Aspiration Smoke Detection-ASD

Introduction
What is Siemens ASD?

• ASD is a Aspirating Smoke Detection System.
• It continually samples air from the monitored area.
• Able to detect smoke very early during the initial developing fire stages.
• Optical dual-wavelength detection technology with one blue and one infrared light source.
• Able to differentiate between smoke and dust by measuring a full range of particle sizes.
• Pipe is basic component - Usually low-cost PVC.
How the Air Sampling System Works

Air samples are drawn into the sampling pipe and carried through to the detector head by the enclosure-mounted aspirator.

Pipe specification
• Any rigid pipe with a smooth bore
• Typically 16-21mm inside diameter, 21-25mm outside diameter
How does the ASD from Siemens work?

- The ASD continuously draw samples of air from the areas requiring protection – via pipes with sampling holes.
- Air samples are evaluated for presence of smoke in detector chamber.
- Very early warning for business-critical applications – due to very high sensitivity.
Positioning ASD

- **Pyrolytic phase**: Smouldering

  - **Visible Smoke**: Flaming fire
  - **Smoke Density**: Very early
  - **ASD Alarms**: Early

  - **ASD Systems**
  - **Point Detectors**

- **Time**: Very early

- **Sprinkler**: Open fire

- **Flame**

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Detector chamber principle

- Use two projectors, blue and infrared
- Flash the projectors alternately
- Receive scattered light
Blue and infrared are balanced - set equally sensitive to dust (e.g. cement)

Blue is much more sensitive to small particles

Small particles indicate the early stages of fire

Particle size data from Bankston, Zinn, Browner & Powell, 1981
We offer 2 ASD products

**FDA221**
- Covers an area of up to **500m²**
- 3 Alarm outputs
- Fault output
- GPI
- Analogue 4-20mA Output (Smoke)

**FDA241**
- Covers an area of up to **800m²**
- 4 Alarm outputs
- Fault output
- GPI
- Analogue 4-20mA Output (Smoke / Airflow)
- Programmable Purge Functionality
- Dust LED and Output
Parameter Sets FDA221

FDA221
Sensor operating mode “Automatic discrimination”

<table>
<thead>
<tr>
<th>Parameter set</th>
<th>Prealarm</th>
<th>Fire 1</th>
<th>Sensor “Smoke”</th>
</tr>
</thead>
<tbody>
<tr>
<td>06</td>
<td>0.14 %/m</td>
<td>0.20 %/m</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>0.28 %/m</td>
<td>0.40 %/m</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>0.50 %/m</td>
<td>0.70 %/m</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>0.70 %/m</td>
<td>1.00 %/m</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1.40 %/m</td>
<td>2.00 %/m</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter set</th>
<th>Fire 2</th>
<th>Sensor “Extinguishing”</th>
</tr>
</thead>
<tbody>
<tr>
<td>06</td>
<td>6.0 %/m</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>8.0 %/m</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>10.0 %/m</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>15.0 %/m</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>20.0 %/m</td>
<td></td>
</tr>
</tbody>
</table>
## Parameter Sets FDA241

**FDA241**
Sensor operating mode “Automatic discrimination”

### Sensor “Smoke”

<table>
<thead>
<tr>
<th>Parameter set</th>
<th>Inspect</th>
<th>Prealarm</th>
<th>Fire 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>0.030 %/m</td>
<td>0.040 %/m</td>
<td>0.05 %/m</td>
</tr>
<tr>
<td>02</td>
<td>0.030 %/m</td>
<td>0.045 %/m</td>
<td>0.06 %/m</td>
</tr>
<tr>
<td>03</td>
<td>0.040 %/m</td>
<td>0.055 %/m</td>
<td>0.07 %/m</td>
</tr>
<tr>
<td>04</td>
<td>0.050 %/m</td>
<td>0.075 %/m</td>
<td>0.10 %/m</td>
</tr>
<tr>
<td>05</td>
<td>0.070 %/m</td>
<td>0.100 %/m</td>
<td>0.15 %/m</td>
</tr>
<tr>
<td>06</td>
<td>0.080 %/m</td>
<td>0.140 %/m</td>
<td>0.20 %/m</td>
</tr>
<tr>
<td>07</td>
<td>0.180 %/m</td>
<td>0.280 %/m</td>
<td>0.40 %/m</td>
</tr>
<tr>
<td>08</td>
<td>0.300 %/m</td>
<td>0.500 %/m</td>
<td>0.70 %/m</td>
</tr>
<tr>
<td>09</td>
<td>0.400 %/m</td>
<td>0.700 %/m</td>
<td>1.00 %/m</td>
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<tr>
<td>10</td>
<td>0.800 %/m</td>
<td>1.400 %/m</td>
<td>2.00 %/m</td>
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</tbody>
</table>

