

SIEMENS Fire Safety

Li-Ion “Off-Gas Particle” Detector

Aspirated Lithium-Ion Battery “OGP” Detector
[with patented *Dual Wavelength Technology*]
Model FDA241

Architect & Engineer Specifications

- ☐ Patented Dual wavelength sensor technology
 - Provides enhanced detection via Blue and Infrared light-scattering technology
 - Differentiates between deceptive phenomena and an actual fire (nuisance-alarm avoidance)
- ☐ Responds to flaming and smoldering fires as well as Lithium-Ion Battery electrolyte off-gas particle signatures
- ☐ Dust Sensor & Indicator
- ☐ Detection coverage area 8,600 sq. ft. (800 m²)
- ☐ “Asyst-Tool” pipe network design software
- ☐ Programmable Alarm thresholds
- ☐ Out of Box install and commissioning
- ☐ Complies with NFPA 76 (Telco standard) VEWFD, EWFD & Standard detection levels
- ☐ Programmable 4-20 mA output supports real-time monitoring of:
 - Smoke value,
 - Sample pipe airflow,
 - Background dust value,
 - Background fine dust value
- ☐ Pre-engineered pipe network designs
- ☐ Programmable general-purpose input (GPI)
- ☐ Multiple event logging
- ☐ Non-volatile event memory
- ☐ Service access for field personnel
- ☐ Intuitive “system status” User-Interface
- ☐ Supports optional “Purge” function for cleaning sample pipe network
- ☐ Restriction of Hazardous Substances (RoHS compliant)
- ☐ VdS Approved
 - Li-Ion battery electrolyte particle detection
- ☐ VdS Approved
 - Aspirated smoke detection for standard building protection under EN54-20
- ☐ ETL Listed for Electrical safety to Std.’s:
 - UL 61010-1:2012 Ed.3+
 - CSA C22.2#61010-1:2012 Ed.3

Product Overview

Model FDA241 is an advanced, aspirated fire / Li-Ion off-gas particulate detector uniquely designed to detect products of combustion from common fires in addition to off-gas particulate from lithium-ion batteries in advance of a hazardous Li-Ion battery thermal runaway condition.

The FDA241 unit increases the safety level of lithium-ion battery protection applications. The FDA241 unit is the first and currently the only commercial fire detection device to have earned the globally respected **VdS** approval. The approval covers the reliable early detection of Lithium-Ion battery off-gassing events. A Li-Ion battery off-gassing event is a leading indicator of Li-Ion battery failure providing “signature particulates” as a precursor to Li-Ion battery thermal runaway condition.

The uniquely designed detection chamber utilizes patented *dual wavelength* (blue and infrared) detection technology for accurate – very early warning detection of a broad spectrum of particle sizes providing high-tech, unparalleled fire detection to the widest range of fire types while allowing the detector to distinguish non-threatening deceptive phenomena avoiding unwanted alarm conditions.

The FDA241 unit protects small to medium sized mission-critical Lithium-Ion battery energy storage system (BESS) environments up to 8,600 sq. ft. (800 m²). Each FDA unit continuously draws air into its detection chamber thru a connected sample pipe network and associated sample holes installed throughout the protected space.

The FDA unit provides 4 programmable smoke thresholds (Inspect, Pre-Alarm, Fire 1, and Fire 2) which can be programmed to operate with a connected sample pipe network, to meet detection requirements of NFPA 76 “Standard for the Fire Protection of Telecommunications Facilities” as referenced in NFPA 855.

Simple ‘out-of-the-box’ detector mounting and commissioning: Installation is simple thanks to combined functions for normalizing background smoke values and sample pipe network airflow, as well as appropriate pre-settings for alarm and fault thresholds.

The sample pipe network is designed for peak performance using the “Asyst-Tool” software to calculate performance of desired pipe network layout to specific site geometry and specified sample hole sensitivities including isometric layout for simple visual verification of pipe design.



Model FDA241

Aspirated Smoke and Off-Gas Particle (OGP) Detector
[with **Dual wavelength technology**]



Product Overview – (continued)

Siemens aspirating smoke detectors with patented “Dual wavelength” detection technology are successfully deployed for early and reliable detection of both Fire and Li-Ion battery off-gas events within rooms and equipment. They have proven to be especially suited to applications where both individual smoke detectors & individual point gas detectors are one dimensional in detecting only off-gas conditions or Fire conditions but not both conditions combined - Siemens FDA “OGP” technology does.

An aspirating smoke detector continually draws air from the monitored area using a connected sample pipe network with defined sample holes. The air is brought to the detection chamber and is analyzed for smoke particles using the detector installed there. The sensitivity level of the detector can be adjusted.

