POLON-ALFA

FIRE DETECTION

ASPIRATING SMOKE DETECTOR

VENTUM PRO LITE

Technical manual

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Edition I

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1 General information

This document contains important information on the function and on the project planning for the intended use.

1.1 Introduction

This technical manual is intended for installers of fire alarm systems. It primarily includes engineers, fitters, service technicians etc. who have expertise in the field of fire alarm technology, but might be working with this device for the first time.

POLON-ALFA S.A. shall not be liable for any damages or losses that might result from failure to comply with this technical manual.

This technical manual is not a substitute for the necessary training courses in the handling of the devices.

This technical manual refers to following aspirating smoke detectors:

- VENTUM PRO LITE
- VENTUM PRO LITE TWO
- VENTUM PRO LITE-SL (Silent)
- VENTUM PRO LITE TWO-SL (Silent)

The aspirating smoke detectors may only be used for early fire and very early fire detection. As the aspirating smoke detectors are devices from a series, the VENTUM PRO LITE is described. Device-specific versions of any of the other aspirating smoke detectors are pointed out separately.

1.2 Safety notices

The following pictorial symbols designate points in this manual which require special attention to be paid in order to avoid damage, and to assure smooth and problem-free operation of equipment.

1.2.1 Personal injury

⚠ DANGER

Type and source of hazard

... indicates an immediately dangerous situation that leads to death or serious injury if it is not avoided.

⚠ WARNING

Type and source of hazard

...indicates a possibly dangerous situation that leads to death or serious injury if it is not avoided.

⚠ CAUTION

Type and source of hazard

...indicates a possibly dangerous situation that leads to light or minor injuries if it is not avoided.

1.2.2 Material and environmental damage

NOTE

Type and source of hazard

...indicates a possibly dangerous situation that leads to material and environmental damage if it is not avoided.

1.2.3 Other notices

TIP
…indicates useful information and recommendations to make work more efficient or improve results.

LITERATURE
...indicates further documentation.

1.3 Warranty and limitation of liability

This document is subject to technical modifications without prior announcement and makes no claim to completeness.

The "delivery and installation conditions" of POLON-ALFA S.A. apply as a matter of principle. Guarantee and liability claims in the case of personal injuries and damage to property cannot be asserted if they are based on one or more of the following causes:

- Insufficient attention to the instructions regarding project planning, installation, commissioning and maintenance
- Improper use
- Insufficient monitoring of wear parts
- Improperly executed repairs
- Unauthorised constructional alterations
- Force majeure

1.4 Copyright

The copyright to this manual remains with POLON-ALFA S.A.

The technical manual is exclusively intended for the installer and his employees.

Reprinting of the technical manual, including excerpts, is not permitted. Reproduction or distribution of the technical manual in any form is only permitted with written authorisation from POLON-ALFA S.A.

1.5 Packaging

NOTE

Environmental damage caused by incorrect disposal

Incorrect disposal of the packaging materials may pose risks to the environment. Packaging materials are valuable raw materials and can be re-used in many cases or treated and recycled.

- ► Always dispose of packaging in accordance with national laws, standards and directives.

The individual aspirating smoke detector is packed in accordance with the anticipated transport conditions, protecting it from damage until it is installed. Do not remove the packaging until shortly before installation.

100% environmentally friendly materials were used for the packaging. Dispose of the packaging material in accordance with the applicable laws, standards and directives.

1.6 Environmental protection

If no return or disposal agreement was made, recycle dismantled components as follows:

- Metals should be scrapped
- Plastic elements should be returned for recycling
- Other components should be sorted according to their material characteristics and then disposed of
- Return batteries to municipal collection points or send them back to POLON-ALFA S.A.

1.7 Information for the operating company

Perform regular visual inspections and function tests to ensure the system remains functional. Such tests are an integral part of the system documentation and must be set out by the installer of the system in accordance with the system parameters.

Any alterations to the facility being protected must be coordinated with the installer to ensure the system remains fully functional.

2 Product description

You will find the characteristics and application areas in this chapter.

2.1 Characteristics

The VENTUM PRO LITE belongs to the group of tried and tested aspirating smoke detectors of POLON-ALFA S.A.

In addition to monitoring rooms and equipment, the device can be used to monitor air conditioning units or ducts.

Sensitivity The device has a response sensitivity from 0,5 up to 0.015% light obscuration/m. Further sensitivity levels of the main alarm can be progressively adjusted depending on the application. The reliable "high-power light source" (HPLS) ensures uniform response behaviour for different types of fires in accordance with EN 54-20 and ISO 7240-20.

It is possible to double the monitoring area if two detector modules are used in the device.

LOGIC·SENS By analysing the chronological signal path, the intelligent signal processor LOGIC·SENS distinguishes between nuisance variable and fire event to prevent false alarms.

PIPE·GUARD In the same way as point-type smoke detectors, which are electronically monitored for cable breaks and short-circuiting, highly sensitive and operationally reliable airflow monitoring is required for aspirating smoke detectors. The unique airflow sensor employed in all aspirating smoke detectors from POLON-ALFA S.A. reliably detects fluctuations of the airflow beyond 10%, e.g. due to rupture or blockage of the pipe system.

The airflow monitoring is temperature-compensated and can be set in relation to air pressure.

A dynamic air flow sensor system can additionally be activated in order to react to slight and rapid changes in the air flow.

The pipe system aspiration apertures require a specifically defined opening diameter, depending on the project specifications. POLON-ALFA S.A. has developed aspiration-reducing film sheets with sleeves and aspiration-reducing clips in order to achieve these precise aspiration apertures. These

Aspiration apertures not only allow convenient assembly, but also prevent "whistling" background noises. A further advantage is the quick and simple checking and detection of the aspiration aperture diameters.

Point-type smoke detector project planning The aspiration apertures of the pipe system are equivalent to point-shaped smoke detectors. The monitoring areas are planned in accordance with the applicable laws, standards and directives.

Diagnostic tool A diagnostic tool is available for the commissioning and servicing. A quick and convenient fault limitation is enabled by means of a diagnostic interface and diagnostic software.

Selection of fan voltage The fan voltage is set according to the project specifications by means of jumpers or bridges.

- VENTUM PRO LITE
  - On the basic board by means of jumper JU1: 6.9 V or 9 V
- VENTUM PRO LITE-SL
  - On the fan control circuit board type FC-2 (standard for VENTUM PRO LITE-SL) by means of bridges BR1 and BR2: 6.5 V, 6.9 V or 9 V
  - On the fan control circuit board type FC-3 (optional for VENTUM PRO LITE-SL) by means of bridges BR1 and BR2: 10 V, 11 V or 12 V

2.2 Areas of application

The VENTUM PRO LITE is used for early fire and very early fire detection in rooms and facilities.

Principle Air samples are taken from the monitored area using a pipe system with defined sampling points and supplied to the detector module.

This is particularly suitable in areas where point-type detectors cannot be used or where their use is limited. This applies particularly to monitored areas where ...

- ... there is a high fire risk.
- ... a high smoke detection sensitivity is required.
- ... air conditioning is used.

- ... electromagnetic fields are present.
- ... point-type smoke detectors are difficult to access and installation or maintenance is difficult to carry out.
- ... the height of the monitoring area is greater than permitted for point-type smoke detectors.
- ... point-type smoke detectors are not desired due to aesthetic reasons.
- ... very high or low temperatures prevail.
- ... air pollution is to be expected and the use of air filters is therefore required.
- ... protection against vandalism is required.

Room monitoring

Room monitoring is suitable for application areas such as:

- Raised floors, suspended ceilings
- Tunnels, channels, difficult to access cavities
- Warehouses, high-bay warehouses, refrigerated warehouses
- Lift shafts
- Cultural facilities (e.g. museums)

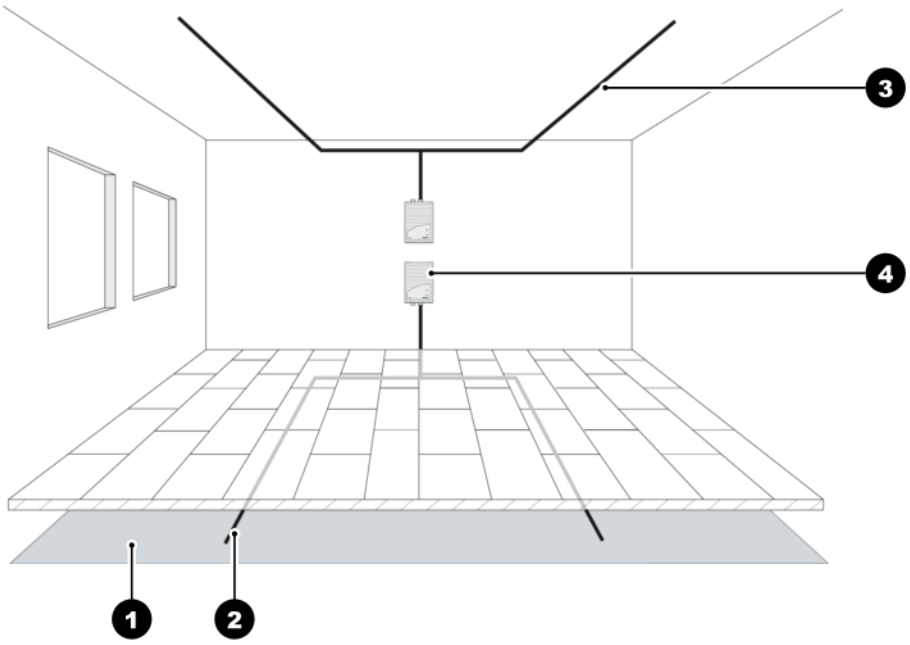


Image 1: Principle of room monitoring

1	Raised floor
2	Pipe system installed in raised floor (partially concealed)
3	Pipe system installed below the ceiling
4	VENTUM PRO LITE

Room monitoring with air-conditioning

Room monitoring with air-conditioning is suitable for application areas such as:

- Raised floors, suspended ceilings
- Ventilation ducts
- Distribution, IT and server rooms, transformer cells
- Air-conditioning units
- Air-conditioning ducts in bypass

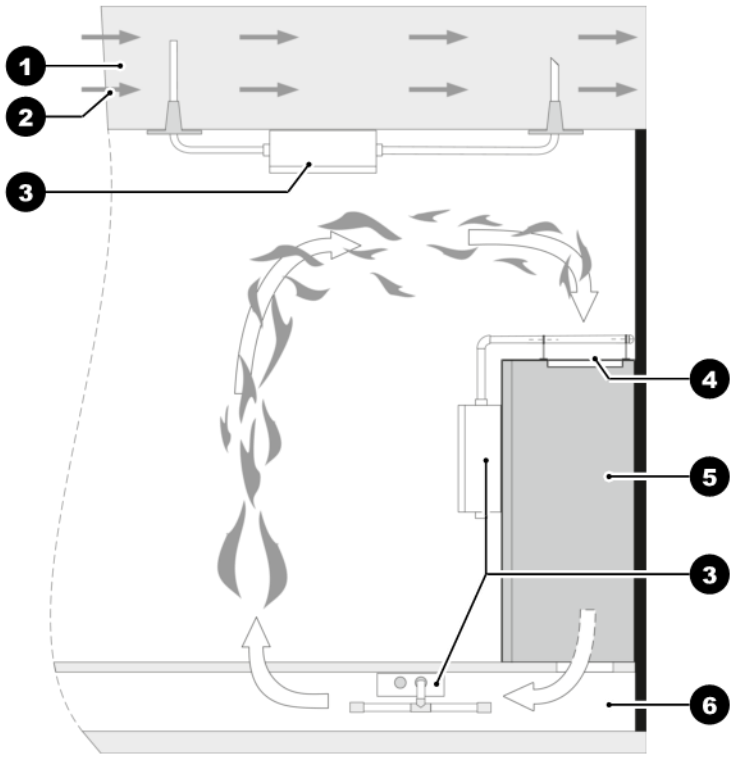


Image 2: Principle of room monitoring with air-conditioning (e.g. air circulation units or air-conditioning ducts)

1	Air-conditioning duct
2	Airflow
3	VENTUM PRO LITE
4	Ventilation grille
5	Air circulation unit
6	Raised floor

System monitoring

Equipment includes unventilated or forced-ventilated units and cabinets. Equipment monitoring is suitable for application areas such as:

- distributor, control, IT, network, emergency power supply and server cabinets
- telecommunication cabinets
- measuring and control systems

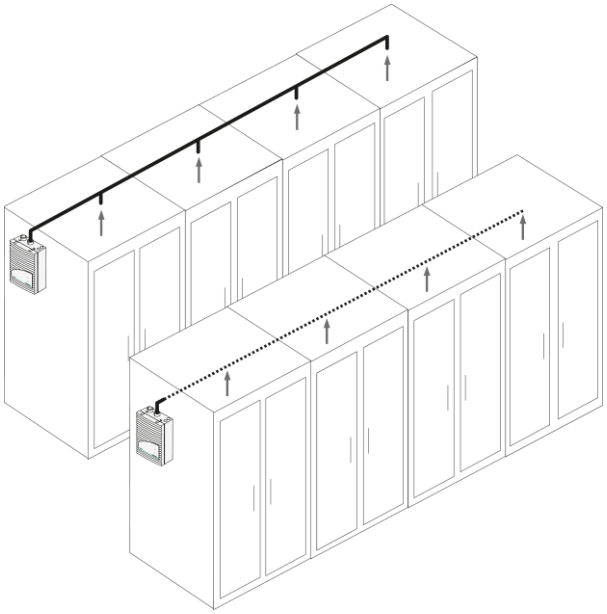


Image 3: Principle of equipment monitoring

The VENTUM PRO LITE can also be used for very early fire detection in rooms with special air conditioning.

High-quality goods and systems can be reliably monitored thanks to the high sensitivity level. The VENTUM PRO LITE is therefore particularly suitable for application areas in which e.g. ...

- … early intervention is required due to high value concentration.
- …systems have to be permanently ready for operation.
- ... highly sensitive smoke detection is required (e.g. in monitoring areas that have a low level of smoke aerosols in the air due to filter elements).
- …high air exchange rates exist.

3 Technical description

In this chapter, you will find the overviews of all components and functional descriptions.

3.1 System description

The system is composed of the device and a pipe system.

The device contains the following main components:

- A sensitive detector module to detect smoke aerosols
- An air flow sensor integrated in the detector module for monitoring the pipe system for rupture and blockage
- A fan to transport the air samples to the detector module

On the VENTUM PRO LITE TWO, one of the two detector modules can be optionally equipped with or without air flow sensor and with or without LOGIC·SENS.

The pipe system consists of pipes and fittings, optionally from ABS or PVC plastic material. Each aspiration aperture in the pipe system represents a point-type smoke detector during planning.

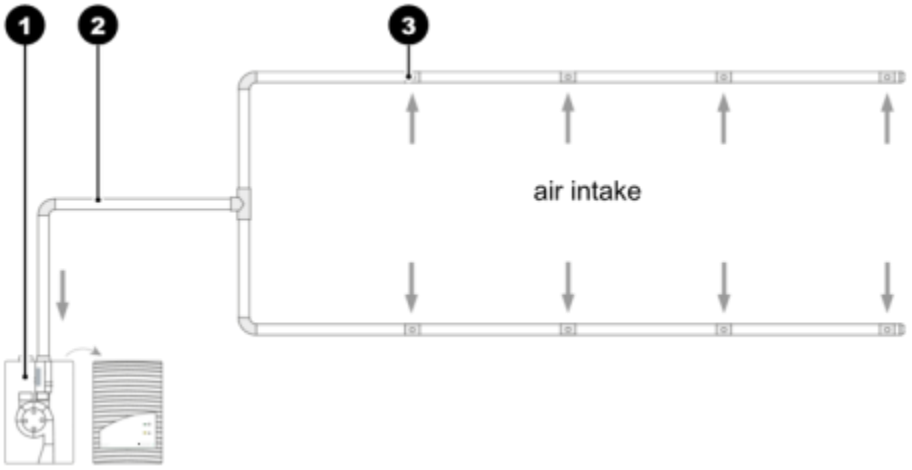


Image 4: System Description

1	VENTUM PRO LITE
2	Pipe system
3	Aspiration aperture

Extensive accessories (e.g. various air filters, response indicators) are available in order to ensure safe operation even under the most difficult conditions (e.g. clean rooms, recycling areas).

3.1.1 Function

Air samples are taken from the monitored area using a pipe system with defined sampling points and supplied to the detector module.

Detector module

Depending on the sensitivity (main alarm) of the detector module used (optionally from 0,015 up to 1.0% light obscuration/m), an alarm is triggered on the VENTUM PRO LITE when the corresponding light obscuration is reached. Up to four different sensitivity levels can be set on the detector module (see chapter "Sensitivity").

Two monitoring areas can be monitored with a VENTUM PRO LITE TWO (two detector modules). Dual detection dependency and, additionally, a pre-alarm can be achieved by choosing different response sensitivities when monitoring an individual monitoring area.

The alarm is displayed using the red alarm LED on the device and can be transmitted to any connected fire detection control panel (FDCP). The alarm

Alarm levels

levels as well as the display and transmission of faults can be subjected to different delay times (see chapter "Installation" and "Making settings").

Alarm messages are saved and are to be reset after rectifying the cause.

Monitoring of detector module

Detector modules are monitored for dirt, disturbance of signal and for removal. Soiling of the detector module has no effect on the sensitivity. Faults are displayed via the yellow malfunction LED on the device and can be transmitted to a connected fire detection control panel via a fault contact. Faults caused by temporary ambient fluctuation can be hidden by adjusting a time delay.

LOGIC·SENS

A switch on the detector module of the VENTUM PRO LITE can be used to activate or deactivate the intelligent signal processor LOGIC·SENS. By means of the intelligent signal processing, LOGIC·SENS enables deceptive phenomena to be overridden and thus contributes to safe operation without false alarms.

Air flow monitoring

An air flow sensor controls the connected pipe system for changes in the airflow. An excessively low air flow indicates blockage, an excessively high air flow indicates a break. Air flow monitoring is temperature-compensated and can be set in relation to air pressure.

The air flow fault is displayed on the device after the expiration of an adjustable delay time. The message is transmitted to a connected fire detection control panel via a fault contact. The threshold values for the monitoring window can be adapted to the ambient conditions.

The dynamic air flow sensors are only active at the low air flow level.

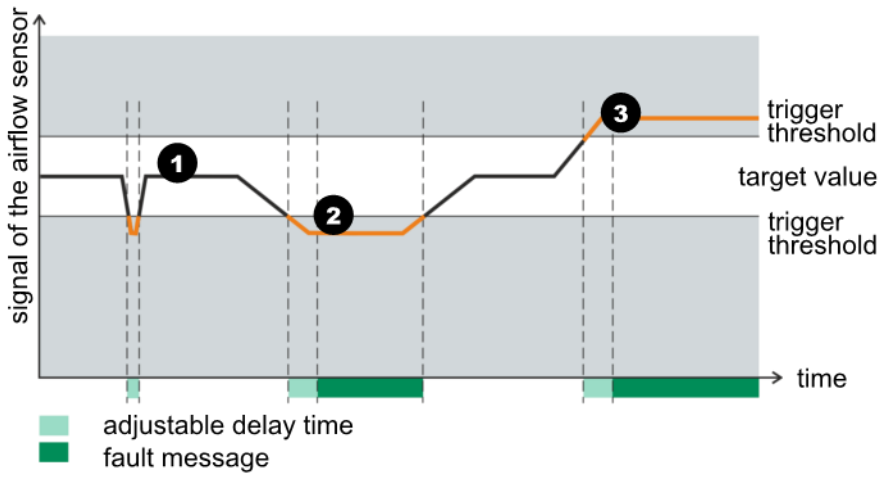


Image 5: Example of signal path airflow sensor fault

1	Normal airflow
2	Airflow too low (blockage)
3	Airflow too high (rupture)

Fault indicator

A pending detector module or air flow fault generates a fault message, which is displayed on the device and on any connected FDCP. The fault indicator can be set to "saving" (default) or "non-saving".

Fault identification via flash codes

The device has LED indicators on the detector module. Various flash codes provide information about the device status. This makes it possible to quickly differentiate between faults due to a defective detector module or a blocked or broken pipe system.

Reset through FDCP

Alarm and fault messages are reset via a connected fire detection control panel. A reset circuit board can be optionally used if, in case of operation of the VENTUM PRO LITE via a fire detection control panel with collective detection lines, alarm and fault messages are reset simultaneously with the resetting of the detection lines. In case of operation via fire detection control panel with addressable detection lines, resetting can be accomplished via the addressing module.

Relay output

The VENTUM PRO LITE has a potential-free switch contact per detector module for each alarm level and for the collective fault. This means that the VENTUM PRO LITE can be switched to collective and addressable detection lines of any connected fire detection control panel (using the addressing modules of the respective fire detection control panels).

Air flow calibration

The air flow calibration on the VENTUM PRO LITE is performed fully automatically, meaning that the commissioning is facilitated significantly. The air flow initialisation is performed selectively dependent on or independent of air pressure.

The air flow Init process is carried out so that the air flow characteristic for the pipe network can be determined and saved. The air flow Init process must always be run for every device after one of the following operations has been carried out:

- Installation of the device
- Changes to the pipe system
- Change of the fan voltage

Pipe system

A pipe system with a total length of max. 160 m and a maximum of 20 aspiration apertures can be connected to the VENTUM PRO LITE with one detector module.

Two pipe systems can be connected to the VENTUM PRO LITE TWO with two detector modules. The overall pipe system may have a total length of max. 2x 160 m or a maximum of 2x 20 aspiration apertures.

3.2 Structure and accessory components

3.2.1 Overview

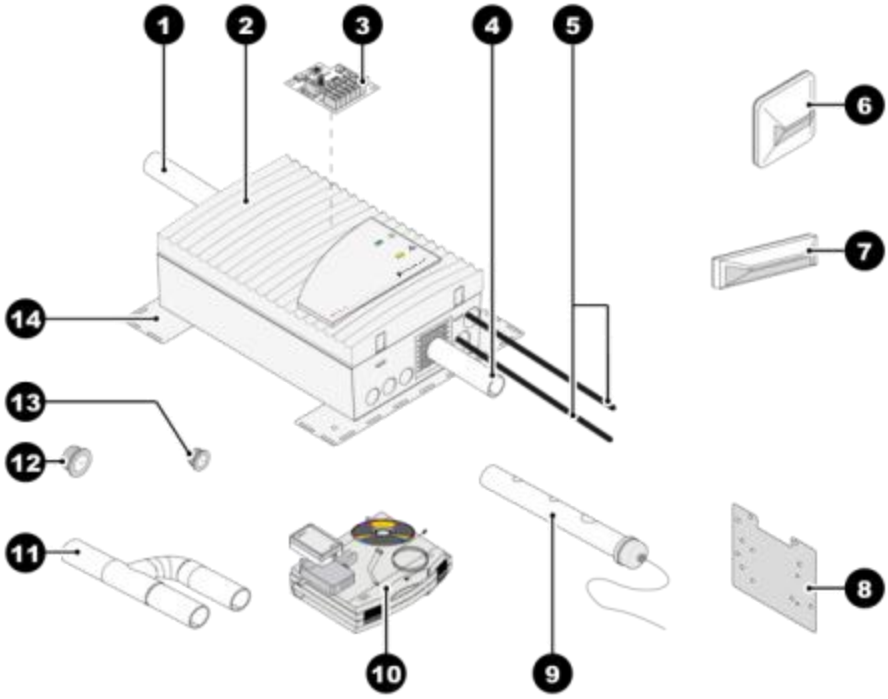


Image 6: Structure an accessory components

1	Pipe system
2	VENTUM PRO LITE
3	Reset circuit board*1
4	Air return
5	Fire alarm cable (FDCP/power supply or to the next device)
6	Response indicator type FDAI 92
7	Response indicator type FDAI 91
8	Installation kit for additional modules*1
9	Test pipe*1
10	Diagnostic tool*1
11	Pipe adapter*1
12	Membrane cable entries M25*1
13	Membrane cable entries M20*1
14	Device bracket*1

*1 optional

The components illustrated in the overview can be used optionally.

3.2.2 Device

The device consists of the following components:

- Plastic housing with
  - Pipe connections for aspiration pipes (I, II)
  - Pipe connection for air return
- Fan (standard or silent) with optimised air supply
- LEDs for alarm, fault and operation;
  additionally with VENTUM PRO LITE TWO: Alarm 2
- Motherboard with interface for diagnostic tool
- Membrane cable entries (3x enclosed)

The following components must be ordered separately:

- Sensitive detector module according to the principle of optical scattered light detectors with additional air flow monitoring
- Front film sheet to display device information

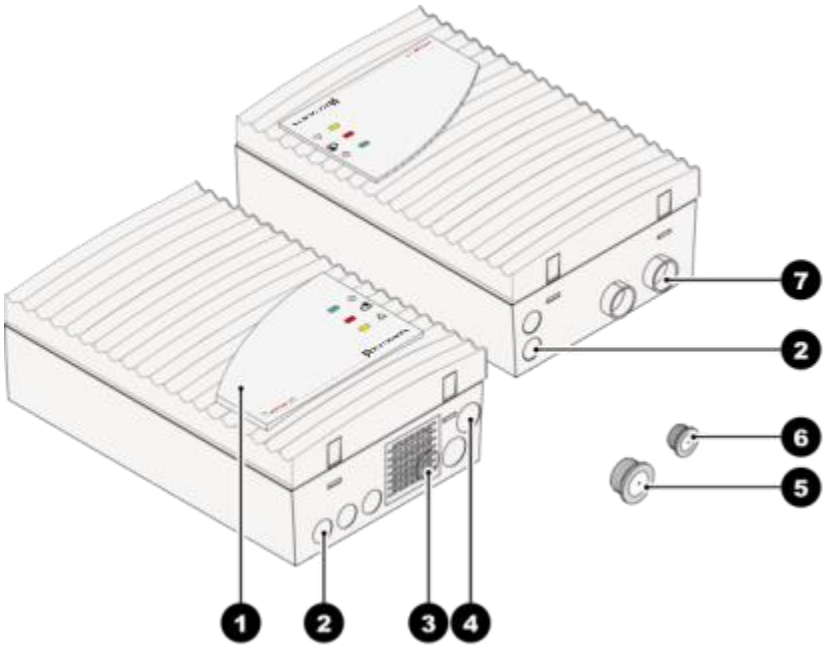


Image 7: Displays and connections

Item	Component	Description
1	Front panel with displays	-
2	Cable gland for fire alarm cable	5x M20
3	Connection for air return pipe	For air return
4	Cable gland for fire alarm cable	2x M25
5	Cable entry (large)	2x M25 for cable with ∅ 1 to 18 mm
6	Cable entry (small)	1x M20 for cable with ∅ 1 to 13 mm
7	Aspiration pipe connection Second connection = only VENTUM PRO LITE TWO	For pipe system Ø 25 mm

Table 1: Overview of displays and connections

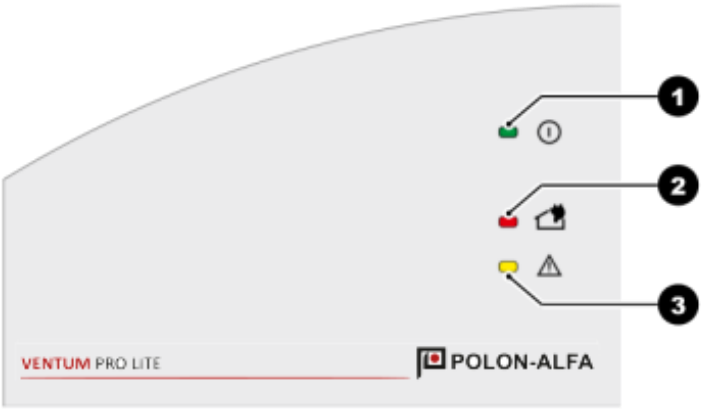


Image 8: Front panel VENTUM PRO LITE and VENTUM PRO LITE-SL

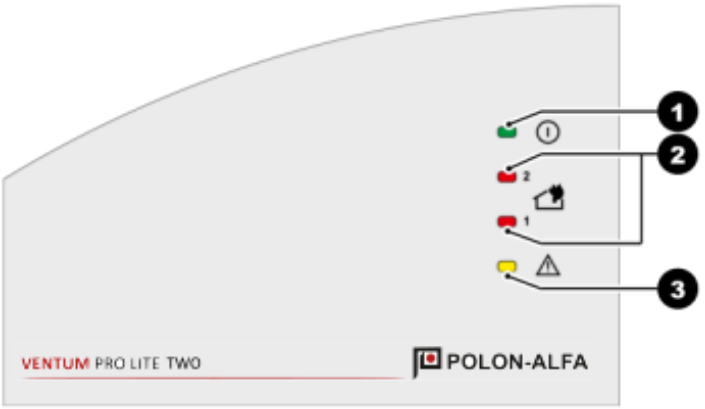


Image 9: Front panel VENTUM PRO LITE TWO and VENTUM PRO LITE TWO-SL

1	Operation
2	Alarm (detector module I or II)
3	Fault, failure of the fan or pipe system fault or detector module fault

3.2.3 Detector box

External detector boxes can be installed in the pipe system in conjunction with the VENTUM PRO LITE. The detector box can be used in order to ...

- ... set up dual detection dependency.
- ... be able to localise the branch with smoke in a multi-branch pipe system.
- ... increase the response sensitivity in a multi-branch pipe system.

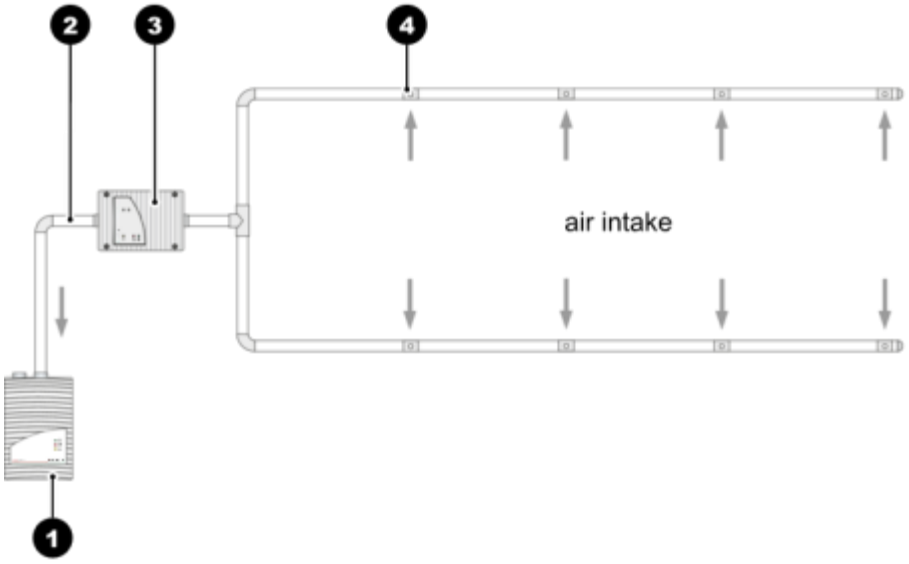


Image 10: Functional principle of detector box (dual detection dependency)

1	VENTUM PRO LITE
2	Pipe system
3	Detector box
4	Aspiration aperture

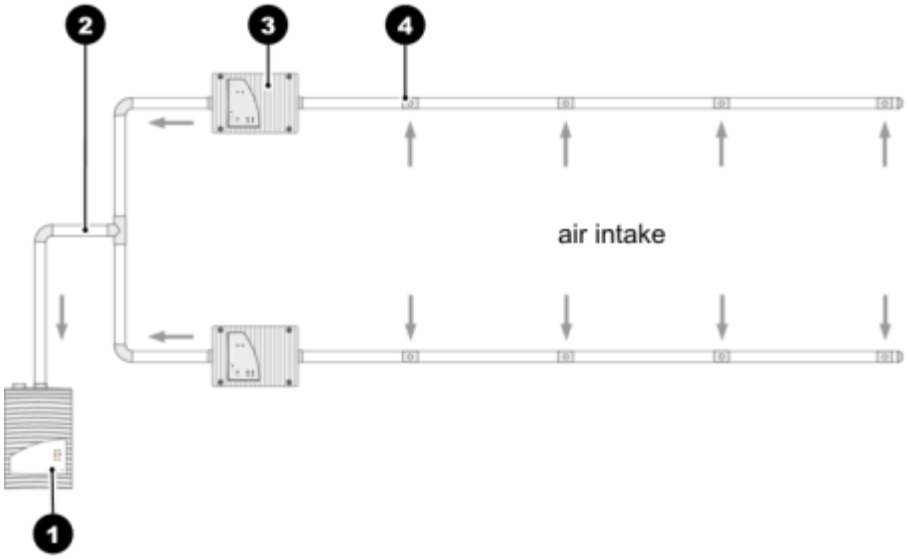


Image 11: Functional principle of detector box (localisation and increase of the response sensitivity)

1	VENTUM PRO LITE
2	Pipe system
3	Detector box
4	Aspiration aperture

The detector box consists of the following components:

- Device base
  - Connections for 25 mm pipe (air inlet and air outlet) with filter
  - Cable glands
  - Connection terminals
- Detection unit (in the housing cover)
  - Sensitive detection according to the principle of visual scattered light smoke detectors
  - contacts for connection to a fire detection control panel
  - LEDs for main alarm, pre-alarm (optional), fault and operation
  - Bargraph for smoke level (optional)
  - Infrared interface for diagnostics

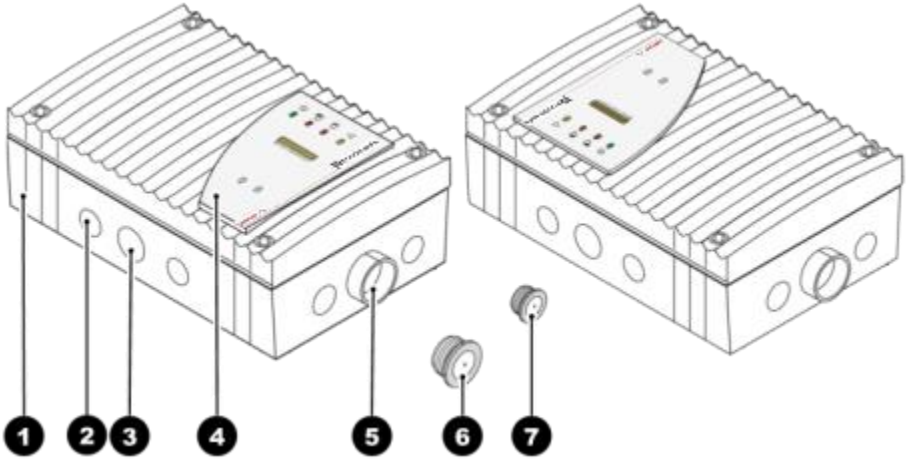


Image 12: Detector box

1	Detector box
2	Cable glands 8x M20
3	Cable glands 6x M25
4	Front film sheet
5	Pipe connection
6	Membrane cable entries 1x M20 (enclosed with device base pack)
7	Membrane cable entries 2x M25 (enclosed with device base pack)

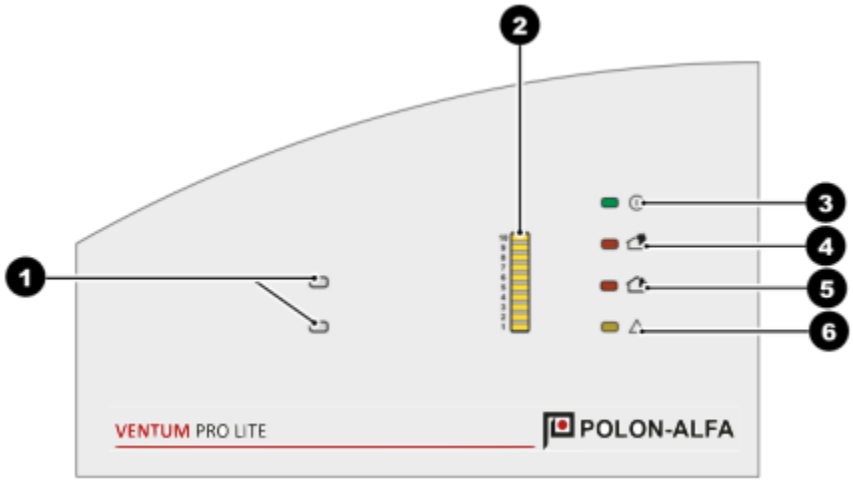


Image 13: Front film sheet of the detector box

Item	Components	Description
1	Infrared interface	Commissioning and fault diagnostics
2	Smoke level display (1) (bargraph, 10x yellow LED)	Current smoke level (2)
3	Operation (green LED)	Operating display
4	Main alarm (red LED)	100% smoke level
5	Pre-alarm (red LED) (1)	66% smoke level
6	Fault (yellow LED)	Pipe system fault, detector module fault or failure of the fan

(1) optional

(2) As a result of signal fluctuation with regard to the smoke level in the transmission range between two smoke level LEDs, the top active smoke level LED can flicker.

3.2.4 Diagnostic tool

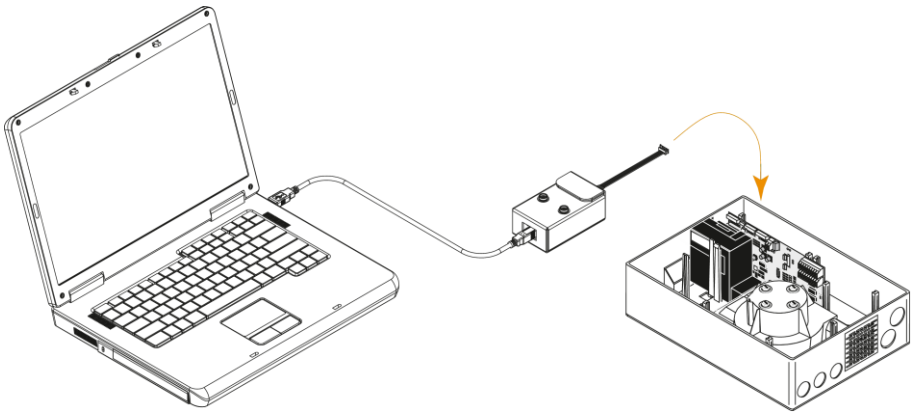


Image 14: Connect diagnostic interface to the basic board

A diagnostic tool is available for the commissioning and servicing. A quick and convenient fault limitation is enabled by means of a diagnostic interface and diagnostic software.

The data is transmitted via a 6-pin ribbon cable which is connected via the plug connector X2 on the basic board of the VENTUM PRO LITE.

Diagnostic messages are stored for at least three days in the device in order to allow analysis of short, sporadically occurring faults (e.g. changed operating conditions).

The stored messages together with alarms and faults can be reset using the diagnostic software.

TIP

All stored and current diagnostic data as well as settings made of the VENTUM PRO LITE can be saved in the form of a file or an automatically created log using the diagnostic software. Store and archive every file under another file name for the purpose of later comparison.

TIP

It is advisable to read out, check and archive the commissioning statuses.

3.2.5 Response indicator

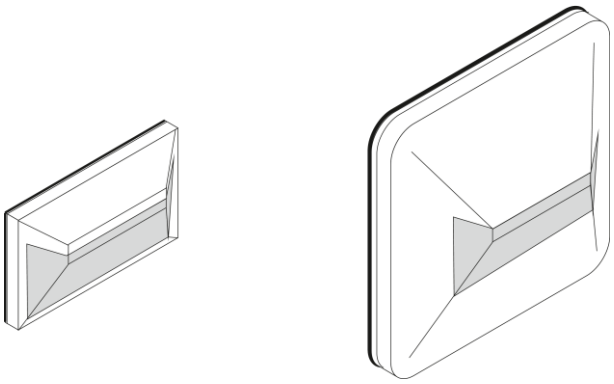


Image 15: Response indicators FDAI 91 and FDAI 92

It is necessary to attach an alarm display in a clearly visible place in case of concealed fitting of the VENTUM PRO LITE.

The VENTUM PRO LITE offers the possibility of connecting the response indicators FDAI 91 and FDAI 92.

3.2.6 Device brackets

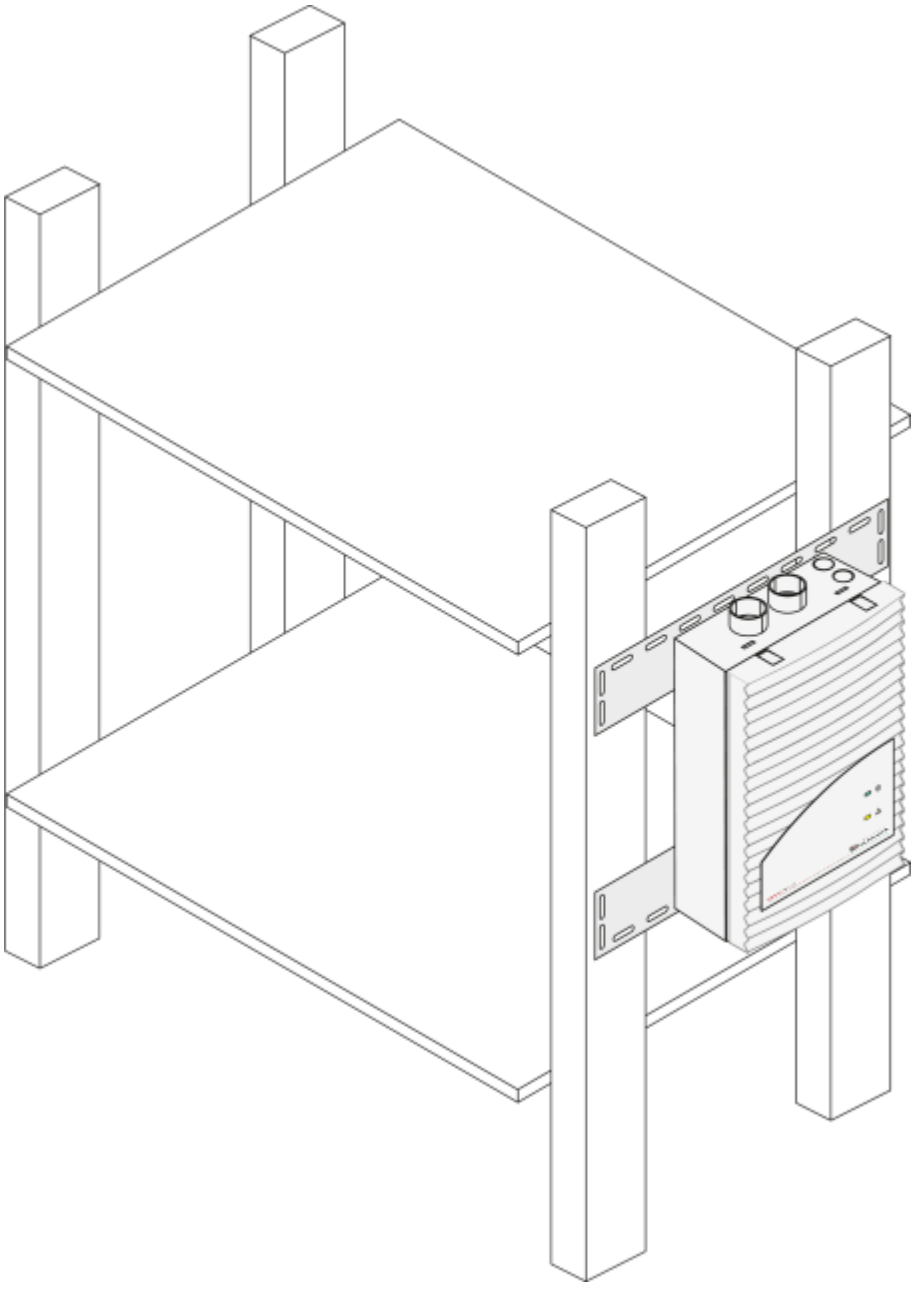


Image 16: Device brackets

The VENTUM PRO LITE can be directly mounted on a wall. Additional brackets can be delivered if required (e. B. for fixing to shelf racks).

3.3 Pipe system

The pipe system serves for extraction of consistent air out of the monitoring areas.

3.3.1 Entire overview of available pipe components

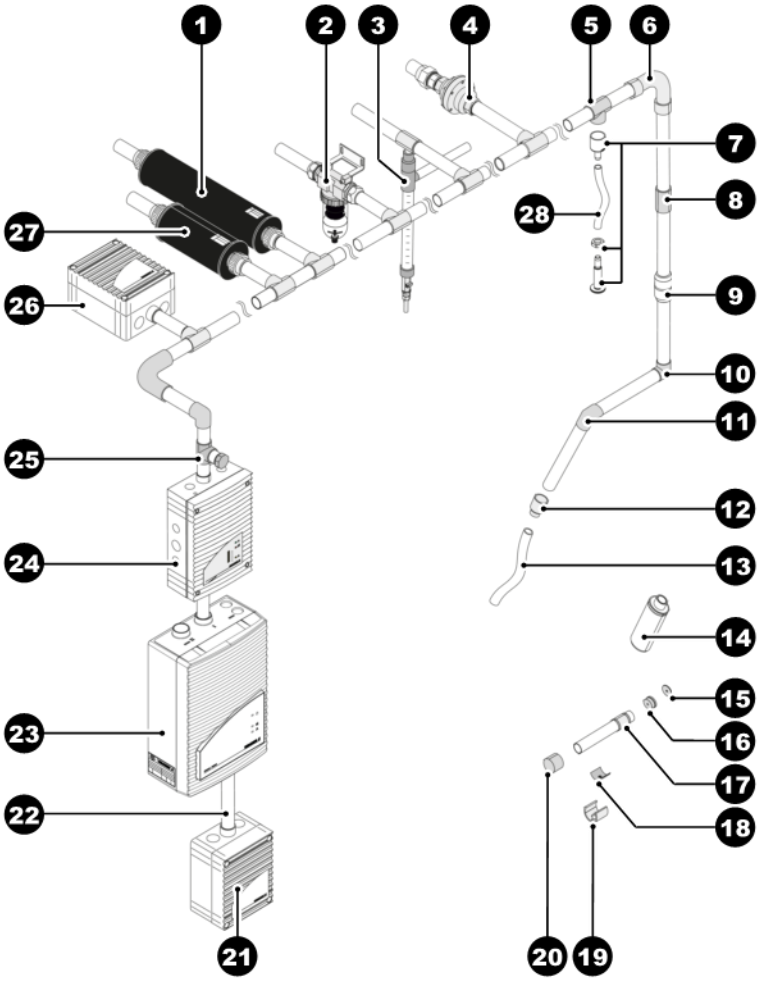


Image 17: Available pipe system components

1	Special filter type SF-650
2	Condensate separator type KA-DN-25
3	Condensate separator type KA-1-P
4	Detonation protector
5	T-piece
6	Curve 90°
7	Ceiling duct set (3-part)
8	Sleeve
9	Double screw connection
10	90° angle
11	45° angle
12	Reduction piece
13	Aspiration hose
14	Non-return valve
15	Aspiration-reducing film sheet
16	Aspiration reduction[1)]
17	Sleeve for aspiration-reducing film sheet
18	Aspiration reduction[2)]
19	Plastic clip for aspiration reduction[2)]
20	End cap
21	Silencer
22	Air return
23	VENTUM PRO LITE
24	Detector box
25	Test adapter
26	Air filter
27	Special filter type SF-400
28	Capillary hose (aspiration hose for ceiling ducts)

[1)]with 10 mm drill hole to attach an aspiration reducing film sheet

[2)]for refrigerated areas and/or air purge systems

Select the components shown for the corresponding application and also use them in combination.

3.3.2 Air purge system

NOTE

Damage of aspiration reducing film sheets due to purging

If air purge systems are used, aspiration reducing film sheets can be damaged or detached in the purging process.

- ► Use aspiration reducing clips with appropriate aspiration reductions.

In monitoring areas where dust particles or freezing are possible, it may be necessary to purge the pipe system and its aspiration apertures with compressed air. Compressed air is purified and dehumidified ambient air.

If dirt is to be effectively removed from the pipe system, provide a non-return valve at the end of each branch of the pipe system (not for applications in refrigerated areas).

The following figures show the components of manual air jet equipment.

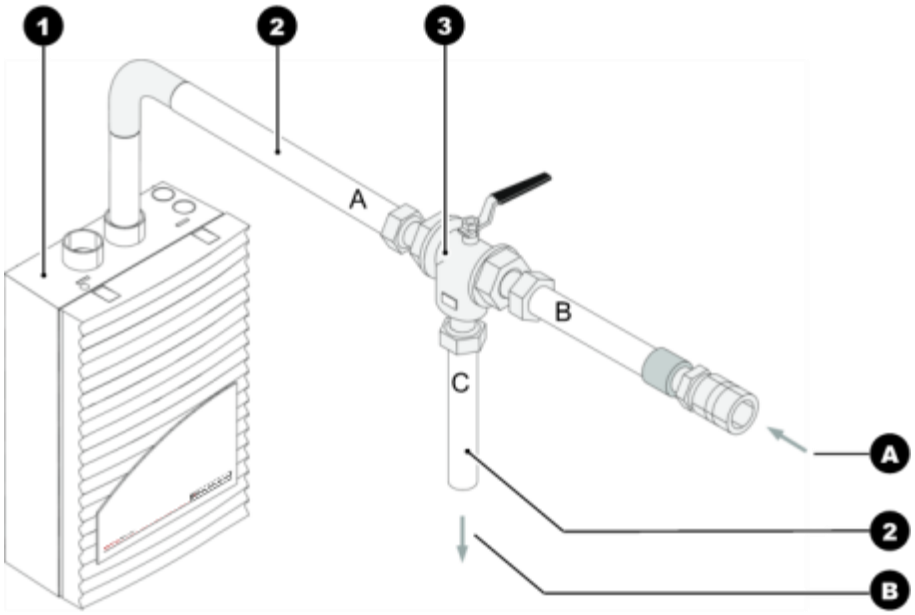


Image 18: Manual air purge system with metal 3-way ball valve

1	Device
2	Pipe system
3	3-way ball valve (metal)
A	Compressed air
B	Air flow for purging

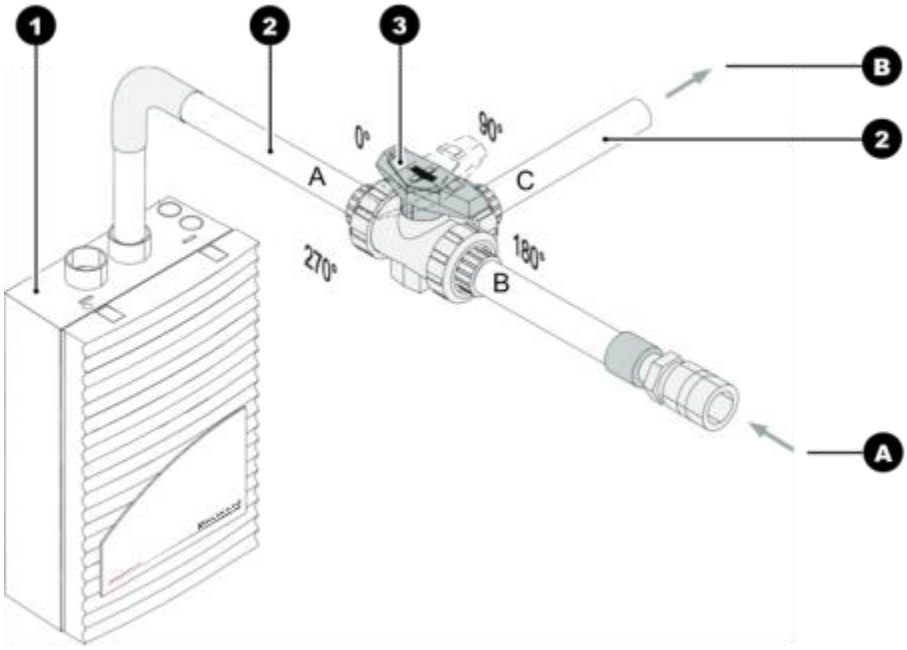


Image 19: Manual air purge system with 3-way ball valve made of ABS or PVC

1	Device
2	Pipe system
3	3-way ball valve (ABS/PVC)
A	Compressed air
B	Air flow for purging

3.3.3 Sampling points

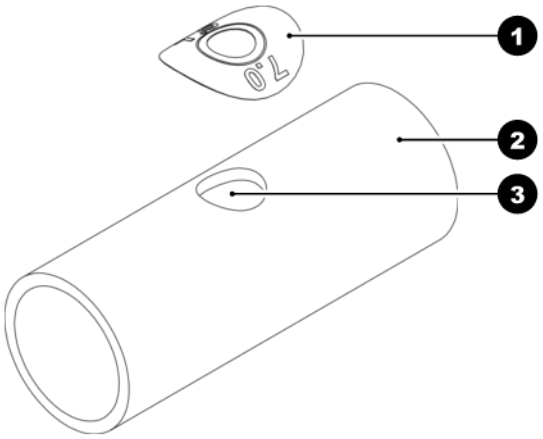


Image 20: Aspiration borehole and aspiration reducing film sheet

1	Aspiration reducing film sheet
2	Aspiration pipe (pipe system)
3	Aspiration borehole Ø 10 mm

A sampling point is a 10 mm borehole in the aspiration pipe, which is covered with a aspiration reducing film sheet. The aspiration reducing film sheet exhibits the respective, necessary opening diameter for the aspiration reducing film sheet (e.g. 7 mm).