### Sensor “Extinguishing”

<table>
<thead>
<tr>
<th>Parameter set</th>
<th>Fire 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>2.0 %/m</td>
</tr>
<tr>
<td>02</td>
<td>2.5 %/m</td>
</tr>
<tr>
<td>03</td>
<td>3.0 %/m</td>
</tr>
<tr>
<td>04</td>
<td>4.0 %/m</td>
</tr>
<tr>
<td>05</td>
<td>5.0 %/m</td>
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<tr>
<td>06</td>
<td>6.0 %/m</td>
</tr>
<tr>
<td>07</td>
<td>8.0 %/m</td>
</tr>
<tr>
<td>08</td>
<td>10.0 %/m</td>
</tr>
<tr>
<td>09</td>
<td>15.0 %/m</td>
</tr>
<tr>
<td>10</td>
<td>20.0 %/m</td>
</tr>
</tbody>
</table>

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Range of Application

Standalone

- Alarm (Fire 1), Pre-Alarm, Fault
- FDA241: Extinguishing (Fire 2), Dust

Sinteso/Cerberus PRO

- Supervised 4-20mA Output
- MP4.0 or higher
- FDnet/C-NET
- FDnet/C-NET Interface FDCC221S

Relay outputs
- Extinguishing Fire 2 (FDA241)
- Alarm Fire 1
- Pre-Alarm
- Fault
- Dust (FDA241)
Range of application

Room protection
- Air samples are drawn at defined points in the room
- Are analyzed by detector that is easily accessible
- Easy-to-read alarm status

Object protection
- Air ventilation increases smoke dilution
- Air samples are drawn directly at source for early localization and warning of potential fire
- Earlier response

Combined protection
- Volumetric detection and protection of individual equipment
- Monitoring of sensitive or special environmental zones
Multiple Pipe Designs

FDA221 protection area: 500 m²
1 or 2 Pipes

FDA241 protection area: 800 m²
1, 2, 3 or 4 Pipes
Room and false ceiling protection

Do not have different air pressure (room and false ceiling)

Room protection only

End cap or Capillary tube
Pipe
Capillary tube
Capillary tube
Room Protection - False ceiling

Pipe

Capillary tube

Sampling point flat

Capillary tube

Sampling point with heat barrier adaptor
### Characteristic product data

#### Standards for ASD according EN54-20
- **Class A** = 1.5 %/m
- **Class B** = 4.5 %/m
- **Class C** = 10 %/m

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Coverage</th>
<th>Fire Relays</th>
<th>Fault Relays</th>
<th>Purge Relay</th>
<th>Single Pipe</th>
<th>Multi Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FDA221</strong></td>
<td>0.14 – 20 %/m</td>
<td>500 m²</td>
<td>3</td>
<td>1</td>
<td>--</td>
<td>30 m Class A with 6 Holes</td>
</tr>
<tr>
<td><strong>FDA241</strong></td>
<td>0.03 – 20 %/m</td>
<td>800 m²</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>60 m Class A with 16 Holes</td>
</tr>
</tbody>
</table>
Tools for your support

Planning with “Asyst”

Siemens Aspirating Smoke Monitoring System “Asyst”

- For easy planning of the pipe network
- “Normal” and “Scientific” operating mode
Why Aspirating Smoke Detection?

- Higher sensitivity
- Very early warning for business critical applications
- Suitable for large open areas
- Cold storage applications
- Inaccessible areas
- Unobtrusive detection
- Dusty and humid environments
- Vandalism lower cost
- Reduced maintenance costs

- Very wide application field’s
- From clean room up to very dirty and humid environments
- Yet still having the highest sensitivity!
Summary

Siemens ASD offers

- Very early warning
- Sees smaller smoke particles
- Robustness towards dust
- New applications