

CH₄ C₂H₂ C₂H₄

C₃H₈ EtO CO CO₂

H₂ H₂S HFC NH₃

NO NO₂ O₂ O₃ SF₆

SO₂ VOC

E2600 Family Gas Detectors

Characteristics of Evikon gas detectors and transmitters

E2608  Dimensions: H82 × W85 × D55 mm Digital interface: RS485 Communication protocol: Modbus RTU Detected gases: CH ₄ , C ₂ H ₂ , C ₂ H ₄ , C ₂ H ₄ O, Cl ₂ , CO, CO ₂ , H ₂ , H ₂ S, NH ₃ , NO, NO ₂ , O ₂ , O ₃ , SO ₂ , SF ₆ , VOC, halocarbon refrigerants	E2610  Dimensions: H85 × W85 × D36 mm Digital interface: UART Detected gases: combustible gases, VOC, CO, NH ₃	E2611  Dimensions: H85 × W85 × D37 mm Digital interface: RS485 Communication protocol: Modbus RTU Detected gases: CH ₄ -C ₄ H ₁₀ , C ₂ H ₂ , H ₂ , NH ₃ , VOC, halocarbon refrigerants
E2618  Dimensions: H82 × W80 × D55 mm Digital interface: RS485 Communication protocol: Modbus RTU Detected gases: CH ₄ , C ₂ H ₂ , C ₂ H ₄ , C ₂ H ₄ O, Cl ₂ , CO, CO ₂ , H ₂ , H ₂ S, NH ₃ , NO, NO ₂ , O ₂ , O ₃ , SO ₂ , SF ₆ , VOC, halocarbon refrigerants	E2630  Dimensions: H90 × W145 × D55 mm Digital interface: UART Detected gases: combustible gases, NH ₃ , NO ₂ , CO, VOC	E2632  Dimensions: H121 × W211 × D55 mm Digital interface: UART Detected gases: combustible gases, NH ₃ , NO ₂ , CO, VOC Simultaneous detection of two gases
E2638  Dimensions: H90 × W145 × D55 mm Digital interface: RS485 Communication protocol: Modbus RTU Detected gases: CH ₄ , C ₂ H ₂ , C ₂ H ₄ , C ₂ H ₄ O, Cl ₂ , CO, CO ₂ , H ₂ , H ₂ S, NH ₃ , NO, NO ₂ , O ₂ , O ₃ , SO ₂ , SF ₆ , VOC, halocarbon refrigerants	E2658  Dimensions: H90 × W145 × D55 mm Digital interface: RS485 Communication protocol: Modbus RTU Detected gases: CH ₄ , C ₂ H ₂ , C ₂ H ₄ , C ₂ H ₄ O, Cl ₂ , CO, CO ₂ , H ₂ , H ₂ S, NH ₃ , NO, NO ₂ , O ₂ , O ₃ , SO ₂ , SF ₆ , VOC, halocarbon refrigerants Flameproof	E2660 and E2660R  Dimensions: H90 × W145 × D55 mm Digital interface: RS485 Communication protocol: Modbus RTU Detected gases: CH ₄ , C ₂ H ₂ , C ₂ H ₄ , C ₂ H ₄ O, Cl ₂ , CO, CO ₂ , H ₂ , H ₂ S, NH ₃ , NO, NO ₂ , O ₂ , O ₃ , SO ₂ , SF ₆ , VOC, halocarbon refrigerants Simultaneous detection of two gases

	E2608	E2610	E2611	E2618	E2630	E2632	E2638	E2658	E2660	E2660R
Analog outputs	●	—	●	●	—	—	●	●	●	●
Relay outputs	●	●	●	—	●	●	●	●	—	●
Acoustic alarm	—	●	●	—	●	●	●	—	—	—
Visual alarm	—	●	●	—	●	●	●	—	—	—
Enclosure: protection	IP65	IP20	IP20	IP65	IP65	IP65	IP65	IP66	IP65	IP65
Enclosure: material	ABS	ABS	ABS	ABS	ABS	ABS	ABS	AI	ABS	ABS
Duct mount version	●	—	—	●	—	—	—	—	—	—
Remote probe	●	—	—	●	—	●	●	—	●	●
Power supply 90...230	●	●	●	—	●	—	●	—	—	●
Detection of two gases	—	—	—	—	—	●	—	—	●	●
Suitable for ATEX 2 and 22	—	—	—	—	—	—	—	●	—	—
LCD monitor	—	—	—	●	—	—	●	—	—	—
PluraSens® platform	●	—	●	●	—	—	●	●	●	●

● – YES — – NO ● – OPTION

PluraSens® Platform



- ◆ Two independent user configurable analog outputs 0-10 V / 4-20 mA
- ◆ RS485 Modbus RTU interface for setup and Fieldbus networking
- ◆ Digital I2C sensor interface for high accuracy and stability
- ◆ Two configurable relays with closing contact 5 A, 250 VAC (optionally)
- ◆ 24 VDC or VAC power supply, optional internal 230 VAC module

Acetylene detection



Acetylene is colorless combustible gas slightly lighter than air.

It results from the interaction of calcium carbide with water. In industrial production, acetylene is mainly manufactured by the pyrolysis of light hydrocarbons.

Acetylene is widely used in metal welding and cutting. Leaks of acetylene should be carefully monitored, as it is highly explosive material.

Typical applications

- Metal welding and cutting
- Cylinder storage rooms
- Industry
- Laboratories, research environment



Sensors:

- Metal oxide semiconductor

Chemical formula		HC≡CH
Molar weight		26
Relative gas density (to air)		0.90
Conversion (at 25°C and 1 atm)		1 ppm = 1.06 mg/m ³
Boiling point		-84 °C
Low explosive limit (LEL), % vol in air		2.5
Upper explosive limit (UEL), % vol in air		100
Odour		Odourless or with a faint ethereal smell if pure. Commercial grade may have garlic-like smell due to impurities.
Hazards		Highly flammable. Gas/air mixtures are explosive. Forms explosive acetylide compounds with copper, mercury, silver & brasses (containing more than 66% copper). Asphyxiant. Non-toxic, but, when generated from calcium carbide, it can contain toxic impurities such as traces of phosphine and arsine.
Exposure limits (NIOSH)	REL C	2662 mg/m ³ /2500 ppm

Suitable E2600 series devices: E2608-LEL, E2610-LEL, E2611-LEL, E2618-LEL, E2630-LEL, E2638-LEL, E2658-LEL

Ammonia detection



Colorless gas, highly soluble in water, with characteristic pungent smell.

Ammonia is a large-scale product of chemical industry, widely used as a raw material for production of fertilizers and explosives, as a refrigerant (R717), as a cleaning and antimicrobial agent. It is also produced naturally from decomposition of organic matter, including plants and animals.

Ammonia is a highly hazardous toxic and corrosive. Ammonia emissions from animal waste in intensive livestock and poultry farms may affect animal health and productivity.

As ammonia is lighter than air and tends to rise up, NH_3 detectors should be mounted near the ceiling in proximity to potential leak sources, or located in breathing area.

Recommended coverage area for each NH_3 detector is 80...120 m² and corresponding coverage radius 5...6 m.