3.3.3.1 Aspiration reducing film sheet and sleeve

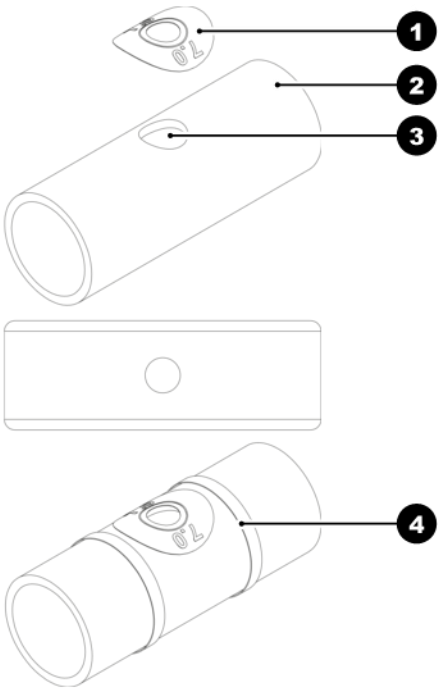


Image 21: Aspiration aperture, aspiration-reducing film sheet and marking tape

1	Aspiration-reducing film sheet
2	Air sampling pipe (pipe system)
3	Aspiration aperture Ø 25/64" (10 mm)
4	Marking tape

The necessary opening diameter of the aspiration reducing film sheet is compliant with the structure of the pipe system (see Chapter “Project planning”).

The aspiration reducing film sheet is secured with a sleeve to prevent it from loosening. The sleeve is a transparent adhesive film with red edges and a 10 mm opening. It is adhered on top of the aspiration reducing film sheet in such a way that the sampling point is not covered and is also visible from greater distances.

NOTE

Damage of aspiration reducing film sheets due to purging

If air purge systems are used, aspiration reducing film sheets can be damaged or detached in the purging process.

► Use aspiration reducing clips with appropriate aspiration reductions.

The standard aspiration reducing film sheets type AF-x and sleeves type AF-BR are not suitable for application in refrigerated areas. Aspiration reducing clips must be used in such areas instead.

3.3.3.2 Aspiration reduction clips

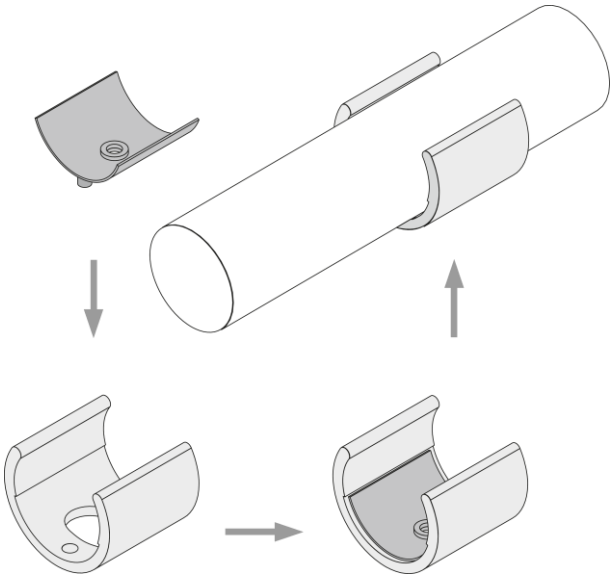


Image 22: Aspiration reduction clips

The aspiration apertures in monitoring areas where blockage (e.g. freezing or dust) can be anticipated must be equipped with a plastic clip type AK-C and a flexible aspiration reducer type AK-x.

When used in refrigerated areas, the flexible aspiration reducer expands to the sampling points during purging and blasts off the ice. The special plastic clip ensures that the aspiration reducer remains in the predefined position.

The aspiration reducer with plastic clips should be preferred to aspiration reducing film sheets with sleeves for project planning in monitoring areas with ambient impacts that require purging (e.g. dust). The plastic clips are

more stable and the cleaning effect is significantly better for pressurisation due to the elastic rubber inserts.

3.3.4 Ceiling feed-throught

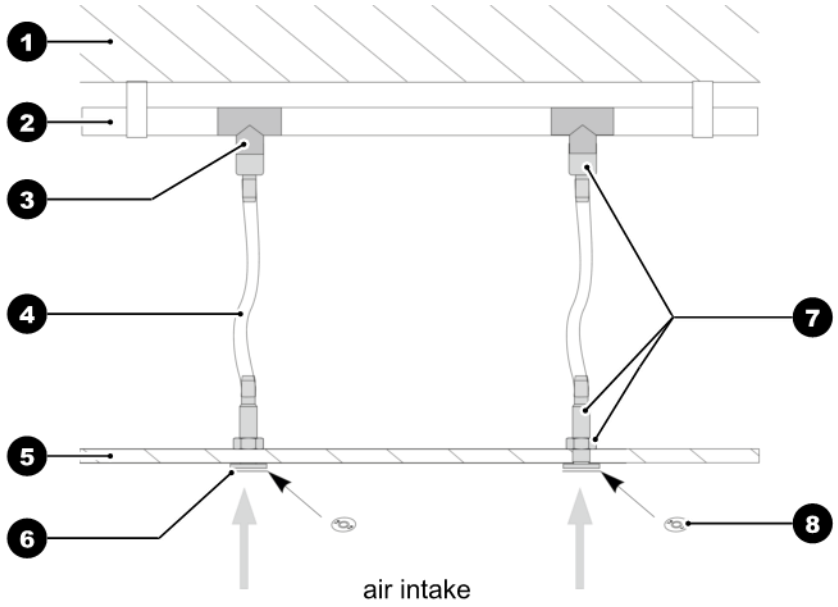


Image 23: Ceiling feed-throught

1	Ceiling
2	Pipe system
3	T-piece (pipe hood)
4	Capillary hose
5	Suspended ceiling
6	Sampling point
7	Ceiling feed-throught (hose nozzle, nut and ceiling feed-throught)
8	Aspiration reducing film sheet

Fitting in suspended ceilings is possible if concealed installation of the pipe system is required for room monitoring. For this purpose, ceiling ducts are fitted in the suspended ceiling with aspiration reducing film sheets according to the project specifications (see chapter "Project planning"). The ceiling ducts are connected to the pipe system via capillary hoses.

The ceiling duct can be used for suspended ceiling boards up to a thickness of approx. 35 mm.

If the length of these capillary hoses is maximum 1 m, project planning applies in accordance with chapter "Project planning".

The aspiration reducing film sheets are available in two versions, depending on the colour of the ceiling.

- Type AFW-x (RAL 9010, Pure white)
- Type AF-x (RAL 9018, Papyrus white)

The aspiration reducing film sheets can be produced in special colours on request.

Special applications

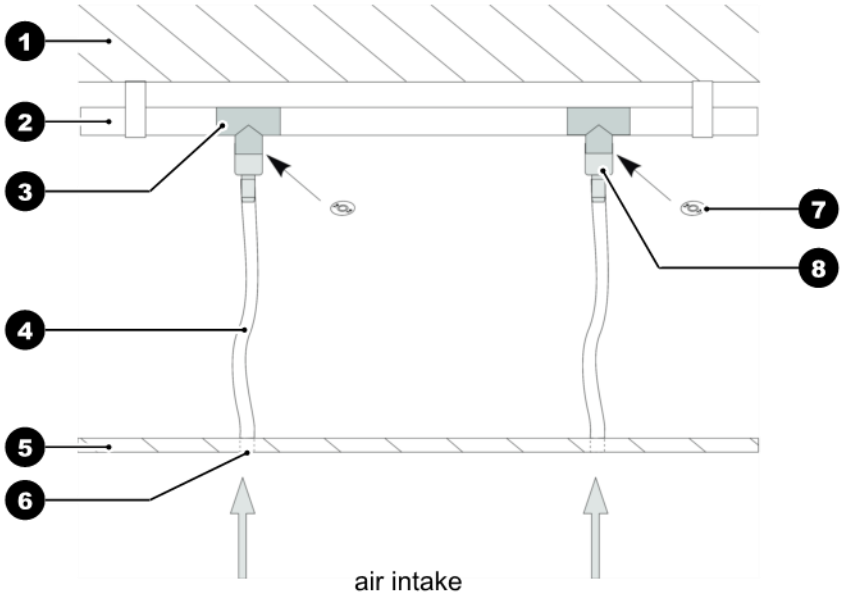


Image 24: Ceiling feed-throught for special applications

1	Ceiling
2	Pipe system
3	T-piece (pipe hood)
4	Capillary hose
5	Suspended ceiling
6	Drilling in the suspended ceiling
7	Aspiration reducing film sheet
8	Hose nozzle

NOTE

Missing monitoring for rupture

The capillary hose cannot be monitored for rupture in case of the special application of ceiling feed-throughts in which the aspiration reducing film sheets are upstream in T-pieces (pipe hoods).

The capillary hoses with upstream aspiration reducer in T-pieces (pipe hoods) can be used for concealed installation e.g. in lamps or plastering. Hence, no aspiration reducing film sheet is visible after the installation.

3.3.5 Air filter and special filter

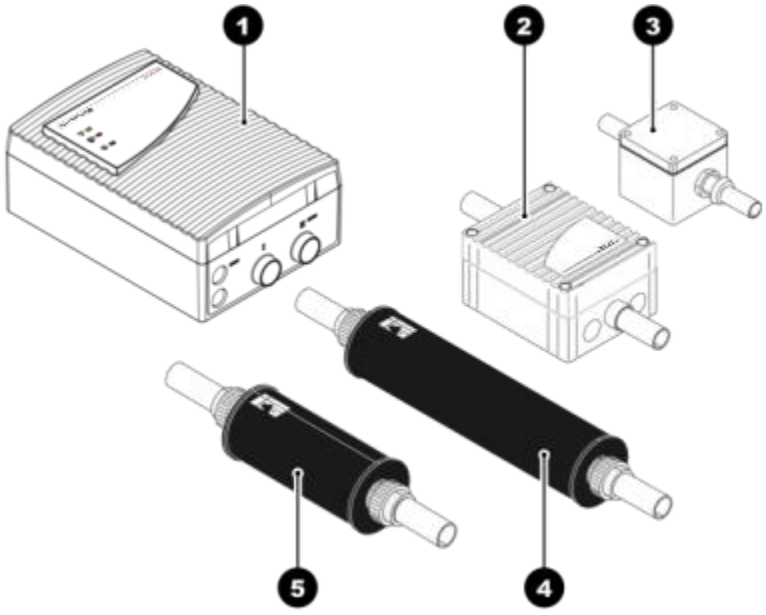


Image 25: Air and special filter

1	VENTUM PRO LITE
2	Air filter type LF-VE, LF-VE-1 or LF-VE-2
3	Air filter type LF-VE-k
4	Special filter type SF-650
5	Special filter type SF-400

In monitoring areas with disturbing ambient influences, e.g. dust, an air or special filter is to be used to protect the detector module of the device.

The air filters listed here are distinguished by the size of the particles absorbed.

Air filter type LF-VE-x

Air filter type LF-VE-x, consisting of a plastic housing with two pipe connections, is used as the standard air filter. The filter material absorbs the particles.

Type	Application	Examples
LF-VE-k	Coarse filter to separate particles ≥30 µm	Insects, fibres, hair
LF-VE	Coarse filter to separate particles ≥15 µm	Dusts, insects, fibres, hairs, fly ash, pollen
LF-VE-1	Filter to separate particles ≥10 µm	As above, and additionally: colour pigments and fine dusts
LF-VE-2	Fine filter to separate particles ≥5 µm	As above, and additionally: fine dusts in low concentrations

Table 2: Air filter – type and areas of application

The air filter is automatically monitored for dirt (blockage) by the airflow monitoring of the VENTUM PRO LITE. If air filters are soiled, the filter inserts can simply be replaced after opening the filter housing.

Air filters in descending branches

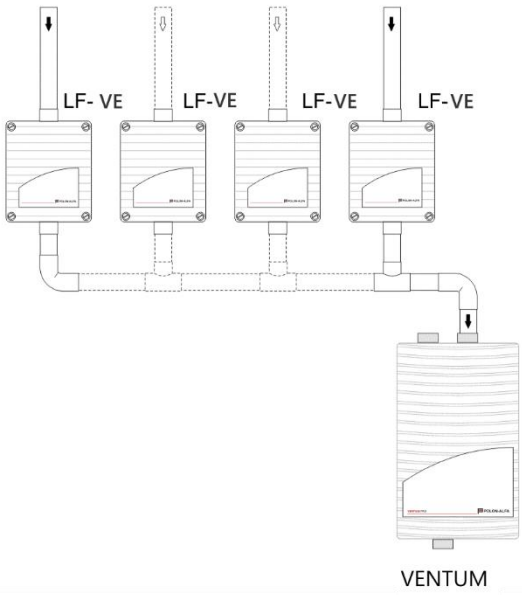


Image 26: Filter LF-VE in multiple aspiration branches

Instead of an air filter in the main branch, an air filter of the same type can be installed in each descending branch to extend the maintenance intervals. The same project planning specifications as defined in the project planning table apply (see Chapter annex).

Air filter in main branch

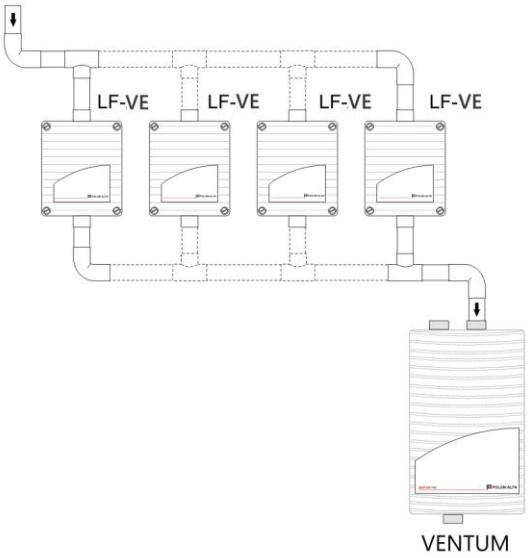


Image 27: Filter LF-VE in auxiliary branch

Moreover, multiple air filters can be installed in parallel in the main branch to extend the maintenance intervals. For this purpose, the main branch must be partitioned into two or several branches and each equipped with the same type of air filter. The individual branches are merged to form one main branch again. The same project planning specifications from the project planning tables apply (see chapter "Annex").

Special filter type SF-x

In case of excessive dirt, special filter type SF-400 or type SF-650 with a larger surface is available. The special filter ensures reliable filtration of dust and dirt particles. The particles are reliably separated and permanently withheld from the filter medium. A consistent air quality is ensured up to the end of the filter's service life.

Type	Use	Examples
SF-400	Fine filter for separating particles ≥1 µm	As LF-VE, additionally: fine dust in high concentrations
SF-650	Fine filter for separating particles ≥1 µm	As above, but with a longer filter service life

Table 3: Special filter (air filter) – type and areas of application

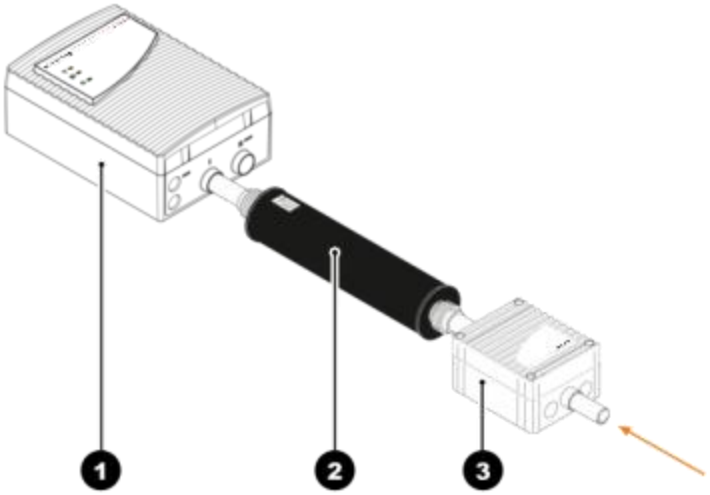


Image 28: Installing special filter and air filter in combination

1	VENTUM PRO LITE
2	Special filter type SF-400 or SF-650
3	Air filter type LF-VE-x

The service life of the special filter can be extended by using an upstream type LF-VE filter.

3.3.6 Air return

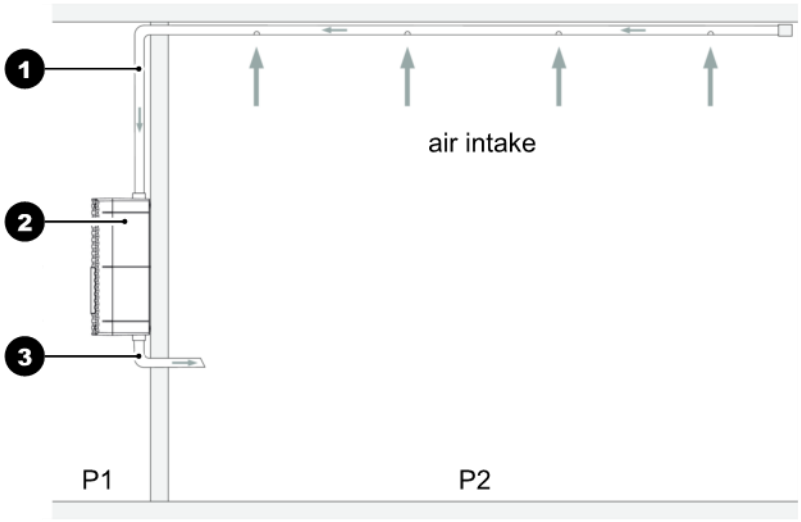


Image 29: Principle of the air return

1	Pipe system
2	Device
3	Air return

If the VENTUM PRO LITE and pipe system are installed in areas with different air pressure (e.g. P1 and P2), return of the air into the pipe system pressure area is required. The air return can be used for pressure compensation or to prevent air pollution (e.g. odours) in adjoining rooms.

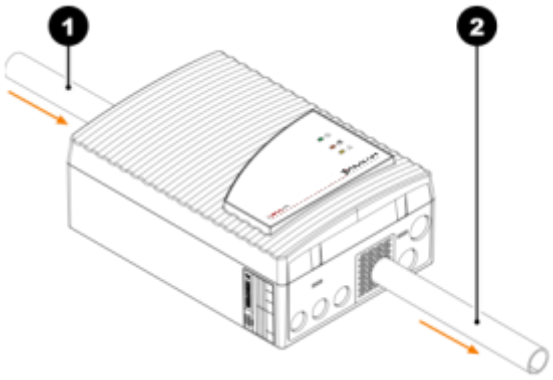


Image 30: Air return

1	Aspiration pipe
2	Air return

The air return pipe is directly connected to the air outlet duct of the VENTUM PRO LITE through the safety guard. The pre-stamped pipe opening in the safety guard has to be broken away. A secure hold is achieved because the air return pipe fits precisely into the air outlet duct.

3.3.7 Silencer

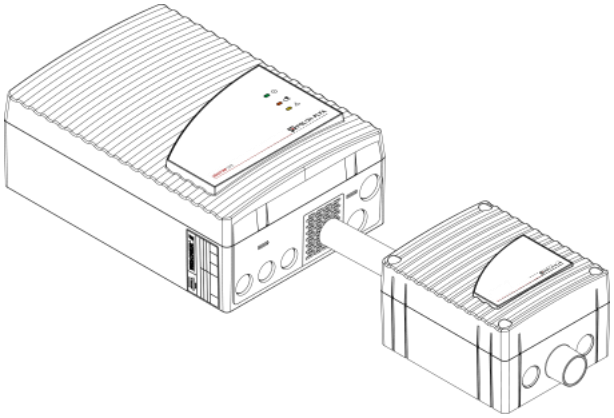


Image 31: SD-1-P silencer

In monitoring areas where low noise emission of the VENTUM PRO LITE is necessary (e.g. in offices of hospitals), the silencer SD-1-P can help reduce the noise level.

3.3.8 Condensate separator

A condensate separator is used in monitoring areas where condensate can form in the pipe system (e.g. if the damp sample air is warmer than the temperature in the immediate vicinity of the pipe and device). Install the condensate separator at the lowest point of the pipe system upstream of the air filter and the VENTUM PRO LITE to collect the condensate.

Condensate separators are used in monitoring areas with:

- Heavily fluctuating temperatures (high air humidity)
- Fresh air monitoring

Type KA-DN 25

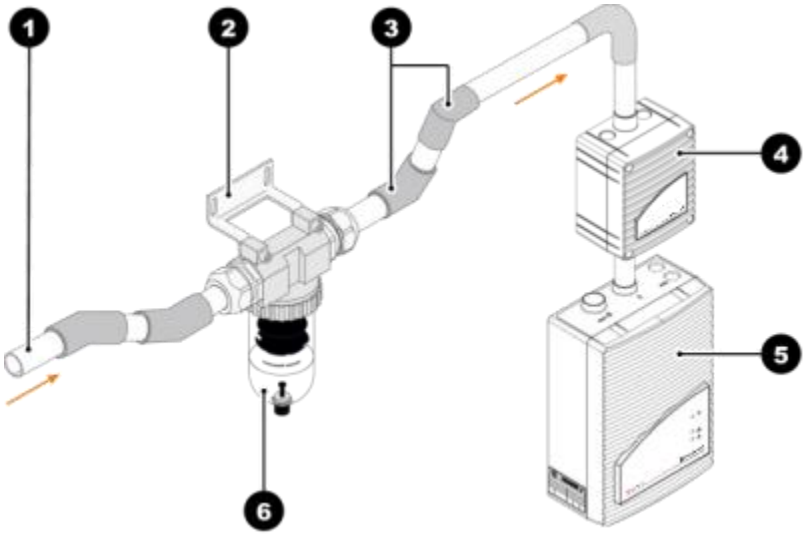


Image 32: Steam trap type KA-DN 25

1	Air sampling pipe
2	Device supports
3	45° elbow
4	Air filter type LF-VE-x
5	VENTUM PRO LITE
6	Steam trap type KA-DN 25

The condensate separator can be operated within a temperature range of 0 °C … +50 °C. The sinter filter in the condensate separator has a pore width of 50 µm and provides additional coarse absorption of dirt particles.

Type KA-1

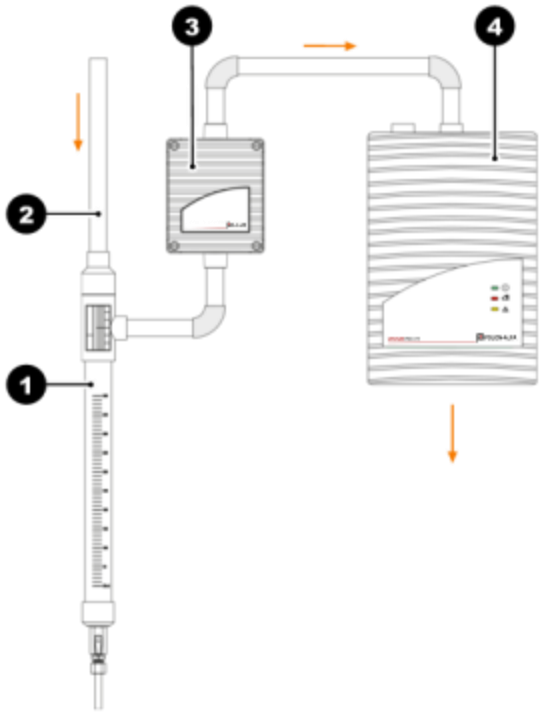


Image 33: Steam trap type KA-1-P

1	Steam trap
2	Pipe system
3	Air filter (optional)
4	VENTUM PRO LITE

The condensate separator can be operated within a temperature range of 0 °C … +60 °C. Automatic condensate separation is possible due to a capillary effect thanks to an integrated cotton wick.

3.3.9 Detonation prevention device

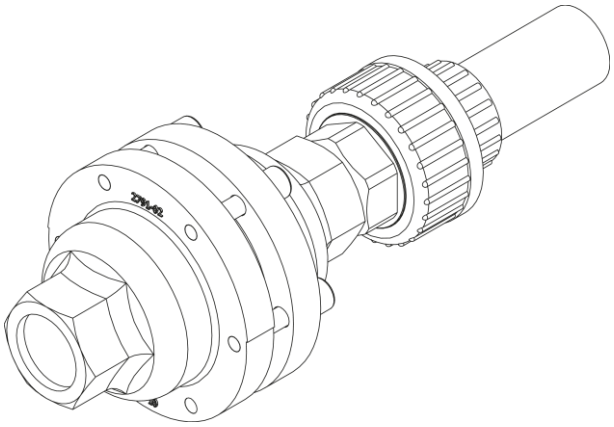


Image 34: Detonation protector

Due to the additional installation of detonation protectors in the pipe system, the VENTUM PRO LITE can also be used for monitored areas with potentially explosive atmospheres (Ex areas). Detonation protectors are used as protection in Ex areas, as pipe deflagrations or detonations can occur in the event of ignition of vapour/air mixtures or gas/air mixtures. This depends on the type and concentration of the ignitable mixture, the initial pressure and temperature. The VENTUM PRO LITE as well as the detonation protectors must be installed outside of the Ex area.

The vapour/air or gas/air mixture flow through the detonation protector during normal operation. The flow can occur in any direction. If the existing mixture ignites in the VENTUM PRO LITE, the resulting detonation is stopped. Ignition (nominal gap width) is prevented by the flame filters. If the mixture is burnt off at the flame filters, it can result in a blowback of the detonation front. To prevent a blowback, the pipe system between the possible ignition source (VENTUM PRO LITE) and detonation protector must be at least 1 m. This indirectly achieves permanent fire protection.

Zones Ex areas are divided into zones depending on the frequency and duration of occurrence of the hazardous, explosive atmosphere. The VENTUM PRO LITE is only permitted to monitor zone 2, where an explosive atmosphere can only occur for a maximum of 30 min per year. With an explosive atmosphere occurring so rarely, it is not expected for the zone to spread due to leaks in the VENTUM PRO LITE.

Explosion groups

Detonation protectors type EC xxx are flame arresters, which are flameproof against pipe deflagrations and detonations. They are intended to monitor Ex areas with explosive gas atmospheres, but not Ex areas with explosive dust atmospheres.

The explosion group is based on the fire load to be monitored:

- Group A, e.g. diesel, petrol, ethane, methane and carbon monoxide
- Group B, e.g. mains gas, hydrogen sulphide and ethylene
- Group C, e.g. hydrogen, acetylene and carbon disulphide.

Detonation protector	Nominal gap width [mm]	Explosion group	Approval
EC IIA	> 0.7	IIA	BAM*
EC IIB3	> 0.5	IIB1 - IIB3	
EC IIC	> 0.2	IIC	

Table 4: Explosion groups for detonation protectors

* Federal Institute for Material Testing

Pipe system and earthing

Design the pipe system between the VENTUM PRO LITE and the detonation protectors as steel pipes (type R-2525).

Aspiration and airflow pipe in the Ex area to be monitored can be either made of plastic or metal. There may be applications where metal pipes cannot be used (e.g. for chemical processes).

The following is to be discussed with an expert in advance:

- The occurrence of ignitable discharges (from experience)
- The pipe system configuration
- The aspiration aperture configuration
- The earthing concept.

The aspiration apertures can either have aspiration reducing film sheets and sleeves or aspiration reducing clips or be drilled directly into the pipe system in the corresponding size. If the expert insists that the aspiration apertures are drilled directly, notify the customer of any whistling aspiration noises.

If no ignitable discharges occur from experience, the pipe system can be made of plastic in the explosive area to be monitored. Plastic parts can be earthed (if necessary) via:

- Conductive paint
- Conductive wire mesh
- Conductive plastic pipes.

Conductive paint must be applied evenly to all parts of the pipe system at a later time on site. Specific thicknesses must not be exceeded. Wire mesh must be braided on site (e.g. criss-cross on the aspiration pipe). The resulting mesh must not exceed specific surface limits. Observe the threshold values specified in national laws, standards and directives. Conductive plastic pipes are earthed via grounding clamps on the pipe and a connected equipotential bonding rail.

4 Technical data

You will find the technical data in this chapter.

4.1 Device

	VENTUM PRO LITE	VENTUM PRO LITE TWO

Voltage

Supply voltage (Ue) [V]	14 … 30
Nominal supply voltage [V]	24

Current All current consumptions specified refer to an ambient temperature of 20 °C.

Fan voltage U_L[V]	6.9	9	6.9	9
Starting current (at 24 V) [mA] (without reset circuit board)	300		320	
Current consumption, standby (at 24 V) [mA] (without reset circuit board)	200[1)]	275	220	295
Current consumption, alarm (at 24 V) [mA] (without reset circuit board)	max. 210	max. 285	max. 240	max. 315
Current consumption, reset circuit board [mA]	max. 20			
Contact load of the alarm and fault relays [V / A] Switching capacity [W]	30 / 1 max. 24			

[1)] The current values can deviate depending on the pipe system used.

Dimensions

H x W x D [mm]	113 x 200 x 292

Weight

[kg]	1.45	1.55

Sound pressure level

Lpa [dB(A)] according to EN ISO 3744 without silencer	from 45[2)]

[2)] depending on project planning and fan voltage

Protection class

IP code in accordance with IEC/DIN EN 60529	IP 20

Impact resistance

In accordance with IEC/EN 62262, EN 50102	IK 04

Housing

Material	Plastic (ABS)
Colour	RAL 9018, Papyrus white

	VENTUM PRO LITE	VENTUM PRO LITE TWO
Temperature range		
[°C]	–30 … +60	
Air humidity		
Non-condensing [% RH]	10 … 95	
Fan		
Design	Radial	
Fan service life (12 V) [h]	43,500 (at 24 °C)	
Displays on the device		
Alarm	1x red LED	2x red LED
Fault	Yellow LED	
Operation	Green LED	
Connections		
Inputs	• Device supply voltage (+/-24 V DC)	
Outputs	• Device supply voltage (+/-24 V DC) • Supply voltage of response indicator(s) type FDAI 91/FDAI 92	
	1x alarm contact 1x fault contact	2x alarm contact 2x fault contact
Cable	twisted in pairs, shielded or unshielded	
Cross-section	Terminals for max. 1.5 mm² wires	
Cable glands	5x M20, 2x M25	
Conical pipe connections	1x for aspiration pipe Ø 25 mm, 1x air return Ø 25 mm	2x for aspiration pipe Ø 25 mm, 1x air return Ø 25 mm

Response sensitivity	
Detector module type	
DM-VPL-50 [% light obscuration/m]	Up to 0.5
DM-VPL-10 [% light obscuration/m]	Up to 0.1
DM-VPL-01 [% light obscuration/m]	Up to 0.015

Silent version

	VENTUM PRO LITE-SL	VENTUM PRO LITE TWO-SL

Voltage

Supply voltage (Ue) [V]	14 … 30
Nominal supply voltage [V]	24

Current All current consumptions specified refer to an ambient temperature of 20 °C.

Fan voltage U_L [V] of fan control circuit board FC-2	6.5	6.9	9	6.5	6.9	9
Starting current (at 24 V) [mA] (without extension modules)	300			330		
Current consumption, standby (at 24 V) [mA] (without extension modules)	140	150	180	170	180	210
Current consumption, alarm (at 24 V) [mA] (without extension modules)	max. 150	max. 160	max. 190	max. 180	max. 190	max. 220

Fan voltage U_L[V] of the fan control circuit board FC-3[1)]	10	11	12	10	11	12
Starting current (at 24 V) [mA] (without extension modules)	300			330		
Current consumption, standby (at 24 V) [mA] (without extension modules)	180	200	230	230	240	270
Current consumption, alarm (at 24 V) [mA] (without extension modules)	max. 200	max. 210	max. 240	max. 260	max. 260	max. 290

[1)] FC-3 = optionally available

Dimensions

H x W x D [mm]	113 x 200 x 292

Weight

[kg]	1.60	1.70

Sound pressure level

LpA according to EN ISO 3744 without silencer [db (A)]	from 31[2)]
LpA according to EN ISO 3744 with silencer [db (A)]	from 23[2)]

[2)] depending on project planning and fan voltage

Protection class

IP code in accordance with IEC/DIN EN 60529	IP 20

	VENTUM PRO LITE-SL	VENTUM PRO LITE TWO-SL

Impact resistance

In accordance with IEC/EN 62262, EN 50102	IK 04

Housing

Material	Plastic (ABS)
Colour	RAL 9018, Papyrus white

Temperature range

[°C]	0 … +40

Air humidity

Non-condensing [% RH]	10 … 95

Fan

Design	Radial
Fan service life (12 V) [h]	43,500 (at 24 °C)

Displays on the device

Alarm	1x red LED	2x red LED
Fault	Yellow LED	
Operation	Green LED	

Connections

Inputs	• Device supply voltage (+/-24 V DC)	
Outputs	• Device supply voltage (+/-24 V DC) • Supply voltage of response indicator(s) type FDAI 91/FDAI 92	
	1x alarm contact 1x fault contact	2x alarm contact 2x fault contact

Cable	twisted in pairs, shielded or unshielded	
Cross-section	Terminals for max. 1.5 mm² wires	
Cable glands	5x M20, 2x M25	
Conical pipe connections	1x for aspiration pipe Ø 25 mm, 1x air return Ø 25 mm	2x for aspiration pipe Ø 25 mm, 1x air return Ø 25 mm

Response sensitivity

Detector module type	
DM-VPL-50 [% light obscuration/m]	Up to 0.5
DM-VPL-10 [% light obscuration/m]	Up to 0.1
DM-VPL-01 [% light obscuration/m]	Up to 0.015

4.2 Accessories

- Detector box
- Response indicators

4.2.1 Detector box

Voltage supply

Supply voltage (Ue) [V]	15 … 30
Nominal supply voltage [V DC]	24

Current consumption All current consumptions specified refer to an ambient temperature of 20 °C and a supply voltage of 24 V.

Standby mode [mA]	30
Alarm mode, device without bargraph [mA]	38
Alarm mode, device with bargraph [mA]	68

Housing dimensions

H x W x D [mm]	70 x 140 x 222

Weight

[kg]	0.8

IP rating

IP code in accordance with IEC/EN 60529	IP54

Impact resistance

In accordance with IEC/EN 62262, EN 50102	IK04

Housing

Material	Plastic (ABS)
Colour	RAL 9018, Papyrus white

Temperature range

[°C]	-20 … +60
Deep freeze version [°C]	-40 … +60

Humidity

Non-condensing [% RH]	max. 95 (non-condensing)

Displays on the device

Operation	Green LED
Alarm	Red LED
Pre-alarm[1)]	Red LED
Collective fault	Yellow LED
Bar graph[1)]	Smoke level 1 … 10 (10x yellow LED)

[1)] optional

Infrared interface

	IR transmitter/receiver

Connections

Terminal connections [mm²]	max. 2.5
Fire alarm cable	shielded (e.g. type J-Y(ST)Y)
Cable glands	8x M20, 6x M25
Pipe connections (conical)	Ø 25 mm, 2x for aspiration pipe

Response sensitivity

Detection unit	
DM-MB-TMx-x-10 [% light obscuration/m]	0.1 … 2.0
DM-MB-TMx-x-50 [% light obscuration/m]	0.5 … 2.0

4.2.2 Response indicator

Voltage

Supply voltage (Ue) [V] Nominal supply voltage [V DC]	5 … 8 6

Current All current consumptions specified refer to an ambient temperature of 20 °C.

Alarm mode [mA]	35

Dimensions

H x W x D [mm]	
Type FDAI 91	62 x 37 x 24
Type FDAI 92	85 x 85 x 25

Weight

[kg]	
Type FDAI 91	0.02
Type FDAI 92	0.05

Protection class

IP code in accordance with IEC/EN 60529	IP40

Housing

Colour	RAL 9010, Pure white

Temperature range

[°C]	-25 … +80

Air humidity

Non-condensing [% RH]	10 … 95

Displays on the device

Alarm	Red LED

Connections

Terminal connections [mm²]	max. 1.5 mm
Fire alarm cable	shielded (e.g. type J-Y(ST)Y)

4.3 Pipe system

	VENTUM PRO LITE VENTUM PRO LITE-SL	VENTUM PRO LITE TWO VENTUM PRO LITE TWO-SL
Max. pipe length [m] Max. number of aspiration apertures	160 20	320 40
Capillary hose max. length per ceiling duct [m]	1	
Temperature range PVC pipe [°C]	-10 … +60	
Temperature range ABS pipe [°C]	-40 … +80	
Max. monitoring area [m²]	1600	3200

Table 5: Technical data of the pipe system

5 Project planning

You will find information for the project planning of a VENTUM PRO LITE with the corresponding pipe system in this chapter.

5.1 General information

The project planning of the VENTUM PRO LITE according to EN 54-20 or ISO 7240-20 is described below. The (standard) project planning must be carried out according to chapter "Project planning guidelines".

The limiting project planning information according to the relevant chapters applies to special applications. This planning information must be considered at the start of special project planning.

Various technical solutions can be selected, depending on the project planning criterion.

Project planning	Project planning criterion	For technical solution see chapter …
Standard	General room monitoring	"Project planning guidelines"
Special	Failure of individual aspiration apertures	"Project planning with single hole monitoring"
	System monitoring/cabinet monitoring	"Simplified project planning"
	Aspiration apertures located far away from the main path	"Project planning with stubs"
	Supply pipe systems with larger diameters	"Project planning with pipe supply lines Ø > 25 mm"
	Shortening of the transport time of the smoke aerosols	"Project planning with acceleration openings"
	Air-conditioning ducts	"Project planning with forced air flow"
	Bypassing obstacles	"Project planning with aspiration hose"
	Different pressure areas	"Project planning with air return"

Table 6: Project planning possibilities according to EN 54-20 or ISO 7240-20

5.1.1 Laws, standards and guidelines

The basic principles for the project planning of a VENTUM PRO LITE can be found in the following laws, standards and guidelines.

In addition to these laws, standards and guidelines, the corresponding national laws, standards and guidelines must be observed and the project planning must be adapted to these specifications.

EN 54-20 or ISO 7240-20

In order to comply with EN 54-20 or ISO 7240-20, the VENTUM PRO LITE must be planned in accordance with the "Project planning guidelines".

VdS

The following guidelines must be additionally observed for smoke detection systems according to the requirements of VdS Schadenverhütung GmbH:

- "Guidelines for automatic fire detection and fire alarm systems – Planning and Installation",
  VdS Schadenverhütung GmbH, Cologne (VdS 2095)
- "Local application protection for electric and electronic equipment – Rules for planning and installation",
  VdS Schadenverhütung GmbH, Cologne (VdS 2304)
- "Project Engineering – Aspirating Smoke Detectors" (leaflet)
  VdS Schadenverhütung GmbH, Cologne (VdS 3435)

National laws, standards and guidelines

Observe the national laws, standards and guidelines. For Germany, these are, for example:

- "Alarm systems for fire, intrusion and hold-up"
  DIN VDE 0833 part 1 and 2
- Additional regulations for the installation of fire detection systems issued by the fire service departments, the building supervisory authorities or the legal board of construction that are only regionally valid.

5.1.2 Pipe system

For the project planning of the pipe system, reliable detection must be guaranteed for any assumed fire source in the monitoring area.

The pipe system layout and number of aspiration apertures depends on the size and shape of the monitoring area. It must be ensured that ...

- ... the aspiration apertures are planned like point-type smoke detectors.
- ... the pipe system is planned according to the project planning guidelines (see chapter "Laws, standards and guidelines"), taking the following into account:
  - Number of pipe connections on the device
  - Pipe shapes
  - Symmetry of the pipe system
  - Branch lengths
  - Changing direction of the pipe system

Pipe connections The VENTUM PRO LITE has two pipe connections. One pipe system may be connected to each of these pipe connections, as long as two detector modules are being used. This means that only one pipe system can be connected if only one detector module is used.

Pipe shapes Different pipe shapes can be selected depending on the geometry of the monitoring range:

Pipe shape	Description
I-pipe system	Pipe system without branching
U-pipe system	Pipe system that separates into two branches after the connection to the VENTUM PRO LITE
M-pipe system	Pipe system that separates into three branches after the connection to the VENTUM PRO LITE
Double U-pipe system	Pipe system that separates into four branches after the connection to the VENTUM PRO LITE

Table 7: Overview of the pipe shapes

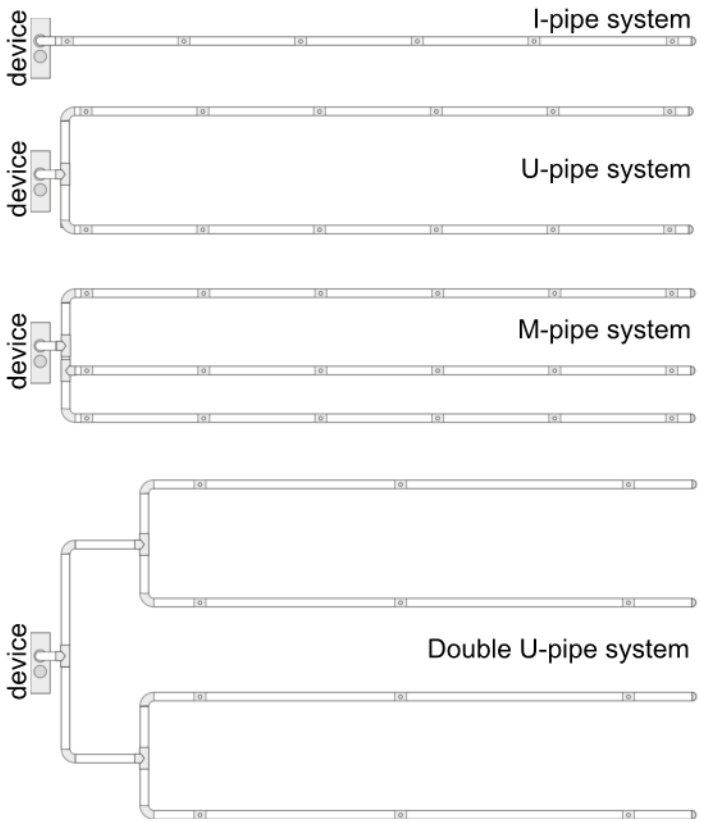


Image 35: Pipe shapes

Symmetry The following conditions are applicable to extract consistent air samples via all sampling points:

- The length of the shortest branch and the length of the longest branch may not exceed a ration of 1:2.
- The number of sampling points of the respective branch may not exceed a ratio of 1:2.
- The sampling points should be as evenly distributed as possible in the respective branches.

TIP

Comply with the limit values of the VENTUM PRO LITE for each pipe system of the selected pipe project planning (see chapter "Project planning limits").

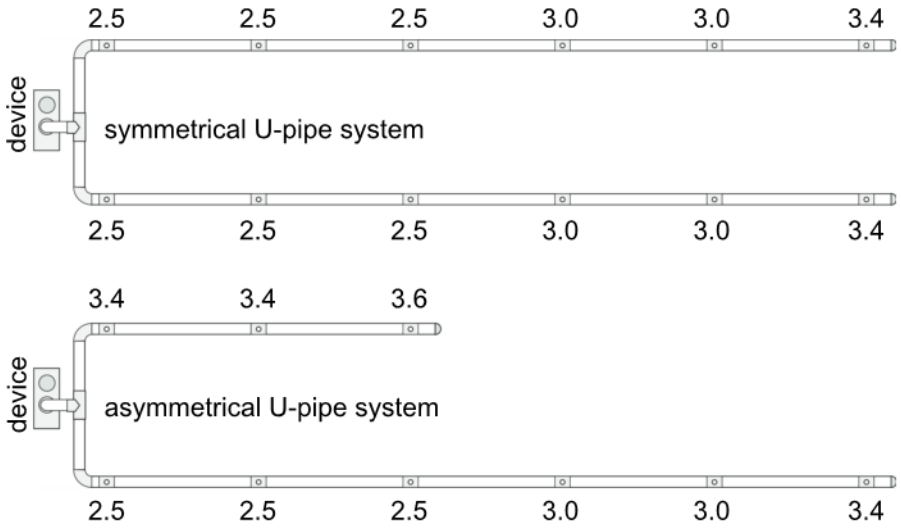


Image 36: Examples of symmetrical and asymmetrical U-pipe system

The previous figure shows an example of a U-pipe system with symmetrical or asymmetrical structure and with calculated diameters of the sampling points (see Chapter Determination of sampling points diameter”).

The diameters of the sampling points are determined separately for each branch of the pipe system and comply with the total number of sampling points on the respective branch.

Calculation

The diameters of the sampling points for an asymmetrical U-pipe system are determined as specified below:

Number of sampling points = total number of sampling points of the respective branch * number of branches in the pipe system

The result and the table of the corresponding pipe shape of the pipe system yield the individual diameters of the sampling points for the respective branch (see Chapter "Determination of sampling points diameter").

Example

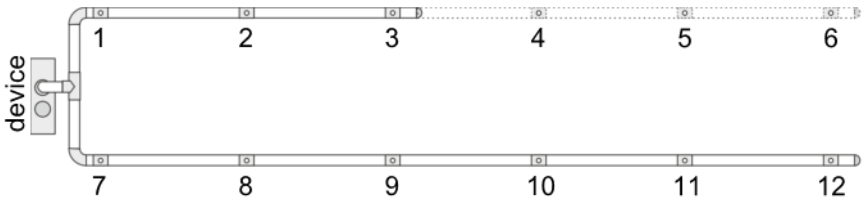


Image 37: Determine number of sampling points for long branch for asymmetrical U-pipe system

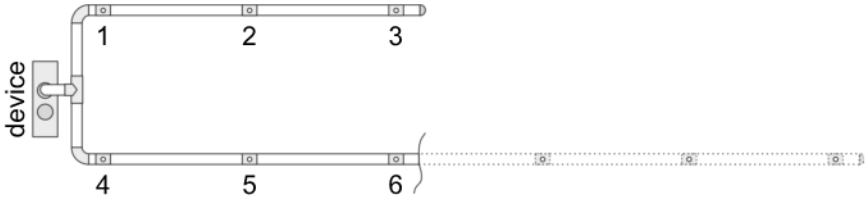


Image 38: Determine number of sampling points for short branch for asymmetrical U-pipe system

The diameters of the sampling points for an asymmetrical U-pipe system (two branches) should be determined. The short branch comprises three sampling points and the long branch comprises six sampling points. The number of sampling points must be multiplied with the number of branches of the pipe system in each case. From the U-pipe systems table, the diameter of the sampling points of column "6" must be taken for the short branch and of column "12" for the long branch (see figure "Examples of symmetrical and asymmetrical U-pipe system").

Branch lengths It is better to plan several shorter branches than a few long ones (preferably a U- or double U-pipe system). This reduces the transport time of the smoke aerosols in the aspiration pipe and enables faster detection.

Change of direction A change of direction in the pipe system can increase the flow resistance and the detection time. A gentle change of direction (e.g. by means of 90° elbow) is already permissible in the scope of project planning in accordance with EN 54-20 or ISO 7240-20 and need not be taken into further consideration.

It is better to use pipe elbows than pipe angles. The maximum total length of the pipe system is reduced if 90° pipe angles are used. A 90° pipe angle corresponds to a straight pipe length of approx. 1.5 m aspiration pipe.

Checking the pipe system

For critical applications, reliable smoke detection must be checked by means of activation tests. The individual aspiration apertures must also be checked for air flow.

TIP

The fan voltage can be increased to shorten the transport time of the smoke aerosols. This, however, will increase the power consumption of the system.

Longer pipe supply lines

Pipes with Ø 32 mm or Ø 40 mm can be used for long pipe supply lines in accordance with the chapter "Special project planning". This allows the air resistance of the pipe supply line to be reduced.

Dual detection dependency according to VdS 3435

One detector module must be allocated per branch. Both detector modules of a device must be analysed separately from each other. Only one extinguishing area may be monitored per VENTUM PRO LITE.

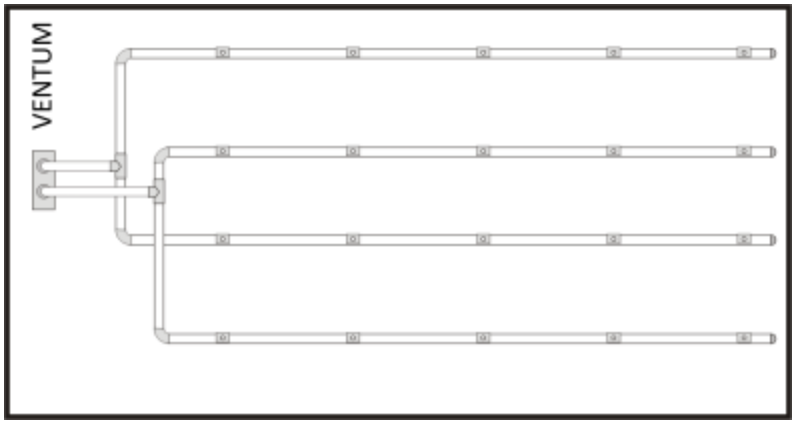


Image 39: Example pipe configuration with dual detection dependency

5.1.3 Air flow monitoring

EN 54-20 or ISO 7240-20 requires the detection of a 20% change in the total air flow of the pipe system. To do this, the trip threshold of the air flow sensor must be set to the highest possible level II permitted by national laws, standards and guidelines. Level I may also be set as an alternative. We recommend performing an air pressure-dependent air flow calibration for both of these settings.

A freely selectable threshold value can be set for systems that do not require EN 54-20 or ISO 7240-20 conformity.

Adaptation of the airflow sensitivity

The air flow sensor sensitivity must be adjusted to the application in question. Breakage and blockage of the pipe system must be detected reliably with low susceptibility to malfunction.

The threshold values and the air flow sensor sensitivity can be adjusted in four levels. We recommend to always select the highest possible level that is permissible according to the national laws, standards and guidelines.

