



RAS-XL Innovative smoke extraction system with laser detector



- ▶ Highly sensitive laser detector
- ▶ High flexibility and security
- ▶ Continuous self-monitoring of the detection and control unit, of the ventilator function, as well as of connections to the annunciator module and PC
- ▶ No filter required
- ▶ Easy-to-service

The image shows the RAS-XL with the optional display panel.

The RAS-XL smoke extraction system is a highly-sensitive smoke detection system for early fire detection. Its particle counting principle with laser beam guarantees that the smallest smoke particles are detected even in the early phases.

Functions

The RAS-XL handles early fire detection to protect electronic data processing rooms, computer centers, telephone exchanges, clean rooms, etc. It also enables the monitoring of difficult-to-access objects. The detection points are nearly invisible.

A fan extracts air from the monitored object via the suction pipe to the laser detector. On entry into the measuring chamber, smoke particles up to a minimal concentration of 0.0005% are counted by the laser. The sensitivity is independent of the particle size and remains constant across the entire smoke spectrum. The detector is calibrated so that particle sizes below 0.01 mm and above 10 mm are not detected. This prevents false alarms due to dust, pollen or chemical vapors.

The airflow is monitored permanently and taken into account during the analysis. Obstructions and

interruptions in the suction pipe are detected by the system.

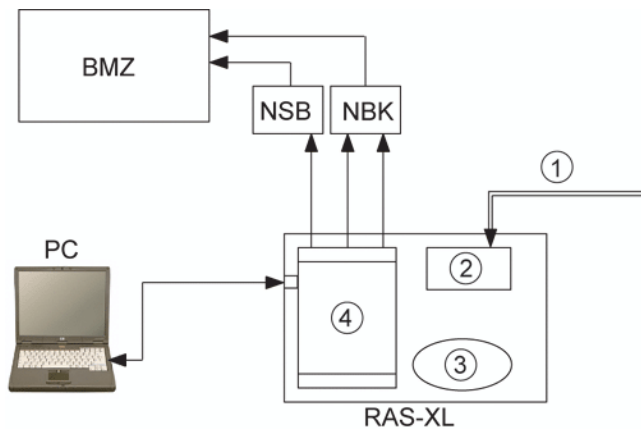
Optionally an annunciator module can be integrated into the detector module or placed as a remote unit up to 1000 m away.

The LaserNET software handles the programming and monitoring of the RAS-XL detector modules. Alarm thresholds, time delays, day/night mode, and averaging are preprogrammed at the factory. Using a PC and LaserNET software, the parameters can be adjusted to the special circumstances on location and the smoke data display, event logs, and individual parameters can be archived and output on a printer.

With an optional interface module IIM, up to 127 RAS-XL detector modules can be networked. Communication between PC and IIM is possible directly or via a modem.

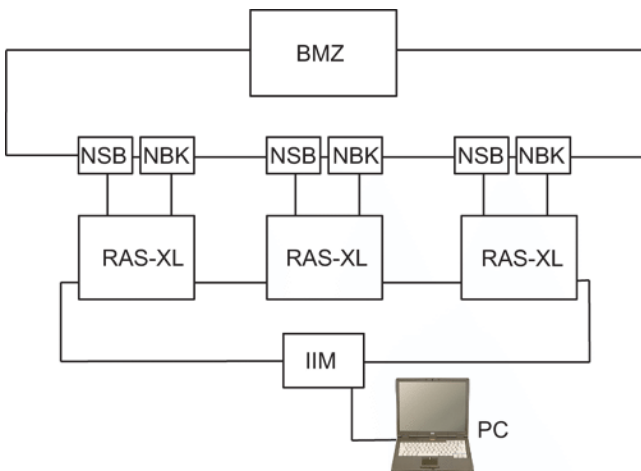
The common interface standard OPC enables the connection of and data communication between the optional interface module IIM and the management system RUBIN NT/XP.

