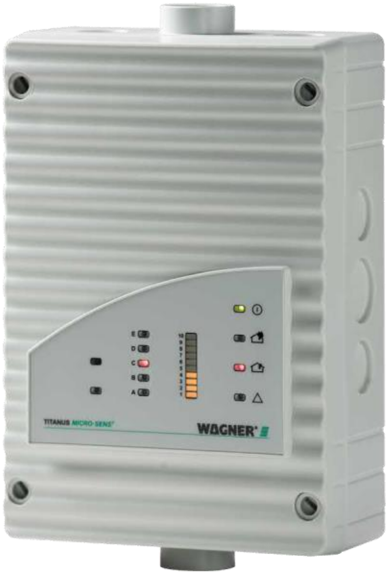
Ampac

Fire detection and evacuation solutions that save lives.



Aspirating smoke detector TITANUS MICRO·SENS®

Technical Manual

MAN3186

A Halma company

Contents

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.

WAGNER Group GmbH shall not be liable for any damages or losses that might result from failure to comply with this technical manual.

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

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

The "delivery and installation conditions" of WAGNER Group GmbH apply as a matter of principle. No warranty and liability claims can be applied for personal injury and material damages if these were caused by one or more of the following factors:

- Insufficient attention paid 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

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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, dismantled components should be recycled as follows:

- Metals should be scrapped
- Plastic elements should be returned for recycling
- Sort the remaining components by material quality and dispose of them.
- Batteries should be returned to a municipal collection station or to WAGNER Group GmbH

1.7 Instructions for the user

Regular visual inspections and functional tests must be carried out 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 physical modification to the protected object 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 TITANUS MICRO·SENS® belongs to the group of tried and tested aspirating smoke detectors of WAGNER Group GmbH.

In addition to monitoring rooms and equipment, the TITANUS MICRO·SENS® can be used to monitor air conditioning units or ducts. Using the innovative ROOM IDENT method (optional), the unit can also determine the location of the fire.

Fire site localisation (optional)

The unique ROOM IDENT technology enables the exact localisation of the fire and monitoring of up to five separate areas. For the fastest possible intervention of emergency services, the fire site can be marked, e.g. via response indicators assigned to the different monitoring areas. By means of a connected relay module, the localised fire site can be forwarded to a superior fire detection control panel (FDCP).

Sensitivity

The TITANUS MICRO·SENS® has a response sensitivity (main alarm) of up to 0.1 or 0.5 % light obscuration/m. By means of smoke level indication, a display sensitivity of 0.01 to 0.05 % light obscuration/m is achieved. A wide detection range across all standard types of blaze is achieved thanks to the High Power Light Source technology. The unit can optionally have two response sensitivities (pre-alarm and main alarm).

LOGIC·SENS

The intelligent signal processor LOGIC·SENS distinguishes between deception 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 air flow monitoring is required for aspirating smoke detectors. The unique air flow sensor system used in all WAGNER Group GmbH aspirating smoke detectors reliably detects fluctuations in the air flow, for example due to breakage or the blockage of the pipe system.

Air flow monitoring is temperature-compensated and can be set in relation to air pressure.

In addition, a dynamic air flow sensor system can be activated in the diagnostic software. This sensitises the device to quick changes in the air flow, e.g. in the event the aspiration apertures are suddenly covered. An air flow fault is already triggered at an air flow deviation of approx. 5%.

Plug-and-play The plug-and-play function enables the TITANUS MICRO·SENS® to be easily installed and commissioned.

The device base is pre-assembled on-site. Due to the presetting of the detection unit for the standard application, the TITANUS MICRO·SENS® is immediately ready for operation after installation in the device base.

Redundant fan (optional) For the highest safety requirements, the TITANUS MICRO·SENS® can be equipped with a redundant fan. ROOM IDENT is not possible when operating the unit with a redundant fan.

Network capability (optional) Several TITANUS MICRO·SENS® devices can be linked together in an Ethernet network using a network module. The operator can monitor the entire system including the smoke level, air flow values, etc. from a central location using Visu*LAN* T®, for example. An integrated data logger allows the data to be stored on a memory card over a longer period of time and analysed later on. The TITANUS MICRO·SENS® can also be integrated into existing danger and building management systems via what is referred to as an OPC server.

Potential-free contacts The TITANUS MICRO·SENS® has one potential-free contact each for alarm and fault. This means that the unit can be switched to collective and addressable detection lines of an FDCP (using the suitable addressing modules).

A relay module (optional) can be connected to the TITANUS MICRO·SENS®. With this, potential-free contacts are available for alarm, fault and pre-alarm (RU-2) as well as for ROOM IDENT (RU-1).

Diagnostics The diagnosis device is a system which provides quick and easy device configuration and fault localisation for set-up operations, inspections and servicing. Events are stored in the TITANUS MICRO·SENS® for 72 hours for diagnosis purposes. The events are stored until they are manually deleted using the diagnostic software.

Point-type detector project planning The aspiration apertures of the pipe system are equivalent to point-shaped smoke detectors. The monitoring areas can therefore be planned in accordance with the currently valid national directives.

Aspiration apertures	The pipe system aspiration apertures require a specifically defined opening diameter, depending on the project specifications. WAGNER Group GmbH has developed aspiration-reducing film sheets with sleeves and aspiration-reducing clips in order to achieve these precise aspiration apertures. These 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.
Extensive pipe accessories	The extensive range of WAGNER Group GmbH accessories enables aspirating smoke detectors to be used even under the most difficult conditions. Products ranging from various types of air filters to condensate separators and air purge systems increase service life under extremely dusty, damp and deep-freeze ambient conditions.

2.2 Areas of application

The TITANUS MICRO·SENS® is an aspirating smoke detector used for the protection of rooms, facilities and air conditioning ducts.

Principle

Air samples are taken from the monitoring area using a pipe system with defined aspiration apertures and supplied to the detection unit.

This principle is particularly suitable in areas where point smoke detectors cannot be used or where their use is limited, e.g. areas to be protected

- with high fire risks
- with contaminated air where filter elements are required
- which are difficult to access and where point detectors are difficult to install or maintain
- which are air-conditioned
- which are subjected to high or low temperatures
- which must be protected against vandalism or sabotage
- whose height is greater than the permissible height for point detectors.
- where high detection sensitivity is required
- in which point detectors are not wanted due to aesthetic reasons
- where strong electromagnetic fields occur
- where false alarms must be avoided

Room monitoring

The TITANUS MICRO·SENS® is suitable for the monitoring of rooms with, e.g.

- Raised floors, suspended ceilings
- Tunnels, channels, difficult to access cavities
- Warehouses, refrigerated warehouses, lift shafts
- Museums, cultural facilities
- Hotel rooms, hospital rooms, offices, prison cells, train compartments

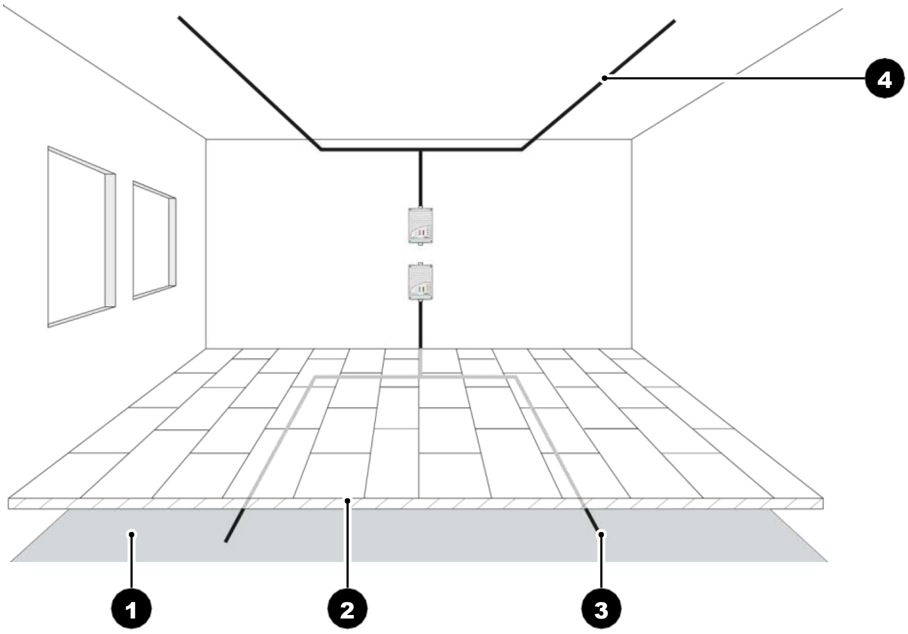


Image 1: Principle of room monitoring

1	Floor
2	False floor
3	Pipe system installed in false floor (partially concealed)
4	Pipe system installed below the ceiling

Room monitoring with air-conditioning

Room monitoring is performed:

- in server rooms with air conditioning
- on ventilation ducts
- over raised floors, suspended ceilings
- in IT rooms, e-distributor rooms, transformer cells
- on air conditioning units
- on air conditioning ducts in the bypass.

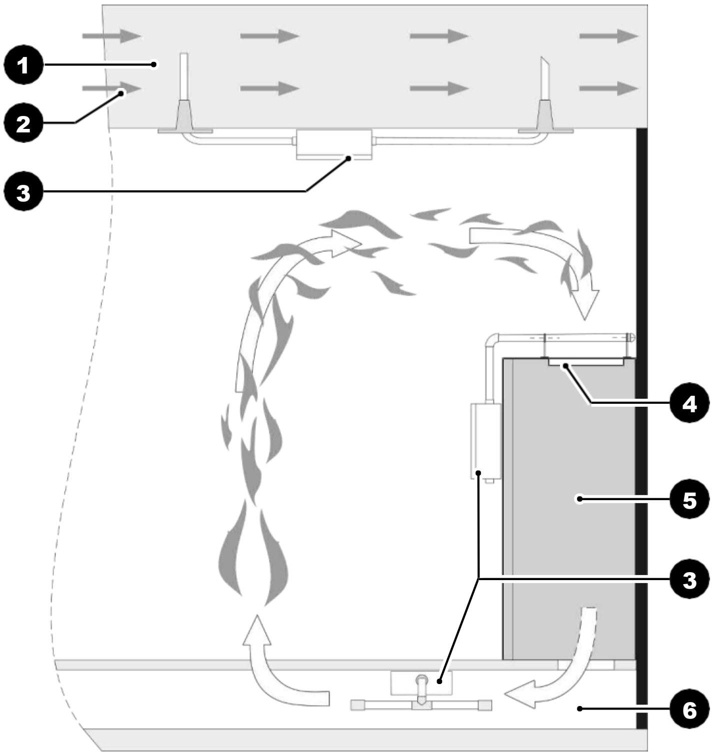


Image 2: Principle of room monitoring with air-conditioning (e.g. air circulation units or air-conditioning ducts)

1	Air-conditioning duct
2	Air flow
3	TITANUS MICRO·SENS®
4	Ventilation grille
5	Air circulation unit
6	Raised floor

System monitoring

The TITANUS MICRO·SENS® is also suitable for the monitoring of un-ventilated and forced-ventilated units/cabinets, e.g.:

- Distribution cabinets, switching cabinets
- Telephone exchange installations
- Measuring and control systems

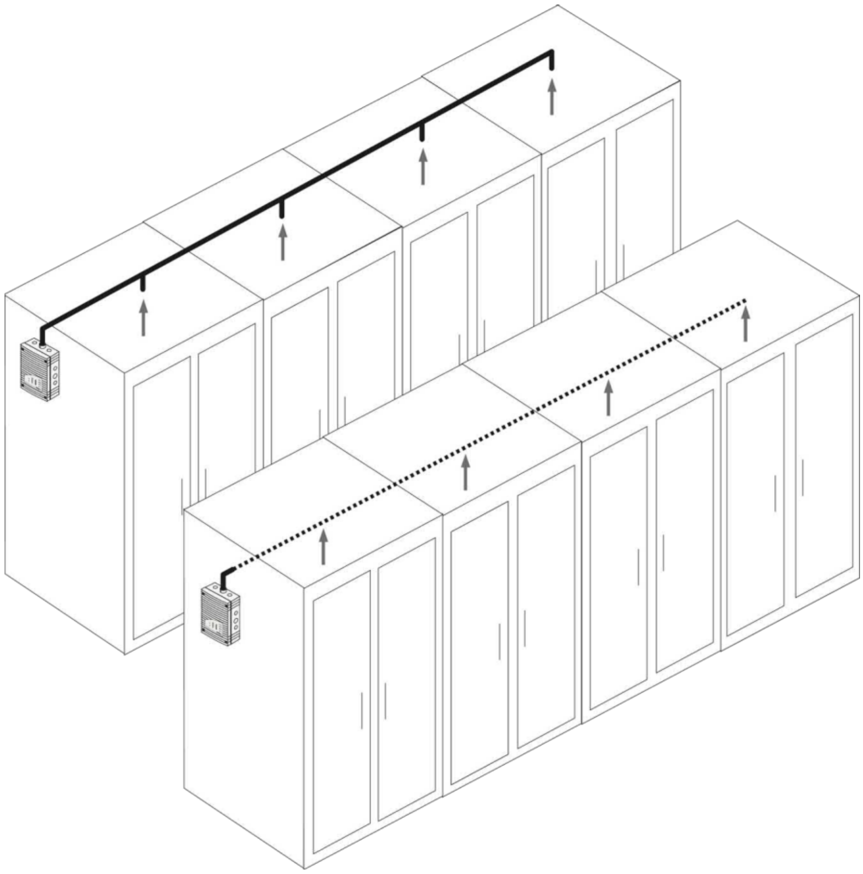


Image 3: Principle of equipment monitoring

The TITANUS MICRO·SENS® 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 TITANUS MICRO·SENS® is therefore particularly suited for application areas in which:

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

3 Technical description

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

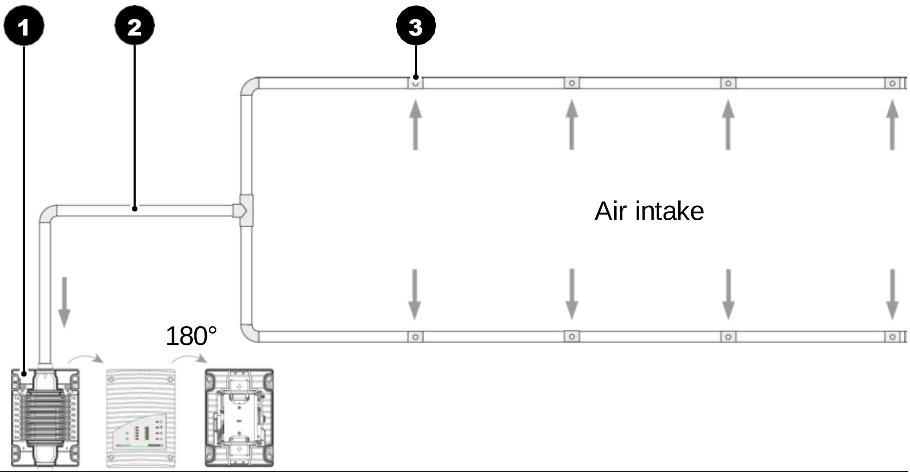
3.1 System description

The TITANUS MICRO·SENS® comprises the detection unit, device base and pipe system.

The most important component of the TITANUS MICRO·SENS® is the sensitive detection unit. It comprises:

- the aspiration unit for transporting the air samples
- the smoke sensor unit for detecting the smoke aerosols
- the integrated air flow sensor for monitoring the pipe system for breakage and blockage

The pipe system fundamentally consists of a pipe and fittings, optionally as a UPVC or ABS plastic version. Each aspiration aperture in the TITANUS MICRO·SENS® pipe system represents a ceiling detector in project planning.



1	TITANUS MICRO·SENS®
2	Pipe system
3	Aspiration apertures

Extensive accessories (e.g. integrated air filter, various external air filters or air purge system) are available in order to ensure safe operation even under the most difficult conditions (e.g. recycling areas). For applications with special safety requirements, a TITANUS MICRO·SENS® version with a redundant fan can be used.

A deep-freeze version of the TITANUS MICRO·SENS® can be used in cryogenic areas.

When installed to monitor multiple surveillance areas as well as blind spots, response indicators for quick identification of the fire site as well as a remote remote display to show the status of the detection unit are available.

3.1.1 Function

Air samples are taken from the monitored area by means of the aspiration unit of the TITANUS MICRO·SENS® via a pipe system with defined aspiration apertures, and are supplied to the sensitive detection unit.

Detection

Depending on the set response sensitivity (0.1 or 0.5 up to 2 % light obscuration/m) of the detection unit used, the TITANUS MICRO·SENS® triggers the main alarm when the corresponding light obscuration is reached. Sensitivities are adjustable in steps of 0.1 % light obscuration/m.

The alarm is indicated via the alarm display on the unit and transmitted to any connected FDCP. The transmission of alarms and faults can be assigned different delay times. This is done by means of diagnostic software.

The intelligent signal processing LOGIC SENS is used to block out misleading values that are similar to those shown in the event of a fire and ensures high immunity to false alarms.

Air flow monitoring

An air flow sensor checks the connected pipe system for breakage and blockage. Air flow monitoring is temperature-compensated and can be set in relation to air pressure.

Depending on the pipe system design and the air flow sensor settings, it may be possible to detect a blockage in a single aspiration aperture.

After a programmable delay time has elapsed, the fault is displayed on the TITANUS MICRO·SENS® and a corresponding fault message is forwarded via a fault contact to any connected FDCP. The trigger thresholds for the monitoring window can be adapted to the ambient conditions.

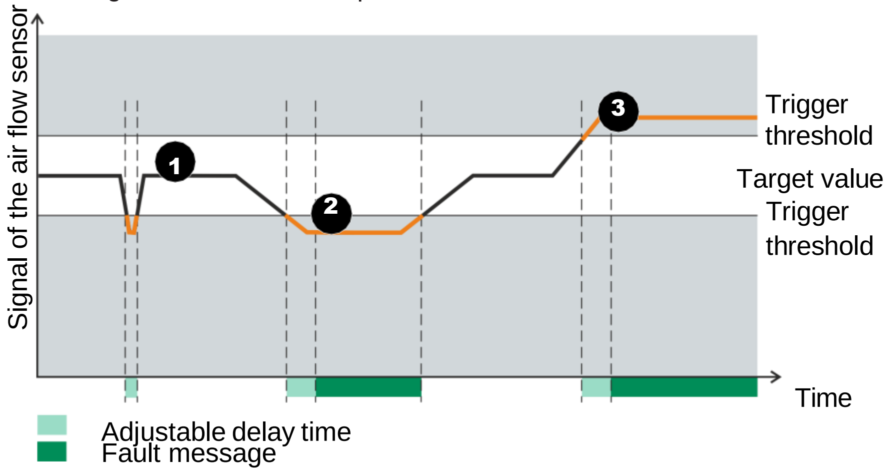


Image 4: Example of signal path air flow sensor fault

1	Normal air flow
2	Air flow too low (blockage)
3	Air flow too high (rupture)

Air flow calibration

An automatic, air pressure-independent air flow calibration is carried out on the TITANUS MICRO·SENS® after the detection unit has been installed in the device base. In addition, calibration by means of a diagnostic tool is possible. This can be used to carry out air pressure-dependent or -independent air flow calibration.

To adjust the TITANUS MICRO·SENS® to the typical air flow of the pipe network, the air flow initialisation process needs to be performed. This has to be done for each device once during commissioning, after making changes to the pipe system planning and after changing the fan voltage.

During the air flow initialisation process, 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 trigger threshold, 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 fault be reported by the unit and can be transmitted.

Functional monitoring
The detection unit is monitored for contamination and signal faults. Faults are displayed on the TITANUS MICRO·SENS® and transmitted to any connected FDCP.

Fire site localisation (optional)
Localisation of the fire site via ROOM IDENT is possible with I-pipe project planning for a maximum of five rooms or facilities. The process of localisation can be divided into four phases:

Phase 1

The TITANUS MICRO·SENS® draws in air samples from the monitoring area in the general operating state and evaluates them for the presence of smoke particles.

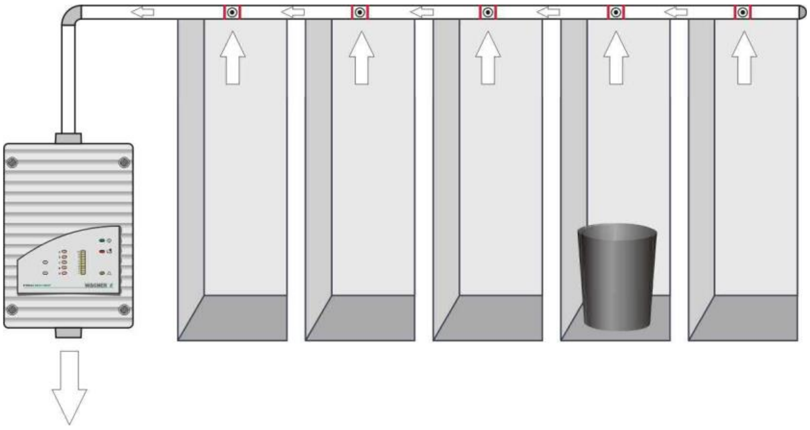


Image 5: Phase 1 ROOM IDENT in the general operating state

Phase 2

As soon as the system has switched to the alarm state as a result of a rise in the concentration of smoke particles typical of a fire, the alarm is triggered.

Units where the function "Main alarm according to ROOM IDENT" is activated start to localise the fire site already from an adjustable pre-alarm threshold. With these units, the alarm is only triggered after the localisation has been completed.

The function "Main alarm according to ROOM IDENT" is not AS ISO 7240-20 compliant.

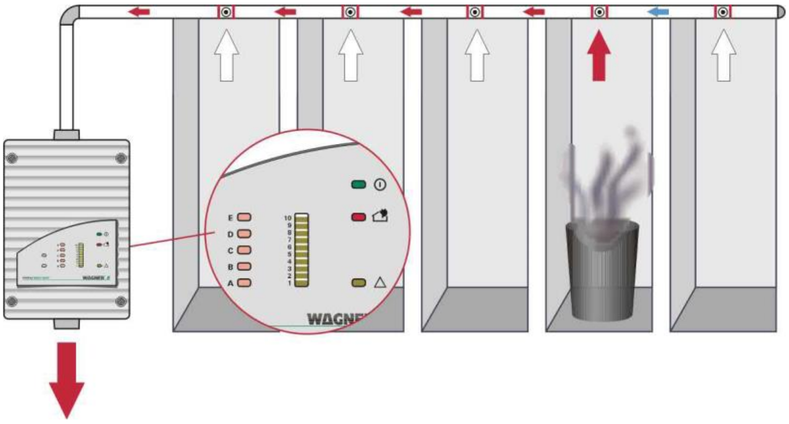


Image 6: Phase 2 ROOM IDENT Very early fire detection.

Phase 3

With the alarm or with the function "Main alarm after ROOM IDENT", and after the adjustable pre-alarm threshold has been reached, the aspiration fan switches off and a second fan purges the pipe system of smoke particles in the opposite direction.

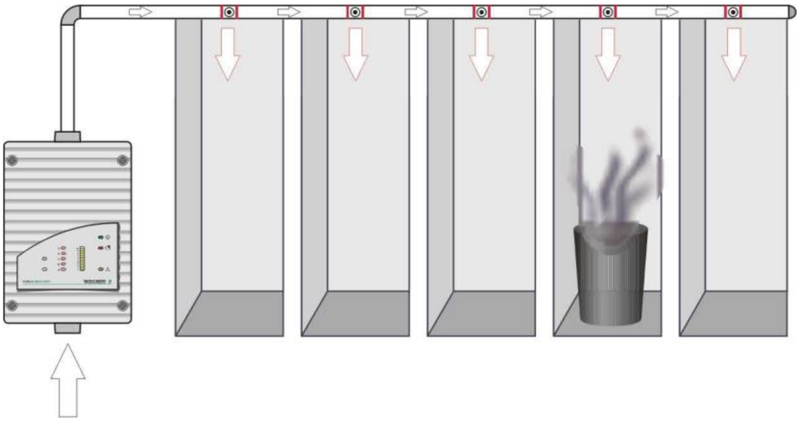


Image 7: Phase 3 ROOM IDENT Purging upon alarm

Phase 4

After purging of the pipe system, the direction of flow is reversed again and the time it takes for smoke particles to penetrate the detection unit is measured. Based on this time, the location of the smoke source can be precisely assigned to one of the monitored areas.

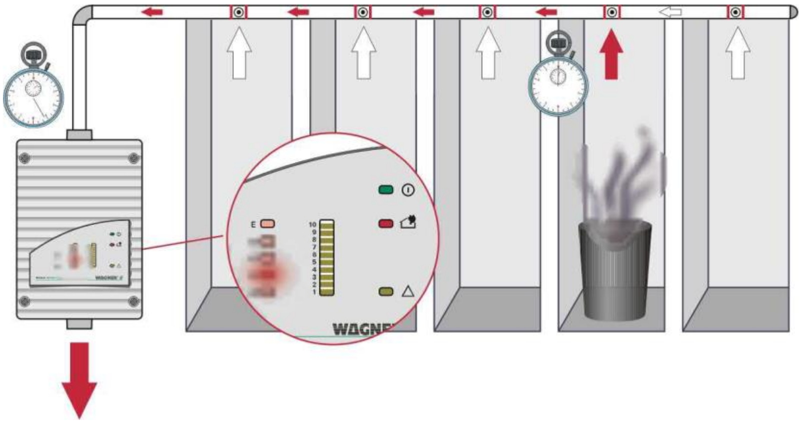


Image 8: Phase 4 ROOM IDENT Localisation of the fire site by reversing the flow direction of the fan

After successful localisation, the fire site is indicated via a corresponding display on the TITANUS MICRO·SENS® and optionally via an external response indicator in the monitoring area.

For units where the function "Main alarm after ROOM IDENT" is activated, the alarm is now triggered.

Resetting via 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 TITANUS MICRO·SENS® 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.

