, 100 ppm Carbon Monoxide*(bump gas)							11L	aerosol
18100701	CYL, 100 ppm Carbon Monoxide							34L	w/CGA 600 fitting
18100743	KIT		.						w/34L Zero Air
18102163	CYL, 100 ppm Carbon Monoxide							103L	
18102162	KIT	.							
18102301	CYL, 125 ppm Carbon Monoxide							103L	
18101352	CYL, 200 ppm Carbon Monoxide							34L	w/CGA 600 fitting
18102302	CYL, 250 ppm Carbon Monoxide							103L	
18101063	CYL, 300 ppm Carbon Monoxide							34L	w/CGA 600 fitting
18102303	CYL, 500 ppm Carbon Monoxide							103L	
18102806	CYL, 2 ppm Chlorine							58L	
18103697	CYL, 5 ppm Chlorine							58L	
18105007	CYL, 10 ppm Chlorine							34L	aluminum
18101758	CYL, 10 ppm Chlorine							58L	
18101741	KIT	.							
18103127	CYL, 25% LEL Hexane							103L	
18102249	CYL, 40% LEL Hexane							34L	w/CGA 600 fitting
18107987	CYL, 500 ppm Hexane							103L	
18100453	CYL, 25% LEL Hydrogen							34L	w/CGA 600 fitting
18100461	CYL, 50% LEL Hydrogen							34L	w/CGA 600 fitting
18103481	CYL, 50% LEL Hydrogen							103L	
18102905	CYL, 50 ppm Hydrogen							34L	w/CGA 600 fitting
18103945	CYL, 100 ppm Hydrogen							34L	w/CGA 600 fitting
18102996	CYL, 500 ppm Hydrogen							103L	
18103010	CYL, 1,000 ppm Hydrogen							103L	
18102154	CYL, 10 ppm Hydrogen Chloride							58L	
18102148	KIT	.							
18102152	CYL, 10 ppm Hydrogen Cyanide							58L	
18102149	KIT	.							
18102970	CYL, 10 ppm Hydrogen Sulfide							58L	
18104984	CYL, 25 ppm Hydrogen Sulfide							34L	aluminum
18100859	CYL, 25 ppm Hydrogen Sulfide							58L	
18100842	KIT	.							
18102988	CYL, 40 ppm Hydrogen Sulfide							58L	
18102245	CYL, 50 ppm Hydrogen Sulfide							58L	
18102304	CYL, 125 ppm Hydrogen Sulfide							58L	
18105809	CYL, 10 ppm Isobutylene							103L	
18106591	CYL, 100 ppm Isobutylene							34L	w/CGA 600 fitting
18102939	CYL, 100 ppm Isobutylene							103L	
18104554	CYL, 500 ppm Isobutylene							103L	
18100206	CYL, 1% Methane							34L	w/CGA 600 fitting
18108001	CYL, 2.0% Methane							103L	
18107284	CYL, 2.0% Methane							34L	
18100214	CYL, 2.5% Methane							34L	
18101303	KIT		.						
18101378	CYL, 2.5% Methane							103L	
18102312	CYL, 99% Methane							34L	w/CGA 600 fitting
18102491	KIT				.				
18104778	CYL, 99% Methane							34L	aluminum


NOTE: Calibration gas cylinder expiration times vary due to gas type. Please contact Industrial Scientific for detailed information.

# CALIBRATION GAS CROSS REFERENCE CHART

PART #	DESCRIPTION	0.5LPM Regulator 18100883	0.5LPM Regulator 18100933	Demand Flow Regulator		Demand Flow Regulator w/Gas Pressure Switch		VOL.	NOTES
				18102509	18103564	18105841	18105866		
18105114	CYL, 10% LEL Methane							34L	w/CGA 600 fitting
18105098	CYL, 500 ppm Methane							34L	w/CGA 600 fitting
18105106	CYL, 1,000 ppm Methane							34L	w/CGA 600 fitting
18102244	CYL, 100% Nitrogen							103L	
18102248	CYL, 100% Nitrogen							34L	w/CGA 600 fitting
18105585	CYL, 1 ppm Nitrogen Dioxide							34L	aluminum
18102897	CYL, 2 ppm Nitrogen Dioxide							58L	
18104976	CYL, 5 ppm Nitrogen Dioxide							34L	aluminum
18102219	CYL, 5 ppm Nitrogen Dioxide							58L	
18102238	KIT	.							
18106252	CYL, 10 ppm Nitrogen Dioxide							58L	
18105452	CYL, 25 ppm Nitrogen Dioxide							34L	aluminum
18101477	CYL, 25 ppm Nitrogen Dioxide							58L	
18101469	KIT	.							
18102153	CYL, 25 ppm Nitric Oxide							58L	
18102150	KIT	.							
18100289	CYL, 19% Oxygen							34L	w/CGA 600 fitting
18100271	CYL, 20.9% Oxygen							34L	w/CGA 600 fitting
18102234	CYL, 12% LEL Pentane							103L	
18101162	CYL, 25% LEL Pentane							34L	w/CGA 600 fitting
18101261	KIT		.						2 cylinders
18104398	CYL, 1.0 ppm Phosphine							34L	aluminum
18104059	CYL, 1.0 ppm Phosphine							58L	
18107797	Cyl., 5 PPM Phosphine							58L	
18107805	Cyl., 5 PPM Phosphine							34L	
18100164	CYL, 25% LEL Propane							34L	w/CGA 600 fitting
18103762	CYL, 25% LEL Propane							103L	
18100172	CYL, 50% LEL Propane							34L	w/CGA 600 fitting
18104992	CYL, 5 ppm Sulfur Dioxide							34L	aluminum
18102222	CYL, 5 ppm Sulfur Dioxide							58L	
18102239	KIT	.							
18101220	CYL, 10 ppm Sulfur Dioxide							58L	
18101212	KIT	.							
18105726	CYL, 100 ppm Toluene							34L	w/CGA 600 fitting
18100693	CYL, Zero Grade Air (20.9% Oxygen)							34L	w/CGA 600 fitting
18101584	CYL, Zero Grade Air (20.9% Oxygen)							103L	