	I	II	III	IV
	In conformity with EN 54-20 or ISO 7240-20			
Threshold value	Low	Medium	High	Very high
Sensitivity	Very high	High	Medium	Low

Table 8: Overview of threshold values and sensitivity of the air flow sensor

Dynamic air flow sensors

The air flow monitoring of VENTUM PRO LITE enables the system to detect both a breakage at the pipe end and sudden obstruction in individual aspiration apertures (e.g. in the event of sabotage to the pipe system). These dynamic air flow sensors are only active if level I was selected for the air flow monitoring.

Level I limitations

The air flow monitoring may only be set to level I if ...

- ... project planning according to "Single hole monitoring" was carried out (see chapter "Project planning with single hole monitoring"),
- ... the air flow sensor was calibrated depending on the air pressure (see chapter "Air pressure-dependent adjustment") and
- ... no large air flow fluctuations can occur.

Air pressure differences

The same air pressure should always be applied along the branches.

If the VENTUM PRO LITE and pipe system are installed in areas with different air pressure, return of the suction air into the pipe system pressure area is required (see chapter "Project planning with forced airflow", section "Air return").

5.1.4 Sensitivity

The sensitivity of a VENTUM PRO LITE can be classified into specific fire sensitivity classes according to EN 54-20 or ISO 7240-20. These fire sensitivity classes describe specific example applications in which the devices can be used. Reliable pipe project planning can be determined for every fire sensitivity class (see Chapter "Project planning guidelines").

Devices with a higher fire sensitivity class according to EN 54-20 or ISO 7240-20 also meet the requirements of the lower classes.

Fire sensitivity class	Description	Application example
A	Aspirating smoke detectors with very high sensitivity	Very early detection: strong smoke dilution by air conditioning in IT areas
B	Aspirating smoke detectors with increased sensitivity	Early detection: good time saving thanks to very early fire detection (without air-conditioning)
C	Aspirating smoke detectors with standard sensitivity	Normal detection: fire detection with the advantages of aspirating smoke detectors

Table 9: Overview of the fire sensitivity classes

Depending on the number of sampling points, the fire sensitivity classes A, B and C can be achieved with each available detection module.

Sensitivities (main alarm)

Detector module type		
DM-VPL-50 [% light obscuration/m]	**DM-VPL-10 [% light obscuration/m]**	**DM-VPL-01 [% light obscuration/m]**
-	0.8	0.12
-	**0.4** (Standard)	**0.06** (Standard)
1	0.2	0.03
0.5 (Standard)	0.1	0.015

Table 10: Overview of sensitivities (main alarm)

The project planning for the monitoring areas is always carried out in accordance with the national laws, standards and guidelines for point-type smoke detectors.

5.1.5 Project planning limits

Observe the following limit values for every pipe system:

Project planning	Standard	Special		
		Single hole monitoring	Simplified	with acceleration openings
Min. distance between 2 aspiration apertures [m]	4	4	0.1	2.5
Max. distance between 2 aspiration apertures [m]	12	12	4	12
Max. total pipe length with one connected pipe system [m]	160	140	100	160
Max. total pipe length with 2 connected pipe systems [m]	320 (2x 160)	280 (2x 140)	200 (2x 100)	320 (2x 160)
Number of aspiration apertures per detector module [piece]	20	14	20	20

Table 11: Limit values of the pipe systems

The limit values for "standard project planning" must be observed for the following special project planning:

- Project planning with single hole monitoring
- Project planning with pipe supply lines Ø > 25 mm

The maximum monitoring area per aspiration aperture corresponds with the monitoring area of point-type smoke detectors according to chapter "Laws, standards and guidelines".

The maximum total monitoring area, the maximum total pipe length and the maximum number of aspiration apertures depend on the selected project planning, as well as the restrictions imposed by national laws, standards and guidelines.

5.2 Project planning guidelines

The following factors must be known for project planning that complies with EN 54-20 or ISO 7240-20:

- Requirement for the sensitivity of the VENTUM PRO LITE
- Number of aspiration apertures
- Pipe accessories required for the corresponding application (e.g. condensate separator for saunas, filter for recycling plants)

The corresponding standard-compliant structure of the pipe system can be determined from these factors on the basis of the following chapters and by means of the project planning tables (see chapter "Annex").

5.2.1 Determination of necessary pipe accessories

Due to the fact that pipe accessories (e.g. air filters) have a certain influence on the dimensions of pipe project planning, the corresponding pipe accessories for the corresponding application must be selected in advance. An upgrade (e.g. with a fine filter) is usually only possible if a detector module with higher sensitivity is used or a certain reserve is planned in advance.

For project planning that complies with EN 54-20 or ISO 7240-20, no components may be used that have not been approved by POLON-ALFA S.A

The following pipe accessories can be used without restricting project planning:

- Condensate separator KA-1-P
- Silencer SD-1-P
- Air filter LF-VE-k

The following pipe accessories must be taken into account for the project planning of the pipe system:

- Air filter
- Special filter
- Condensate separator KA-DN 25

- Detector box
- Detonation prevention device

5.2.1.1 Detailed pipe accessories

Air filter

Type	Application	Examples
LF-VE-k	Coarse filter to separate particles ≥30 µm	Insects, fibres, hair
LF-VE	Coarse filter to separate particles ≥15 µm	Dusts, insects, fibres, hairs, fly ash, pollen
LF-VE-1	Filter to separate particles ≥10 µm	As above, and additionally: colour pigments and fine dusts
LF-VE-2	Fine filter to separate particles ≥5 µm	As above, and additionally: fine dusts in low concentrations

Table 12: Air filter – type and areas of application

Special filter (air filter)

Type	Use	Examples
SF-400	Fine filter for separating particles ≥1 µm	As LF-VE, additionally: fine dust in high concentrations
SF-650	Fine filter for separating particles ≥1 µm	As above, but with a longer filter service life

Table 13: Special filter (air filter) – type and areas of application

Condensate separator

Type	Application
KA-DN 25	• To collect and separate condensate from the pipe system • Manual operation
KA-1-P	• To collect and separate condensate from the pipe system • Manual operation • Automatic operation also possible, for areas with heavy condensation • Larger capacity

Table 14: Condensate separator – type and areas of application

Silencer

Type	Application
SD-1-P	for monitoring areas sensitive to noise

Table 15: Silencer – type and areas of application

Detector box

Type	Application
MB2	Additional detector for precise localisation of fire, staged alarming or cross-detection interaction
DM-MB-TMx-x-10	
DM-MB-TMx-x-50	

Table 16: Detector box – type and areas of application

Detonation prevention device

Type	Application
EC IIA	Detonation prevention device for monitoring areas with explosion group II A
EC IIB3	Detonation prevention device for monitoring areas with explosion group II B 3
EC IIC	Detonation prevention device for monitoring areas with explosion group II C

Table 17: Detonation prevention device – type and areas of application

5.2.2 Procedure for pipe project planning

In this chapter you will find information concerning the determination of the corresponding project planning tables, overall pipe lengths of the pipe system and the sensitivity of the detector modules.

In order to optimise the detection results of a VENTUM PRO LITE, a room can be monitored with more aspiration apertures than required by the national laws, standards and guidelines. However, the number of aspiration apertures required by the standards must be used to calculate the necessary sensitivity of a device.

5.2.2.1 Determination of project planning table

The following project planning tables are available in the annex for planning pipe systems with pipe accessories:

- Project planning without air filter / with air filter type LF-VE-k
- Project planning with air filter LF-VE
- Project planning with air filter LF-VE-1
- Project planning with air filter LF-VE-2
- Project planning with special filter type SF-400 / SF-650

5.2.2.2 Determination of further parameters

Example In the following example, the project planning should fulfil the following criteria:

- No air filter
- Eight sampling point
- Fire sensitivity class B
- Use of a condensate separator

Step	Activity	Result
1	Select the corresponding project planning table (see Chapter "Annex") on the basis of the air filter to be used (see Chapter "Detailed pipe accessories")	The project planning table is determined
2	Determine the gaps with the number of sampling points required according to the project specifications	Gap is determined for: - any further, required pipe components (e.g. detector box) - achievable fire sensitivity classes for the selected number of required sampling points
3	Determine the necessary sensitivity to attain the fire sensitivity class	Sensitivity setting and corresponding detector module are determined
4	Select corresponding pipe project planning table for further pipe components (e.g. detector box) according to the project specifications (see Chapter "Detailed pipe accessories")	Pipe project planning table is determined
5	Select required overall pipe length according to the project specifications	Pipe shape and required fan level are determined

Table 18: Procedure for project planning with pipe accessories (example)

The orange markings show the possible project planning with different pipe shapes and fan voltages.

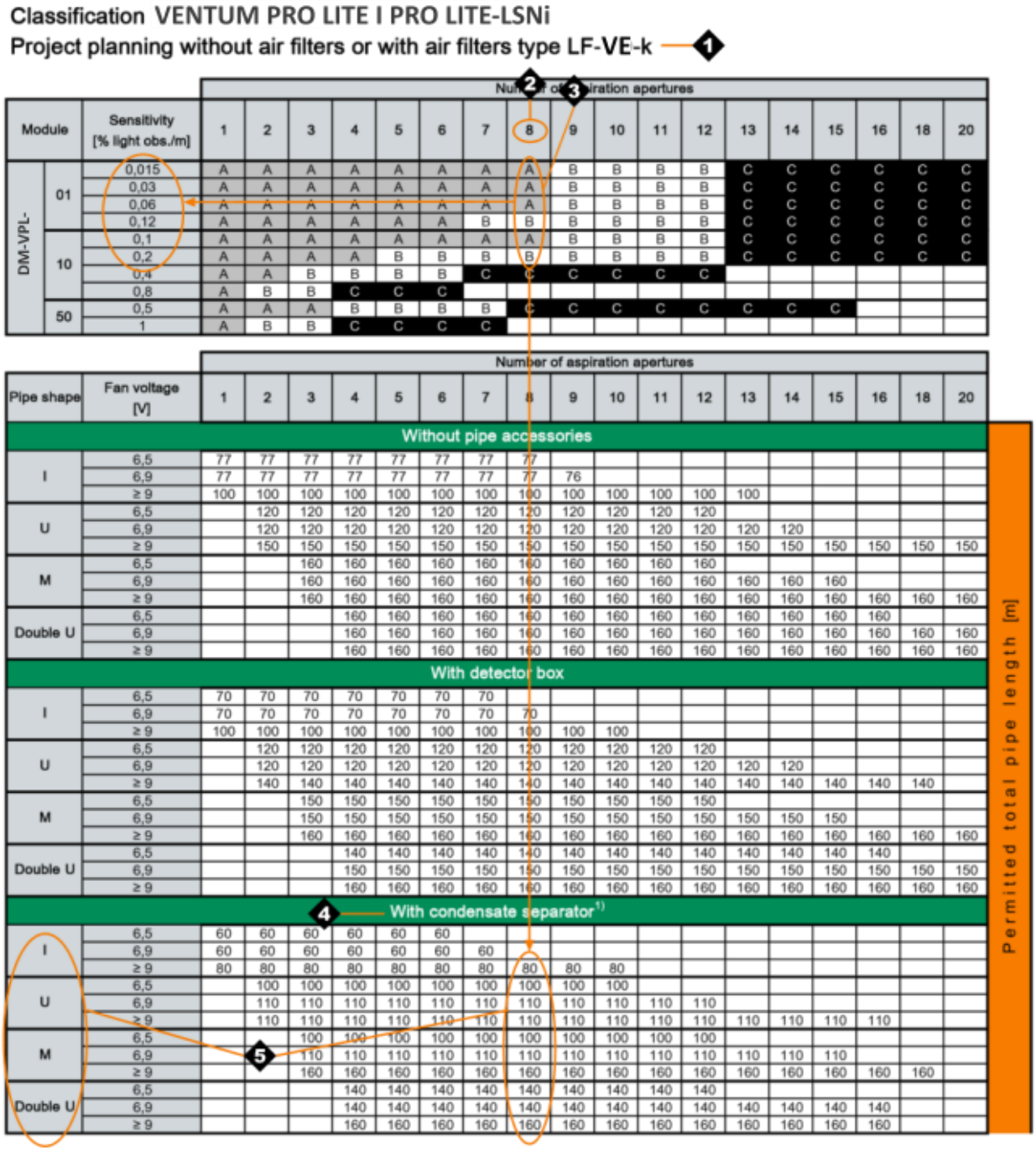


Image 40: Project planning example

Results The following detector modules can be optionally used with the corresponding settings for fire sensitivity class A or B:

- DM-VPL-01 - with a sensitivity of at least 0.12% light obscuration/m
- DM-VPL-10 - with a sensitivity of at least 0.2% light obscuration/m

Pipe shape	Fan voltage [V]	Max. overall pipe length [m]
I-pipe system	≥ 9	80
U-pipe system	6.5	100
	6.9	110
	≥ 9	110
M-pipe system	6.5	100
	6.9	110
	≥ 9	160
Double U-pipe system	6.5	140
	6.9	140
	≥ 9	160

Table 19: Results of project planning with pipe accessories (example)

5.2.3 Determination of aspiration aperture diameter

The diameters of the aspiration apertures can be taken from the corresponding table for the respective pipe shape.

I-pipe

Image 41: I-pipe system

	Number of sampling points												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Item	Punch diameter of the aspiration reducing film sheets [mm]												
A	7.0	6.0	5.2	4.6	4.2	3.8	3.6	3.4	3.0	3.0	2.5	2.5	2.5
B	-	6.8	5.2	4.6	4.2	3.8	3.6	3.4	3.0	3.0	2.5	2.5	2.5
C	-	-	5.6	4.6	4.4	4.0	3.8	3.4	3.2	3.0	3.0	3.0	2.5
D	-	-	-	5.0	4.4	4.0	3.8	3.4	3.4	3.0	3.0	3.0	2.5
E	-	-	-	-	4.4	4.2	3.8	3.6	3.6	3.4	3.0	3.0	3.0
F	-	-	-	-	-	4.2	3.8	3.8	3.6	3.4	3.4	3.0	3.0
G	-	-	-		-	-	4.0	3.8	3.6	3.6	3.4	3.2	3.0
H	-	-	-	-	-	-	-	4.0	3.8	3.6	3.4	3.2	3.0
I	-	-	-	-	-	-	-	-	3.8	3.6	3.6	3.2	3.2
J	-	-	-	-	-	-	-	-	-	3.8	3.8	3.2	3.2

	Number of sampling points												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Item	Punch diameter of the aspiration reducing film sheets [mm]												
K	-	-	-	-	-	-	-	-	-	-	3.8	3.8	3.4
L	-	-	-	-	-	-	-	-	-	-		4.0	3.8
M	-	-	-	-	-	-	-	-	-	-	-	-	4.0

Table 20: Diameter of the sampling points for I-pipe systems

U-pipe

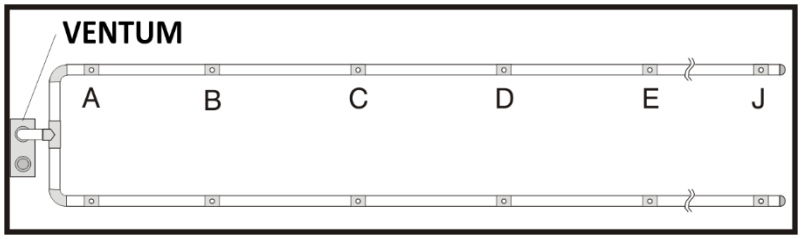


Image 42: U-pipe system

	Number of sampling points									
	2	4	6	8	10	12	14	16	18	20
Item	Punch diameter of the aspiration reducing film sheets [mm]									
A	5.2	3.6	3.4	3.0	2.5	2.5	2.0	2.0	2.0	2.0
B	-	4.4	3.4	3.0	3.0	2.5	2.0	2.0	2.0	2.0
C	-	-	3.6	3.2	3.0	2.5	2.5	2.0	2.0	2.0
D	-	-	-	3.4	3.2	3.0	2.5	2.5	2.0	2.0
E	-	-	-	-	3.2	3.0	3.0	2.5	2.5	2.0
F	-	-	-	-	-	3.4	3.2	3.0	2.5	2.5
G	-	-	-		-	-	3.6	3.4	3.0	2.5
H	-	-	-	-	-	-	-	3.6	3.4	2.5
I	-	-	-	-	-	-	-	-	3.6	3.6
J	-	-	-	-	-	-	-	-	-	3.8

Table 21: Diameter of the sampling points for U-pipe systems

M-pipe

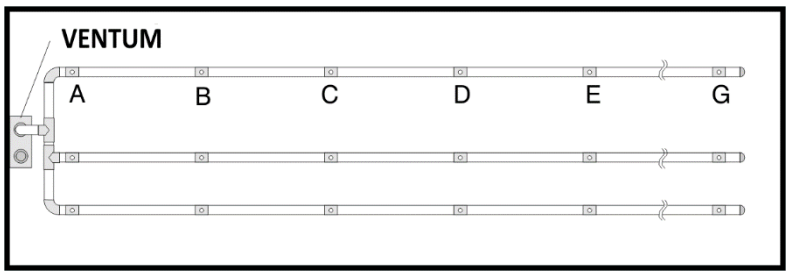


Image 43: M-pipe system

	Number of aspiration apertures					
	3	6	9	12	15	18
Item	Punching diameter of the aspiration reducing film sheets [mm]					
A	4.4	3.4	3.0	2.5	2.5	2.0
B	-	3.6	3.0	2.5	2.5	2.5
C	-	-	3.2	3.2	2.5	2.5
D	-	-	-	3.2	3.0	2.5
E	-	-	-	-	3.2	3.0
F	-	-	-	-	-	3.2

Table 22: Diameter of the aspiration apertures for M-pipe systems

Double U-pipe

Image 44: Double U-pipe system

	Number of aspiration apertures				
	4	8	12	16	20
Item	Punching diameter of the aspiration reducing film sheets [mm]				
A	4.0	3.0	2.5	2.0	2.0
B	-	3.4	3.0	2.5	2.0
C	-	-	3.0	3.0	2.5
D	-	-	-	3.2	2.5
E	-	-	-	-	3.6

Table 23: Diameter of the aspiration apertures for double U-pipe systems

5.3 Special project planning

In this chapter, you will find information on the project planning of a VENTUM PRO LITE with the corresponding pipe system, deviating from the previous standard project planning (see Chapter "Project planning guidelines").

5.3.1 Project planning with single hole monitoring

According to the pipe shape, the following pipe system parameters are applicable to detect a single or a specific number of blocked sampling points.

The standard project planning specifications (see chapter "Project planning guidelines") apply to a standard-compliant pipe system structure.
Additionally observe the following limit values and aspiration aperture diameters deviating from standard project planning.

Additional pipe accessories (e.g. air filters) can influence the maximum pipe length.

5.3.1.1 I-pipe system

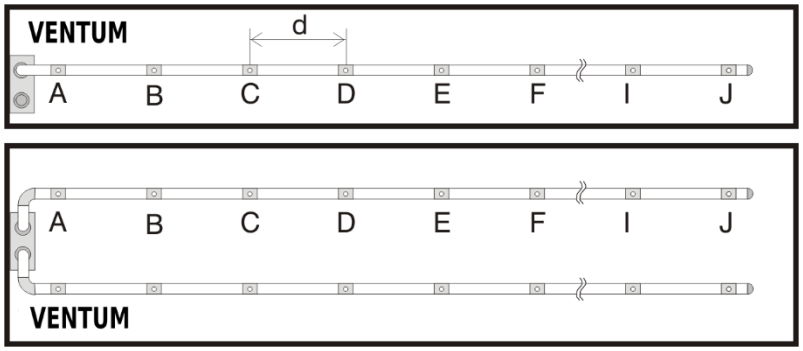


Image 45: I-pipe system for single hole monitoring

Threshold values

Prerequisite	Limit value
Min. clearance: device <–> first aspiration aperture [m]	4
Max. clearance: device <–> first aspiration aperture [m]	20
Max. distance: first aspiration aperture <–> last aspiration aperture [m] With low fan voltage 6.5 and 6.9 V With high fan voltage 9 to 12 V	 40 60
Max. total pipe length per pipe system [m] With low fan voltage 6.5 and 6.9 V With high fan voltage 9 to 12 V	 60 80

Prerequisite	Limit value
Min. distance between 2 aspiration apertures (d) [m]	4
Max. distance between 2 aspiration apertures (d) [m]	12
Max. number of aspiration apertures per pipe system [piece]	10

Table 24: Limit values for project planning with single hole monitoring (I-pipe system)

Sampling points

	Number of sampling points								
	2	3	4	5	6	7	8	9	10
Item	Punch diameter of the aspiration reducing film sheets [mm]								
A	6.0	5.0	4.2	3.8	3.2	3.0	2.5	2.5	2.0
B	6.8	5.2	4.4	3.8	3.2	3.0	2.5	2.5	2.0
C	-	5.2	4.6	4.0	3.6	3.0	3.0	2.5	2.5
D	-	-	4.6	4.0	3.6	3.4	3.0	3.0	2.5
E	-	-	-	4.4	4.0	3.4	3.4	3.0	3.0
F	-	-	-	-	4.0	3.8	3.4	3.4	3.0
G	-	-	-	-	-	3.8	3.8	3.4	3.4
H	-	-	-	-	-	-	3.8	3.8	3.4
I	-	-	-	-	-	-	-	3.8	3.6
J	-	-	-	-	-	-	-	-	3.6

Table 25: Diameter of the sampling points for single hole monitoring (I-pipe system)

Threshold values

A different number of blocked aspiration apertures is detected depending on the number of aspiration apertures and the threshold value set.

NOTE

No conformity in case of improper project planning

If the threshold value of the air flow sensor is set incorrectly, conformity with EN 54-20 or ISO 7240-20 is not given.

- ► The threshold value of the air flow sensor must be set to the highest possible level II permitted by national laws, standards and guidelines. Level I may also be set as an alternative.

	Number of aspiration apertures								
	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Number of blocked aspiration apertures	**Threshold values**								
1	**III**	**III**	**II**	**I**	**I**	-	-	-	-
2	O	O	**III**	**III**	**II**	**I**	**I**	-	-
3	O	O	O	O	**III**	**III**	**II**	**I**	**I**
4	O	O	O	O	O	O	**III**	**II**	**I**
5	O	O	O	O	O	O	O	O	**II**

Table 26: Threshold values for project planning with single hole monitoring (I-pipe system)

- not possible

O is not feasible

Example Blockage of 3 aspiration apertures from a total of 6 aspiration apertures should be detected. The switch for setting the air flow monitoring must be set to level III.

5.3.1.2 U-pipe system

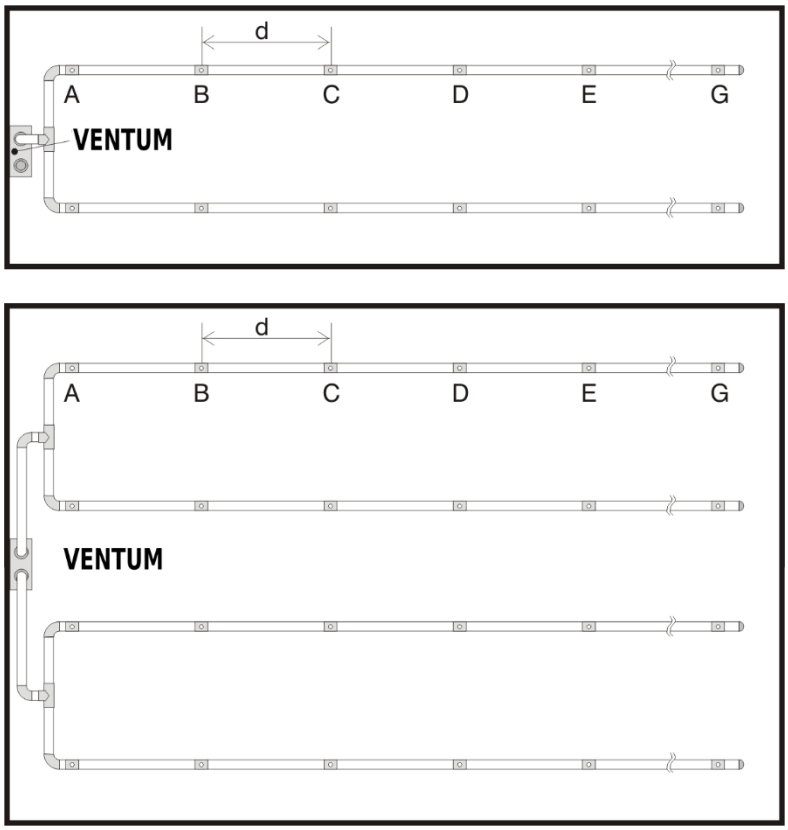


Image 46: U-pipe system for special project planning

Threshold values

Prerequisite	Limit value
Min. distance: device <–> T-piece [m]	4
Max. distance: device <–> T-piece [m]	20
Max. branch length [m] With low fan voltage 6.5 and 6.9 V With high fan voltage 9 to 12 V	 40 50
Max. total pipe length per pipe system [m] With low fan voltage 6.5 and 6.9 V With high fan voltage 9 to 12 V	 100 120
Min. distance between 2 aspiration apertures (d) [m]	4
Max. distance between 2 aspiration apertures (d) [m]	12
Max. number of aspiration apertures per pipe system [piece]	14

Table 27: Limit values for project planning with single hole monitoring (U-pipe system)

Sampling points

	Number of sampling points						
	2	4	6	8	10	12	14
Item	Punch diameter of the aspiration reducing film sheets [mm]						
A	5.2	3.6	3.4	3.2	2.5	2.5	2.0
B	-	4.0	3.4	3.2	3.0	2.5	2.0
C	-	-	3.6	3.4	3.0	2.5	2.5
D	-	-	-	3.4	3.2	3.0	2.5
E	-	-	-	-	3.2	3.0	3.0
F	-	-	-	-	-	3.2	3.0
G	-	-	-	-	-	-	3.2

Table 28: Diameter of the sampling points for single hole monitoring (U-pipe system)

Threshold values

A different number of blocked aspiration apertures is detected depending on the number of aspiration apertures and the threshold value set.

NOTE

No conformity in case of improper project planning

If the threshold value of the air flow sensor is set incorrectly, conformity with EN 54-20 or ISO 7240-20 is not given.

- The threshold value of the air flow sensor must be set to the highest possible level II permitted by national laws, standards and guidelines. Level I may also be set as an alternative.

	Number of aspiration apertures						
	2	4	6	8	10	12	14
Number of blocked aspiration apertures	Threshold values						
1	III	II	I	-	-	-	-
2	O	III	II	I	-	-	-
3	O	O	III	II	I	-	-
4	O	O	O	III	II	I	-

	Number of aspiration apertures						
	2	**4**	**6**	**8**	**10**	**12**	**14**
Number of blocked aspiration apertures	**Threshold values**						
5	O	O	O	O	**III**	**II**	**I**
6	O	O	O	O	O	**III**	**II**
7	O	O	O	O	O	O	**III**

Table 29: Threshold values for project planning with single hole monitoring (U-pipe system)

- not possible

O is not feasible

Example Blockage of 3 aspiration apertures from a total of 6 aspiration apertures should be detected. The switch for setting the air flow monitoring must be set to level III.

5.3.1.3 M-pipe system

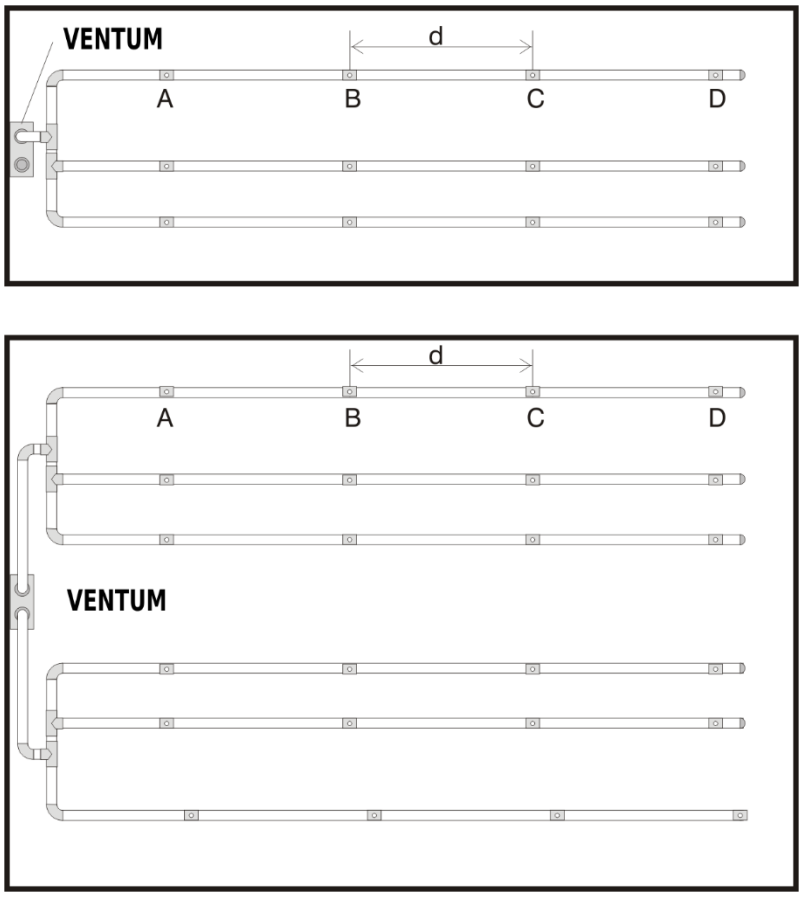


Image 47: M-pipe system for special project planning

Threshold values

Prerequisite	Limit value
Min. distance: device <–> T-piece [m]	4
Max. distance: device <–> T-piece [m]	20
Max. branch length [m] With low fan voltage 6.5 and 6.9 V With high fan voltage 9 to 12 V	 30 40
Max. total pipe length per pipe system [m] With low fan voltage 6.5 and 6.9 V With high fan voltage 9 to 12 V	 110 140
Min. distance between 2 aspiration apertures (d) [m]	4
Max. distance between 2 aspiration apertures (d) [m]	12
Max. number of aspiration apertures per pipe system [piece]	12

Table 30: Limit values for project planning with single hole monitoring (M-pipe system)

Sampling points

	Number of aspiration apertures			
	3	6	9	12
Item	Punching diameter of the aspiration reducing film sheets [mm]			
A	4.4	3.4	3.0	2.5
B	-	3.6	3.0	2.5
C	-	-	3.2	3.2
D	-	-	-	3.2

Table 31: Diameter of the aspiration apertures for single hole monitoring (M-pipe system)

Threshold values

A different number of blocked aspiration apertures is detected depending on the number of aspiration apertures and the threshold value set.

NOTE

No conformity in case of improper project planning

If the threshold value of the air flow sensor is set incorrectly, conformity with EN 54-20 or ISO 7240-20 is not given.

- The threshold value of the air flow sensor must be set to the highest possible level II permitted by national laws, standards and guidelines. Level I may also be set as an alternative.

	Number of aspiration apertures			
	3	6	9	12
Number of blocked aspiration apertures	Threshold values			
1	III	I	-	-
2	O	II	-	-
3	O	III	I	-
4	O	O	II	I

	Number of aspiration apertures			
	3	6	9	12
Number of blocked aspiration apertures	Threshold values			
5	O	O	O	II
6	O	O	O	III
7	O	O	O	O

Table 32: Threshold values for project planning with single hole monitoring (M-pipe system)

- not possible

O is not feasible

Example Blockage of 3 aspiration apertures from a total of 6 aspiration apertures should be detected. The switch for setting the air flow monitoring must be set to level III.

5.3.1.4 Double U-pipe system

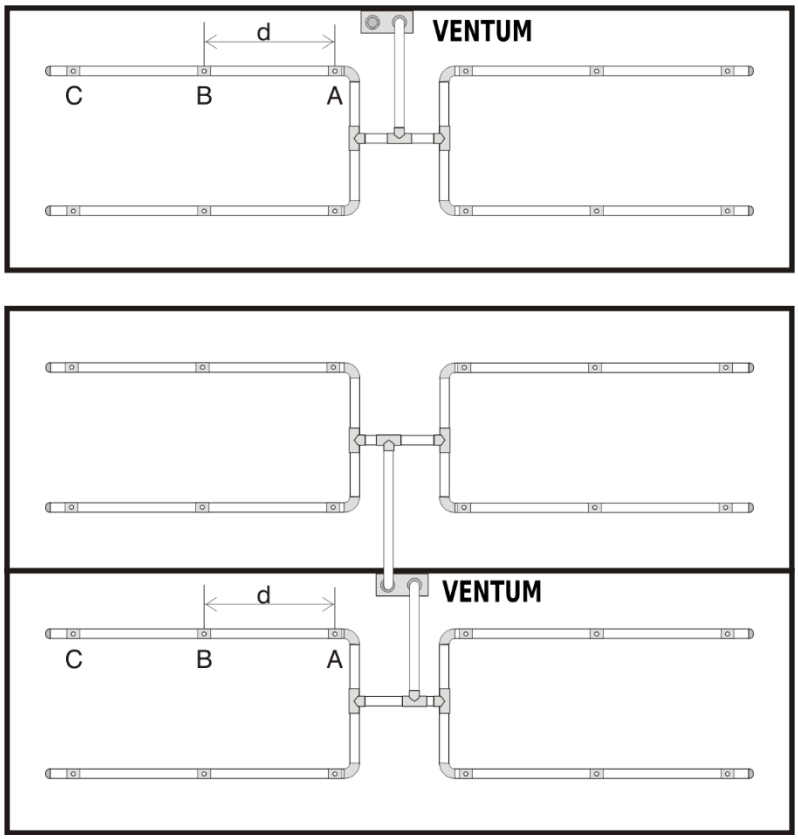


Image 48: Double U-pipe system for special project planning

Threshold values

Prerequisite	Limit value
Min. distance: device <–> last T-piece [m]	4
Max. distance: device <–> last T-piece [m]	20
Max. branch length [m] With low fan voltage 6.5 and 6.9 V With high fan voltage 9 to 12 V	 20 30
Max. total pipe length per pipe system [m] With low fan voltage 6.5 and 6.9 V With high fan voltage 9 to 12 V	 100 140
Min. distance between 2 aspiration apertures (d) [m]	4
Max. distance between 2 aspiration apertures (d) [m]	12
Max. number of aspiration apertures per pipe system [piece]	12

Table 33: Limit values for project planning with single hole monitoring (double U-pipe system)

Sampling points

	Number of sampling points		
	4	8	12
Item	Punch diameter of the aspiration reducing film sheets [mm]		
A	4.0	3.0	2.5
B	-	3.4	3.0
C	-	-	3.0

Table 34: Diameter of the sampling points for single hole monitoring (U-pipe system)

Threshold values

A different number of blocked aspiration apertures is detected depending on the number of aspiration apertures and the threshold value set.

NOTE

No conformity in case of improper project planning

If the threshold value of the air flow sensor is set incorrectly, conformity with EN 54-20 or ISO 7240-20 is not given.

- The threshold value of the air flow sensor must be set to the highest possible level II permitted by national laws, standards and guidelines. Level I may also be set as an alternative.

	Number of aspiration apertures		
	4	8	12
Number of blocked aspiration apertures	Threshold values		
1	I	-	-
2	II	I	-
3	O	II	I
4	O	III	II
5	O	O	III
6	O	O	III

Table 35: Threshold values for project planning with single hole monitoring (double U-pipe system)

- not possible

O is not feasible

Example Blockage of 3 aspiration apertures from a total of 8 aspiration apertures should be detected. The switch for setting the air flow monitoring must be set to level II.

5.3.2 Simplified project planning

Simplified project planning is applied in equipment monitoring and in rooms with small dimensions. The benefits of this project planning are the uniform diameters of the sampling points.

The standard project planning specifications (see chapter "Project planning guidelines") apply to a standard-compliant pipe system structure.
Additionally observe the following limit values and aspiration aperture diameters deviating from standard project planning.

Additional pipe accessories (e.g. air filters) can influence the maximum pipe length.

5.3.2.1 I-pipe system

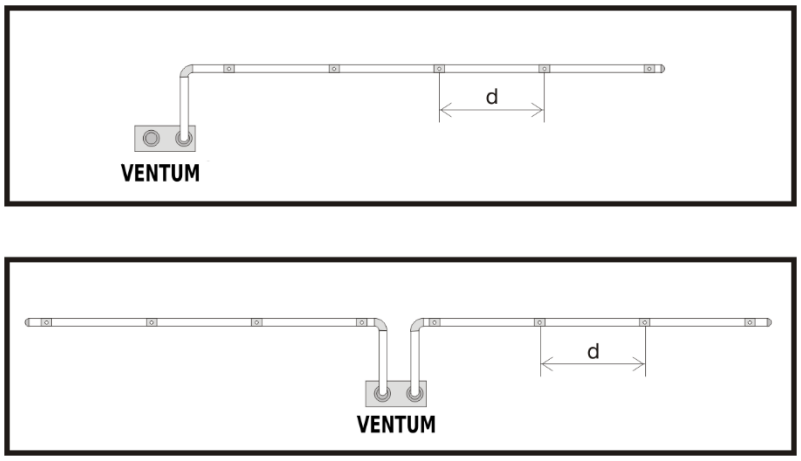


Image 49: I-pipe system for simplified pipe project planning

Threshold values

Prerequisite	Threshold value
Min. clearance: device <–> first sampling point [m]	2
Max. clearance: device <–> first sampling point [m]	20
Max. distance: first sampling point <–> last sampling points [m]	20
Max. overall pipe length Ø 25 mm [m]	40
Min. distance between 2 sampling points (d) [m]	0.1
Max. distance between 2 sampling points (d) [m]	4
Max. number of aspiration apertures per pipe system [piece]	13

Table 36: Threshold values of a simplified project planning (I-pipe system)

Sampling points

Number of sampling points											
2	3	4	5	6	7	8	9	10	11	12	13
Punch diameter of the aspiration reducing film sheets [mm]											
6.0	5.0	4.4	4.0	3.6	3.4	3.2	3.0	3.0	3.0	3.0	2.5

Table 37: Diameter of the sampling points with simplified project planning (I-pipe system)

5.3.2.2 U-pipe system

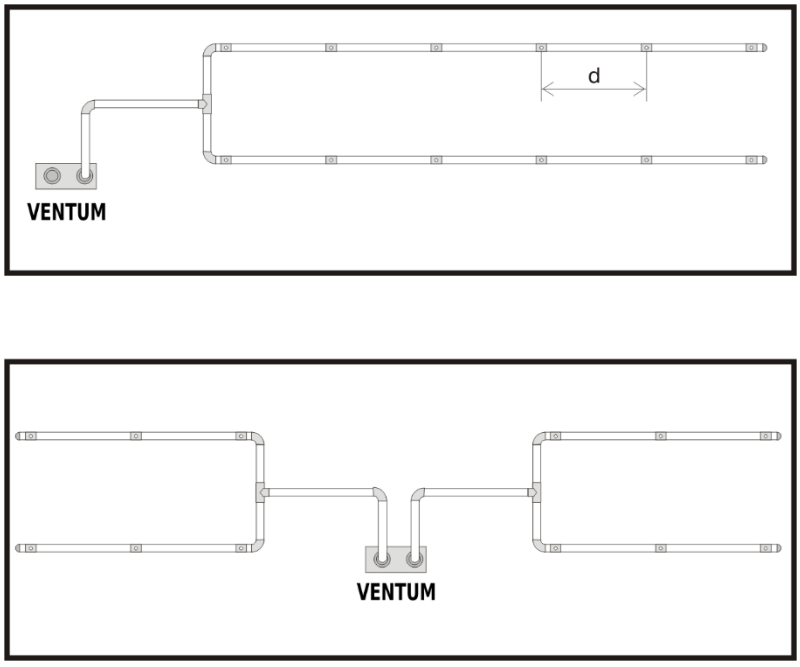


Image 50: U-pipe system for simplified pipe project planning

Threshold values

Prerequisite	Threshold value
Min. distance: device <–> T-piece [m]	2
Max. distance: device <–> T-piece [m]	20
Max. branch length [m]	20
Max. overall pipe length Ø 25 mm [m]	60
Min. distance between 2 sampling points (d) [m]	0.1
Max. distance between 2 sampling points (d) [m]	4
Max. number of aspiration apertures per pipe system [piece]	18

Table 38: Threshold values of a simplified project planning (U-pipe system)

Sampling points

Number of sampling points								
2	4	6	8	10	12	14	16	18
Punch diameter of the aspiration reducing film sheets [mm]								
6.0	4.4	3.6	3.2	3.0	3.0	2.5	2.5	2.5

Table 39: Diameter of the sampling points with simplified project planning (U-pipe system)

5.3.2.3 M-pipe system

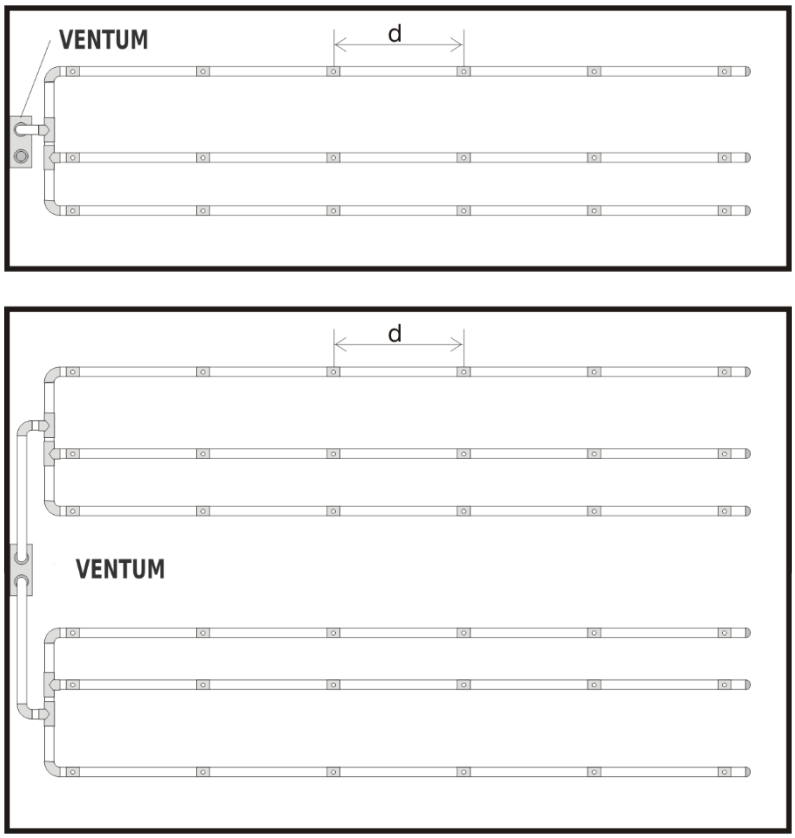


Image 51: M-pipe system for simplified pipe project planning

Threshold values

Prerequisite	Threshold value
Min. distance: device <–> T-piece [m]	2
Max. distance: device <–> T-piece [m]	20
Max. branch length [m]	20
Max. overall pipe length Ø 25 mm [m]	80
Min. distance between 2 sampling points (d) [m]	0.1
Max. distance between 2 sampling points (d) [m]	4
Max. number of aspiration apertures per pipe system [piece]	18

Table 40: Threshold values of a simplified project planning (M-pipe system)

Sampling points

Number of sampling points					
3	**6**	**9**	**12**	**15**	**18**
Punch diameter of the aspiration reducing film sheets [mm]					
5.0	3.6	3.0	3.0	2.5	2.5

Table 41: Diameter of the sampling points with simplified project planning (M-pipe system)

5.3.2.4 Double U-pipe system

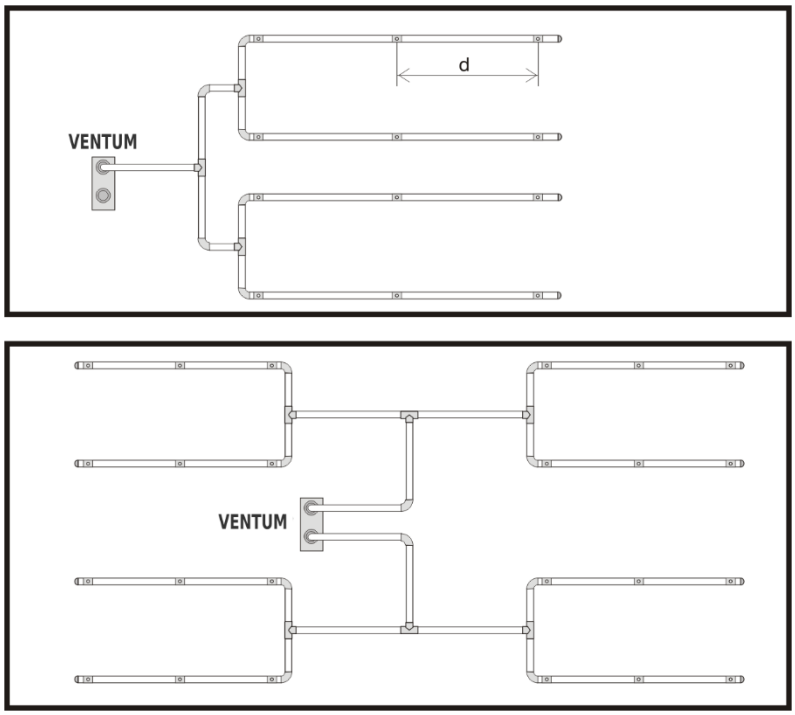


Image 52: Double U-pipe system for simplified pipe project planning

Threshold values

Prerequisite	Threshold value
Min. distance: device <–> T-piece [m]	2
Max. distance: device <–> T-piece [m]	20
Max. branch length [m]	20
Max. overall pipe length Ø 25 mm [m]	100

Prerequisite	Threshold value
Min. distance between 2 sampling points (d) [m]	0.1
Max. distance between 2 sampling points (d) [m]	4
Max. number of aspiration apertures per pipe system [piece]	20

Table 42: Threshold values of a simplified project planning (double U-pipe system)

Sampling points

Number of sampling points				
4	**8**	**12**	**16**	**20**
Punch diameter of the aspiration reducing film sheets [mm]				
4.0	3.4	3.0	2.5	2.0

Table 43: Diameter of the sampling points with simplified project planning (double U-pipe system)

5.3.3 Project planning with stubs

Project planning with stubs is suitable to achieve sampling points, which are not located on the main path of a branch.

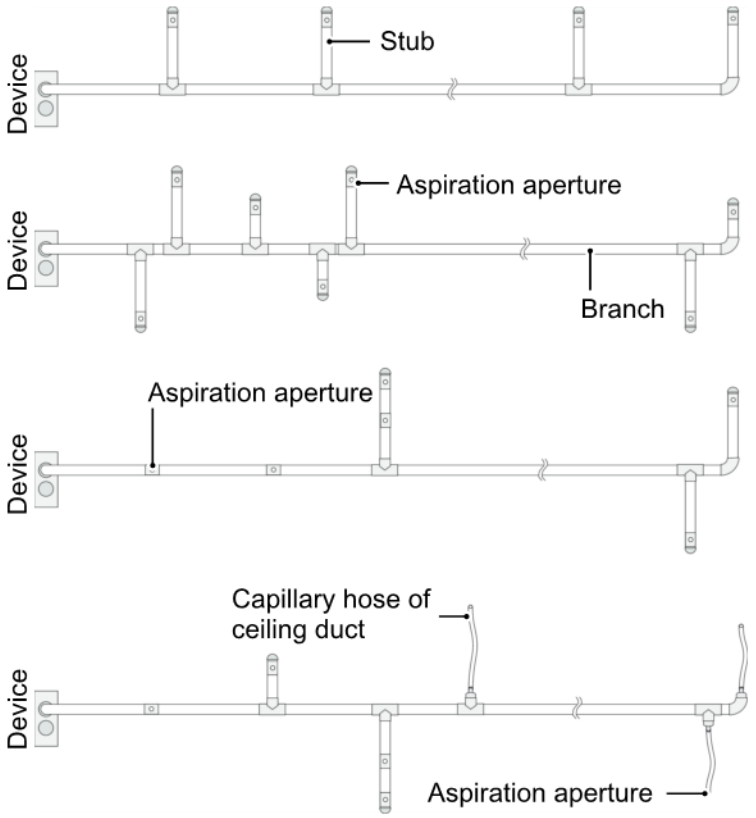


Image 53: Examples of project planning with stubs (as I-pipe system here)

The project planning configurations shown in the diagram for the I-pipe system are to be transferred to the individual branches of other pipe shapes (U-, M- and double U-pipe systems).

Critical length ($l_{crit.}$)

For project planning with stubs, it must be ensured that the "critical length" ($l_{crit.}$) does not exceed the permissible maximum overall pipe length. The "critical length" with the I-pipe system is defined as the distance between the VENTUM PRO LITE and the most distant aspiration aperture.

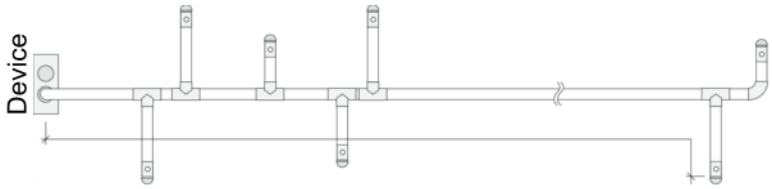


Image 54: Critical length ($l_{crit.}$)

With branched pipe systems, $l_{crit.}$ results from the sum of the "pipe lines" ($l_{supply\ 1}$, $l_{supply\ 2}$ …) and the "critical length of the branches" ($l_{branch\ 1}$, $l_{branch\ 2}$ …).

Example Determination of the critical length $l_{crit.}$ for pipe systems with more than one branch (double U-pipe system here):

$$l_{crit.} = l_{supply\ 1}+l_{supply\ 2}+l_{supply\ 3}+l_{branch\ 1}+l_{branch\ 2}+l_{branch\ 3}+l_{branch\ 4}$$

$l_{supply\ x}$	Length of the supply line
$l_{crit.}$	Critical length
$l_{branch\ x}$	Length of the branch

Stubs that are further away from $l_{crit.}$ (e.g. $l_{stub\ A}$), are not added to the permissible overall pipe length.

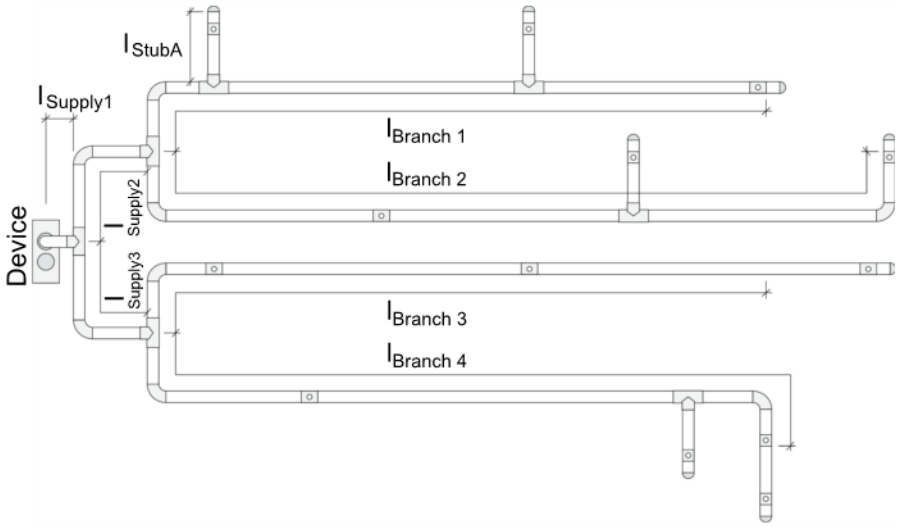


Image 55: Determination of the critical length lcrit. for pipe systems with more than one branch (double U-pipe system here)

Intervals of the aspiration apertures The permissible min. and max. distance (d) between the aspiration apertures must be taken into account, depending on the type of project planning.