3.2 Layout and accessory components

3.2.1 Overview

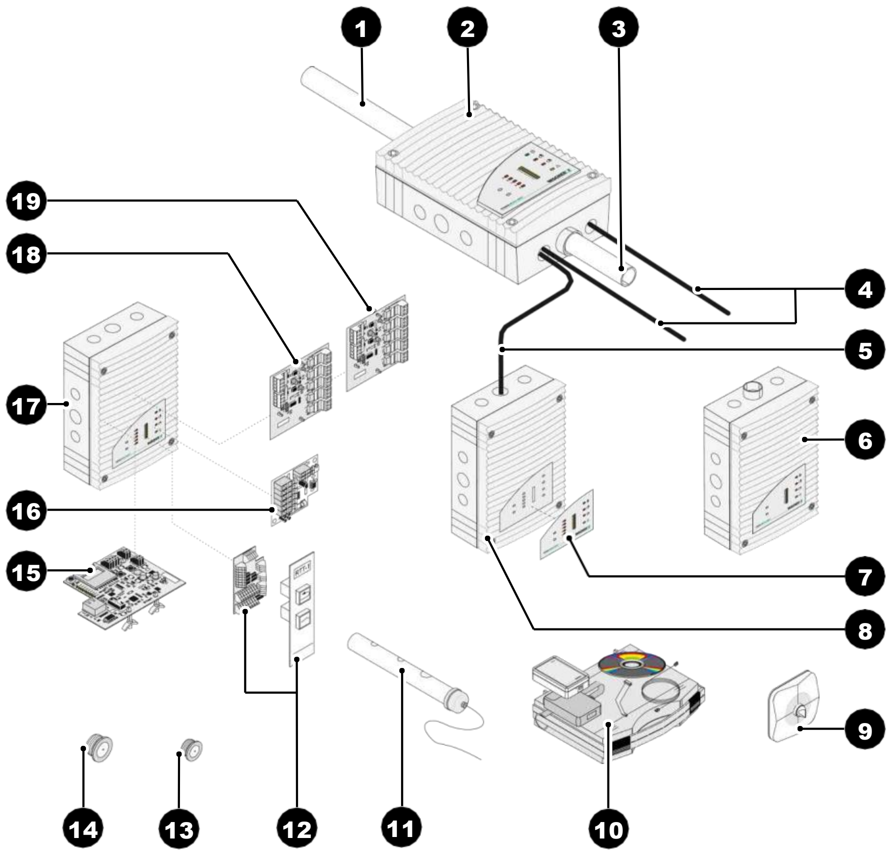


Image 9: Layout and accessory components

1	Pipe system
2	TITANUS MICRO·SENS®
3	Air return
4	Fire alarm cable (FDCP/power supply or to the next unit)
5	Indicator bus*[1]
6	Detector box*[1]
7	Front film sheet for remote display*[1]
8	Remote display*[1]
9	Response indicator*[1]
10	Diagnostic tool
11	Test pipe*[1]
12	Reset and disconnect button*[1]
13	Membrane cable entries M20*[1]
14	Membrane cable entries M25*[1]
15	Network module*[1]
16	Reset circuit board*[1]
17	Additional housing*[1]
18	Relay module RU-1*[1]
19	Relay module RU-2*[1]

*[1] optional

The components illustrated in the overview can be used optionally.

3.2.2 Device

The TITANUS MICRO·SENS® consists of the following components:

- Device base
- Detection unit
- Pipe system

Device base

- Connections for 25 mm aspiration pipe (inlet and return)
- Cable glands
- Potential-free contacts for connection to an FDCP

Detection unit

- Sensitive detection with state-of-the-art technology based on the scattered light smoke detector principle with integrated air flow monitoring

- Aspiration unit with optimised air ducting
- Visual displays for smoke level[1)], main alarm, pre-alarm[1)], fault, operation and localisation of the fire site[1)]
- Infrared interface for diagnostic tool

[1)] optional

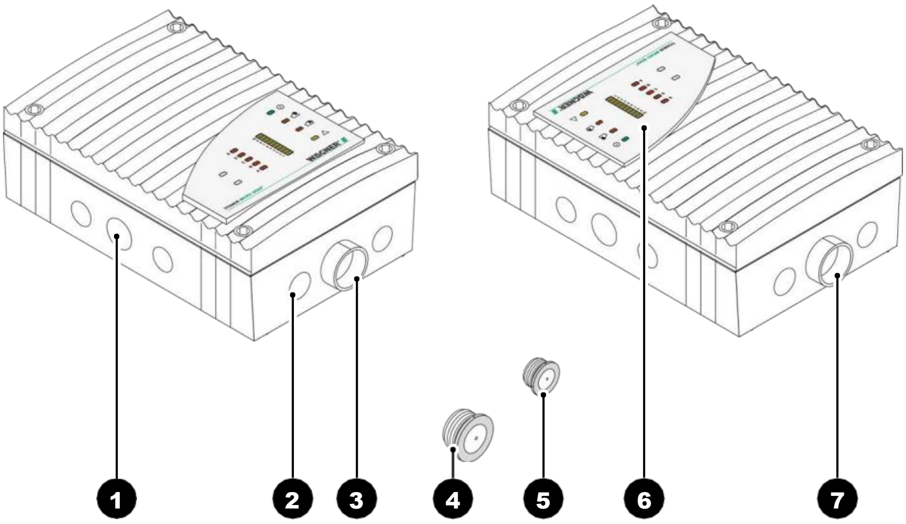


Image 10: Displays and connections

Item	Function	Description
1	Cable gland for fire alarm cable	6x M25
2	Cable gland for fire alarm cable	8x M20
3	Connection for air return pipe	For air return
4	Cable entries (large)	1x M25 for cable with Ø of 1 to 18 mm
5	Cable entries (small)	2x M20 for cables with Ø of 1 to 13 mm
6	Front film sheet	-
7	Aspiration pipe connection	For Ø 25 mm pipe system

Table 1: Function and description of components

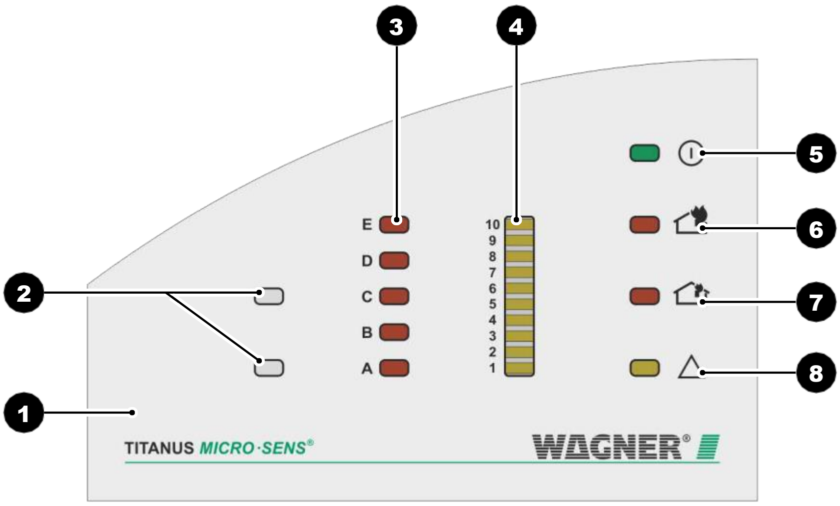


Image 11: Front film sheet of TITANUS MICRO·SENS®

Item	Function	Description
1	Front film sheet	-
2	Infrared interface	Commissioning and fault diagnostics
3	Alarm location display (5x red LED) 1)	Fire site localisation A-E
4	Smoke level indicator (Bar graph, 10x yellow LED) 1)	Current smoke level 2)
5	Operation (green LED)	Operating indicator
6	Main alarm (red LED)	100% smoke level
7	Pre-alarm (red LED) 1)	66% smoke level
8	Fault (yellow LED)	Fan failure or pipe system or detection unit fault

Table 2: Symbols of the front film sheet

1) optional

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

3.2.3 Reset circuit board

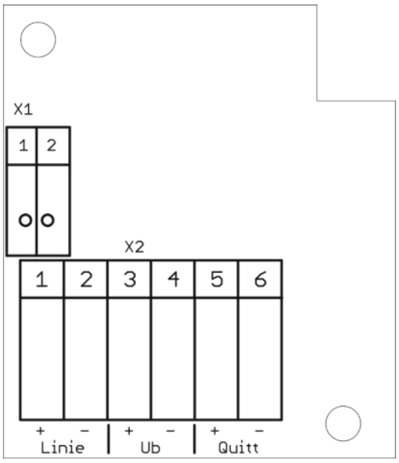


Image 12: Reset circuit board

The TITANUS MICRO·SENS® enables the use of maximum one optional reset circuit board.

The optional reset circuit board is used to reset alarm and fault messages on the device in case of resetting of a collective detection line via a fire detection control panel. The reset circuit board can only be used if:

- the terminating resistor of the detection line is activated by an ohmic R_E resistor (R_E = End-Of-Line),
- the line voltage of the fire detection control panel drops below 3 V within 450 ms (deactivation of the detection line voltage) and
- the permissible standby current of the collective detection line to be calculated is 1 mA … 50 mA.

3.2.4 Diagnostic tool

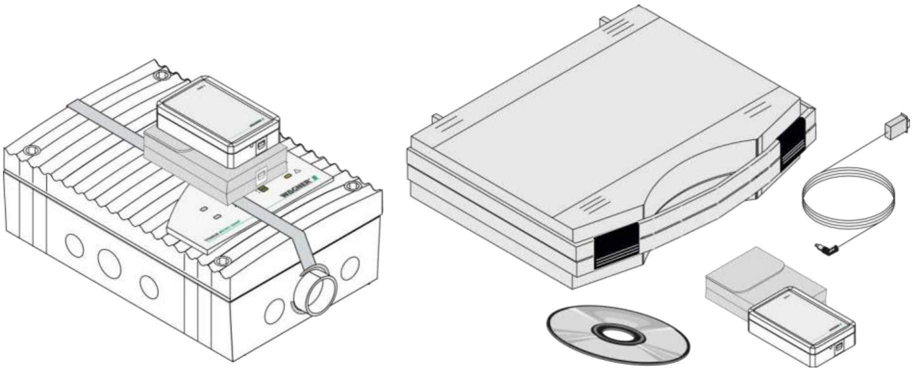


Image 13: Diagnostic tool

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

The device configuration for the TITANUS MICRO·SENS® can be changed during commissioning using the diagnostic tool. For maintenance and service, the diagnostic software offers the option to display the stored and current device state as well as fault messages of the TITANUS MICRO·SENS® on the PC or laptop. Data is transmitted to the diagnosis interface via the infrared interface on the TITANUS MICRO·SENS®. A USB cable is provided to transmit data from the diagnosis interface to the PC or laptop.

Fault messages can be deleted at any time using the diagnostic software. Without deletion, the fault messages remain stored in the TITANUS MICRO·SENS® for 72 hours. This enables analysis of short, sporadically occurring faults (e.g. after changed operating conditions).

3.2.5 Detector box

External detector boxes can be installed in the pipe system in conjunction with the TITANUS MICRO·SENS®. 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.

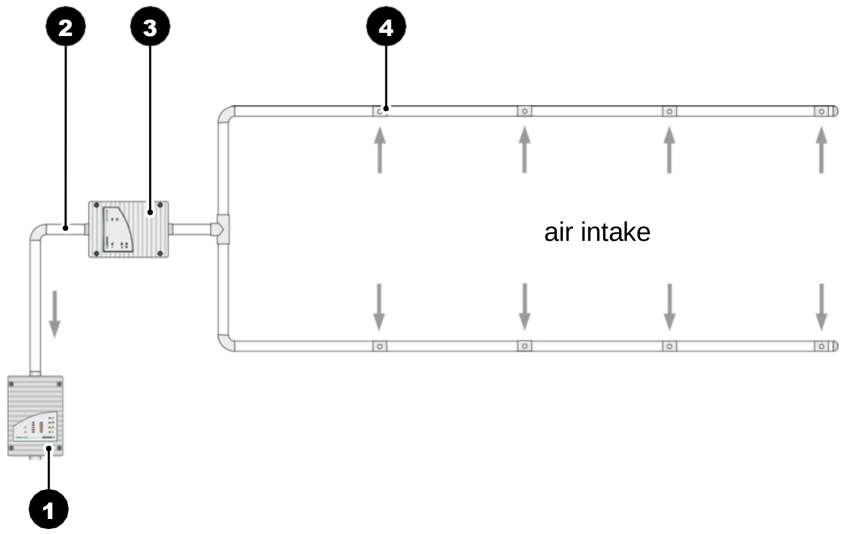


Image 14: Detector box function principle (dual detection dependency)

1	TITANUS MICRO·SENS®
2	Pipe system
3	Detector box
4	Aspiration aperture

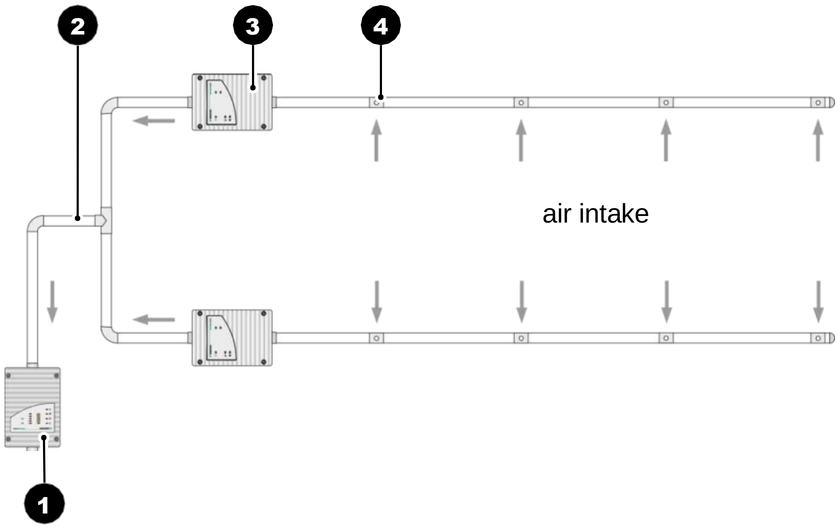


Image 15: Functional principle of detector box (localisation and elevation of the response sensitivity)

1	TITANUS MICRO·SENS®
2	Pipe system
3	Detector box
4	Aspiration aperture

LITERATURE
You will find more information in the technical manual "TITANUS MICRO·SENS® detector box".

