ASD 531

Aspirating Smoke Detector

As of production version 200619 and FW version 01.02.xx

The ASD 531 aspirating smoke detector has the task of continuously taking air samples via a sampling pipe tube network from a monitored area and feeding the samples to a smoke sensor.

The ASD 531 consists of the detector housing and a sampling pipe tube network. The sampling pipe has several sampling holes whose size is such that each hole extracts the same amount of air. The sampling pipe may be I-, U-, T-, H-, or E-shaped. The sampling pipe is symmetrically designed in principle. Asymmetrical sampling pipe tube networks can also be implemented with the help of the “ASD PipeFlow” calculation software.

Fig. 1 ASD 531

Description

Integrated in the detector housing is a fan which, in conjunction with the sampling pipe, ensures an uninterrupted supply of air to the detector housing. Airflow monitoring detects any pipe blockages and pipe breakages in the sampling pipe.

The ASD 531 aspirating smoke detector is part of the ASD 535 product range and is available in a version for 1 sampling tube and 1 smoke sensor without smoke level indicator.

The **SSD 31** smoke sensor is used in the ASD 531. It has an alarm sensitivity range of 0.02%/m to 10%/m.

The ASD 531 aspirating smoke detector has two slots for additional modules. The following modules can be fitted:

- XLM 35 eXtended Line Module
- RIM 36 Relay Interface Module with 5 relays

The ASD 531 can be connected to a superordinate FACP by means of potential-free change-over contacts.

With the installation of an **XLM 35**, the ASD 531 can be ideally connected via the addressable loop to the SecuriFire and Integral fire alarm systems.

The **RIM 36** is available as a further installation option. This module enables the availability of all three pre-signal levels as well as the states of the smoke sensor and the sampling pipe.

The ASD 531 aspirating smoke detector can be used for:

- **Equipment monitoring**: EDP systems, electrical distributors, switch cabinets, etc.
- **Space monitoring**: EDP rooms, ultra-clean rooms, warehouses, hollow floors, protection of cultural assets, transformer stations, prison cells, etc.

The ASD 531 can also be deployed in areas where normally conventional point detectors are used. Local regulations and provisions must be observed from case to case.

The response behaviour of the ASD 531 has been tested in compliance with EN 54-20, Class A, B and C.

When setting up ASD 531 fire alarm systems, the information and specifications in “**Technical Description ASD 531**” must be observed and adhered to. This includes among others:

- **General** Section 1
- **Planning** Section 4
- **Mounting** Section 5
- **Installation** Section 6
- **Commissioning** Section 7
- **Operation** Section 8

Opening the detector housing

Press the **rotary snap locks** down **firmly** with a screwdriver (at least No. 5) toward the housing base and then **turn** 90° to open them. The position of the lock slit shows the current status:

- angled approx. 45° toward detector housing corner = closed;
- angled approx. 45° toward detector housing edge = open.

In either position the rotary snap locks **must** snap into place.

Connection

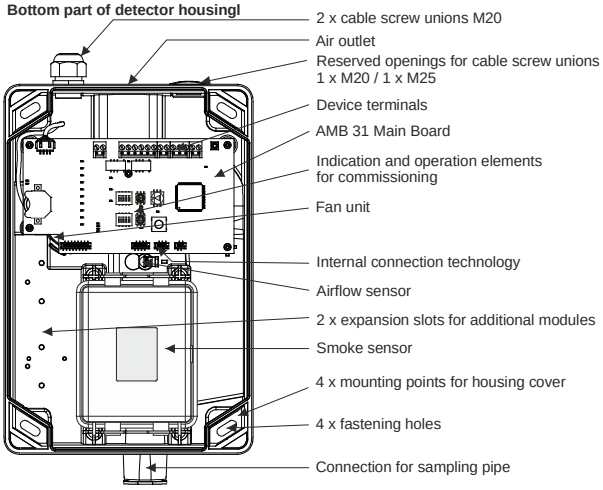

Fig. 2 Inside view of the ASD 531

Device connections on the AMB 31

The electrical connection is by means of plug-in terminals.