System Overview



RAS-XL individual system with connection to a fire panel

Pos.	Designation
1	Suction pipe
2	Laser detector
3	Fan unit
4	Evaluation electronics



Connection of several RAS-XLs to a fire panel, with networking via an intelligent interface module IIM (optional)

Certifications and Approvals

Meets relevant European regulations and guidelines

Country	Certification body	Certificate number
Germany	VdS Schadenverhütung GmbH	G 201084
USA	FM	300 7661

Installation/Configuration Notes

General installation/configuration notes

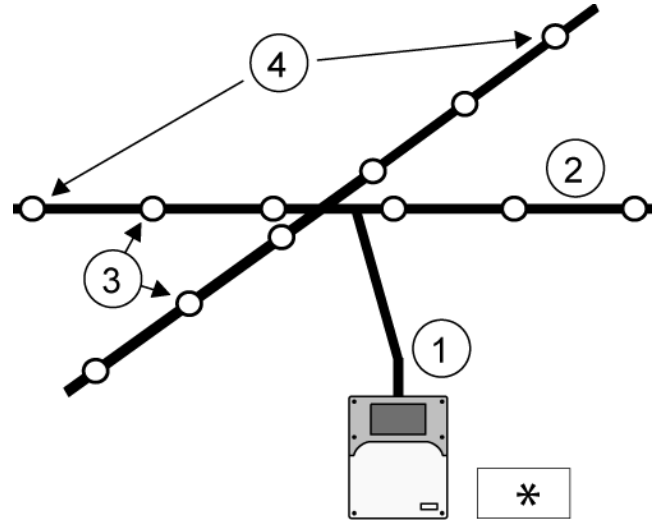
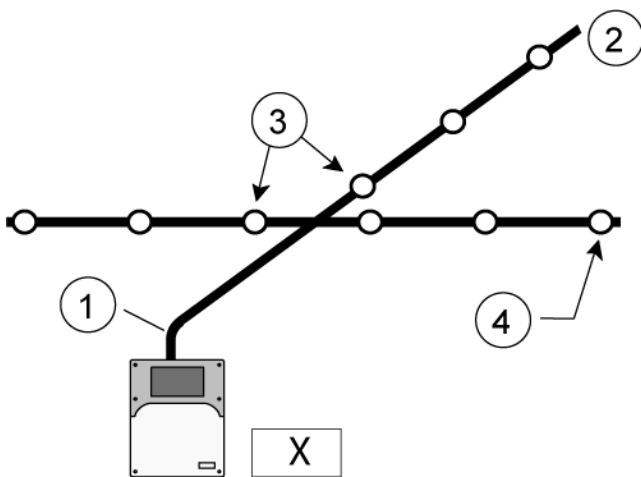
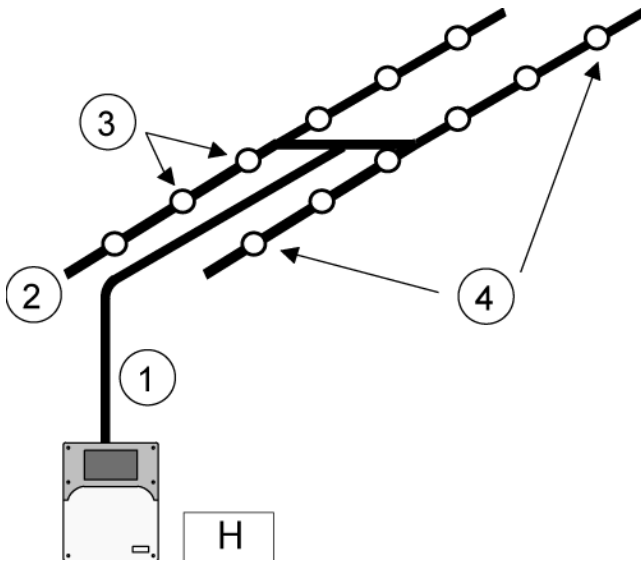
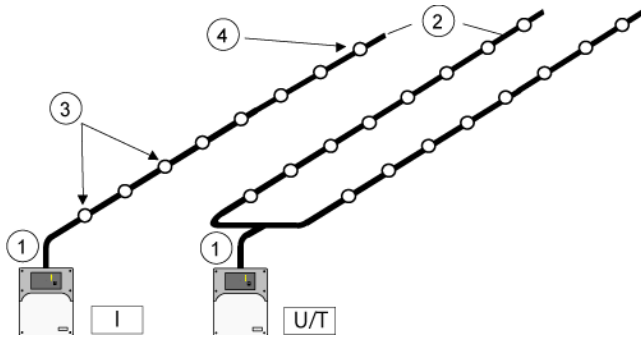
Note These general installation/configuration notes apply for both smoke extraction systems (RAS) taking into consideration the specially-listed limiting values for the RAS-XL und RAS 100 LSN.