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

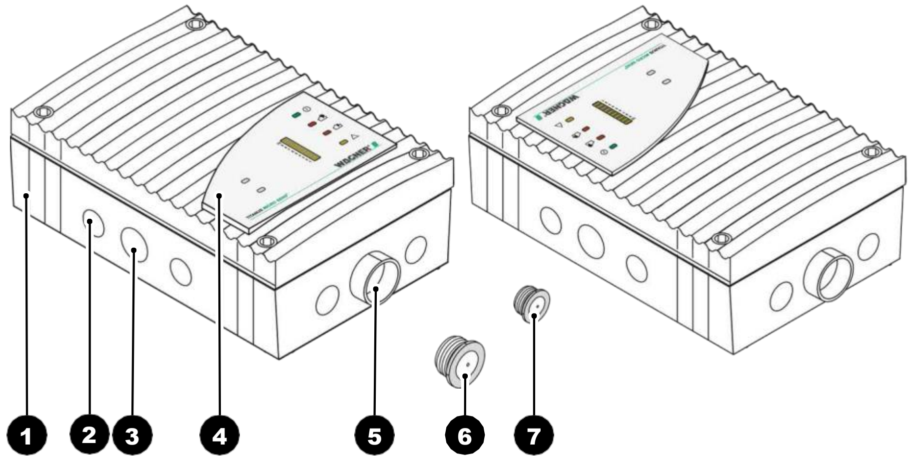


Image 16: Detector box

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)

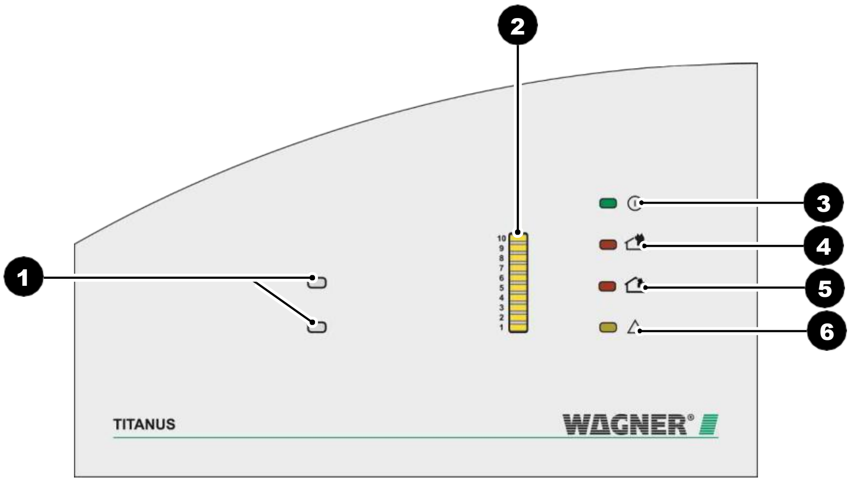


Image 17: Front film sheet of the detector box

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 indicator
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.

3.2.6 Network module

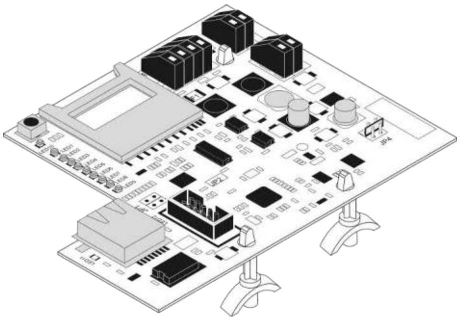


Image 18: Network module type NU-2

With the network modules, multiple network-capable aspirating smoke detectors can be connected to a network and log data and status information recorded for all aspirating smoke detectors equipped with a network module. A special network module is available for deep-freeze applications.

Versions

Various upgrades of the network module are available for a variety of applications:

Type	Application				
	TCP/IP	SNMP	Web server	Data logger	Refrigerated applications
NU-2	X	X	-	-	X
NU-2-D	X	X	X	X	-
NU-2-DO	-	-	-	X	-
NU-2-D-F	X	X	X	X	X
NU-2-DO-F	-	-	-	X	X

Table 3: Network module versions

TCP/IP

With the TCP/IP Ethernet standard transmission protocol, the aspirating smoke detector can be connected to risk management systems (e.g. VisuLAN®). All status information as well as event and log data are thus available for risk management.

SNMP

All network-capable aspirating smoke detectors can be queried for status information and log data using a network module (optional) via the Simple Network Management Protocol (SNMP). By installing SNMP management software, customers can constantly visualise and monitor the network-capable aspirating smoke detectors.

When an incident occurs (e.g. a threshold is exceeded), an alert or a fault message is sent to a managing entity or directly to another network participant via what is referred to as SNMP traps.

Data logger (optional)

An integrated data logger is used to record event data (alarms and faults) and log data (smoke level, air flow, air flow temperature or detection status) of the TITANUS MICRO·SENS®. The event and log data are saved to a memory card at pre-defined logging intervals of 1 to 60 s and analysed with the TITANUS® *DataView* and TITANUS® *EventView* programs.

Web server

In case of network modules with an integrated web server, it is possible to display current data and status information for each device as a website. The user interfaces are easily accessible via a standard web browser. After successful setup on the network, the information is available immediately. The web server does not require any special configuration.

Multi-application operation

The TCP/IP network-capable network modules have four TCP/IP channels that support multi-application operation. Up to four TCP/IP applications can communicate simultaneously with one network module and additional data logger and SNMP data can be accessed.

When multi-application mode is used, this may cause delayed website loading in the web browser.

Write protection

Write protection can be activated on the network module to protect parameter settings. Once successfully commissioned, network settings can be protected against overwriting.

LITERATURE
You will find more information in the technical manual "TITANUS networking".

3.2.7 Remote display

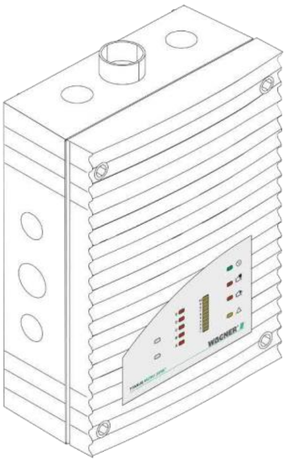


Image 19: Remote display for wall mounting

The TITANUS MICRO·SENS® offers connection options for one or more remote displays. The displays on the remote display are identical to those on the detection unit. Connection is made on the device base of the TITANUS MICRO·SENS®.

A remote display can be connected from up to a distance of 1000 m. If another remote display is connected after the first display, it can be 1000 m away from the first display. This is possible because every remote display is also a repeater.

At small distances, energy is supplied directly from the TITANUS MICRO·SENS®. In case of larger distances, energy is supplied by an external supply (see chapter "Energy supply" project planning).

3.2.8 Response indicator

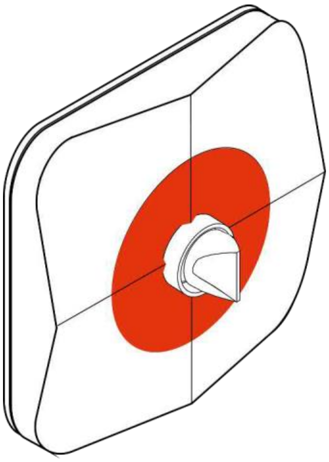


Image 20: Response indicator type DJ-TM

When using the TITANUS MICRO·SENS® with localisation of the fire site, up to five addressable response indicators can be used via the indicator bus. The response indicator can be connected up to a distance of 1000 m.

3.3 Pipe system

The pipe system serves to take air samples from the monitoring area.

3.3.1 Entire overview of available pipe components

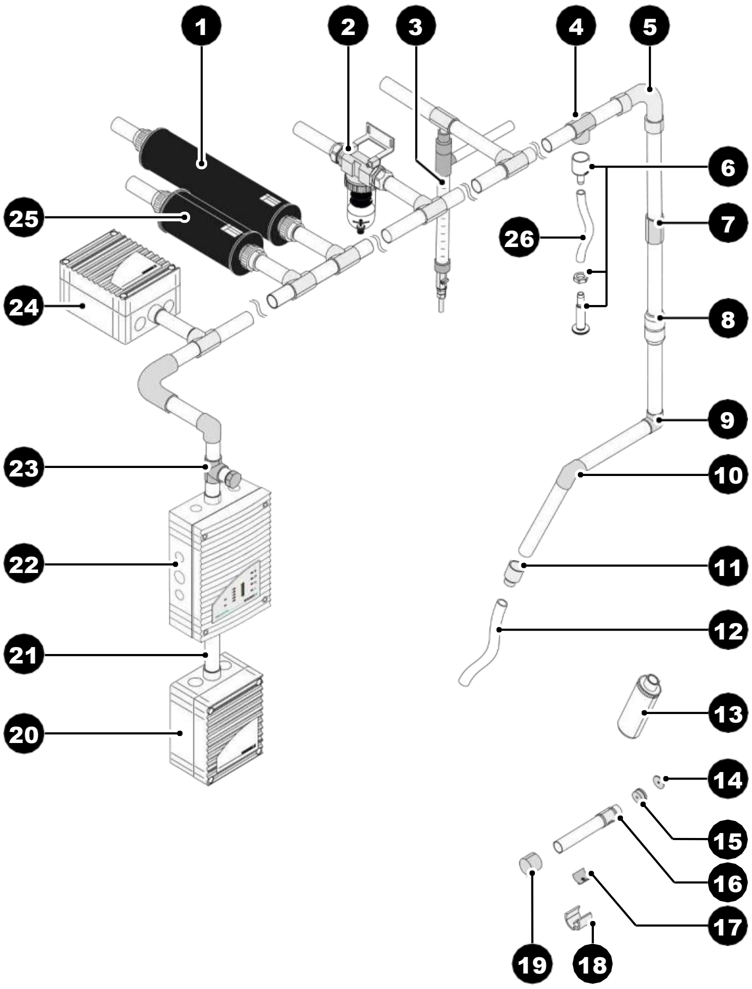


Image 21: Available pipe system components

1	Special filter type SF-650
2	Condensate separator type KA-DN-25
3	Condensate separator type KA-1
4	T-piece
5	Curve 90°
6	Ceiling feed-through set (3-part)
7	Sleeve
8	Double screw connection
9	90° angle
10	45° angle
11	Reducing coupling
12	Aspiration hose
13	Non-return valve
14	Aspiration-reducing film sheet
15	Aspiration reduction[1)]
16	Sleeve for aspiration-reducing film sheet
17	Aspiration reduction[2)]
18	Plastic clip for aspiration reduction[2)]
19	End cap
20	Silencer
21	Air return
22	TITANUS MICRO·SENS®
23	Test adapter
24	Air filter type LF-Ad-x
25	Special filter type SF-400
26	Capillary hose (aspiration hose for ceiling feed-throughs)

The accessory components shown in the figure are to be selected for the corresponding individual application and can be used 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 an increased occurrence of dust particles or freezing is to be expected, it may be necessary to purge the pipe system and its aspiration apertures with compressed air.

Depending on the frequency of blockages, the pipe purging process can be performed manually or automatically. Use a transportable compressed air bottle or activate the manual purging unit installed on-site for this purpose.