Terminal	Signal	
1	+14 to +30 VDC ①	Main power supply line
2	0 V	
3	+14 to +30 VDC ①	Redundant power supply line
4	0 V	
5	+ supply (for OC consumers)	
6	Output Fault, OC (all events)	
7	Output Alarm, OC	
8	Rel. 1 “(NO)”	Fault ②
9	Rel. 1 “(NC)”	
10	Rel. 1 “COM”	
11	Rel. 2 “NO”	Alarm
12	Rel. 2 “NC”	
13	Rel. 2 “COM”	
14	Input Reset external +	Opto-isolator input reset
15	Input Reset external -	

① UL/FM: +16.4 to +27 VDC
② The “Fault” relay has picked up in the normal state ➔ contact Te. 10/8 closed, 10/9 open (ASD 531 under voltage; no fault present).

XLM 35, RIM 36 terminal assignment

The terminal assignments of the XLM 35 and RIM 36 can be found in the corresponding data sheets T 140 088 (XLM 36) and T 140 364 (RIM 36).

Wiring principle

Examples of and information on the wiring principle can be found in the Technical Description ASD 531, T 140 416, Sec. 6.

Using the smoke sensor

The ASD 531 ships with the smoke sensor already fitted. The smoke sensor has to be removed from the detector housing for the installation of the ASD (release the two lock clamps); however it should be left inside its protective packaging until the definitive commissioning. The definitive installation is carried out as described below, see **Fig. 3**.

- Always leave the smoke sensor inside its protective packaging until it is ready to be installed definitively in the detector housing.
- Depending on the situation – (e.g. if there is a long time between mounting and commissioning or if the environment is extremely dusty (construction work) – only remove the smoke sensor from its protective packaging and insert it definitively in the detector housing when commissioning the ASD 531.
- Before installing the smoke sensor check that the insect protection screens are properly fitted to the smoke sensor chamber at the air inlet and outlet.
- The smoke sensor chamber must be absolutely free of any dirt and/or dust. Remove any residue resulting from mounting the detector housing.

Check the installation position when installing the smoke sensor. The connector plug of the smoke sensor must be face away from the slots of the additional modules. The anti-twist rib on the smoke sensor case prevents an incorrect installation position.

The smoke sensor is secured inside the ASD housing using the two lock clamps. Connect the ribbon cable supplied with the smoke sensor to the smoke sensor (large ribbon cable connector) and to the AMB 31 main board (small ribbon cable connector).

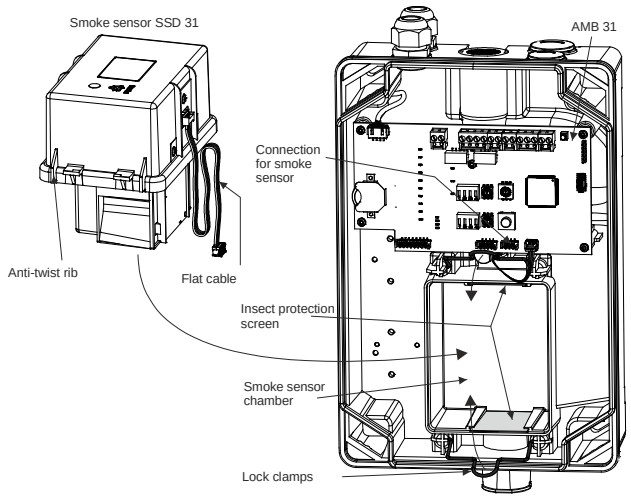

Fig. 3 Using the smoke sensor

Displays on the control unit

Several LEDs on the control unit indicate the current status of the ASD 531.