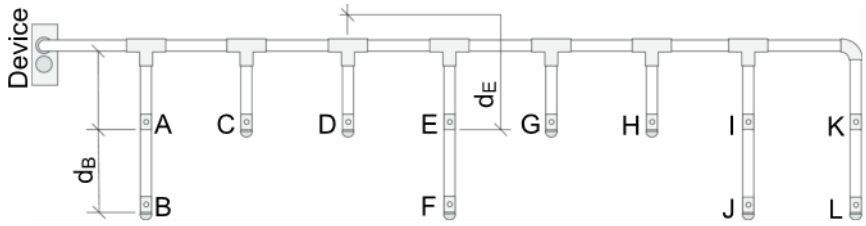


Image 56: Intervals of the aspiration apertures

Depending on the type of project planning, the following threshold values apply for the intervals between the sampling points as well as for the intervals between the T-piece and the first sampling point of the following stub:

Project planning		d [m]	
		min.	max.
Standard		4	12
Special	Chapter "Project planning with single hole monitoring"	4	12
	Chapter "Simplified project planning"	0.1	4
	Chapter "Project planning with acceleration points"	2.5	12

Table 44: Permissible intervals between the sampling points

If the maximum distance ($d_{max.}$) is exceeded, this can be rectified by an additional sampling point on the stub. Please note that a maximum of two sampling points may be planned on each stub.

Diameter of sampling points

The diameters of the aspiration apertures can be found in the corresponding chapter, depending on the type of project planning (e.g. standard or special project planning with acceleration openings).

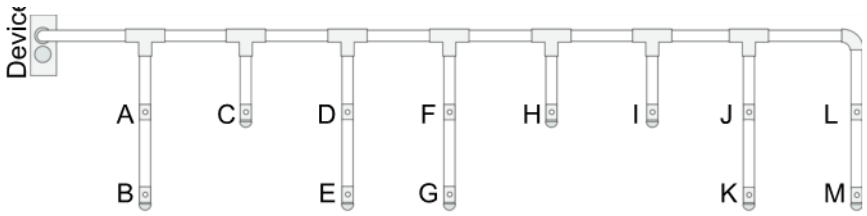


Image 57: Diameter of aspiration apertures

Maximum stub length

The stub length is the pipe length between a T-piece (as outlet of a stub) and the last sampling point of the connected stub. The maximum stub length may not exceed 2x $d_{max.}$ (maximum distance between two sampling points).

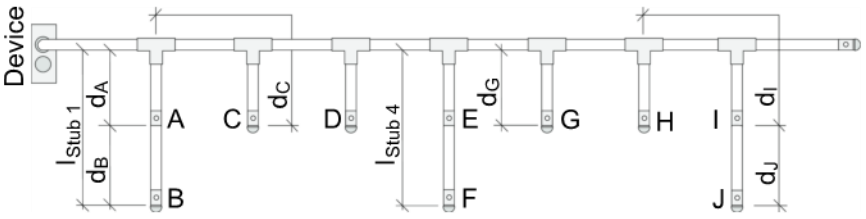


Image 58: Determining stub lengths (I-pipe system shown)

5.3.4 Project planning with pipe supply lines Ø > 25 mm

Only Ø 32 or 40 mm pipes may be used for the planning of supply pipe lines with larger diameters. The pipe supply line is described as the pipe system between the device and the first sampling point (I-pipe system) or the last T-piece (U, M and double U-pipe system).

General pipe project planning is limited by the use of pipe supply lines with larger diameters as follows:

- 1 m pipe with ∅ 32 mm substitutes 2 m pipe with ∅ 25 mm
- 1 m pipe with ∅ 40 mm substitutes 3 m pipe with ∅ 25 mm

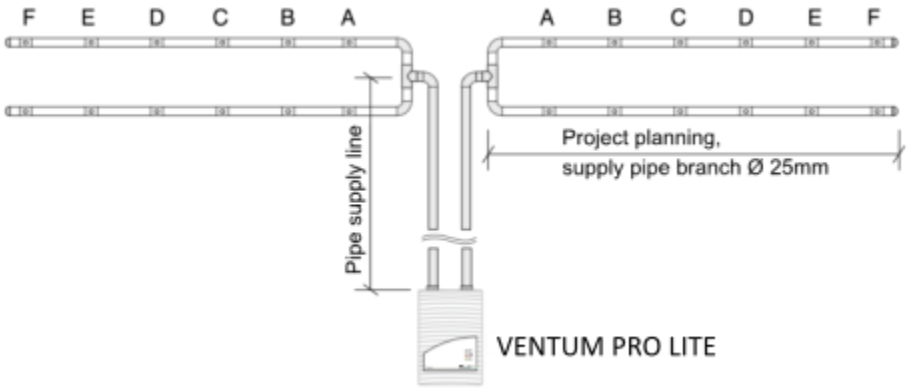


Image 59: Example project planning for pipe supply lines with long pipe supply lines

5.3.5 Project planning with acceleration points

Acceleration openings are additional openings at the end of a pipe system. They allow for max. pipe project planning and for reduction of the transport time of the smoke aerosols in the aspiration pipe. However, physical conditions reduce the detection of a breakage in the pipe system.

The diameter of the aspiration apertures can be taken from the following tables for the respective pipe shape. Furthermore, the separate project planning tables "Project planning with acceleration openings" must be used (see chapter "Annex").

5.3.5.1 I-pipe system

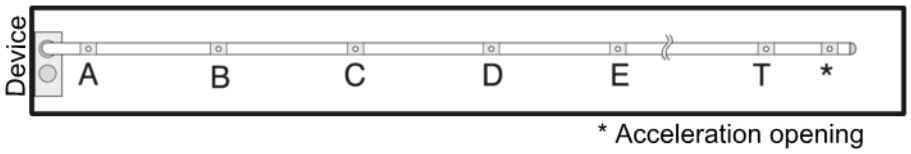


Image 60: I-pipe with acceleration opening

	Number of sampling points									
	1	2	3	4	5	6	7	8	9	10
Item	Punch diameter of the aspiration reducing film sheets [mm]									
A	7.0	7.0	7.0	3.2	3.0	2.5	2.0	2.0	2.0	2.0
B	AO	7.0	7.0	7.0	3.8	3.0	2.5	2.0	2.0	2.0
C	-	AO	7.0	7.0	6.0	3.6	3.0	2.5	2.0	2.0
D	-	-	AO	7.0	7.0	5.6	3.6	3.0	2.5	2.0
E	-	-	-	AO	7.0	7.0	5.2	3.4	3.0	2.5
F	-	-	-	-	AO	7.0	7.0	5.0	3.6	3.2
G	-	-	-	-	-	AO	7.0	7.0	4.4	3.4
H	-	-	-	-	-	-	AO	7.0	7.0	4.0
I	-	-	-	-	-	-	-	AO	7.0	7.0
J	-	-	-	-	-	-	-	-	AO	7.0
K	-	-	-	-	-	-	-	-	-	AO
L	-	-	-	-	-	-	-	-	-	-
M	-	-	-	-	-	-	-	-	-	-
N	-	-	-	-	-	-	-	-	-	-
O	-	-	-	-	-	-	-	-	-	-
P	-	-	-	-	-	-	-	-	-	-
Q	-	-	-	-	-	-	-	-	-	-
R	-	-	-	-	-	-	-	-	-	-
S	-	-	-	-	-	-	-	-	-	-
T	-	-	-	-	-	-	-	-	-	-
*	-	-	-	-	-	-	-	-	-	-

Table 45: Diameter of the sampling points for I-pipe system with acceleration points

AO = acceleration point = 7.0 mm

* = acceleration point = 7.0 mm

	Number of sampling points									
	11	12	13	14	15	16	17	18	19	20
Item	Punch diameter of the aspiration reducing film sheets [mm]									
A	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
B	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
D	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
E	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
F	2.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
G	3.0	2.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
H	3.4	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I	3.6	3.2	2.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0
J	7.0	3.6	3.4	2.5	2.5	2.0	2.0	2.0	2.0	2.0
K	7.0	6.8	3.6	3.2	2.5	2.0	2.0	2.0	2.0	2.0
L	AO	7.0	6.8	3.2	3.4	2.5	2.0	2.0	2.0	2.0
M	-	AO	7.0	6.8	3.6	3.2	2.5	2.0	2.0	2.0
N	-	-	AO	7.0	6.0	3.6	3.0	2.5	2.0	2.0
O	-	-	-	AO	7.0	6.0	3.4	3.0	2.5	2.0
P	-	-	-	-	AO	7.0	6.0	3.4	3.0	2.5
Q	-	-	-	-	-	AO	7.0	5.6	3.4	2.5
R	-	-	-	-	-	-	AO	7.0	5.2	3.4
S	-	-	-	-	-	-	-	AO	7.0	5.0
T	-	-	-	-	-	-	-	-	AO	7.0
*	-	-	-	-	-	-	-	-	-	AO

Table 46: Diameter of the sampling points for I-pipe system with acceleration points

AO = acceleration point = 7.0 mm

* = acceleration point = 7.0 mm

5.3.5.2 U-pipe system

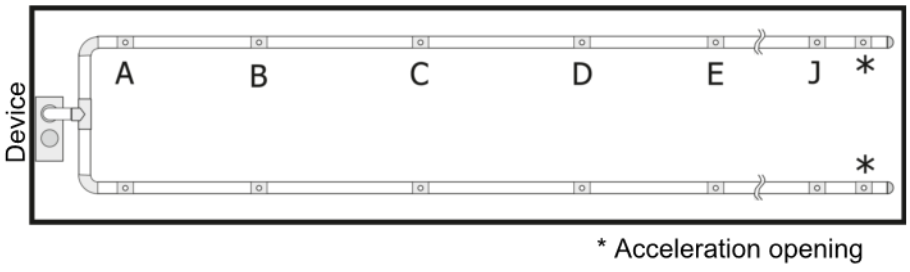


Image 61: U-pipe with acceleration openings

	Number of aspiration apertures									
	2	4	6	8	10	12	14	16	18	20
Item	Punching diameter of the aspiration reducing film sheets [mm]									
A	7.0	7.0	6.8	4.6	3.0	2.5	2.5	2.0	2.0	2.0
B	AO	7.0	7.0	5.0	3.6	2.5	2.5	2.5	2.5	2.5
C	-	AO	7.0	7.0	5.0	3.0	3.0	2.5	2.5	2.5
D	-	-	AO	7.0	7.0	5.0	3.0	3.0	2.5	2.5
E	-	-	-	AO	7.0	7.0	4.0	3.0	3.4	2.5
F	-	-	-	-	AO	7.0	7.0	3.6	3.4	2.5
G	-	-	-	-	-	AO	7.0	7.0	4.0	3.0
H	-	-	-	-	-	-	AO	7.0	6.0	4.0
I	-	-	--	-	-	-	-	AO	7.0	6.0
J	-	-	-	-	-	-	-	-	AO	7.0
*	-	--	-	-	-	-	-	-	-	AO

Table 47: Diameter of the aspiration apertures for U-pipe system with acceleration openings

AO = acceleration point = 7.0 mm

* = acceleration point = 7.0 mm

5.3.5.3 M-pipe system

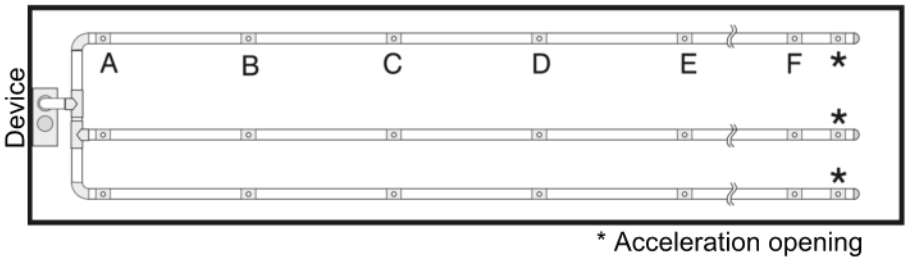


Image 62: M-pipe with acceleration openings

	Number of aspiration apertures					
	3	6	9	12	15	18
Item	Punching diameter of the aspiration reducing film sheets [mm]					
∅ aspiration aperture in mm*)	7.0	7.0	6.8	4.6	3.0	2.5
A	AO	7.0	7.0	5.0	3.4	2.5
B	-	AO	7.0	7.0	5.0	3.6
C	-	-	AO	7.0	7.0	4.6
D	-	-	-	AO	7.0	7.0

	Number of aspiration apertures					
	3	6	9	12	15	18
Item	Punching diameter of the aspiration reducing film sheets [mm]					
E	-	-	-	-	AO	7.0
F	-	-	-	-	-	AO
*						

Table 48: Diameter of the aspiration apertures for M-pipe system with acceleration openings

AO = acceleration point = 7.0 mm

* = acceleration point = 7.0 mm

5.3.5.4 Double U-pipe system

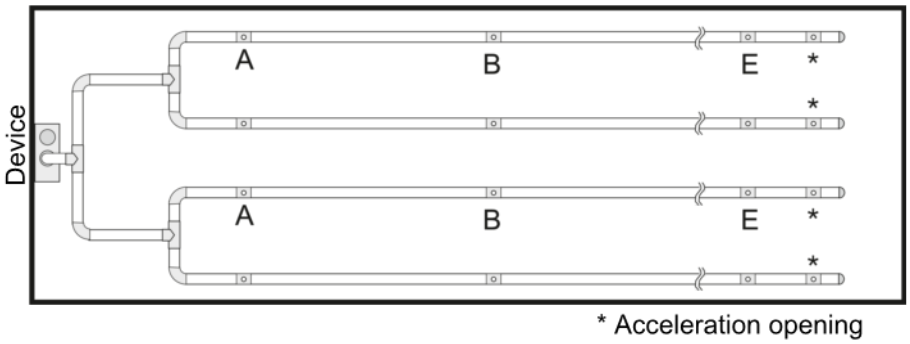


Image 63: Double U-pipe with acceleration openings

	Number of aspiration apertures				
	4	8	12	16	20
Item	Punching diameter of the aspiration reducing film sheets [mm]				
A	7.0	7.0	6.8	4.6	3.0
B	AO	7.0	7.0	5.0	3.4
C	-	AO	7.0	7.0	5.0
D	-	-	AO	7.0	7.0
E	-	-	-	AO	7.0
*	-	-	-	-	AO

Table 49: Diameter of the aspiration apertures for double U-pipe system with acceleration openings

AO = acceleration point = 7.0 mm

* = acceleration point = 7.0 mm

5.3.6 Project planning with forced air flow

Monitoring of air-conditioning ducts

Air conditioning systems are distinguished between low-speed and high-speed systems.

	Low-speed systems	High-speed systems
Flow speed [m/s]	max. 6 … 10	>10
Duct cross-section	High	Low
Pressure differential along the direction of flow	Low	High

Table 50: Overview of low-speed and high-speed systems

The distribution of the flow speed in an air-conditioning duct is separated into four speed ranges.

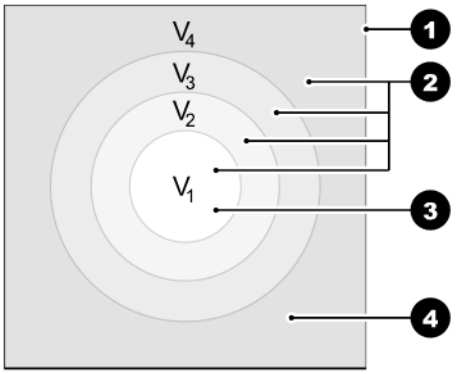


Image 64: Speed distribution in the air-conditioning duct

1	Cross-section of air-conditioning duct
2	Speed ranges V_1 ... V_4
3	Centre of the air-conditioning duct (highest air flow)
4	Outer area of the air-conditioning duct (lowest air flow)

The information listed in this section only applies to low-speed systems.

There are insufficient empirical values for high-speed systems. Smoke tests must be performed for the use of high-speed systems in order to determine the optimum response behaviour.

Aspiration

The pipe system in the air-conditioning duct must be arranged in the speed areas V_1 … V_3 to achieve optimum detection results.

Installation location of the pipe system

The exhaust air duct must be selected as the installation location for the pipe system. It should be positioned as far away from obstacles as possible (e.g. silencers, air baffles and bends). The reference value for the distance from obstacles is at least 3x minimum duct diameter.

Monitor the main speed ranges if positioning the pipe system directly behind obstacles is unavoidable.

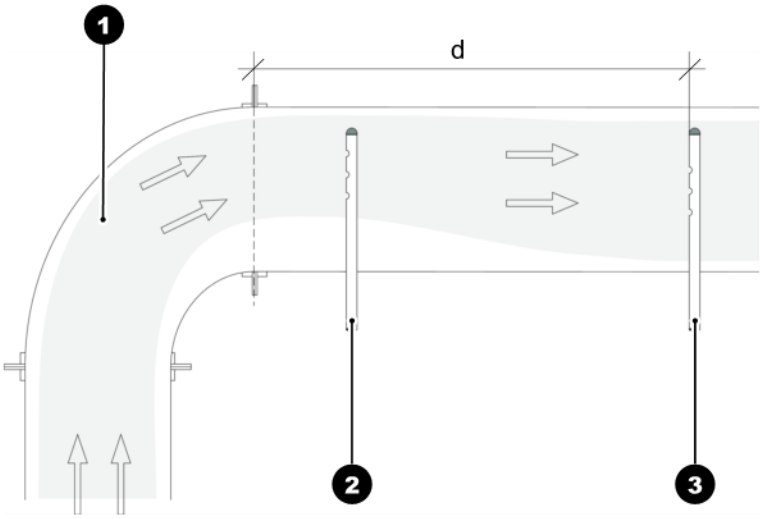


Image 65: Change in direction in the air-conditioning duct without baffles

1	Main speed range
2	Pipe system in exceptional cases *)
3	Pipe system in the conventional arrangement

*) If the distance (d) of "at least 3x minimum duct diameter" cannot be adhered to.

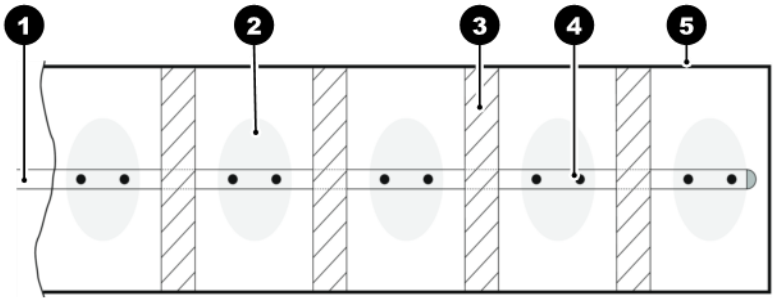


Image 66: Silencer in air-conditioning duct

1	Aspiration pipe
2	Main speed range
3	Sound absorption
4	Suction drill hole
5	Air-conditioning duct

The following must be observed when installing pipe systems in air-conditioning ducts:

- Air return is required as the VENTUM PRO LITE and the pipe system are located in areas with different air pressures.
- The pipe inlets in the air-conditioning duct must be sealed to be airtight.
- The section of the pipe system located outside the air-conditioning duct must be glued to be airtight.

Air return The air return must be positioned at a distance of at least 2 m from the aspiration. The open end of the air return must be chamfered by a 45° angle.

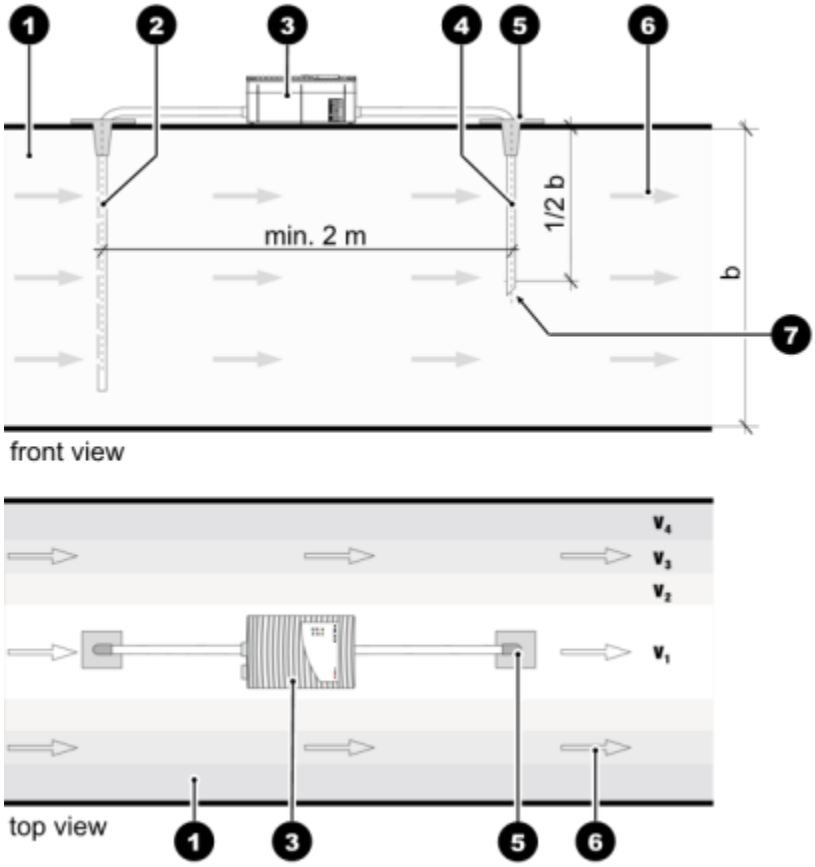


Image 67: Air return in the air-conditioning duct

1	Air-conditioning duct
2	Aspiration
3	VENTUM PRO LITE
4	Air return
5	Duct adapter
6	Airflow
7	45° chamfered end

The pipes must be offset if the distance of 2 m cannot be adhered to. In this way, a pressure drop between the supply air and the exhaust air is achieved as the pipes are located in different speed ranges.

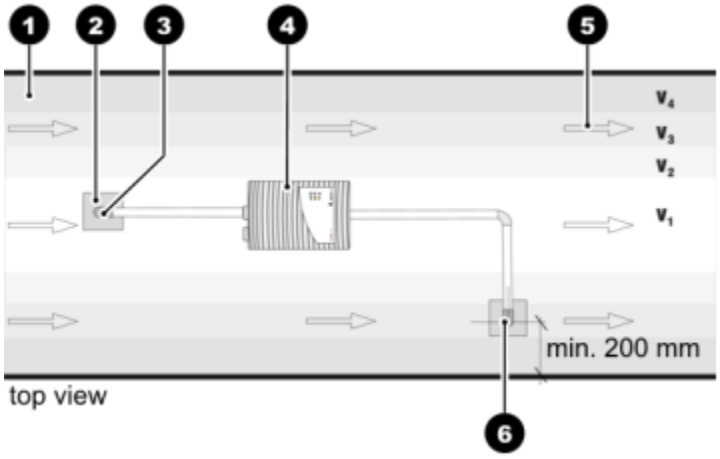


Image 68: Offset arrangement of the air return line

1	Air-conditioning duct
2	Duct adapter
3	Aspiration in the speed range V_1
4	VENTUM PRO LITE
5	Airflow
6	Return in the speed range V_3

Sampling points distance

	Duct cross-section ≤ 0.5 m²	Duct cross-section > 0.5 m²
Distance of sampling points from the wall [mm]	100 … 200	200 … 300
Mutual distance between sampling points [mm]	100	150

Table 51: Distances between the sampling points for project planning with forced airflow

Diameter of sampling points

The diameters of the sampling points are obtained from the number of sampling points. The precise value can be taken from Chapter “Simplified project planning”.

The pipe connection is achieved with an end cap without drilling.

Arrangement of the aspiration apertures

The aspiration apertures must be arranged against the air flow.

Note for the project planning that the air-conditioning ducts for the installation of the pipe system are often only accessible from two sides.

Example

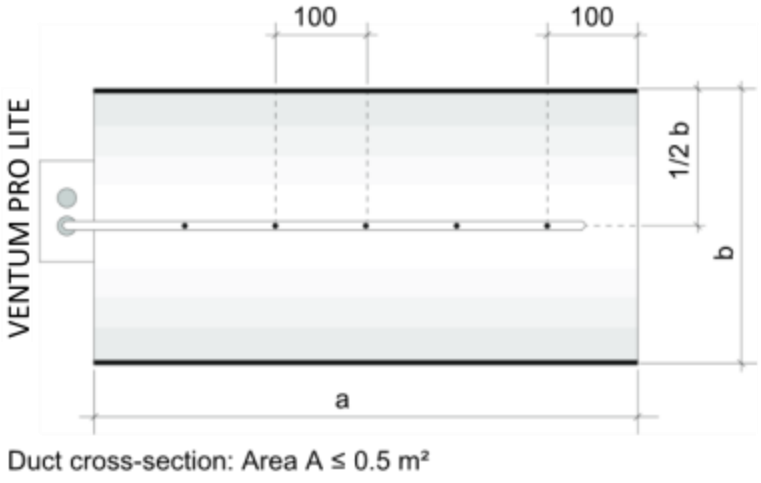


Image 69: Ducts with small duct cross-section

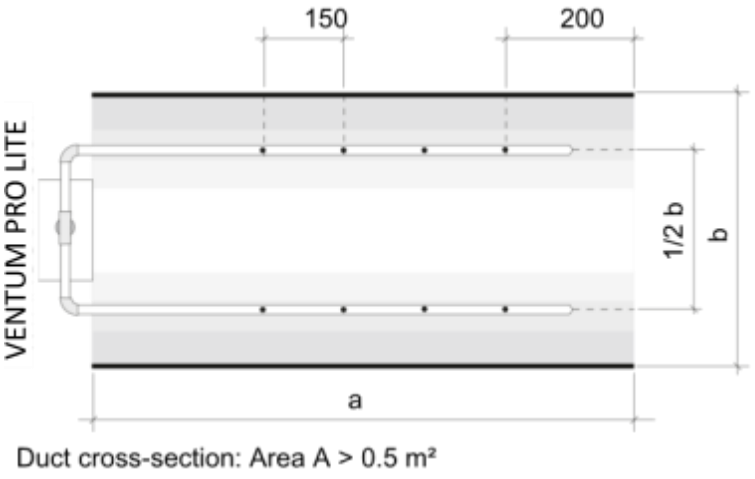


Image 70: Ducts with large duct cross-section

5.3.7 Project planning with aspiration hose

The use of aspiration hoses can make sense if several changes of direction are required in a pipe system over short distances (e.g. to bypass ceiling beams).

Aspiration hoses that are used for the implementation of ceiling ducts have a smaller cross-section and are defined as capillary hoses.

The overall aspiration pipe cannot consist of aspiration hoses alone.

No openings may be drilled in the aspiration hoses and no aspiration reductions may be made to the aspiration hoses.

As the use of aspiration hoses can have a negative impact on the transport time of the smoke aerosols, the influence of the aspiration hose on the permissible overall pipe length must be taken into account.

Factors for the calculation of the aspiration pipe length with aspiration hoses:

Aspiration hose type SCH-PG16

Fan voltage [V]	Factor a
6.5	0.9
6.9	0.6
≥ 9.0	0.7

Table 52: Factor a for aspiration hose type SCH-PG16

Aspiration hose type SCH-P25

Fan voltage [V]	Factor a
6.5	0.3
6.9	0.3
≥ 9.0	No influence

Table 53: Factor a for aspiration hose type SCH-P25

Calculation In order to calculate the maximum aspiration pipe length with aspiration hose, the length of the aspiration hose must be multiplied with the respective factor a and deducted from the permissible overall pipe length.

Aspiration pipe length = overall pipe length - (length of the aspiration hose * factor a)

Example 1 Overall, a type SCH-PG16 aspiration hose with a length of 22 m is connected to a VENTUM PRO LITE with a fan voltage of 6.9 V. The permissible overall pipe length for the pipe system is 120 m. The following results for the maximum aspiration pipe length including the aspiration hose:

Aspiration pipe length = 120 m - (22 m * 0.6) = 106.8 m

Example 2 For the pipe project planning, a total of 100 m aspiration pipe and aspiration hose is connected to a VENTUM PRO LITE with a fan voltage of 6.5 V. The permissible overall pipe length for the entire pipe project planning can be 120 m according to the project planning table. The following results for the maximum length of the overall aspiration hose type SCH-P25, which can be installed as part of the pipe project planning, after conversion of the formula:

Length of aspiration hose = (overall pipe length - aspiration pipe length) / factor a

Length of aspiration hose = (120 - 100 m) / 0.3 = 66.67 m

5.3.8 Project planning with air return

If the VENTUM PRO LITE and the pipe system are installed in areas with different air pressure, return of the aspirated air into the pipe system pressure area is required. For this, a correspondingly long aspiration pipe must be connected to the air outlet of the VENTUM PRO LITE.

As air return can have a negative effect on the transport time of the smoke aerosols, this must be considered for the permissible overall pipe length.

Factors for the calculation of the suction pipe length with air return:

Air return ∅ 25 mm

	Fan voltage [V]		
Length of the Air return [m]	6.5	6.9	≥ 9.0
	Factor b		
0 … 5	0.0	1.3	0.0
>5 … 10	0.8	0.5	0.5
>10 … 25	0.8	0.8	0.5
>25 … 50	0.8	0.8	0.5

Table 54: Factor b for air return Ø 25 mm

Air return ∅ 32 mm

	Fan voltage [V]		
Length of the Air return [m]	6.5	6.9	≥ 9.0
	Factor b		
0 … 5	0.0	0.3	0.0
> 5 … 10	0.0	0.3	0.0
> 10 … 25	0.2	0.3	0.0
> 25 … 50	0.25	0.3	0.1

Table 55: Factor b for air return Ø 32 mm

Air return ∅ 40 mm

Air return with a ∅ 40 mm pipe does not have any influence on the overall pipe length and can be planned and/or retrofitted without reducing the overall pipe length.

Calculation In order to calculate the maximum aspiration pipe length with air return, the length of the air return must be multiplied with the respective factor b and deducted from the permissible overall pipe length.

Aspiration pipe length = overall pipe length – (length of the air return * factor b)

Example An air return Ø 25 mm of 22 m length must be connected to a VENTUM PRO LITE with a fan voltage of 6.9 V. The permissible overall pipe length for the pipe system is 120 m. The following results for the maximum aspiration pipe length:

Aspiration pipe length = 120 m - (22 m * 0.8) = 102.4 m

5.4 Energy supply

NOTE

No standard conformity in case of wrong energy supply

The energy supply of the VENTUM PRO LITE must be approved in accordance with EN 54-4 or ISO 7240-4.

When configuring the external energy supply, the alarm-ready state and the alarm state of the connected devices are taken into account. The state with the higher current consumption is decisive for selecting the energy supply.

Refer to the chapter "Technical data" for the current consumption values of the VENTUM PRO LITE.

Alarm state

Alarm current In the event of an alarm, the energy supply must provide the alarm current for:

- Connected devices
- Any connected accessories

Variable	Unit	Description
I_{alarm}	A	Alarm current
n_0	-	Number of devices
I_{alarm_0}	A	Alarm current of device
n_1	-	Number of accessories 1
$I_{alarm\ 1}$	A	Alarm current/current consumption of accessories 1
n_i	-	Number of accessories i
I_{alarm_i}	A	Alarm current/current consumption of accessories i

Alarm-ready state

In the alarm-ready state, the energy supply must ensure that the backup batteries are charged and supply the standby current for:

- Connected devices
- Any connected accessories

To be able to calculate the power supply current I_{PS} that is actually required for the alarm-ready state, the standby current $I_{standby}$ and the charging current $I_{charging}$ have to be calculated first.

Standby current

$$I_{standby} = n_0 \cdot I_{standby\_0} + n_1 \cdot I_{standby\_1} + \cdots + n_i \cdot I_{standby\_i}$$

Variable	Unit	Description
$I_{standby}$	A	Standby current
n_0	-	Number of devices
$I_{standby\_0}$	A	Standby current of device
n_1	-	Number of accessories 1
$I_{standby\_1}$	A	Standby current/current consumption of accessories 1
n_i	-	Number of accessories i
$I_{standby\_i}$	A	Standby current/current consumption of accessories i

To be able to calculate the charging current $I_{charging}$, the required minimum capacity of the backup batteries C_{min} must be calculated first.

Observe the relevant national laws, standards and guidelines. In Germany, for example, the following apply: DIN VDE 0833 and/or VdS 2095. In accordance with these laws, standards and guidelines, a hold-up time of 30 h (under certain conditions 4 h) with a subsequent alarm time of 0.5 h must generally be ensured by the backup power supply. Deviating hold-up times may be selected for applications that do not fall under these directives.

- Calculate the minimum required battery capacity according to the following formula:

$$C_{min} = (I_{standby} \cdot t_1 + I_{alarm} \cdot t_2) \cdot 1{,}25$$

Variable/constant	Unit	Description
C_{min}	Ah	Minimum required battery capacity
$I_{standby}$	A	Standby current
t_1	h	Required hold-up time
I_{alarm}	A	Alarm current
t_2	h	Required alarm time
$1{,}25$	-	Safety factor, only consider for hold-up times < 24 h

Nominal battery capacity

To select the required nominal battery capacity $C_{nominal}$, consider the following criteria:

- Available nominal battery capacities > C_{min}
- Possible nominal battery capacities according to the energy supply manufacturer
- Restrictions due to energy supply device approvals.

$$C_{min} < C_{nominal}$$

Variable	Unit	Description
C_{min}	Ah	Minimum required battery capacity
$C_{nominal}$	Ah	Nominal battery capacity

Charging current

The following minimum charging current is required to charge the backup batteries to 80% of their nominal capacity within 24 h:

$$I_{charging} = \frac{0{,}8 \cdot C_{nominal}}{24\ \mathrm{h}} \cdot 1{,}3$$

Variable/constant	Unit	Description
$I_{charging}$	A	Charge current
$0{,}8$	-	80% in 24 h
$C_{nominal}$	Ah	Nominal battery capacity
$1{,}3$	-	Charging factor due to thermal losses when charging the backup batteries

Power supply current

$$I_{PS} \geq I_{standby} + I_{charging}$$

Variable	Unit	Description
I_{PS}	A	Power supply current for alarm-ready state
$I_{standby}$	A	Standby current
$I_{charging}$	A	Charge current

Cable length and wire cross-section

The maximum cable length between the energy supply and the device is calculated based on the conductivity (cable material), the wire cross-section, the maximum current and the permissible drop in voltage on the device supply line.

To calculate the maximum cable length l_{max}, the wire cross-section A has to be calculated first.

$$A = \frac{\pi \cdot d^2}{4}$$

Variable	Unit	Description
A	mm²	Conductor cross-section
d	mm	Wire diameter

The permissible drop in voltage on the device supply line is the difference between the end-point voltage of the backup batteries and the lower supply voltage of the VENTUM PRO LITE.

LITERATURE

You will find information on the end-point voltage in the technical data of the energy supply in use.

Refer to the chapter "Technical data" for the supply voltage of the VENTUM PRO LITE.

$$l_{max} = \frac{\sigma \cdot \Delta U \cdot A}{I_{standby} \cdot 2}$$

Variable	Unit	Description
l_{max}	m	Maximum permissible line length
σ	1/Ωm	Electric conductivity of line material
ΔU	V	Maximum permissible drop in voltage on the device supply cable
A	mm²	Conductor cross-section
$I_{standby}$	A	Standby current

6 Installation

You will find information about installing the VENTUM PRO LITE and the pipe system in this chapter.

6.1 General information

The regulations, guidelines and terms listed in chapter "Requirements" apply.

The following must be observed when installing the device:

- Incursions, changes and modifications to equipment must be avoided. If adjustments are required, these must be arranged with the operating company, device manufacturer and/or supply company (written consent).
- All incursions to the house mains (230 V/400 V supply) and third-party systems must be carried out on-site. This includes, for example:
  - The primary connections of the power supply units
  - Any connection to third-party systems (e.g. fire detector control panels)
  - Carrying out any potentially required lightning and surge protection measures according to the relevant standards

NOTE
Danger of short circuit on the motherboard Only perform the following work with the device disconnected from the mains.

6.2 Determination of installation location

⚠ WARNING

Danger of pipe deflagration or detonation

The VENTUM PRO LITE must not be mounted in areas with a potentially explosive atmosphere. Non-observance could lead to an ignition of the explosive atmosphere due to static discharge.

When choosing the installation location, you should make sure that:

- The device is not situated in the immediate vicinity of opening areas (e.g. doors).
- The displays are clearly visible.
- The installation background is dry and level.
- No surrounding components (e.g. wall projections) obstruct the air inlet or air outlet.

6.3 Installation of device

You must install the VENTUM PRO LITE either with the bottom part of the housing directly to a wall or using a special bracket.

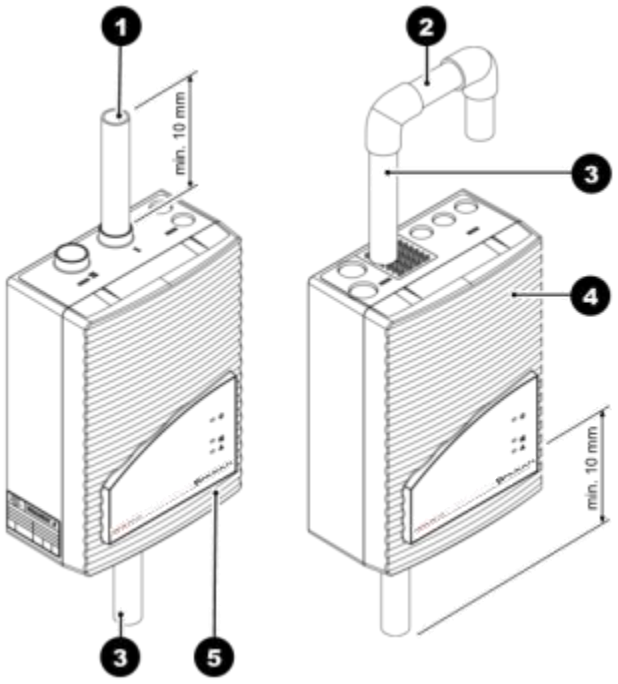


Image 71: Mounting orientation

1	Aspiration pipe
2	Angled pipe
3	Air return
4	VENTUM PRO LITE with top air outlet
5	VENTUM PRO LITE with bottom air outlet

The device can be installed with the air inlet pointing up or down. Rotate the cover accordingly by 180°.

Bottom air outlet Make sure that air outlet of the device is not obstructed. Maintain a distance of at least 10 cm between the air outlet and surrounding components (e.g. wall projection).

Air outlet pointing up Make sure that no foreign particles and no dripping water can enter the air outlet opening. Use a short pipe angled down for this.

Installation materials

Wall mounting	Installation with brackets
4x cylinder or flat-head screws • Thread diameter max. 6 mm • Head diameter max. 10 mm	4x cylinder or flat-head screws • Thread diameter 4 mm
	4x washers • Diameter 9 mm • Drill hole diameter 4,3 mm
	4x hexagon nuts • Thread diameter M4

Table 56: Installation materials for installation of device

Wall mounting

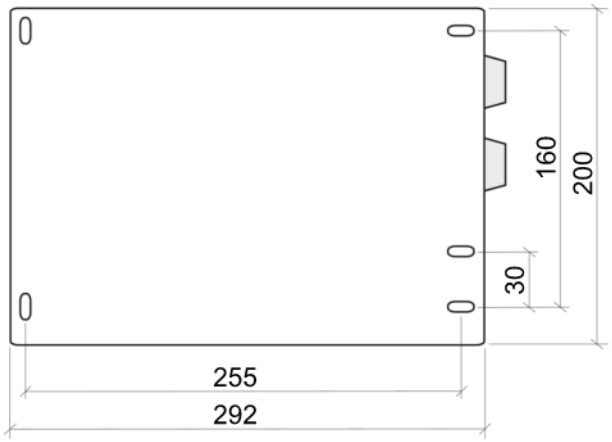


Image 72: Drilling intervals for bottom section of housing

- ► Mark the drilling intervals on a wall.
- ► Drill the holes according to the size of the suitable installation material (screws/plugs).
- ► Tighten the four screws by hand. It must be ensured that the device is installed mechanically stress-free.
- ► Insert the aspiration pipe into the pipe connection (air inlet) of the device up to the stop. Please note that the aspiration pipe must not be glued together with the pipe connection for service purposes or for the replacement of the device.

Installation with brackets

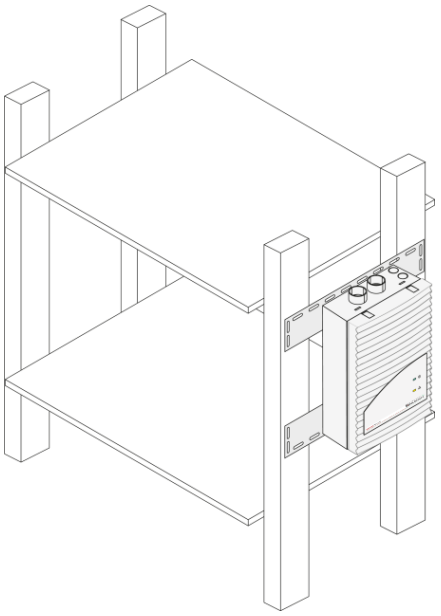


Image 73: Device brackets

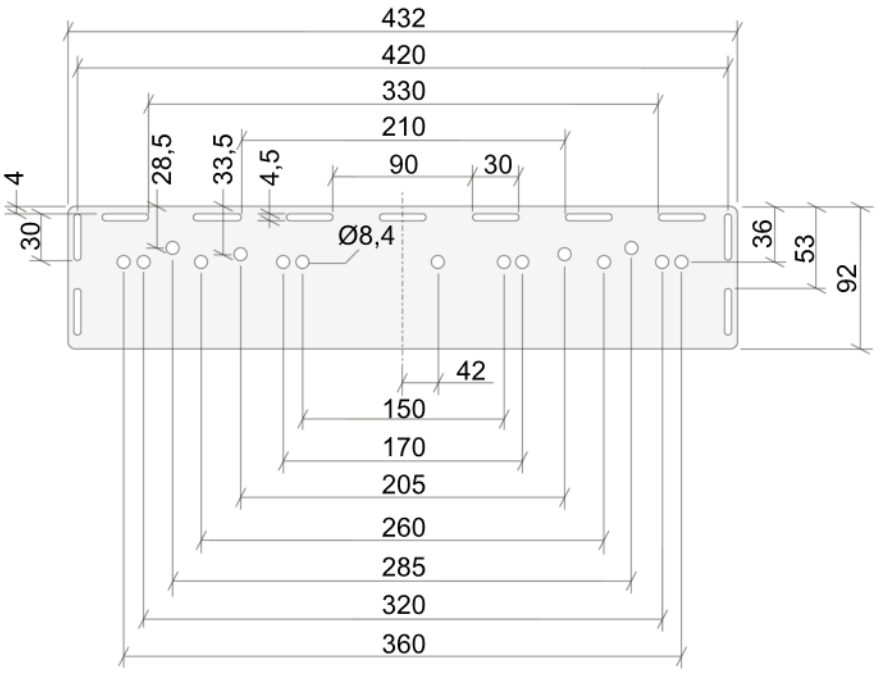


Image 74: Drill hole intervals [mm] for bracket type MT-1

- Fix the brackets onto the device.
- Mark the drilling intervals on the corresponding installation surface (e.g. frame).

- Drill the holes according to the size of the suitable installation material (screws/plugs).
- Tighten the four screws by hand. It must be ensured that the device is installed mechanically stress-free.
- Insert the aspiration pipe into the pipe connection (air inlet) of the device up to the stop. Please note that the aspiration pipe must not be glued together with the pipe connection for service purposes or for the replacement of the device.

6.4 Opening the device

NOTE

Electrostatic discharge due to contact

Protect the components of the main circuit board from damage due to static discharge.

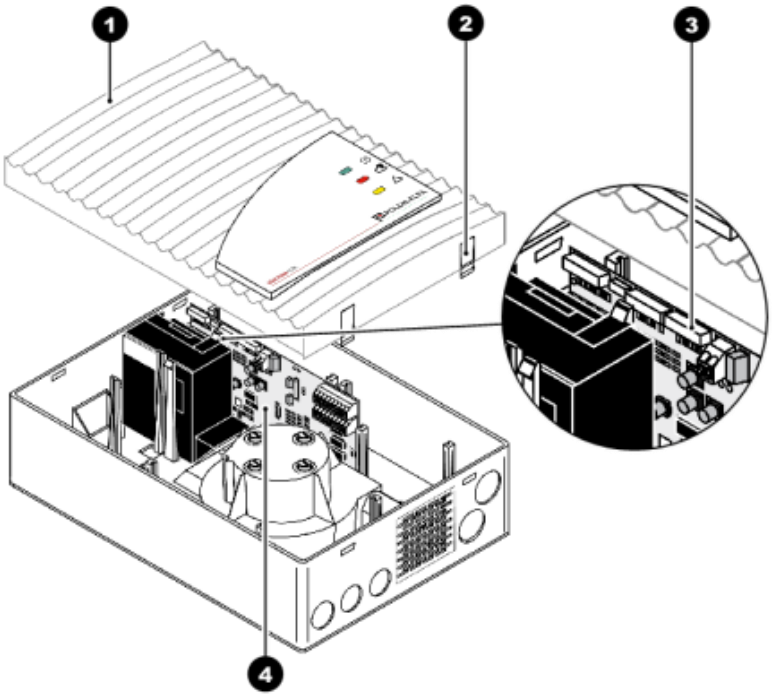


Image 75: Opening the device

1	Housing cover
2	Quick-action fasteners
3	Connection for display circuit board (terminal X4 (DISPLAY))
4	Basic board

- Carefully unlock the quick-action fasteners on the housing using a flat-head screwdriver by simultaneously pressing in the closing flaps located on one side.
- Lift the housing cover.
- Carefully loosen the ribbon cable of the display board from the motherboard.
- Put the housing cover to one side. Ensure that the housing cover is neither soiled nor damaged.

6.5 Making settings

The settings of the VENTUM PRO LITE are made via the detector modules by means of DIL switches.

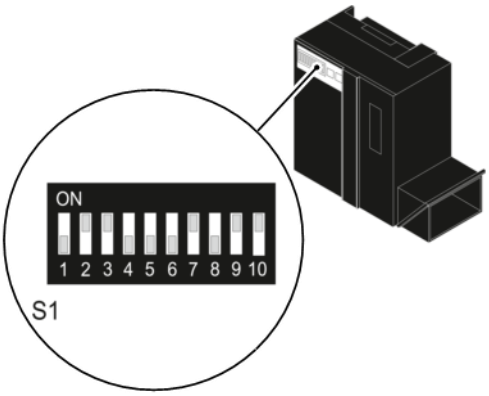


Image 76: Setting the DIL switches of the detector module (standard)

6.5.1 Setting the response sensitivity (main alarm)

Detector module type			DIL switch S1	
DM-VPL-50 [% light obscuration/m]	DM-VPL-10 [% light obscuration/m]	DM-VPL-01 [% light obscuration/m]	Contact 1	Contact 2
-	0.8	0.12	ON	ON
-	**0.4 (Standard)**	**0.06 (Standard)**	OFF	ON
1	0.2	0.03	ON	OFF
0.5 (Standard)	0.1	0.015	OFF	OFF

Table 57: Response sensitivity (main alarm)

6.5.2 Setting the delay time of the alarm trigger

If the smoke level rises during operation of the VENTUM PRO LITE up to one of the alarm thresholds, the delay time starts to run. The signal is only transferred with the alarm still pending after expiration of the delay time. This means that a false alarm can be prevented in case of short-term loads (e.g. due to dust).

The alarm delay period should be set to 0 s for test purposes only.

Delay period [s]	DIL switch S1	
	Contact 3	Contact 4
0	OFF	OFF
10 (standard)	**ON**	**OFF**
30	OFF	ON
60	ON	ON

Table 58: Alarm trigger delay time

6.5.3 Setting the trigger threshold for the air flow monitoring

Select the trigger threshold of the air flow fault according to the chapter "Project planning".

Level	Activation threshold	DIL switch S1	
		Contact 5	Contact 6
I[1)]	Low	ON	OFF
II[1)]	**Medium** (standard)	**OFF**	**ON**
III	High	OFF	OFF
IV	Very high	ON	ON

Table 59: Trigger threshold for air flow monitoring

[1)] Permissible according to EN 5420/ISO 7240-20

6.5.4 Setting the delay time for the air flow fault

In monitoring areas with brief disturbance factors (e.g. air pressure fluctuations due to open doors), corresponding delay times should be set. The delay time should at least be equivalent to the duration of the disturbance factors.

Delay time	DIL switch S1	
	Contact 7	Contact 8
30 s[1)]	OFF	ON

Delay time	DIL switch S1	
	Contact 7	Contact 8
120 s[1] (standard)	**ON**	**OFF**
15 min	ON	ON
60 min	OFF	OFF

Table 60: Delay time for the air flow fault

[1] Permissible according to 54-20/ISO 7240-20

6.5.5 Activating or deactivating the memory fault display

The display for collective faults (detector module and air flow fault) can be set to "saving" (default) or "non-saving".

Display setting	DIL switch S1 Contact 9
Saving (standard)	**ON**
Non-saving	OFF

Table 61: Fault indicator

6.5.6 Activating or deactivating LOGIC·SENS

When signal evaluation is switched on, LOGIC·SENS prevents false alarms by detecting disturbance variables which only occur for a brief period.

Setting LOGIC·SENS	DIL switch S1 Contact 10
On (standard)	**ON**
Off	OFF

Table 62: LOGIC·SENS

6.5.7 Setting the contact type of the collective fault

NOTE

Danger of short circuit on the motherboard

Only perform the following work with the device disconnected from the mains.

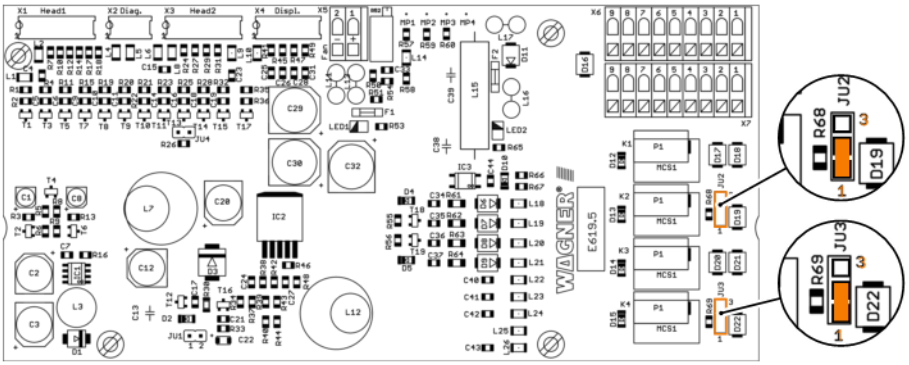


Image 77: Jumper position of JU2 and JU3 of the collective fault contacts

The contact type (N/C or N/O contact) of the collective fault is set with jumpers JU2 and JU3. The contact type of the 1st fault contact is set with jumper JU2, while the 2nd fault contact is set with jumper JU3.

Contact type	Jumper JU2		Jumper JU3	
	Pin pair 1+2	Pin pair 2+3	Pin pair 1+2	Pin pair 2+3
N/C contact (standard)	**X**	**O**	**X**	**O**
N/O contact	O	X	O	X

Table 63: Collective fault contact

X = pin pair jumpered

O = pin pair open

6.6 Setting and connecting the fan

The fan voltage must be set according to project specifications before connecting the fan. The different settings and connection diagrams for VENTUM PRO LITE and VENTUM PRO LITE-SL must be observed.