Typical applications

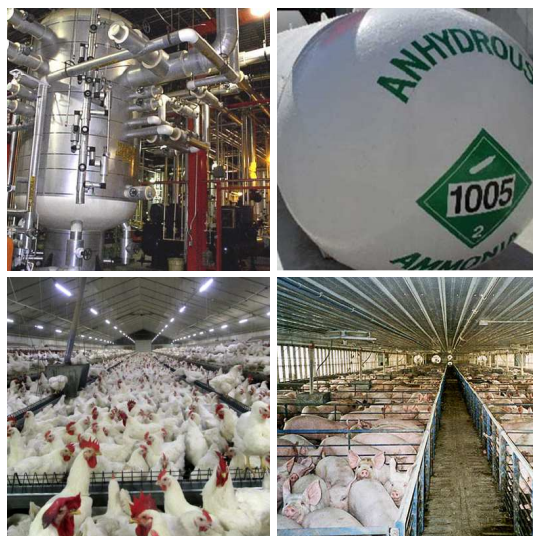
- Large industrial refrigeration systems
- Animal agriculture (livestock and poultry)
- Fertilizer production and storage
- Laboratories, research environment

Sensors:

- Metal oxide semiconductor (S)
- Electrochemical (E) **NOTE** Electrochemical sensors are not suitable for the areas with constantly high ammonia concentration. In such spaces the semiconductor sensor should be used.

Chemical formula		NH_3
Molar weight		17
Relative gas density (to air)		0,59
Conversion (at 25°C and 1 atm)		1 ppm = 0.70 mg/m ³
Boiling point		-33.34 °C
Low explosive limit (LEL), % vol in air		15
Upper explosive limit (UEL), % vol in air		28
Odour		Characteristic pungent smell
Odour detection threshold		0.04 ppm ...57 ppm according to different studies
Hazards		Ammonia is an irritant to skin, eyes and respiratory tract. Ammonia inhalation causes breathing difficulties (wheezing). At high concentrations may lead to pulmonary edema.
Exposure limits (Directive 2000/39/EC)	TWA	14 mg/m ³ /20 ppm
	STEL	36 mg/m ³ /50 ppm

Suitable E2600 series devices: E2608-NH3-E, E2608-NH3-S, E2610-NH3, E2611-NH3, E2618-NH3-E, E2618-NH3-S, E2630-NH3, E2638(R)-NH3-E, E2638-NH3-S, E2658-NH3-E, E2658-NH3-S



Carbon Dioxide detection



Carbon dioxide (CO₂) level is a primary indicator of indoor air quality. Monitoring of CO₂ is required for demand controlled ventilation in occupied places, to prevent oxygen depletion by CO₂ leaks in confined rooms, and to ensure optimal atmosphere for growth of plants and mushrooms.

CO₂ is slightly heavier air, but the gas tends to spread evenly in the room. Carbon dioxide detectors should be mounted in the breathing zone at a height ~1,5 m from the floor.

Recommended coverage area for each CO₂ detector is 500...1000 m² and corresponding coverage radius 12...18 m.

Typical applications

- Public buildings, theaters, cinemas, concert halls
- HVAC in office buildings, hotels
- Factories, refrigeration facilities
- Greenhouses and mushroom plants



Sensors:

- Optical (NDIR) (ambient pressure compensation is available as an option)

Chemical formula	CO ₂
Molar weight	44
Relative gas density (to air)	1.52
Conversion (at 25°C and 1 atm)	1 ppm = 1.80 mg/m ³
Boiling point	Sublimes
Flammability	Nonflammable
Odour	Odourless
Hazards	Dusts of various metals (Mg, Zr, Ti, Al, Cr, Mn) are ignitable and explosive when suspended in carbon dioxide. In concentrations up to 1% (10 000 ppm), it will make some people feel drowsy and give the lungs a stuffy feeling. Concentrations of 7% to 10% (70 000 to 100 000 ppm) may cause suffocation, even in the presence of sufficient oxygen, manifesting as dizziness, headache, visual and hearing dysfunction, and unconsciousness within a few minutes to an hour.
Exposure limits (Directive 2006/15/EC)	TWA 9000 mg/m ³ /5000 ppm STEL Not specified

Indoor air quality in non-residential buildings

CO ₂ level	Description
< 450 ppm	High quality (fresh air)
450-600 ppm	Medium quality
600-1000 ppm	Moderate quality
> 1000 ppm	Low quality

Suitable E2600 series devices: E2608-CO2-10K, E2608-CO2-50K, E2618-CO2-10K, E2618-CO2-50K, E2638-CO2-10K, E2638-CO2-50K, E2658-CO2-10K, E2658-CO2-50K

Carbon Monoxide detection



Carbon monoxide (CO) is a highly toxic, colorless and odourless gas. Monitoring is required in places where CO may be formed from incomplete combustion.

CO is very close to the same density as air, so the gas tends to spread evenly in the room. Carbon monoxide detectors should be mounted in the breathing zone at a height ~1,5 m from the floor in proximity to potential leak sources.

Recommended coverage area for each CO detector is 500...1000 m² and corresponding coverage radius 12...18 m.

Typical applications

- Indoor parking, vehicle service centers
- Boiler and burner rooms
- Factories and warehouses
- Tunnels
- Wastewater treatment plants
- Incineration facilities



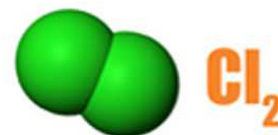
Sensors:

- Electrochemical

Chemical formula		CO
Molar weight		28
Relative gas density (to air)		0.97
Conversion (at 25°C and 1 atm)		1 ppm = 1.15 mg/m ³
Boiling point		-191.5 °C
Low explosive limit (LEL), % vol in air		12.5
Upper explosive limit (UEL), % vol in air		74
Odour		Odourless
Hazards		Highly toxic. Mild poisoning causes lightheadedness, confusion, headache, dizziness, and flu-like effects. Larger exposures can lead to toxicity of the CNS and heart, and death. After acute poisoning, long-term problems may occur. CO also have negative effects on a baby if exposed during pregnancy. Chronic exposure to low levels can lead to depression, confusion, and memory loss.
Exposure limits (NIOSH)	TWA	40 mg/m ³ /35 ppm
	IDLH	1380 mg/m ³ /1200 ppm

Suitable E2600 series devices: E2608-CO, E2610-CO, E2611-CO, E2618-CO, E2638-CO, E2638-CO, E2658-CO

Chlorine detection



Chlorine is yellow-greenish gas with pungent odour. It is used as disinfectant and bleaching agent in the manufacturing of industrial and consumer products.

Chlorine is a toxic gas that irritates the respiratory system. Being a strong oxidizer, it may react with flammable materials.

As chlorine is heavier than air and tends to sink down, detectors should be mounted close to the floor in proximity to potential leak or generation sources.