PART #	DESCRIPTION	0.5LPM Regulator 18102260	0.5LPM Regulator 18103374	Demand Flow Regulator		Demand Flow Regulator w/Gas Pressure Switch			VOL.	NOTES
				18103549	18103556	18105833	18105858	18106740		
18108019	CYL, 250 ppm CO, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 50% LEL Methane								650L	w/CGA 330 fitting
18103366	CYL, 100 ppm CO, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 25% LEL Pentane								650L	w/CGA 330 fitting
18108050	CYL, 100 ppm CO, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 2% Methane								650L	w/CGA 330 fitting
18104091	CYL, 100 ppm CO, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 2.5% Methane								875L	w/CGA 330 fitting
18107219	CYL, 100 ppm CO, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 25% LEL Propane								650L	w/CGA 330 fitting
18107227	CYL, 25 ppm H <sub>2</sub> S, 19% O <sub>2</sub> , 25% LEL Pentane								650L	w/CGA 330 fitting
18102258	CYL, 100 ppm CO, 19% O <sub>2</sub> , 25% LEL Pentane								552L	w/CGA 590 fitting
18102259	CYL, 100 ppm CO, 19% O <sub>2</sub> , 2.5% Methane								552L	w/CGA 590 fitting
18104265	CYL, 250 ppm CO, 19% O <sub>2</sub> , 2.5% Methane								552L	w/CGA 590 fitting
18103671	CYL, 100 ppm CO, 2.5% CO <sub>2</sub> , 19% O <sub>2</sub> , 25% LEL Pentane								552L	w/CGA 590 fitting
18106963	CYL, 10 ppm Hydrogen Chloride								650L	w/CGA 330 fitting
18106633	CYL, 25 ppm Hydrogen Sulfide								650L	w/CGA 330 fitting
18103101	CYL, 100 ppm Carbon Monoxide								552L	w/CGA 590 fitting
18104125	CYL, 250 ppm Carbon Monoxide								552L	w/CGA 590 fitting
18106955	CYL, 10 ppm Chlorine								650L	w/CGA 330 fitting
18102320	CYL, Zero Grade Air (20.9% Oxygen)								552L	w/CGA 590 fitting
18107375	CYL, 100 ppm Isobutylene								552L	w/CGA 590 fitting
18107292	CYL, 100 ppm Isobutylene								34L	aluminum
18106658	CYL, 25 ppm NH <sub>3</sub>								650L	w/CGA 660 fitting
18107722	CYL, 25 ppm NO								650L	w/CGA 660 fitting
18107730	CYL, 25 ppm NO <sub>2</sub>								650L	w/CGA 660 fitting
18105817	CYL, 10 ppm SO <sub>2</sub>								650L	w/CGA 660 fitting
18108308	CYL, 100 ppm CO, 5 ppm NO <sub>2</sub> , 19% O <sub>2</sub> , 2.5% Methane								650L	w/CGA 660 fitting

NOTE: Calibration gas cylinder expiration times vary due to gas type. Please contact Industrial Scientific for detailed information.



Industrial Scientific's hiring program is ideal for customers who need additional monitors for special projects such as turnarounds or shutdowns, but don't want to purchase them. The program offers flexible hiring periods and rates from weekly, monthly to long-term.

**OVER 5,000 PRODUCTS  
AVAILABLE ...**

- Our complete line of portable gas detectors and accessories are available including the MX6, MX4, GasBadge® Pro and BM25
- Weekly or monthly rates

**FAST, RELIABLE SERVICE ...**

- Most orders can ship the same day they are ordered
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**GAS DETECTORS ARRIVE READY  
TO USE ...**

- Guaranteed reliable out of the box
- Fully inspected
- Certified calibrated to NIST standards
- Chargers are supplied at no cost with all rechargeable gas monitors

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will start when you receive  
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## ■ REPAIR SOLUTIONS

Industrial Scientific designs and manufactures the highest quality gas detection equipment in the industry. But our commitment to quality doesn't end once the instruments are shipped. If your instrument does need to be repaired, there will be no compromise on quality and no guessing about what is covered under warranty since many of our portable instruments are "Guaranteed For Life."



### ■ Factory Repair

Industrial Scientific offers factory repair service at our European headquarters as well as other office locations. Each factory service center offers fast turnaround and excellent value on any instrument repair and ensures that your instruments are repaired exactly to your specification. The latest instrument software upgrades are also provided at no additional cost. Call your local Industrial Scientific office for factory service and support, or go to [www.indsci.com](http://www.indsci.com) to fill out the printable document.



### ■ Extended Warranty Program

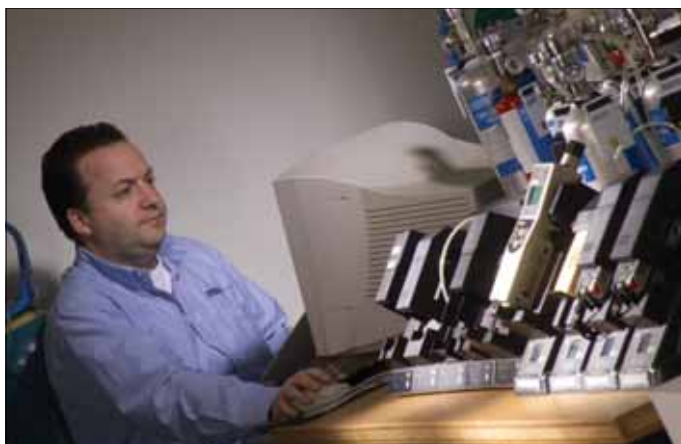
The Extended Warranty Program is designed to secure customers' cost of ownership for instruments with limited warranties (non-guaranteed for life equipment). This additional coverage extends the warranty to a full four years and must be purchased within the first six months of instrument ownership.

## ■ MAINTENANCE SOLUTIONS

Industrial Scientific products are manufactured to provide unparalleled reliability and designed to be simple for the user to maintain. For customers with limited time, personnel or resources, our docking-stations are available to ensure your equipment is consistently maintained to factory standards and in optimum working condition.

### ■ Docking Station™

The DS2 Docking Station provides automated calibration, record-keeping and diagnostics to help you properly maintain your Industrial Scientific equipment. A cost-effective solution for managing one monitor or an entire fleet of monitors, the DS2 modules can be placed practically anywhere you use your equipment. See below for information on Docking Station Start-Up Services offered by Industrial Scientific.



