



Confined Space (4-Gas) Detectors

What are confined space gas detectors?

Portable confined space gas detectors are required to determine safe levels of hazardous gas prior to entry into a confined space and during works.

A confined space can be defined as an area large enough for someone to enter and work in but;

- Has limited restriction of entry / exit
- Volume of less than 100 m³
- No means of ventilation
- Below two metres in length, width and height

Typically these detectors measure 4 gases - Combustible gases (LEL), Oxygen (O₂), Hydrogen Sulphide (H₂S) and Carbon Monoxide (CO). These devices are generally worn directly on the worker's clothing or attached to Personal Protective Equipment (PPE), close to the worker's breathing area.



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a1-cbiss supply a range of multi-gas detectors and monitors for numerous applications and industries from well-known manufacturers:



SELECTING THE RIGHT GAS DETECTORS FOR CONFINED SPACE ENTRY...

Now that you've read about the effects of each gas you should realise the importance of gas detectors. The tricky part is deciding which gas detector is for you?

Gas detectors have been around for a long time, since the early days when a canary in a cage dying signified gas was present. Although the canary didn't provide a visual or audio alarm, the importance of a detector was ever present.



Sensor Selection

Considering what type of detector is required for your confined space rests on the choice of sensor. Make sure the instrument chosen for confined space entry can accommodate the types and number of sensors. The types of sensors selected should reflect the known and potential atmospheric hazards associated with the confined spaces to be monitored.

Most confined space gas detectors employ an oxygen sensor, a catalytic sensor for flammable/combustible gases and one or two electrochemical sensors for detecting specific toxic gases. You may need to add an infrared sensor for the detection of carbon dioxide or methane in confined space.

An increasing number of gas detectors additionally include a photoionization sensor (PID) for VOC gas measurement.

NOTE: if you are unsure of what gas hazards are potentially present, a1-cbiss can help conduct a hazard assessment before you purchase those new instruments.



Alarms

Alarms are put in place to alert the user by a visual, audible and vibration alarm the moment one or more limit values of the substances to be measured

are reached or exceeded. Alarms should be in excess of 90dB and highly visible to attract the attention of the worker. Wireless communication capabilities enable access to real-time instrument readings and alarm status (including Man-Down alarm) from any location (control room or outside of the confined space) for better visibility and faster incident response. This can help facilitate faster, data-driven decision-making to save lives and protect assets.

“Selecting the right gas detector could be the single most important decision you ever make”



Sampling method

In confined space testing there are two primary means of exposing the sensor to the gases present;

- A sample draw uses a pump to draw a sample back into the instrument for analysis. Drawing a sample protects the user by eliminating any need to enter the space or by providing pre-entry checks if the space has to be entered.

a1-cbiss recommend buying an “attachable” pump for a confined space detector which permits users to remove the pump and operate the instrument in diffusion mode when a sample pump is not required. This technique is not only more cost effective but it can enhance battery lifetime too.

- Most recommended gas detector sensors operate by diffusion, they rely on the inherent movement of the air to direct a sample to them. Diffusion detectors can stand up to the challenge of toxic gases. If you need to be free of moving parts and pumps, diffused pumps are the perfect fast response solution for confined spaces.



Approvals

As your detector is designed to help detect explosive gases, it is essential that it is ATEX approved and designed to be intrinsically safe.

You must ensure your detector displays the ATEX logo;



Intrinsically safe detectors are required to keep electrical energy at a minimum, In doing so, the detector can guarantee

that there won't be enough power to spark.

Consideration must be given to the application where the gas detector is to be used. In the marine industry, a confined space monitor must be used in accordance with the amendments to SOLAS regulation XI-1/7 contained in IMO Resolution MSC.380 (94):

- Every ship to which SOLAS Chapter I applies shall carry an appropriate portable atmosphere testing instrument or instruments;
- As a minimum, these shall be capable of measuring concentrations of oxygen, flammable gases or vapours, hydrogen sulphide and carbon monoxide prior to entry into enclosed spaces;



Data logging

There are two types of data storage: datalogging and event logging. Event logging will only show alarm events. Gas detectors that have event logging will only have capability for a certain number of events. Datalogging allows data to be recorded at given intervals over a period of time.

The capability to provide documentation of proper use can significantly reduce liability exposure, and in the long run save much more than the cost of including datalogging in the instrument at the time of purchase.

Aside from keeping records, using your detector for data logging will allow you to recognise any potential

dangerous trends in both exposure and detector usage.

How it's worn

In normal operation, most confined space instruments are worn on the belt or a helmet, used with a shoulder strap or chest harness, or held by hand.

Tip: All gas detectors should be worn within 30cm of the wearer's mouth for effective personal safety.



Batteries

Different gas detectors utilise different rechargeable battery technologies. Commonly used types of rechargeable batteries include nickel metal hydride (NiMH), lithium ion (Li-ion) and lithium polymer batteries.

The primary advantage of rechargeable batteries is overall cost-effectiveness. Frequent replacement of disposable batteries can be very expensive. On the other hand, while alkaline batteries may not be the most cost-effective approach, having the ability to use them in an instant is a strong design advantage. Some detection instrument designs offer interchangeable rechargeable and alkaline battery packs. Other designs allow the optional use of either alkaline or "off the shelf" rechargeable batteries.

Accessories

Depending on the type of confined space being accessed, Be sure to verify which accessories are included in the purchase price for the instrument. If the gas detection instrument includes a rechargeable battery, does the price include a battery charger? Do the accessories include a sample draw kit or automatic pump. Concussion proof boot? Clips or straps? Calibration cup?

Be sure to factor in the extra cost of accessories when considering your purchase!

Choosing from the vast range of gas detectors can be a difficult job, so we've put together some of our own recommendations.

Confined Space (4 Gas) Detectors

Product	Detection Capabilities	Sampling Method	Weight	Data Storage	Advanced Features	Price (gas dependant)
	RAE MicroRAE Toxic, Catalytic, 6 Gas Options	Diffusion	206g	6 Months Datalogging	Real-Time Readings	££
	RAE QRAE3 Toxic, Catalytic, 6 Gas Options	Built-in Pump Option	410g With Pump	3 Months Datalogging	Real-Time Readings	££
	BW GasAlert MicroClip X3 Toxic, Catalytic, 4 Gas Options	Diffusion	179g	Eventlogging Datalogging	3 Year Warranty	£
	ISC VENTIS Series Toxic, Catalytic, IR and PID 30 Gas Options	Optional Pump	390g With Pump	60 Alarm Events. > 3 Months Datalogging	Alarm Messages Panic Alarm, iAssign™	££
	GMI PS200 Toxic, Catalytic, 4 Gas Options	Built-in Pump Option	230g With Pump	Timed or Session Datalogging	Marine MED Approval	£
	OLDHAM BM25 AREA MONITOR Toxic, Catalytic, IR and PID 32 Gas Options	Diffusion or Sample draw	6.8 kg	4 month Datalogging	Wireless Option	£££

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