Function / state	Operation	Alarm	Fault	Det. dusty / dirty
	green	red	yellow	yellow
System Off (no voltage)				
System inactive (reset external)	On		½ T	
Smoke sensor Off (from FACP)	On		½ T	
Quiescent state	On			
Pipe blockage/breakage, delay running ①	On		1 T	
Pipe blockage/breakage, fault triggered	On		On	
Fan tacho signal missing	On		On	
Fault triggered	On		On	
Pre-signal 1	On	2 T		
Pre-signal 2	On	1 T		
Pre-signal 3	On	½ T		
Alarm	On	On		
Smoke sensor filter fault	On			2 T
Smoke sensor dusty	On			1 T
Smoke sensor dirty	On			½ T
Smoke sensor fault	On			On
Lamp test (press “Reset” 10 s)	On	1 T	1 T	1 T

① No fault triggered (triggers only after delay time has expired ➔ “Fault” continuously lit).
T = flashing display; ½ s cycle / 1 s cycle / 2 s cycle

Indicators on the AMB 31 main board

Various auxiliary LEDs are on the AMB 31 and have the following meaning:

- LED “Class” and “Holes” flash = invalid constellation of rotary switches “Class” and “Holes”;
- LED “Mode” = various functions;
- LED “WDog” = watchdog indicator;
- LED CardOk = SD memory card present;
- LED Com = communication with the SD memory card;
- LED 2 (yellow) flashing = filter replacement started;
- LED 4 (green) continuously lit = filter monitoring “On”.

Programming

The ASD 531 has several switch positions that are configured with permanently assigned parameters:

- System limits according to EN 54-20, Class A to C, without using “ASD PipeFlow”, positions ***A/1*** to ***F/C***;
- System limits for saving the settings after using “ASD PipeFlow”, positions ***1/1*** to ***3/F***.

Switch positions of rotary switch “Mode”

Pos.	Purpose
0	Initial reset
1	Operation position
2	Isolate device
3	Test trigger fault
4	Test trigger pre-signal
5	Test trigger alarm
6	Log off optional module
7	Device inactive
8	Filter monitoring On/Off, filter replacement
9	Read out / change filter service life
A – ***F***	Reserve

The table lists only the available switch positions. For information about the input procedure please refer to Technical Description T 140 416, Sec. 8.3.

System limits without ASD PipeFlow calculation

The system limits apply to the planning without using the ASD PipeFlow calculation software. There are two areas, with the following meaning:

- **Detector sensitivity**
  Rotary switch “Class”, switch positions ***A*** to ***F***;
  Rotary switch “Holes”, switch positions ***1*** to ***C***;
- **Air flow tolerance and delay time**
  DIP switch “Airflow”, switch positions ***1*** to ***4***.

Detector sensitivity

The desired alarm class according to EN 54-20 is set on the “Class” rotary switch. If accessory materials are used in the sampling pipe, positions ***A*** to ***C*** are to be used for a response grade compliant with EN 54-20. For sampling pipes without accessory material, one of the positions from ***D*** to ***F*** is to be used when selecting the response grade compliant with EN 54-20.

The rotary switch “Holes” sets the (total) number of sampling holes.

Meaning of the rotary switch positions:

- “Class” pos. ***A***, EN 54-20, Class A, with dust filter
- “Class” pos. ***B***, EN 54-20, Class B, with dust filter
- “Class” pos. ***C***, EN 54-20, Class C, with dust filter
- “Class” pos. ***D***, EN 54-20, Class A, without dust filter
- “Class” pos. ***E***, EN 54-20, Class B, without dust filter
- “Class” pos. ***F***, EN 54-20, Class C, without dust filter
- “Class” pos. ***1*** – ***C***, Number of sampling holes (***A*** = 10; ***C*** = 12)

Air flow tolerance and delay time

The air flow tolerance and delay time are set on the "Airflow" DIP switch:

Switch 1	Switch 2	Air flow tolerance
OFF	OFF	±20% ①
OFF	ON	±30%
ON	OFF	±50%
ON	ON	±10%

Switch 3	Switch 4	Delay time
OFF	OFF	300 s (5 min) ①
OFF	ON	10 min
ON	OFF	20 min
ON	ON	10 s (test position) ②

① For a normative system the setting **±20% / 300 s** is required. Other values are **not** EN tested and may be used only after consulting with the manufacturer.