6.6.1 Switching the fan voltage

In critical monitoring areas, the fan voltage can be increased to shorten the transport time of the smoke aerosols in the aspiration pipe.

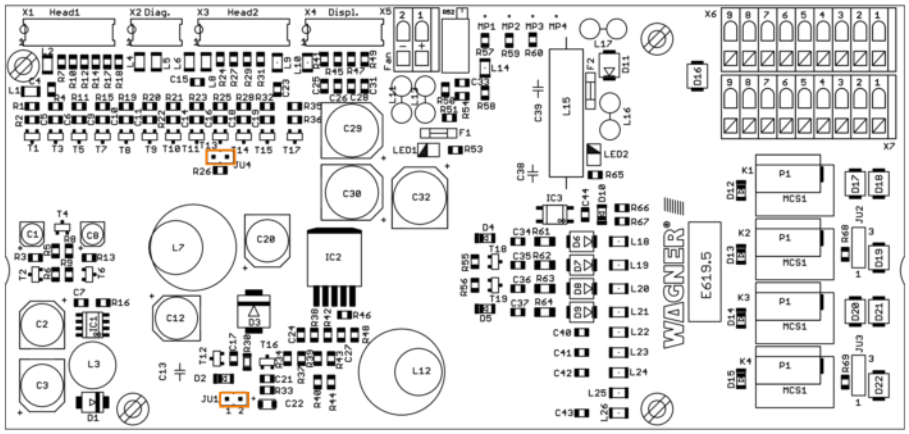


Image 78: Switching the fan voltage via jumper JU1

NOTE

Danger of short circuit on the motherboard

Only perform the following work with the device disconnected from the mains.

Fan voltage [V]	Jumper JU1
6.9 (standard)	**closed**
9	open

Table 64: Switching the fan voltage

- ► Remove the jumper to increase the fan voltage.
- ► Press the Flow Init button on the detector module.

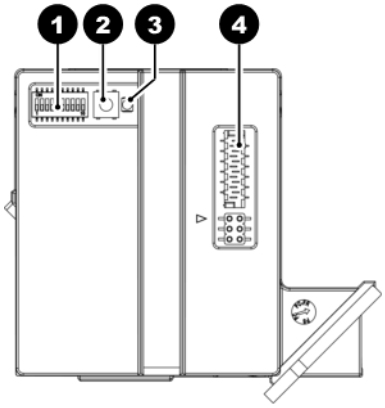


Image 79: Connections and LED on the detector module

1	DIL switch
2	Flow initialisation button
3	LED
4	Connection for flat ribbon cable

6.6.2 Connecting the fan

The electrical connection of the fan is made using terminal strip X5 (FAN) on the VENTUM PRO LITE basic board.

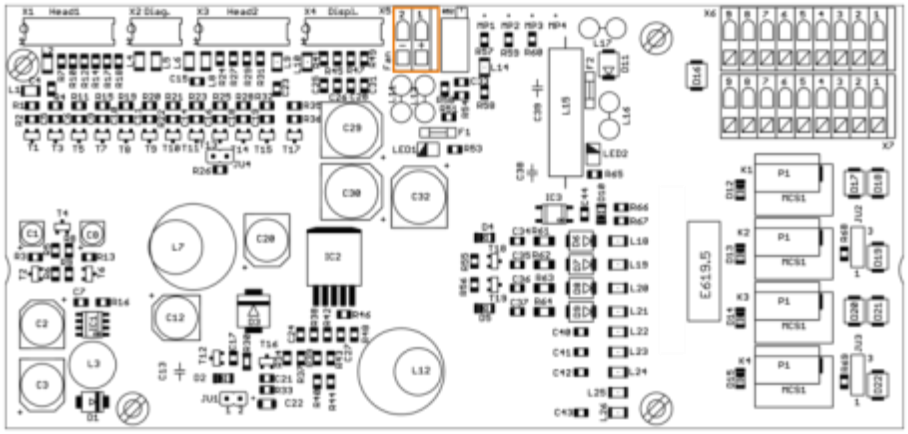


Image 80: Connect the fan to the basic board

Upon delivery of the VENTUM PRO LITE, the fan was connected in the factory.

- ► Connect the red fan connection cable to terminal strip X5 / terminal 1 (+).

► Connect the black fan connection cable to terminal strip X5 / terminal 2 (-).

6.6.3 Switching the fan voltage for the SL version

The default setting for the fan voltage is 6.9 V (FC-2) or 11 V (FC-3). The fan voltage can be adjusted according to project planning by plugging or removing the BR1 and/or BR2 bridges.

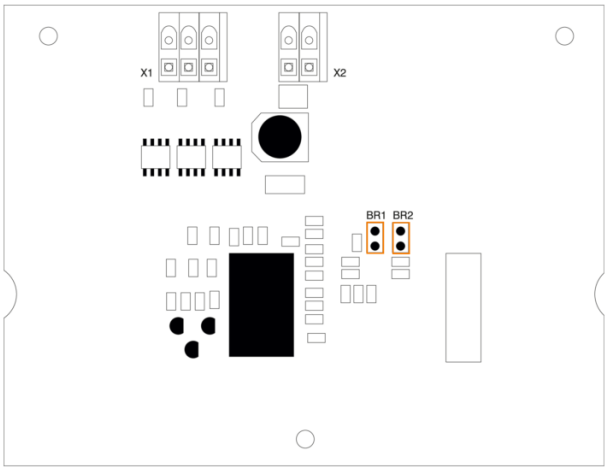


Image 81: Switching the fan voltage via the bridges BR1 and BR2 (fan control circuit boards)

NOTE

Danger of short circuit on the motherboard

Only perform the following work with the device disconnected from the mains.

Fan voltage on the fan control circuit board [V]		Bridge BR1 Pin pair 1+2	Bridge BR2 Pin pair 1+2
Type FC-2	Type FC-3		
6.5	10	O	X
6.9 (standard)	**11** (standard)	**X**	**O**
9	12	O	O

Table 65: Switching the fan voltage for the SL version

X = pin pair jumpered

O = pin pair open

- It must be ensured that jumper JU1 on the basic board is unplugged.

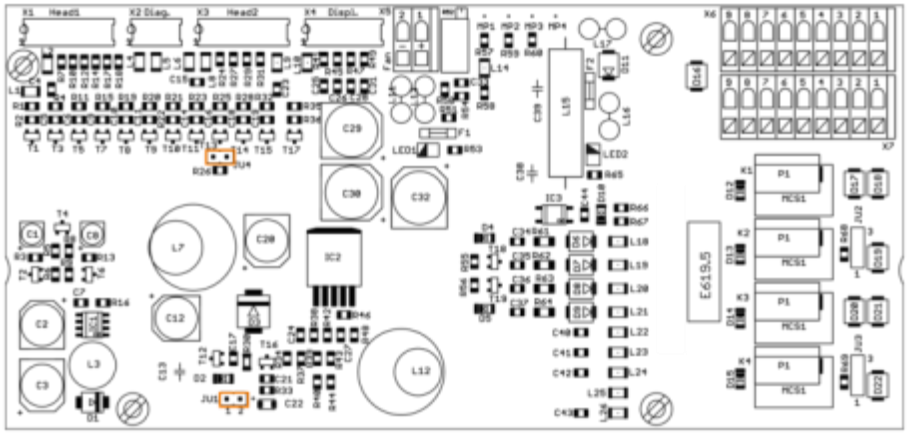


Image 82: Unplug the jumper JU1 from the basic board

- Plug in or unplug the bridge(s) according to the project planning.
- Press the Flow Init button on the detector module.

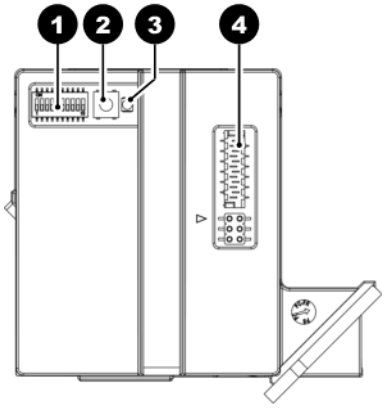


Image 83: Connections and LED on the detector module

1	DIL switch
2	Flow initialisation button
3	LED
4	Connection for flat ribbon cable

6.6.4 Connecting the fan for the SL version

The electrical connection of the fan control circuit board is made using terminal strip X5 (FAN) on the VENTUM PRO LITE basic board.

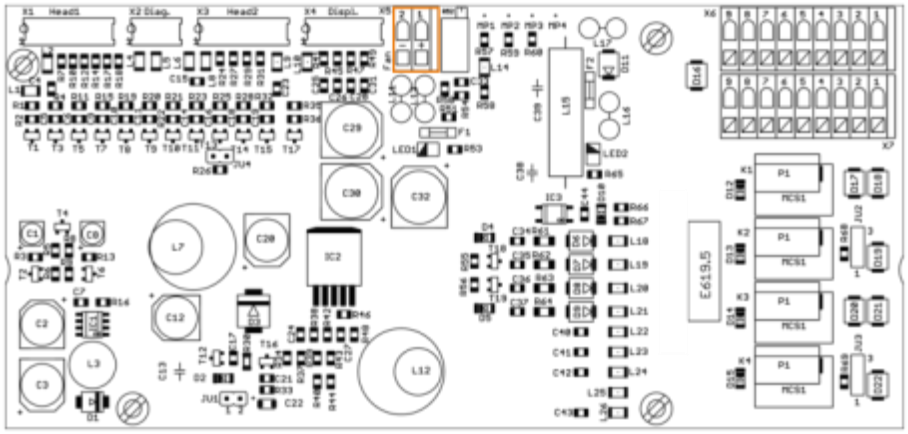


Image 84: Connecting the fan control circuit board to the basic board

The electrical connection of the fan is made using terminal strip X1 (FAN) on the fan control circuit board.

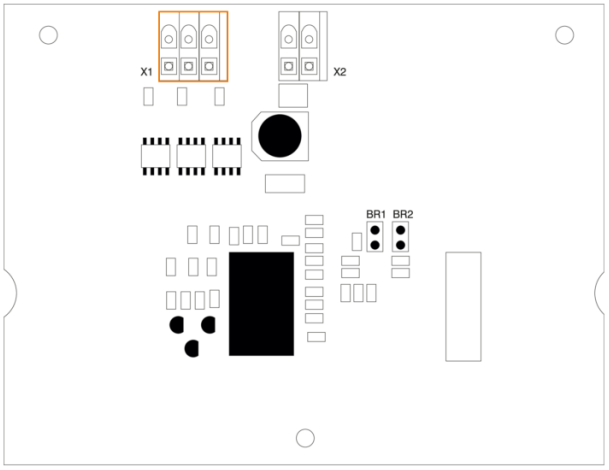


Image 85: Connecting the fan to the fan control circuit board type FC-2 or FC-3

Upon delivery of the VENTUM PRO LITE, the fan was connected in the factory.

- Connect terminal strip X5 / terminal 1 on the basic board to terminal strip X2 / terminal 2 (+) on the fan control circuit board.
- Connect terminal strip X5 / terminal 2 on the basic board to terminal strip X2 / terminal 1 (-) on the fan control circuit board.
- Connect the brown fan connection cable to terminal strip X1 / terminal 1 of the fan control circuit board.
- Connect the yellow fan connection cable to terminal strip X1 / terminal 2 of the fan control circuit board.

► Connect the purple fan connection cable to terminal strip X1 / terminal 3 of the fan control circuit board.

6.7 Inserting and connecting detector module I

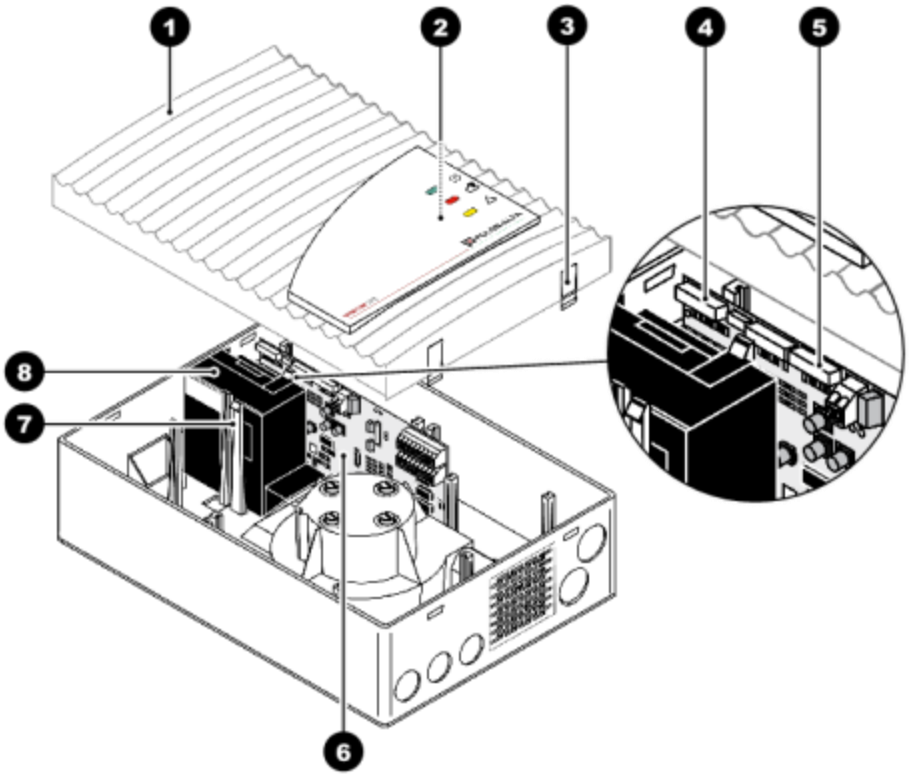


Image 86: Opening the device

1	Housing cover
2	Display circuit board (not visible)
3	Quick-action fasteners
4	Connection: X1 HEAD 1
5	Connection: X4 DISPLAY
6	Basic board
7	Retaining clips
8	Detector module

NOTE

Danger of short circuit on the motherboard

Only perform the following work with the device disconnected from the mains.

NOTE

Electrostatic discharge due to contact

Protect the components of the main circuit board from damage due to static discharge.

- Carefully unlock the quick-action fasteners on the housing using a flat-head screwdriver by simultaneously pressing in the closing flaps located on one side.
- Lift the housing cover.
- Carefully loosen the ribbon cable of the display board from the motherboard.
- Put the housing cover to one side. Ensure that the housing cover is neither soiled nor damaged.
- Carefully spread the two retaining clips apart and insert the detector module. The retaining clips must be positioned against the detector module and audibly engage. Only use type DM-VPL-xx detector modules (green type plate).
- Then press both retaining clips together again.
- Connect the flat ribbon cable of the detector module to the basic board (connection X1 (HEAD1)). Ensure the marking pin is positioned correctly before plugging the ribbon cable plug into the basic board.

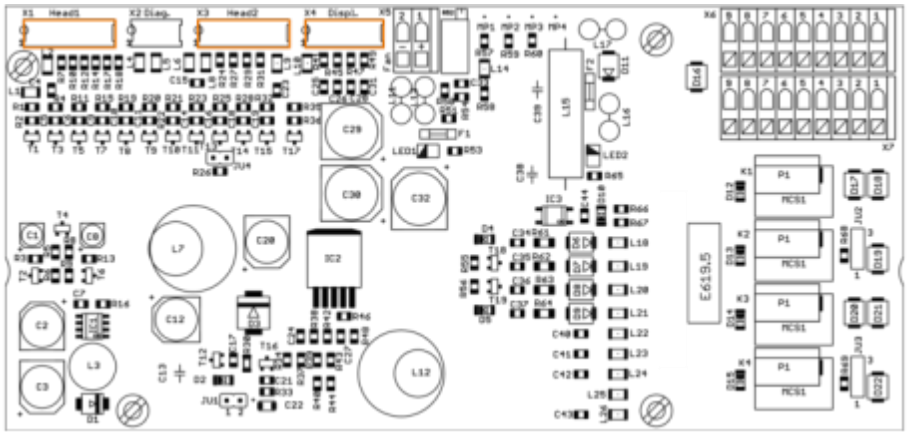


Image 87: Connections on basic board X1, X3 and X4

- Connect the flat ribbon cable of the display circuit board to the basic board (connection X4 (DISPLAY)). Ensure the marking pin is positioned correctly before plugging the ribbon cable plug into the basic board.
- Press the Flow Init button on the detector module.

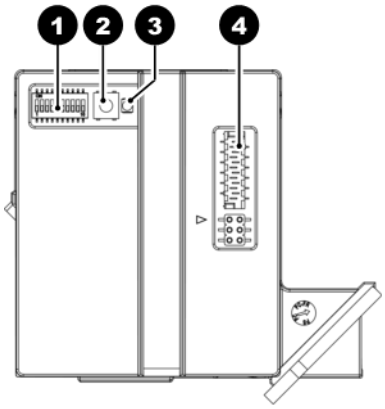


Image 88: Connections and LED on the detector module

1	DIL switch
2	Flow initialisation button
3	LED
4	Connection for flat ribbon cable

- Close the cover. Ensure that none of the ribbon cables are squashed.
- Let the quick-action fasteners click into place.

6.8 Inserting and connecting detector module II

NOTE

Danger of short circuit on the motherboard

Only perform the following work with the device disconnected from the mains.

- Carefully unlock the quick-action fasteners on the housing using a flat-head screwdriver by simultaneously pressing in the closing flaps located on one side.
- Lift the housing cover.
- Carefully loosen the ribbon cable of the display board from the motherboard.
- Put the housing cover to one side. Ensure that the housing cover is neither soiled nor damaged.
- Carefully remove the fan cover for the second aspiration duct (self-adhesive plastic cover) by using a screwdriver, for example.

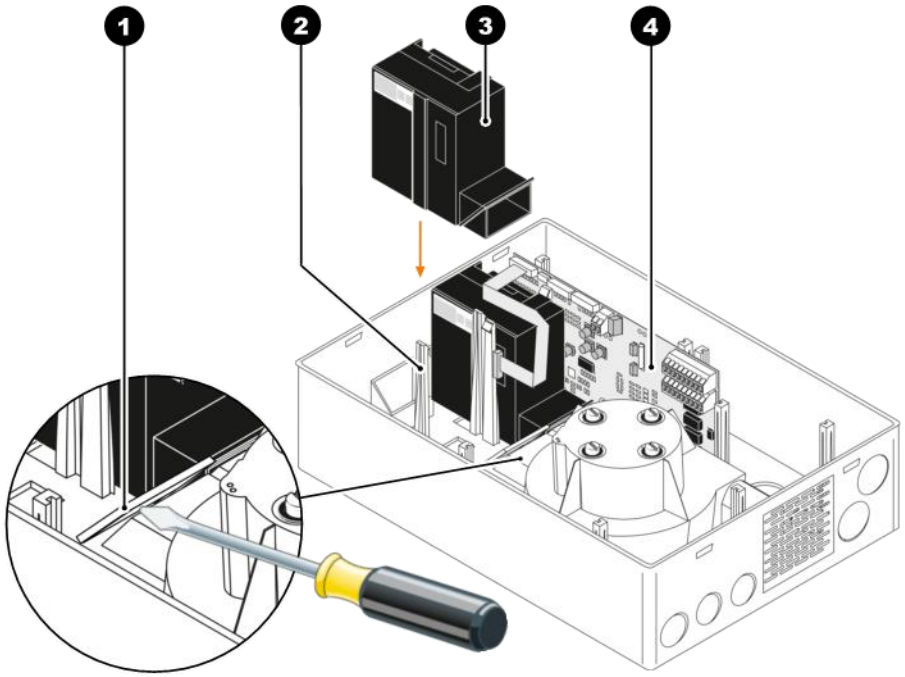


Image 89: Insert detector module II

1	Fan cover
2	Retaining clips
3	Detector module
4	Basic board

- Carefully break the seal on the housing for connection of the second pipe system (predetermined breaking point marked with "II") by using a screwdriver, for example.

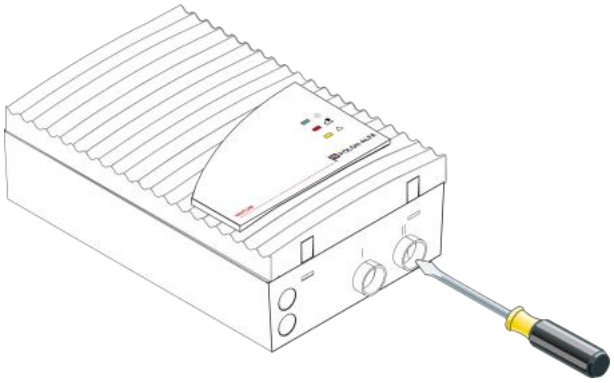


Image 90: Break the seal for the second pipe system

- Carefully spread the two retaining clips apart and insert the detector module. The retaining clips must be positioned against the detector

module and audibly engage. Only use type DM-VPL-xx detector modules (green type plate).

- Then press both retaining clips together again.
- Unplug the jumper JU4 from the basic board.

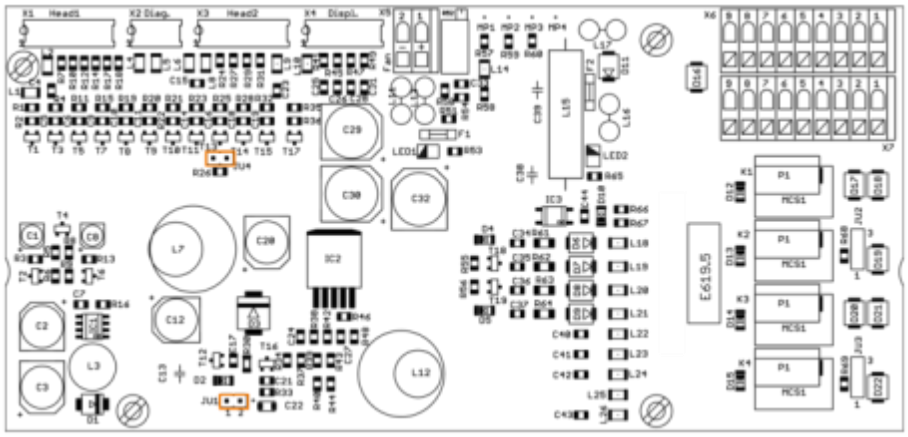


Image 91: Unplugging the jumper JU4 from the basic board

- Connect the flat ribbon cable of detector module II to the basic board (X3 (HEAD2)). Ensure the marking pin is positioned correctly before plugging the ribbon cable plug into the basic board.

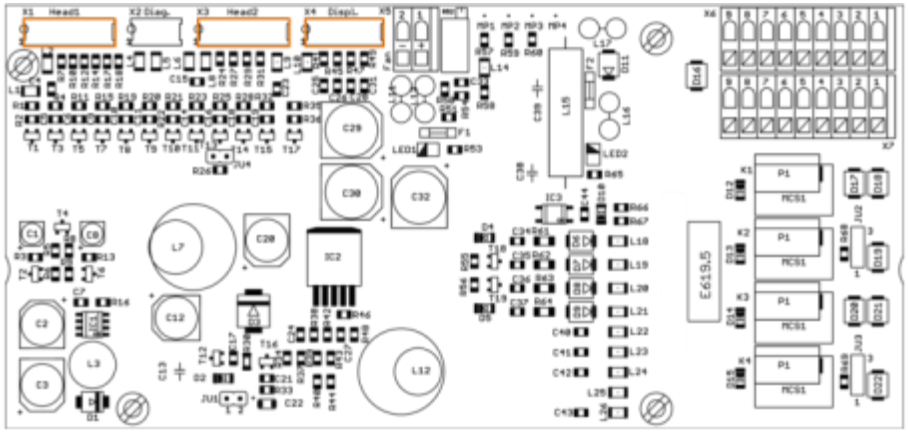


Image 92: Connections for basic board X1, X3 and X4

- Connect the flat ribbon cable of the display circuit board to the basic board (connection X4 (DISPLAY)). Ensure the marking pin is positioned correctly before plugging the ribbon cable plug into the basic board.
- Connect the device to the power supply.

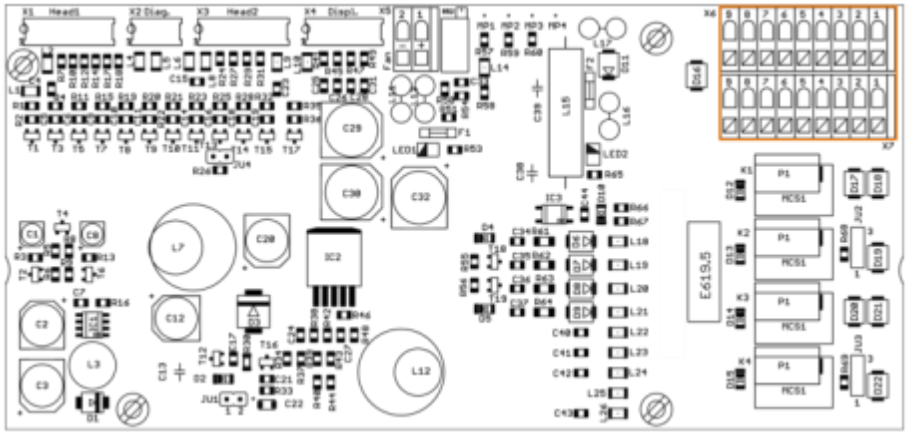


Image 93: Connect the power supply

- Press the Flow Init button on the detector module.

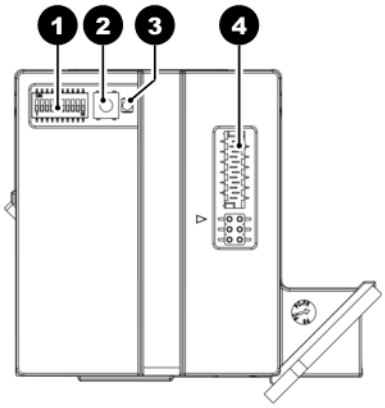


Image 94: Connections and LED on the detector module

1	DIL switch
2	Flow initialisation button
3	LED
4	Connection for flat ribbon cable

- Close the cover. Ensure that none of the ribbon cables are squashed.
- Let the quick-action fasteners click into place.

With an extension to VENTUM PRO LITE TWO:

- Replace the front film sheet.

6.9 Inserting and connecting the reset circuit board

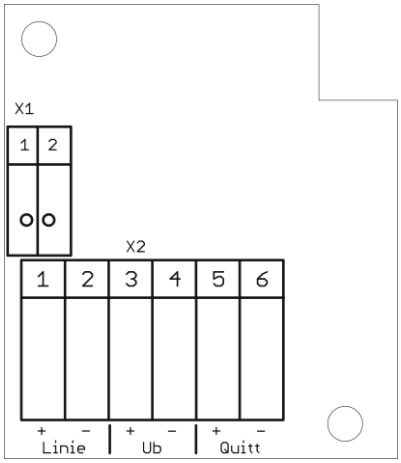


Image 95: Reset circuit board

The VENTUM PRO LITE enables the use of maximum one optional reset circuit board. If several VENTUM PRO LITE are connected to a detector line, a reset circuit board is only used in the last device of the detector line. A previously calculated termination resistor (R_{ER} = End Reset) must be used on the reset circuit board.

The installation of reset circuit boards in the housing is carried out using a mounting plate (see installation kit for additional modules type KT-HS-1).

The reset circuit board can only be inserted at the specified position due to its height.

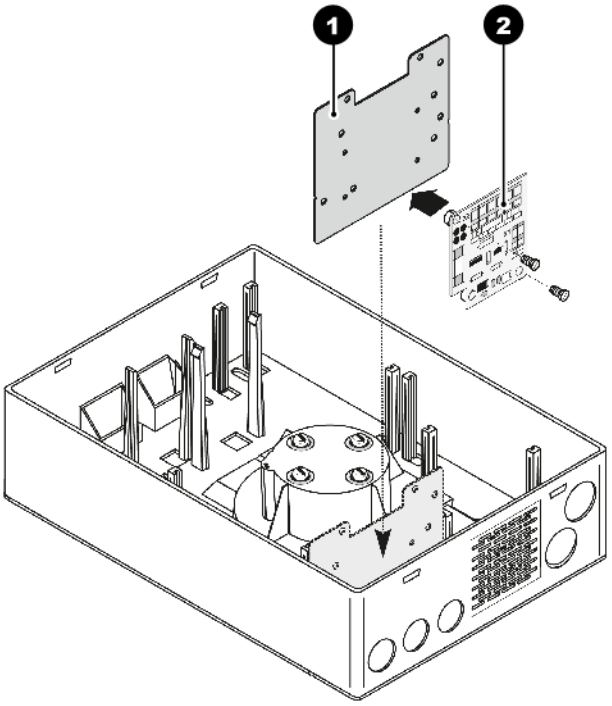


Image 96: Position of the reset circuit board

1	Mounting plate
2	Reset circuit board

Calculation

Standby current of the detector line

The standby current I_R of the detector line must be calculated as shown below:

$$I_R = \frac{U_L}{R_E}$$

I_R	Standby current of the detector line [A]
U_L	Detector line voltage from the control panel [V]
R_E	Original termination resistance of the detector line, depending on the manufacturer of the control panel [Ω]

Termination resistor

If no acknowledgement is achieved by means of the calculated termination resistor of the reset circuit board, reduce the value of the termination resistor by approx. 20%.

Calculate the value of the termination resistor R_{ER} as shown below:

$$R_{ER} = \frac{(U_{DL} - 2{,}7\ \mathrm{V})}{I_{standby\_DL}}$$

Variable/constant	Unit	Description
R_{ER}	Ω	Resistor (ER = End Reset)
U_{DL}	V	Detector line voltage (DL = Detector Line)
$2{,}7$	V	Voltage loss within the reset circuit board
$I_{standby\_DL}$	A	Standby current of the detector line (DL = Detector Line)

NOTE

Danger of short circuit on the motherboard

Only perform the following work with the device disconnected from the mains.

NOTE

Electrostatic discharge due to contact

Protect the components of the main circuit board from damage due to static discharge.

- Insert the calculated termination resistor (R_{ER} ¼ W) in the reset circuit board (connection X1). The termination resistor is not included in the scope of delivery.

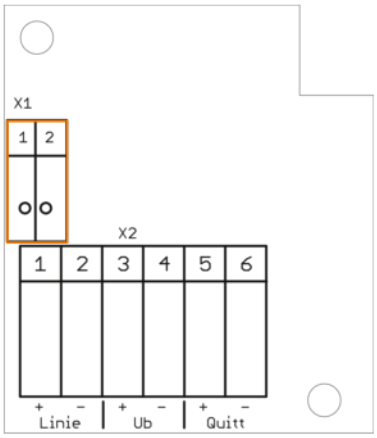


Image 97: Inserting the termination resistor in the reset circuit board

- Fixing the reset circuit board to the mounting plate (installation kit for additional module type KT-HS-1) with two plastic spacers (enclosed with the reset circuit board).

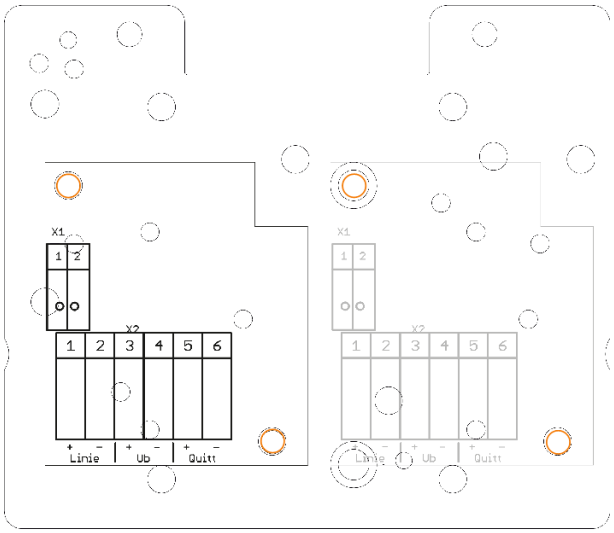


Image 98: Mounting plate with reset circuit board

- Carefully unlock the quick-action fasteners on the housing using a flat-head screwdriver by simultaneously pressing in the closing flaps located on one side.

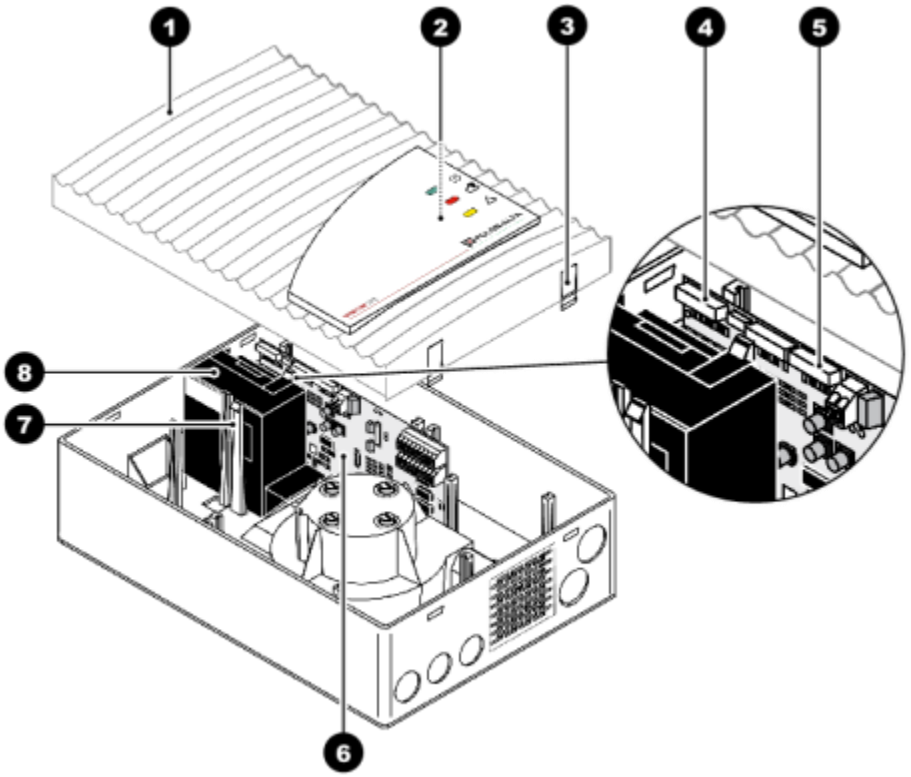


Image 99: Opening the device

1	Housing cover
2	Display circuit board (not visible)
3	Quick-action fasteners
4	Connection: X1 HEAD 1
5	Connection: X4 DISPLAY
6	Basic board
7	Retaining clips
8	Detector module

- ► Lift the housing cover.
- ► Carefully loosen the ribbon cable of the display board from the motherboard.
- ► Put the housing cover to one side. Ensure that the housing cover is neither soiled nor damaged.
- ► Establish the electrical connection for the reset circuit board (see chapter "Connecting to an FDCP, with reset circuit board").

- ► Connect the flat ribbon cable of the display circuit board to the basic board (connection X4 (DISPLAY)). Ensure the marking pin is positioned correctly before plugging the ribbon cable plug into the basic board.

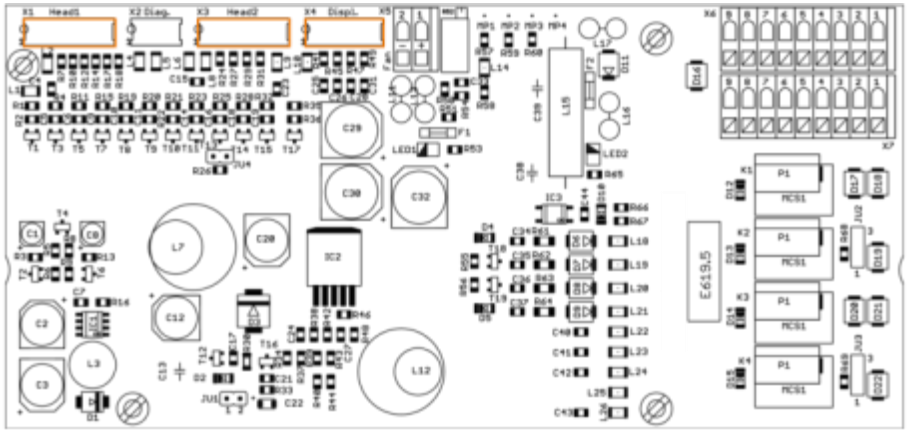


Image 100: Connections on basic board X1, X3 and X4

- ► Close the cover. Ensure that none of the ribbon cables are squashed.
- ► Let the quick-action fasteners click into place.

6.10 Establishing the electrical connection

In order to guarantee the tightness of the housing, select the corresponding membrane cable entries (enclosed):

- Membrane cable entry M25 for ∅ 9 … 14 mm
- Membrane cable entry M20 for ∅ 8 … 12 mm

The following work steps are required to prepare the electrical connections:

- ► Break through the necessary number of cable ducts in the lower part of the housing with a screwdriver, for example.
- ► Insert the corresponding cable entries into the cable ducts.
- ► Route the cables through the membrane cable entries. Use shielded cables for the external wiring of the device.

NOTE

Danger of short circuit on the motherboard

Only perform the following work with the device disconnected from the mains.

NOTE

Maximising fault protection

In order to maximise fault protection, use shielded cables for the external wiring of the device (e.g. fire alarm cable type J-Y(ST)Y 2x2x0.8).

The electrical connection is established via the basic board of the VENTUM PRO LITE (connections X6 and X7).

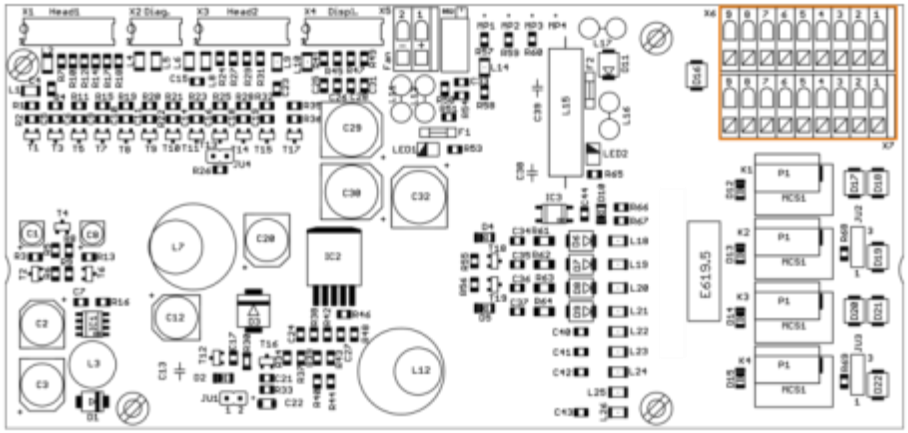


Image 101: Connections X6 and X7 on the basic board

- Establish the electrical connection for the basic board in accordance with the following circuit diagram(s). The permissible cable cross-sections of the membrane cable entries/cable glands of the following components and the permissible wire cross-sections of the terminals (see chapter "Technical data") must be ensured.

6.10.1 Connecting to an FDCP, with reset button

The relay contacts on the main circuit board (e.g. alarm or fault contacts) can be used as shown below:

- for connection on a fire detection control panel
- for the control of signal transmitters, control systems etc.
- for connection of response indicators

TIP

The "Reset" input must not be permanently connected with +24 V. Otherwise, all messages, including an alarm, would be automatically reset following the rectification of the cause (alarm "not saved") and thus be no longer visible on the fire detection control panel.

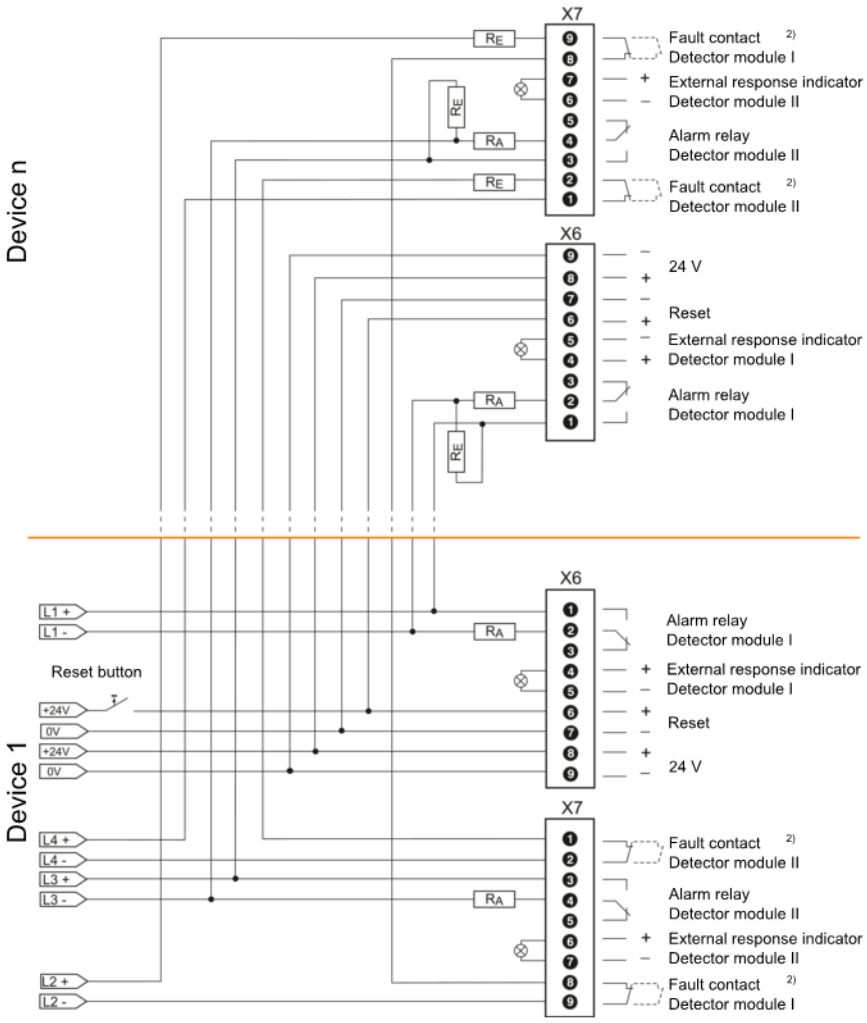


Image 102: Example connection to an FDCP with reset button

L1 … L4	Detector line connection
	Resistors depend on the connected fire detection control panel.
2)	The fault contacts (N/C or N/O) are set via jumpers on the basic board. ▪ JU2 = detector module I ▪ JU3 = detector module II The following applies: ▪ JU2/JU3 contact 1+2 = N/C (standard) ▪ JU2/JU3 contact 2+3 = N/O

6.10.2 Connecting to an FDCP, with reset circuit board

► Set the fault indicator to "non-saving" (see chapter "Activation or deactivation of memory fault display").

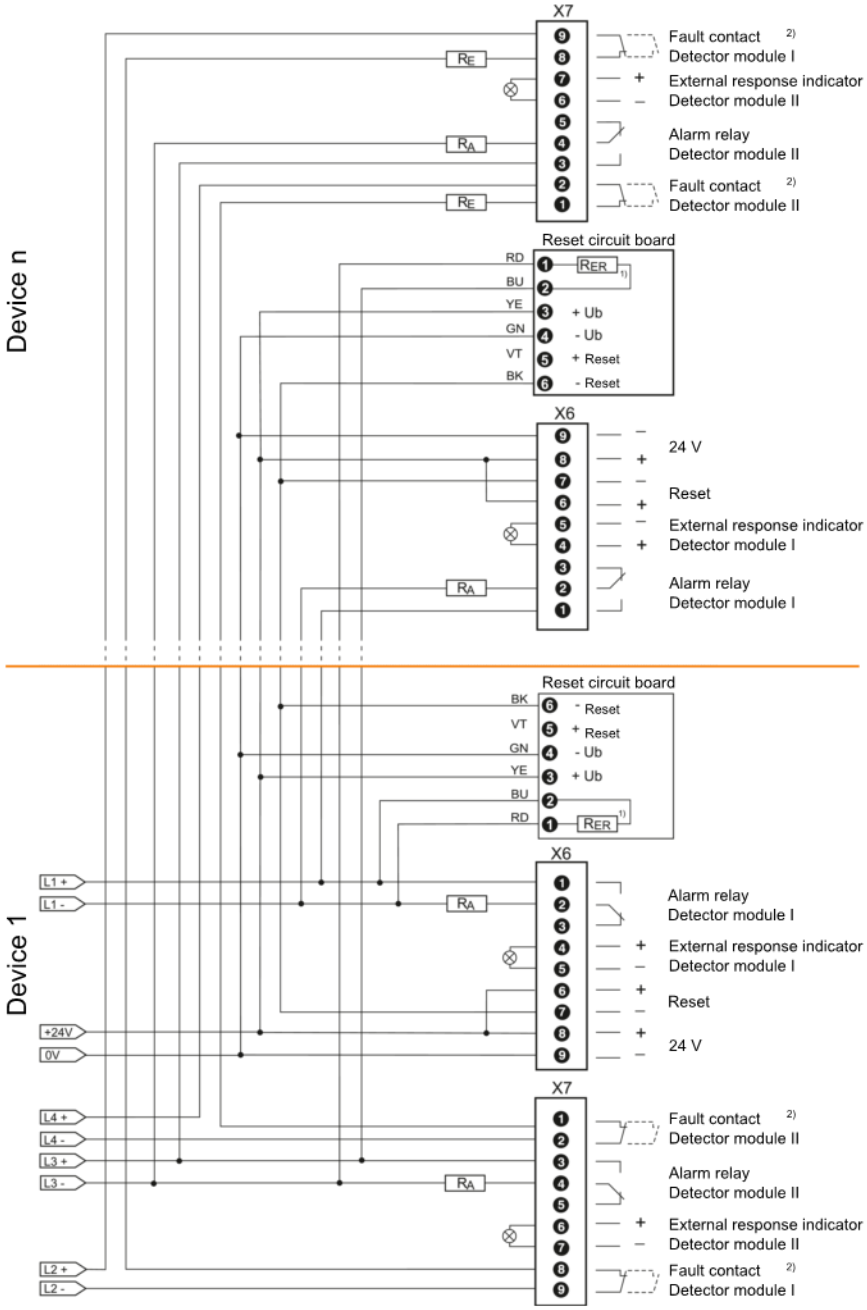


Image 103: Example connection to FDCP with reset circuit board

L1 … L4	Detector line connection
	Resistors depend on the connected fire detection control panel.
1)	These resistors must be calculated (see chapter "Inserting and connecting the reset circuit board").
2)	The fault contacts (N/C or N/O) are set via jumpers on the basic board. ▪ JU2 = detector module I

	▪ JU3 = detector module II The following applies: ▪ JU2/JU3 contact 1+2 = N/C (standard) ▪ JU2/JU3 contact 2+3 = N/O

6.10.3 Connecting without an FDCP, with reset button

TIP

The "Reset" input must not be permanently connected with +24 V. Otherwise, all messages, including an alarm, would be automatically reset following the rectification of the cause (alarm "not saved") and thus be no longer visible on the fire detection control panel.

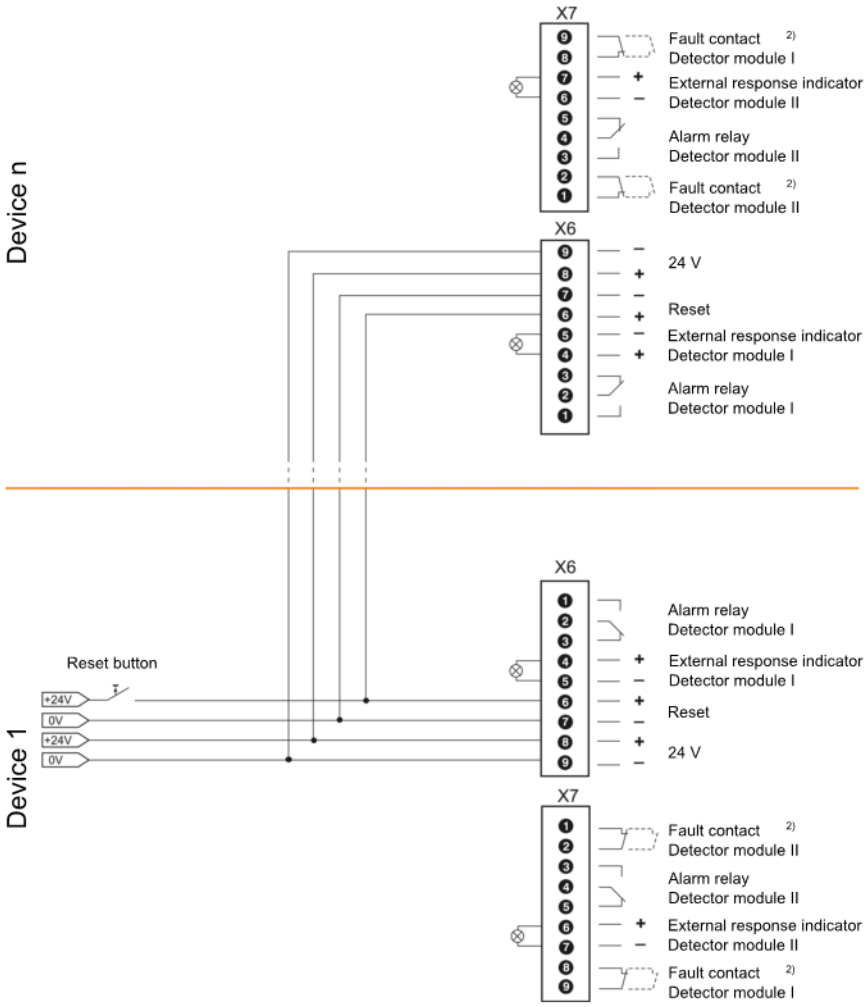


Image 104: Example connection (without an FDCP) with reset button

2)	The fault contacts (N/C or N/O) are set via jumpers on the basic board. ▪ JU2 = detector module I ▪ JU3 = detector module II The following applies: ▪ JU2/JU3 contact 1+2 = N/C (standard) ▪ JU2/JU3 contact 2+3 = N/O

6.11 Connecting response indicators

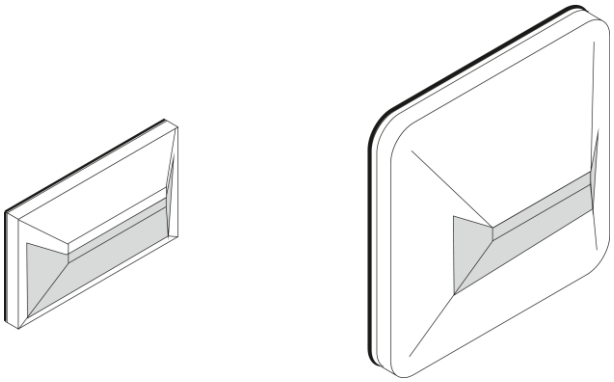


Image 105: Response indicators FDAI-91 and FDAI-92

The electrical connection is established via the basic board of the VENTUM PRO LITE.

- Response indicator for detector module 1: X6:4 and 5
- Response indicator for detector module 2: X7:6 and 7

► Calculate the lines in accordance with chapter "Energy supply".

NOTE
Danger of short circuit on the motherboard Only perform the following work with the device disconnected from the mains.

