



Flammable and Toxic Gas Detection

—Your partner in safety

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Company Profile

Content

Focused Photonic Inc. (also known as FPI) measures gas, air, dust and water, is one of the world's leading manufacturers of analytical instrumentation for industrial process and environmental monitoring.

In late 1990's, FPI was initially registered in California, USA for research and development of Tunable Diode Laser (TDL) technology and utilization. The establishment of FPI in 2002 was shortly followed by its successful expansion to steel Industry where the cross-stack TDL of FPI built an exceptional reputation for the industries as benchmark process monitor. The entry into environmental monitoring was soon driven by customer needs. Leveraging patented technologies of how-wet UV spectrometer combined with well established TDL, continuous emission monitoring system (CEMS) was re-defined by FPI resulted in sample conditioning minimized, reliability reinforced and cost reduced.

FPI provides one-stop monitoring of process, emission, ambient and water. By combining global expertise with local support, FPI delivers only the cutting-edge technologies of analytical instrumentation with an easily accessible networks worldwide. FPI continues to improve our local presence through subsidiaries and distributors aiming to provide optimal services to industries and municipalities.

Corporate Name	Focused Photonics Inc.
Establishment	January, 2002
Capital	445,000,000 CNY (approx. 73,000,000 USD) A ChiNext company of Shenzhen Stock Exchange
Head Office	760 Bin'an Road, Bingjiang District, Hangzhou 310052, China
Numbers of Employees	2,334 (As of December 5, 2014)
Business Description	<ol style="list-style-type: none"> 1. Manufacturing and sales of industrial process instruments 2. Manufacturing and sales of environmental monitoring instruments 3. Manufacturing and sales of laboratory and scientific instruments 4. Manufacturing and sales of metal analysis instruments 5. Manufacturing and sales of hydrological instruments 6. Manufacturing and sales of other measuring and analytical instruments 7. Contracts for instrumentation services and operation 8. Contracts for instrumentation work, electrical work, telecommunication work, and other related work 9. All business accompanying the preceding items

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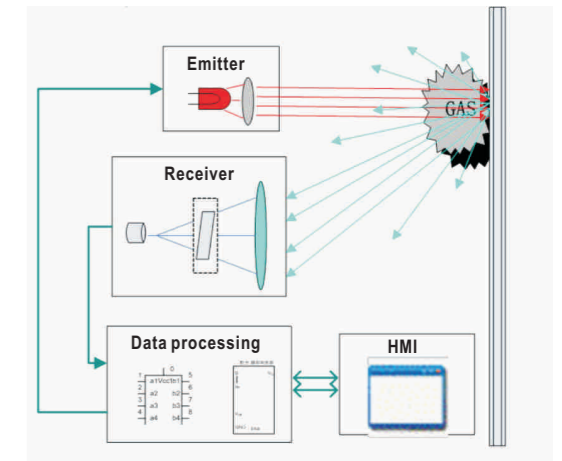
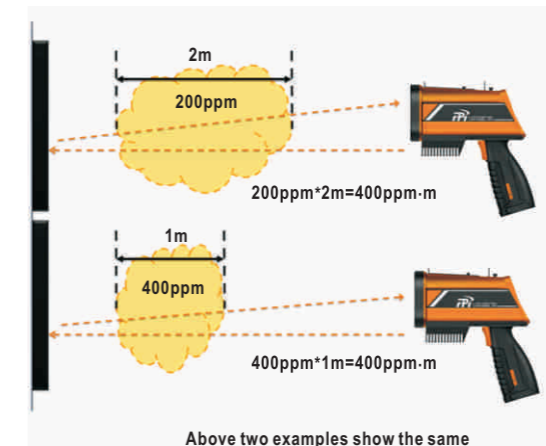
Remote Laser Gas Detector

Backed by decade expertise and research on utilization of TDL (Tunable Diode Laser) technology, the latest RLGD-100 is developed on a well proven technology platform. The RLGD-100, is a portable detector that allows high-sensitivity real-time detection of methane from a distance. Methane leaks can be quickly monitored by pointing the laser beam towards the suspected leak, or along the survey line. It enables easy access to hard-to-reach locations, and provides protection for operator and industrial applications against a wide range of potential leak sources.