### ■ Docking Station™ Commissioning Services

Available for the Docking Station™, an automated calibration and maintenance station for Industrial Scientific portable gas monitors.

- All hardware installations and connections
- Any necessary instrument microprocessor updates
- All software configurations
- Operational testing
- End-user training



*The DS2 provides automated instrument management and diagnostic functions.*



*"The main objective of our Training Department is to provide a complete, expedient program that allows you to increase your safety awareness.*

*We work with you to develop a plan that corresponds to your specific needs. Our specialists will be happy to meet with you and guide you through the training process with a program that far exceeds your expectations."*

**- Dave Kuiawa, Training Director**



## TRAINING SERVICES:

How does an electrochemical sensor work? What do I need to know if I work with toxic gases? How will new regulations impact my daily activities? How can proper maintenance make it easier to use my instruments and save money?

Our Training Department is here to provide answers to your questions, individually or in a group setting, to both companies and individuals.

Industrial Scientific holds training workshops designed specifically to make gas detection easier for users. The courses are led by a team of Industrial Scientific trainers who are experts in instrument use, regulations, fire prevention, hazardous materials and confined spaces.

These workshops give participants the skills they need to identify the characteristics of gases and the potential hazards that may exist in the workplace. The calibration and maintenance of gas detection equipment are also covered.

### Whom are these courses designed for?

- Safety and health professionals
- Firefighters and emergency responders
- Contractors



## FACE TO FACE TRAINING:

### ■ GDME PROGRAM:

Industrial Scientific instruments

are provided to participants for use during the training sessions.

Whether you are a novice or have years of gas detection experience, GDME training courses are for you.

**GDME**  
GAS DETECTION MADE EASY

#### ■ Hazardous gases

Instruction in commonly used gases, their properties and effects. Overview of gases specific to confined spaces - hazards related to oxygen and to combustible and toxic gases.

#### ■ Use of instruments in confined spaces

Overview of applicable laws. Instruction in the use of gas detection instruments in compliance with French law.

#### ■ Sensor technology

Understanding of how the instruments work. Instruction in catalytic diffusion sensors, electrochemical sensors, infra-red sensors, etc. Each type of sensor is interchangeable and has its own unique set of characteristics.

#### ■ Presentation of the instruments

Overview of the entire range of portable Industrial Scientific instruments, including Docking Stations™. Instruction in the features and use of each unit.

#### ■ Calibration and maintenance

Instruction in all aspects of calibration and maintenance—the most important component of a safe, reliable gas detection program. Troubleshooting and sensor replacement. Provides you with the knowledge and skills needed to manage your instruments.

#### ■ Hands-on activities

Learning by doing. We provide the instruments for you to use during the course, but you can also bring your own ISC instruments so that they can be tested and calibrated.

Participants in our Gas Detection Made Easy™ courses have the opportunity to receive a certificate of qualification. More than just a certificate of your attendance, you must pass a test to earn this "Certificate of Qualification" required by certain regulatory standards.

## END USER COURSE OFFERINGS AND OUTLINES:

### ■ PORTABLE INSTRUMENT OPERATIONS LEVEL TRAINING (1 day course)

The Portable Instrument Operations Level Training class is specifically designed to educate and empower the gas monitor end user on all issues related to gas monitoring. Initially, we explore the gas hazards in confined spaces and how these conditions manifest themselves in the workplace. From there we examine terms and technology to ensure a good fit with the application. Next we explore Industrial Scientific's current line of gas monitoring instruments receiving instruction on operation techniques that are sure to save your company money. Finally the course shifts to Docking Stations™, automated solutions for bump testing, calibration, data downloading, diagnostics, and recordkeeping. This course is a must for all people responsible for the operation of portable gas monitoring instruments. This class is also an excellent prerequisite for those wishing to enroll in the Portable Instrument Technician Level Training Class. Additionally, this is a competency certification course so the student will leave the class with a certificate and shoulder patch.

#### Course highlights:

- Gas Hazard Identification
- Confined Space Safety Review
- Atmospheric Testing
- Sensor Technology
- Instrument Operations for Current Industrial Scientific Instruments
- Docking and Calibration Stations
- Competency Test

### ■ PORTABLE INSTRUMENT TECHNICIAN LEVEL TRAINING (2 day course)

The Portable Instrument Technician Level Training course is designed for the individual responsible for the maintenance of portable gas monitors. This course reviews sensor technology and discusses the advantages and disadvantages of each. From there we explore the specifics on all aspects of gas monitor maintenance from operation to set-up, calibration, disassembly, troubleshooting, and repair. Pupils will receive hands-on instruction in these areas as well as participate in the diagnosis and remedy of malfunctioning instruments. This course is a tremendous value for Instrumentation Technicians from all disciplines and upon completion, an immediate return on investment is realized through an increase in efficiency and prowess. Additionally, this is a competency certification course so the student will leave the class with a certificate and shoulder patch.

#### Course highlights:

- Sensor and battery technology review
- Instrument operations training
- Options set-up procedures
- Calibration and bump testing operations
- Disassembly, troubleshooting and remedy hands-on training
- Competency Test

### ■ NEW! SPECIAL DISTRIBUTORS TRAINING

To learn more, please visit us at :  
[www.indsci.com/training](http://www.indsci.com/training)



### ■ ONLINE TRAINING

Our online training courses transform the classroom experience into an online format. These courses combine videos, lectures and recommended readings in practical modules that can be accessed 24/7. This format allows students to learn at their own pace: <http://www.indsci.com/training.aspx>



### ■ INSTRUMENT TRAINING VIDEO

Industrial Scientific also offers free online training videos to give you an introduction to certain instruments and their features. These training tools guide participants through topics such as navigating instrument menus, remote sampling, archiving data and calibrating. The videos are divided into several different tutorials, which are indexed for easy navigation and consultation.

The online training videos are available at:  
[http://www.indsci.com/video\\_training.aspx](http://www.indsci.com/video_training.aspx)



Each day, Industrial Scientific Corporation receives hundreds of phone calls requesting information on everything from exposure limits to the definition of intrinsic safety. Remember, anytime you have a question involving monitoring or safety, simply call 00800 - WORKSAFE (00800 - 96757233) or visit our Web site at [www.indsci.com](http://www.indsci.com).