② This setting may be used only for test purposes; it is not permitted in normal operation.

System limits for planning without "ASD PipeFlow" calculation

Shape	Length from ASD to the last T-piece/cross	Max. length from ASD to farthest sampling hole	Number of sampling holes per sampling branch	Max. overall length of the sampling pipe
I	---	30 m	1 – 7	30 m
U / T	1 – 10 m	30 m	1 – 6	55 m
H	1 – 10 m	20 m	1 – 3	55 m
E	1 – 10 m	20 m	1 – 4	55 m

Sampling holes for planning with "ASD PipeFlow" calculation

The tables below show the corresponding hole diameters for the numbers in **Fig. 4** depending on the number of sampling holes per sampling branch.

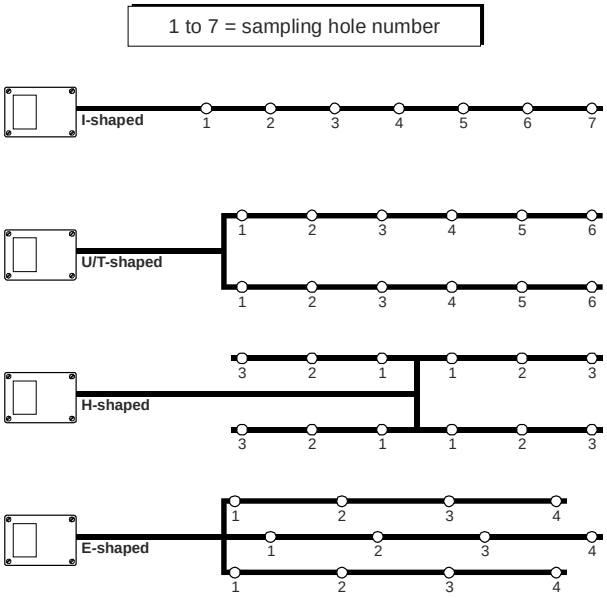

Fig. 4 Size of sampling holes

I-shaped sampling pipe							
Number per sampling branch	Ø sampling hole number from the ASD						
	1	2	3	4	5	6	7
1	7.0						
2	5.5	7.0					
3	5.0	5.5	7.0				
4	4.5	4.5	5.5	7.0			
5	4.0	4.5	5.0	5.0	6.5		
6	3.5	3.5	3.5	3.5	4.0	5.5	
7	3.5	3.5	3.5	3.5	4.0	4.0	5.5

U/T-shaped sampling pipes						
Number per sampling branch	Ø sampling hole number from the ASD					
	1	2	3	4	5	6
1	7.0					
2	5.0	6.5				
3	4.5	5.0	7.0			
4	3.5	4.0	4.0	6.5		
5	3.0	3.0	3.0	3.0	5.5	
6	3.0	3.0	3.0	3.0	3.0	5.5

H-shaped sampling pipes			
Number per sampling branch	Ø sampling hole number from the ASD		
	1	2	3
1	7.0		
2	3.5	6.5	
3	2.5	2.5	6.5

E-shaped sampling pipes				
Number per sampling branch	Ø sampling hole number from the ASD			
	1	2	3	4
1	7.0			
2	4.5	7.0		
3	3.0	3.0	6.0	
4	2.5	2.5	2.5	6.0

Relay and state latching:

Adjustable with DIP switch "Relay" no. **1** to **3**.

Signal	Switch position	Default setting	Range
• Alarm	1	On	On / Off
• Fault	2	On	On / Off
• Pre-signal	3	Off	Off / On

RIM 36 relay assignment:

The alternative relay assignment can be activated on DIP switch "Relay" no. **4**.