Typical applications

- Chemical and polymer industry
- Swimming pools
- Water treatment plants
- Laboratories

Sensors:

- Electrochemical



Chemical formula		Cl ₂
Molar weight		70.9
Relative gas density (to air)		2.44
Conversion (at 25°C and 1 atm)		1 ppm = 2.90 mg/m ³
Boiling point		-34.04 °C
Odour		Pungent, irritating smell
Odour detection threshold		Some individuals will not notice the odour until it is more than three times the exposure limit.
Hazards		Nonflammable, but a strong oxidizer, may react explosively with many common chemicals. Potent irritant of the eyes, mucous membrane, skin and respiratory system. Death can occur within minutes after exposure of 400 to 1000 ppm. Chronic exposure of 1 ppm can cause a moderate, but permanent, reduction in pulmonary function.
Exposure limits (Directive 2006/15/EC)	TWA	not specified
	STEL	1.5 mg/m ³ / 0.5 ppm
IDLH (NIOSH)		10 ppm

Suitable E2600 series devices: E2608-Cl₂, E2618-Cl₂, E2638-Cl₂, E2658-Cl₂

Ethylene detection



Extremely flammable colorless gas, widely used as a raw material in polymer industry and as a fruit ripener. Ethylene is the most commercially produced organic compound in the world.

Typical applications

- Agriculture
- Industry
- Gas storage rooms
- Laboratories, research environment



Sensors:

- Electrochemical

Chemical formula		$H_2C=CH_2$
Molar weight		28
Relative gas density (to air)		0,97
Conversion (at 25°C and 1 atm)		1 ppm= 1.15 mg/m ³
Boiling point		-103.7 °C
Low explosive limit (LEL), % vol in air		2.7
Upper explosive limit (UEL), % vol in air		36.0
Odour		Faint sweet odour when pure
Odour threshold		270...600 ppm, so odour is not an adequate warning property to prevent excessive exposure to ethylene
Hazards		Extremely flammable. Gas/air mixtures are explosive. Excessive exposure by inhalation may cause headache, dizziness, anaesthesia, drowsiness, unconsciousness, or other central nervous system effects.
Exposure limits (ACGIH)	TWA	200 ppm
	STEL	not established

Suitable E2600 series devices: E2608-C2H4, E2618-C2H4, E2638-C2H4, E2658-C2H4

Ethylene oxide detection



Ethylene oxide (properly called oxirane, also called epoxyethane, dimethylene oxide, oxacyclopropane, 1,2-Epoxy ethane) is a colorless gas (boiling point 10,7°C) with an ether-like odour. It forms flammable mixtures with air in the range 3...100% EtO.

It is a slow poison with carcinogenic, mutagenic, irritating, and anaesthetic effect.



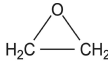
Typical applications

- Raw material in large-scale chemical production
- Sterilant for medical instruments and devices
- Laboratories



Sensors:

- Electrochemical

Chemical formula	C_2H_4O 	
Molar weight	44	
Relative gas density (to air)	1.52	
Conversion (at 25°C and 1 atm)	1 ppm = 1.80 mg/m ³	
Boiling point	10.7 °C	
Low explosive limit (LEL), % vol in air	3	
Upper explosive limit (UEL), % vol in air	100	
Odour	Pungent, ether-like	
Odour threshold	430 ppm	
Hazards	Flammable. Gas/air mixtures are explosive. Ethylene oxide is a slow poison with carcinogenic, mutagenic, irritating, and anaesthetic effect Exposure routes are inhalation, ingestion, (liquid), skin and/or eye contact.	
Exposure limits (OSHA)	TWA	1 ppm
	STEL	5 ppm

Suitable E2600 series devices: E2608-ETO, E2618-ETO, E2638-ETO, E2658-ETO

Halocarbon detection

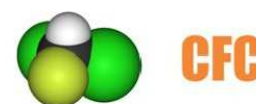
Halocarbon refrigerants are highly volatile nonflammable liquids, with vapours heavier than air.

Overexposure may cause dizziness and loss of concentration. At higher concentrations, CNS depression and cardiac arrhythmia may result from exposure. Vapours displace air and can cause asphyxiation. At higher temperatures (>250°C) decomposition products may include hydrofluoric acid (HF) and carbonyl halides.

Moreover, an escape of refrigerant through a leak may damage the refrigerating facilities..

As halocarbon refrigerants are heavier than air and tend to sink down, refrigerant gas detectors should be mounted close to the floor in proximity to potential leak sources.

Recommended coverage area for each refrigerant detector is 80...120 m² and corresponding coverage radius 5...6 m.



Typical applications

- Cold storage warehousing
- Refrigerated plants
- Mechanical/Chiller Rooms
- Ice Skating Arenas

Sensors:

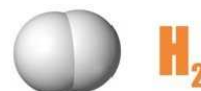
- Metal oxide semiconductor
- NDIR (high selectivity and fast response for demanding applications)

Classification of halocarbon refrigerants

Group	Refrigerants	Notes
1) Chlorofluorocarbons (CFC)	R11, R12	Chlorine containing refrigerants (CFC and HCFC) are considered to be damaging to the ozone layer and contributing to the greenhouse effect. According to Montreal Protocol, chlorine containing halocarbons should be completely dismissed and their manufacturing closed down.
2) Hydrochlorofluorocarbons (HCFC)	R22, R141b, R142b	
3) Hydrofluorocarbons (HFC)	R32, R125, R134a, R143a	Hydrofluorocarbons (HFC) contain no chlorine and are safer for the environment. Now hydrofluorocarbons are the most commonly used halocarbon refrigerants.
4) Hydrofluoroolefins (HFO)	R 1234ez, R1234yf, R1336mzz	Hydrofluoroolefins (HFO) are the last generation of refrigerants, more environmentally friendly than HFCs.

Suitable E2600 series devices: E2608-HFC, E2611-HFC, E2618-HFC, E2638-HFC, E2658-HFC

Hydrogen detection



Mandatory in the spaces, where potentially explosive concentration of hydrogen gas can accumulate as a result of generation or leaks.

As hydrogen is lighter than air and tends to rise up, hydrogen detectors should be mounted near the ceiling in proximity to potential sources.

Recommended coverage area for each hydrogen detector is 80...120 m² and corresponding coverage radius 5...6 m.

Typical applications

- Battery charging rooms
- Gas cylinders storage
- Gas testing equipment, gas blending benches
- Wastewater treatment plants
- Laboratories, research environment
- Vehicle fuel cells, hydrogen filling stations



Sensors:

- Metal oxide semiconductor
- Pellistor (catalytic)

Chemical formula	H ₂
Molar weight	2
Relative gas density (to air)	0.07
Conversion (at 25°C and 1 atm)	1 ppm = 0.0818 mg/m ³
Boiling point	-252.88 °C
Low explosive limit (LEL), % vol in air	4
Upper explosive limit (UEL), % vol in air	75
Odour	Odourless
Hazards	Flammable, forms explosive mixtures with air. Asphyxiant.
Exposure limits	not established

Suitable E2600 series devices: E2608-LEL, E2610-LEL, E2611-LEL, E2618-LEL, E2630-LEL, E2638-LEL, E2658-LEL

Hydrogen sulfide detection



Colorless gas with characteristic odour of rotten eggs. It is slightly heavier than air, very poisonous, corrosive, flammable, and explosive. At high concentrations it causes the paralysis of olfactory nerve, which increase the risk of overexposure.

Hydrogen sulfide results from anaerobic decay of organic matter, e.g. in sinks, sewers etc.