Principle

RLGD-100 employs Tunable Diode Laser (TDL) technology, where laser light beam is projected over a distance onto a reflective target, a fraction of backscatter is reflected and received by the transceiver. Methane in the laser path creates a distinct signal in the returned light, which will be collected and focused onto a detector and converted to an electronic signal. Average methane density between the detector and target are displayed in ppm.m.



Key Features

- ✔ Locate methane up to 30 metres
- ✔ High sensitivity and ultra-fast response
- ✔ Response to methane only, no interference
- ✔ Self-check and automatic calibration before start-up
- ✔ User-friendly LCD display
- ✔ Wireless data logging
- ✔ Visual and audible alarms
- ✔ Easy to operate and maintenance free
- ✔ Long operation time

Applications

- ✔ Pipeline survey
- ✔ Industrial and commercial property surveys
- ✔ Natural gas plants
- ✔ LNG transportation inspection
- ✔ Animal production
- ✔ Landfill gas monitoring

TECHNICAL DATA	
Target gas	Methane (CH ₄) or methane contained gases
Detection distance	(0.5~30)m
Measuring range	(0~50000)ppm·m
Measuring accuracy	± 10%
Sensitivity	5 ppm·m
Response time	0.1s
Operating time	8h
Explosion proof	Ex ib II A T3 Gb, IP54
Operation temperature	(-20~+50)°C
Operation humidity	(30~95)%RH
Power supply	6.4V DC, 3000mA
Size	262×110×270mm (L×W×H)
Weight	1.5kg

Fixed Gas Detectors

FPI offers a rich gas detector portfolio that developed on electrochemical, catalytic combustion, photo ionization and infrared technologies. The GT series gas detectors are used to monitor flammable and toxic gases, oxygen, carbon dioxide, VOCs and other inorganic gases. The gas detectors can make a valuable contribution to the safety of various industries. They can be used to trigger alarms if a specified concentration of the gas or vapor is exceeded. This can provide an early warning of a problem and help to ensure people's safety.

Key Features

- ✔ Integrated design and adaptable for harsh conditions
- ✔ Fast and reliable detection for several gases down to ppm, %LEL level
- ✔ Easy handling and programmable with remote controller or built-in keys
- ✔ Standard 4-20mA, RS 485, HART output
- ✔ Visual and audible alarms
- ✔ One-key calibration



Application Areas

Agriculture

- ✔ Large-scale cultivating workshop
- ✔ CO2 detection in greenhouse
- ✔ Biogas digester

Petroleum and Petrochemical

- ✔ Oilfield operation district
- ✔ Well drilling platform
- ✔ Natural gas purification
- ✔ Oil&gas transportation & distribution
- ✔ Refinery production process
- ✔ Refined oil storage

Metallurgy

- ✔ Coal gas detection
- ✔ Coke making, iron making and steel making
- ✔ Hot rolling, cold rolling and acid cleaning
- ✔ Confined space

Pipeline

- ✔ Leak point in pipeline
- ✔ Regulator station, pressure regulating box, gate well
- ✔ Boiler gas
- ✔ Hotel kitchen
- ✔ Sewage treatment

Type of Sensor

There are a number of different types of sensors used for gas detection. The choice of sensor depends on:

- the gas to be detected;
- the expected range of concentration;
- whether the detector is fixed or portable;
- whether the detector is point or open path;
- the presence of other gases that may affect readings or damage the sensor.