- In planning, a distinction is made between area monitoring and equipment monitoring.
- PVC pipes and halogen-free suction pipe can be used. For equipment monitoring, halogen-free pipe should be used.
- When installing the suction pipe system, for 40 mm pipes, a mounting clamp should be attached every 100 cm and for 25 mm pipe every 80 cm.
- Country-specific standards and guidelines must be observed during the planning phase..

Area monitoring

- The suction pipe system should be arranged such that any fires can be detected at the initial stage.
- At least two suction openings are required per area.
- Per suction boring, max. 60 m² (square area) is permissible as monitoring area (according to VdS). In addition, object-specific guidelines must be heeded (e.g. for high-board warehouses).
- The suction pipe systems must be arranged so that it is fundamentally symmetrical (incl. suction borings). A symmetry deviation of up to 10 % is permissible without consultation.
- If symmetry cannot be adhered to, upon request a calculation of the suction pipe is possible.
- Specified limiting values may not be exceeded without consultation.
- Per RAS, several areas may only be monitored if the corresponding guidelines permit this (e.g. limitation to max. five areas, according to VdS 2095).
- Arrangement of the suction pipe:
 - For normal area monitoring, the suction pipe is installed in an I-, U-, T- or H-shaped arrangement.
 - With wood ceilings, as in historic buildings, for example, under certain circumstances a suction pipe form can be required for which the symmetry or the distance from branch to branch cannot be adhered to.

- In these cases it is possible to use "cross" or "star" shaped arrangement of suction pipes.



- Pos. Description
- 1 Ascent/feeder
- 2 Suction branch
- 3 Suction openings
- 4 Furthest-removed suction openings

Limiting values for area monitoring with the RAS-XL

Note The limiting values for the RAS 100 LSN are listed separately in the section "RAS 100 LSN smoke extraction systems with optical smoke detectors O 400 LSN-RAS" under "Installation/ configuration notes."

Arrangement	I	U/T	H	Cross	Star
Furthest-removed suction openings	80 m	70 m	55 m	60 m	53 m
Maximum suction openings	12	20	20	18	15 or 18
Maximum suction openings	see corresponding guideline, (e.g. VdS 2095 in Germany, VKF in Switzerland)				

Monitoring area per suction opening: max. 60 m², square area

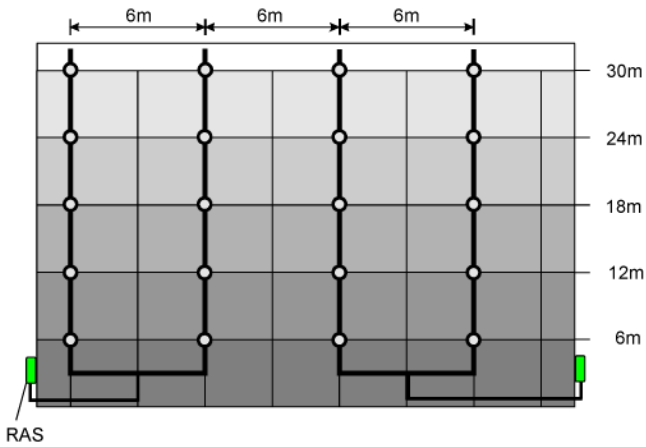
Note The extraction system must be constructed throughout with pipe diameter 25 mm!