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

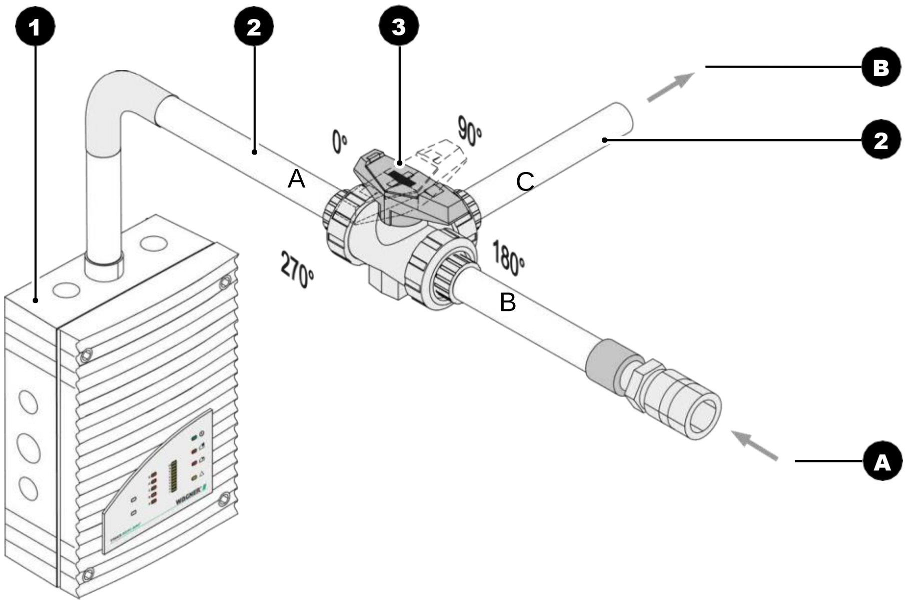


Image 22: Manual air purge system with 3-way ball valve made of ABS or PVC

1	TITANUS MICRO·SENS®
2	Pipe system
3	3-way ball valve (ABS/PVC)
A	Compressed air
B	Air flow for purging

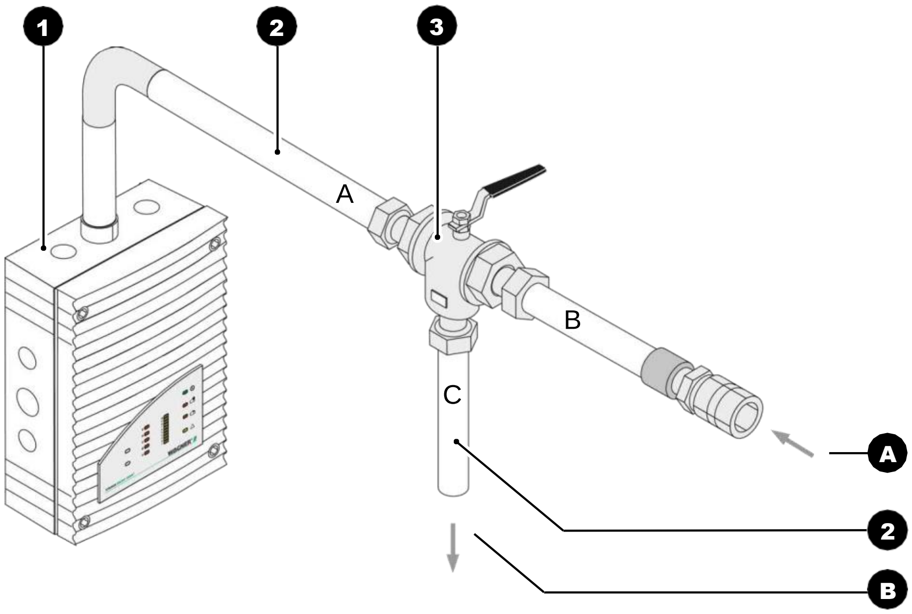


Image 23: Manual air purge system with metal 3-way ball valve

1	TITANUS MICRO·SENS®
2	Pipe system
3	3-way ball valve (metal)
A	Compressed air
B	Air flow for purging

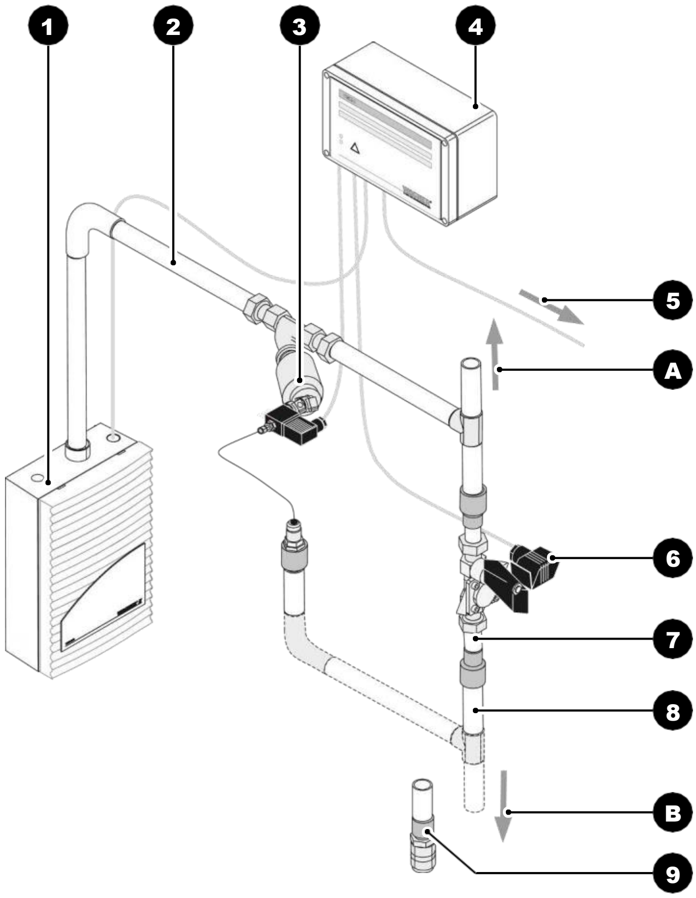


Image 24: Components of automatic air purge system

1	TITANUS MICRO·SENS®
2	Pipe system
3	2/2-way valve, shut-off valve complete
4	Valve controller
5	To FDCP
6	2/2-way valve, compressed air valve complete
7	Aspiration pipe 20x1.5 mm
8	Reducer
9	Quick-action coupling sleeve with fittings
A	Air flow for purging
B	Compressed air

3.3.3 Aspiration apertures

3.3.3.1 Aspiration-reducing film sheets

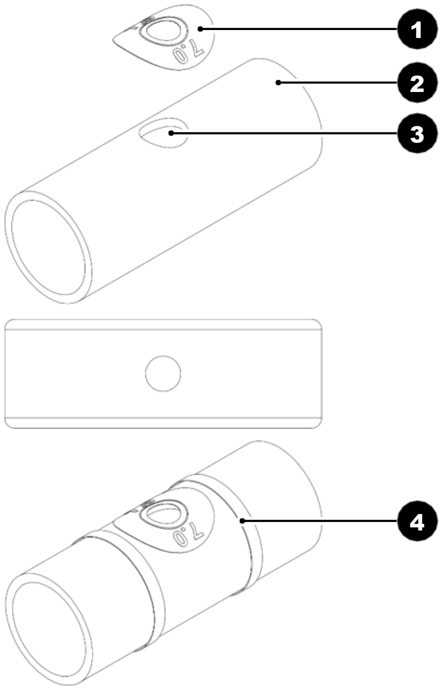


Image 25: Aspiration aperture, aspiration-reducing film sheet and marking tape

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

An aspiration aperture is a 10 mm drill hole in the aspiration pipe which is covered with an aspiration-reducing film sheet with the required opening diameter. The size of the aspiration-reducing film sheet depends on the pipe system installation (see chapter "Project planning"). Two versions of aspiration-reducing film sheets are available. Depending on the ceiling colour, use either type AFW-x (Pure white, RAL 9010) or type AF-x (Papyrus white, RAL 9018) aspiration-reducing film sheets. The film sheets can be produced in special colours on request.

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 hole. It is adhered on top of the aspiration-reducing film sheet in such a way that the aspiration aperture is not covered and is also visible from greater distances.

The standard aspiration-reducing film sheet type AF-x and sleeve type AF-BR are not suitable for application in low temperature areas.

Aspiration-reducing clips must be used in such areas instead.

3.3.3.2 Aspiration-reducing clips

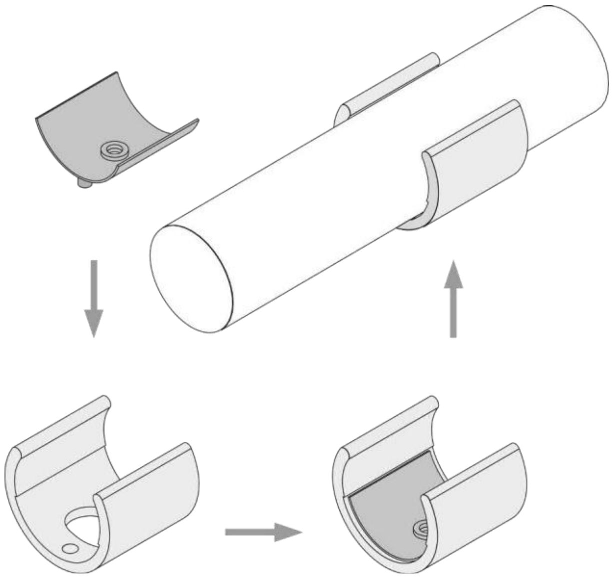


Image 26: Aspiration-reducing clips for areas with excessive dirt and deep freeze applications

The aspiration apertures in areas where blockages are expected must be equipped with a plastic clip type AK-C and a flexible aspiration reducer type AK-x.

When used in deep freeze applications, the flexible aspiration reducer expands to the aspiration apertures during clearing and blasts off the ice. The special plastic clip ensures that the aspiration reducer remains in the predefined position.

The aspiration reducers with plastic clips are to be preferred to aspiration-reducing film sheets with sleeves for project planning in areas with ambient impacts that require air purging (e.g. dust). The plastic clips are more stable when pressure is applied and the cleaning effect is significantly better due to the elastic rubber inserts.

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.

3.3.4 Ceiling feed-through

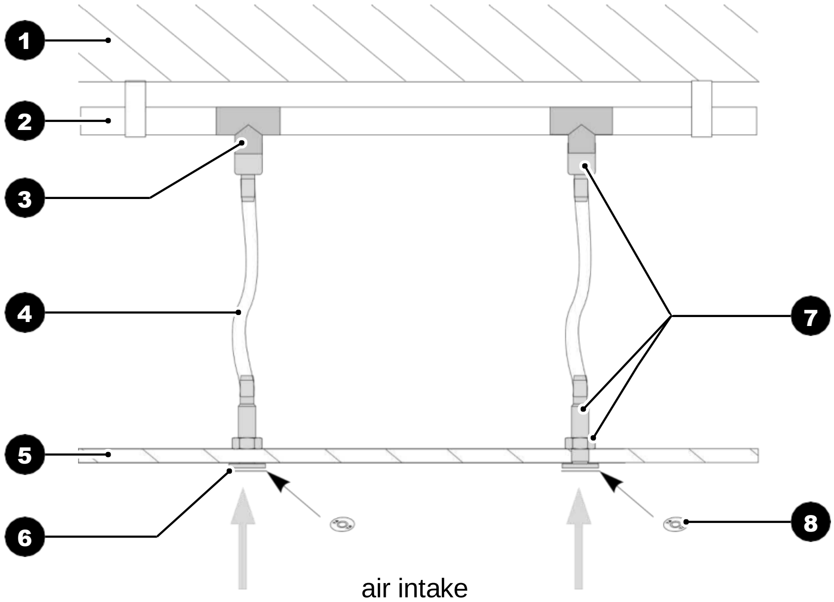


Image 27: Ceiling feed-through

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

Aesthetics

Fitting in suspended ceilings is possible if concealed installation of the pipe system is required for room monitoring. Ceiling feed-throughs are placed in the suspended ceiling. According to the pipe project planning, the ceiling feed-throughs are provided with aspiration-reducing film sheets with defined aspiration apertures (see chapter "Project planning") and are connected with the pipe system via aspiration hoses. The length of these capillary hoses is max. 1 m.

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

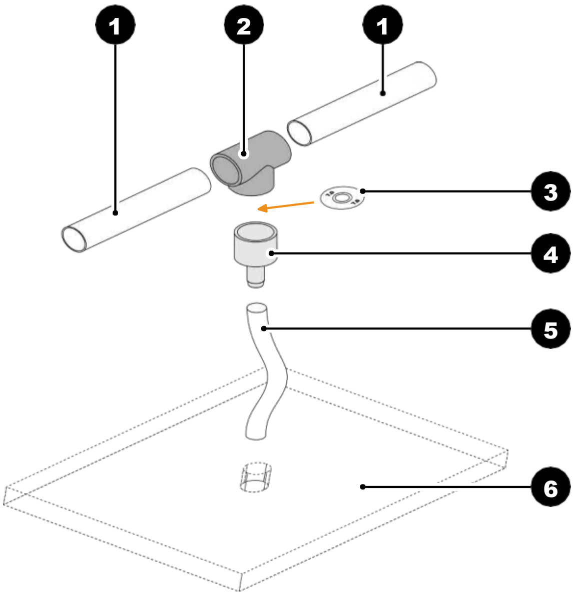


Image 28: Ceiling feed-throught with upstream aspiration-reducing film sheet

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

The aspiration hoses (capillary hoses) with upstream aspiration reduction in the T-pieces (pipe hoods) can be used for concealed installation in e.g. lamps or plastering.

NOTE

Damage to the components of the ceiling feed-through due to purging

The components of the ceiling feed-through can be damaged when pressurised. Ceiling feed-throughs must not be purged.