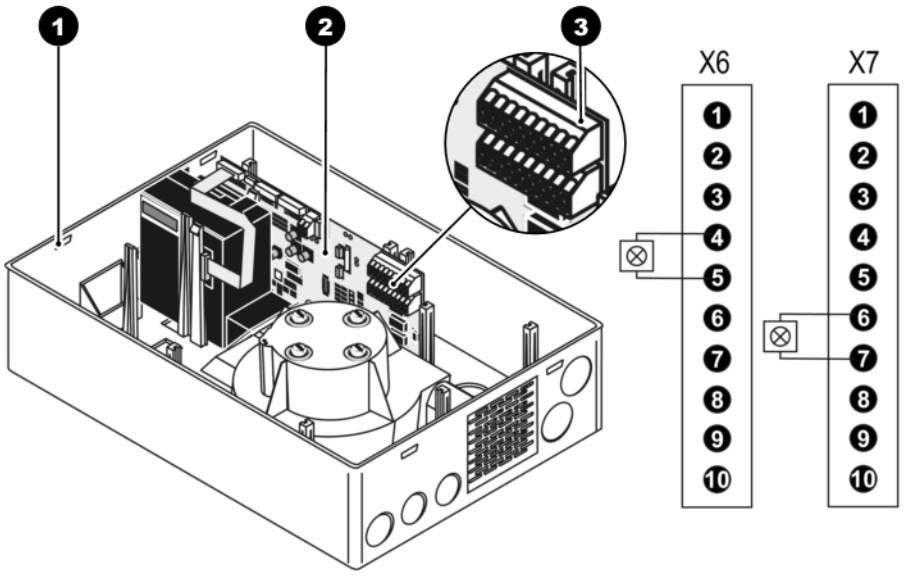


Image 106: Connecting the response indicator

1	Quick-action fasteners
2	Basic board
3	Connecting terminals X6/X7

- Carefully unlock the quick-action fasteners on the housing using a flat-head screwdriver by simultaneously pressing in the closing flaps located on one side.
- Lift the housing cover.
- Carefully loosen the ribbon cable of the display board from the motherboard.
- Put the housing cover to one side. Ensure that the housing cover is neither soiled nor damaged.
- Break through the necessary cable gland in the lower part of the housing with a screwdriver, for example.
- Insert the respective membrane cable entry M20 or M25 (enclosed with housing).
- Feed the fire alarm cable through the cable entry.
- Push a latch on the response indicator cover by using a screwdriver.
- Remove the cover.

- Connect the response indicator as follows. Observe the permissible wire cross-sections of the terminals (see chapter "Technical data").

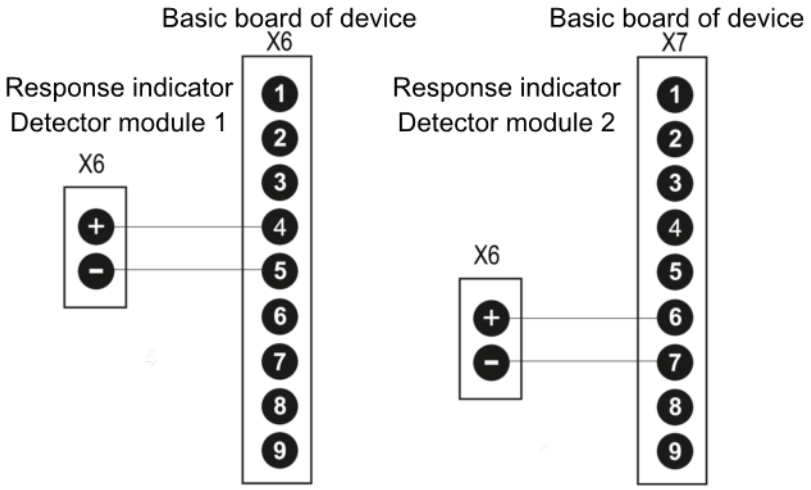


Image 107: Response indicator connection diagram

- Connect the flat ribbon cable of the display circuit board to the basic board (connection X4 (DISPLAY)). Ensure the marking pin is positioned correctly before plugging the ribbon cable plug into the basic board.
- Close the cover. Ensure that none of the ribbon cables are squashed.
- Let the quick-action fasteners click into place.

6.12 Data logging

The diagnostic software can be used ...

- ... to perform a test of the VENTUM PRO LITE.
- ... to save all current and stored data as well as settings made in the VENTUM PRO LITE as a file or in an automatically created log, see chapter "Function test".

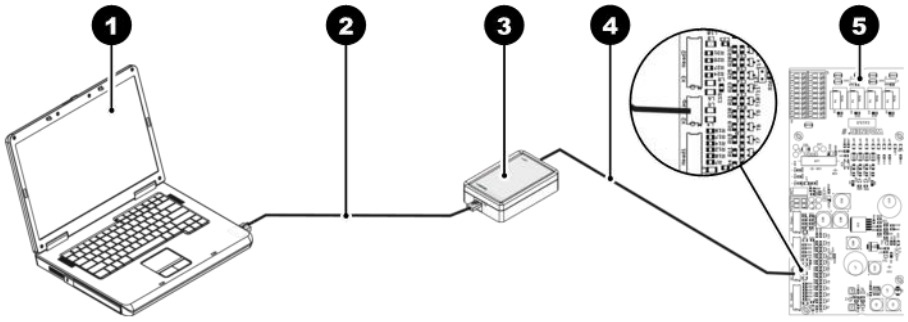


Image 108: Connect diagnostic interface

1	Service PC
2	USB connection cable
3	Diagnostic interface
4	Diagnostics interface connection cable
5	Basic board VENTUM PRO LITE

- ► Store and archive the files for later comparison. Make sure to save each file under another file name.

6.13 General information on the pipe system

Set up the pipe system in accordance with the project specifications and project planning specifications (see chapter "Project planning").

The pipes, aspiration hoses and fittings used for the pipe system should at least fulfil the requirements of class 1131 in accordance with EN 61386-1, 2004.

Class 1131 defines the following requirements for the pipe system used:

Characteristics	Severity
Compression resistance [N]	125
Impact resistance [kg]	0.5 (drop height of 100 mm)
Temperature range [°C]	-15 … +60

Table 66: Requirements for the pipe system according to class 1131 (EN 61386-1, 2004)

NOTE

Changing the length of pipe lines

For the setup of the pipe system, note the temperature difference at the time of installation and the later use of the monitoring area (see chapter "Pipe system"). This influences the material to be used and potential changes in the length of the pipe lines.

The following pipes, fittings and aspiration hoses must be used for setting up the pipe system:

	Outer-Ø [mm]	Inner-Ø [mm]
Aspiration pipe	25	20 … 21.5
Aspiration pipe[1)]	32	27.5 … 28.5
Aspiration pipe[1)]	40	34.5 … 36.5
Aspiration pipe for detonation protection (steel)	25	20
Aspiration hose (SCH-PG16)	21.1	16.4
Aspiration hose (SCH-P-25)	25	18.5
Capillary hose (aspiration hose for ceiling ducts)	12	9

Table 67: Characteristics of the aspiration pipes and hoses to be used

[1)] For pipe systems with larger diameters of the pipe supply lines (see chapter "Project planning with pipe supply lines Ø >25 mm").

NOTE

Hazard of bending or rupturing pipe lines

Do not use pipe clips with rubber inserts as they do not permit length extensions, meaning that the pipe system would bend or even rupture.

Mount the pipe system firmly so that it will neither bend nor become distorted. Observe the right type and the proper mounting of the pipe clips. The distance between the pipe clips should be maximum 80 cm. In case of high temperature fluctuations, reduce the distance between the pipe clips to maximum 30 cm.

Minimise the pipe lengths and changes of direction. An excessive number of pipe elbows and angles reduces the air flow speed in the aspiration pipe, thus increasing the detection time. It is better to use pipe elbows than pipe angles. Angles have an extremely high flow resistance and should only be used in locations where they are unavoidable for structural reasons. The pipe length should be reduced in proportion to the pipe elbows used. A 90° pipe angle corresponds to a straight pipe length of approx. 1.5 m.

6.13.1 Length alterations on the pipe system

Length alterations (extensions and reductions) of the pipes are caused by temperature changes. Temperature increase leads to extension of the pipes, temperature reduction leads to shortening of the pipes. The change in length must be considered all the more the further the temperature of the pipe system deviates from the standard operating temperature at the time of installation.

The change in length can be calculated with the following formula:

$$\Delta L = L \times \Delta T \times \delta$$

ΔL	Length alteration in [mm]
L	Length of the pipe to be calculated in [m]
ΔT	Maximum temperature difference in (°C)
δ	Coefficient of length alteration in mm/m°C δPVC = 0.08 mm/m°C δABS = 0.101 mm/m°C

Example A temperature change of 10 °C on an ABS pipe with a length of 10 m causes a length change of 10.1 mm.

6.13.1.1 Pipe clips

Type NG xx

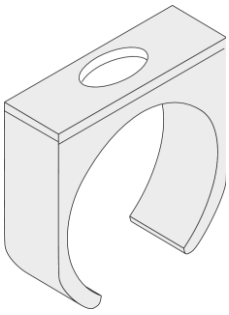


Image 109: Pipe clip standard type NG xx

For the first pipe clip after the device, use a type that does not permit length extension of the pipe. The following plastic pipe clips are used as standard:

- Type NG 23, Ø 25 mm
- Type NG 29, Ø 32 mm
- Type NG 38, Ø 40 mm

Type CLIC-PA

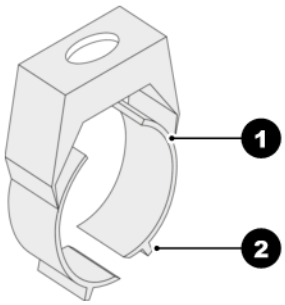


Image 110: Pipe clip type CLIC-PA

1	Pipe is fixed
2	Pipe is locked

- Position 1 (initial engaging) fixes the pipe, preventing length extension.
- Position 2 (second engaging) fixes the pipe, preventing length extension.

Type SNAP CLIP SC

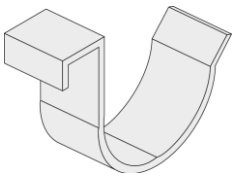


Image 111: Pipe clip type SNAP CLIP SC

The spring steel clips are available for the following three profile sizes:

- 1 … 4 mm
- 4 … 7 mm
- 8 … 12 mm

Spring steel clips (type SNAP CLIP-SC) are used for high-bay warehouses and refrigerated areas.

6.14 Installation of the pipe system

- ► Crop the pipes using a pipe cutter, pipe shears or a metal saw.
- ► Deburr the cut edges and remove any filings.

⚠ WARNING

Risk of injury due to flammable liquids and vapours

Formation of explosive/highly flammable vapour/air mixtures is possible.
Injuries to health due to direct or indirect contact.

- ► Prior to processing, observe the safety notes of the manufacturer.

- ► Before gluing into place, free the cut edges from dirt and grease with Tangit cleaner.
- ► Glue the pipe transitions to be airtight with the fittings using Tangit glue.
- ► Close open pipe ends with end caps.

NOTE

Hazard of bending or rupturing pipe lines

Do not use pipe clips with rubber inserts as they do not permit length extensions, meaning that the pipe system would bend or even rupture.

- ► Fix the pipes to the walls. Ensure that the corresponding intervals are adhered to and that pipe clips are used.
- ► After completion, check the pipe system for:
  - leakage (e.g. due to damage)

- faulty connections
- correct execution of the sampling points in accordance with the project specifications

6.15 Installation of the aspiration pipe

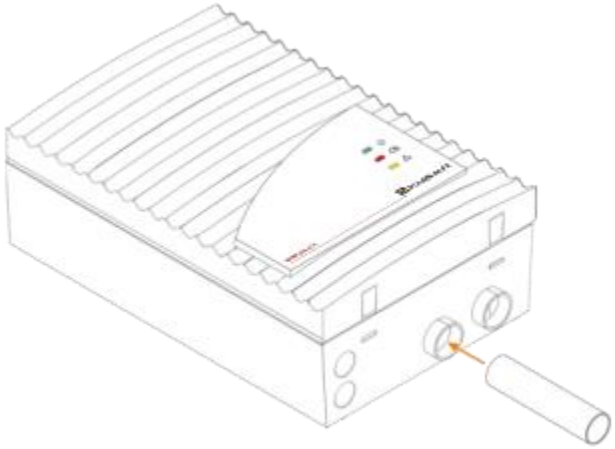


Image 112: Installation of the aspiration pipe

NOTE

Hazard of bending or rupturing pipe lines

Do not use pipe clips with rubber inserts as they do not permit length extensions, meaning that the pipe system would bend or even rupture.

- ► Insert the aspiration pipe into the pipe connection (air inlet) of the device up to the stop. Please note that the aspiration pipe must not be glued together with the pipe connection for service purposes or for the replacement of the device.

If strong temperature fluctuation occurs in the monitoring area, the pipe can be pulled out of the pipe connection due to length changes.

- ► Fix the pipe immediately before the device.

6.16 Installation of the aspiration hose

Take the project planning guidelines into account for the aspiration hose to be used (see chapter "Project planning with aspiration hose").

The overall aspiration pipe cannot consist of aspiration hoses alone.

No openings may be drilled in the suction hoses and no aspiration reductions may be made to the suction hoses.

- ► Crop the suction hose using a pipe cutter, pipe shears or a metal saw.
- ► Deburr the cut edges and remove any filings.

Follow one of the two following sections according to the type of aspiration hose used:

Aspiration hose type SCH-PG16 (ABS hose)

- ► Insert the aspiration hose into the hose screw connection type SCH-PG16-VO.
- ► Twist the hose screw connection into the relevant pipe with inner thread type ABSR-2518-PG16.

Aspiration hose type SCH-P-25 (PVC hose)

⚠ WARNING

Risk of injury due to flammable liquids and vapours

Formation of explosive/highly flammable vapour/air mixtures is possible.
Injuries to health due to direct or indirect contact.

- ► Prior to processing, observe the safety notes of the manufacturer.

- ► Before gluing into place, free the cut edges from dirt and grease with Tangit cleaner.
- ► Glue the aspiration hose into a fitting or socket (outer Ø 25 mm) using Tangit glue.
- ► After completion, check the pipe system for:
  - leakage (e.g. due to damage)
  - faulty connections
  - correct execution of the sampling points in accordance with the project specifications

6.17 Installation of aspiration apertures

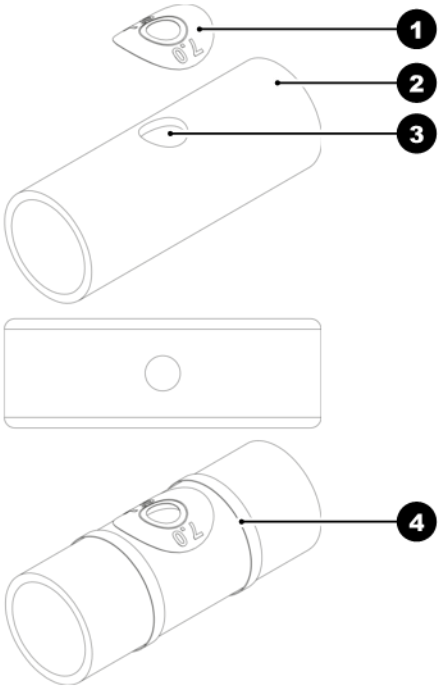


Image 113: Aspiration aperture, aspiration-reducing film sheet and marking tape

1	Aspiration-reducing film sheet
2	Air sampling pipe (pipe system)
3	Aspiration aperture Ø 25/64" (10 mm)
4	Marking tape

Select the position and size of the aspiration apertures in the pipe system according to the project specifications and taking the project planning guidelines into account (see chapter "Project planning").

Use aspiration reducing clips for refrigerated areas and when using air purge systems. For all other applications, use aspiration reducing film sheets.

- ► Drill a hole with a 10 mm drill at right angles to the pipe.
- ► Deburr the drill hole carefully.
- ► Remove any shavings from the drilling area.

⚠ WARNING

Risk of injury due to flammable liquids and vapours

Formation of explosive/highly flammable vapour/air mixtures is possible.
Injuries to health due to direct or indirect contact.

- ► Prior to processing, observe the safety notes of the manufacturer.

- ► Clean the drilling area along the entire pipe circumference to remove any dirt and grease using Tangit cleaner.
- ► Select the size of the aspiration-reducing film sheet according to the project planning guidelines.

NOTE

Detach aspiration-reducing film sheets

Should aspiration-reducing film sheets become partially or completely detached from the aspiration pipe, detection in accordance with the project specifications cannot be guaranteed.

- ► Avoid any contact with the adhesive surfaces to keep these free from dust and grease.

- ► Adhere the aspiration-reducing film sheet to the centre of the drill hole.
- ► Secure the aspiration-reducing film sheet against detachment, if necessary. Adhere the sleeve over the centre of the aspiration-reducing film sheet. The diameter of the opening in the aspiration-reducing film sheet must not be changed.

6.18 Installation of the ceiling feed-throught

A ceiling feed-throught is required for concealed installation of the pipe system (e.g. in the suspended ceiling).

6.18.1 Installation of the ceiling feed-throught

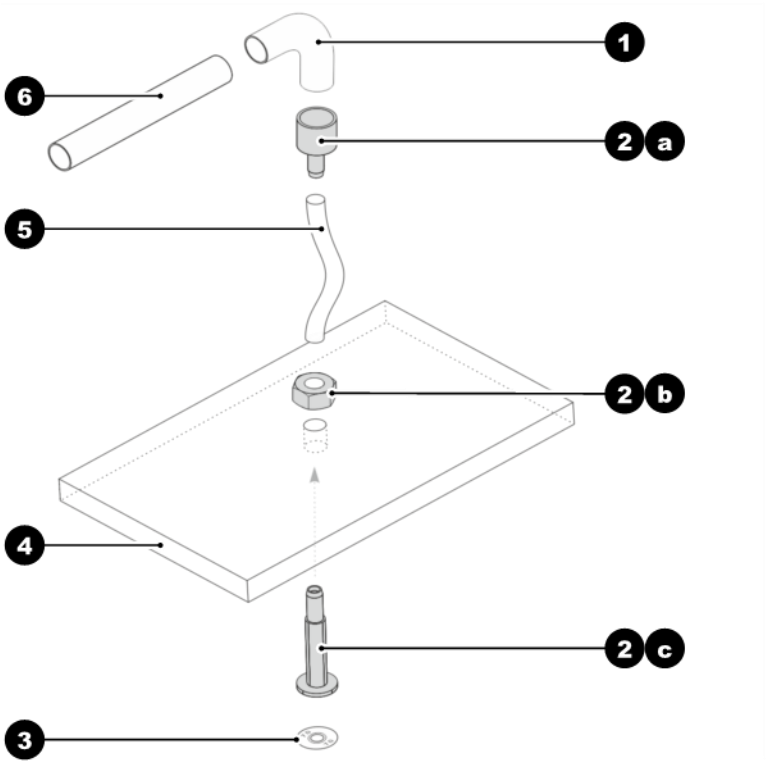


Image 114: Overview of ceiling feed-throught components

1	Elbow 90°
2	Ceiling feed-throught set (3-part)
2a	Hose nozzle
2b	Nut
2c	Ceiling feed-throught
3	Aspiration reducing film sheet
4	Suspended ceiling
5	Capillary hose
6	Pipe system

⚠ WARNING

Risk of injury due to flammable liquids and vapours

Formation of explosive/highly flammable vapour/air mixtures is possible.
Injuries to health due to direct or indirect contact.

- ► Prior to processing, observe the safety notes of the manufacturer.

- ► Free the components to be glued from dirt using Tangit cleaner (e.g. dirt and grease).
- ► Glue the components into place using Tangit glue.

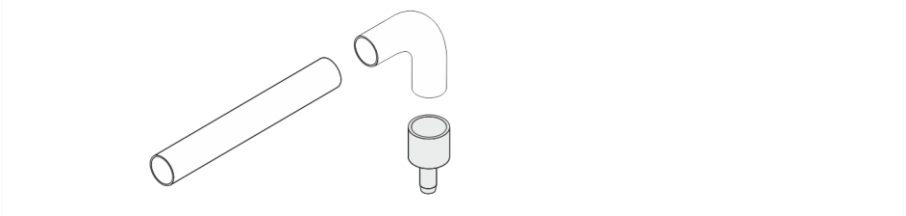


Image 115: Aspiration pipe, elbow and hose nozzle

- ► Drill a Ø 13 mm hole in the suspended ceiling.
- ► Push the ceiling feed-throught through the drilled hole from below.
- ► Position the nut above the suspended ceiling and tighten it.

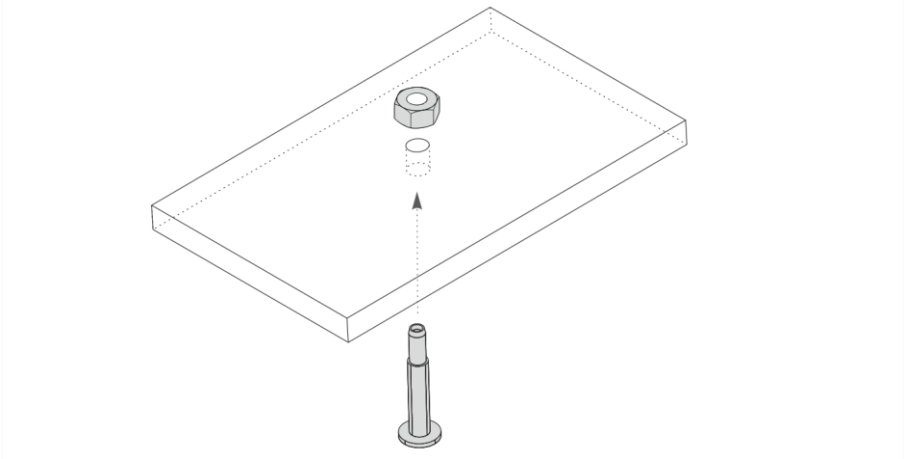


Image 116: Ceiling feed-throught and nut

- ► Determine the distance between the ceiling feed-throught and the hose nozzle for the capillary hose. Ensure that the capillary hose is attached without without tension and that it is not longer than 1 m.

- ► Cut the capillary hose using the hose shears.
- ► Attach the cut capillary hose to the ceiling feed-throught and to the hose nozzle. Heat the capillary hose with a hot air blower of necessary.

NOTE

Detach aspiration-reducing film sheets

Should aspiration-reducing film sheets become partially or completely detached from the aspiration pipe, detection in accordance with the project specifications cannot be guaranteed.

- ► Avoid any contact with the adhesive surfaces to keep these free from dust and grease.

- ► Adhere the necessary aspiration reducing film sheet to the centre of the ceiling feed-throught (according to project planning guidelines).

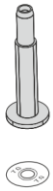


Image 117: Apply the aspiration reducing film sheet

The aspiration reducing film sheets are available in two versions, depending on the colour of the ceiling.

- Type AFW-x (RAL 9010, Pure white)
- Type AF-x (RAL 9018, Papyrus white)

The aspiration reducing film sheets can be produced in special colours on request.

6.18.2 Installation of the ceiling feed-throught for special applications

A special ceiling feed-throught is required for the concealed installation of the pipe system in which the aspiration reducing film sheet should not be visible (e.g. in a suspended ceiling with plastering).

NOTE

Missing monitoring for rupture

The capillary hose cannot be monitored for rupture in case of the special application of ceiling feed-throughts in which the aspiration reducing film sheets are upstream in T-pieces (pipe hoods).

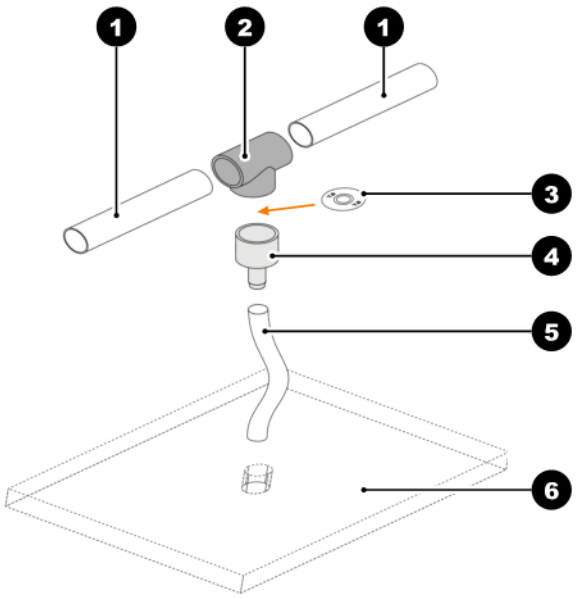


Image 118: Ceiling feed-throught with upstream aspiration reducing film sheet

1	Pipe system
2	T-piece (pipe hood)
3	Aspiration reducing film sheet
4	Hose nozzle
5	Capillary hose
6	Suspended ceiling

NOTE

Detach aspiration-reducing film sheets

Should aspiration-reducing film sheets become partially or completely detached from the aspiration pipe, detection in accordance with the project specifications cannot be guaranteed.

- Avoid any contact with the adhesive surfaces to keep these free from dust and grease.

- Attach the necessary aspiration reducing film sheet centrally (according to the project planning guidelines) in the T-piece (pipe cover).

⚠ WARNING

Risk of injury due to flammable liquids and vapours

Formation of explosive/highly flammable vapour/air mixtures is possible. Injuries to health due to direct or indirect contact.

- Prior to processing, observe the safety notes of the manufacturer.

- Free the components to be glued from dirt using Tangit cleaner (e.g. dirt and grease).
- Glue the components into place using Tangit glue.

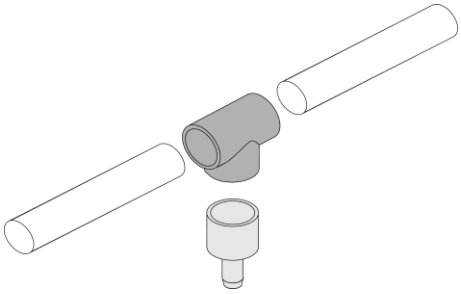


Image 119: Pipe system, T-piece and hose nozzle

- Drill a Ø 13 mm hole in the suspended ceiling.
- Determine the distance between the ceiling feed-throught and the hose nozzle for the capillary hose. Ensure that the capillary hose is attached without without tension and that it is not longer than 1 m.
- Cut the capillary hose using the hose shears.

- ► Attach the cut capillary hose to the ceiling feed-throught and to the hose nozzle. Heat the capillary hose with a hot air blower of necessary.
- ► Glue the capillary hose into the drilled hole of the suspended ceiling using Tangit glue.

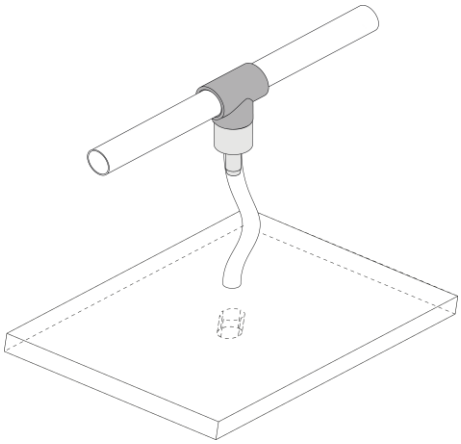


Image 120: Capillary hose and suspended ceiling

6.19 Installation of pipe system on forced airflow monitoring

A forced airflow means the use of ventilating and air-conditioning units. Special project planning must be observed for the monitoring of the ventilation or air-conditioning ducts (see Chapter "Project planning with forced airflow").

6.19.1 Detection of supply and exhaust air openings

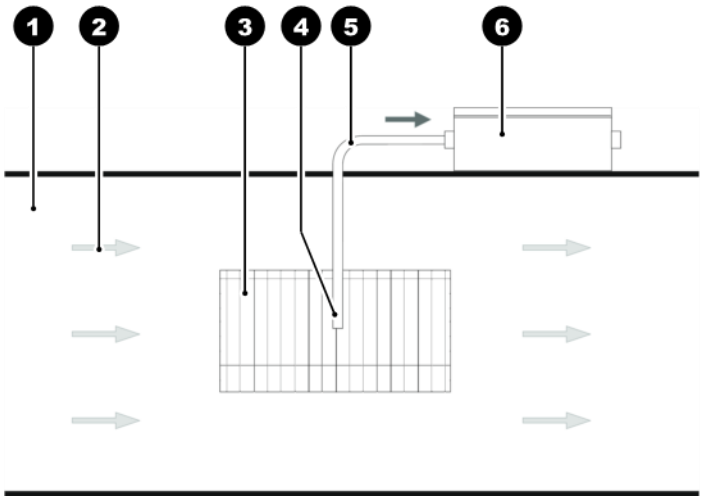


Image 121: Detection of supply and exhaust air openings, e.g. air grille

1	Air-conditioning duct
2	Airflow
3	Air grille (exhaust air opening)
4	Aspiration aperture
5	Aspiration pipe
6	VENTUM PRO LITE

Adjust the aspiration apertures in the air flow if the smoke aerosols are aspirated in forced air flow. Position the aspiration apertures as shown below:

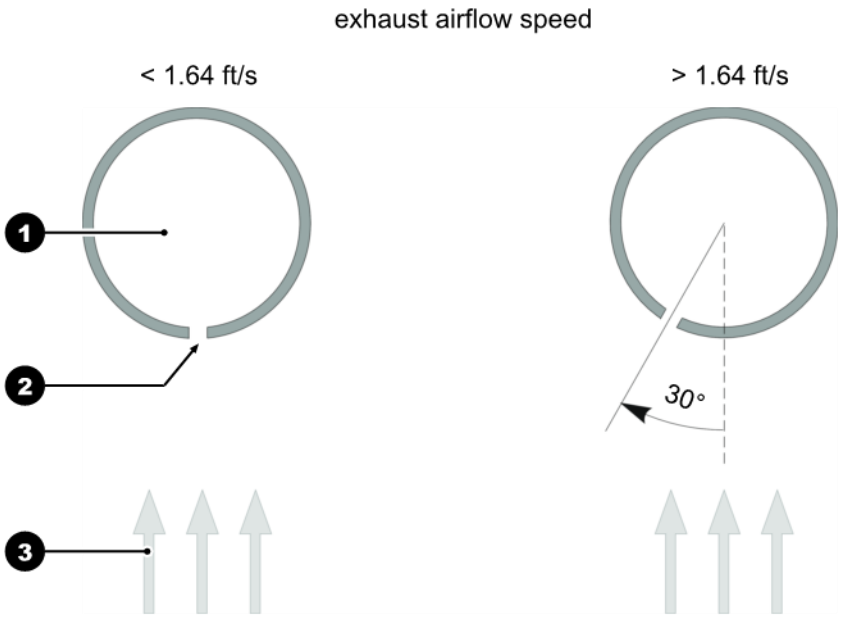


Image 122: Position the aspiration apertures according to the exhaust airflow speed

1	Aspiration pipe
2	Aspiration aperture
3	Airflow

6.19.2 Detection in the bypass

For project planning of the VENTUM PRO LITE in areas with forced air flow, see chapter "Project planning with forced air flow".

Refer to the chapter "Installation of air return" for information on connecting the air return.

Detection in air flows ≥ 2 m/s

- Additionally return the exhaust air VENTUM PRO LITE to the air flow area.
- Cut off the end of the air return pipe at an angle of 45°.

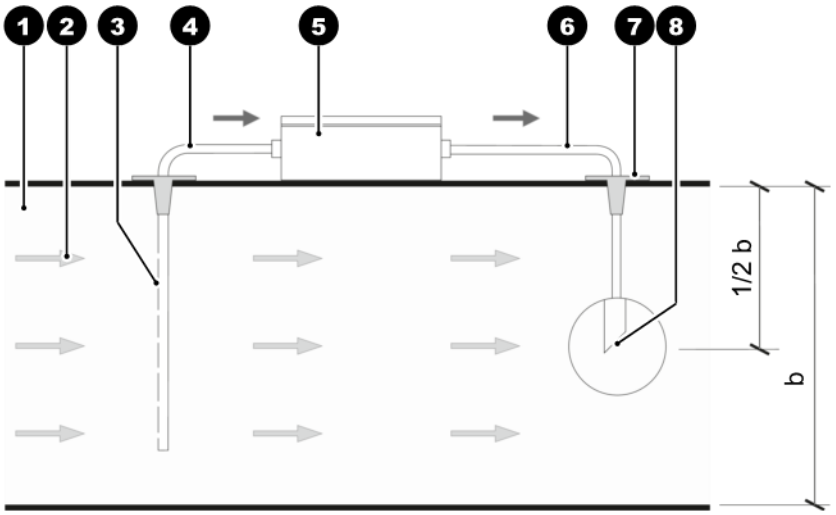


Image 123: Detection in the bypass

1	Air-conditioning duct
2	Airflow
3	Aspiration apertures
4	Aspiration pipe
5	VENTUM PRO LITE
6	Air return
7	Duct adapter
8	45° angle (at the open end of the air return)

6.20 Installing the air filter/special filter

Install an air filter or special filter before the air inlet of a VENTUM PRO LITE.

6.20.1 Installing air filter type LF-VE or LF-VE-x

Installation of air filter type LF-VE and LF-VE-x is identical.

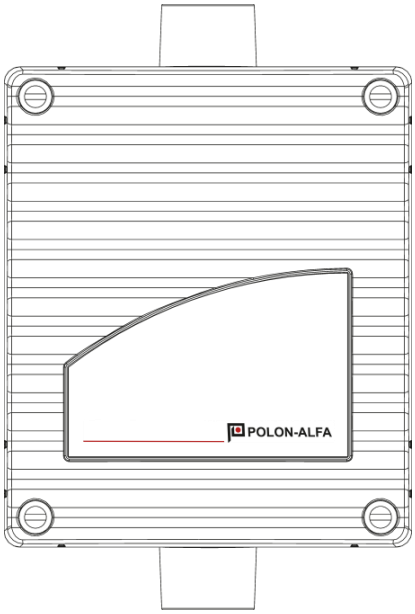


Image 124: Air filter type LF-VE and LF-VE-x

Installation materials Cylinder or flat-head screws

- Thread diameter max. 4 mm
- Head diameter 5 … 7 mm

► Insert the aspiration pipe in the provided pipe connection of the bottom part of the housing. Please note that the aspiration pipe must not be glued together with the pipe connection for service purposes or for the replacement of the device. Also please observe the flow direction that is specified on the rating plate on the bottom part of the housing.

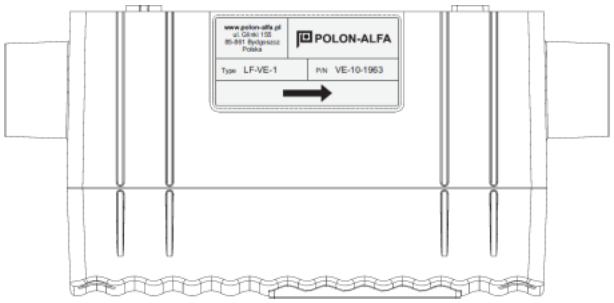


Image 125: Direction of flow air filter type LF-VE and LF-VE-x

► Mark the drilling intervals on a wall.

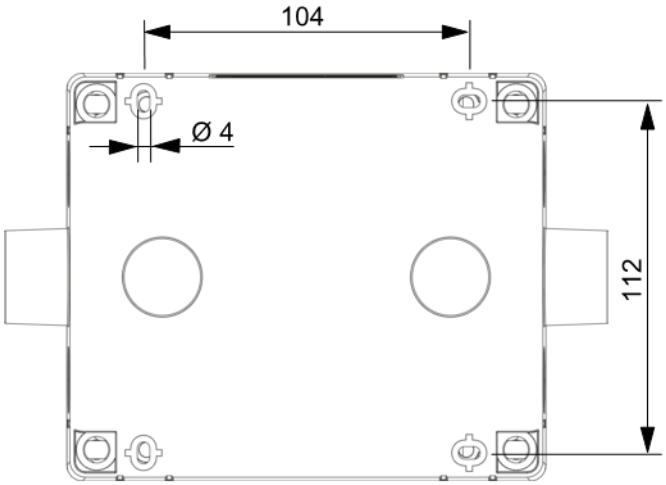


Image 126: Drilling intervals air filter type LF-VE and LF-VE-x

- ► Drill the holes according to the size of the suitable installation material (screws/plugs).
- ► Tighten the four screws by hand. It must be ensured that the device is installed mechanically stress-free.
- ► In case of strong temperature fluctuation, fix the aspiration pipe immediately before the device so that the pipe will not detach itself from the pipe connection as a result of length changes.

6.20.2 Installing air filter type LF-VE-k

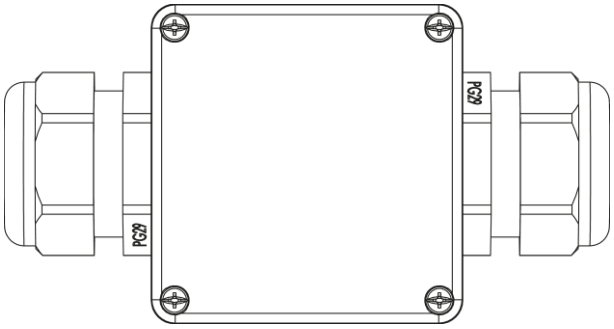


Image 127: Air filter type LF-VE-k

Installation materials Cylinder or flat-head screws

- Thread diameter max. 4 mm
- Head diameter 5 … 7 mm

- ► Insert the aspiration pipe in the provided pipe connection of the bottom part of the housing. Please note that the aspiration pipe must not be

glued together with the pipe connection for service purposes or for the replacement of the device. Also please observe the flow direction that is specified on the rating plate on the bottom part of the housing.

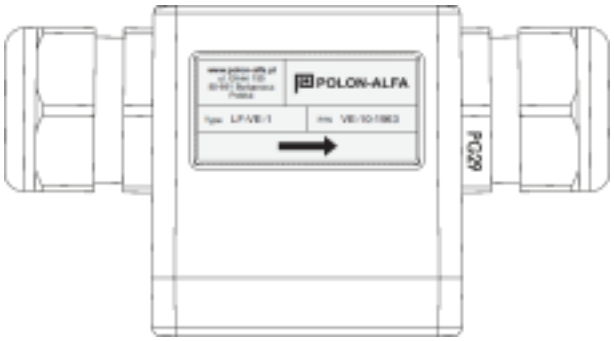


Image 128: Direction of flow for air filter type LF-VE-k

- Secure the aspiration pipe by means of the screw connections of the air filter.
- Mark the drilling intervals on a wall.

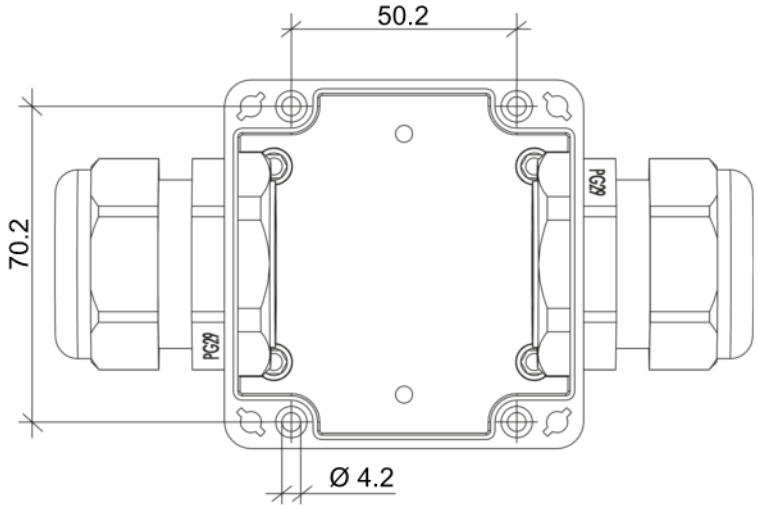


Image 129: Drilling intervals for air filter type LF-VE-k

- Drill the holes according to the size of the installation material.
- Tighten the four screws by hand. Ensure that the device is installed with zero voltage.
- In case of strong temperature fluctuation, fix the aspiration pipe immediately before the device so that the pipe will not detach itself from the pipe connection as a result of length changes.

6.20.3 Installing special filter type SF-400 or SF-650

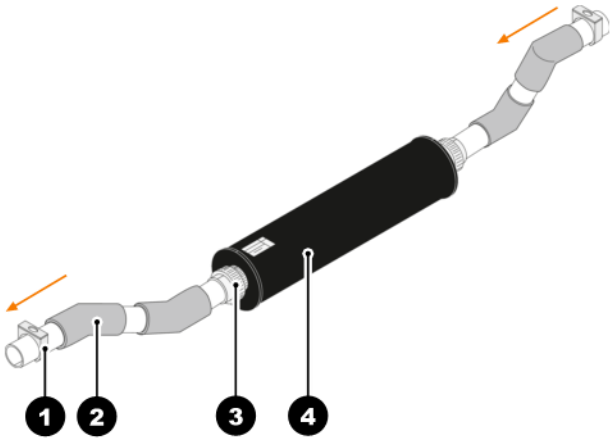


Image 130: Installing the special filter

1	Clamp
2	45° angle
3	PVC transition screw connection
4	Special filter type SF-400, SF-650

- ► Glue a pipe section into the transition screw connections.
- ► Fit a 45° elbow to the remaining end of the pipe section.
- ► Fasten the special filter with pipe sections in the already installed pipe system by means of 45° angles and clamps. Observe the flow direction that is specified on the type plate on the housing of the special filter.

Installation materials

- Pipe fittings made of ABS or PVC:
- 45° angle

6.20.4 Installing special filter and air filter in combination

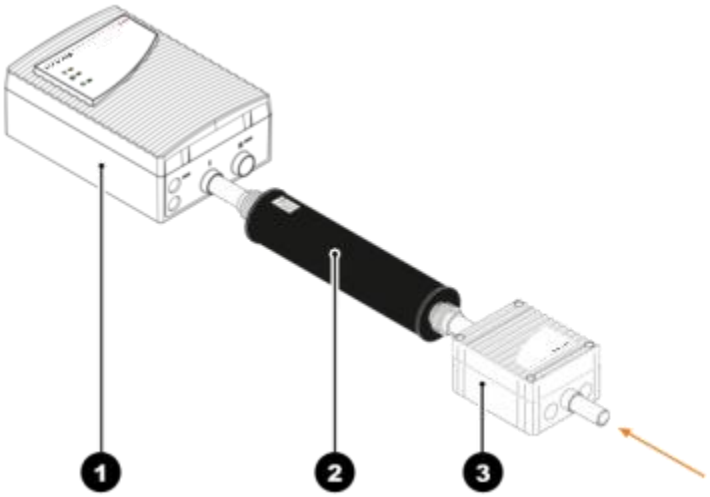


Image 131: Installing special filter and air filter in combination

1	VENTUM PRO LITE
2	Special filter type SF-400, SF-650
3	Air filter type LF-VE, LF-VE-1, LF-VE-2

In case of a combination of air filter type LF-VE-x and special filter type SF-x, install the air filter downstream of the special filter, viewed from the VENTUM PRO LITE.

6.21 Installation of air return

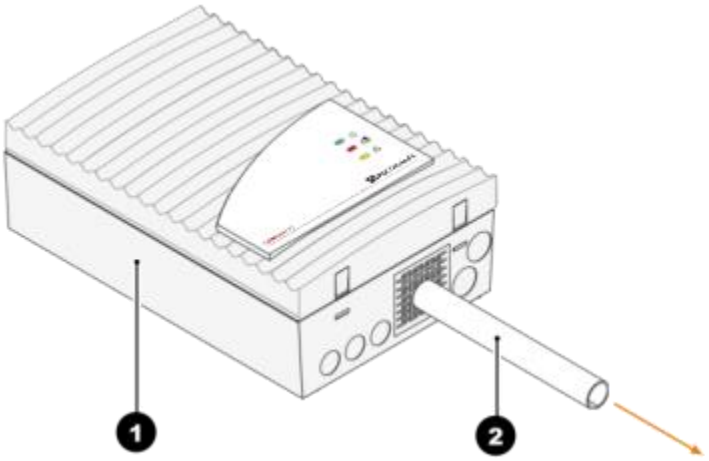


Image 132: Installation of air return

1	VENTUM PRO LITE
2	Air return

- Remove the pre-stamped pipe opening in the safety guard of the air outlet, e.g. using a small cutter.
- Insert the air return pipe into the pipe connection (air outlet) of the device up to the stop. Note that the aspiration pipe must not be glued to the pipe connection for service purposes or the replacement of the device.
- In case of strong temperature fluctuations, fasten the air return pipe immediately before the device so that the pipe does not detach itself from the pipe connection as a result of length changes.

6.22 Installing a silencer

A silencer should be installed downstream of the air outlet of a VENTUM PRO LITE.

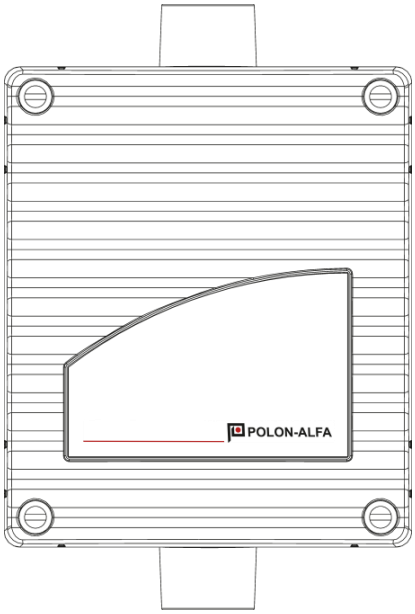


Image 133: Silencer type SD-1-P

- Insert the aspiration pipe in the provided pipe connection of the bottom part of the housing. Please note that the aspiration pipe must not be glued together with the pipe connection for service purposes or for the replacement of the device. Also please observe the flow direction that is specified on the rating plate on the bottom part of the housing.

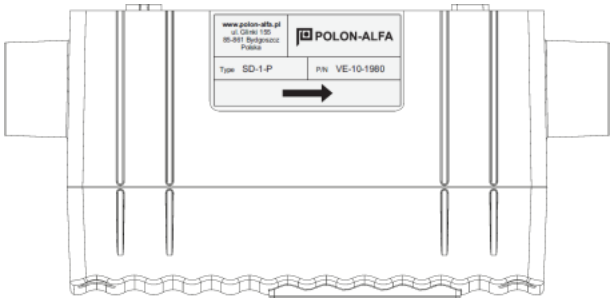


Image 134: Direction of flow for silencer type SD-1-P

- Mark the drilling intervals on a wall.

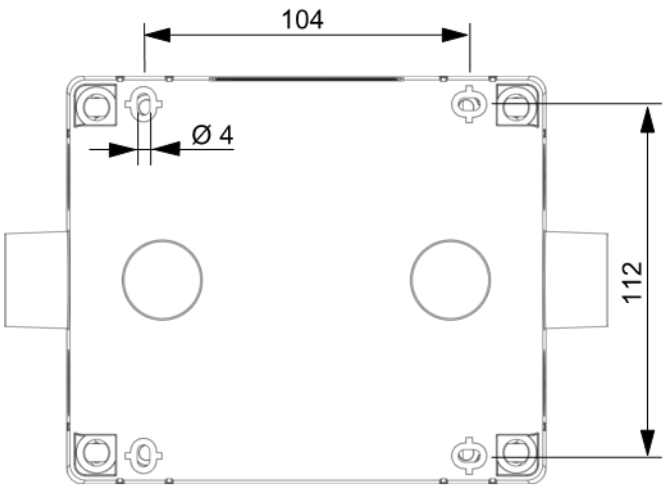


Image 135: Drilling intervals for silencer type SD-1-P

- Drill the holes according to the size of the suitable installation material (screws/plugs).
- Tighten the four screws by hand. It must be ensured that the device is installed mechanically stress-free.
- In case of strong temperature fluctuation, fix the aspiration pipe immediately before the device so that the pipe will not detach itself from the pipe connection as a result of length changes.

6.23 Installation of 3-way ball valve

A ball valve is required to purge the pipe system with compressed air or to close off the pipe system and simulate a blocked pipe.

6.23.1 3-way ball valve (metal)

It switches between fire detection (0° position) and purging (180° position).

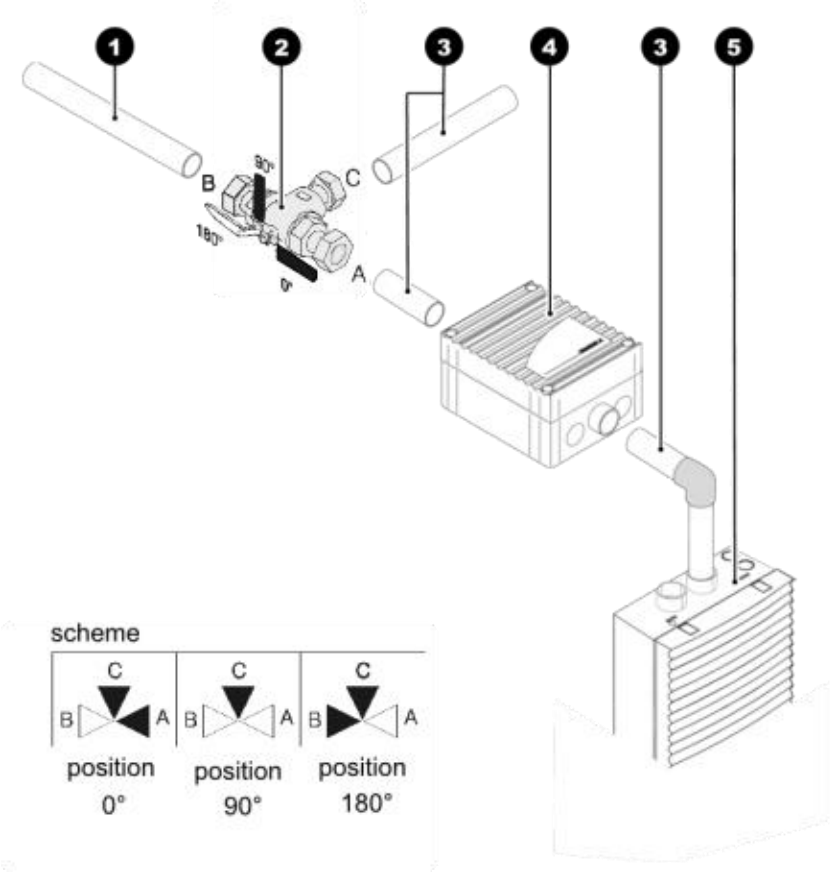


Image 136: Installation of 3-way ball valve

1	Compressed air connection
2	3-way ball valve
3	Pipe system
4	Air filter (optional)
5	Device
▶	open
▷	closed

The 3-way ball valve is fixed in the pipe system by means of transition screw connections. Observe the allocation of the connections as defined in the scheme of the 3-way ball valve.

- ► Install the pipe system on connection C.
- ► Install the device on connection A or B.
- ► Install the compressed air supply on the remaining connection.

6.23.2 3-way ball valve (ABS/PVC)

It switches between fire detection (90° position) and purging (270° position).