Relay	OFF = Default	ON = Alternative
Rel. 1	Pre-signal 1	Alarm
Rel. 2	Pre-signal 2	Alarm
Rel. 3	Pre-signal 3	Alarm or fault ①
Rel. 4	Smoke sensor: dirt / dust / fault	Alarm or fault ①
Rel. 5	Sampling pipe: pipe blockage / pipe breakage / fan fault	Fault ①

① The following faults are included here:
⇒ Smoke sensor; dust, dirt, fault
⇒ Sampling pipe; pipe blockage, pipe breakage
⇒ General; fan, initial reset, undervoltage, clock

Commissioning

When commissioning the ASD 531, it is necessary to perform an initial reset to automatically adjusting the airflow monitoring on the connected sampling pipe.

If the ASD 531 is operated without “ASD PipeFlow” calculation, the commissioning can be carried out directly using the “**BasiConfig**” **process**.

In projects in which the “ASD PipeFlow” calculation software was used, the switch settings “1/1” to “3/F” are to be applied.

Starting up

Before the ASD 531 is switched on, make sure all the precautions required for its operation have been taken (see also T 140 416, Sec. 7.1).

- Sampling pipe correctly laid and connected;
- Smoke sensor removed from protective packaging, built in and connected;
- Isolation strip on the lithium battery (AMB 31) removed.

Startup sequence and procedure:

1. Switch on supply voltage (FACP); the next procedure can be carried out while the fan is ramping up to its definitive speed (takes about 100 s). **The system is immediately armed for alarm**.
2. “**BasiConfig”**: Set the required response grade and the number of sampling holes (e.g. “***B/6***”) ➔ see “***Re-programming***”.
   - or:
   Select corresponding “**ASD PipeFlow**”: values (Technical Description ASD 531, T 140 416, Sec. 4.3.1). Set rotary switch.
3. Following a **minimum waiting time of 2 min** after switching on, an initial reset must be performed (possible only via AMB 31) ➔ see “***Initial reset***”.
4. The ASD 531 is now ready for operation.

Re-programming

Example: Response grade B, sampling holes 6, airflow tolerance / delay time ±30% / 600 s ①.

Measure	Indicator ②	Procedure Remark
1. Turn rotary switch “Class” to position “***B***”	--	Set response grade B
2. Turn rotary switch “Holes” to position “***6***”	--	Set 6 sampling holes
3. Set DIP switch “Airflow”: Positions “***1***” and “***3***” on “***OFF***”; Positions “***2***” and “***4***” on “***ON***”;	--	Set airflow tolerance / delay time ±30% / 600 s ①

① For normative systems the setting ***±20%*** / ***300 s*** is required. Other values are **not** EN tested and may be used only after consulting with the manufacturer.

② The “Class” and “Holes” LEDs begin to flash after a delay time when there is an invalid entry (e.g. Class A with 10 sampling holes).

Initial reset

Measure	Indicator	Procedure Remark
Before performing an initial reset after switching on the ASD 531, a **waiting time of at least 2 min** must be observed.		
1. Turn rotary switch “Mode” to position “***0***”	--	• Switch position initial reset
2. Press key “Set/Res”	--	• Initial reset in progress
3. Wait	Both middle LEDs of the air flow indicator are lit	• Initial reset completed
4. Turn rotary switch “Mode” to position “***1***”	--	• Operation switch position
5. Press key “Set/Res”	--	• Operating mode running

Filter replacement

When filter monitoring is activated and after expiry of the configured filter service life, a “Filter fault (service life exceeded)” fault is triggered. To remedy, the filter element in a filter-box or dust filter unit must be replaced.

For an activated filter replacement the ASD is set to the “**isolate**” state. This insures that during the replacement work falling dust particles from the filter element do not cause a false alarm.

When the ASD 531 housing is closed, the “Start filter replacement” function can be activated by means of the **“Reset” key** (provided the filter monitoring is activated). To do so, press the key **longer than 15 s** (attention: lamp test after 10 s). After 15 s the filter replacement is started and indicated by switching to the “Isolate” state (LED “Fault”).

After the filter has been replaced, the “Filter replacement” procedure is completed by pressing the **“Reset” key** on the ASD. This cancels the “Isolate” state and resets the fault on the ASD. “Filter service life” monitoring is restarted at 0.