The position and size of the sample holes are calculated with the 'FXS2056 ASD Asyst Tool V2' software. The calculation ensures that the sampled air passes from each sample hole to the detector within the time specified and with the required calculated sensitivity.

Operation

Dual wavelength Light-Scattering Technology

A patented detector chamber design using a dual wavelength, light-scattering technology, can distinguish both small and large particles of combustion, as well as identify deceptive phenomena is at the core of each Model FDA intelligent aspirated smoke / Li-Ion battery off gas detector.

Therefore, each FDA241 detector can detect both smoldering and flaming fires – all in an ecologically efficient manner and is an approved Li-Ion battery off-gas particle detector that out-performs traditional spot type gas sensors.

The high-quality, optical-electronic measuring chamber for each Model FDA241 houses the following components:

- | | |
|--------------------------------|------------------------------------|
| ➤ Two (2) optical transmitters | ➤ One (1) IR optical transmitter |
| ➤ One (1) optical receiver | ➤ One (1) Blue optical transmitter |

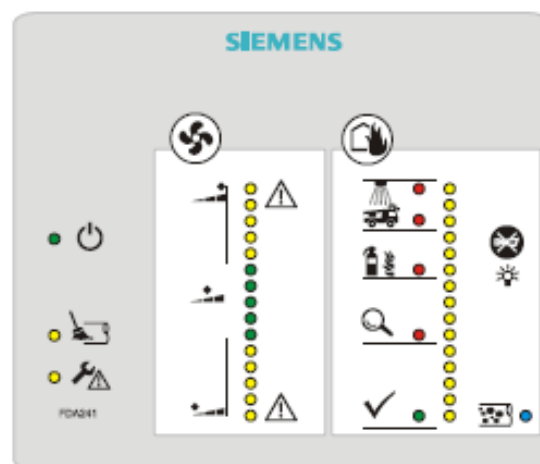
The transmitters illuminate the smoke particles from different angles: one sensor transmits IR scatter, and the other sensor transmits Blue scatter. The dual wavelength scattered light subsequently reaches the receiver (photodiode) and generates a measurable electric signal. The combination of a forward-and-backward scatter facilitates optimum detection, as well as differentiates between light-and-dark particles / particle size.

This type of detection creates standardized, responsive behavior, therefore optimizing the differentiation between wanted signals and deceptive phenomena. Additionally, this scenario generates the following advantages:

- ✓ Detects Gas Particles
- ✓ Early detection of all fire types of fire – whether they generate light-or-dark smoke, or no smoke
- ✓ The fire detector can be operated at a very sensitive threshold level, by achieving a higher immunity against false alarms caused by deceptive phenomena.

User interface

The FDA241 display contains clear, comprehensible bar graphs for smoke and airflow, as well as an alarm indicator, an error indicator, and a dust indicator. When the housing cover is open, the operator has access to the 'Reset', 'Normalize Smoke', and 'Normalize Flow' functions, as well as the mini-USB connector.



Model FDA241
Front Indicator Panel

Legend for user interface indicators

 Operation	 Flow warnings	 Smoke alarm	 Info alarm
 Blowing out	 High flow Normal flow Low flow	 Fire 2	 No smoke
 Error		 Fire 1  Pre-alarm	 Fault/test  Dust

Application Data

Installation of Model FDA intelligent aspirated smoke and off gas detector requires a sample pipe network with sample holes appropriately spaced for the area being protected as described in the system design documents. The unit is powered by a 24 VDC power supply adequately sized to power the unit(s) installed in the protected space.

Model FDA detector applications are designed with the Asyst design software to support various sample hole spacings as required in the system design documents for the specific project. Should questions arise regarding sample hole spacing, sample pipe network installation, etc.... observe NFPA 72 guidelines.

Good fire-protection-system engineering and common sense dictate how and when aspirated fire & off-gas detectors are installed and used. Contact your local Siemens – Fire Safety distributor or sales office whenever you need assistance applying Model FDA in unusual applications. Be sure to follow NFPA guidelines and FDA detector installation instructions – included with every Siemens – Fire Safety detector – and local codes as for all fire protection equipment.

Accessories

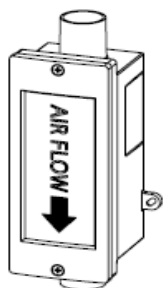
The application of the FDA unit is supported with the following accessories which provide additional capability when application requirements create the need.

