



Landfill  
Gas Extraction  
Power Generation  
Gas Flow



## H<sub>2</sub> Compensated CO Gas Extraction Monitor

The GEM2000 Plus is designed to monitor landfill gas extraction systems. Utilising new technology the GEM2000 Plus gives increased reliability for Carbon Monoxide (CO) readings. It retains the features of the field proven GEM2000.

### Benefits

- Aids balancing of gas extraction site
- Simultaneous display of all gases
- Maximise power generation from site
- Storage of changes in set up of gas field
- Field proven
- Real time adjustments can be made
- Standardises monitoring routines
- Easy transfer of data
- Easy to read

### Features

- ATEX Certified, Zone 1 
- MCERTS approved 
- CH<sub>4</sub>, CO<sub>2</sub>, and O<sub>2</sub> measured
- H<sub>2</sub> Compensated CO
- H<sub>2</sub>S - other gases are available upon request
- Peak gases recorded
- Calculates flow (m<sup>3</sup>/h) and calorific value (Kw or BTU) - external flow device and Gas Analyser Manager software required
- Records static and differential pressure
- Technician log
- Optional Event Log
- Two instruments in one (GA and GEM)
- Optional GPS



### Applications

- Gas Extraction Sites
- Flare monitoring
- Landfill Sites

## Technical Specifications

GEM2000 Plus					
POWER SUPPLY					
Battery type	Rechargeable nickel metal hydride battery pack containing six 4AH cells (not user replaceable)				
Battery life	Typical use 10 hours from fully charged				
Battery lifetime	Up to 1000 charge/ discharge cycles				
Battery charger	Separate intelligent 2A battery charger powered from mains supply (100-240V 47-63Hz)				
Charge time	Approximately 2 hours from complete discharge				
Alternative power	Can be powered externally for fixed in place applications. Contact Geotechnical Instruments (UK) Ltd for further information.				
Memory back-up battery	Lithium manganese for data retention				
GAS RANGES					
Gases measured	CO <sub>2</sub> and CH <sub>4</sub>	By dual wavelength infrared cell with reference channel			
	O <sub>2</sub>	By internal electrochemical cell			
	CO (hydrogen compensated)	By internal electrochemical cell - up to 1% hydrogen compensated			
	H <sub>2</sub> S 0-500ppm	By internal electrochemical cell			
	H <sub>2</sub> S 0-5000ppm	By external gas pod (option)			
	NH <sub>3</sub> 0-1000ppm	By internal electrochemical cell (optional gas in replacement of CO (Hydrogen compensated) sensor			
	H <sub>2</sub> 0-1000ppm	By internal electrochemical cell (optional gas in replacement of CO (Hydrogen compensated) sensor			
	A full range of gas pods can be used as well as the two internal cell positions.				
Range	CH <sub>4</sub>	0-70% to specification, 0-100% reading			
	CO <sub>2</sub>	0-60% to specification, 0-100% reading			
	O <sub>2</sub>	0-25%			
	CO	0-2000ppm			
	H <sub>2</sub> S	0-500ppm internal or 0-5000ppm external pod			
Typical accuracy	<b>Gas</b>	<b>0-5% vol</b>	<b>5-15% vol</b>	<b>15%-FS</b>	<b>FS</b>
	CH <sub>4</sub>	±0.5% (vol)	±1.0% (vol)	±3.0% (vol)	70%
	CO <sub>2</sub>	±0.5% (vol)	±1.0% (vol)	±3.0% (vol)	60%
	O <sub>2</sub>	±1.0% (vol)	±1.0% (vol)	±1.0% (vol)	25%
	<b>Gas</b>	<b>Range</b>	<b>0-FS</b>		
	CO	0-2000ppm	± 10.0% of reading or 15ppm, whichever is greater		
	H <sub>2</sub> S	0-500ppm	± 10.0% FS		
Response time, T90	CH <sub>4</sub>	≤ 20 seconds			
	CO <sub>2</sub>	≤ 20 seconds			
	O <sub>2</sub>	≤ 20 seconds			
	CO	≤ 60 seconds			
	H <sub>2</sub> S	≤ 60 seconds			

## Technical Specifications

### GEM2000 Plus, cont'd.

#### GAS RANGES, cont'd.

CO measurement	Compensated for interference from hydrogen up to 1% hydrogen. Cross sensitivity approximately 1%
Oxygen cell lifetime	Approximately 3 years in air
Other electrochemical cells lifetime	Approximately 2 years in air

#### FACILITIES

Temperature measurement	-10°C to +75°C with optional probe
Temperature accuracy	± 1.0°C with optional probe
Visual and audible alarm	User selectable CO <sub>2</sub> , CH <sub>4</sub> , and O <sub>2</sub> alarm levels*
Communications	Via USB lead to 7 pin Lemo connector*
Relative pressure	± 500 mbar from calibration pressure
Relative pressure accuracy	± 4 mbar typically (should be zeroed before reading) to ± 15 mbar max
Available memory	1000 IDs*, 2000 readings, 1000 events*

#### PUMP

Flow	550 ml/min typically
Flow fail point	-200 mbar vacuum - user settable*
Maximum vacuum restart	-375 mbar approximately with flow rate of approximately 80ml/min


#### ENVIRONMENTAL CONDITIONS

Operating temperature range	0°C to 40°C
Relative humidity	0 - 95% non condensing
Case seal	IP65
Barometric pressure	± 200 mbar from calibration pressure
Barometric pressure accuracy	± 5 mbar typically

#### PHYSICAL

Weight	2 kilograms
Size	L 63mm, W 190mm, D 252mm
Case material	ABS
Keys	Membrane panel
Display	Liquid crystal display, 40 x 16 characters Fibre optic woven back-light for low light conditions
Gas sample filters	User replaceable integral fibre filter at inlet port and an external PTFE water trap filter

#### CERTIFICATION RATING

ATEX	 II 2G Ex ib IIA T1 Gb (Ta = 0°C to +40°C)
MCerts	Sira MC 080127/00 Compatible to instrument serial number 10,000 and above
ISO17025	Optional calibration to UKAS certificate number 4533

\* Gas Analyser Manager software required.

**Important Note:** this specification is for GEM2000 Plus units serial numbers 10,000 and above marked with modification D. The information in this document is correct at the time of generation. We do, however, reserve the right to change the specification without prior notice as a result of continuing development.



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