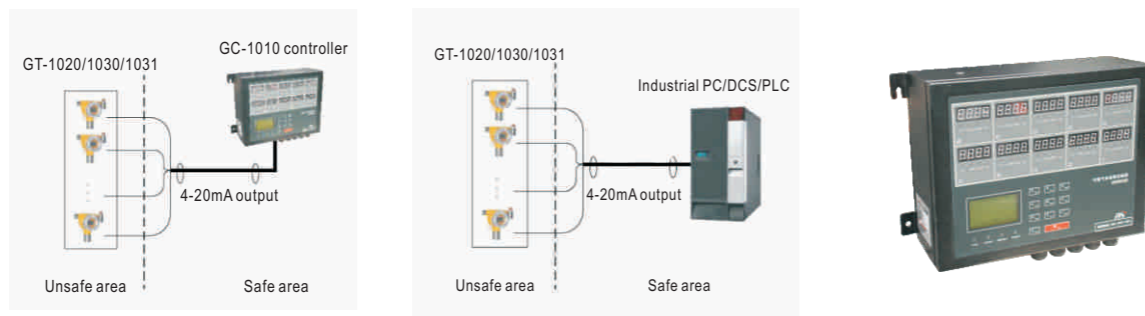
Sensor Principle	
Catalytic combustion	The operating principle is that heat is generated during the catalyzed reaction between the gas and oxygen in air. The resulting rise in temperature of the catalyst bead causes a change in electrical resistance of a platinum wire embedded in the bead, also acting as the heater, which is a measure of gas concentration.
	Combustible gas detection, 0~100%LEL
	Product model: GT-1030/1031-TF, and GT-1030/1031-TS, etc.
Electrochemical	The operating principle is that the gas diffuses through a permeable electrode to its interface with the cell's electrolyte. Here electrochemical reactions take place which alter the electrical characteristics of this electrode. Measurement of these electrical parameters with respect to other electrodes within the cell give a signal proportional to the gas concentration.
	Oxygen and toxic gas detection, in ppm level
	Product model: GT-1121, GT-1020-DF, and GT-1020-TF, etc.
Photo Ionization	The operating principle is that an ionized gas will conduct an electrical current in proportion to the number of ions present. Hydrocarbon gases and vapors are easily ionized and the current flow produced is easily measured.
	VOCs and some inorganic gas detection, in ppm level
	Product model: GT-1040.
Infrared	The operating principle is based on the absorption of infrared light by certain molecules which are detected by a decrease in transmitted radiation over a beam path.
	Detect CO ₂ and methane, and halohydrocarbon gas such as chloromethane
	Product model: GT-1020-IR, and GT-1030/1031-IR.

Detector accessories

■ Detector Controller

The detector controller is used to supply power and process data for the gas detector. It is based on two-wire and three-wire systems.

Product model: GC-1010-AA/AE, GC-1010-CA, and GC-1020-AA/AE.



Schematic Diagram of Networking
(Networking based on wiring system)

Note: The whole system consists of a detector and a controller. The detector is responsible for sensing toxic and harmful gas in the environment, and sending these signals to the controller or industrial computer in the safety zone through (4~20)mA output.

■ Explosion-proof wiring box

The explosion-proof box is used for all kinds of electrical connection industrial site with explosion proof requirement. The box is also corrosion prevented and easy to use.

TECHNICAL DATA	
Explosion proof	Exd II B T6, Exd II C T6
Protection class	IP65/ IP66
Rated current	10/20/32/63/100A
Electrical interface	G1/2, G3/4, G1



■ RC-1000

Compared with traditional potentiometer, magnetic bar and one-way infrared remote control, RC-1000 reveals its advantage in remotely acquiring data and setting parameters. With the ability to restore setting parameters, one RC-1000 can be used for parameter setting and calibration for several detectors.

TECHNICAL DATA	
LCD	128*128 STN LCD
Number of button	8
Battery	Two AAA batteries
Explosion-proof type	Intrinsically safe Exia IIC T4
Power consumption	<100mW
Operating humidity	(10-95)% RH (non-condensing)
Cone angle of infrared receiver	50°
Cone angle of infrared emitter	50°
Dimension	127.7mm×48mm×26mm (H × W × T)



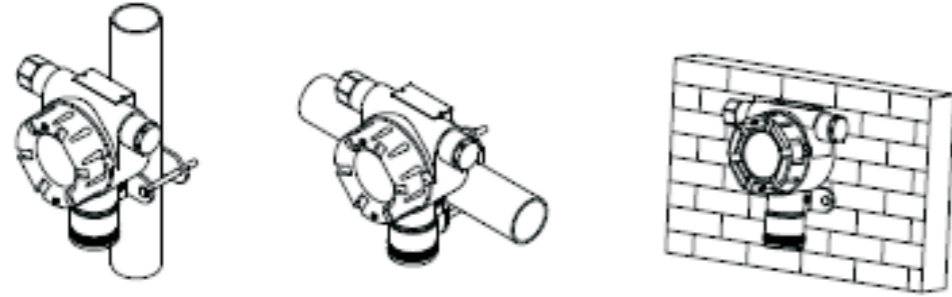
■ SG-100

SG-100 can be integratively installed on GT detector to give audible alarms and emits red flash light when gas concentration detected exceeds. The locknut design ensures alarm can be observed at any direction. It is full compatible with all other GT series detectors except two-wire ones.