Typical applications

- Wastewater and sewage treatment plants
- Paper and pulp mills
- Food and beverages industry
- Laboratories



Sensors:

- Electrochemical

Chemical formula	H ₂ S		
Molar weight	34		
Conversion (at 25°C and 1 atm)	1 ppm = 1.40 mg/m ³		
Relative gas density (to air)	1.17		
Boiling point	-60 °C		
Low explosive limit (LEL), % vol in air	4.0		
Upper explosive limit (UEL), % vol in air	44.0		
Odour	Characteristic smell of rotten eggs. Above 30 ppm, Odour described as sweet or sickeningly sweet.		
Odour threshold	0.01-1.5 ppm Note: Sense of smell becomes rapidly fatigued and can NOT be relied upon to warn of the continuous presence of H ₂ S.		
Hazards	Highly flammable, explosive gas. Broad-spectrum poison, mostly affecting nervous system. At low concentrations causes eye irritation, a sore throat and cough, nausea, shortness of breath, and pulmonary edema. Long-term, low-level exposure results in fatigue, loss of appetite, headache, poor memory, irritability, and dizziness. Exposure to high levels can induce immediate collapse, with loss of breathing and a high probability of death.		
Exposure limits (Commission Directive 2009/161/EU)	TWA	7 mg/mm ³ / 5 ppm	
	STEL	14 mg/mm ³ / 10 ppm	
	IDLH (NIOSH)	140 mg/mm ³ / 100 ppm	

Suitable E2600 series devices: E2608-H2S, E2618-H2S, E2638-H2S, E2658-H2S

LPG detection



Mandatory in closed spaces, where potentially explosive concentration of liquefied petroleum gas (LPG) can accumulate as a result of leaks.

As butane and propane, the main constituents of LPG, are heavier than air and tend to sink down, LPG detectors should be mounted near the floor in proximity to potential sources.

Recommended coverage area for each LPG detector is 80...120 m² and corresponding coverage radius 5...6 m.

Typical applications

- LPG plants and facilities
- LPG boiler houses, commercial kitchens
- Underground parkings, storage rooms
- Laboratories, research environment



Sensors:

- Metal oxide semiconductor
- Pellistor (catalytic)

	Propane	<i>n</i> -Butane	isoButane
Chemical formula	CH ₃ CH ₂ CH ₃	CH ₃ CH ₂ CH ₂ CH ₃ (C ₄ H ₁₀)	CH ₃ CH(CH ₃)CH ₃ (C ₄ H ₁₀)
Molar weight	44	58	
Relative gas density (to air)	1.55	2.0	
Conversion (at 25°C and 1 atm)	1 ppm = 1.80 mg/m ³	1 ppm = 2.38 mg/m ³	
Boiling point	-42 °C	-0.56 °C	-11.7 °C
Low explosive limit (LEL), % vol in air	2.1	1.6	1.8
Upper explosive limit (UEL), % vol in air	9.5	8.4	9.6
Odour	Odourless when pure. Commercially available propane for fuel purposes may contain odorant ("gas smell").	gasoline-like odour	
Hazards	Highly flammable, mixtures with air are explosive. Asphyxiant. May cause dizziness, confusion, excitation when inhaled.	Highly flammable. Inhalation of butane can cause euphoria, drowsiness, narcosis, asphyxia, cardiac arrhythmia, fluctuations in blood pressure and temporary memory loss, when abused directly from a highly pressurised container, and can result in death from asphyxiation and ventricular fibrillation.	
Exposure limits	NIOSH TWA	1800 mg/m ³ /1000 ppm	1900 mg/m ³ /800 ppm

Suitable E2600 series devices: E2608-LEL, E2610-LEL, E2611-LEL, E2618-LEL, E2630-LEL, E2638-LEL, E2658-LEL

Methane detection



Mandatory in confined spaces, where potentially explosive concentration of methane (natural gas) can accumulate as a result of generation or leaks.

As methane is lighter than air and tends to rise up, methane detectors should be mounted near the ceiling in proximity to potential sources.

Recommended coverage area for each methane detector is 80...120 m² and corresponding coverage radius 5...6 m.

Typical applications

- Boiler rooms, commercial kitchens
- Biogas production plants
- Gas pipelines and compressor stations
- Gas blending and testing equipment, cylinders storage
- Wastewater treatment plants
- Laboratories, research environment



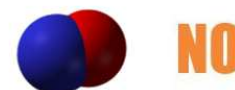
Sensors:

- Metal oxide semiconductor
- Pellistor (Catalytic)

Chemical formula	CH ₄
Molar weight	16
Relative gas density (to air)	0.55
Conversion (at 25°C and 1 atm)	1 ppm = 0.65 mg/m ³
Boiling point	-161.49 °C
Low explosive limit (LEL), % vol in air	5.0
Upper explosive limit (UEL), % vol in air	15
Odour	Odourless when pure. Methane used in the kitchens contains odorant
Hazards	Highly flammable, mixtures with air are explosive. Asphyxiant.
Exposure limits	not established

Suitable E2600 series devices: E2608-CH4, E2608-LEL, E2610-LEL, E2611-CH4, E2611-LEL, E2618-CH4, E2618-LEL, E2630-LEL, E2638-CH4, E2638-LEL, E2658-CH4, E2658-LEL

Nitric oxide detection



Colorless gas, relatively insoluble in water, practically of the same density as air (NO-air density ratio is 1,03:1).

Irritates respiratory tract and eyes, at high concentrations may cause lung edema and death.

Health exposure limits:

8 hours TWA = 25 ppm (Directive 91/322/EEC)

IDLH = 100 ppm (NIOSH)

Typical applications

- Chemical industry
- Healthcare
- Laboratories

Sensors:

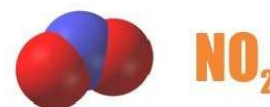
- Electrochemical



Chemical formula		NO
Molar weight		30
Relative gas density (to air)		1.03
Conversion (at 25°C and 1 atm)		1 ppm = 1.23 mg/m ³
Boiling point		-152 °C
Flammability		Nonflammable, but accelerates the burning of combustible materials.
Odour		Pure NO is odourless, but in the air it oxidizes to NO ₂ which has a pungent odour
Hazards		Irritates respiratory tract and eyes, at high concentrations may cause lung edema and death.
Exposure limits (Directive 91/322/EEC)	TWA	30 mg/m ³ / 25 ppm
	IDLH (NIOSH)	123 mg/m ³ / 100 ppm

Suitable E2600 series devices: E2608-NO, E2618-NO, E2638-NO, E2658-NO

Nitrogen dioxide detection



Nitrogen dioxide is brown gas with pungent odour. It is formed in most combustion processes when using air as the oxidant.

Nitrogen dioxide is toxic when inhaled. At low concentrations it anesthetizes the nose, thus creating a potential for overexposure.

As nitrogen dioxide is heavier than air and tends to sink down, detectors should be mounted close to the floor in proximity to potential sources.

