"Changing the way industry looks at gas sensing"

GasFinder

How GasFinder works

All GasFinders employ the same laser gas detection technology.

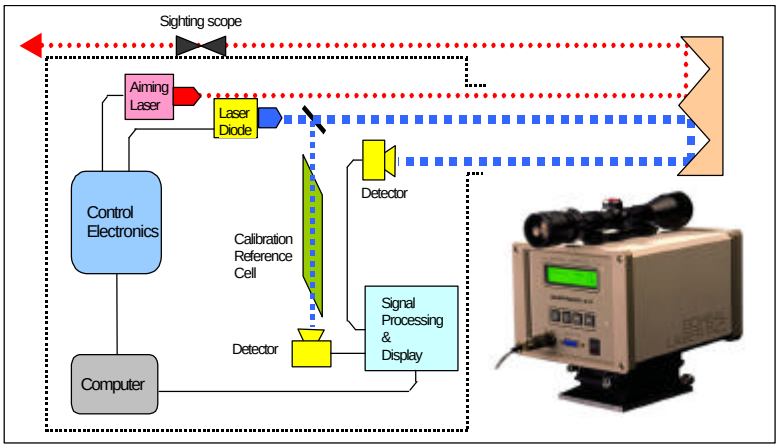
GasFinder (see schematic and photo below) is an open-path gas detector that uses an integrated transmitter/receiver unit and a remote, passive retro-reflector. The GasFinder transceiver houses the laser diode, drive electronics, detector module and micro-computer subsystems. Laser light is emitted from the transceiver through ambient air to the reflector and back. The return light is focused onto a photo-diode. A portion of the laser beam is passed through an onboard, stable reference cell to provide a continuous calibration update. Measure and reference signals are then compared to determine the actual gas concentration in the optical path.

In GasFinderFC the transmitter/receiver optics are housed in a remote head or probe. Fibre-optic cable carries the laser light from the laser diode to the remote head, which directs the beam along a measurement path to a reflector. The return light is collected on a photo-diode housed in the head or probe and the photo current is carried to the GasFinderFC via coaxial cable for analysis.

GasFinderMC works just like GasFinderFC. However, the GasFinderMC control unit also houses multiplexing hardware that enables up to eight paths to monitored at the same time. The transmitter heads and probes are intrinsically safe which enables the GasFinderMC system to be installed in electrically hazardous areas.

All GasFinders have a local data display with simple, menu driven set-up functions. Serial and analog signals are also available. The serial signal contains extensive self diagnostic data. A built-in data logger stores up to 10,000 readings. Boreal's GasView software enables easy transfer of data and diagnostics to a PC.

GasFinder Schematic



Operational Specifications

Dynamic Range	4 orders of magnitude
Response Time	1 second (default) Programmable
Path Length	< 1m to >1000m
Light Source	Semiconductor diode laser
Eye Safety	Class I or Class IIIa (ANSI) FDA/CDRH approved
Data I/O Interface Options	RS-232, RS-485, Modbus 4-20mA current loop

Physical Specifications

GasFinder/GasFinderFC

Weight	5 kg
Dimensions (L x W x H)	26 x 20 x 16 cm
Power Requirements	2A @ 12 Vdc
Ambient Temperature	-30°C to +50°C
Ingress Protection	IP 65
Hazardous Area Classification	North American Class 1, Div 2, Groups A,B,C,D

GasFinder MC

Central Control Unit	Weight	12 kg
	Dimensions (W x D x H)	44 x 38 x 13 cm
	Power requirement	<1A @ 110 Vac
	Ambient Temperature	0°C to 50°C
Open Path Transmitter	Weight	4 kg
	Dimensions (L x dia)	35 x 10 cm
	Ambient Temperature	-45°C to +80°C
	Ingress Protection	IP 65
Duct Transmitter Unit	Weight	2 kg
	Dimensions (L x dia)	25 x 12 cm
	Ambient Temperature	-45°C to +80°C
Number channels/paths		Up to 8
Maximum cable lengths		1000 m
Hazardous Area Classification		Cl 1, Div 1, Groups A,B,C,D Cenelec Zone 1

Selected Gases

Gas	Sensitivity (in ppm for different path lengths/plume size) 1m	10m	100m	1000m
HF	0.1	0.01	0.001	0.0001
NH3	2	0.2	0.02	0.002
H2S	20	2	0.2	0.02
HCN	1	0.1	0.01	0.001
CH4	1	0.1	0.01	0.001

Other gases include CO2, HCl, C2H2, CO

FEATURES

Three patented features provide laser gas detector leadership in price, performance, and ease of use.