3.3.5 Air filter and special filter

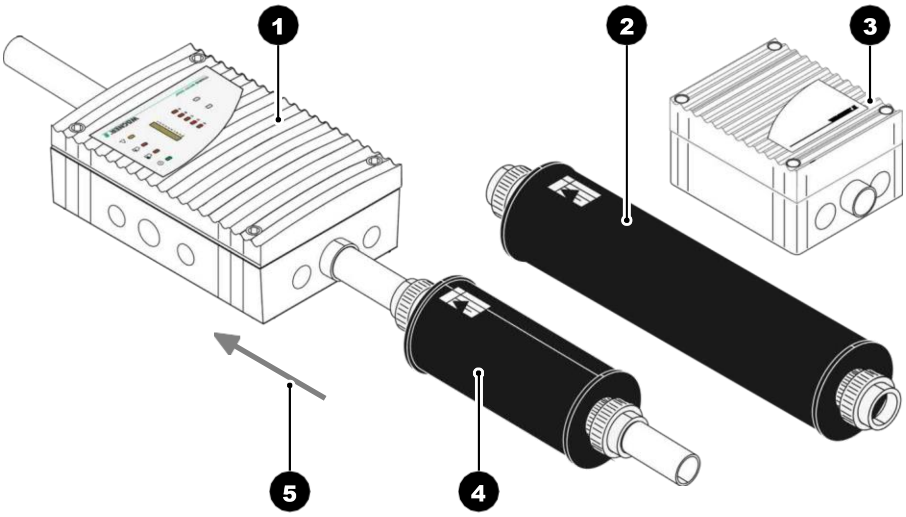


Image 29: Air and special filter

1	TITANUS MICRO·SENS®
2	Special filter SF-650
3	Air filter LF-AD-x
4	Special filter SF-400
5	Direction of flow

In monitoring areas with disturbing ambient influences (e.g. dust), an air or special filter is to be used to protect the TITANUS MICRO·SENS®.

Air filter type LF-AD-x

Air filter type LF-AD-x, consisting of a plastic housing with two pipe connections and filter elements, is used as a standard air filter. The air filter is automatically monitored for dirt (blockage) by the air flow monitoring of the TITANUS MICRO·SENS®. If air filters are soiled, the filter elements can simply be replaced after opening the filter housing.

Type	Application	Examples
LF-AD	Coarse filter for separating particles > approx. 15 µm	Dust, insects, fibres, hairs, cinders, pollen
LF-AD-1	Filter for separating particles > approx. 10 µm	As above, additionally: Colour pigments and fine dust
LF-AD-2	Fine filter for separating particles > approx. 5 µm	As above, additionally: Fine dust in lower concentrations

Table 4: Overview of the air filters

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 by the filter medium. A consistent quality of dust filtration is ensured until the end of the filter's service life.

Type	Application	Examples
SF-400	Fine filter for separating particles > approx. 1 µm	As with LF-AD Additionally: fine dusts in high concentrations
SF-650	Fine filter for separating particles > approx. 1 µm	As above, but with a longer filter service life

Table 5: Overview of special filters

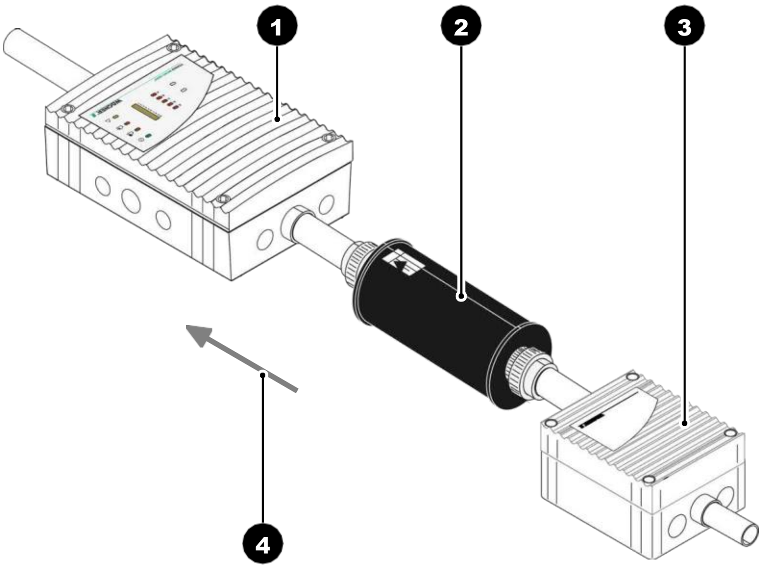


Image 30: Installing air filter and special filter in combination

1	TITANUS MICRO·SENS®
2	Special filter SF-x
3	Air filter LF-AD-x
4	Direction of flow

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

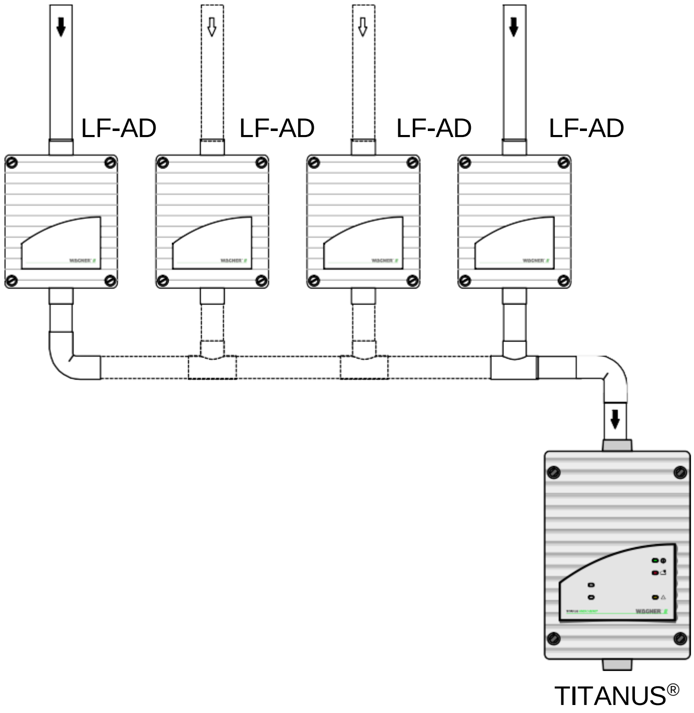


Image 31: Air filter type LF-AD in multiple aspiration branches

To extend maintenance intervals, one air filter can be installed in each outgoing branch instead of one in the main aspiration branch. The same project planning specifications as defined in the annexed project planning table apply.

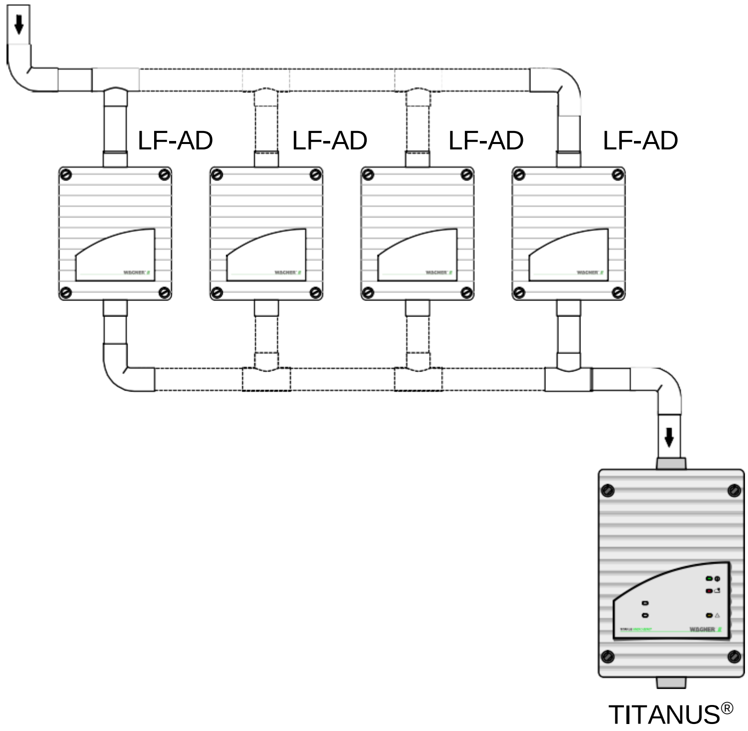


Image 32: Air filter type LF-AD in the main aspiration branch

Moreover, multiple air filters can be installed in parallel in the main aspiration branch to extend the maintenance intervals. For this purpose, the main aspiration branch must be partitioned into two or several branches and each equipped with the same air filter or air filter combination. The individual branches can then optionally be joined as a main aspiration branch again or routed separately into the monitored area(s). The same project planning specifications as for using a single air filter as defined in the annexed project planning table apply.

3.3.6 Air return for pressure differences and air pollution

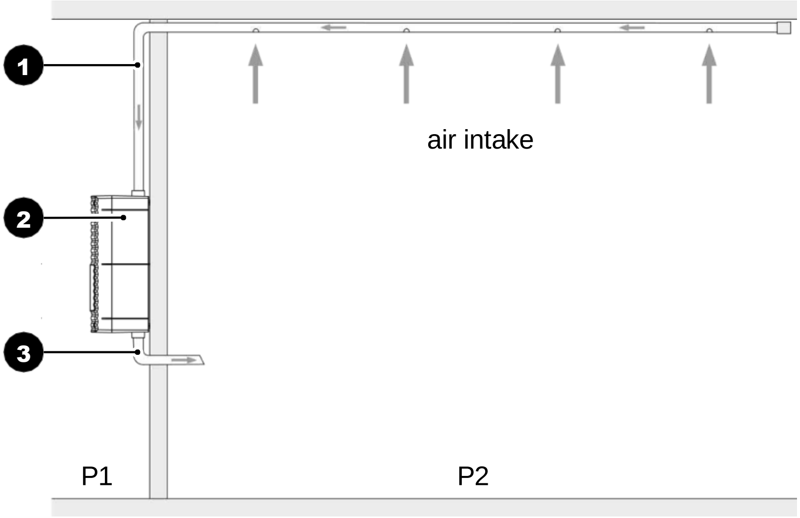


Image 33: Principle of the air return

1	Pipe system
2	TITANUS MICRO·SENS®
3	Air return

If the TITANUS MICRO·SENS® and pipe system are installed in two areas P1 and P2 with different air pressure, return of the suction air into the pipe system pressure area is required. Air return can also serve to prevent air pollution (e.g. odours) in adjoining rooms.

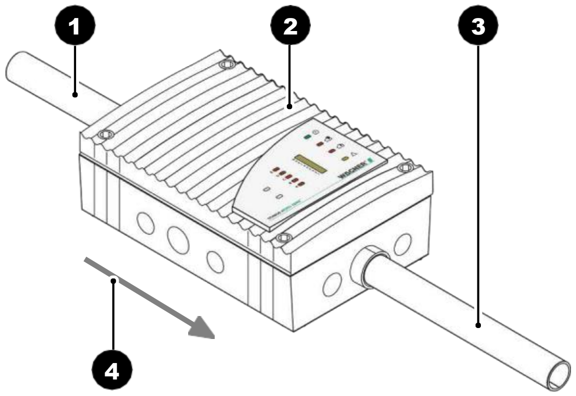


Image 34: Air return

1	Aspiration pipe
2	TITANUS MICRO·SENS®
3	Air return
4	Direction of flow

The air return pipe is mounted in the conical pipe connection for the air return of the TITANUS MICRO·SENS®. A secure hold is ensured due to the precise fit of the air return pipe.

3.3.7 Silencer

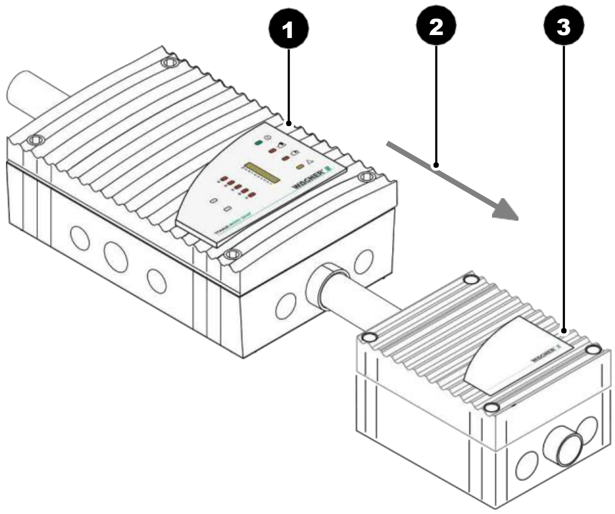


Image 35: Installing a silencer

1	TITANUS MICRO·SENS®
2	Direction of flow
3	Silencer type SD-1

By using the silencer type SD-1, the noise level can be reduced by up to 10 dB(A) for use in areas in which low noise emissions of the TITANUS MICRO·SENS® are required (such as in offices or hospitals).

The silencer is directly mounted to the air return of the TITANUS MICRO·SENS®.

3.3.8 Condensate separator

If the TITANUS MICRO·SENS® is operated in environments where condensate can form in the pipe system, a condensate separator is used. To collect the condensate, the condensate separator is mounted at the lowest point of the pipe system upstream of the air filter and TITANUS MICRO·SENS®.