TECHNICAL DATA	
Operating voltage	(15~30) V DC
Operating current	<30mA
Alarm sound	>85dB
Operating temperature	(-40~70)°C
Alarm frequency	0.3Hz/3Hz
Explosion-proof grade	Exdib IIC T6
Interface size	M20X1.5
Dimension	43mm×83mm



Installation

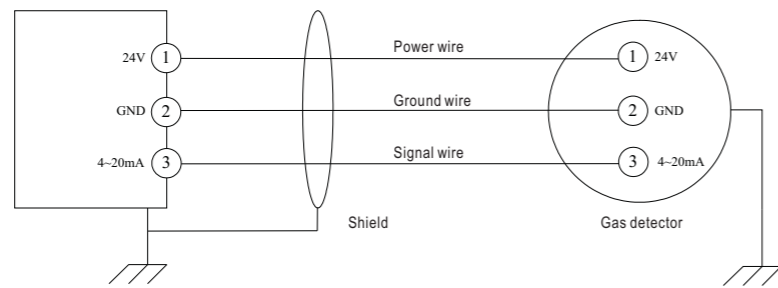


The detector can be mounted on a vertical/horizontal tube or wall.

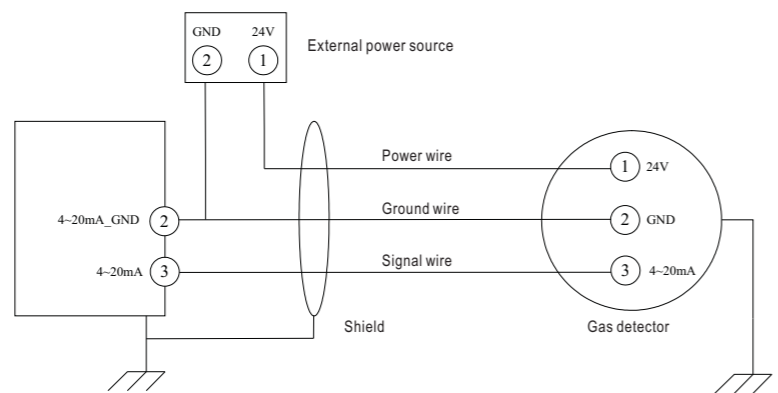
- Leak source and leak accumulation should be identified and used in selecting the optimum detector mounting location within the area.
- Identify air current, wind patterns within the protected areas when choosing installation point.
- Installation height is determined by density of measured gas.

Note: Locations near excessive heat or vibration sources should be avoided if possible.

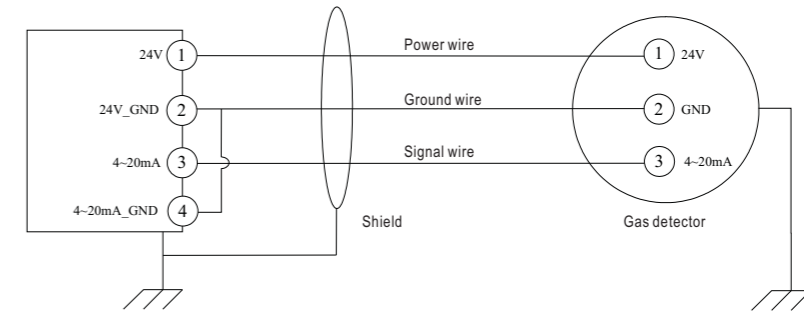
Wiring



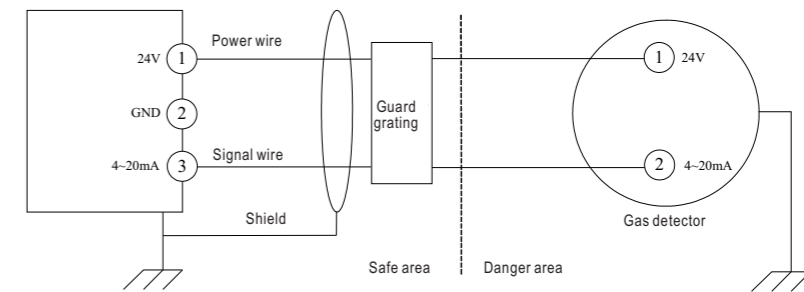
Wired to controller/PLC/DCS
(with 24V DC power supply)