High-board warehouse

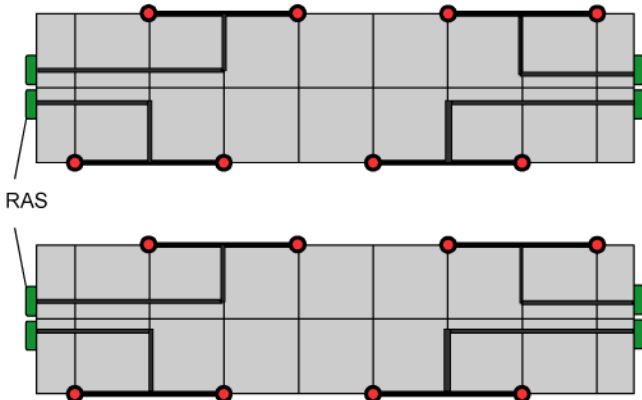
- High-board warehouses must be monitored on several levels.
- To reach different levels, the suction branches can be arranged horizontally or vertically.

- The suction openings must be created so that the air is extracted from the loading side of the high-board warehouse.
- Depending on the applicable guidelines, ceiling monitoring is also required.
- When planning the suction pipe, the following limiting values must be adhered to:

Side view of a high-board row



Top view of two high-board rows



Height from floor of level 1	6 m
Height from floor of level 2	12 m
Height from floor of level 3	18 m
Distance of the uppermost level to the ceiling	0.3 - 0.8 m*
Vertical distance of the suction branches	6 m

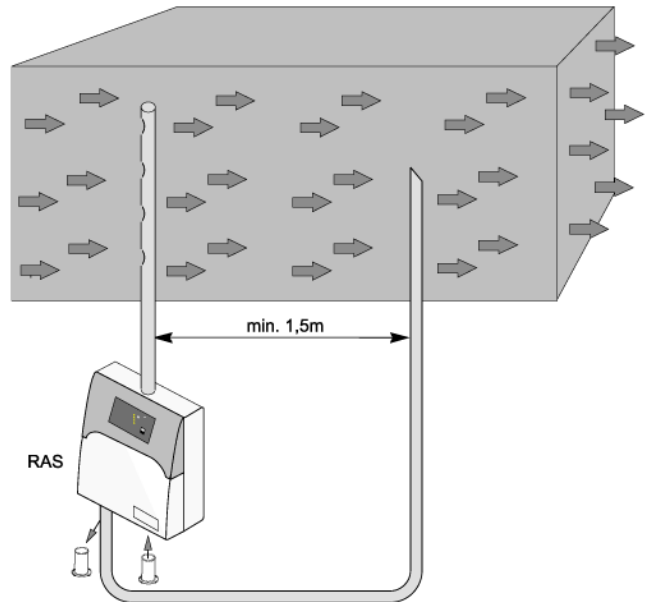
Otherwise the same limiting values apply as for area monitoring.

* With additional ceiling monitoring, the distance can be increased up to a max. 6 m.

Ventilation duct

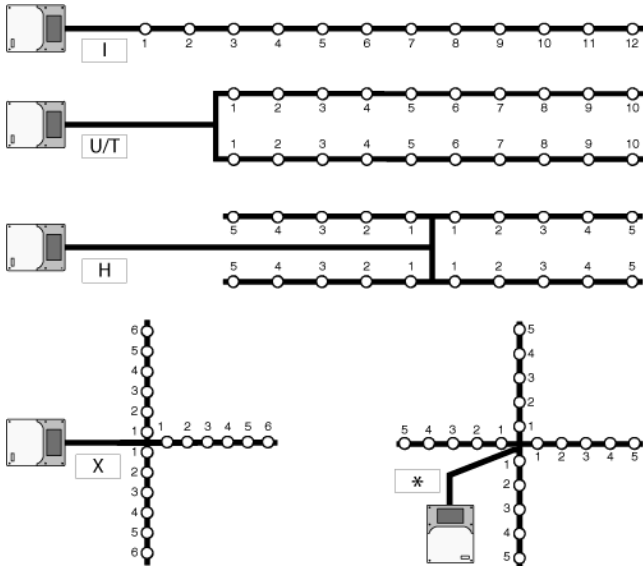
- For the monitoring of ventilation ducts with the RAS, the installation of air returns is required.
- The suction and return pipes are installed with airtight flanges in the ventilation duct. These air duct flanges are available as accessories.

