

# G1000 Smoke Density Monitor

Opacity Meter & Emission Control

Rapid Response to Smoke



Perfecting Sensible Technology

Check smoke emissions from all kinds of combustion such as diesel engines, incinerators, and boilers. Green Instruments has produced more than 1000 of these patented opacity monitors over the past years. They are installed on cruise ships and tankers, on refineries and power plants.



# Robust Technology & Versatile Design



Optic head with fiber-optic cable

The G<sub>1000</sub> Smoke Density Monitor is a particular robust system that is well suited to resist heat and vibrations in and around smoke stacks. Our patented technology removes the light source from the smoke stack contrary to competing technology. Instead, the infrared LED is placed in the monitor cabinet and the light beam brought to the smoke stack via robust optic fibers. The lenses of the optic heads are kept clean with purge air.

These features reduce the requirements for maintenance and especially spare parts to a bare minimum. Green Instruments (former SBS Technology) was the first to make use of this design to the highest satisfaction of our customers.

This robustness is combined with a high flexibility which means that the G<sub>1000</sub> Smoke Density Monitor can be installed in very diverse settings. The small monitoring unit can be placed almost anywhere. It provides you with two alarm relays and an analog signal that can be adapted to your special needs.

## Key Features

- **Avoid image damaging black smoke**
- **Avoid investigations, fines, and delays**
- **Satisfy EPA and other authorities**
- **Documentation compliant with Visible Smoke Control Area regulation**
- **For combustion monitoring and optimization**
  
- **In-situ and real-time measurement**
- **Simple auditing**
- **Durable and robust design**
- **Temperature and vibration resistant optic heads**
- **Two freely configurable alarm relays**
- **Analog output signal (4...20 mA or 0...10 V)**
- **Cost effective**
- **Easy to install – easy to configure**
- **Low maintenance**
  
- **Worldwide customer support via service partners**

# Benefits to Economy and Environment



Easy lens cleaning



An installation of a G1000 Smoke Density Monitor with the monitoring unit and one optic head

Port authorities and regional authorities around the world – but especially in North America – are to increasing degrees regulating emissions from ships as well as from industrial plants. Although legislation is varying, regulations in North America would typically rule that ships may not emit smoke with an opacity of more than 20% for more than 3 minutes. A similar limit is set for shipboard incinerators by IMO.

Installing a G1000 Smoke Density Monitor will help you check and document compliance with environmental standards. This will avoid fines, time-consuming investigations, and costly delays. The cost of installing a G1000 Smoke Density Monitor is marginal compared to a single fine. Monitoring the emissions of your ships will also contribute positively to your image as environmentally responsible company. Especially black smoke has the potential of severely harming that image.

But the economic benefit has a wider range. By controlling the combustion, your crew and personnel is better equipped to detect faulty operation at an early stage and thus optimize operation and maintenance.

# Specifications

## Monitoring Unit incl. Digital Display:

Power Supply	standard 210–250 V AC – 50/60 Hz – 20 VA max. or optional 105–130 V AC – 50/60 Hz or 20–30 V DC
Ambient temperature	0°C – 55°C
Dimensions/ Weight	H×W×D: 300 × 200 × 150 mm / 5.5 kg (monitoring unit alone)
Enclosure	IP 65 Steel box – with DNV, LRS and other approvals
Display	0...100% opacity level (programmable)
Output signal (linearized)	4...20 mA (4 mA ≈ 100% – 20 mA ≈ 0% Opacity) max. 800 Ω or 0...10 V DC (0 V ≈ 100% – 10 V ≈ 0% Opacity) max. 10 mA
Alarm delay	default 10 s (programmable 0–99 s)
Relay function	2 relays, volt free, freely configurable — default NC — max. 250 V AC, max. 2A
Default alarm levels	Relay 1 at 20% opacity (= Ringelman 1) and Relay 2 at 30% opacity

## Fiber-Optic Cables:

Optic fibers	glass-fiber core in stainless steel sheathings with brass end tip
Operating temperature	max. 240°C at the glass fiber tip behind the lenses – up to 500°C in the stack with the purge air in operation
Length of cables	standard 4.5 m – optional 6.0 m, 7.5 m, or others

## Optic Heads with Purge-Air System:

Welding sockets	34×200 mm (∅×L) – sockets aligned opposite of each other
Scanning distance	1 m to 3 m – for shorter ranges one lens need to be removed or replaced
Head Housing	H×W×D: < 120 × 100 × 60 mm – stainless steel – with purge-air connector
Purge Air Supply	10 NLPM – i.e. 5 NLPM for each head

## Optional Equipment:

- Welding & Adjustment Bracket for easy mounting
- Audit Filter Pens
- Purge air blower — Filter-regulator for purge air
- Alarm Annunciator for panel mounting
- Visualization and data logging
- Data-system integration via various busses such as RS485 and CAN

Specifications subject to changes without notice