Our customer service representatives helped us pull together a library of the questions we're asked most often. Use this section as a quick reference when you have a question. And, if you don't find your answer here, give us a call. There's never a charge for a question.

## ■ GLOSSARY OF OCCUPATIONAL SAFETY AND HEALTH TERMS

**dB: Decibel** – A unit used to measure the relative power of sound. A 3 dB increase in sound output power represents a doubling of the perceptible volume.

**eV: Electron Volt** – A measurement of energy equal to the amount of energy it takes to move 1 electron through 1 volt of potential.

**IDLH: Immediately Dangerous to Life and Health** – The maximum concentration of gas (in ppm) from which a worker could escape within 30 minutes without experiencing any escape-impairing or irreversible health effects.

**LEL/LFL: Lower Explosive Limit/Lower Flammable Limit** – The minimum concentration at which a gas will explode. A common unit of measurement is a percent of the LEL.

**mA: Milliamp** – A unit of electric current expressed in amperes. 4-20 mA signals are commonly used analog signals in industrial electronics, where 4 represents the lowest value, for instance 0 ppm, and 20 represents the maximum, for instance, 999 ppm.

**PEL: Permissible Exposure Limit** – Level of gas (in ppm) a worker can be exposed to 8 hours a day/40 hours a week for the rest of their life with no long term health effects.

**PID: Photolonization Detector** – An instrument that utilizes ultra-violet light energy to ionize and detect the presence of an unknown gas or vapor.

**ppm: Part Per Million** – A common unit of measurement for toxic gases. This term literally means one part out of one million possible parts.

**TLV-STEL: Short Term Exposure Limit** – The average amount of gas (in ppm) a worker can be exposed to in a 15 minute period with no long term health effects. This may occur 4 times a shift with one hour between 15 minute exposures.

**TLV-TWA: Time Weighted Average** – The average amount of gas (in ppm) a worker can be exposed to over a certain time period. This time is defined as 8 hours to represent a normal work day.

**TLV: Threshold Limit Value** – A term used to signify limits in gas exposure. TLV is used as a prefix for TWA and STEL.

**UEL/UFL: Upper Explosive Limit/Upper Flammable Limit** – The maximum concentration at which a gas will explode.

**VAC: Volts Alternating Current** – An electric current that reverses direction at regular intervals.

**VDC: Volts Direct Current** – An electric current of constant direction.

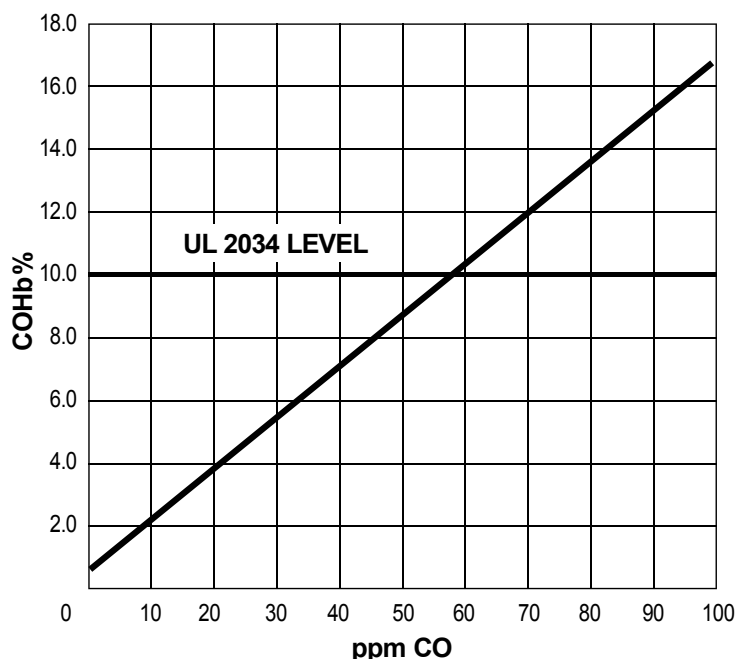
**VOC: Volatile Organic Compound** – Any compound containing carbon, except methane, that can be readily vaporized.

## ■ LOWER EXPLOSIVE LIMITS OF COMBUSTIBLE GASES

The following are the lower explosive limits of selected gases which should be useful:

Acetone	2.5% of volume
Acetylene	2.5% of volume
Benzene	1.2% of volume
Butane	1.9% of volume
Butyl Alcohol (Butanol)	1.4% of volume
Diethyl Ether	1.9% of volume
Ethane	3.0% of volume
Ethyl Alcohol (Ethanol)	3.3% of volume
Ethylene	2.7% of volume
Ethylene Oxide	2.7% of volume
Hexane	1.1% of volume

Hydrogen	4.0% of volume
Isopropyl Alcohol (Isopropanol)	2.0% of volume
Methane	5.0% of volume
Methyl Alcohol (Methanol)	6.0% of volume
Methyl Ethyl Ketone	1.4% of volume
n-Pentane	1.4% of volume
Propane	2.1% of volume
Propylene	2.0% of volume
Styrene	0.9% of volume
Toluene	1.1% of volume
Xylene	1.1% of volume



The carboxyhemoglobin level is a measure of the amount of Carbon Monoxide which has been absorbed into the blood stream. The chart converts the amount of Carbon Monoxide measured in the exhaled breath to the percentage carboxyhemoglobin level in the blood. The UL 2034 level (10% carboxyhemoglobin) depicted on the chart shows the average carboxyhemoglobin concentration after a fifteen minute exposure to 400 ppm Carbon Monoxide. At this exposure level, the average person will begin to experience the symptoms of Carbon Monoxide poisoning.