- The pipe system should be installed in a low-turbulence area that is removed from air baffles, sound absorbers, etc.
- Suction and return pipes should be placed in the middle of the ventilation duct and should maintain a distance of at least 1.5 m to one another. If this is not possible, the return should be installed approximately 1/3 of the duct width from the middle.
- The suction pipe has holes that are direct against the airflow, boring diameter: see corresponding table.
- For larger air conditioning shafts, a U- or H-shaped suction pipe system makes sense.
- The air return pipe is open at the end and at a 45 degree angle. The output opening should be in the middle of the duct.



Dimensioning of the suction openings for area monitoring

- The same quantity of air should be extracted into all openings of the suction pipe.
- Therefore, the borings should be enlarged the further away they are from the RAS.
- The numbering of the suction openings occurs beginning with the boring nearest to the RAS and continuing through to the furthest removed from the RAS (see figure for the RAS 100 LSN).



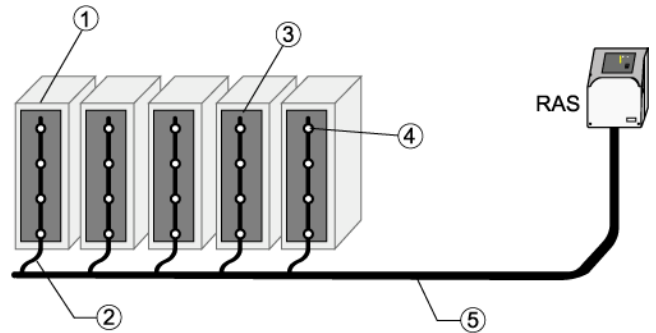
- Tables with sizes of the suction openings are listed separately:
 - for the RAS-XL, see below under "Installation/configuration notes for the RAS-XL"
 - for the RAS 100 LSN, see under "Installation/configuration notes" in the section "RAS 100 LSN smoke extraction systems with optical smoke detectors O 400 LSN-RAS."

Equipment monitoring

- Equipment monitoring with the RAS is in addition to area monitoring. With equipment monitoring, an object (machine, device) is monitored directly.
- Detector boxes and suction pipes should always be fastened directly on the object to be monitored.
- Per system, only max. 6 objects (according to VdS max. 5 objects) may be monitored - e.g. free-standing cabinets or a row of cabinets with internal separating walls.
- Symmetry does not have to be adhered to for equipment monitoring.
- In contrast to area monitoring, which provides individual suction borings, in equipment monitoring suction points with several suction borings are used.
- A maximum of 6 suction points per system can be attached. The suction point is defined as a small I-, U-, T- or H-shaped pipe form with 2 to 4 suction borings or as a funnel.
- All air output openings of an object must be detected with a suction point, whereby a maximum of 6 suction points can be installed per RAS.

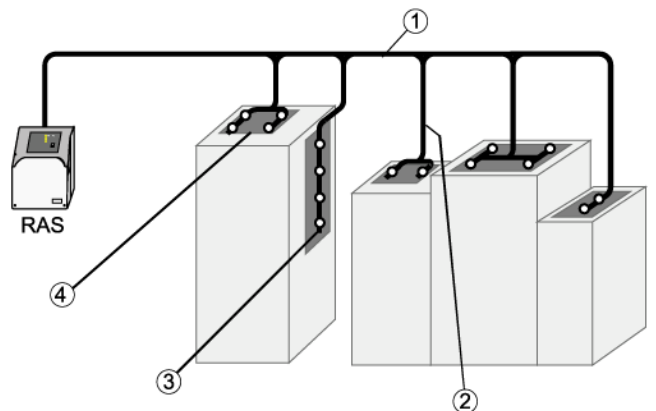
- The suction points must be arranged on the object so that they are in the main cooling current of the machine.
 - If this cannot be located, the use of an airflow measurement device can be very helpful.
- For objects with high air throughput (strong discharge), the suction pipe should be installed with a spacer to facilitate suction.
 - If this is not possible, this can also be done with suction borings angled by 20-30 degrees or by the use of screwed-on pipe funnels.