Condensate separators are used in monitoring areas with:

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

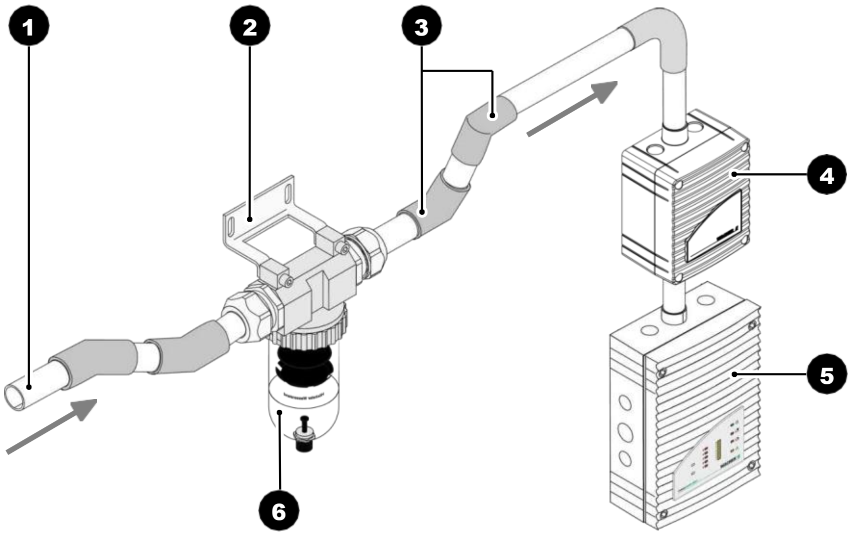


Image 36: Condensate separator type KA-DN 25

1	Aspiration pipe
2	Bracket
3	45° angle
4	Air filter type LF-AD-x
5	TITANUS MICRO·SENS®
6	Condensate separator type KA-DN 25

The use of 45° angles enables optimum wall spacing.

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.

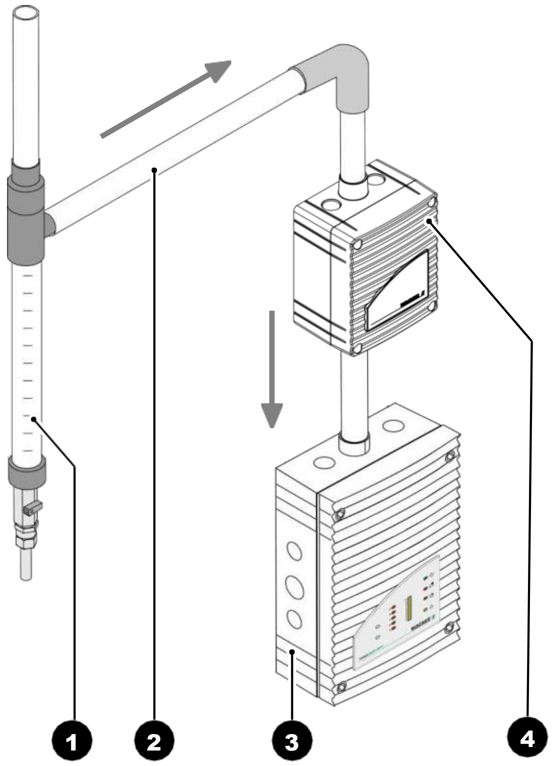


Image 37: Condensate seperator type KA-1

1	Condensate separator type KA-1
2	Aspiration pipe
3	TITANUS MICRO·SENS®
4	Air filter type LF-AD-x

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

4 Technical data

You will find the technical data in this chapter.

4.1 Device

	TITANUS MICRO·SENS®

Voltage supply

Supply voltage (Ue) [V]	16 … 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.

	U_L = 9 V	U_L = 10.5 V	U_L = 12 V	U_L = 13.5 V
Starting current[1)] [mA]	150	150	150	150
Standby mode[1)] [mA]	105	125	145	170
Alarm state, unit without bar graph[1)] [mA]	110	130	150	175
Alarm state, unit with bar graph[1)] [mA]	140	160	180	205

U_L = fan voltage
[1)] without extension modules

Housing dimensions

W x H x D [mm]	140 x 220 x 70

Weight

[kg]	0.8

Outputs

Contact capacitance in alarm and fault relays	1 A / 30 V DC

Sound pressure level

LpA according to EN ISO 3744	From 40 dB(A), depending on project planning and fan voltage

IP rating

IP code in accordance with IEC/DIN EN 60529	
without air return	IP20
with pipe section 100 mm/pipe bend	IP42
with air return	IP54

Impact resistance

In accordance with IEC/EN 62262, EN 50102	IK04

Housing

Material	Plastic (ABS or ABS-FR)
Colour	Papyrus white, RAL 9018

Temperature range

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

Humidity

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

Fan

	Design	Axial
	Fan service life (12 V)	60,000 h at 24 °C

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)
	Alarm location display[1)]	5x red LED

[1)] optional

Infrared interface

		IR transmitter/receiver

Connections

	Terminal connections [mm²]	0.5 … 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, 1x for aspiration pipe, 1x air return

Response sensitivity

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

4.2 Accessories

- Detector box TITANUS MICRO·SENS®
- Remote display
- Response indicator
- Relay module
- Reset circuit board
- Network module

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)
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	

[1)] optional

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 Remote displays

Voltage

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

Current

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

Standby mode [mA]	15
Max. state [mA]	50
Electrical connection lengths [m]	Max. 1000

Dimensions

H x W x D [mm]	70 x 140 x 200

Weight

[kg]	0.6

Protection class

IP code in accordance with IEC/EN 60529	IP54

Impact resistance

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

Housing

Material	Plastic (ABS)
Colour	RAL 9018, Papyrus white

Temperature range

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

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)
Alarm location display[1)]	5x red LED

[1)] optional

Connections

Terminal connections [mm²]	0.5 … 2.5
Fire alarm cable	shielded (e.g. type J-Y(ST)Y)
Cable glands	8x M20, 6x M25

4.2.3 Response indicator

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]	2
Flashing light [mA]	5
Permanent light [mA]	8
Electrical connection lengths [m]	Max. 1000

IP rating

IP code in accordance with IEC/EN 60529	IP30

4.2.4 Relay module

Current consumption

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

RU-1 standby mode [mA]	6
RU-1 alarm state [mA]	Max. 36
RU-2 standby mode [mA]	13
RU-2 alarm state [mA]	Max. 36

Dimensions

H x W x D [mm]	19 x 98 x 94

Temperature range

[°C]	-40 … +60

Max. load capacity of the relay contacts

	1 A with 30 V DC

4.2.5 Reset circuit board

Current consumption

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

[mA]	Max. 20

Temperature range

[°C]	-40 … +60

4.2.6 Network module

Current consumption

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

[mA]	Max. 50

Temperature range

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

4.3 Pipe system

Max. pipe length Ø 25 mm [m]	50
Max. number of aspiration apertures	8
Max. length of aspiration hose per ceiling feed-through [m]	1
Temperature range [°C] PVC pipe ABS pipe	 -10 … +60 -40 … +80
Max. monitoring area [m²]	500

5 Project planning

You will find information for the project planning of a TITANUS MICRO·SENS® with the corresponding pipe system in this chapter.

5.1 General information

The project planning of the TITANUS MICRO·SENS® according to AS ISO 7240-20 is described below. The framework conditions are shown in the "General" chapter.

Project planning must be carried out according to the chapter "Pipe project planning".

The limiting project planning information according to the chapter "Special project planning" applies to special applications in addition to the chapter "Pipe project planning". This must be considered at the start of special project planning.

There are various technical solutions to be selected from, depending on the project planning criteria.

Project planning	Project planning criterion	For technical solution see chapter…
Standard	General room monitoring	"Project planning guidelines"
Special	Detecting 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"
	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 AS ISO 7240-20

5.1.1 Laws, standards and guidelines

The basic principles for the project planning of a TITANUS MICRO·SENS® 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.

AS ISO 7240-20

In order to comply with AS ISO 7240-20, the TITANUS MICRO·SENS® must be planned in accordance with the "Project planning guidelines".

Observe the national laws, standards and guidelines.

- For Australian installations, the requirements of AS 1670.1 Fire detection, warning, control and intercom systems – System design, installation and commissioning – part 1 Fire must be followed, unless the system is being installed as part of an engineered solution.
- For New Zealand installations, the requirements of NZS 4512 Fire detection and alarm systems in buildings must be followed, unless the system is being installed as part of an engineered solution.
- Additional regulations for the installation of fire detection systems issued by the fire service department, the building supervisory authorities or the legal board of construction that are only regionally valid.

:

5.1.2 Pipe system

When planning the pipe system, it must be ensured that reliable fire detection is guaranteed for any fire present in an installation or in a monitored area.

The number of aspiration apertures and the design of the pipe system depend on the size and geometry of the monitoring area. The aspiration apertures are to be planned like point detectors. The pipe system is to be fitted in accordance with the project planning guidelines of this chapter while taking the following points into consideration.

Pipe configurations

4 types of pipe layouts can be selected, depending on the room geometry:

Pipe configuration	Characteristic
I-pipe	Pipe system without branching
U-pipe	Pipe system that separates into two branches after connection to the TITANUS MICRO·SENS®
M-pipe	Pipe system that separates into three branches after connection to the TITANUS MICRO·SENS®
Double U-pipe	Pipe system that separates into four branches after connection to the TITANUS MICRO·SENS®

Table 7: Pipe configuration characteristics

To localise the fire site, I-pipe configuration must be planned.

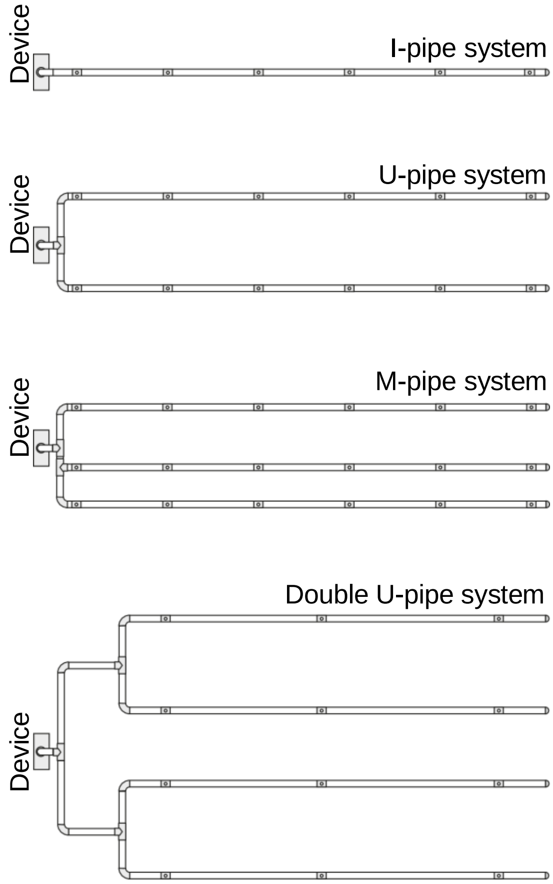


Image 38: Pipe configurations

Symmetry of the pipe system

The following conditions are applicable to extract consistent air samples via all aspiration apertures:

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

TIP
Comply with the limit values of the TITANUS MICRO·SENS® for each pipe system of the selected pipe project planning (see chapter "Project planning limits").

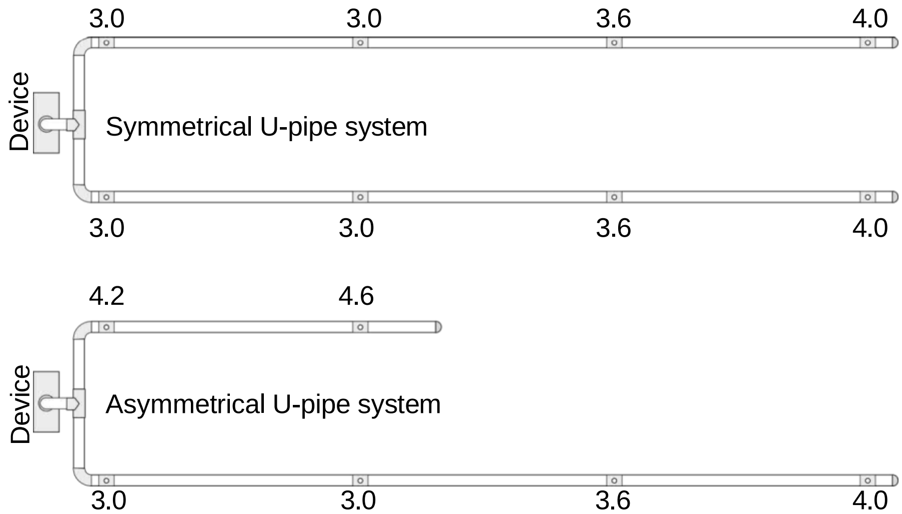


Image 39: Examples of symmetrical and asymmetrical U-pipe system

The previous figure shows an example of a U-pipe system with symmetrical or asymmetrical layout and with the diameters of the aspiration apertures calculated accordingly. The diameters of the aspiration apertures are determined separately for each branch of the pipe system and depend on the total number of aspiration apertures on the respective branch. The corresponding diameters of the aspiration apertures can be found in the tables in chapter "Diameter of the aspiration apertures".

Calculation

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

Number of aspiration apertures = total number of aspiration apertures 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 aspiration apertures for the respective branch (see chapter "Determining the diameter of the aspiration apertures").