Typical applications

- Indoor parkings, skating arenas, tunnels
- Thermal power stations
- Pulp mills
- Laboratories



Sensors:

Electrochemical

Chemical formula		NO ₂
Molar weight		46
Relative gas density (to air)		1.59
Conversion (at 25°C and 1 atm)		1 ppm = 1.88 mg/m ³
Boiling point		21.2 °C
Flammability		Powerful oxidizer, can cause many organic substances (wood, paper, oil etc) to ignite. Irritates the skin, eyes and respiratory tract. Exposure to levels above 100 ppm can cause death due to asphyxiation from fluid in the lungs. There are often no symptoms at the time of exposure other than transient cough, fatigue or nausea, but over hours inflammation in the lungs causes edema.
Odour		Characteristic pungent odour
Odour threshold		0.1 to 0.4 ppm
Hazards		Irritates respiratory tract and eyes, at high concentrations may cause lung edema and death.
Exposure limits (NIOSH)	ST REL	1.88 mg/m ³ / 1 ppm
	IDLH	37.6 mg/m ³ / 20 ppm

Suitable E2600 series devices: E2608-NO2, E2618-NO2, E2630-NO2, E2638-NO2, E2658-NO2

Oxygen detection

Oxygen may be dangerously displaced in closed rooms by other neutral gases, like argon, refrigerants, CO₂ etc.

Oxygen depletion detectors should be mounted in the breathing zone at a height ~1,5 m from the floor.

Recommended coverage area for each O₂ detector is 150...300 m² and corresponding coverage radius 7...10 m.

Typical applications

- Inert gas storages, confined spaces
- Modified atmospheres (filling of windows and packages)
- Nitrogen blanketing in industrial processes
- Incubators, fermentation vessels



Sensors:

- Electrochemical
- Optical (fluorescence quenching based) (marked as -L)

Chemical formula	O ₂
Molar weight	32
Relative gas density (to air)	1.1
Conversion (at 25°C and 1 atm)	1 ppm = 1.31 mg/m ³
Boiling point	-183°C
Odour	Odourless
Hazards	Strong oxidant. May reacts with combustible and reducing materials (oils, solvents etc), causing fire and explosion hazard. Oxygen enriched atmospheres (>22% O ₂) present a significant fire and explosion risk. Oxygen deficiency in air may lead to loss of concentration, reduced coordination, fatigue. At very reduced levels fainting and death may occur. Breathing of oxygen at increased concentrations may lead to hyperoxia (seizures, respiratory problems, disorientation).
Normal atmosphere concentration	20.8...21%
Deficiency threshold (OSHA)	19.5%
Immediately life-treatening level	<10%
Exposure limits	not established

Suitable E2600 series devices: E2608-O2, E2608-O2-L, E2618-O2, E2618-O2-L, E2638-O2, E2638-O2-L, E2658-O2, E2658-O2-L

Ozone detection

Ozone is a non-flammable gas, colorless to blue in color with very pungent odour. It is a powerful oxidizer, attacks the eyes and respiratory system and can cause pulmonary edema. Used as powerful disinfectant and purifier agent.



Typical applications

- Swimming pools, spas
- Food processing and preservation
- Water treatment and purification
- Air purification and sterilization



Sensors:

- Electrochemical

Chemical formula		O ₃
Molar weight		48
Conversion (at 25°C and 1 atm)		1 ppm = 1.96 mg/m ³
Relative gas density (to air)		1.50
Boiling point		-112 °C
Odour		Characteristic pungent irritating odour
Odour threshold		100 ppb
Hazards		Powerful oxidizer, can cause flammable substances to ignite. Ozone can harm lung function and irritate the respiratory system. Exposure to ozone (and the pollutants that produce it) is linked to premature death, asthma, bronchitis, heart attack, and other cardiopulmonary problems.
Exposure limits (NIOSH)	TWA	0.2 mg/mm ³ / 0.1 ppm
	IDLH (NIOSH)	9.8 mg/mm ³ / 5 ppm

Suitable E2600 series devices: E2608-03, E2618-03, E2638-03, E2658-03

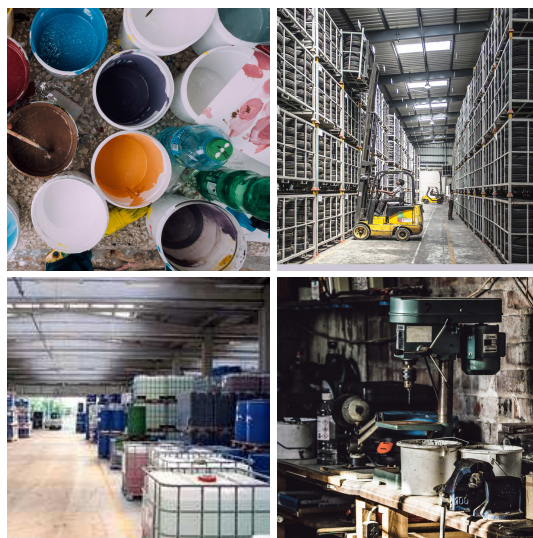
Solvent vapors detection

Vapors of organic solvents (acetone, ethanol, ethyl acetate, toluene, xylenes) are toxic and flammable.

It is necessary to control the level of solvent vapors in the air of painting chambers, solvent storage rooms and workshops.

Typical applications

- Painting chambers
- Workshops
- Solvent storage warehouses



Sensors:

- Metal oxide semiconductor (detection range up to 100% LEL)
- Photoionization detector (PID) (detection range 0..50 or 0...300 ppm)

Acetone

Synonyms/Trade Names: Dimethyl ketone, Ketone propane, 2-Propanone

Chemical formula		(CH ₃) ₂ CO
Molar weight		58
Relative gas density (to air)		2.0
Conversion (at 25°C and 1 atm)		1 ppm = 2.38 mg/m ³
Boiling point		56.11 °C
Low explosive limit (LEL), % vol in air		2.5
Upper explosive limit (UEL), % vol in air		12.8
Odour		Characteristic pungent smell
Hazards		Highly flammable. Slightly toxic in normal use. Irritant causing mild skin irritation and moderate to severe eye irritation. At high vapour concentrations, it may depress the CNS.
Exposure limits	8 hours (2000/39/EC)	1900 mg/m ³ / 500 ppm
	NIOSH REL TWA	590 mg/m ³ / 250 ppm
	IDLH (NIOSH)	2500 ppm [10%LEL]

Benzene

Synonyms/Trade Names: Benzol, Phenyl hydride

Chemical formula	C ₆ H ₆ 
Molar weight	78
Relative gas density (to air)	2.69
Conversion (at 25°C and 1 atm)	1 ppm = 3.19 mg/m ³
Boiling point	80 °C

Benzene (continued)

Low explosive limit (LEL), % vol in air		1.2
Upper explosive limit (UEL), % vol in air		7.8
Odour		Hyacinth-like odour
Hazards		Highly flammable. Irritant. Carcinogen. May cause dizziness; headache, nausea, staggered gait; anorexia, lassitude . Target organs: eyes, skin, respiratory system, blood, central nervous system, bone marrow.
Exposure limits (NIOSH REL)	Ca TWA	0.319 mg/m ³ /0.1 ppm
	STEL 15 minutes	1 ppm
	Ca IDLH	500 ppm

