Sieger Searchline Excel

The Searchline Excel is the world’s best selling infrared open path gas detector.
The Searchline Excel is the world’s best selling infrared open path gas detector with over 6,000 units installed in challenging applications throughout industry. From the Arctic Circle to Middle Eastern Deserts, customers have repeatedly selected the Searchline Excel as their preferred choice.

Product Evolution
Honeywell Analytics pioneered the original design of open path infrared combustible gas detectors with the introduction of the original Searchline back in 1987. Since then we have continued to work in conjunction with major international oil and gas companies to fully understand the detailed application requirements of these systems.

In 1998 we introduced Searchline Excel which has become the industry standard for open path gas detection by meeting and exceeding all customer driven demands.

Applications include:
- Offshore platforms & vessels (FPSO’s)
- Downstream chemical processing plants
- Gas transport and pipelines
- Large storage areas & buildings

Why open path gas detection?
Open path detectors compliment the use of individual point detectors and offer many significant benefits including:

- Wider area coverage - most likely to pick up any leak
- Very high speed of response
- NO unrevealed failure modes - no possibility of blocked gas path to detector
- Detector location not as critical
- Indicates size of hazard

Gas leak missed by point detectors but picked up by Open Path Detector
**The Difference**
The patented optical design used in Searchline Excel has proven itself as the only solution available that fully addresses all the challenges of open path gas detection. Unlike some competitive devices, it does not try to hide fundamental design inadequacy with the use of software masks that can compromise the unit’s ability to detect gas. Searchline Excel employs a patented double band pass filter that fully compensates for all types of fog and/or rain thereby allowing it to continue operate accurately and reliably in all climatic conditions.

**Different fog types scatter/absorb differently**

<table>
<thead>
<tr>
<th>Fog type 1</th>
<th>Fog type 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upscale gas/false alarm</strong></td>
<td><strong>Downscale gas/ftault</strong></td>
</tr>
<tr>
<td>R S</td>
<td>R S</td>
</tr>
</tbody>
</table>

**R - reference wavelength**

**S - sample wavelength**

**The solution... double band pass filter**

<table>
<thead>
<tr>
<th>Fog type 1</th>
<th>Fog type 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>R S R</td>
<td>R S R</td>
</tr>
</tbody>
</table>

**R - reference wavelengths**

**S - sample wavelength**

The differential scatter and absorption has a linear effect with respect to the reference wavelengths. The output from the reference detector is the average between the reference bands and will be exactly the same as the sample wavelength.

Radially symmetrical heating elements bonded to transmitter and receiver windows.

The unique **coaxial design of the optics** also means that Searchline Excel is also the only open path gas detector that can operate correctly under partial obscuration conditions without the possibility of generating a false alarm.

Searchline Excel is the only open path gas detector in the world that has achieved performance approval by FM.
The fundamental design of Searchline Excel has remained the same since its original launch and it continues to lead the field. Other manufacturers have tried unsuccessfully to develop comparable instruments but none have the experience or technology that is utilized in Searchline Excel.

Sample and reference detector alignment
- Reduced sensitivity to alignment
- Guaranteed performance
- Reduced sensitivity to partial obscuration

Improved handheld software
- Simple confirmation of alignment
- Visual indication of target and current signal levels
- Compatible with existing systems

Improved telescope
- High Power Rifle Telescope
- Easier to align with greater zoom and magnification
- Robust shock resistant design

True Alignment System
A good installation is key to obtaining the best performance from an open path gas detection system. Optimum alignment of the transmitter and receiver will ensure the best performance of the system in the harshest climatic conditions.

A visual check of the path using a telescope is required to ensure that there are no physical obstructions in the beam. With the new True Alignment System used on Searchline Excel this alignment is so accurate that the requirement for further adjustment using a software based alignment tool is eliminated.

Improved telescope mounting mechanism
- Simple engagement and locking mechanism
- 3 point mounting datum ensures true alignment
- Sight can be angled to most convenient position
- So accurate that further “software guided” adjustments not required
Searchline Excel is totally immune to interference from sunlight or any other sources of radiation such as flare stacks, arc welding or lightning.

This is achieved by using a xenon flash lamp that is actually brighter than the sun at the infrared detection wavelengths and solid state detectors with a wide dynamic range.

The lamp is also modulated to have a unique pulse duration and shape. The receiver then uses high speed digital signal processing to validate that all the signals received have this unique signature and rejects any extraneous signals.
Modbus digital output - know before you go!

The multi drop Modbus capability can enable significant savings in installation and cabling costs. A single comms cable can be run between up to 32 detectors instead of the usual ‘home run’ required for each detector. Additionally, the 2 way digital communication protocol allows configuration, warning and fault diagnosis information to be communicated back to the control room. This reduces servicing and maintenance costs as the operator can diagnose the state of any individual unit before deciding to send anyone into the field.