## ■ WEIGHT OF VARIOUS GASES COMPARED TO AIR

The following gases are lighter than air:

Acetylene	Ammonia
Carbon Monoxide	Ethylene
Hydrogen	Hydrogen Cyanide
Methane	

The following gases are heavier than air:

Argon	Butane
Carbon Dioxide	Chlorine
Ethane	Hexane
Hydrogen Chloride	Hydrogen Sulfide
Methyl Ethyl Ketone	Methyl Mercaptan
Nitrogen Dioxide	Nitrous Oxide
Oxygen	Phosphine
Sulfur Dioxide	Propane

## ■ INTRINSIC SAFETY

### What is intrinsic safety?

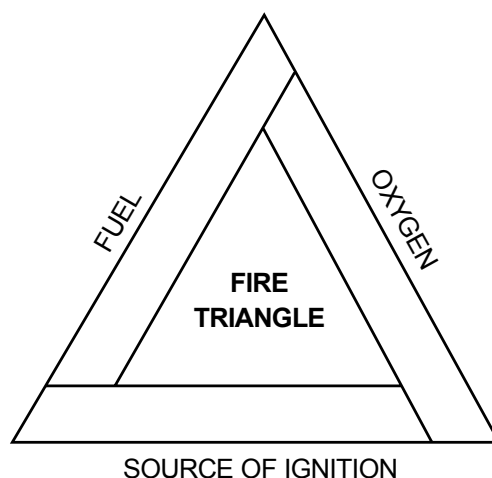
Intrinsic safety is a design technique applied to electrical equipment and wiring for hazardous locations. The technique is based on limiting energy, electrical and thermal, to a level below that required to ignite a specific hazardous atmospheric mixture.

### How is intrinsic safety defined?

Intrinsically safe equipment and wiring shall not be capable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a flammable or combustible atmospheric mixture in its most easily ignitable concentration.

### Who verifies intrinsic safety?

Equipment is tested and certified for intrinsic safety by independent third party agencies, such as Underwriters Laboratories (UL), Canadian Standards Association (CSA), Factory Mutual Research Corporation (FM) and the Mine Safety and Health Administration (MSHA). Independent testing ensures that your gas monitoring equipment is not only designed to be intrinsically safe, but meets all required standards for intrinsic safety.



Ref: R. Stahl – Intrinsic Safety Primer ©1988

**National Electrical Code Article 504-2**  
**Definition of a Intrinsically Safe Circuit © 1996**

A circuit in which any spark or thermal effect is incapable of causing ignition of a flammable or combustible material in air under prescribed test conditions.

## ■ LEL CORRELATION FACTORS

The following chart outlines LEL correlation factors for combustible gas sensors.

		CALIBRATION GAS							
		Acetone	Acetylene	Butane	Hexane	Hydrogen *	Methane *	Pentane *	Propane *
GAS BEING SAMPLED	Acetone	1.0	1.3	1.0	0.7	1.7	1.7	0.9	1.1
	Acetylene	0.8	1.0	0.7	0.6	1.3	1.3	0.7	0.8
	Ammonia	0.5	0.7	0.5	0.4	0.9	0.8	0.4	0.5
	Benzene	1.1	1.5	1.1	0.8	1.9	1.9	1.0	1.2
	Butane	1.0	1.4	1.0	0.8	1.8	1.7	0.9	1.1
	Ethane	0.8	1.0	0.8	0.6	1.3	1.3	0.7	0.8
	Ethanol	0.9	1.1	0.8	0.6	1.5	1.5	0.8	0.9
	Ethylene	0.8	1.1	0.8	0.6	1.4	1.3	0.7	0.9
	Hexane	1.4	1.8	1.3	1.0	2.4	2.3	1.2	1.4
	Hydrogen	0.6	0.8	0.6	0.4	1.0	1.0	0.5	0.6
	Isopropanol	1.2	1.5	1.1	0.9	2.0	1.9	1.0	1.2
	Methane	0.6	0.8	0.6	0.4	1.0	1.0	0.5	0.6
	Methanol	0.6	0.8	0.6	0.5	1.1	1.1	0.6	0.7
	Pentane	1.2	1.5	1.1	0.9	2.0	1.9	1.0	1.2
	Propane	1.0	1.2	0.9	0.7	1.6	1.3	0.8	1.0
	Styrene**	1.3	1.7	1.3	1.0	2.2	2.2	1.1	1.4
	Toluene	1.3	1.6	1.2	0.9	2.1	2.1	1.1	1.3
	Xylene	1.5	2.0	1.5	1.1	2.6	2.5	1.3	1.6
	JP-4							1.2	
	JP-5							0.9	
	JP-8							1.5	

Example:

The instrument has been calibrated on methane and is now reading 10% LEL in a pentane atmosphere. To find actual % LEL pentane, please multiply by the number found at the intersection of the methane column (calibration gas) and the pentane row (gas being sampled) ... in this case, 1.9. Therefore, the actual % LEL pentane is 19% (10 x 1.9).

\* Calibration gases available from Industrial Scientific.

\*\* Values shown are theoretical and have not been verified through calibration gas testing.



## ■ SENSOR CROSS INTERFERENCE TABLE

		SENSOR											
		Carbon Monoxide	Hydrogen Sulfide	Sulfur Dioxide	Nitrogen Dioxide	Chlorine	Chlorine Dioxide	Hydrogen Cyanide	Hydrogen Chloride	Phosphine	Nitric Oxide	Hydrogen	Ammonia
GAS	Carbon Monoxide	100	2	1	0	0	0	0	0	0	0	20	0
	Hydrogen Sulfide	10	100	1	-8	-3	-25	200	60	3	10	20	10
	Sulfur Dioxide	0	10	100	0	0	0	—	40	—	0	0	-40
	Nitrogen Dioxide	-20	-20	-100	100	12	—	-70	—	—	30	0	0
	Chlorine	-10	-20	-25	90	100	20	-20	6	-10	0	0	0
	Chlorine Dioxide	—	—	—	—	20	100	—	—	—	—	—	—
	Hydrogen Cyanide	15	10	50	1	0	0	100	35	1	0	30	5
	Hydrogen Chloride	3	0	0	0	2	0	0	100	0	15	0	0
	Phosphine	—	—	—	—	—	—	0	300	100	—	—	—
	Nitric Oxide	10	1	1	0	—	—	-5	45	—	100	30	50
	Hydrogen	60	0.05	0.5	0	0	0	0	0	0	0	100	0
	Ammonia	0	0	0	0	0	0	0	0	0	0	0	100

The table above reflects the percentage response provided by the sensor listed across the top of the chart when exposed to a known concentration of the target gas listed in the left hand column. Note: This table is given as a guide only and is subject to change.