Ethanol

Chemical formula		CH ₃ CH ₂ OH
Molar weight		46
Relative gas density (to air)		1,59
Conversion (at 25°C and 1 atm)		1 ppm = 1.89 mg/m ³
Boiling point		78.37°C
Low explosive limit (LEL), % vol in air		3 - 3.3
Upper explosive limit (UEL), % vol in air		19
Odour		Characteristic smell of alcohol
Hazards		Highly flammable. Gas/air mixtures are explosive. Inhalation of vapours leads to cough, headache, fatigue and drowsiness. High concentrations may damage the foetus. Repeated high exposure may affect the liver and the nervous system.
Exposure limits according to Commission Directive 2006/15/EC	TWA 8 hours	1210 mg/m ³ / 1000 ppm
	STEL 15 minutes	-

Ethyl acetate

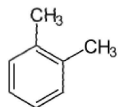
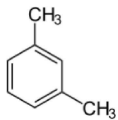
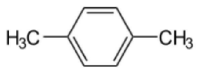
Chemical formula		
Molar weight		88
Conversion (at 25°C and 1 atm)		1 ppm = 3.60 mg/m ³
Boiling point		77.1 °C
Low explosive limit (LEL), % vol in air		2
Upper explosive limit (UEL), % vol in air		11.5
Odour		Sweet "pear" smell
Hazards		Flammable. Short-term exposure to high levels of ethyl acetate results first in irritation of the eyes, nose and throat, followed by headache, nausea, vomiting, sleepiness, and unconsciousness.
Exposure limits (NIOSH)	TWA 8 hours	1400 mg/m ³ /400 ppm
	IDLH	2000 ppm [10%LEL]

Toluene

Chemical formula	C ₆ H ₅ CH ₃ 	
Molar weight	92	
Conversion (at 25°C and 1 atm)	1 ppm = 3.77 mg/m ³	
Boiling point	110.7°C	
Low explosive limit (LEL), % vol in air	1.1 - 1.27	
Upper explosive limit (UEL), % vol in air	6.75–7.1	
Odour	Characteristic “chemical” smell	
Hazards	Highly flammable. Gas/air mixtures are explosive. Inhalation possible effects: irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paraesthesia; dermatitis; liver, kidney damage	
Exposure limits according to Commission Directive 2006/15/EC	TWA	192 mg/mm ³ / 50 ppm
	STEL	384 mg/mm ³ / 100 ppm

Xylene

(the term is used for any one of three isomers of dimethylbenzene, or a combination thereof)

Chemical formula	C ₆ H ₄ (CH ₃) ₂		
Isomers	<i>ortho</i> -xylene 	<i>meta</i> -xylene 	<i>para</i> -xylene 
Molar weight	106		
Conversion (at 25°C and 1 atm)	1 ppm = 4.34 mg/m ³		
Boiling point	144.4 °C	139 °C	138.35 °C
Low explosive limit (LEL), % vol in air	0.9 - 1.1		
Upper explosive limit (UEL), % vol in air	6.0–7.0		
Odour	Characteristic “chemical” smell		
Hazards	Flammable. Inhaling can cause dizziness, headache, drowsiness, and nausea.		
Exposure limits according to Commission Directive 2000/39/EC	TWA	221 mg/mm ³ / 50 ppm	
	STEL	442 mg/mm ³ / 100 ppm	

Suitable E2600 series devices: E2608-VOC, E2608-PID, E2610-VOC, E2611-VOC, E2618-VOC, E2618-PID, E2630-VOC, E2638-VOC, E2638-PID, E2658-LEL, E2658-PID

Sulfur dioxide detection



Sulfur dioxide is colorless gas with pungent odour. It is an intermediate in the production of sulfuric acid. SO_2 is used as reductant, as bleaching agent for delicate materials and as a preservative in food industry and winemaking.

Sulfur dioxide is toxic when inhaled.

As sulfur dioxide is heavier than air and tend to sink down, refrigerant gas detectors should be mounted at 30-45 cm above the floor in proximity to potential leak sources.

Typical applications

- Chemical industry
- Winemaking
- Food processing and preservation
- Laboratories

Sensors:

- Electrochemical



Chemical formula		SO_2
Molar weight		64
Conversion (at 25°C and 1 atm)		1 ppm = 2.62 mg/m ³
Relative gas density (to air)		2.21
Boiling point		-10 °C
Flammability		Nonflammable
Odour		Characteristic pungent irritant odour similar to a just-struck match
Odour threshold		From 0.266 mg/m ³ (0.1 ppm) to 12.5 mg/m ³ (4.7 ppm) according to different studies
Hazards		Inhaling sulfur dioxide is associated with increased respiratory symptoms and disease, difficulty in breathing, and premature death.
Exposure limits (NIOSH)	TWA	5 mg/mm ³ / 2 ppm
	STEL	13 mg/mm ³ / 5 ppm
	IDLH (NIOSH)	262 mg/mm ³ / 100 ppm

Suitable E2600 series devices: E2608-SO2, E2618-SO2, E2638-SO2, E2658-SO2

Sulfur hexafluoride detection

Colorless, odourless, non flammable, non toxic gas, five times heavier than air. Sulfur hexafluoride has excellent dielectric properties almost three times better than air and nitrogen. It works well as an arc quencher in circuit breakers and electrical switch gear.

Although SF₆ is not immediately dangerous to health, the leakage detection is necessary due to costs and environment considerations, since SF₆ is the most potent greenhouse gas known.



SODA Permissible Exposure Limit (PEL):

General Industry: 1000 ppm, 6000 mg/m³

Construction Industry: 1000 ppm, 6000 mg/m³ TWA

Health Effects: Apparent low toxicity (HE19); Asphyxiant (HE17)

Typical applications

- Power plants
- Laboratories

Sensors:

- Optical (DIR)

Chemical formula	SF ₆
Molar weight	146,1
Conversion (at 25°C and 1 atm)	1 ppm = 5,98 mg/m ³
Relative gas density (to air)	5,03
Boiling point	Sublimes
Flammability	Non-flammable
Odour	Odourless
Hazards	Non-toxic, but may contain highly toxic sulfur pentafluoride (SF ₅) as an impurity. At electrical discharge may decompose to form toxic products. Extremely potent greenhouse gas.
Exposure limits NIOSH REL TWA = OSHA PEL TWA	1000 ppm (6000 mg/m ³)

Suitable E2600 series devices: E2608-SF6, E2618-SF6, E2638-SF6, E2658-SF6

Battery Charging Rooms

Safety of battery back-up installations for various electronic systems has to be monitored. As lead acid batteries are charged, hydrogen gas is produced, which may accumulate and reach hazardous combustible levels in confined spaces.

Gas	Typical range	Transmitter	Detector
Hydrogen H ₂	0...100 %LEL	E2618-LEL E2638-LEL E2658-LEL	E2608-LEL
			E2610-LEL
			E2611-LEL
			E2630-LEL
			E2638R-LEL
			E2658R-LEL



Boiler Houses

Control of leaks of combustible gases and Carbon Monoxide

Gas	Typical range	Transmitter	Detector
Carbon Monoxide CO	0...1000 ppm	E2618-CO E2638-CO E2658-CO	E2608-CO
			E2610-CO
			E2630-CO
			E2638R-CO
			E2658R-CO
Methane CH ₄	0...100 %LEL	E2618-CH4 E2638-CH4 E2658-CH4	E2608-CH4
			E2610-LEL
			E2611-CH4
			E2630-LEL
			E2638R-CH4
			E2658R-CH4
Propane C ₃ H ₈	0...100 %LEL	E2618-LEL E2638-LEL E2658-LEL	E2608-LEL
			E2610-LEL
			E2611-LEL
			E2630-LEL
			E2638R-LEL
			E2658R-LEL



Farms

Air quality in livestock sheds is crucial for health and productivity of the animals. It is recommended to monitor ammonia level in the sheds.