Pipe installation in hollow floors



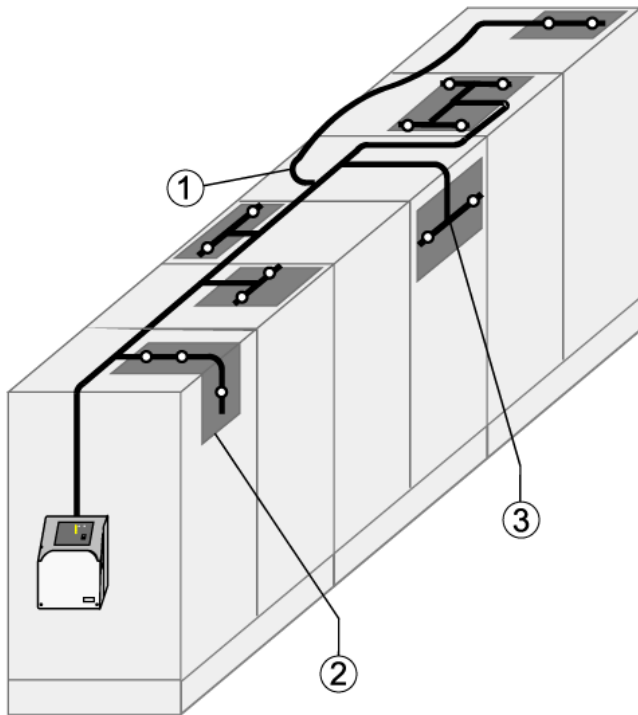
Pos.	Description
1	EDP equipment
2	Flexible suction branch
3	Suction opening
4	ventilation grid
5	Supply pipe in the hollow floor

Pipe installation on the wall or ceiling



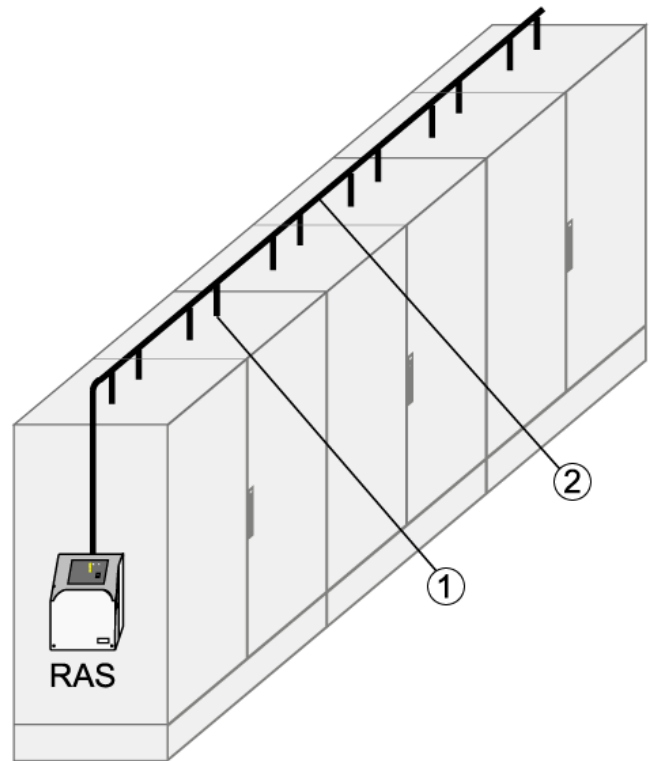
Pos.	Description
1	Pipe installation on the wall or ceiling
2	Suction branch stiff or flexible
3	Suction opening
4	Ventilation grid

Direct installation on ventilated EDP cabinets



Pos.	Description
1	Flexible suction branch
2	Ventilation grid
3	Suction point with suction openings

Direct installation on EDP cabinets without ventilation



Pos.	Description
1	Suction branch with suction opening in the end fitting
2	Feeder/collector line

Limiting values for equipment monitoring:

Number of suction points	1 - 6
Number of devices/cabinets that can be monitored (national guidelines must be adhered to)	1 – 6 (acc. to VdS max. 5)
Furthest removed suction point	20 m
Maximum length of the suction pipe (total)	50 m
PipeØ of the main line (interior/exterior)	20 / 25 mm
Minimum pipe diameter of flexible suction branch (interior/exterior)	12 / 16 mm or 16 / 21 mm
Maximum length per flexible suction branch	5 m
Number of suction openings per suction point	2 - 4
Maximum number of suction openings (total)	24

Note Generally the limiting values above must be adhered to. After consultation with Bosch Security Systems, possible deviations are permissible for special applications.