1. "No phase adjustment" detection technology: enables paths from 1m to 1000m without requiring any phase adjustments or calibration.

2. Built-in, permanent calibration reference cell: means GasFinders are delivered calibrated, stay in calibration and never needs to be re-calibrated.

3. Fibre-optic multiplexing: enables multiple path/point monitoring.

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Products Summary

BOREAL LASER GasFinder

Boreal Laser's GasFinder technology has now been proven in numerous safety, environmental and process applications. GasFinder systems are robust, reliable and low maintenance, and so are typically used in critical applications.

GasFinder is a fully portable open path gas monitor providing one second response and broad dynamic range. GasFinder is permanently calibrated, small and light (less than 5kg). Alignment is easy and stable. GasFinder response does not depend on path length, so a series of paths of different lengths (between 1m and 1000m) can be measured in quick succession. GasFinder is ideal for short duration studies and troubleshooting, including safety monitoring during process unit turnarounds and new construction and commissioning.

GasFinderFC is a fully portable fibre-coupled version of GasFinder with all the same benefits. It can be used for open path, process or stack monitoring. A primary application has been portable stack and duct monitoring. GasFinderFC provides the basis for airborne and vehicle mounted leak detection systems.

GasFinderMC is a multiple path system that can monitor up to eight paths at the same time. These paths can be open path, process or stack/duct or any combination of these. GasFinderMC is primarily used for fixed installations and in hazardous areas. Using the multiple path capability of GasFinder MC, it is now possible to provide complete facility perimeter coverage at relatively low cost.

GasFinders are typically supplied for single gas applications. However, multiple gas capability is feasible with GasFinderMC.

GasFinderFC (above) with stack probe (below) for portable stack monitoring

BENEFITS

Laser Gas Detection

- ✓ No cross-interferences
- ✓ One second response
- ✓ Long paths possible
- ✓ Wide measurement range
- ✓ Robust, reliable technology

GasFinder specific

- ✓ Self-calibrating
- ✓ Easy set-up and use
- ✓ Portable operation possible
- ✓ Built-in data logger
- ✓ Self-diagnostics
- ✓ No consumables
- ✓ No maintenance

APPLICATIONS

Oil & Gas

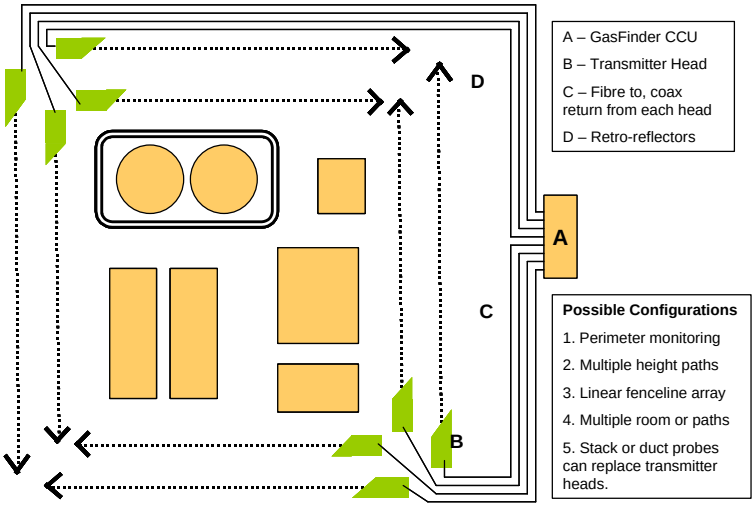
- ➢ HF leak detection in refinery HF Alkylation units
- ➢ H_2S safety monitoring in Sour Gas Operations
- ➢ Refinery perimeter H_2S, CH_4 and NH_3 monitoring
- ➢ Airborne CH_4 monitoring for pipeline leaks

Primary Aluminium

- ➢ Pot room and perimeter ambient HF monitoring
- ➢ HF scrubber inlet, outlet and stack monitoring

Selected Others

- ➢ HF leak detection in HF manufacturing and use
- ➢ HF stack monitoring (bricks, ceramics, incinerators)
- ➢ NH3 stack monitoring
- ➢ Agricultural CH_4 and NH_3 emissions
- ➢ Detection of CH_4 hotspot in landfills



A – GasFinder CCU
B – Transmitter Head
C – Fibre to, coax return from each head
D – Retro-reflectors

Possible Configurations

1. Perimeter monitoring
2. Multiple height paths
3. Linear fenceline array
4. Multiple room or paths
5. Stack or duct probes can replace transmitter heads.

GasFinderMC (shown above with an open path transmitter head) can be used in various configurations (left) for environmental, safety and process monitoring