Monitoring of CO₂ level in grain silos helps to detect early the spoilage of the grain by insects and molds.

Gas	Typical ranges	Transmitter	Detector
Ammonia NH ₃	0...1000 ppm	E2618-NH3-S E2638-NH3-S	E2608-NH3-S E2610-NH3 E2611-NH3 E2630-NH3 E2638R-NH3-S
Methane CH ₄	0...100 %LEL	E2618-CH4 E2638-CH4	E2608-CH4 E2610-LEL E2611-CH4 E2630-LEL E2638-CH4
Carbon Dioxide CO ₂	0...10 000 ppm 0...50 000 ppm	E2618-CO2 E2638-CO2 E2658-CO2	E2608-CO2 E2638R-CO2 E2658R-CO2



Food and Beverages Industry

Whether pre-cooking food, treating wastes and byproducts or ensuring food is preserved properly for shipment, food and beverage processors use and produce dangerous gases. As a result, gas detection is an important part of the everyday safety requirements for these processing facilities.

Gas	Typical ranges	Transmitter	Detector
Propane C ₃ H ₈	0...100 %LEL	E2618-LEL E2638-LEL	E2608-LEL E2610-LEL E2611-LEL E2630-LEL E2638R-LEL
Carbon Monoxide CO	0...1000 ppm	E2618-CO E2638-CO	E2608-CO E2610-CO E2630-CO E2638R-CO
Carbon Dioxide CO ₂	0...10 000 ppm 0...50 000 ppm	E2618-CO2 E2638-CO2	E2608-CO2 E2638R-CO2
Nitrogen Dioxide NO ₂	0...20 ppm 0...100 ppm	E2618-NO2 E2638-NO2	E2608-NO2 E2610-NO2 E2630-NO2 E2638R-NO2



Food and Beverages Industry (continued)

Hydrogen Sulfide H ₂ S	0...100 ppm	E2618-H ₂ S E2638-H ₂ S	E2608-H ₂ S E2638R-H ₂ S
Ammonia NH ₃	0...100 ppm 0...300 ppm 0...1000 ppm	E2618-NH ₃ E2638-NH ₃	E2608-NH ₃ E2610-NH ₃ E2611-NH ₃ E2630-NH ₃ E2638R-NH ₃
Halocarbon Refrigerants	0...1000 ppm	E2618-HFC E2638-HFC	E2608-HFC E2611-HFC E2638R-HFC
Volatile Organic Compounds VOC	0...1000 ppm 0...100 %LEL	E2618-VOC	E2608-VOC E2610-VOC E2611-VOC E2630-VOC
	0...50 ppm 0...300 ppm	E2618-PID E2638-PID	E2608-PID E2638R-PID
Oxygen Deficiency O ₂	16...21 %vol	E2618-O ₂ (-L) E2638-O ₂ (-L)	E2608-O ₂ (-L) E2638R-O ₂ (-L)
Ozone O ₃	0...5 ppm	E2618-O ₃ E2638-O ₃	E2608-O ₃ E2638R-O ₃

**Hotels, Libraries, Restaurants**

Control of indoors air quality and leaks of refrigerants

Gas	Typical range	Transmitter	Detector
Carbon Dioxide CO ₂	0...10 000 ppm 0...50 000 ppm	E2618-CO ₂ E2638-CO ₂ (-10K or 50K)	E2608-CO ₂ E2638R-CO ₂ (-10K or 50K)
Oxygen Deficiency O ₂	16...21 %vol	E2618-O ₂ (-L) E2638-O ₂ (-L)	E2608-O ₂ (-L) E2638R-O ₂ (-L)
Halocarbon Refrigerants	0...1000 ppm	E2618-HFC E2638-HFC	E2608-HFC E2611-HFC E2638R-HFC



Ice Skating Arenas

Air quality of public indoor environments has to be monitored for people safety. Ice resurfacing equipment operated in closed arenas releases CO and NO₂ gases from the burning of fuel. Dehumidification equipment can lead CO gas into the ventilation system. Leaks of refrigerant gases (propane, halocarbons, ammonia) can occur in refrigeration equipment.

Gas	Typical range	Transmitter	Detector
Carbon Monoxide CO	0...1000 ppm	E2618-CO	E2608-CO
		E2638-CO	E2610-CO
		E2658-CO	E2630-CO
			E2638R-CO
			E2658R-CO
Nitrogen Dioxide NO ₂	0...20 ppm 0...100 ppm	E2618-NO2	E2608-NO2
		E2638-NO2	E2630-NO2
		E2658-NO2	E2638R-NO2
			E2658R-NO2
Propane C ₃ H ₈	0...100 %LEL	E2618-LEL	E2608-LEL
		E2638-LEL	E2610-LEL
			E2611-LEL
			E2630-LEL
			E2638R-LEL
Ammonia NH ₃	0...100 ppm 0...300 ppm 0...1000 ppm	E2618-NH3*	E2608-NH3*
		E2638-NH3*	E2610-NH3
			E2611-NH3
			E2630-NH3
			E2638R-NH3*
*-E or -S			
Halocarbon Refrigerants	0...1000 ppm	E2618-HFC	E2608-HFC
		E2638-HFC	E2611-HFC
			E2638R-HFC
Dual: E2660(R)-CO-NO2, E2660(R)-CO-HFC or other combinations			



Pulp and Paper Industry

Pulp and paper mills can present many dangerous situations, which can be significantly decreased by utilizing toxic gas monitoring.

Gas	Typical ranges	Transmitter	Detector
Hydrogen Sulfide H ₂ S	0...100 ppm	E2618-H2S E2638-H2S	E2608-H2S
			E2638R-H2S
Nitrogen Dioxide NO ₂	0...20 ppm 0...100 ppm	E2618-NO2 E2638-NO2	E2608-NO2
			E2630-NO2
			E2638R-NO2
Sulfur Dioxide SO ₂	0...20 ppm	E2618-SO2 E2638-SO2	E2608-SO2
			E2638R-SO2



Indoor Parking and Service Garages

By monitoring the concentration of toxic vehicle exhaust fumes and ventilating based on their concentration, a safe environment in garages and economical ventilation can be ensured. For gasoline, natural gas, propane powered vehicles, CO should be detected. For vehicles with diesel engines, NO₂ levels should be measured. Alternatively, CO₂ as general air quality indicator may be monitored.