- The size and number of suction openings of a suction point depend on the ventilation opening of the object.

Dimensioning of the suction openings for equipment monitoring (for all RASes)

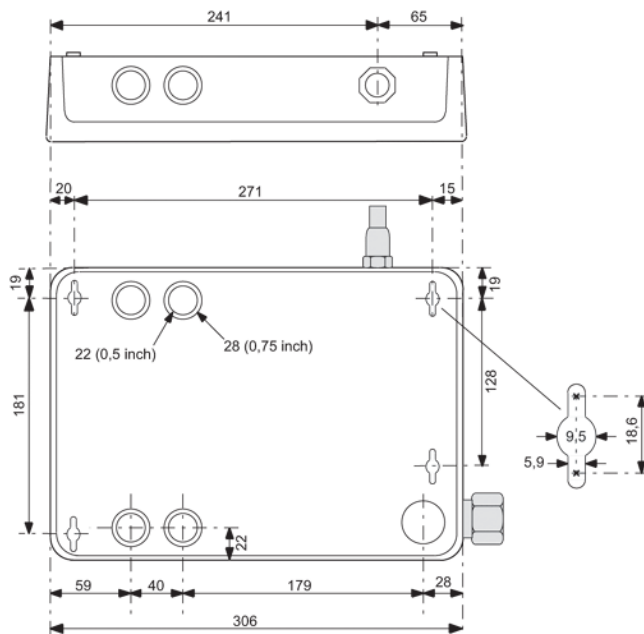
Ventilation opening, (length x width)	Shape of the suction point	Number of suction openings	Ø of suction opening
< 200 x < 150	I	2	4.5 mm
< 300 x < 150	I	3	4.0 mm
< 400 x < 150	I or T	4	3.5 mm
< 800 x < 200	T	4	3.5 mm
< 400 x < 400	U	4	3.5 mm
< 400 x < 400	H	4	3.5 mm

< = smaller / > = larger

Note Suction points must be placed directly in the airflow, whereby the suction openings must be counter to the airflow. With the suction point, no symmetry is required. For optimal smoke detection with strong ventilation, the suction openings can be equipped with funnels.

Installation/configuration notes RAS-XL

Assembly drawing



- The RAS-XL is compatible with the previous RAS types. During an exchange, the existing suction pipe can be used if it has a continuous pipe diameter of 25 mm.
- Sunken installation of the detector module with rear or side air outlet is possible.
- At the factory, the dummy plate or the display module is mounted so that the suction opening is on the upper right. Turning the device 180° and connection to the lower left is possible.

- For connection to a fire panel, one NBK fire interface and one NSB fire control interface per RAS-XL are required.
- So that the same quantity of air is extracted into all suction openings, these must be enlarged with increasing distance to the detector.
- The required diameters depend on the extraction pipeline geometry and number of suction openings per branch and are listed in the following tables.
- When connecting to a fire panel, a total of 3 alarms can be transmitted: 1 pre alarm and 2 main alarms or 2 pre alarms and 1 main alarm.

Dimensioning of the RAS-XL suction openings:

Extraction pipeline geometry: I-shape

Suction openings per suction branch	No. of the suction opening					
	1	2	3	4	5	6
2	5.0	5.0	-	-	-	-
3	4.5	5.0	5.0	-	-	-
4	4.0	4.5	5.0	5.0	-	-
5	4.0	4.0	4.5	5.0	5.0	-
6	3.5	4.0	4.0	4.5	5.0	5.0
7	3.5	3.5	4.0	4.0	4.5	5.0
8	3.0	3.5	3.5	4.0	4.0	4.5
9	3.0	3.0	3.5	3.5	4.0	4.0
10	3.0	3.0	3.0	3.5	3.5	4.0
11	2.5	3.0	3.0	3.0	3.5	3.5
12	2.5	2.5	3.0	3.0	3.0	3.5

