Enhanced Laser Diode Spectroscopy (ELDS™)

‘The new era of laser open path gas detection’

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Enhanced Laser Diode Spectroscopy- ELDS

• What does an ELDS device do?
  • Its detects gas escapes in open areas when a gas cloud cuts a beam of laser light.

• What is the difference to TLDAS?
  • TLDAS (Tuneable Laser Diodes Absorption Spectroscopy) An established technique used in process gas analysers.
  • ELDSTM is an enhanced version of the same technique. Provides a more robust solution in open environments.
  • This patented enhanced version uses multiple harmonics, Which eliminates unwanted false positives.
What Does It Detect?

- Ammonia (NH₃)
- Carbon Dioxide (CO₂)
- Hydrogen Chloride (HCl)
- Hydrogen Fluoride (HF)
- Hydrogen Sulphide (H₂S)
- Methane (CH₄)
- Ethylene (C₂H₄)

- Methane (CH₄) + Hydrogen Sulphide (H₂S)

* Gas & measuring range dependant

- Target Gas Specific – No unwanted alarms
- Faster speed of response (3-5 seconds) – Higher risk mitigation
- Path lengths 5-200m*
- Methane vent inlet variant (min 2% LFL alarm, T90 <1 second)
Where Is It Used?

As part of a combined gas & fire detection system

One of several available technologies for gas and flame detection

Laser OPGD  Optical flame  Acoustic gas  IR OPGD  ECC / Cat. Point gas  IR point gas
Ideal Gas Detection Scenario - High Pressure Release

Open Path Detector

Fixed Point Detector

ALARM

NO ALARM
High Pressure Release + Changing Wind Direction

Open Path Detector

Fixed Point Detector

ALARM

NO ALARM

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Low Pressure Release – Rapid Dilution

Open Path Detector

Fixed Point Detector

ALARM

NO ALARM
How Senscient ELDS™ Works?

1. Tx sends target gas specific wavelength to Rx.
2. Target gas absorbs specific wavelength.
3. Fourier transform analysis of absorption reveals unique harmonic fingerprint (2f – 5f).
4. Amplitude of harmonics is proportional to gas concentration.
Enhanced (Multiple) Harmonic Verification

Detection Waveform

Target Gas Absorption

Waveform With Target Gas

Waveform in time domain

Fourier Transform

Waveform in frequency domain

Amplitude = Gas concentration

Enhanced (Multiple) Harmonic Verification

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Daily Automatic Functional Test

- Tx test gas signal programmed during factory calibration with real gas
- Test duration ~50 seconds
- Analogue outputs held during test
- Test result retrievable from integral event log

Tx generated test gas signal every 24 hours
What Are The Advantages Over Differential IR Devices?

<table>
<thead>
<tr>
<th></th>
<th>Senscient ELDS</th>
<th>Differential IR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gases</td>
<td>Methane specific</td>
<td>General</td>
</tr>
<tr>
<td></td>
<td>Ethylene specific</td>
<td>Hydrocarbons</td>
</tr>
<tr>
<td>Measuring ranges</td>
<td>0-1, 0-5 LEL.m, 0-1000 ppm.m</td>
<td>0-5 LEL.m</td>
</tr>
<tr>
<td>Speed of response</td>
<td>&lt;5 seconds</td>
<td>&lt;5 seconds</td>
</tr>
<tr>
<td>Fog resilience</td>
<td>Good</td>
<td>Poor</td>
</tr>
<tr>
<td>Routine testing</td>
<td>Daily auto test</td>
<td>3 monthly manually</td>
</tr>
</tbody>
</table>

**Sensitivity**

- **Conventional IR or ELDS**
  - 0-5 LEL.m

- **ELDS 0-1 LEL.m**
  - 5 times more sensitive

- **ELDS 0-1000 ppm.m**
  - 220 times more sensitive
Applications & Users

NH₃ - Storage tank

CH₄ + H₂S - FPSO

H₂S - Refinery

H₂S – Well head
ELDS - Enhanced laser Diode Spectroscopy

- Detects toxic & flammable gases
- Target gas specific
- Fast speed of response

- Improved performance in rain & fog
- Daily automatic end to end self test
- No consumable sensing elements

Thank you for your Attention
Any Questions?