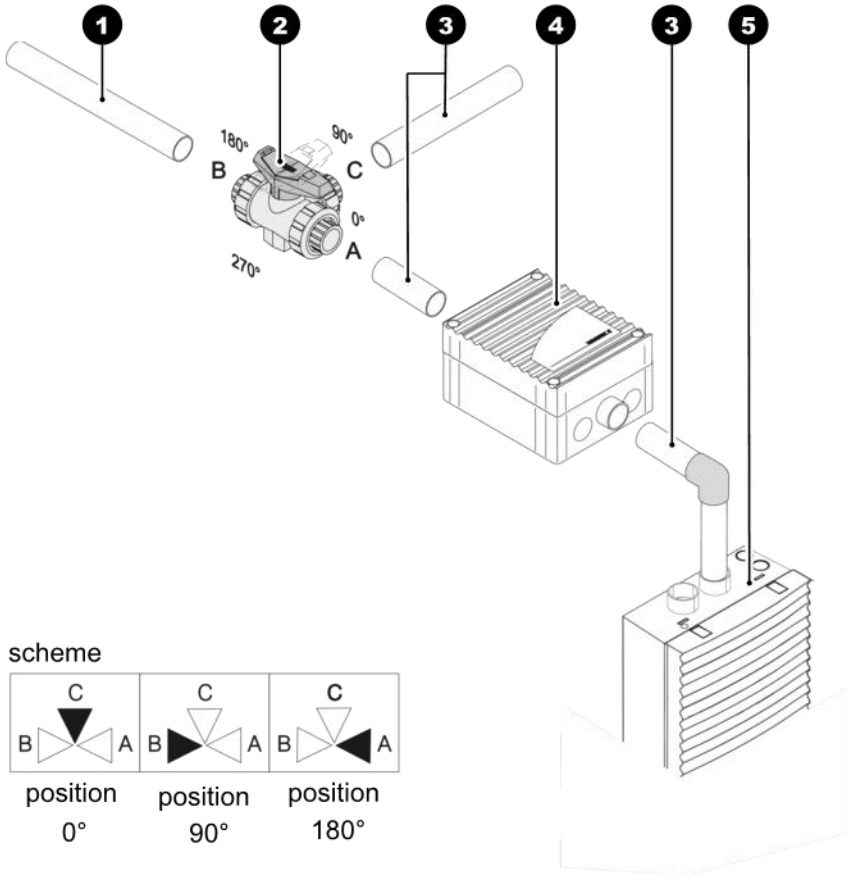


Image 137: Installing a 3-way ball valve made of ABS/PVC

1	Compressed air connection
2	3-way ball valve
3	Pipe system
4	Air filter (optional)
5	Device
▶	
▷	

The 3-way ball valve is fixed in the pipe system by means of transition screw connections. Observe the allocation of the connections as defined in the scheme of the 3-way ball valve.

- Install the pipe system on connection C.
- Install the device on connection A or B.
- Install the compressed air supply on the remaining connection.

6.24 Installation of the condensate separator

A condensate separator is used in monitoring areas where condensate can form in the pipe system.

6.24.1 Condensate separator type KA-DN 25

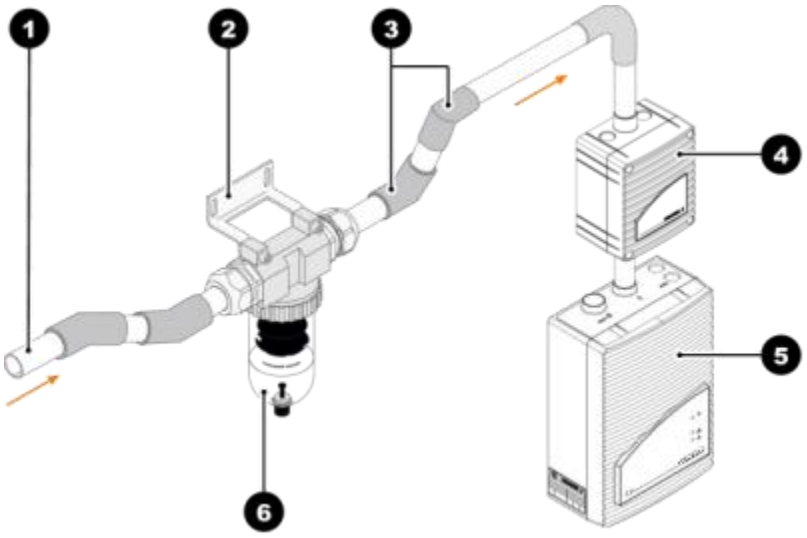


Image 138: Steam trap type KA-DN 25

1	Air sampling pipe
2	Device supports
3	45° elbow
4	Air filter type LF-VE-x
5	VENTUM PRO LITE
6	Steam trap type KA-DN 25

The condensate separator is installed in the pipe system at the lowest point of the pipe system upstream of an air filter (optional) and the VENTUM PRO LITE.

For optimum wall spacing, four 45° angles are required for installation of the condensate separator in the pipe system.

- ► Install two 45° angles in series in the pipe system.
- ► Install the condensate separator in the pipe system using the PG screw connections During installation, observe the flow direction, which is indicated by a direction arrow on the housing.
- ► Fasten the condensate separator to the wall with two screws and the bracket.

6.24.2 Condensate separator type KA-1-P

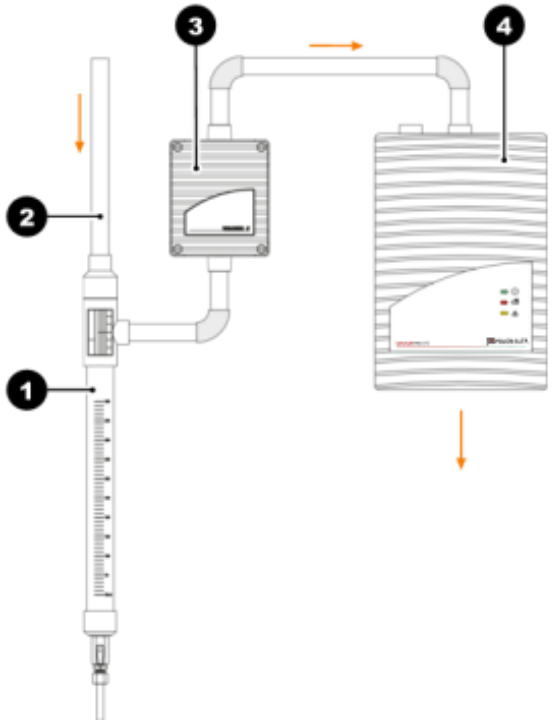


Image 139: Steam trap type KA-1-P

1	Steam trap
2	Pipe system
3	Air filter (optional)
4	VENTUM PRO LITE

The condensate separator can be used manually as well as automatically. The condensate separator is placed at the lowest point of the pipe system in front of an air filter (optional) and the device in the pipe system.

You will need two 40 mm pipe clips and Tangit glue to install the condensate separator in the pipe system.

- ► Place the condensate separator in the intended position.
- ► Fix the condensate separator to the wall using the two 40 mm pipe clips.

⚠ WARNING

Risk of injury due to flammable liquids and vapours

Formation of explosive/highly flammable vapour/air mixtures is possible.
Injuries to health due to direct or indirect contact.

- ► Prior to processing, observe the safety notes of the manufacturer.

- ► Glue the pipe system to be airtight with the condensate separator using Tangit glue.

Follow one of the two following sections according to the type use:

Manual

- ► Remove the manually tightened wick insert.
- ► Close the manual bleed valve (horizontal position).

Automatic

- ► Open the manual bleed valve (vertical position). Make sure that an automatic condensate separation follows due to capillary effect by means of the integrated cotton wick.

6.25 Installation of detonation prevention device

⚠ WARNING

Danger of pipe deflagration or detonation

The VENTUM PRO LITE must not be mounted in areas with a potentially explosive atmosphere. Non-observance could lead to an ignition of the explosive atmosphere due to static discharge.

The following is to be discussed with an expert in advance:

- Whether ignitable discharges can occur (from experience)

- The pipe system configuration
- The aspiration aperture configuration
- The earthing concept.

The pipes used in the Ex area are installed on the detonation protector via a transition screw connection. The steel aspiration pipes used between the VENTUM PRO LITE and the detonation protectors are mounted to the detonation protectors via screw-in connections. The connections must be established by means of a ¾“ or 1“ thread.

If from experience you expect ignitable discharges, execute the pipe system laid in the Ex area to be electrically conductive (metal pipe or electrically conductive plastic pipe). The pipe system is earthed via grounding clamps on the pipe and a connected equipotential bonding rail.

The aspiration pipe can be plastic in Ex areas if no ignitable discharges can occur from experience.

The aspiration apertures can either have aspiration reducing film sheets with sleeves or aspiration reducer clips or be drilled directly into the pipe system. In case of drilled aspiration apertures, whistling aspiration noises may occur.

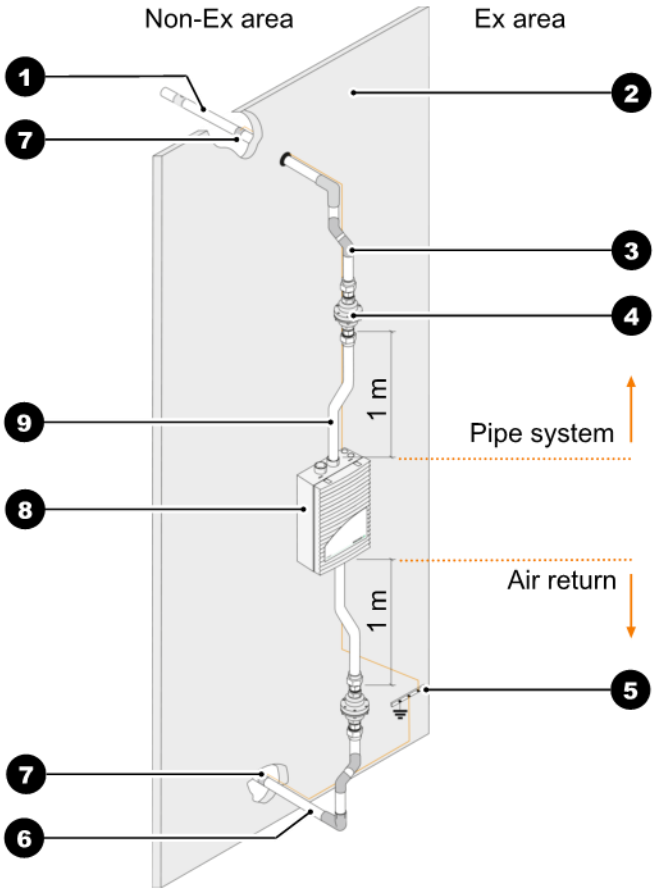


Image 140: Installing the detonation protector

1	Aspiration pipe with transition screw connection and aspiration apertures
2	Wall (segregates Ex area from non-Ex area)
3	Elbow
4	Detonation protector
5	Equipotential bonding rail (if necessary)
6	Air return
7	Grounding clamp (if necessary)
8	VENTUM PRO LITE
9	Steel aspiration pipe with screw-in connection (type R-2525)

- ► Install the detonation protectors with a minimum distance of 1 m from the VENTUM PRO LITE in the aspiration and air return pipe.
- ► Connect the VENTUM PRO LITE and the detonation protectors via the screw-in connections on the steel aspiration pipe (type R-2525).

- ► Seal the threaded connections with Synthesol or sealing tape.
- ► Earth the pipe system depending on its material.

6.26 Installation of test adapter

A test adapter must be installed upstream of the air inlet of a VENTUM PRO LITE.

The test adapter must always be closed in normal operation and is only opened for maintenance and service purposes, to introduce test gas or smoke aerosols.

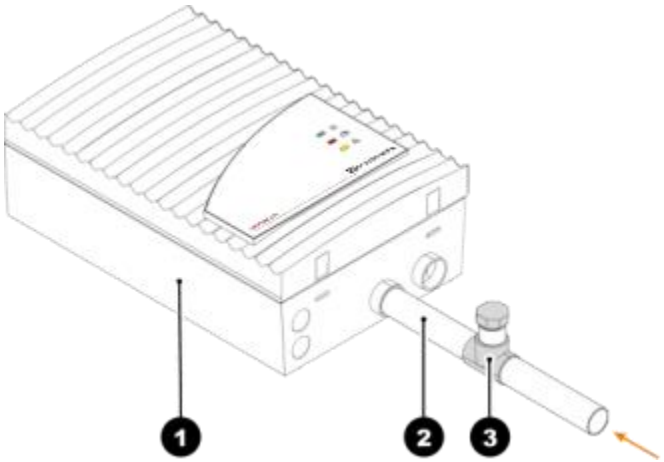


Image 141: Installation of test adapter

1	VENTUM PRO LITE
2	Aspiration pipe
3	Test adapter

⚠ WARNING

Risk of injury due to flammable liquids and vapours

Formation of explosive/highly flammable vapour/air mixtures is possible.
Injuries to health due to direct or indirect contact.

- ► Prior to processing, observe the safety notes of the manufacturer.

- ► Before gluing into place, free the cut edges from dirt and grease with Tangit cleaner.
- ► Glue the test adapter in the pipe system in the immediate proximity of the device with Tangit glue.

7 Commissioning

You will find information about the commissioning in this chapter.

TIP
All stored and current diagnostic data as well as settings made of the VENTUM PRO LITE can be saved in the form of a file or an automatically created log using the diagnostic software. Store and archive every file under another file name for the purpose of later comparison.

Complete the test record during commissioning (see chapter "Annex"). The test record is required for the subsequent evaluation of the data (e.g. air flow value, air pressure and temperature during commissioning).

The following work steps are required prior to the commissioning:

- Check the settings of the VENTUM PRO LITE (see chapter "Making settings").
- Check that the pipe system is completely installed and connected to the device.
- Connect the device to the power supply.

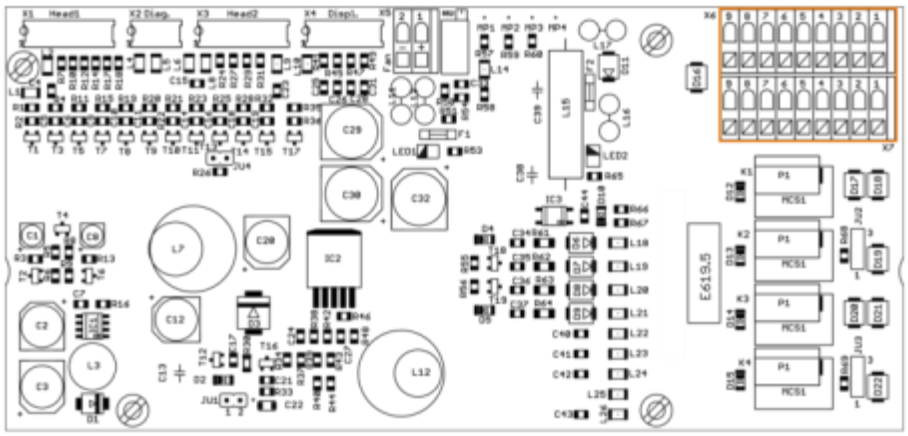


Image 142: Connections for basic board X6 and X7

7.1 Calibration of air flow sensor

Principle

During the air flow initialisation of the connected pipe system, the device initially saves the measured actual value of the air flow as a target value via the integrated airflow monitoring. This target value serves as reference value for the further evaluation of a potential air flow fault. According to the selected air flow level (see chapter "Sensitivity"), the current air flow value can fluctuate more or less around this target value during operation without triggering an air flow fault. Only if the selected air flow level is exceeded will the air flow malfunction be reported by the device and transmitted.

The device must have been in operation for at least 30 min before the VENTUM PRO LITE can be correctly calibrated to the connected pipe system.

No changes may be made to the pipe system after the calibration of the air flow sensor. The air flow sensor must be recalibrated if subsequent changes are required.

The type of calibration must be saved in the test record in each case so that the air flow value can be correctly evaluated in case of servicing measures.

Types of adjustment

The adjustment of the airflow sensor can:

- be carried out independently of the current air pressure.
  Observe the relevant limitations (see Chapter "Airflow monitoring").
- Can be carried out depending on the current air pressure to compensate the influence of air pressure fluctuation.
  Use the air pressure correction tables for this purpose (see chapter "Annex").

The initialisation phase of the VENTUM PRO LITE takes approx. 10 s. Once air flow initialisation has finished, the operating LED is permanently illuminated and the air flow sensor has determined its target value for the connected pipe system.

Adjustment depending on air pressure

In case of a low and medium air flow level, an air pressure-dependent calibration should be performed.

Calibrate the air flow sensor depending on the air pressure and thus ensure trouble-free long-term operation of the device (see chapter "Air pressure-

dependent calibration"). Only with this type of calibration are slight air pressure fluctuations still within the monitoring window and therefore in the permissible tolerance range.

Adjustment independent of air pressure

In case of a large air flow level, the air flow sensor may also be calibrated independent of the air pressure.

If the air flow sensor calibration is performed independently of the air pressure, fluctuation of the air pressure can lead to undesirable air flow faults. It must be ensured that no air pressure fluctuations can occur in the immediate vicinity. If this cannot be guaranteed, be sure to calibrate the air flow sensor depending on the air pressure.

7.1.1 Air pressure-independent calibration

No changes may be made to the pipe system after the calibration of the air flow sensor. The air flow sensor must be recalibrated if subsequent changes are required.

The smoke detection is fully functional during the initialisation phase. During this time, the air flow must not be influenced and the operating LED flashes.

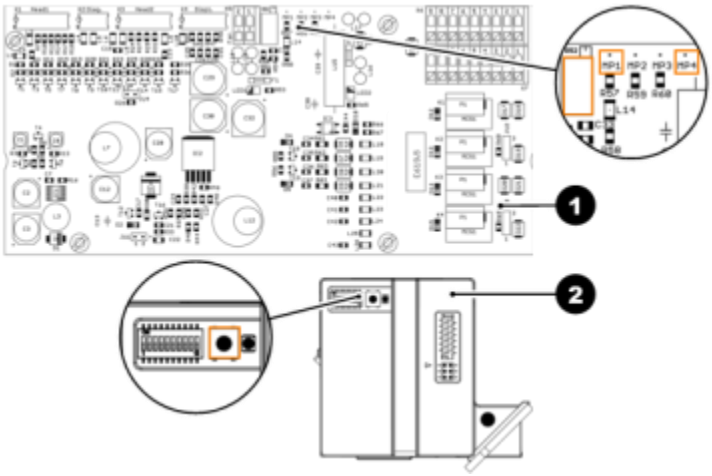


Image 143: Trimming potentiometer and measuring points on the basic board

1	Basic board
2	Detector module

- Make sure that the VENTUM PRO LITE is in operation for at least 30 min.

- Check the voltage at measuring points MP1 (+) and MP4 (-) using a multimeter. Pay attention to polarity. Select the "V-DC" range on the measuring device. The voltage set by default on the measuring points is 1.2 V. It corresponds with the average annual air pressure of the corresponding height (m above sea level).
- If the voltage does not correspond to the required value, set the value using trimming potentiometer R52 with a small screwdriver.
- Press the Flow Init button on the detector module.

7.1.2 Air pressure-dependent calibration

No changes may be made to the pipe system after the calibration of the air flow sensor. The air flow sensor must be recalibrated if subsequent changes are required.

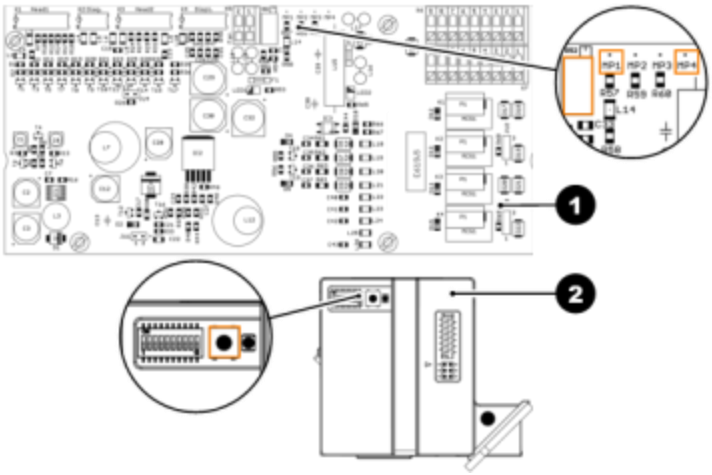


Image 144: Trimming potentiometer and measuring points on the basic board

1	Basic board
2	Detector module

A barometer, temperature gauge and a multimeter are required for air pressure-dependent calibration of the air flow sensor.

- Make sure that the VENTUM PRO LITE is in operation for at least 30 min.
- Enter all values determined in the following steps into the test record (see chapter "Annex").

- ► Determine the altitude above sea level of the installation location of the VENTUM PRO LITE.
- ► Measure the air pressure with the barometer. Make sure that the airflow sensor is not adjusted to 0 % if the measured air pressure does not correspond to the level of the corresponding annual mean.
- ► Use the temperature gauge to measure the ambient temperature.
- ► Use the air pressure correction tables (see chapter "Annex") to determine the calibration value to which the air flow sensor must be set. Observe the pipe project planning when selecting the air pressure correction table.
- ► Check the voltage at measuring points MP1 (+) and MP4 (-) using a multimeter. Pay attention to polarity. Select the "V-DC" range on the measuring device. The voltage set by default on the measuring points is 1.2 V. It corresponds with the average annual air pressure of the corresponding height (m above sea level).
- ► If the voltage does not correspond to the required value, set the value using trimming potentiometer R52 with a small screwdriver.
- ► Press the Flow Init button on the detector module.

7.2 Checking the detector module and the alarm transmission

Do not carry out the test during an air flow initialisation. The airflow influence falsifies the target value for the connected pipe system.

- ► Make sure that air flow sensor calibration has been carried out (see chapter "Calibration of airflow sensor").
- ► Enter all values determined in the following steps into the test record (see chapter "Annex").

TIP

Accelerating the test

Detector module testing and alarm signal transmission can be accelerated. For this, contact 10 of DIL switch S1 on the detector module must be set to OFF.

- ► Check and, if necessary, change the switch position (S1, contact 10) on the detector module for LOGIC-SENS.
- ► Spray test aerosol either into the first sampling point or into the test adapter of the pipe system. The alarm can also be triggered by an activated smoke stick.
- ► Check whether the alarm is displayed on the device. Make sure that the alarm LED is flashing during the set delay time. The alarm LED illuminates permanently after the expiry of the delay time. If this is not the case, check whether ...
  - ... the display circuit board is connected.
  - ... there is a defect on the device.
  - ... the detector module must be replaced.
- ► Check whether the alarm is transmitted to the fire detection control panel and reported on the corresponding detection line. If this is not the case, check the transmission paths.

7.3 Checking the air flow monitoring and fault signal transmission

Do not carry out the test during an air flow initialisation. The airflow influence falsifies the target value for the connected pipe system.

A breakage or blockage in the pipe system is displayed on any connected FDCP or by a flash code via LED on the detector module. The flash code is repeated every 2 s.

- Breakage: LED flashes 3x

- Blockage: LED flashes 2x

► Make sure that air flow sensor calibration has been carried out (see chapter "Calibration of airflow sensor").

► Enter all values determined in the following steps into the test record (see chapter "Annex").

Rupture

► Loosen the pipe at the connection to the device or open the test adapter.

► Check whether the fault LED on the device is flashing. Note that the fault LED on the device will only shine permanently after the expiry of the set delay time.

► Optionally check the air flow sensor values in the diagnostic software under the "States" tab and the "Air flow" group field.

► Check whether the fault is displayed on a connected fire detection control panel. If this is not the case, check the transmission paths.

Blockage

► Depending on the project planning airflow monitoring, close off the corresponding number of sampling points with adhesive tape.

► Check whether the fault LED on the device is flashing. Note that the fault LED on the device will only shine permanently after the expiry of the set delay time.

► Optionally check the air flow sensor values in the diagnostic software under the "States" tab and the "Air flow" group field.

► Check whether the fault is displayed on a connected fire detection control panel. If this is not the case, check the transmission paths.

➜ Checking does not reveal any defects.

► Check the air flow monitoring (see chapter "Function test").

Troubleshooting

If the air flow faults are not correctly detected, check whether:

- all aspiration apertures are free.
- the pipe system is free.
- the pipe system displays breakage or cracks.
- all pipe connections are tight.
- the fan is able to blow freely.
- the correct aspiration-reducing film sheets have been used.
- any test adapters and air filters are closed.

- any filter inserts are clean.
- any ball valves and purging valves are in "operating position".

7.4 Function test

If the device cannot be calibrated, check its functionality using the test pipe and a digital pressure gauge or the diagnostic software.

7.4.1 Preparing for the function test

Carry out the preparation for a function test of the VENTUM PRO LITE TWO for both pipe systems.

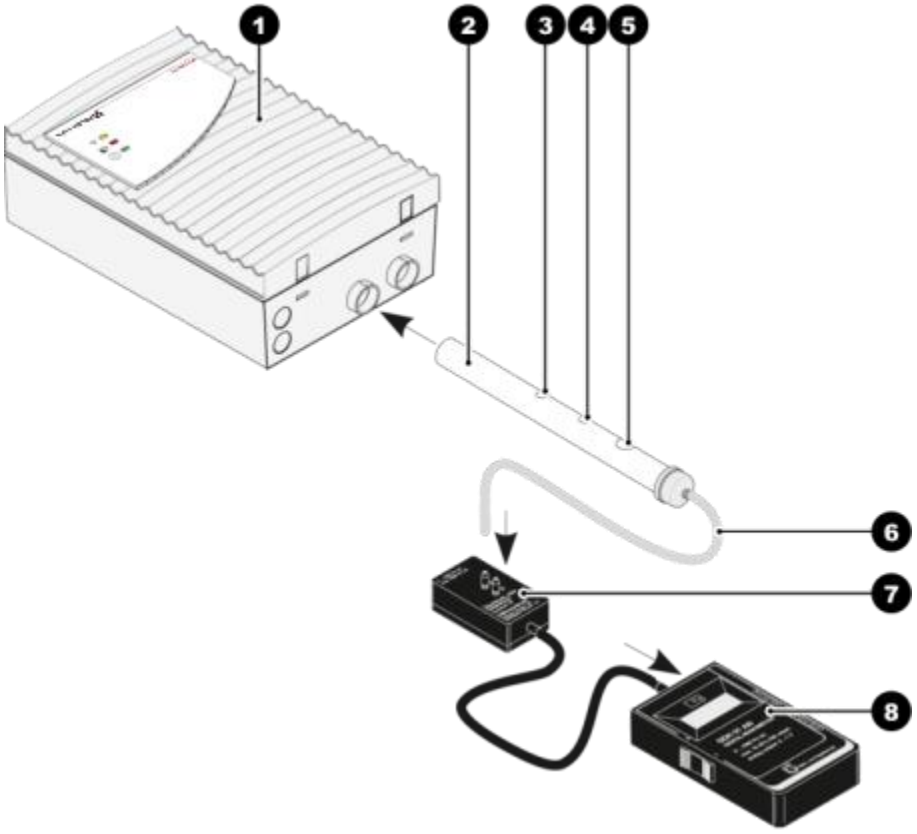


Image 145: Preparing for the function test

1	VENTUM PRO LITE
2	Test pipe
3	Aspiration aperture Ø 4.6 mm
4	Aspiration aperture Ø 4.2 mm
5	Aspiration aperture Ø 7.0 mm
6	Pressure measurement hose
7	Adapter
8	Digital fine pressure gauge (example)

- ► Make sure that the VENTUM PRO LITE is in operation for at least 30 min.
- ► Disconnect the pipe system from the device.
- ► Connect the test pipe.
- ► Connect the pressure measurement hose to connection B on the adapter.

► Connect the 4-pin plug of the adapter to the digital pressure gauge.

► Turn on the digital pressure gauge.

7.4.2 Performing the function test

The function test can be performed with or without a digital manometer. The complete test with a digital manometer is described in the following. If any deviations from the described procedure occur during the function test, the device or its air flow sensor is defective.

For a VENTUM PRO LITE TWO, carry out a function test for both pipe systems.

A breakage or blockage in the pipe system is displayed on any connected FDCP or by a flash code via LED on the detector module. The flash code is repeated every 2 s.

- Breakage: LED flashes 3x
- Blockage: LED flashes 2x

► Make sure that the VENTUM PRO LITE is in operation for at least 30 min.

► Press the Flow Init button on the detector module.

➜ The operating LED must flash and the fault LED must go out.

► Close all the test pipe aspiration apertures with adhesive tape.

➜ The vacuum produced in the device must reach the following value after a short start-up time:

Fan voltage [V]	Negative pressure [Pa]
6.5	235
6.9	290
9	475
10	575
11	675
12	710

Table 68: Negative pressure generated during function test

► Open up the aspiration apertures on the test pipe.

- ► Press the Flow Init button on the detector module.
  - ➜ The operating LED must flash and the fault LED must go out.
- ► Close all the test pipe aspiration apertures with adhesive tape.
  - ➜ The flash code of the LED on the detector module must indicate "Blockage" after several seconds.
- ► Open up the aspiration apertures on the test pipe.
  - ➜ The flash code of the LED on the detector module must go out after several seconds.
- ► Remove the test pipe.
  - ➜ The flash code of the LED on the detector module must indicate "Breakage" after several seconds.
- ► Connect the test pipe to the device.
  - ➜ The flash code of the LED on the detector module must go out after several seconds.

No faults occurred when carrying out the function test of the VENTUM PRO LITE.

- ► Check the pipe system.

Connection test

- ► Check whether…
  - … the pipe system is tightly connected to the pipe connection of the device.
  - … all pipe fittings are glued together.
  - … the pipe system is sealed. First, close all aspiration apertures (e.g. with insulating tape). Then, measure the air flow at the opening for air return.
  - … the correct aspiration reducing film sheets were glued to the aspiration apertures.

Function test with diagnostic software

The diagnostic software can be optionally used to perform the function test.

- ► Connect VENTUM PRO LITE and the service PC via connection X2 (Diag.) on the basic board of the device using a 6-pin ribbon cable.
- ► Start the diagnostic software.
  - ➜ The current data from the VENTUM PRO LITE is shown on the service PC screen.

► Repeat commissioning from chapter "Calibration of air flow sensor".

After the function test

TIP

All stored and current diagnostic data as well as settings made of the VENTUM PRO LITE can be saved in the form of a file or an automatically created log using the diagnostic software. Store and archive every file under another file name for the purpose of later comparison.

► A printout of the setting values must be kept in the project folder for future reference.

8 Maintenance

You will find information about the maintenance in this chapter.

Complete the test record during maintenance (see chapter "Annex"). The test record is required for the subsequent evaluation of the data (e.g. air flow value, air pressure and temperature during maintenance).

All stored and current device data as well as settings made via the DIL switch can be saved as a file using the diagnostic software.

8.1 Maintenance intervals

The servicing includes regular maintenance. The VENTUM PRO LITE is initially inspected during commissioning and then annually. The national laws, standards and guidelines regarding the applications and project specifications must also be taken into account.

Perform the following checks during each maintenance:

Type of inspection	Further information in chapter
Visual inspection	"Visual inspection"
Alarm transmission (from the detector module)	"Checking the detector module and the alarm transmission"
Pipe system inspection	"Checking the pipe system"
Airflow sensor adjustment	"Check airflow sensor adjustment"
Airflow monitoring	"Checking the airflow monitoring and the fault transmission"

Table 69: Maintenance intervals

8.2 Visual inspection

- ► At the beginning of maintenance, check whether ...
  - ... the device is undamaged (see chapter "Flash code table").
  - … the aspiration pipe and connection cables are securely connected.
  - … the device bracket – if applicable – is attached properly.

- ... the pipe system is freely accessible.
- ... the pipe system is securely installed and undamaged (if accessible).
- … the aspiration apertures of the pipe system are clear.

8.3 Flash codes

The detector module is equipped with an LED that displays different faults and device statuses using flash codes.

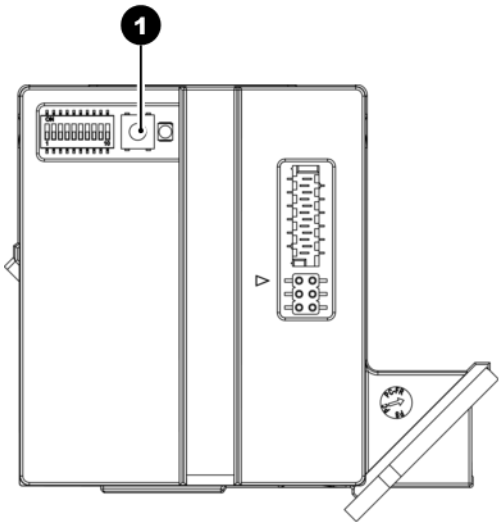


Image 146: Detector module LED

1	LED

Number **of flashes**	Meaning
2x	Airflow too low (blockage)
3x	Airflow too high (rupture)
4x	Stabilisation phase after switch-on or fan is switched off
Constant light	Hardware defect in the detector module

Table 70: Flash codes on the detector module

8.4 Checking the detector module and the alarm transmission

- Proceed according to chapter "Checking the detector module and the alarm transmission".
- Also perform a visual inspection of the detector module for external contamination or damage and replace if necessary. If there is a hardware defect in the detector module, the LED lights up continuously.

8.5 Checking the pipe system

NOTE

Device damage due to application of compressed air

During start-up and purging, compressed air is applied that can result in damage to the air flow sensor.

- Preferably use a 3-way ball valve.
- Disconnect the VENTUM PRO LITE from the pipe system prior to purging.

- Check the aspiration apertures of the pipe system for blockage in monitoring areas where dust particles or icing are possible.

  ➜ There is a blockage of one or more aspiration apertures.
- Purge the pipe system with compressed air (purified and dehumidified ambient air). Use a compressor, a transportable compressed air bottle (purging unit) or activate the manual purging unit installed on site for this purpose.

8.5.1 Purging the pipe system

NOTE

Damage to the airflow sensor

Disconnect the device from the pipe system before purging the pipe system and the sampling points.

Complete the individual purging processes within 50 s. If another purging process is required, repeat the above procedure after 120 s at the earliest.

3-way ball valve made of metal

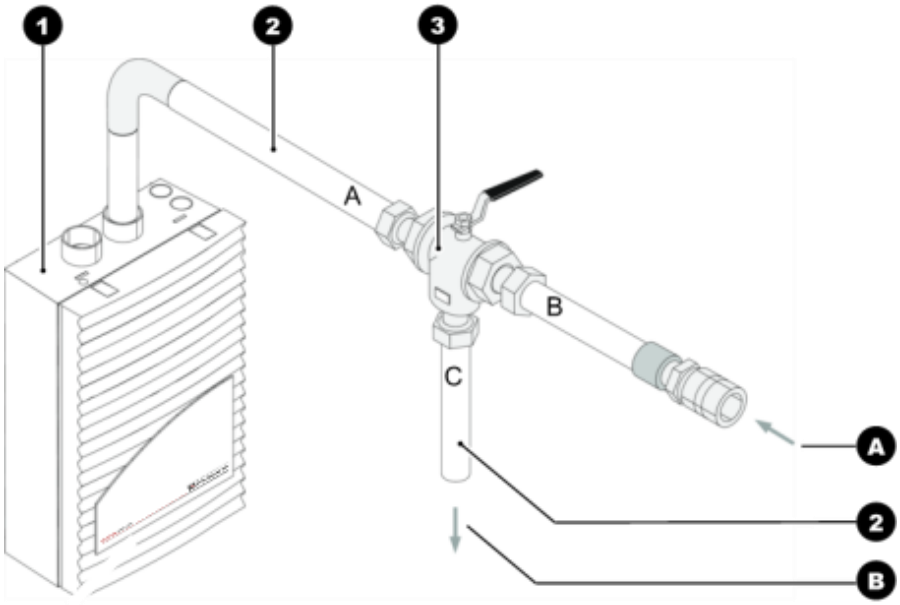
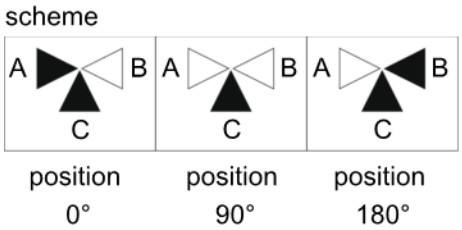


Image 147: Manual air purge system with metal 3-way ball valve



1	Device
2	Pipe system
3	3-way ball valve
4	Quick-action coupling sleeve
A	Compressed air
B	Air flow for purging
▶	open
▷	closed

- Connect the compressed air supply using the transition screw connection to the 3-way ball valve.
- Move the lever of the 3-way ball valve from the setting 0° to setting 180°, to disconnect the pipe system from the device.
- Purge the pipe system manually for approx. 10 s.
- Move the lever of the 3-way ball valve to the 90° setting. In this position, the device is neither connected to the pipe system nor to the connection for compressed air.
- Wait approx. 20 seconds so that the dust and dirt swirled up in the pipe system can settle and are not drawn into the device.
- Within 10 seconds, move the lever of the 3-way ball valve to the 0° setting to connect the pipe system to the device.

3-way ball valve made of ABS/PVC

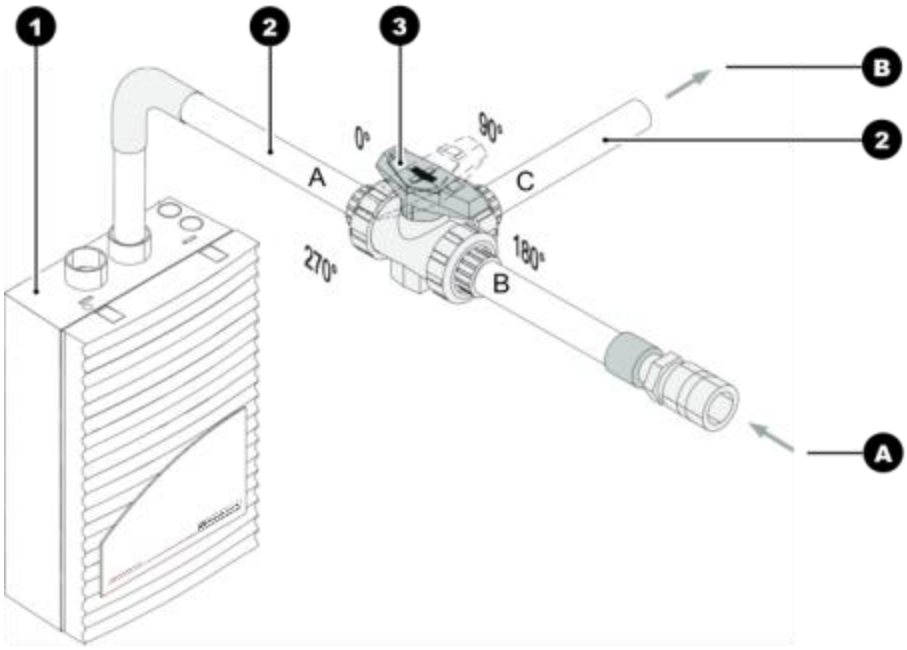
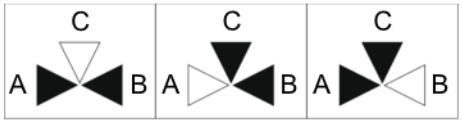


Image 148: Manual air purge system with 3-way ball valve made of ABS or PVC

scheme



1	Device
2	Pipe system
3	3-way ball valve (ABS/PVC)
A	Compressed air
B	Air flow for purging
▶	open
▷	closed

- ► Connect the compressed air supply using the transition screw connection to the 3-way ball valve.
- ► Move the lever of the 3-way ball valve from the setting 270° to setting 90°, to disconnect the pipe system from the device.

- ► Purge the pipe system manually for approx. 10 s.
- ► Move the lever of the 3-way ball valve to the 0°/180°setting. In this position, the device is neither connected to the pipe system nor to the connection for compressed air.
- ► Wait approx. 20 seconds so that the dust and dirt swirled up in the pipe system can settle and are not drawn into the device.
- ► Within 10 seconds, move the lever of the 3-way ball valve to the 270° setting to connect the pipe system to the device.

8.6 Replacing the detector module

Calibration of the detector module is not necessary.

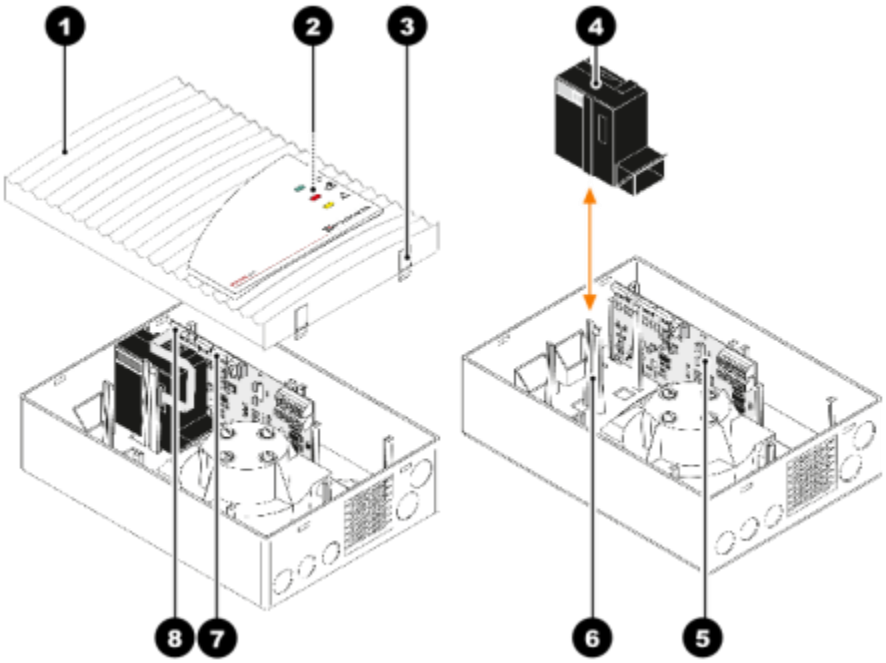


Image 149: Replacing the detector modules

1	Housing cover
2	Display circuit board (not visible)
3	Quick-action fasteners
4	Detector module
5	Basic board
6	Retaining clips
7	Connection for ribbon cable of the display circuit board
8	Connection for ribbon cable of the detector module

NOTE

Danger of short circuit on the motherboard

Only perform the following work with the device disconnected from the mains.

- Carefully unlock the quick-action fasteners on the housing using a flat-head screwdriver by simultaneously pressing in the closing flaps located on one side.

- ► Lift the housing cover.
- ► Carefully loosen the ribbon cable of the display board from the motherboard.
- ► Put the housing cover to one side. Ensure that the housing cover is neither soiled nor damaged.
- ► Loosen the ribbon cable of the detector module from the motherboard.
- ► Carefully spread the two retaining clips apart and remove the detector module.
- ► Transfer the settings of the old detector module onto the new detector module. Only use type DM-VPL-xx detector modules (green type plate).
- ► Carefully spread the two retaining clips apart and insert the detector module. The retaining clips must be positioned against the detector module and audibly engage. Only use type DM-VPL-xx detector modules (green type plate).
- ► Then press both retaining clips together again.
- ► Connect the ribbon cable of the detector module to the basic board (connection: X1 (HEAD1) or X3 (HEAD2). Ensure the marking pin is positioned correctly before plugging the ribbon cable plug into the basic board.

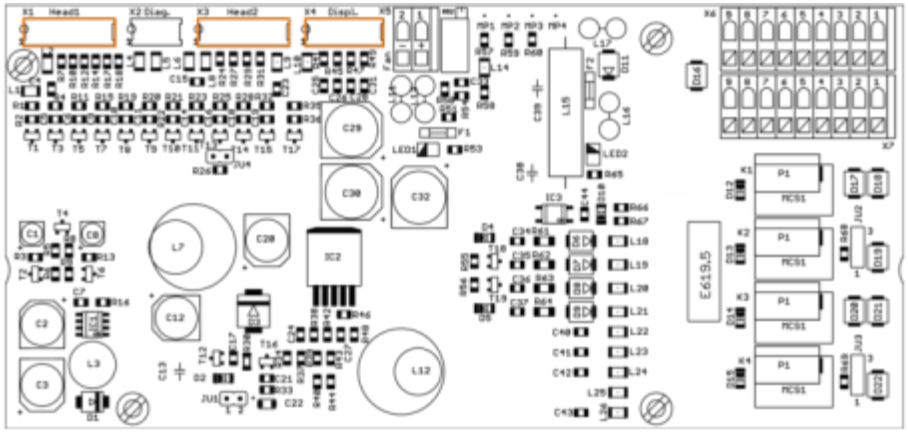


Image 150: Connections on basic board X1, X3 and X4

- ► Connect the flat ribbon cable of the display circuit board to the basic board (connection X4 (DISPLAY)). Ensure the marking pin is positioned correctly before plugging the ribbon cable plug into the basic board.
- ► Connect the device to the power supply.

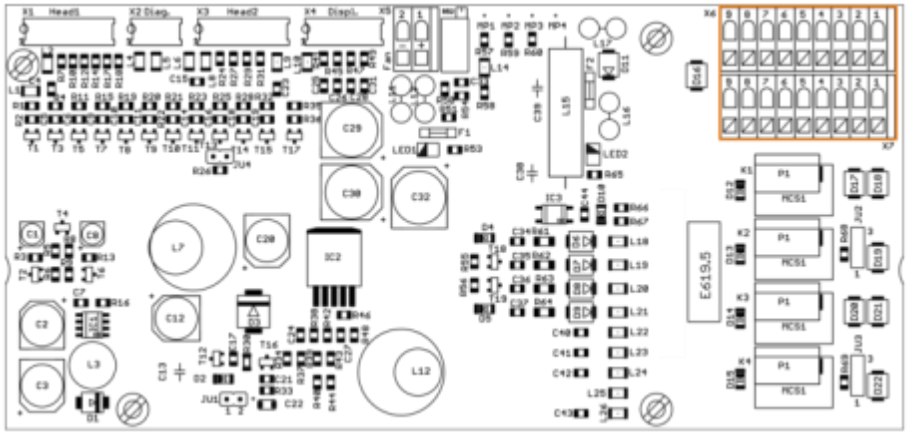


Image 151: Connect the power supply

- Make sure that the VENTUM PRO LITE is in operation for at least 30 min.
- Press the Flow Init button on the detector module.

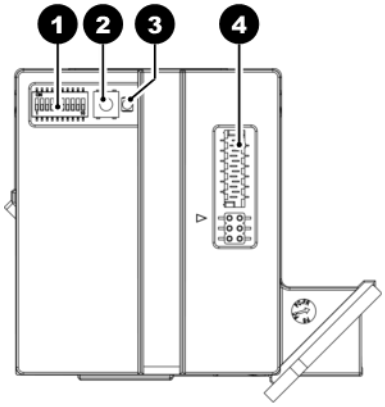


Image 152: Connections and LED on the detector module

1	DIL switch
2	Flow initialisation button
3	LED
4	Connection for flat ribbon cable

- Close the cover. Ensure that none of the ribbon cables are squashed.
- Let the quick-action fasteners click into place.

8.7 Changing the filter inserts of the air filter type LF-VE-x

Opening the filter after the expiry of the adjusted delay time will lead to an air flow fault.

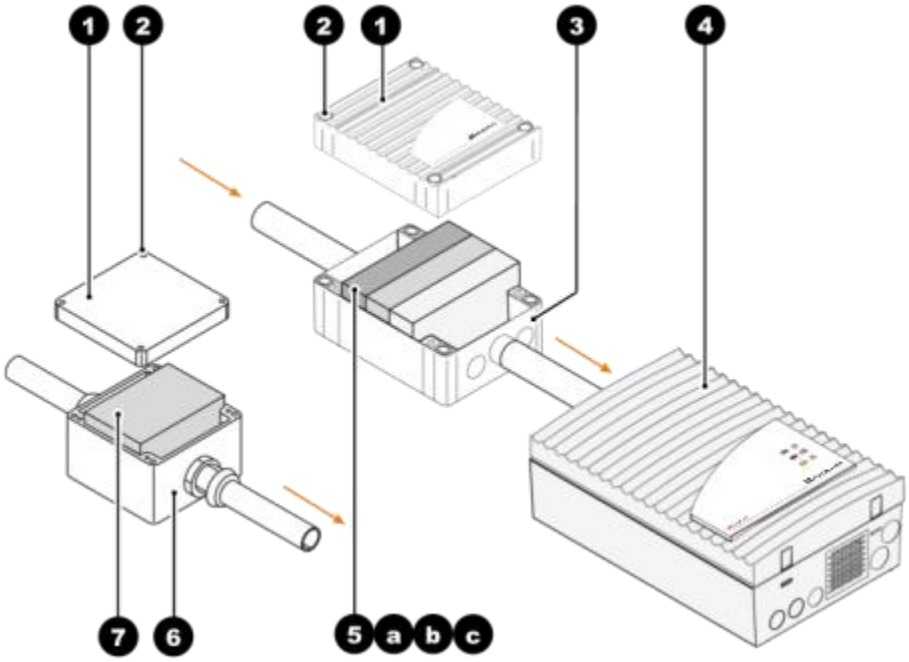


Image 153: Replacing the filter inserts of the air filter type LF-VE-x

1	Housing cover
2	Cover screws
3	Air filter type LF-VE, LF-VE-1, LF-VE-2
4	VENTUM PRO LITE
5	Filter inserts
a	Coarse filter mat
b	Medium filter mat
c	Fine filter mat
6	Air filter type LF-VE-k
7	Coarse filter mat

- ► Loosen the four cover screws using a slotted screwdriver.
- ► Put the housing cover to one side. Ensure that the housing cover is neither soiled nor damaged.
- ► Remove the filter inserts.
- ► Check the filter inserts for contamination. In case of light contamination, clean the filter inserts, or replace them in case of severe contamination.
- ► Carefully clean off any dust deposits from the inside of the housing.
- ► Insert the cleaned or new filter inserts in the correct order. The correct order can be found on the information sign on the housing base.
- ► Close the cover.
- ► Tighten the four cover screws by using a screwdriver.

8.8 Replacing the filter inserts of the special filter type SF-400/SF-650

Removing the special filter leads to an air flow fault on the VENTUM PRO LITE.

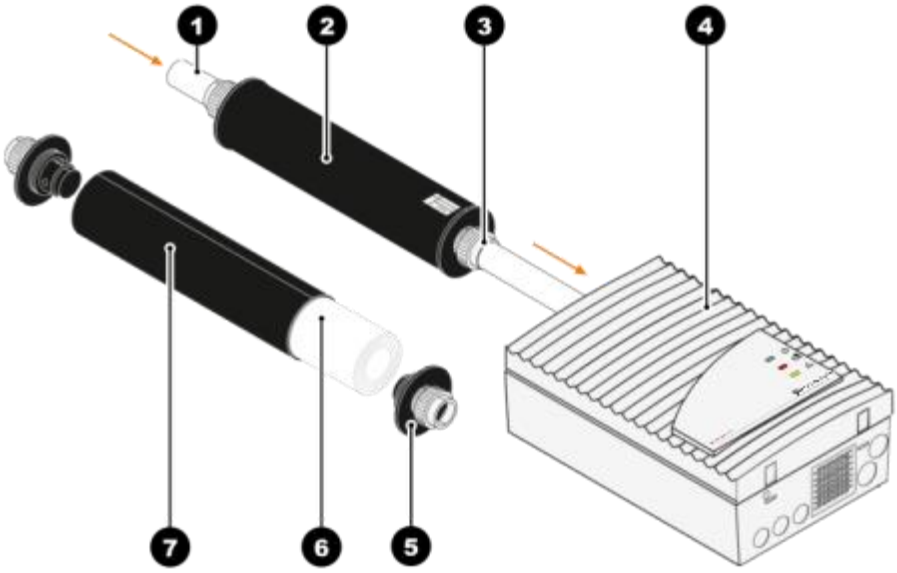


Image 154: Replacing the filter elements

1	Pipe system
2	Special filter type SF-400, SF-650
3	PVC transition screw connections
4	VENTUM PRO LITE
5	Screw-in plugs
6	Filter element
7	Filter housing

- ► Loosen the two PVC transition screw connections on the special filter.
- ► Remove the special filter from the pipe system.
- ► Remove the two screw-in plugs on the filter housing.
- ► Remove the old filter element.
- ► Insert the new filter element into the filter housing.
- ► Screw the two screw-in plugs into the filter housing.
- ► Re-insert the special filter into the pipe system. Observe the flow direction of the special filter that is specified on the type plate on the housing of the special filter.
- ► Tighten the PVC transition screw connections.