Suction openings per suction branch	No. of the suction opening					
	7	8	10	11	12	
2	-	-	-	-	-	
3	-	-	-	-	-	
4	-	-	-	-	-	
5	-	-	-	-	-	
6	-	-	-	-	-	
7	5.0	-	-	-	-	
8	5.0	5.0	-	-	-	
9	4.5	5.0	3.5	-	-	
10	4.0	4.5	3.0	5.0	-	
11	4.0	4.0	3.0	5.0	5.0	
12	3.5	4.0	3.0	4.5	5.0	5.0

Extraction pipeline geometry: U-shape

Suction openings per suction branch	No. of the suction opening							
	1	2	3	4	5	6	7	8
2	4.5	4.5	-	-	-	-	-	-
3	4.0	4.5	4.5	-	-	-	-	-
4	4.0	4.0	4.5	4.5	-	-	-	-
5	3.5	4.0	4.0	4.5	4.5	-	-	-

6	3.5	3.5	4.0	4.0	4.5	4.5	-	-
7	3.0	3.5	3.5	4.0	4.0	4.5	4.5	-
8	2.5	3.0	3.5	3.5	4.0	4.0	4.5	4.5

Extraction pipeline geometry: H-shape

Suction openings per suction branch	No. of the suction opening				
	1	2	3	4	5
2	4.0	4.0	-	-	-
3	3.5	4.0	4.0	-	-
4	3.5	3.5	4.0	4.0	-
5	3.5	3.5	3.5	4.0	4.0

Extraction pipeline geometry: cross shape

Suction openings per suction branch	No. of the suction opening					
	1	2	3	4	5	6
2	4.5	4.5	-	-	-	-
3	4.0	4.5	4.5	-	-	-
4	4.0	4.0	4.5	4.5	-	-
5	3.5	4.0	4.0	4.5	4.5	-
6	3.0	3.5	3.5	4.0	4.0	4.5

Extraction pipeline geometry: star shape

Suction openings per suction branch	No. of the suction opening				
	1	2	3	4	5
2	4.0	4.0	-	-	-
3	4.0	4.0	4.0	-	-
4	3.5	4.0	4.0	4.0	-
5	3.0	3.5	4.0	4.0	4.0

Parts Included

Qty.	Components
1	Detector module with laser detector head and fan unit, dummy plate with multicolor status LED

Note For connection to a fire panel, one NSB and one NBK per RAS-XL are required. The intelligent interface module IIM is sold separately.

Technical Specifications

Electrical

Operating voltage	24 VDC (18 V DC . . . 38 V DC)
Current consumption	Without / with display module
• In standby	340 mA / 370 mA
• In case of malfunction	365 mA / 395 mA
• In case of alarm	380 mA / 410 mA
Contact load relay outputs	2 A, 30 VDC

Mechanics

LED Displays	
• Normal operation	Steady light green
• Auto setup	Flashing light green
• Malfunction/interruption	Steady light yellow
• Pre-alarm	Flashing light red
• Alarm	Steady light red
Connecting the suction pipe	¾" or 25 mm adapter
Connecting the exhaust line	1" or 25 mm adapter
Detector module	
• Material	Plastic / metal
• Color	Light gray
• Dimensions (W x H x D)	320 x 228 x 108 mm
• Weight	Approx. 3.4 kg

Environmental conditions

Protection category as per EN 60529	IP 31
Permissible operating temperature	
• Detector module	0 °C . . . +52 °C
• Suction pipe	0 °C . . . +60 °C
Permissible rel. humidity	0 % . . . 95 %

Special features

Potential-free relay outputs for 2 pre-alarms, 2 alarms malfunction and interruption	6
Alarm thresholds, programmable	
• As stand-alone system	4
• When connected to fire panel	3
Response sensitivity	0.0002 . . . 0.04 dB/m (0.005 . . . 1.0 %/m)
Signal averaging	2 sec, 4 sec or 8 sec
Signal delay for all alarms and malfunctions	0 . . . 60 s

Smoke data storage	
• Max. storage time	28 days
• Storage capacity	40320 smoke data
Event storage	128 (max. number of entries)
Computer connection	RJ 12-RS 232

Ordering Information

RAS-XL Innovative smoke extraction system with laser RAS-XL detector

Hardware Accessories

Display module for the RAS-XL	RAS-XL display
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