FDAZ291 aspirator (FDA241/FDA221)



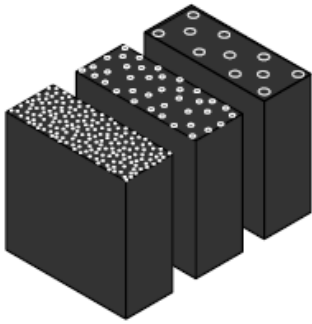
- Spare part for the aspirating smoke detectors FDA241 and FDA221
- You will find more information in document A6V10916366

FDAZ292 ASD filter box



- Filter box for installation in the pipe system for aspirating smoke detectors
- Filters dust and other dirt out of the air aspirated by the aspirating smoke detector
- Minimizes internal contamination of the aspirating smoke detector
- Contains filter set FDAZ292-AA with three filters, coarse/medium/fine
- Compatible with the aspirating smoke detectors FDA241 and FDA221
- You will find more information in document A6V10877841

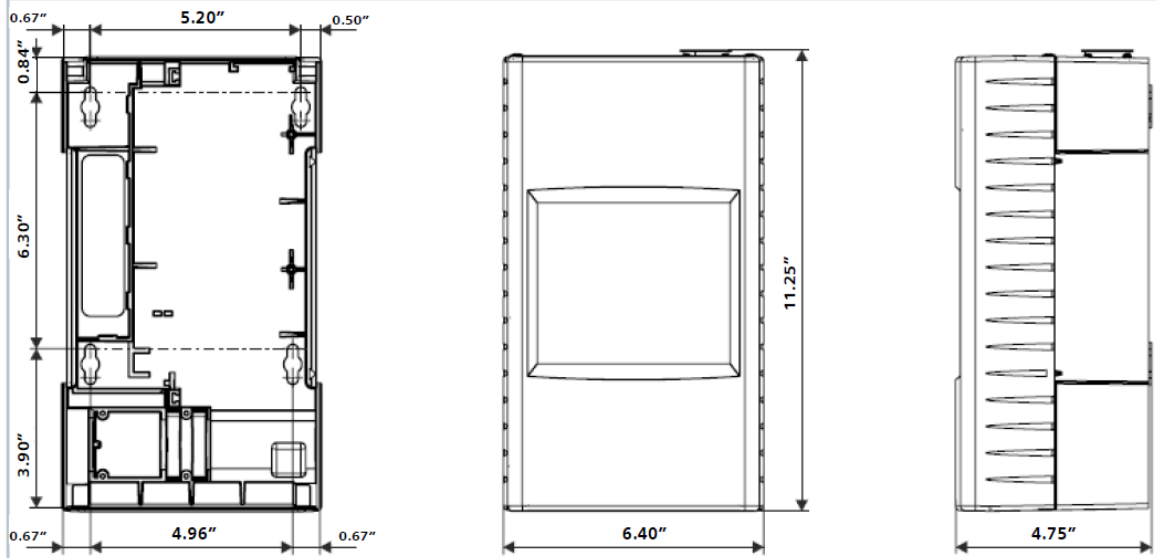
FDAZ292-AA ASD filter set



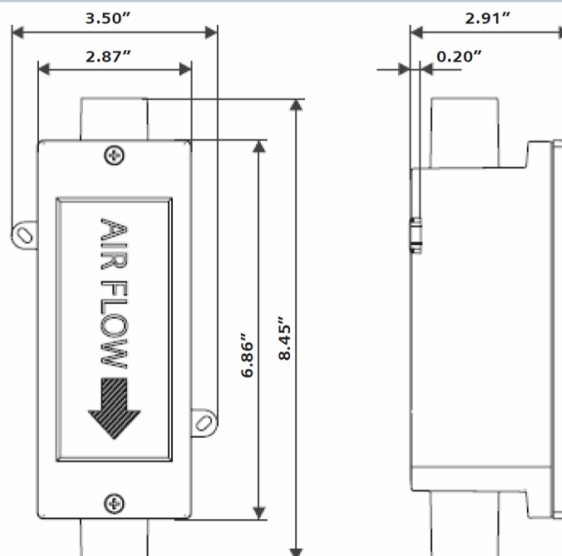
- Spare part for the ASD filter box FDAZ292
- Filter set contains one coarse filter, one medium filter, and one fine filter