The filter replacement can also be started via *BasiConfig* rotary switch “Mode”, position ***8***. For information please refer to Technical Description T 140 416, Section 7.8.

Measurements / Commissioning protocol

Carry out the following measurements:

- Measure voltage at terminals 1 (+), 2 (-) (also terminals 3 and 4 if redundant supply) ➔ target value = 17.6 to 27.6 VDC
- Airflow value based on the LED bar (see Technical Description, T 140 416, Sec. 7.6.1).

The commissioning protocol is like a personal history of the ASD 531 and should therefore be filled out conscientiously and completely and stored in the ASD 531. If required, a copy can be made and stored in the system dossier.

Checking fault and alarm release

Test	Procedure	Action
		Block or switch off fire incident control and remote alerting on the superordinate FACP.
Check airflow monitoring	Tape over the sampling holes (adhesive tape); the number depends on the pipe configuration.	• As soon as the resulting change in the airflow is exceeded by ±20%, the "Fault" LED begins to flash. • Once the LS-Ü delay (300 s) has elapsed, the ASD triggers a fault ➔ fault on FACP ①.
Check alarm release	Impose smoke at the maintenance sampling hole or sampling hole.	• ASD triggers an alarm ➔ alarm on FACP; check for correct alarm transmission (zone/ range release) on the FACP①. • Any pre-signals will also release.

① Reset the ASD 531 between each check (please note: resetting the ASD does not reset the FACP).

Article numbers and spare parts

Short designation		Article number
Aspirating Smoke Detector ASD 531		11-2000002-01-XX
Replacement smoke sensor SSD 31		11-2200009-01-XX
eXtended Line Module XLM 35		11-2200003-01-XX
RIM 36 Relay Interface Module		11-2200005-01-XX
SD memory card (industrial version)		11-4000007-01-XX
AMB 31 Main Board		11-2200012-01-XX
Aspirating Fan Unit AFU 32, complete		11-2200008-01-XX
Air Flow Sensor AFS 32		11-2200007-01-XX
Insect Protection Screen IPS 35 (set of 2)		11-2300012-01-XX
Lithium battery		11-4000002-01-XX
Cable screw union	M20 (set of 10)	11-4000003-01-XX
	M25 (set of 10)	11-4000004-01-XX
Adapter US cable screw union AD US M-Inch		11-2300029-01-XX
UMS 35 Universal Module Support		4301252.0101
Technical description ASD 531		T 140 416
Material for the sampling pipe		T 131 194
Commissioning protocol		T 140 418
Data sheets	XLM 35	T 140 088
	RIM 36	T 140 364
AFU 32 installation instructions		T 140 426