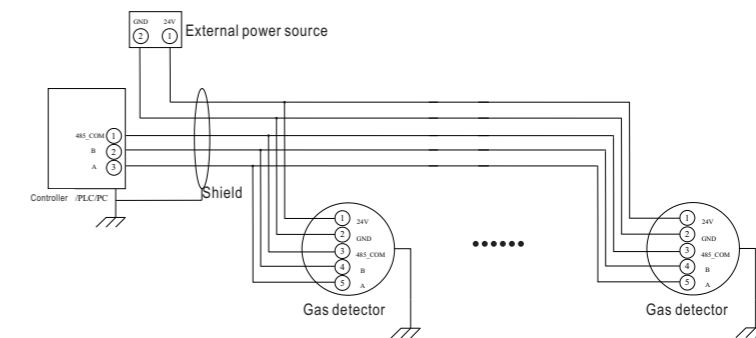
Wired to controller/PLC/DCS
(without 24V DC power supply)



Wired to controller/PLC/DCS
(with power supply and isolated sourcing output)







Wiring of intrinsically safe two-wire detector



RS 485 wiring

Product model		GT-1121	GT-1020-DF	GT-1020-TF	GT-1040
Key properties		Two-wire, intrinsically safe, LCD	Two-wire, explosion proof, LCD	Three-wire, explosion proof, LCD	Three-wire, explosion proof, LCD
Measuring principle		Electrochemical	Electrochemical	Electrochemical	Photoionization
Product picture					
Measuring gas		CO, H ₂ S, O ₂ etc.	CO, H ₂ S, O ₂ etc.	CO, H ₂ S, O ₂ etc.	More than 300 VOC gases including benzene and toluene
Response time (T90)		≤ 15s (CO, H ₂ S etc.) ≤ 10s (O ₂ etc.)	≤ 15s (CO, H ₂ S etc.) ≤ 10s (O ₂ etc.)	≤ 15s (CO, H ₂ S etc.) ≤ 10s (O ₂ etc.)	≤ 10s
Temperature		(-20~50)°C, up to (-40~70)°C under short-time operation condition	(-20~50)°C, up to (-40~70)°C under short-time operation condition	(-20~50)°C, up to (-40~70)°C under short-time operation condition	(-40~60)°C
Display mode		LCD	LCD	LCD, with backlight	LCD, with backlight
Operating mode		Two-way infrared remote control with display	Two-way infrared remote control with display	Two-way infrared remote control with display	Two-way infrared remote control with display
Signal output	Analog output	(4~20)mA	(4~20)mA	(4~20)mA	(4~20)mA
	Digital output	None	None	2-channel relay	2-channel relay
Electrical properties	Electrical properties	G1/2" or NPT3/4", etc.	G1/2" or NPT3/4", etc.	G1/2" or NPT3/4", etc.	G1/2" or NPT3/4", etc.
	Maximum power consumption	<0.5W	<0.5W	<2.5W	<2.5W
	Power supply	(10~30) VDC	(10~30) VDC	(10~30) VDC	(10~30) VDC
Certification	Protection class	IP66	IP66	IP66	IP66
	Explosion proof grade	Exia II C T6	Exd II C T6	Exd II C T6	Exd II C T6
Weight		About 1.5KG	About 1.5KG	About 1.5KG	About 1.5KG

Product model		GT-1020/1030/1031-IR	GT-1030/1031-TF	GT-1030/1031-TS	GT-2121
Key properties		Three-wire, explosion proof, LCD	Three-wire, explosion proof, LCD	Three-wire, explosion proof, LCD	Single gas, diffusion
Measuring principle		Infrared	Catalytic combustion	Catalytic combustion	Electrochemical
Product picture					
Measuring gas		Combustible hydrocarbon gas including CO ₂ and methane	Combustible gas	Combustible gas	CO, H ₂ S, O ₂ etc.
Response time (T90)		≤ 15s	≤ 15s	≤ 30s	≤ 15s
Temperature		(-40~70)°C	(-40~70)°C	(-40~70)°C	(-20~50)°C (10~95)%RH
Display mode		LCD, with backlight	LCD, with backlight	LCD	LCD, with backlight
Operating mode		Two-way infrared remote control with display	Two-way infrared remote control with display	Infrared touch	Diffusion type sampling
Signal output	Analog output	(4~20)mA	(4~20)mA	(4~20)mA	
	Digital output	2-channel relay	2-channel relay	2-channel relay	
Electrical properties	Electrical properties	G1/2" or NPT3/4", etc.	G1/2" or NPT3/4", etc.	G1/2" or NPT3/4", etc.	3V lithium battery, life time around 5500 hours
	Maximum power consumption	<3.5W	<3.5W	<3.5W	
	Power supply	(10~30) VDC	(10~30) VDC	(10~30) VDC	
Certification	Protection class	IP66	IP66	IP66	Ip66/IP67
	Explosion proof grade	Exd II C T6	Exd II C T6	Exd II C T6	Exia II C T4
Weight		About 1.5KG	About 1.5KG	About 1.5KG	About 100g