— No data available

## ■ COMMON CHEMICAL NAMES AND SYMBOLS

Ammonia	NH <sub>3</sub>
Arsine	AsH <sub>3</sub>
Benzene	C <sub>6</sub> H <sub>6</sub>
Bromine	Br <sub>2</sub>
Carbon Dioxide	CO <sub>2</sub>
Carbon Monoxide	CO
Chlorine	Cl <sub>2</sub>
Chlorine Dioxide	ClO <sub>2</sub>
Ethylene Oxide	ETO
Fluorine	F <sub>2</sub>
Hydrogen	H <sub>2</sub>
Hydrogen Bromide	HBr
Hydrogen Chloride	HCl
Hydrogen Cyanide	HCN

Hydrogen Fluoride	HF
Hydrogen Sulfide	H <sub>2</sub> S
Methane	CH <sub>4</sub>
Nitric Acid	HNO <sub>3</sub>
Nitric Oxide	NO
Nitrogen	N <sub>2</sub>
Nitrogen Dioxide	NO <sub>2</sub>
Oxygen	O <sub>2</sub>
Ozone	O <sub>3</sub>
Phosgene	COCl <sub>2</sub>
Phosphine	PH <sub>3</sub>
Silane	SiH <sub>4</sub>
Sulfur Dioxide	SO <sub>2</sub>
Sulfuric Acid	H <sub>2</sub> SO <sub>4</sub>

## ■ HAZARDOUS GASES FOUND IN COMMON INDUSTRIAL ENVIRONMENTS

(All values listed are established by HSE unless otherwise noted.)

### Ammonia: $\text{NH}_3$

Colorless toxic gas with a pungent suffocating odor

PEL/TWA: 25.0 ppm      STEL: 35.0 ppm  
IDLH: 300.0 ppm      LEL: 15.0% of volume

- Fertilizer Plants
- Water and Wastewater Treatment Plants
- Refrigeration Facilities and Cold Storage
- Semiconductor Industry

### Carbon Dioxide: $\text{CO}_2$

Colorless, odorless gas

PEL/TWA: 5,000.0 ppm      STEL: 15,000.0 ppm  
IDLH: 40,000.0 ppm

- Breweries and Wineries
- Carbonated Beverage Bottling Plants
- Food Processing Plants
- Landfills

### Carbon Monoxide: $\text{CO}$

Colorless, odorless gas – most abundant toxic gas

PEL/TWA: 30.0 ppm      STEL: 200.0 ppm  
IDLH: 1,200.0 ppm      LEL: 12.5% of volume

- Fire Fighting
- Steel Mills
- Mining and Minerals
- Parking Garages

### Chlorine: $\text{Cl}_2$

Green-yellow gas with a pungent, irritating odor

PEL/TWA: 0.5 ppm      STEL: 0.5 ppm  
IDLH: 30.0 ppm

- Pulp and Paper Mills
- Water Treatment Plants
- Swimming Pools and Chlorination Plants
- Nuclear Reactors

### Chlorine Dioxide: $\text{ClO}_2$

Red-yellow or orange-green, irritating odor

PEL/TWA: 0.1 ppm      STEL: 0.3 ppm  
IDLH: 5.0 ppm

- Pulp and Paper Mills
- Wastewater Treatment Plants

### Hydrogen: $\text{H}_2$

Colorless, odorless gas

PEL/TWA: No limit set by OSHA      STEL: N/A  
IDLH: No limit set by NIOSH      LEL: 4% by volume

- Chemical Manufacturing
- HazMat Operations
- Power Generation

### Hydrogen Chloride: $\text{HCl}$

Colorless to slight yellow corrosive gas with a pungent, irritating odor

PEL/TWA: 1.0 ppm      STEL: 5.0  
LEL: 12.5% of volume      IDLH: 50.0 ppm

- Vinyl Production
- Cotton Production
- Petroleum and Gas Wells
- Steel Manufacturing

### Hydrogen Cyanide: $\text{HCN}$

Colorless toxic gas with a bitter, almond-like odor

PEL/TWA: N/A      STEL: 10.0 ppm  
IDLH: 50.0 ppm      LEL: 5.6% of volume

- Gold Plating Industries
- Precious Metal Mining and Recovery
- Nylon Manufacturing

### Hydrogen Sulfide; $\text{H}_2\text{S}$

Colorless toxic gas with a strong odor of rotten eggs

PEL/TWA: 5.0 ppm      STEL: 10.0 ppm  
IDLH: 100.0 ppm      LEL: 4.0% of volume

- Oil Fields and Refineries
- Mining and Metals Industries
- Paper Mills and Leather Tanneries
- Water Treatment and Sewer Maintenance

### Nitric Oxide: $\text{NO}$

Colorless toxic gas

PEL/TWA: 100.0 ppm      STEL: N/A  
IDLH: 100.0 ppm

- Diesel Emissions
- Underground Mining
- Agriculture – Silos
- Semiconductor Plants

### Nitrogen Dioxide: $\text{NO}_2$

Reddish-brown toxic gas with a pungent odor

PEL/TWA: 3.0 ppm      STEL: 5.0 ppm  
IDLH: 20.0 ppm

- Boilers and Furnaces
- Diesel Emissions
- Underground Mining
- Semiconductor Plants

### Ozone: $\text{O}_3$

Colorless, blue gas with a very pungent odor

PEL/TWA: N/A      STEL: 0.2 ppm  
IDLH: 5.0 ppm

- Wastewater Treatment Plants
- Power Generation
- Welding

### Phosphine: $\text{PH}_3$

Colorless gas, garlic-like odor

PEL/TWA: 0.1 ppm      STEL: 0.2 ppm  
IDLH: 5.0 ppm      LEL: 1.79% of volume

- Pesticides-Agricultural Fumigant
- Doping Agent

### Sulfur Dioxide: $\text{SO}_2$

Colorless toxic gas with a pungent odor

PEL/TWA: 2.0 ppm      STEL: 5.0 ppm  
IDLH: 100.0 ppm

- Pulp and Paper Mills
- Coal Fired Generation Stations
- Water Treatment
- Circuit Board (Etching) Industry