Declaration of performance
www.securiton.ch/declaration-of-performance

Dimensioned drawing

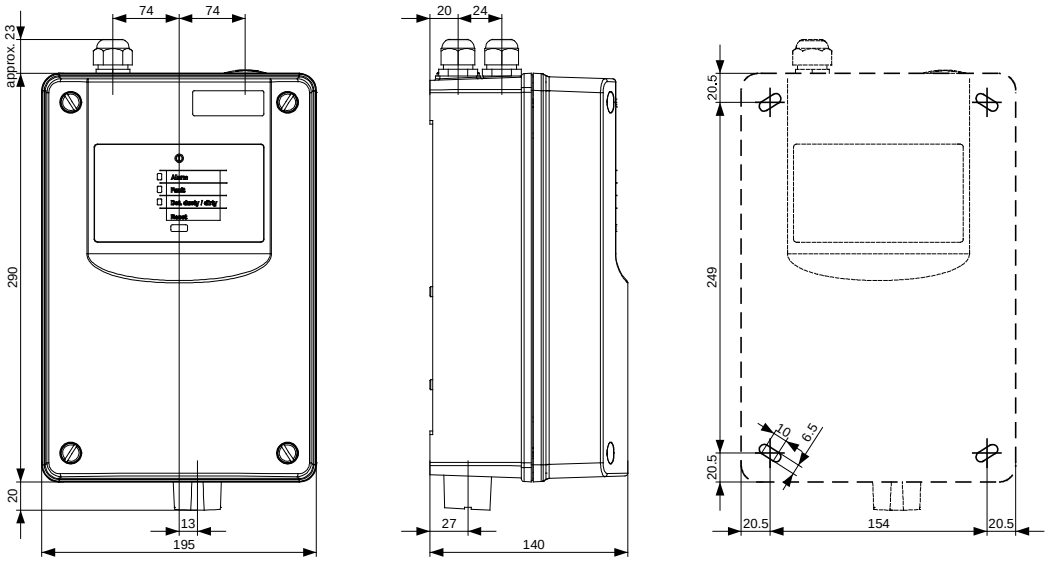

Fig. 5 Detector housing dimensioned drawing

Technical data

Type			ASD 531	
Supply voltage range			14 to 30 (**UL/FM = 16.4 to 27**)	VDC
Maximum power consumption,			**typical**	
measured at ➔		14 VDC ①	24 VDC	
ASD 531	Quiescent / fault	approx. 110	approx. 75	mA
	Alarm	approx. 120	approx. 80	mA
additionally with RIM 36 (all relays triggered)		approx. 30	approx. 15	mA
additionally with XLM 35		approx. 15	approx. 5	mA
Switch-on current peak ② (caused by EMC protection elements on the ASD supply input)			approx. 5	A
			for max. 1	ms
Sampling pipe length			see T 140 416, Sec. 4.2.1	
Sampling pipe diameter, typical (inner/outer)			Ø 20 / 25	mm
Max. number of sampling holes			see T 140 416, Sec. 4.2.1	
Sampling hole diameter		Ø 2 / 2.5 / 3 / 3.5 / 4 / 4.5 / 5 / 5.5 / 6 / 6.5 / 7		mm
Response range			EN 54-20, Class A, B, C	
Protection type compliant with IEC 60529 / EN 60529			54	IP
Ambient conditions compliant with IEC 60721-3-3 / EN 60721-3-3			3K5 / 3Z1	class
Extended ambient conditions:				
• Detector housing temperature range			–10 – +55 (**UL max. +40**)	°C
• Sampling pipe temperature range			–10 – +55 ③	°C
• Max. permissible temperature fluctuation in detector housing and sampling pipe operation			20 ③	°C
• Max. permissible storage temperature for detector housing (without condensation)			–20 – +70	°C
• Ambient pressure difference between detector housing and sampling pipe (sampling holes)			must be identical	
• Humidity ambient condition for detector housing (transient without condensation)			95 ③	% rel. h
• Humidity ambient condition (continuous)			70 ③	% rel. h
Max. loading capacity, relay contact			50 (**UL max. 30**)	VDC
			1	A
			30	W
Max. loading capacity per OC output (dielectric strength 30 VDC)			100	mA
Plug-in terminals			2.5	mm²
Cable entry for cable Ø			Ø 5 – 12 (M20) / Ø 9 – 18 (M25)	mm
Sound pressure level			25	dB (A) / 1 m
Housing	material		ABS blend, UL 94-V0	
	colour		grey 280 70 05 / anthracite violet 300 20 05	RAL
Approvals			EN 54-20 / FM 3230-3250 / UL 268A 6th Ed / ULC-S529 3rd Ed	
ASD 531 dimensions (W x H x D)			195 x 333 x 140	mm
Weight ASD 531			1,950	g

① Power consumption at maximum permitted voltage drop in the electrical installation (decisive value for calculating the conductor cross-section).

② May cause the protective circuit to trigger immediately in the case of power supplies with overload protective circuits (primarily in devices with no emergency power supply and output current of < 1.5 A).

③ Lower or higher temperature ranges are also possible subject to consultation with the manufacturer. The manufacturer must be consulted if the device is used in the condensation range.

Changes to Index “c” on pages: 2, 6, 7

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