Product model	GC-1010-AA/AE	GC-1010-CA	GC-1020-AA/AE
Key properties	10-channel, integrated, RS485 / Ethernet	2-channel, integrated, RS485	10-channel, integrated, RS485 / Ethernet
Product picture			
Material	Carbon steel	Carbon steel	Carbon steel
Temperature / humidity	(-10~50)°C (10~90)%RH	(-10~50)°C (10~90)%RH	(-10~50)°C (10~90)%RH
Alarm mode	Audible alarm, can be connected to audible and visual alarm	Audible alarm, can be connected to audible and visual alarm	Audible and visual alarming
Signal input	10-channel (4-20)mA	10-channel (4-20)mA	32-channel / 64-channel bus (compatible with 2-channel (4-20)mA)
Signal output	23-channel relay (2 for each channel; system-level: alarm, combined alarm); RS485 or Ethernet (optional)	7-channel relay (2 for each channel, system-level: I alarm and II alarm); 2-circuit (4-20)mA or RS485 (optional)	4-channel relay (Level I and II alarm, fault, backup); RS485, Ethernet interface, GPRS module (optional)
Power supply	220V AC±20%, 50HZ (with battery: 18V/7AH)	220V AC±20%, 50HZ (optional with battery): 18V/3.2AH)	20V AC±20%, 50HZ
Power consumption	<60W	<20W	<35W
Display mode	System-level 204*128 lattice, with backlight LCD, 10 groups of channel-level high-brightness Nixie tubes	System-level 192*64 lattice, with backlight LCD, 2 groups of channel-level high-brightness Nixie tubes	7" true color screen, touch screen operation

Gas Type		Gas Detector								
Measured Gas	Measurement Range	Electrochemical, two-wire		EC, three-wire	Photoionization, three-wire		Infrared, three-wire	Catalytic Combustion, three-wire		Single gas diffusion
		GT-1121	GT-1020-DF	GT-1020-TF	GT-1040	GT-1020-IR	GT-1030/1031-IR	GT-1030/1031-TF	GT-1030/1031-TS	GT-2121
Flammable Gas	0-100LEL%						●	●	●	
CO	0-50/100/200/500/1000/2000ppm	●	●	●						●
H ₂ S	0-50/100/200ppm	●	●	●						●
O ₂	0-25%/30%vol	●	●	●						●
Cl ₂	0-5/10/20ppm	●	●	●						
NH ₃	0-10/20/50/100ppm	●	●	●						
H ₂	0-100/200/500/1000/2000ppm	●	●	●						
NO	0-20/50/100ppm	●	●	●						
NO ₂	0-5/10/20ppm	●	●	●						
HCN	0-10/20/30ppm	●	●	●						
SO ₂	0-5/10/20/50/100/200ppm	●	●	●						
HCl	0-10/20/30ppm	●	●	●						
CH ₂ CHCl	0-100ppm	●	●	●						
C ₂ H ₄ O	0-10/20/50/100ppm	●	●	●						
CHOOH	0-100ppm	●	●	●						
CH ₂ CHCN	0-100ppm	●	●	●						
CH ₃ OH	0-100ppm	●	●	●						
HF	0-5/10ppm	●	●	●						
SiH ₄	0-5/10/20/50ppm	●	●	●						
AsH ₃	0-1ppm	●	●	●	●					
COCl ₂	0-1ppm	●	●	●						
CH ₃ CHCHCH ₃	0-100ppm				●					
C ₄ H ₆	0-100ppm				●					
CH ₃ COOCHCH ₂	0-100ppm				●					
VOC	0-50/100/1000/5000ppm				●					
CO ₂	0-2000/5000ppm, 0-5%/100%VOL					●				