Installation options

1. Hazardous Area
   - 4-20mA output to Controller
   - Local intrusive interrogation via SHC and Hand Held Interrogator
   - Lowest cost

2. Hazardous Area
   - 4-20mA output to Controller
   - Redundant 4-20mA signals to Controller
   - Optional remote status via Modbus to SCADA
   - Local non intrusive interrogation

3. Hazardous Area
   - Multi drop Modbus output
   - Remote status to DCS/PLC
   - Local non intrusive interrogation
   - Cabling cost savings

Options

- DX100 (M) UL/CSA/FM approved
- DVC100 (M) ATEX approved

Searchline Excel/Junction box/Controller
Searchline Excel/DVC100 (M) or DX100 (M)/Controller
Searchline Excel/DVC100 (M) or DX100 (M)/DCS or PLC

Power

Modbus
DCS/PLC

SCADA
Cross-Duct Technology

Features & benefits
- Fast speed of response provides earliest warning
- High sensitivity allows low alarm set points
- Alignment free design makes installation simple
- Duct flex and vibration tolerance keeps the system online
- Integral functional gas test facility allows for simple system check
- Contamination resistant optics reduce the need for unscheduled maintenance
- Not affected by interference from water vapour
- Immune to catalytic poisons
- Works in inert atmospheres

Based on the proven open path design, Searchline Excel Cross-Duct was developed in response to the unique requirements for monitoring in HVAC ducting and Turbine Enclosures.

Searchline Excel Cross-Duct delivers the highest speed of response at low alarm set points over a wide temperature range.
Technical Summary - Searchline Excel Cross-Duct

**Specification**

**Available Gas Calibrations:** Methane*

**Detection Range:** 0-100% LEL

**Minimum Alarm Thresholds:** 20% LEL (>0.5 to 2.5m duct width) 10% LEL (>2.5m to 5m duct width)

**Speed of Response:** T90 < 1 second

**Output Signals**
- Measuring range: 4-20mA sink or source (Default current source)
- Over range: 21mA
- Warning: 3mA
- Beam Block: 2.5mA
- Inhibit: 2mA
- Fault: 0mA

**Diagnostics:**
- RS 485 serial link

**Digital Output:**
- Modbus RS485 multi-drop. (Using DVC100(m) or DX100(m)).

**Operating Temperature:** -40 to +65°C (-40 to 150°F) ambient. Contact Honeywell Analytics for high temperature applications.

**Operating Humidity:** 0-99% (non condensing)

**Operating Pressure:** 91.5 - 105.5 kPa (non compensated)

**Repeatability:** 5.0% LEL (<1 metre duct width) 2.5% LEL (>1 metre duct width)

**Warm-up Time:** <1 hour (fully stabilised)

**Power Supply:**
- Unit: 13W max. Heated Reflector Panel: 6W (nom) @ 24Vdc

**Enclosure Material:** 316 Stainless steel

**IP Rating:** IP66 and IP 67

**Weight:**
- Transceiver 13kg, reflector panel 2.0kg (>0.5 to 2.5m duct width), 4kg (>2.5 to 5.0m duct width)

**Vibration:** 2-60 Hz, max ptp amplitude 1mm

**EMC Standards:** EN50270:1999

**Performance Approval:** FM performance approved

**Safety Approvals:**
- ATEX: [IIC] II 2 G
- EExd IIC T5 (~-40 to +65°C).
- EExd IIC T6 (~-40 to +40°C)
- Heated Panel: EExd IIC T4 (~-40 to +60°C)
- UL: Class 1, Div 1, Groups B, C and D Class 1, Zone 1, AEx d IIB + Hydrogen (Amb -40°C to +65°C)

*Contact Honeywell Analytics for other gases and approvals*
## Technical Summary - Searchline Excel