## INDUSTRY



# PHOTOIONIZATION DETECTOR (PID) REFERENCE CHART

## ■ VOLATILE ORGANIC COMPOUNDS DETECTED BY A PID<10.6 eV

### 10.6 eV lamp

Acetaldehyde  
(Acetic acid)  
Acetic anhydride  
Acetone  
Acrolein  
Acrylamide  
Allyl alcohol  
Allyl chloride  
Allyl glycidyl ether  
Allyl propyl disulfide  
Amino pyridine  
Amyl acetate  
Aniline  
Benzene  
Benzyl chloride  
Bromoform  
Butadiene  
Butoxyethanol  
Butyl acetate  
Butyl alcohol  
Butyl mercaptan  
Butylamine  
Butyl glycidyl ether  
Butyl toluene  
Camphor vapor  
Carbon disulfide  
Chloroacetaldehyde  
Chloroacetophenone  
Chlorobenzene  
Chloromethyl methyl ether  
Chloronitropropane  
Chloroprene  
Chrysene  
Cresol  
Crotonaldehyde  
Cumene  
Cyclohexane  
Cyclohexanol  
Cyclohexanone  
Cyclohexene  
Cyclopentadiene  
Di-ethylhexyl phthalate  
Diacetone alcohol  
Diazomethane  
Dibutylphthalate  
Dichlorobenzene  
Dichloro ethyl ether  
Dichloroethylene  
Dichlorvos  
Diesel  
Diethylamino ethanol  
Diethylamine  
Diglycidyl ether  
Diisobutyl ketone  
Diisopropylamine

Dimethylamine  
Dimethylaniline  
Dimethylformamide  
Dimethylhydrazine  
Dimethyloacetamide  
Dimethylphthalate  
Dinitrotoluene  
Dinitro cresol  
Dinitro aniline  
Dinitro benzene  
Dioxane  
Diphenyl  
Dipropylene glycol methyl ether  
(Epichlorohydrin)  
(Ethanol)  
Ethanolamine  
Ethoxyethyl acetate  
Ethyl acetate  
Ethyl acrylate  
Ethyl amyl ketone  
Ethyl benzene  
Ethyl bromide  
Ethyl butyl ketone  
Ethyl ether  
Ethyl mercaptan  
Ethyl silicate  
Ethylamine  
Ethylene dibromide  
Ethylenediamine  
Ethyleneimine  
Furfural  
Furfuryl alcohol  
Gasoline  
Glycidol  
Heptane  
Hexane  
Hexanone  
Hexone  
Hexylacetate  
Hydroquinone  
Isoamyl acetate  
Isobutyl acetate  
Isobutyl alcohol  
Isophorone  
Isopropyl acetate  
Isopropyl alcohol  
Isopropyl ether  
Isopropylamine  
Isopropyl glycidyl ether  
JP 4, 6, 8  
Ketene  
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Methyl acetylene  
Methyl acrylate  
Methyl amyl ketone

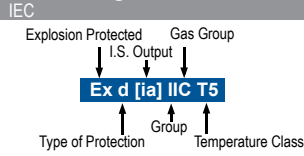
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Methylcyclohexane  
Methylcyclohexone  
Methylcyclohexanol  
Monomethylaniline  
Morpholine  
Naphthalene  
Naphthylamine  
Nitroaniline  
Nitrobenzene  
Nitromethane  
Nitrosodimethylamine  
Nitrotoluene  
Octane  
Pentaborane  
Pentane  
Pentanone  
Perchloroethylene  
Phenol  
Phenyl ether  
Phenylene diamine  
Phenylhydrazine  
Propyl acetate  
Propyl alcohol  
Propylene dichloride  
Propylene imine  
Propylene oxide  
Pyridine  
Quinone  
Stibine  
Stoddard solvent vapor  
Styrene  
Terphenyls  
Tetrachloroethylene  
Tetrachloronaphthelene  
Tetrahydrofuran  
Tetramethyl lead  
Toluene  
Toluidine  
Toner fluid vapor  
Trichloroethylene  
Triethylamine  
Turpentine vapor  
Vinyl chloride  
Vinyl toluene  
White spirit  
Xylene

### Not Detected by a PID

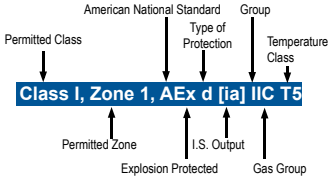
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Freons  
Hydrogen  
Hydrogen bromide  
Hydrogen chloride  
Hydrogen cyanide  
Hydrogen fluoride  
Methane  
Nitric acid  
Nitrogen  
Oxygen  
Ozone  
Sulfur dioxide  
Water

## GUIDE TO HAZARDOUS LOCATIONS

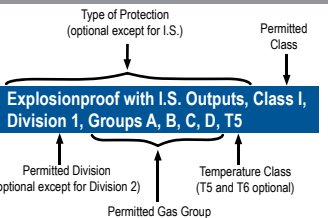
## Ex Marking



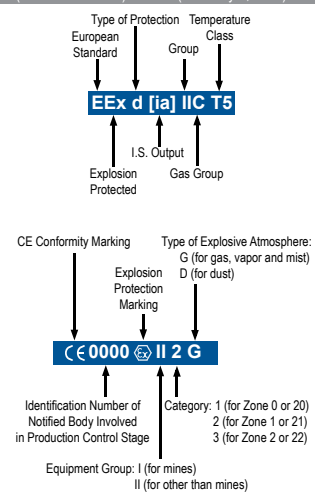
## U.S. NEC®505



## U.S. NEC®500



## EU (Directive 94/9/EC) – ATEX (from July 1, 2003)



## Acronyms

**ATEX** – Atmosphère Explosible  
**CENELEC** – European Committee for Electrotechnical Standardization  
**EU** – European Union  
**IEC** – International Electrotechnical Commission  
**I.S.** – Intrinsically Safe  
**MSHA** – Mine Safety and Health Administration  
**NEC®** – National Electric Code®