8.9 Checking the air flow sensor calibration

The value of the air flow sensor must be checked using diagnostic software during servicing.

Principle During the initialisation of the connected pipe system, the device initially saves the measured actual value of the air flow as a target value via the integrated air flow monitoring. This target value serves as reference value for the further evaluation of a potential air flow fault. Depending on the selected air flow threshold (see chapter "Project planning", section "Adjusting air flow sensitivity"), the current air flow value may fluctuate around this target value during operation without triggering an air flow fault. Only if the selected air flow threshold is exceeded will the air flow malfunction be reported by the device and transmitted.

Checking the actual value In the diagnostic software under the "States" tab, the following information regarding air flow is displayed:

- Actual value (blue hash/bar character)
- Target value
- Tolerance range of the selected air flow level (yellow area)
- Limits of the tolerance range (min./max.)

The limits of the tolerance range correspond to the following deviations:

- ±10% = level I
- ±20% = level II
- ±30% = level III
- ±50% = level IV

► Check the deviation of the actual value from the target value.

➜ There is a deviation of > ±70%.

► The pipe system should be checked as a preventive measure (see the following section "Rectifying air flow faults").

TIP

The current air flow value may deviate from the target value not only due to a fault in the pipe system (breakage or blockage), but also due to air pressure fluctuations in the surrounding area.

Rectifying airflow faults

If the airflow alignment has been performed depending on air pressure but the actual value is not within the airflow range (airflow fault is displayed by the device), another fault exists in addition to air pressure or temperature fluctuations.

- In this case, check the pipe system for tightness and blockages (see Chapter "Checking the airflow monitoring and fault transmission", "Troubleshooting" section).
- After completing troubleshooting, restore the original configuration of the pipe system if this was changed when searching for the fault.

  ➜ Checking does not reveal any defects.
- Check the air flow monitoring (see chapter "Function test").

If no deviations are detected during the function test, this confirms there is no defect in the air flow monitoring system.

Only authorised personnel is permitted to replace the detector module in case of an air flow monitoring defect.

- Perform another adjustment with the pipe system connected.
- Observe the current airflow value during ongoing maintenance or check it during the next inspection at the latest.
- If a similar target value deviation results as before, disturbing ambient influences are the cause of this deviation. If these negative influences on the air flow monitoring cannot be rectified, set the next higher air flow level. Ensure compliance with the applicable national laws, standards and guidelines.

8.10 Checking the air flow monitoring and fault signal transmission

A breakage or blockage is displayed by a flash code on each detector module (LED).

► Check the airflow monitoring (see Chapter "Commissioning" and "Checking the airflow monitoring and fault transmission").

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Glossary

Aerosol

Airborne particles in microscopic or sub-microscopic grain size range. They exist of unburned parts of the burning material, intermediate products of oxidative conversion and finely distributed carbon (soot).

Airflow sensor

For monitoring the entire airflow in the pipe system, i.e. controlling the pipe system for ruptures and blockage. According to the air monitoring requirement, single hole monitoring and rupture detection can be achieved at the end of the pipe system.

Alarm

- Acoustic signal triggered via fire detector to report a fire. - Variably adjustable alarm level. The triggering of the alarm means the definite detection of a fire. The fire brigade is alarmed.

Alarm current

Increased current in alarm status. See also "Standby current"

Area with potentially explosive atmosphere

A potentially explosive area where a potentially explosive atmosphere exists.

Aspirating smoke detector

Active system, in which the vacuum that is required for the aspiration of the air samples is generated by a system-integrated fan. The air samples are then conveyed to a evaluation unit (detector module, detector head or detection unit).

Collective fault

An non-differentiated, i.e. non-localisable disturbance alarm that is reported to a main control centre.

Contact load

Maximum capacity with which a relay contact can be switched.

Deflagration

A deflagration (derived from Latin deflagrare = to burn) is a rapid burning process in which the explosion pressure is solely created by the , generated and expanding gases. The propagation occurs as a result of the heat released by the reaction. The combustion proceeds at a speed which is lower than the sound velocity in the burning medium. See "Detonation"

Detector line

Monitored transmission path through which the fire alarm can be connected to the fire detector control panel. See also "Primary line"

Detector module

Modular scattered light smoke detectors, optimised for use in aspirating smoke detectors with special air supply; with Flow Init button for initialising the integrated airflow sensor, diagnostic LED with flash code for indicating fault states and DIL switches. See also "Scattered light smoke detectors", "Airflow sensor" and "DIL switch"

Detonation

We speak of a detonation if the speeds are higher than the sound velocity in the burning medium. In this case, the burning mechanism changes from the heating of the unburned mixture to shock wave-induced combustion. Detonations in pipe systems can result in pressures that exceed the explosion pressures in case of deflagration many times over. With the detonation, the pressure wave is superimposed with the temperature-affected volume expansion caused by the explosion reaction. See "Deflagration"

DIL switch

Dual In Line - For setting e.g. air flow sensors, response sensitivity or time delays for alarms and faults.

Disturbance alarm

Message that there is a deviation from a target value in the fire alarm centre.

Disturbance variable

All exogenous variables which impair the intended function of a fire alarm system.

Dual detection dependency

Measure for the verification of alarm statuses. The fire alarm is only triggered after the response of two detectors or multiple response of one detector. With the response of the first detector, both an internal alarm and a control function can be triggered.

Fire alarm system

Hazard alarm systems which serve people as a direct call for help in case of fire hazards and/or to detect and report fires at an early stage.

fire detection control panel

See "Fire detector control panel"

Fire detector control panel

Central part of a fire alarm system that monitors the system for faults, supplies the detector with power and records messages, displaying them optically, acoustically and transmitting them if necessary.

LOGIC·SENS

The intelligent signal processor can be activated or deactivated via a DIL switch, FDCP and/or diagnostic software. This signal processor permits an analysis of the measured smoke level by comparison with the known

parameters, whereby a disturbance variable is detected, thus preventing false alarm.

Monitoring area

Entire area that is monitored by automatic fire alarms.

Monitoring window

Adjustment area where the normal airflow is between a defined top and bottom value.

Nominal gap width

Maximum gap of the flame filter in the housing of the detonation protection that may be existent without the hazard of an ignition spark from the device entering the area with potentially explosive atmosphere.

Point-type smoke detectors

Respond to burning materials contained in the air and/or aerosols (airborne particles).

Primary line

Transmission paths automatically and permanently monitored for wire breakage and short circuit. These serve the signal transmission of important functions of a fire alarm system.

Scattered light smoke detectors

Optical smoke detectors which utilise the physical phenomena of light scattering due to smoke particles, which causes a signal change on the LED.

Sensitivity

A measure of the fire sensitivity. It is measured in the percentage of light obscuration per metre. The sensitivity (main alarm) is the triggering level which triggers the main alarm when the corresponding light obscuration is reached.

Single hole monitoring

Detection of changes in the diameter (e.g. blockage) of every single aspiration aperture.

Smoke aerosol

See "Aerosol"

Standby current

Current on the detection line in the normal operating status. See also "Alarm current"

Termination resistor

Termination element at the end of a detector or control line for the monitoring of the detector or control line, even including wire breakage and short circuit.

Test aerosol

An aerosol, whose relevant characteristics for the respective intended use are known. See "Aerosol"

Annex

Related documents

- "Air pressure correction tables" (Resources/pdf/9007200091164555.pdf)
- "Project planning tables with air filters" (Resources/pdf/9007200114838155.pdf)
- "Project planning tables with acceleration openings and air filters" (Resources/pdf/9007200114835211.pdf)
- "Test record" (Resources/pdf/9007199990375563.pdf)

Air pressure correction tables

Project planning tables with air filters

Project planning tables with acceleration openings and air filters

Test record

Air pressure correction table for adjustment

Equipment protection

Height [m above sea level]	Air pressure [hPa] at a height of														
0	973	978	983	988	993	998	1003	1008	1013	1018	1023	1028	1033	1038	1043
50	967	972	977	982	987	992	997	1002	1007	1012	1017	1022	1027	1032	1037
100	961	966	971	976	981	986	991	996	1001	1006	1011	1016	1021	1026	1031
150	954	959	964	969	974	979	984	989	994	999	1004	1009	1014	1019	1024
200	948	953	958	963	968	973	978	983	988	993	998	1003	1008	1013	1018
250	942	947	952	957	962	967	972	977	982	987	992	997	1002	1007	1012
300	936	941	946	951	956	961	966	971	976	981	986	991	996	1001	1006
350	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
400	924	929	934	939	944	949	954	959	964	969	974	979	984	989	994
450	918	923	928	933	938	943	948	953	958	963	968	973	978	983	988
500	912	917	922	927	932	937	942	947	952	957	962	967	972	977	982
550	906	911	916	921	926	931	936	941	946	951	956	961	966	971	976
600	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970
650	894	899	904	909	914	919	924	929	934	939	944	949	954	959	964
700	888	893	898	903	908	913	918	923	928	933	938	943	948	953	958
750	882	887	892	897	902	907	912	917	922	927	932	937	942	947	952
800	877	882	887	892	897	902	907	912	917	922	927	932	937	942	947
850	871	876	881	886	891	896	901	906	911	916	921	926	931	936	941
900	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935
950	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930
1000	854	859	864	869	874	879	884	889	894	899	904	909	914	919	924
1050	848	853	858	863	868	873	878	883	888	893	898	903	908	913	918
1100	843	848	853	858	863	868	873	878	883	888	893	898	903	908	913
1150	837	842	847	852	857	862	867	872	877	882	887	892	897	902	907
1200	832	837	842	847	852	857	862	867	872	877	882	887	892	897	902
1250	827	832	837	842	847	852	857	862	867	872	877	882	887	892	897
1300	821	826	831	836	841	846	851	856	861	866	871	876	881	886	891
1350	816	821	826	831	836	841	846	851	856	861	866	871	876	881	886
1400	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880
1450	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875
1500	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870
1550	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865
1600	789	794	799	804	809	814	819	824	829	834	839	844	849	854	859
1650	784	789	794	799	804	809	814	819	824	829	834	839	844	849	854
1700	779	784	789	794	799	804	809	814	819	824	829	834	839	844	849
1750	774	779	784	789	794	799	804	809	814	819	824	829	834	839	844
1800	769	774	779	784	789	794	799	804	809	814	819	824	829	834	839
1850	764	769	774	779	784	789	794	799	804	809	814	819	824	829	834
1900	759	764	769	774	779	784	789	794	799	804	809	814	819	824	829
1950	754	759	764	769	774	779	784	789	794	799	804	809	814	819	824
2000	749	754	759	764	769	774	779	784	789	794	799	804	809	814	819
2050	744	749	754	759	764	769	774	779	784	789	794	799	804	809	814
2100	739	744	749	754	759	764	769	774	779	784	789	794	799	804	809
2150	734	739	744	749	754	759	764	769	774	779	784	789	794	799	804
2200	729	734	739	744	749	754	759	764	769	774	779	784	789	794	799
2250	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795
2300	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790
2350	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785
2400	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780
Spannung [V]	**0,50**	**0,60**	**0,70**	**0,80**	**0,90**	**1,00**	**1,10**	**1,20**	**1,30**	**1,40**	**1,50**	**1,60**	**1,70**	**1,80**	**1,90**

Air pressure correction table for adjustment

Room protection (I-shaped pipe system)

Height [m above sea level]	Air pressure [hPa] at a height of														
0	973	978	983	988	993	998	1003	1008	1013	1018	1023	1028	1033	1038	1043
50	967	972	977	982	987	992	997	1002	1007	1012	1017	1022	1027	1032	1037
100	961	966	971	976	981	986	991	996	1001	1006	1011	1016	1021	1026	1031
150	954	959	964	969	974	979	984	989	994	999	1004	1009	1014	1019	1024
200	948	953	958	963	968	973	978	983	988	993	998	1003	1008	1013	1018
250	942	947	952	957	962	967	972	977	982	987	992	997	1002	1007	1012
300	936	941	946	951	956	961	966	971	976	981	986	991	996	1001	1006
350	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
400	924	929	934	939	944	949	954	959	964	969	974	979	984	989	994
450	918	923	928	933	938	943	948	953	958	963	968	973	978	983	988
500	912	917	922	927	932	937	942	947	952	957	962	967	972	977	982
550	906	911	916	921	926	931	936	941	946	951	956	961	966	971	976
600	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970
650	894	899	904	909	914	919	924	929	934	939	944	949	954	959	964
700	888	893	898	903	908	913	918	923	928	933	938	943	948	953	958
750	882	887	892	897	902	907	912	917	922	927	932	937	942	947	952
800	877	882	887	892	897	902	907	912	917	922	927	932	937	942	947
850	871	876	881	886	891	896	901	906	911	916	921	926	931	936	941
900	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935
950	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930
1000	854	859	864	869	874	879	884	889	894	899	904	909	914	919	924
1050	848	853	858	863	868	873	878	883	888	893	898	903	908	913	918
1100	843	848	853	858	863	868	873	878	883	888	893	898	903	908	913
1150	837	842	847	852	857	862	867	872	877	882	887	892	897	902	907
1200	832	837	842	847	852	857	862	867	872	877	882	887	892	897	902
1250	827	832	837	842	847	852	857	862	867	872	877	882	887	892	897
1300	821	826	831	836	841	846	851	856	861	866	871	876	881	886	891
1350	816	821	826	831	836	841	846	851	856	861	866	871	876	881	886
1400	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880
1450	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875
1500	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870
1550	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865
1600	789	794	799	804	809	814	819	824	829	834	839	844	849	854	859
1650	784	789	794	799	804	809	814	819	824	829	834	839	844	849	854
1700	779	784	789	794	799	804	809	814	819	824	829	834	839	844	849
1750	774	779	784	789	794	799	804	809	814	819	824	829	834	839	844
1800	769	774	779	784	789	794	799	804	809	814	819	824	829	834	839
1850	764	769	774	779	784	789	794	799	804	809	814	819	824	829	834
1900	759	764	769	774	779	784	789	794	799	804	809	814	819	824	829
1950	754	759	764	769	774	779	784	789	794	799	804	809	814	819	824
2000	749	754	759	764	769	774	779	784	789	794	799	804	809	814	819
2050	744	749	754	759	764	769	774	779	784	789	794	799	804	809	814
2100	739	744	749	754	759	764	769	774	779	784	789	794	799	804	809
2150	734	739	744	749	754	759	764	769	774	779	784	789	794	799	804
2200	729	734	739	744	749	754	759	764	769	774	779	784	789	794	799
2250	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795
2300	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790
2350	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785
2400	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780
Voltage [V]	**0,58**	**0,67**	**0,76**	**0,85**	**0,94**	**1,03**	**1,12**	**1,21**	**1,30**	**1,39**	**1,48**	**1,57**	**1,66**	**1,75**	**1,84**

Air pressure correction table for adjustment

Room protection (U-shaped, M-shaped and double U-shaped pipe system)

Height [m above sea level]	Air pressure [hPa] at a height of														
0	973	978	983	988	993	998	1003	1008	1013	1018	1023	1028	1033	1038	1043
50	967	972	977	982	987	992	997	1002	1007	1012	1017	1022	1027	1032	1037
100	961	966	971	976	981	986	991	996	1001	1006	1011	1016	1021	1026	1031
150	954	959	964	969	974	979	984	989	994	999	1004	1009	1014	1019	1024
200	948	953	958	963	968	973	978	983	988	993	998	1003	1008	1013	1018
250	942	947	952	957	962	967	972	977	982	987	992	997	1002	1007	1012
300	936	941	946	951	956	961	966	971	976	981	986	991	996	1001	1006
350	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
400	924	929	934	939	944	949	954	959	964	969	974	979	984	989	994
450	918	923	928	933	938	943	948	953	958	963	968	973	978	983	988
500	912	917	922	927	932	937	942	947	952	957	962	967	972	977	982
550	906	911	916	921	926	931	936	941	946	951	956	961	966	971	976
600	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970
650	894	899	904	909	914	919	924	929	934	939	944	949	954	959	964
700	888	893	898	903	908	913	918	923	928	933	938	943	948	953	958
750	882	887	892	897	902	907	912	917	922	927	932	937	942	947	952
800	877	882	887	892	897	902	907	912	917	922	927	932	937	942	947
850	871	876	881	886	891	896	901	906	911	916	921	926	931	936	941
900	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935
950	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930
1000	854	859	864	869	874	879	884	889	894	899	904	909	914	919	924
1050	848	853	858	863	868	873	878	883	888	893	898	903	908	913	918
1100	843	848	853	858	863	868	873	878	883	888	893	898	903	908	913
1150	837	842	847	852	857	862	867	872	877	882	887	892	897	902	907
1200	832	837	842	847	852	857	862	867	872	877	882	887	892	897	902
1250	827	832	837	842	847	852	857	862	867	872	877	882	887	892	897
1300	821	826	831	836	841	846	851	856	861	866	871	876	881	886	891
1350	816	821	826	831	836	841	846	851	856	861	866	871	876	881	886
1400	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880
1450	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875
1500	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870
1550	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865
1600	789	794	799	804	809	814	819	824	829	834	839	844	849	854	859
1650	784	789	794	799	804	809	814	819	824	829	834	839	844	849	854
1700	779	784	789	794	799	804	809	814	819	824	829	834	839	844	849
1750	774	779	784	789	794	799	804	809	814	819	824	829	834	839	844
1800	769	774	779	784	789	794	799	804	809	814	819	824	829	834	839
1850	764	769	774	779	784	789	794	799	804	809	814	819	824	829	834
1900	759	764	769	774	779	784	789	794	799	804	809	814	819	824	829
1950	754	759	764	769	774	779	784	789	794	799	804	809	814	819	824
2000	749	754	759	764	769	774	779	784	789	794	799	804	809	814	819
2050	744	749	754	759	764	769	774	779	784	789	794	799	804	809	814
2100	739	744	749	754	759	764	769	774	779	784	789	794	799	804	809
2150	734	739	744	749	754	759	764	769	774	779	784	789	794	799	804
2200	729	734	739	744	749	754	759	764	769	774	779	784	789	794	799
2250	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795
2300	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790
2350	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785
2400	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780
Voltage [V]	**0,54**	**0,63**	**0,73**	**0,82**	**0,92**	**1,01**	**1,11**	**1,20**	**1,30**	**1,40**	**1,49**	**1,59**	**1,68**	**1,78**	**1,87**

Classification VENTUM PRO LITE / PRO LITE-LSNi

With acceleration openings and without air filters or with air filters type LF-VE-k

Module		Sensitivity [% light obs./ft]	Number of aspiration apertures																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DM-VPL-L-	01	0,015	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C	C	C
		0,03	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C	C	C
		0,06	A	A	A	A	A	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C
		0,12	B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C
	10	0,1	A	A	A	B	B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C
		0,2	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C			
		0,4	C	C	C	C	C															
		0,8																				
	50	0,5	B	C	C	C	C	C	C	C												
		1	C																			

Pipe shape	Fan voltage [V]	Number of aspiration apertures																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Without pipe accessories																						Permitted total pipe length [m]
I	6,9	120	120	120	120	120	120	120	120	120	120	120	120	110	110	110	110					
	≥ 9	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	
U	6,9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
M	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (1 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (2 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
With detector box																						
I	6,9	120	120	120	120	120	120	120	120	120	120	120	100	100	100							
	≥ 9	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120			
U	6,9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160			
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
M	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	150	150	150		
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (1 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (2 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12																					
With condensate separator[1)]																						
I	6,9	90	90	90	90	90	90	90	90	90	80	80	80									
	≥ 9	120	120	120	120	110	110	90	90	90	90	90	90	90	90	90						
U	6,9		160	160	160	160	160	160	160	160	150	150	150	150	150	150						
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	150	150
M	6,9			160	150	150	150	150	150	150	150	150	150	120	120	120						
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (1 DM)	6,9				160	160	160	160	160	150	150	150	150	150	150	150	150					
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (2 DM)	6,9				160	160	160	160	160	150	150	150	150	150	150	150	150					
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12																					
With detonation prevention[2)]																						
I	6,9	53	53	53	53	46	46															
	≥ 9	64	64	64	53	53	53	53	53													
U	6,9		100	90	90	80	80	80	80													
	≥ 9		120	120	120	120	120	100	100	100	100	80	80	60	60	60	60					
M	6,9			90	90	90	90	70	70	70												
	≥ 9			120	120	120	120	120	120	120	100	100	100	100	100	100	90	90	90	90	90	
Double U (1 DM)	7				100	80	80	80	80													
	≥ 9				120	120	120	120	120	120	120	120	120	90	90	90	90	90	90	90	90	
	12				120	120	120	120	120	110	110	110	110	100	100	100	100	100	100	100	100	
Double U (2 DM)	6,9				100	80	80	80	80													
	≥ 9				120	120	120	120	120	120	120	120	120	90	90	90	90	90	90	90	90	
	12																					

[1)] **Available for following pipe accessories:**
DM-MB-TM-xx and/or MB2 and/or KA-DN 25

[2)] **Available for following pipe accessories:**
Detonation prevention EG IIx and/or KA-DN 25
Detonation prevention EG IIx and/or DM-MB-TM-xx and/or MB2

Classification VENTUM PRO LITE / PRO LITE-LSNi
With acceleration openings and air filters type LF-VE

Module		Sensitivity [% light obs./ft]	Number of aspiration apertures 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DM-VPL-L-	01	0,015	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C	C	C
		0,03	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C	C	C
		0,06	A	A	A	A	B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C
		0,12	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C	C
	10	0,1	A	A	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C
		0,2	B	B	B	B	C	C	C	C	C	C	C	C	C	C						
		0,4	C	C	C	C																
		0,8																				
	50	0,5	C	C	C	C	C	C	C													
		1																				

Pipe shape	Fan voltage [V]	Number of aspiration apertures 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Without pipe accessories																					
I	6,9	120	120	120	120	120	120	120	120	120	110	110	110	110	110	110	110				
	≥ 9	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
U	6,9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
M	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U (1 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U (2 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	12																				
With detector box																					
I	6,9	120	120	120	120	120	120	120	120	120	120	120	100	100	100						
	≥ 9	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120		
U	6,9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160		
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
M	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	150	150	150	
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U (1 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U (2 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	12																				
With condensate separator[1)]																					
I	6,9	90	90	90	90	90	90	90	90	80	80	80									
	≥ 9	120	120	120	120	110	110	90	90	90	90	90	90	90	90	90					
U	6,9		160	160	160	160	160	160	160	150	150	150	150	150	150						
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	150	150
M	6,9			160	150	150	150	150	150	150	150	150	150	150	120	120	120				
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U (1 DM)	6,9				160	160	160	160	160	150	150	150	150	150	150	150	150				
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U (2 DM)	6,9				160	160	160	160	160	150	150	150	150	150	150	150	150				
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	12																				
With detonation prevention[2)]																					
I	6,9	53	53	53	53	46	46														
	≥ 9	64	64	64	53	53	53	53	53												
U	6,9		100	90	90	80	80	80	80												
	≥ 9		120	120	120	120	120	100	100	100	100	80	80	60	60	60	60				
M	6,9			90	90	90	90	70	70	70											
	≥ 9			120	120	120	120	120	120	120	100	100	100	100	100	100	90	90	90	90	90
Double U (1 DM)	6,9				100	80	80	80	80												
	≥ 9				120	120	120	120	120	120	120	120	120	90	90	90	90	90	90	90	90
	12				120	120	120	120	120	110	110	110	110	100	100	100	100	100	100	100	100
Double U (2 DM)	6,9				100	80	80	80	80												
	≥ 9				120	120	120	120	120	120	120	120	120	90	90	90	90	90	90	90	90
	12																				

Permitted total pipe length [m]

[1)] **Available for following pipe accessories:**
DM-MB-TM-xx and/or MB2 and/or KA-DN 25

[2)] **Available for following pipe accessories:**
Detonation prevention EG IIx and/or KA-DN 25
Detonation prevention EG IIx and/or DM-MB-TM-xx and/or MB2

Classification VENTUM PRO LITE / PRO LITE-LSNi
With acceleration openings and air filters type LF-VE-1

Module		Sensitivity [% light obs./ft]	Number of aspiration apertures 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DM-VPL-L-	01	0,015	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C	C	C
		0,03	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C	C	C
		0,06	A	A	A	B	B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C
		0,12	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C		
	10	0,1	A	B	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C
		0,2	B	B	B	C	C	C	C	C	C	C	C	C	C							
		0,4	C	C	C																	
		0,8																				
	50	0,5	C	C	C	C	C	C														
		1																				

Pipe shape	Fan voltage [V]	Number of aspiration apertures 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Without pipe accessories																					
I	6,9	120	120	120	120	120	120	120	120	120	120	120	100	100	100	100					
	≥ 9	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	
U	6,9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160		
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
M	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160		
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U (1 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U (2 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	12																				
With detector box																					
I	6,9	120	120	120	120	120	120	120	120	120	120	120	100	100	100						
	≥ 9	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120		
U	6,9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160		
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
M	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	150	150	150	
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U (1 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U (2 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	12																				
With condensate separator[1)]																					
I	6,9	90	90	90	90	90	90	90	90	90	80	80	80								
	≥ 9	120	120	120	120	110	110	90	90	90	90	90	90	90	90	90					
U	6,9		160	160	160	160	160	160	160	150	150	150	150	150	150						
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	150	150
M	6,9			160	150	150	150	150	150	150	150	150	150	150	120	120	120				
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U (1 DM)	6,9				160	160	160	160	160	150	150	150	150	150	150	150	150				
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U (2 DM)	6,9				160	160	160	160	160	150	150	150	150	150	150	150	150				
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	12																				
With detonation prevention[2)]																					
I	6,9	53	53	53	53	46	46														
	≥ 9	64	64	64	53	53	53	53	53												
U	6,9		100	90	90	80	80	80	80												
	≥ 9		120	120	120	120	120	100	100	100	100	80	80	60	60	60	60				
M	6,9			90	90	90	90	70	70	70											
	≥ 9			120	120	120	120	120	120	120	100	100	100	100	100	100	90	90	90	90	90
Double U (1 DM)	6,9				100	80	80	80	80												
	≥ 9				120	120	120	120	120	120	120	120	120	90	90	90	90	90	90	90	90
	12				120	120	120	120	120	110	110	110	110	100	100	100	100	100	100	100	100
Double U (2 DM)	6,9				100	80	80	80	80												
	≥ 9				120	120	120	120	120	120	120	120	120	90	90	90	90	90	90	90	90
	12																				

Permitted total pipe length [m]

[1)] **Available for following pipe accessories:**
DM-MB-TM-xx and/or MB2 and/or KA-DN 25

[2)] **Available for following pipe accessories:**
Detonation prevention EG IIx and/or KA-DN 25
Detonation prevention EG IIx and/or DM-MB-TM-xx and/or MB2

Classification VENTUM PRO LITE / PRO LITE-LSNi
With acceleration openings and air filters type LF-VE-2

Module		Sensitivity [% light obs./ft]	Number of aspiration apertures																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DM-VPL-L-	01	0,015	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C	C	C
		0,03	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C	C	C
		0,06	A	A	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C
		0,12	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C					
	10	0,1	A	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C
		0,2	B	B	C	C	C	C	C	C	C	C	C									
		0,4	C	C																		
		0,8																				
	50	0,5	C	C	C	C																
		1																				

Pipe shape	Fan voltage [V]	Number of aspiration apertures																				Permitted total pipe length [m]
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Without pipe accessories																						
I	6,9	120	120	120	120	120	120	120	120	120	120	120	100	100	100	100						
	≥ 9	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120		
U	6,9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160			
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
M	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160			
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (1 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (2 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12																					
With detector box																						
I	6,9	120	120	120	120	120	120	120	120	120	120	120	100	100	100							
	≥ 9	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120			
U	6,9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160			
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
M	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	150	150	150		
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (1 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (2 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12																					
With condensate separator[1)]																						
I	6,9	90	90	90	90	90	90	90	90	80	80	80										
	≥ 9	120	120	120	120	110	110	90	90	90	90	90	90	90	90	90						
U	6,9		160	160	160	160	160	160	160	150	150	150	150	150	150							
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	150	150	
M	6,9			160	150	150	150	150	150	150	150	150	150	120	120	120						
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (1 DM)	6,9				160	160	160	160	160	150	150	150	150	150	150	150	150					
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (2 DM)	6,9				160	160	160	160	160	150	150	150	150	150	150	150	150					
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12																					
With detonation prevention[2)]																						
I	6,9	53	53	53	53	46	46															
	≥ 9	64	64	64	53	53	53	53	53													
U	6,9		100	90	90	80	80	80	80													
	≥ 9		120	120	120	120	120	100	100	100	100	80	80	60	60	60	60					
M	6,9			90	90	90	90	70	70	70												
	≥ 9			120	120	120	120	120	120	120	100	100	100	100	100	100	90	90	90	90	90	
Double U (1 DM)	6,9				100	80	80	80	80													
	≥ 9				120	120	120	120	120	120	120	120	120	120	90	90	90	90	90	90	90	90
	12				120	120	120	120	120	110	110	110	110	100	100	100	100	100	100	100	100	
Double U (2 DM)	6,9				100	80	80	80	80													
	≥ 9				120	120	120	120	120	120	120	120	120	120	90	90	90	90	90	90	90	90
	12																					

[1)] **Available for following pipe accessories:**
DM-MB-TM-xx and/or MB2 and/or KA-DN 25

[2)] **Available for following pipe accessories:**
Detonation prevention EG IIx and/or KA-DN 25
Detonation prevention EG IIx and/or DM-MB-TM-xx and/or MB2

Classification VENTUM PRO LITE / PRO LITE-LSNi
With acceleration openings and air filters type SF-400 / SF-650

Module		Sensitivity [% light obs./ft]	Number of aspiration apertures 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DM-VPL-L-	01	0,015	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C	C	
		0,03	C	C	C	C	C	C														
		0,06																				
		0,12																				
	10	0,1																				
		0,2																				
		0,4																				
		0,8																				
	50	0,5																				
		1																				

Pipe shape	Fan voltage [V]	Number of aspiration apertures 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Without pipe accessories																					
I	6,9	120	120	120	120	120	120	120	120	120	120	120	100	100	100	100					
	≥ 9	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120		
U	6,9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160		
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
M	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	150	150	150	
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (1 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (2 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12																				
With detector box																					
I	6,9	120	120	120	120	120	120	120	120	120	120	120	100	100	100						
	≥ 9	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120		
U	6,9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160		
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
M	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	150	150	150	
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (1 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (2 DM)	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12																				
With condensate separator[1)]																					
I	6,9	90	90	90	90	90	90	90	90	90	80	80	80								
	≥ 9	120	120	120	120	110	110	90	90	90	90	90	90	90	90	90					
U	6,9		160	160	160	160	160	160	160	150	150	150	150	150	150						
	≥ 9		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	150	
M	6,9			160	150	150	150	150	150	150	150	150	150	120	120	120					
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (1 DM)	6,9				160	160	160	160	160	150	150	150	150	150	150	150	150				
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U (2 DM)	6,9				160	160	160	160	160	150	150	150	150	150	150	150	150				
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	12																				
With detonation prevention[2)]																					
I	6,9	53	53	53	53	46	46														
	≥ 9	64	64	64	53	53	53	53	53												
U	6,9		100	90	90	80	80	80	80												
	≥ 9		120	120	120	120	120	100	100	100	100	80	80	60	60	60	60				
M	6,9			90	90	90	90	70	70	70											
	≥ 9			120	120	120	120	120	120	120	100	100	100	100	100	100	90	90	90	90	
Double U (1 DM)	6,9				100	80	80	80	80												
	≥ 9				120	120	120	120	120	120	120	120	120	90	90	90	90	90	90	90	
	12				120	120	120	120	120	110	110	110	110	100	100	100	100	100	100	100	
Double U (2 DM)	6,9				100	80	80	80	80												
	≥ 9				120	120	120	120	120	120	120	120	120	90	90	90	90	90	90	90	
	12																				

Permitted total pipe length [m]

[1)] **Available for following pipe accessories:**
DM-MB-TM-xx and/or MB2 and/or KA-DN 25

[2)] **Available for following pipe accessories:**
Detonation prevention EG IIx and/or KA-DN 25
Detonation prevention EG IIx and/or DM-MB-TM-xx and/or MB2

Classification VENTUM PRO LITE / PRO LITE-LSNi
Project planning without air filters or with air filters type LF-VE-k

Module		Sensitivity [% light obs./m]	Number of aspiration apertures 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20
DM-VPL-	01	0,015	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,03	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,06	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,12	A	A	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C
	10	0,1	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,2	A	A	A	A	B	B	B	B	B	B	B	B	C	C	C	C	C	C
		0,4	A	A	B	B	B	B	C	C	C	C	C	C						
		0,8	A	B	B	C	C	C												
	50	0,5	A	A	A	B	B	B	B	C	C	C	C	C	C	C	C			
		1	A	B	B	C	C	C	C											

Pipe shape	Fan voltage [V]	Number of aspiration apertures 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	Permitted total pipe length [m]
Without pipe accessories																				
I	6,5	77	77	77	77	77	77	77	77											
	6,9	77	77	77	77	77	77	77	77	76										
	≥ 9	100	100	100	100	100	100	100	100	100	100	100	100	100						
U	6,5		120	120	120	120	120	120	120	120	120	120	120							
	6,9		120	120	120	120	120	120	120	120	120	120	120	120	120					
	≥ 9		150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	
M	6,5			160	160	160	160	160	160	160	160	160	160	160						
	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160				
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U	6,5				160	160	160	160	160	160	160	160	160	160	160	160	160			
	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
With detector box																				
I	6,5	70	70	70	70	70	70	70												
	6,9	70	70	70	70	70	70	70	70											
	≥ 9	100	100	100	100	100	100	100	100	100	100									
U	6,5		120	120	120	120	120	120	120	120	120	120	120							
	6,9		120	120	120	120	120	120	120	120	120	120	120	120	120					
	≥ 9		140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140		
M	6,5			150	150	150	150	150	150	150	150	150	150	150						
	6,9			150	150	150	150	150	150	150	150	150	150	150	150	150	150			
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U	6,5				140	140	140	140	140	140	140	140	140	140	140	140	140			
	6,9				150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
With condensate separator[1)]																				
I	6,5	60	60	60	60	60	60													
	6,9	60	60	60	60	60	60	60												
	≥ 9	80	80	80	80	80	80	80	80	80	80									
U	6,5		100	100	100	100	100	100	100	100	100	100								
	6,9		110	110	110	110	110	110	110	110	110	110	110							
	≥ 9		110	110	110	110	110	110	110	110	110	110	110	110	110	110	110			
M	6,5			100	100	100	100	100	100	100	100	100	100							
	6,9			110	110	110	110	110	110	110	110	110	110	110	110	110				
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160		
Double U	6,5				140	140	140	140	140	140	140	140	140							
	6,9				140	140	140	140	140	140	140	140	140	140	140	140	140			
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160			
With detonation prevention device[2)]																				
I	6,5	46	46	46	46															
	6,9	46	46	46	46	38														
	≥ 9	68	68	68	68	68	68													
U	6,5		60	60	60	60	60													
	6,9		60	60	60	60	60													
	≥ 9		60	60	60	60	60	60	60											
M	6,5			80	80	80	80													
	6,9			80	80	80	80	70	70	70										
	≥ 9			120	120	120	120	120	120	120										
Double U	6,5				80															
	6,9				80	80	80	80	80											
	≥ 9				100	100	100	100	100											

[1)] Available for following pipe accessories:
DM-MB-TM-XX and/or MB2 and/or KA-DN 25

[2)] Available for following pipe accessories:
Detonation prevention EG IIx and/or KA-DN 25
Detonation prevention EG IIx and/or DM-MB-TM-XX and/or MB2

Classification VENTUM PRO LITE / PRO LITE-LSNi
Project planning with air filters type LF-VE

Module		Sensitivity [% light obs./m]	Number of aspiration apertures 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20
DM-VPL-	01	0,015	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,03	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,06	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,12	A	A	A	A	A	B	B	B	B	B	B	B	C	C	C	C	C	C
	10	0,1	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,2	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	C
		0,4	A	A	B	B	B	C	C	C	C	C								
		0,8	A	B	C	C	C													
	50	0,5	A	A	B	B	B	B	C	C	C	C	C	C	C					
		1	A	B	B	C	C	C												

Pipe shape	Fan voltage [V]	Number of aspiration apertures 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20
Without pipe accessories																			
I	6,5	70	70	70	70	70	70	70											
	6,9	70	70	70	70	70	70	70	70										
	≥ 9	100	100	100	100	100	100	100	100	100	100	90	90						
U	6,5		120	120	120	120	120	120	120	120	120	120	120						
	6,9		120	120	120	120	120	120	120	120	120	120	120	120	120				
	≥ 9		140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
M	6,5			160	160	160	160	160	160	160	160	160	160	160					
	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160			
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U	6,5				160	160	160	160	160	160	160	160	160	160	160	160	160		
	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
With detector box																			
I	6,5	70	70	70	70	70	70	70											
	6,9	70	70	70	70	70	70	70	70										
	≥ 9	100	100	100	100	100	100	100	100	100	100								
U	6,5		110	110	110	110	110	110	110	110	110	110	110						
	6,9		120	120	120	120	120	120	120	120	120	120	120	120	120				
	≥ 9		140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	
M	6,5			150	150	150	150	150	150	150	150	150	150	150					
	6,9			150	150	150	150	150	150	150	150	150	150	150	150	150			
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U	6,5				140	140	140	140	140	140	140	140	140	140	140	140	140		
	6,9				150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
With condensate separator[1)]																			
I	6,5	60	60	60	60	60	60												
	6,9	60	60	60	60	60	60	60											
	≥ 9	80	80	80	80	80	80	80	80	80	80								
U	6,5		100	100	100	100	100	100	100	100	100								
	6,9		110	110	110	110	110	110	110	110	110	110	110						
	≥ 9		110	110	110	110	110	110	110	110	110	110	110	110	110	110	110		
M	6,5			100	100	100	100	100	100	100	100	100	100						
	6,9			110	110	110	110	110	110	110	110	110	110	110	110	110			
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U	6,5				140	140	140	140	140	140	140	140	140						
	6,9				140	140	140	140	140	140	140	140	140	140	140	140	140		
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160		
With detonation prevention device[2)]																			
I	6,5	46	46	46	46														
	6,9	46	46	46	46	38													
	≥ 9	68	68	68	68	68	68												
U	6,5		60	60	60	60	60												
	6,9		60	60	60	60	60												
	≥ 9		60	60	60	60	60	60	60										
M	6,5			80	80	80	80												
	6,9			80	80	80	80	70	70	70									
	≥ 9			120	120	120	120	120	120	120									
Double U	6,5				80														
	6,9				80	80	80	80	80										
	≥ 9				100	100	100	100	100										

Permitted total pipe length [m]

[1)] Available for following pipe accessories:
DM-MB-TM-XX and/or MB2 and/or KA-DN 25

[2)] Available for following pipe accessories:
Detonation prevention EG IIx and/or KA-DN 25
Detonation prevention EG IIx and/or DM-MB-TM-XX and/or MB2

Classification VENTUM PRO LITE / PRO LITE-LSNi
Project planning with air filters type LF-VE-1

Module		Sensitivity [% light obs./m]	Number of aspiration apertures 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20
DM-VPL-	01	0,015	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,03	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,06	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,12	A	A	A	A	B	B	B	B	B	B	B	B	C	C	C	C	C	C
	10	0,1	A	A	A	A	A	A	A	B	B	B	B	B	C	C	C	C	C	C
		0,2	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	C	
		0,4	A	B	B	B	C	C	C	C	C									
		0,8	B	B	C	C														
	50	0,5	A	A	B	B	B	B	C	C	C	C	C	C						
		1	A	B	B	C	C	C												

Pipe shape	Fan voltage [V]	Number of aspiration apertures 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	Permitted total pipe length [m]
Without pipe accessories																				
I	6,5	70	70	70	70	70	70	70												
	6,9	70	70	70	70	70	70	70	70											
	≥ 9	100	100	100	100	100	100	100	100	100	100	90	90							
U	6,5		120	120	120	120	120	120	120	120	120	120	120							
	6,9		120	120	120	120	120	120	120	120	120	120	120	120	120					
	≥ 9		140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	
M	6,5			160	160	160	160	160	160	160	160	160	160	160						
	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160				
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U	6,5				160	160	160	160	160	160	160	160	160	160	160	160	160			
	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
With detector box																				
I	6,5	70	70	70	70	70	70	70												
	6,9	70	70	70	70	70	70	70	70											
	≥ 9	100	100	100	100	100	100	100	100	100	100									
U	6,5		110	110	110	110	110	110	110	110	110	110	110							
	6,9		120	120	120	120	120	120	120	120	120	120	120	120	120					
	≥ 9		140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140		
M	6,5			150	150	150	150	150	150	150	150	150	150	150						
	6,9			150	150	150	150	150	150	150	150	150	150	150	150	150	150			
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U	6,5				140	140	140	140	140	140	140	140	140	140	140	140	140			
	6,9				150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
With condensate separator[1)]																				
I	6,5	60	60	60	60	60	60													
	6,9	60	60	60	60	60	60	60												
	≥ 9	80	80	80	80	80	80	80	80	80	80									
U	6,5		100	100	100	100	100	100	100	100	100									
	6,9		110	110	110	110	110	110	110	110	110	110	110							
	≥ 9		110	110	110	110	110	110	110	110	110	110	110	110	110	110	110			
M	6,5			100	100	100	100	100	100	100	100	100	100							
	6,9			110	110	110	110	110	110	110	110	110	110	110	110	110				
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160		
Double U	6,5				140	140	140	140	140	140	140	140	140							
	6,9				140	140	140	140	140	140	140	140	140	140	140	140	140			
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160			
With detonation prevention device[2)]																				
I	6,5	46	46	46	46															
	6,9	46	46	46	46	38														
	≥ 9	68	68	68	68	68	68													
U	6,5		60	60	60	60	60													
	6,9		60	60	60	60	60													
	≥ 9		60	60	60	60	60	60	60											
M	6,5			80	80	80	80													
	6,9			80	80	80	80	70	70	70										
	≥ 9			120	120	120	120	120	120	120										
Double U	6,5				80															
	6,9				80	80	80	80	80											
	≥ 9				100	100	100	100	100											

[1)] Available for following pipe accessories:
DM-MB-TM-XX and/or MB2 and/or KA-DN 25

[2)] Available for following pipe accessories:
Detonation prevention EG IIx and/or KA-DN 25
Detonation prevention EG IIx and/or DM-MB-TM-XX and/or MB2

Classification VENTUM PRO LITE / PRO LITE-LSNi
Project planning with air filters type LF-VE-2

Module		Sensitivity [% light obs./m]	Number of aspiration apertures																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20
DM-VPL-	01	0,015	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,03	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,06	A	A	A	A	A	A	A	A	B	B	B	B	C	C	C	C	C	C
		0,12	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	C
	10	0,1	A	A	A	A	A	A	A	B	B	B	B	B	C	C	C	C	C	C
		0,2	A	A	A	B	B	B	B	B	C	C	C	C	C	C	C	C		
		0,4	A	B	B	B	C	C	C	C										
		0,8	B	B	C	C														
	50	0,5	A	A	B	B	B	C	C	C	C	C								
		1	A	B	C	C	C													

Pipe shape	Fan voltage [V]	Number of aspiration apertures																		Permitted total pipe length [m]
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	
Without pipe accessories																				
I	6,5	70	70	70	70	70	70	70												
	6,9	70	70	70	70	70	70	70	70											
	≥ 9	100	100	100	100	100	100	100	100	100	100	90	90							
U	6,5		120	120	120	120	120	120	120	120	120	120	120							
	6,9		120	120	120	120	120	120	120	120	120	120	120	120	120					
	≥ 9		140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	
M	6,5			160	160	160	160	160	160	160	160	160	160							
	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160				
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U	6,5				160	160	160	160	160	160	160	160	160	160	160	160	160	160		
	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
With detector box																				
I	6,5	70	70	70	70	70	70	70												
	6,9	70	70	70	70	70	70	70	70											
	≥ 9	100	100	100	100	100	100	100	100	100	100									
U	6,5		120	120	120	120	120	120	120	120	120	120	120							
	6,9		120	120	120	120	120	120	120	120	120	120	120	120	120					
	≥ 9		140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	
M	6,5			150	150	150	150	150	150	150	150	150	150							
	6,9			150	150	150	150	150	150	150	150	150	150	150	150	150				
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U	6,5				140	140	140	140	140	140	140	140	140	140	140	140	140	140		
	6,9				150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
With condensate separator[1)]																				
I	6,5	60	60	60	60	60	60													
	6,9	60	60	60	60	60	60	60												
	≥ 9	80	80	80	80	80	80	80	80	80	80									
U	6,5		100	100	100	100	100	100	100	100	100	100								
	6,9		110	110	110	110	110	110	110	110	110	110	110	110						
	≥ 9		110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110		
M	6,5			100	100	100	100	100	100	100	100	100	100							
	6,9			110	110	110	110	110	110	110	110	110	110	110	110	110				
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160		
Double U	6,5				140	140	140	140	140	140	140	140	140							
	6,9				140	140	140	140	140	140	140	140	140	140	140	140	140	140		
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160		
With detonation prevention device[2)]																				
I	6,5	46	46	46	46															
	6,9	46	46	46	46	38														
	≥ 9	68	68	68	68	68	68													
U	6,5		60	60	60	60	60													
	6,9		60	60	60	60	60													
	≥ 9		60	60	60	60	60	60	60											
M	6,5			80	80	80	80													
	6,9			80	80	80	80	70	70	70										
	≥ 9			120	120	120	120	120	120	120										
Double U	6,5				80															
	6,9				80	80	80	80	80											
	≥ 9				100	100	100	100	100											

[1)] Available for following pipe accessories:
DM-MB-TM-XX and/or MB2 and/or KA-DN 25

[2)] Available for following pipe accessories:
Detonation prevention EG IIx and/or KA-DN 25
Detonation prevention EG IIx and/or DM-MB-TM-XX and/or MB2

Classification VENTUM PRO LITE / PRO LITE-LSNi
Project planning with air filters type SF-400/SF-650

Module		Sensitivity [% light obs./m]	Number of aspiration apertures																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20
DM-VPL-	01	0,015	A	A	A	A	A	B	B	B	B	B	B	B	C	C	C	C	C	C
		0,03	A	A	B	B	B	B	C	C	C	C	C	C						
		0,06	A	B	B	C	C	C												
		0,12	B	C	C															
	10	0,1	A	B	C	C	C													
		0,2	B	C																
		0,4	C																	
		0,8																		
	50	0,5	C																	
		1																		

Pipe shape	Fan voltage [V]	Number of aspiration apertures																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20
Without pipe accessories																			
I	6,5	70	70	70	70	70	70	70											
	6,9	70	70	70	70	70	70	70	70										
	≥ 9	100	100	100	100	100	100	100	100	100	100	90	90						
U	6,5		120	120	120	120	120	120	120	120	120	120	120						
	6,9		120	120	120	120	120	120	120	120	120	120	120	120	120				
	≥ 9		140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
M	6,5			160	160	160	160	160	160	160	160	160	160						
	6,9			160	160	160	160	160	160	160	160	160	160	160	160	160			
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U	6,5				155	155	155	155	155	155	155	155	155	155	155	155	155		
	6,9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
With detector box																			
I	6,5	70	70	70	70	70	70	70											
	6,9	70	70	70	70	70	70	70	70										
	≥ 9	100	100	100	100	100	100	100	100	100	100								
U	6,5		110	110	110	110	110	110	110	110	110	110	110						
	6,9		120	120	120	120	120	120	120	120	120	120	120	120	120				
	≥ 9		135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	
M	6,5			150	150	150	150	150	150	150	150	150	150						
	6,9			150	150	150	150	150	150	150	150	150	150	150	150	150			
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Double U	6,5				140	140	140	140	140	140	140	140	140	140	140	140	140		
	6,9				150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
With condensate separator[1)]																			
I	6,5	60	60	60	60	60	60												
	6,9	60	60	60	60	60	60	60											
	≥ 9	80	80	80	80	80	80	80	80	80	80								
U	6,5		100	100	100	100	100	100	100	100	100	100							
	6,9		110	110	110	110	110	110	110	110	110	110	110	110					
	≥ 9		110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	
M	6,5			100	100	100	100	100	100	100	100	100	100						
	6,9			110	110	110	110	110	110	110	110	110	110	110	110	110			
	≥ 9			160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Double U	6,5				140	140	140	140	140	140	140	140	140						
	6,9				140	140	140	140	140	140	140	140	140	140	140	140	140		
	≥ 9				160	160	160	160	160	160	160	160	160	160	160	160	160		
With detonation prevention device[2)]																			
I	6,5	46	46	46	46														
	6,9	46	46	46	46	38													
	≥ 9	68	68	68	68	68	68												
U	6,5		60	60	60	60	60												
	6,9		60	60	60	60	60												
	≥ 9		60	60	60	60	60	60	60										
M	6,5			80	80	80	80												
	6,9			80	80	80	80	70	70	70									
	≥ 9			120	120	120	120	120	120	120									
Double U	6,5				80														
	6,9				80	80	80	80	80										
	≥ 9				100	100	100	100	100										

Permitted total pipe length [m]

[1)] **Available for following pipe accessories:**
DM-MB-TM-XX and/or MB2 and/or KA-DN 25

[2)] **Available for following pipe accessories:**
Detonation prevention EG IIx and/or KA-DN 25
Detonation prevention EG IIx and/or DM-MB-TM-XX and/or MB2

Test record VENTUM PRO LITE and PRO LITE TWO

		Device identification					
Device number							
Serial number basic device							
Serial number detector module							
		Measuring an adjustment values					
Commissioning							
Visual check	(✓/ –)						
Depression	[Pa]						
Sensitivity (main alarm)	[% light obs./m]						
Alarm delay	[s]						
Activating treshold (airflow)	(small/medium/ large/very large)						
Fault delay	[min, s]						
Fault indicator stored	(yes/no)						
LOGIC·SENS	(yes/no)						
Fan voltage	[V]						
Adjustmet dependent on the air pressure	(yes/no)						
Adjustmet independent on the air pressure	(yes/no)						
Height above sea level	[m]						
Air pressure	[hPa]						
Temperature	[°C]						
Fault blockage							
LED flashes	(✓/ –)						
Relay drops out after delay time	(✓/ –)						
Signal transmission to central fire panel	(✓/ –)						
Cause of the fault eliminated, LED off	(✓/ –)						
Relay picks up when tresh, is not reached	(✓/ –)						
Cause of the fault eliminated, LED stored	(✓/ –)						
Relay stays dropped out	(✓/ –)						
Fault fracture							
LED flashes	(✓/ –)						
Relay drops out after delay time	(✓/ –)						
Signal transmission to central fire panel	(✓/ –)						
Cause of the fault eliminated, LED off	(✓/ –)						
Relay picks up when tresh, is not reached	(✓/ –)						
Cause of the fault eliminated, LED stored	(✓/ –)						
Relay stays dropped out	(✓/ –)						
Main alarm							
LED flashes	(✓/ –)						
Relay picks up after delay time	(✓/ –)						
Signal transmission to central fire panel	(✓/ –)						
LED stored	(✓/ –)						
Relay stored	(✓/ –)						

Key

OK	✓
not OK	–

Issuer: ……..…… **Signature:** ……..……

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