Mounting Diagrams | Dimensions

FDA241, FDA221



FDAZ292



Technical Data	
FDA241	
Operating Temperature	- 4° – +140°F (-20° – +60°C)
Humidity range	5 – 95 % RH (no condensation)
Protection Category	IP 30
Operating Voltage	24 VDC Nominal (19 - 30 VDC)
Operating Current:	150 mA (nominal), 250 mA (during Alarm) (@ 24 VDC)
Enclosure Mounting Orientation	Vertically Upward (Inlet upward), Vertically Downward (Inlet downward)
Sound Pressure level LWA (dBA) ¹ (At suction speed): - High - Medium - Low	37 33 30
Dust Indicator	Yes
Detector Coverage Area: (Varies by Local Codes & Standards)	8,611 sq. ft. (800 m ²)
Maximum Pipe Length Single Pipe Branched Pipe	197 Ft. (60 M) 2 x 197 Ft. (2 x 60 M)
Sample Pipe Network Options	Pre-engineered option or maximum pipe length must correspond to the specifications determined by using "FXS2056 ASD Asyst Tool V2" calculation software.
Inlet pipe / Exhaust pipe	1 inch (25 mm) outside diameter
Relay Outputs (latching / non-latching) Rated 2.0 A @30 VDC	4
Trouble (Fault) Relay	1
Cable Inlet	1" (2.5 cm) top or back of enclosure
Field Wiring Connection	Screw terminals – 12 – 30 AWG (0.2 thru 2.5mm ²)
Optional Interfaces	Power supply, 4-20 mA output
Sensitivity Range	0.015 – 6.58 %/ft. obs. (0.05 – 20 %/m obs).
Alarm Threshold Parameter Sets	
Fire 1	10 sets 0.015 %/ft – 0.614 %/ft obs. (0.05 thru 2.0 %/m obs.)
Fire 2	10 sets 0.614 %/ft – 6.58 %/ft obs. (2.0 thru 20 %/m obs.)
Alarm Output Delay – individually configured	0 thru 300 seconds: default values - 0 seconds smoke, 15 seconds airflow
User Interface Indicators	<u>4x Alarm status indicators</u> Smoke density and airflow Faults Blow out Dust
Service Area Indicators / Controls	- LED "Status OK" USB port
Event Log	Non-volatile event memory with time and date stamp for smoke density, airflow, detector status and faults
Normalization of smoke value and system airflow	- Setting of threshold values for smoke alarms and faults User setting for normalization of smoke density and airflow
Warranty Period	2 years
Approvals VdS	FDA241 G213050
ETL	ETL listed to UL 61010 and CSA 22.2 NO. 61010 for product safety
National Fire Protection Association	Meets or exceeds the fire detection requirements of NFPA 72, 75, 76 and 855

¹" A-weighted sound pressure level in dB as per DIN EN ISO 3744-2009, measured with a pipe installed on the inlet and exhaust of detector.

13  0786	FDA221 / FDA241	Siemens Schweiz AG; Thelerstrasse 1a CH-6300 Zug Technical data: see doc. A8V10334410
FDA221 / FDA241 - Aspirating smoke detector for use in fire detection and fire alarm systems installed in buildings.		
305/2011/EU (CPR); EN 54-20 / EN 54-17; 2014/53/EU (EMC); EN 50130-4 / EN 61000-6-3; 2011/65/EU (RoHS); EN 50581		
The declared performance and conformity can be seen in the Declaration of Performance (DoP) and the EU Declaration of Conformity (DoC), which is obtainable via the Customer Support center: Tel. +49 89 9221-8000 or http://siemens.com/bt/download		
DoP No.: 0786-CPR-21270; DoC No.: CED-FDA221/FDA241		

Ordering information

Model	Description	Part number	Weight (kg)
FDA241	Aspirating smoke & off-gas particle detector	S54333-F17-A1	1.495
FDAZ292	ASD Filter Box	S54333-C92-A1	0.220
FDAZ292-AA	ASD Filter set (replacement part)	S54333-S91-A1	0.009
FDAZ291	Aspirator (replacement part)	S54333-G1-A1	0.106

Product documentation

Document ID	Title
A6V10334410	Technical manual aspirating smoke & off gas detector FDA241
A6V10345654	Installation, mounting aspirated smoke detectors FDA241
A6V10728226	User manual "ASD Asyst tool V2 FX2056"
A6V10334435	Planning, Installation ASD sample pipe network
A6V10332759	Installation, Operation manual ASD configuration tool FXS2051
A6V10877841	Installation ASD filter box FDAZ292
A6V10916591	Installation replacement Aspirator (FDA241) FDAZ291 (spare part)

NOTICE – The information contained in this data-sheet document is intended only as a summary, and is subject to change without notice.
The product(s) described here has/have a specific instruction sheet(s) that cover various technical, limitation and liability information.

Copies of install-type, instruction sheets – as well as the *General Product Warning and Limitations* document, which also contains important data, are provided with the product, and are available from the Manufacturer.

Data contained in the aforesaid type of documentation should be consulted with a fire-safety professional before specifying or using the product.

Any further questions or assistance concerning particular problems that might arise, relative to the proper functioning of the equipment, please contact the Manufacturer.

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