## Types of Protection

Type of Protection	Code	Permitted Use	Standard	Protection Principle
Increased Safety	AEx e	Class I, Zone 1	FM 3600 (ISA 12.16.01*)	No arcs, sparks or hot surfaces
	EEx e	Zone 1	EN 50 019 (until July 2006) or EN 60079-7	
	Ex e	Zone 1	IEC 60079-7	
Non-Incendive (NI)	(NI)	Class I, Div 2	FM 3611	Contain the explosion and extinguish the flame
Non-Sparking	AEx nA	Class I, Zone 2	FM 3600 (ISA 12.12.02)	
	EEx nA	Zone 2	EN 50 021	
	Ex nA	Zone 2	IEC 60079-15	
Explosionproof (XP)	(XP)	Class I, Div 1	FM 3615	Limit energy of sparks and surface temperature
Flameproof	AEx d	Class I, Zone 1	FM 3600 (ISA 12.22.01*)	
	EEx d	Zone 1	EN 50 018	
	Ex d	Zone 1	IEC 60079-1	
Powder-Filled	AEx q	Class I, Zone 1	FM 3600 (ISA 12.25.01*)	Keep flammable gas out
	EEx q	Zone 1	EN 50 017	
	Ex q	Zone 1	IEC 60079-5	
Enclosed Break	AEx nC	Class I, Zone 2	FM 3600 (ISA 12.12.02)	
	EEx nC	Zone 2	EN 50 021	
	Ex nC	Zone 2	IEC 60079-15	
Intrinsic Safety (IS)	(IS)	Class I, Div 1	FM 3610†	
	AEx ia	Class I, Zone 0	FM 3610†	
	AEx ib	Class I, Zone 1	FM 3610†	
	EEx ia	Zone 0	EN 50 020/39	
	EEx ib	Zone 1	EN 50 020/39	
	Ex ia	Zone 0	IEC 60079-11	
	Ex ib	Zone 1	IEC 60079-11	
Limited Energy	AEx nA	Class I, Zone 2	FM 3600 (ISA 12.12.02)	
	EEx nA	Zone 2	EN 50 021	
	Ex nA	Zone 2	IEC 60079-15	
	EEx nL	Zone 2	EN 50 021	
	Ex nL	Zone 2	IEC 60079-15	
Pressurized	Type X	Class I, Div 1	FM 3620	
	Type Y	Class I, Div 1	FM 3620	
	Type Z	Class I, Div 2	FM 3620	
	EEx p	Zone 1	EN 50 016	
	EEx nP	Zone 2	EN 50 021	
	Ex px	Zone 1	IEC 60079-2	
	Ex py	Zone 1	IEC 60079-2	
	Ex pz	Zone 2	IEC 60079-2	
	Ex nZ	Zone 2	IEC 60079-15	
	AEx nR	Class I, Zone 2	FM 3600 (ISA 12.12.02)	
Restricted Breathing	EEx nR	Zone 2	EN 50 021	
	Ex nR	Zone 2	IEC 60079-15	
Encapsulation	AEx m	Class I, Zone 1	FM 3600 (ISA 12.23.01*)	
	EEx m	Zone 1	EN 50 028	
	Ex m	Zone 1	IEC 60079-18	
	AEx o	Class I, Zone 1	FM 3600 (ISA 12.16.01*)	
Oil Immersion	EEx o	Zone 1	EN 50 015	
	Ex o	Zone 1	IEC 60079-6	

\*Also shall comply with ISA 12.00.01 † Based on ISA 12.02.01

## Classification of Gases and Vapours into EXPLOSION GROUPS and TEMPERATURE CLASSES

	T1	T2	T3	T4	T5
I	Methane				
IIA	Acetone Ethane Ammonia Benzol (pure) Acetic acid Methane (natural gas) Methanol Propane Toluene	Ethanol i-Amyl acetate n-Butane n-Butyl alcohol	Benzene Diesel fuel Aircraft fuel Heating oil n-Hexane	Acetaldehyde Ethylether	
IIB	Coal gas (lighting gas)	Ethylene			
IIC	Hydrogen	Acetylene			Carbon disulphide

Ref. • FM Approvals – Expert Guide to Hazardous Locations © 2004 FM Global Technologies LLC  
 • R. STAHL Inc. – Explosive Facts

## Area Classification

	Flammable Material Present Continuously	Flammable Material Present Intermittently	Flammable Material Present Abnormally
IEC/EU	Zone 0 (Zone 20 - dust)	Zone 1 (Zone 21 - dust)	Zone 2 (Zone 22 - dust)
U.S. NEC®505	Zone 0	Zone 1	Zone 2
NEC®500	Division 1	Division 1	Division 2

IEC classification per IEC 60079-10  
 EU classification per EN 60 079-10  
 U.S. classification per ANSI/NFPA 70 National Electric Code (NEC) Article 500 or Article 505

## Explosion Groups

Typical Gas/Dust/Fiber	U.S. (NEC®505) IEC EU	U.S. (NEC®500)
Acetylene	Group IIC	Class I/ Group A
Hydrogen	(Group IIB + H <sub>2</sub> )	Class I/ Group B
Ethylene	Group IIB	Class I/ Group C
Propane	Group IIA	Class I/ Group D
Methane	Group I*	Mining*
Metal Dust	None	Class II/ Group E
Coal Dust	None	Class II/ Group F
Grain Dust	None	Class II/ Group G
Fibers	None	Class III

\*Not within scope of NEC. Under jurisdiction of MSHA.

## Temperature Class

Maximum Surface Temperature	U.S. (NEC®505) IEC EU	U.S. (NEC®500)
450° C	T1	T1
300° C	T2	T2
280° C		T2A
260° C		T2B
230° C		T2C
215° C		T2D
200° C	T3	T3
180° C		T3A
165° C		T3B
160° C		T3C
135° C	T4	T4
120° C		T4A
100° C	T5	T5
85° C	T6	T6

## Ingress Protection (IP) Codes

First Number	Second Number
Protection Against Solid Bodies	Protection Against Liquid
0 No protection	No protection
1 Objects greater than 50 mm	Vertically dripping water
2 Objects greater than 12 mm	75° to 90° dripping water
3 Objects greater than 2.5 mm	Sprayed water
4 Objects greater than 1 mm	Splashed water
5 Dust-protected	Water jets
6 Dust-tight	Heavy seas
7	Effects of immersion
8	Indefinite immersion

## Approximate U.S. Enclosure Type Equivalent to IPXX

Type	IP	Type	IP	Type	IP
1	10	3S	54	6 and 6P	67
2	11	4 and 4X	55	12 and 12K	52
3	54	5	52	13	54
3R	14				

## ■ CUSTOMER SERVICE

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