### Specification

<table>
<thead>
<tr>
<th>Available Gases:</th>
<th>Methane, Ethane, Propane, Butane, Pentane, Ethylene, Propylene, Ethanol, Methanol.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range:</td>
<td>0 to 5 LEL.m.</td>
</tr>
<tr>
<td>Recommended Alarm Settings:</td>
<td>(Low) 1.0 LEL.m; (High) 3.0 LEL.m.</td>
</tr>
<tr>
<td>Path Lengths:</td>
<td>Short Range 5 to 40m (15 to 130 ft.), Medium Range 40 to 120m (130 to 390 ft.), and Long Range 120 to 200m (390 to 650 ft.)</td>
</tr>
<tr>
<td>Speed of Response:</td>
<td>T90 less than 3 seconds. (Under normal operating conditions).</td>
</tr>
<tr>
<td>Output Signal:</td>
<td>4 to 20mA (maximum loop resistance 600 ohms; source &amp; sink available) and RS485.</td>
</tr>
<tr>
<td></td>
<td>21mA Over range.</td>
</tr>
<tr>
<td></td>
<td>4 to 20mA Normal operation (0 to 5 LEL.m).</td>
</tr>
<tr>
<td></td>
<td>3mA/10 Dirty optics.</td>
</tr>
<tr>
<td></td>
<td>2.5mA/10 Beam blocked.</td>
</tr>
<tr>
<td></td>
<td>2mA/10 Inhibit.</td>
</tr>
<tr>
<td></td>
<td>0mA Fault.</td>
</tr>
<tr>
<td>Digital Output:</td>
<td>Modbus RS485 multi drop. Using DVC100(m) or DX100(m).</td>
</tr>
<tr>
<td>Operating Temperature:</td>
<td>-40 to +65°C (-40 to 150°F).</td>
</tr>
<tr>
<td>Operating Humidity:</td>
<td>0 to 90% RH (non-condensing).</td>
</tr>
<tr>
<td>Operating Pressure:</td>
<td>91.5 to 105.5 KPa (915 to 1055 mbar) (non-compensated).</td>
</tr>
<tr>
<td>Warm-up Time:</td>
<td>Less than 5 minutes (operational), or less than 1 hour (fully stabilised).</td>
</tr>
<tr>
<td>Power Supply:</td>
<td>18V to 32V dc.</td>
</tr>
<tr>
<td>Power Consumption:</td>
<td>Short Range TX: 3.5 / 5.0<em>W maximum. Medium and Long Range TX: 5.5 / 7.5</em>W maximum.</td>
</tr>
<tr>
<td>Enclosure Material:</td>
<td>316 stainless steel.</td>
</tr>
<tr>
<td>Weight (inc. mounting bracket):</td>
<td>Short Range TX: 3.5kg. Medium and Long Range TX: 7kg. RX: 3.5kg.</td>
</tr>
<tr>
<td>Vibration:</td>
<td>2 to 60Hz, max ptp amplitude 1mm.</td>
</tr>
<tr>
<td>Misalignment Tolerance:</td>
<td>Short Range ±0.5º (±~35cm at 40m). Medium Range ±0.5º (±~104cm at 120m). Long Range ±0.5º (±~170cm @ 200m).</td>
</tr>
<tr>
<td>EMC Standards:</td>
<td>EN50270:1999</td>
</tr>
<tr>
<td>Performance Approval:</td>
<td>FM performance approved.</td>
</tr>
<tr>
<td>Safety Approval:</td>
<td>ATEX: Ex IIC T5(-40°C to +65°C). Ex IIC T6(-40°C to +60°C).</td>
</tr>
<tr>
<td></td>
<td>UL: Class 1 Div 1 Groups B,C + D and Class 1 Zone 1 AEx d HB + H2 (Tamb -40°C to +65°C).</td>
</tr>
<tr>
<td></td>
<td>CSA: Class 1 Div 1 Groups B,C + D, T5 and Exd IIC T5 (Tamb -40°C to +65°C).</td>
</tr>
<tr>
<td></td>
<td>FM: Class 1 Div 1 Groups B,C and D</td>
</tr>
<tr>
<td></td>
<td>Other: SAA, GSST.</td>
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<tr>
<td></td>
<td>Independently assessed to IEC61508</td>
</tr>
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<td></td>
<td>m User programmable.</td>
</tr>
</tbody>
</table>

* Turboheating activated (standard feature; user selectable). This is recommended for the most severe weather conditions.

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![Diagram](image1.png)

**Short Range 5 to 40m (15 to 130 ft.)**

![Diagram](image2.png)

**Medium Range 40 to 120m (130 to 390 ft.) and Long Range 120 to 200m (390 to 650 ft.)**
Features / Benefits

Double band pass filters that fully compensate for all types of fog, rain and mist interference.

100% Solar Immune

Correct operation under partial obscuration conditions

High Vibration resilience

Radially symmetrical and bonded window heating

Fully temperature compensated solid state detectors

Low power consumption in all conditions

Simple ‘lock on’ alignment tool

No extra ‘software alignment’ required

Higher power and more robust design telescope

Optional Modbus RS485 multi drop output

FM hazardous area and performance approved

Searchline Excel is the only open path gas detector in the world that has achieved performance approval by FM. Products or services that meet FM Approvals’ rigorous testing standards may bear the FM APPROVED mark, a visual symbol of excellence that is widely recognized and respected. This “Mark of Excellence” tells customers that a company’s product conforms to the highest standards and will continue to meet those standards.

Additional FM tests

With its patented double band pass filter and unique coaxial optical design, Searchline Excel is the only open path gas detector that fully addresses the issues of performance under partial obscuration and fog/mist conditions. As these elements were not covered in the FM standard, our optical engineers worked alongside FM to develop and approve Searchline Excel to a new set of simulated fog/mist and partial obscuration tests.

Please Note:

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