Gas	Typical range	Transmitter	Detector
Carbon Monoxide CO	0...1000 ppm	E2618-CO E2638-CO	E2608-CO
			E2610-CO
			E2630-CO
			E2638R-CO
Nitrogen Dioxide NO ₂	0...20 ppm	E2618-NO2	E2608-NO2
	0...100 ppm	E2638-NO2	E2630-NO2
			E2638R-NO2
Carbon Dioxide CO ₂	0...10 000 ppm	E2618-CO2	E2608-CO2
	0...50 000 ppm	E2638-CO2	E2638R-CO2
Sulfur Dioxide SO ₂	0...20 ppm	E2618-SO2	E2608-SO2
		E2638-SO2	E2638R-SO2
Dual: E2660(R)-CO-NO2, E2660(R)-CO-CO2 or other combinations			



Refrigeration

Leaks of refrigerant gases (propane, halocarbons, ammonia, CO₂) can occur in refrigeration equipment. Refrigerant leaks may also result in dangerous displacement of oxygen in closed rooms.

Gas	Typical range	Transmitter	Detector
Carbon Dioxide CO ₂	0...10 000 ppm 0...50 000 ppm	E2618-CO2 E2638-CO2	E2608-CO2
			E2638R-CO2
Propane C ₃ H ₈	0...100 %LEL	E2618-LEL E2638-LEL	E2608-LEL
			E2610-LEL
			E2611-LEL
			E2630-LEL
			E2638R-LEL
Ammonia NH ₃	0...100 ppm 0...300 ppm 0...1000 ppm	E2618-NH3 E2638-NH3	E2608-NH3
			E2610-NH3
			E2611-NH3
			E2630-NH3
			E2638R-NH3
Halocarbon Refrigerants	0...1000 ppm	E2618-HFC E2638-HFC	E2608-HFC
			E2611-HFC
			E2638R-HFC



Solvent Storages and Painting Chambers

Toxic and flammable vapours of volatile organic compounds (VOC), like ethanol, toluene, xylene may accumulate and reach hazardous combustible levels in confined spaces.

Gas	Typical ranges	Transmitter	Detector
Volatile Organic Compounds VOC	0...1000 ppm 0...100 %LEL	E2618-VOC E2638-VOC E2658-VOC	E2608-VOC
			E2610-VOC
			E2611-VOC
			E2630-VOC
			E2638R-VOC
			E2658R-VOC
Volatile Organic Compounds VOC	0...50 ppm 0...300 ppm	E2618-PID	E2608-PID
		E2638-PID	E2638R-PID
		E2658-PID	E2658R-PID



Swimming Pools and Spas

Control of leaks of water disinfectants Cl_2 and O_3 to ensure safety of people.

Gas	Typical range	Transmitter	Detector
Chlorine Cl_2	0...10 ppm	E2618-CL2	E2608-CL2
	0...20 ppm	E2638-CL2	E2638R-CL2
Ozone O_3	0...5 ppm	E2618-O3	E2608-O3
		E2638-O3	E2638R-O3



Wastewater Treatment

Wastewater treatment process creates a range of inert, toxic and combustible gases, which can build up in enclosed spaces or deplete oxygen to endanger plant personnel, and therefore shall be monitored.

Gas	Typical range	Transmitter	Detector
Methane CH_4	0...100 %LEL	E2618-CH4 E2638-CH4	E2608-CH4
			E2610-LEL
			E2611-CH4
			E2630-LEL
			E2638R-CH4
Hydrogen H_2	0...100 %LEL	E2618-LEL E2638-LEL	E2608-LEL
			E2610-LEL
			E2611-LEL
			E2630-LEL
			E2638R-LEL
Hydrogen Sulfide H_2S	0...100 ppm	E2618-H2S	E2608-H2S
		E2638-H2S	E2638R-H2S



Wastewater Treatment (continued)

Carbon Monoxide CO	0...1000 ppm		E2608-CO
		E2618-CO	E2610-CO
		E2638-CO	E2630-CO
			E2638R-CO
Oxygen Deficiency O ₂	16...21 %vol	E2618-O2(-L)	E2608-O2(-L)
		E2638-O2(-L)	E2638R-O2(-L)
Chlorine Cl ₂	0...10 ppm	E2618-CL2	E2608-CL2
	0...20 ppm	E2638-CL2	E2638R-CL2
Sulfur Dioxide SO ₂	0...20 ppm	E2618-SO2	E2608-SO2
		E2638-SO2	E2638R-SO2
Ozone O ₃	0...5 ppm	E2618-O3	E2608-O3
		E2638-O3	E2638R-O3
Simultaneous detection of two gases with E2660 and E2660R			

Workshops and Welding

Toxic and flammable gases and oxygen deficiency must be monitored for worker safety.

Gas	Typical range	Transmitter	Detector
Acetylene C ₂ H ₂	0...100 %LEL	E2618-LEL E2638-LEL E2658-LEL	E2608-LEL
			E2610-LEL
			E2611-LEL
			E2630-LEL
			E2638R-LEL
			E2658R-LEL
Nitrogen Dioxide NO ₂	0...20 ppm 0...100 ppm	E2618-NO2 E2638-NO2 E2658-NO2	E2608-NO2
			E2610-NO2
			E2630-NO2
			E2638R-NO2
			E2658R-NO2
Carbon Dioxide CO ₂	0...10 000 ppm 0...50 000 ppm	E2618-CO2 E2638-CO2 E2658-CO2	E2608-CO2
			E2638R-CO2
			E2658R-CO2
Carbon Monoxide CO	0...1000 ppm	E2618-CO E2638-CO E2658-CO	E2608-CO
			E2630-CO
			E2638R-CO
			E2658R-CO
Oxygen Deficiency O ₂	16...21 %vol	E2618-O2(-L)	E2608-O2(-L)
		E2638-O2(-L)	E2638R-O2(-L)
		E2658-O2(-L)	E2658-O2 (-L)
Ozone O ₃	0...5 ppm	E2618-O3	E2608-O3
		E2638-O3	E2638R-O3
		E2658-O3	E2658R-O3
Simultaneous detection of two gases with E2660 and E2660R			



Workshops and Welding

Toxic and flammable gases and oxygen deficiency must be monitored for worker safety.

Gas	Typical range	Transmitter	Detector
Acetylene C ₂ H ₂	0...100 %LEL		E2608-LEL
		E2618-LEL	E2610-LEL
		E2638-LEL	E2611-LEL
		E2648-LEL	E2630-LEL
		E2658-LEL	E2638R-LEL E2648R-LEL
Nitrogen Dioxide NO ₂	0...20 ppm 0...100 ppm	E2618-NO2	E2608-NO2
		E2638-NO2	E2610-NO2
		E2648-NO2	E2630-NO2
		E2568-NO	E2638R-NO2
			E2648R-NO2
Carbon Dioxide CO ₂	0...5000 ppm 0...10 000 ppm	E2618-CO2	E2608-CO2
		E2638-CO2	E2609-CO2
		E2648-CO2	E2638R-CO2
		E2658-CO2	E2648R-CO2
Carbon Monoxide CO	0...1000 ppm	E2618-CO	E2608-CO
		E2638-CO	E2630-CO
		E2648-CO	E2638R-CO
		E2658-CO	E2648R-CO
Oxygen Deficiency O ₂	16...21 %vol	E2618-O2(-L)	E2608-O2(-L)
		E2638-O2(-L)	E2638R-
		E2648-O2(-L)	O2(-L)
		E2658-O2(-L)	E2648-O2 (-L)
Ozone O ₃	0...5 ppm	E2618-O3	E2608-O3
		E2638-O3	E2638R-O3
		E2648-O3	E2648R-O3
		E2658-O3	