Example

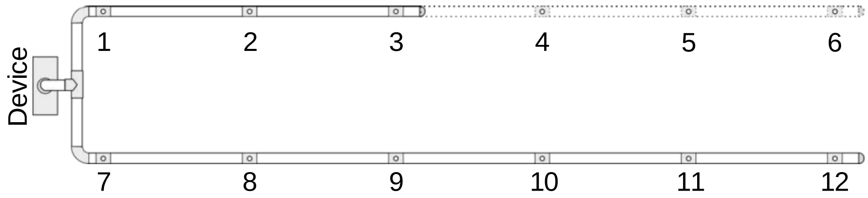


Image 40: Determining the number of aspiration apertures for a long branch

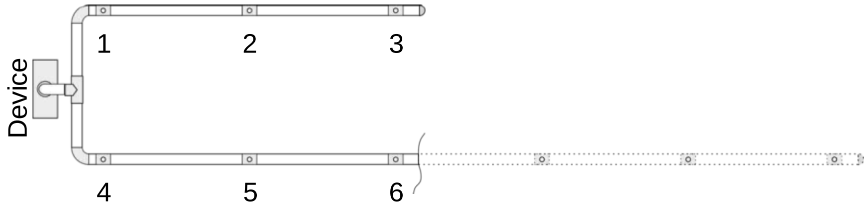


Image 41: Determining the number of aspiration apertures for a short branch

The diameters of the aspiration apertures for an asymmetrical U-pipe system (two branches) should be determined. The short branch comprises three aspiration apertures and the long branch comprises six aspiration apertures. The number of aspiration apertures 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 aspiration apertures 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 length

In order to ensure a short transport time for the smoke aerosols in the aspiration pipe and thus enable rapid detection, it is better to plan several shorter branches than a few long ones (preferably a U- or double U-pipe system).

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

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.

TIP
Elbows are to be given absolute priority over angles. An excessive number of elbows and angles reduces the air flow speed in the aspiration pipe, thus increasing the detection time.

Test For critical applications, check the secure detection with activation attempts. Furthermore, check whether there is an air flow at the individual aspiration apertures.

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.

5.1.3 Air flow monitoring

AS ISO 7240-20 requires the detection of a 20% change in the total air flow of the pipe system. In order to accomplish this, the triggering threshold of the air flow sensor system must be set to ≤ 20%. We recommend performing an air pressure-dependent air flow calibration in this setting.

A freely selectable trigger threshold can be set for systems that do not require AS ISO 7240-20 conformity, provided the applicable national standards and directives are complied with.

The project planning for aspiration pipe air flow monitoring is then selected after taking the countries' relevant, national provisions into account.

Adjusting the air flow 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 trigger threshold and therefore the sensitivity of the air flow sensor can be set from 10% … 50% in increments of 1%. We recommend to always select the highest possible trigger threshold permissible according to the national standards.

	AS ISO 7240-20		Non-compliant	
Activation threshold	10%	20%	40%	50%
Sensitivity	Very high	High	Medium	Low

Table 8: Adaptation of the air flow sensitivity

Dynamic air flow sensors

The device's air flow monitoring 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). If the dynamic air flow sensor system has been activated in the diagnostic software, the following limitations must be observed.

Limitations

The dynamic air flow sensors may only be set if:

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

Air pressure differences

The same air pressure must be present throughout the aspiration pipe.

If the TITANUS MICRO·SENS® and pipe system are located in areas with different air pressure, return of the suction air into the pipe system pressure area must be provided (see chapter "Project planning with air return").

TITANUS MICRO·SENS® with active localisation of the fire site must be installed outside the monitoring area and without air return.

5.1.4 Sensitivity

The sensitivity of a TITANUS MICRO·SENS® can be classified into specific fire sensitivity classes according to AS ISO 7240-20. These fire sensitivity classes describe specific example applications in which the systems can be used. Permissible system project planning can be determined for each classification according to the chapter "Pipe project planning".

TITANUS MICRO·SENS® with a higher fire sensitivity class according to AS ISO 7240-20 also meet the requirements of the lower classes.

Class	Description	Application example
A	Aspirating smoke detector with very high sensitivity	Very early detection: Heavy smoke dilution via air conditioning in IT areas
B	Aspirating smoke detector with increased sensitivity	Early detection: Saves a great deal of time with very early fire detection (without air conditioning)
C	Aspirating smoke detector with standard sensitivity	Normal detection: Fire detection with the advantages of aspirating smoke detectors

Table 9: Fire sensitivity classes

Depending on the number of aspiration apertures, the fire sensitivity classes A, B and C can be achieved with each available detection head.

Detection unit	Sensitivity [% light obscuration/m]	Default setting [% light obscuration/m]	Setting levels [% light obscuration/m]
DM-TMx-xx-10-x	0.1 - 2	0.1	0.1
DM-TMx-xx-50-x	0.5 - 2	0.5	0.1

Table 10: Sensitivities (main alarm)

Project planning of the monitoring area always takes place according to the national provisions for point smoke detectors.

5.1.5 Project planning limits

The following limit values must always be observed for the TITANUS MICRO·SENS®:

- The minimum pipe length between two aspiration apertures is 4 m (with simplified project planning 0.1 m)
- The minimum pipe length between two aspiration apertures for localising the fire site is 3 m.
- The maximum pipe length between two aspiration apertures is 10 m.
- The maximum monitored surface for each aspiration aperture corresponds to the monitoring range for a point-type detector in accordance with the respective national standards.
- A maximum of eight aspiration apertures are possible for each TITANUS MICRO·SENS®.
- A maximum of five intake openings are possible for localising the fire site.

The maximum overall monitoring area and the maximum overall pipe length depend on the project planning selected.

Max. overall monitoring area per TITANUS MICRO·SENS®	Max. project planning pipe length[1)]
500 m^2	50 m (pipe Ø 25 mm)

Table 11: Overall monitoring area and pipe length

[1)] Depending on the project planning selected, restricted values apply in some cases.

There may be restrictions due to country-specific regulations which conflict with the project planning limits stated in this document.

5.2 Project planning guidelines

The knowledge of specific factors is essential in order to carry out project planning in accordance with AS ISO 7240-20. These are the requirements for the sensitivity of the system, the number of aspiration apertures and the accessories necessary for the corresponding application. The pipe system layout in compliance with the standard can be determined based on these factors using the following chapters and the project planning table in the annex.

TIP
Another option for simple, fast and secure project planning is the use of the TITANUS® *PipeXpress* software.

5.2.1 Determination of necessary pipe accessories

Due to the fact that accessory components (e.g. filters) have a certain influence on the dimension of pipe project planning, the accessories for the corresponding application must be selected in advance. An upgrade (e.g. with a finer filter) is usually only possible if a certain reserve is planned in advance.

If components are used that have not been approved by the WAGNER Group GmbH, there is no conformity according to AS ISO 7240-20.

The condensate separator type KA-1 and the silencer type SD-1 can be used without restricting project planning.

The following accessory components must be considered:

- Air filter
- Condensate separator type KA-DN-25
- Stop valve for VSK (for automatic air purge system)
- Detector box
- TITANUS MICRO·SENS® aspiration detector

5.2.2 Detailed pipe accessories

Air filter

Type	Application	Examples
LF-AD	Coarse filter to separate particles ≳15 µm	Dusts, insects, fibres, hairs, fly ash, pollen

Table 12: Air filter – type and areas of application

Type	Use	Examples
SF-400	Fine filter for separating particles ≳1 µm	As LF-AD, 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	• 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	for monitoring areas sensitive to noise

Table 15: Silencer – type and areas of application

Stop valve

Type	Application
AVK-PV	Stop valve for VSK air purge system
AVK-PV-F	Stop valve for VSK air purge system for use in deep freeze applications

Table 16: Stop valve – type and application areas

5.2.3 Procedure for pipe project planning

The following project planning tables are available in the appendix for project planning and for planning pipe systems for each previously selected pipe accessory.

- Project planning without filter
- Project planning with air filter LF-AD
- Project planning with air filter LF-AD-1
- Project planning with air filter LF-AD-2
- Project planning with air filter SF-400 / SF-650

In order to improve the detection quality of a TITANUS MICRO·SENS®, a room can be monitored with more aspiration apertures than required by the national guidelines. However, the number of aspiration apertures required by the standard must be used to calculate the necessary sensitivity of a device.

Procedure

In the following example, project planning with air filter type LF-AD-1 and four aspiration apertures, without any other accessories, should comply with class B. The red arrows show the possible project planning for different pipe shapes.

Action step	Actions
1	Selection Selection of the corresponding project planning table based on the air filter to be used (see chapter "Detailed pipe accessories")
	Result The project planning table is determined
2	Selection Selection of the number of aspiration apertures in the project planning table
	Result The achievable sensitivity class for the selected number of aspiration apertures is determined
3	Selection Determine the necessary sensitivity to attain the fire sensitivity class
	Result Detection unit and sensitivity setting are determined
4	Selection Selection of further pipe components (e.g. condensate separator) based on the components described in the chapter "Pipe accessories"
	Result Pipe project planning table is determined
5	Selection Pipe length selection
	Result Pipe shape and the necessary fan voltage are determined

Table 17: Procedure for project planning

Classifica�on of TITANUS MICRO·SENS® and MICRO·SENS®-LSNi

Project planning with air filter type LF-AD-1

Module	Sensi�vity [% Lt/m]	Number of aspira�on apertures 1	2	3	4	5	6	7	8
DM-TM-10	0.1	A		A	A	A	A	A	A
	0,2	A		A	A	B	B	B	B
	0,3	A		A	B	B	B	B	B
	0,4	A		B	B	B	B	C	C
DM-TM-50	0,5	A		B	B	C	C	C	C
	0,6	A		B	B	C	C	C	C
	0,7	A		B	C	C	C	C	C
	0,8	A		B	C	C	C	C	C
	0,9	A		C	C	C	C	C	C
	1	B		C	C	C	C	C	
	1,1	B		C	C	C	C	C	
	1,2	B		C	C	C	C		
	1,3	B		C	C	C	C		
	1,4	B		C	C	C			
	1,5	B		C	C	C			
	1,6	B		C	C				
	1,7	B		C	C				
	1,8	B		C	C				
	1,9	B		C	C				
	2	B		C					

Pipe shape	Fan voltage [V]	Number of aspira�on apertures 1	2	3	4	5	6	7	8
without pipe accessories or with detector box									
I	≥ 9	40	40	40	40	40			
U	≥ 9	50	50	50	50	50	50	50	50
M	≥ 9	50	50	50	50	50	50	50	50
Doppel-U	≥ 9	50	50	50	50	50	50	50	50
with OXY-SENS® and detector box or with condensate separator or with VSK and detector box									
I	≥ 9	40	40	40					
U	≥ 9	50	50	50	50	50	50		
M	≥ 9	50	50	50	50	50	50		
Doppel-U	≥ 9	50	50	50	50	50	50	50	50

permissible total pipe length [m]

Image 42: Project planning example

Results: The following detection units can be optionally used with the corresponding settings for class B or A:

- Detection unit DM-TMx-xx-10-x with a sensitivity of 0.1 to 0.6 % light obscuration/m
- Detection unit DM-TMx-xx-50-x with a sensitivity of 0.5 or 0.6 % light obscuration/m

Possible system parameters:

- I-pipe system with fan voltage ≥ 9 V, max. 40 m overall pipe length
- U-pipe system with fan voltage ≥ 9 V, max. 50 m overall pipe length
- M-pipe system with fan voltage ≥ 9 V, max. 50 m overall pipe length
- Double U-pipe system with fan voltage ≥ 9 V, max. 50 m overall pipe length

5.2.4 Determination of aspiration aperture diameter

The diameter of the aspiration apertures should be taken from the corresponding table for the respective pipe configuration.

5.2.4.1 I-pipe system

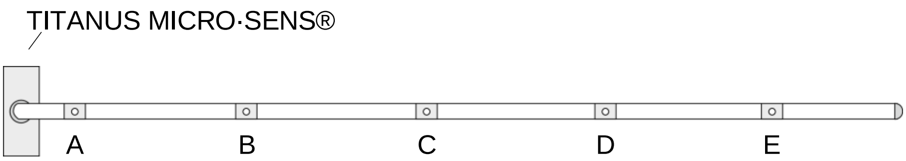


Image 43: I-pipe system

Number of aspiration apertures	1	2	3	4	5
Ø aspiration aperture [mm][1)]					
A	6.8	5.0	4.2	3.4	3.0
B	-	5.0	4.2	3.6	3.2
C	-	-	4.4	3.8	3.4
D	-	-	-	4.4	3.6
E	-	-	-	-	4.4

Table 18: Diameter of aspiration apertures, I-pipe

[1)] Punching diameter of the aspiration-reducing film sheet

5.2.4.2 U-pipe system

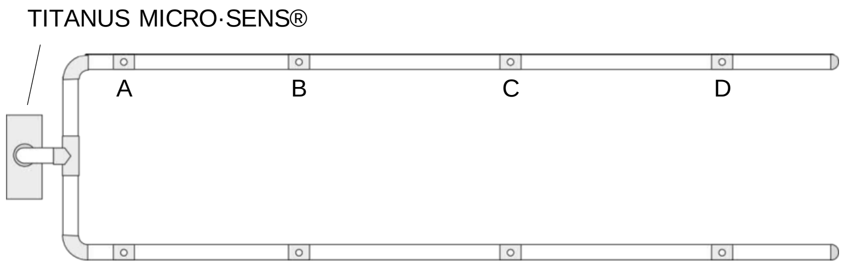


Image 44: U-pipe system

Number of aspiration apertures	2	4	6	8
Ø aspiration aperture				
[mm][1)]	6.0	4.2	3.4	3.0
A	-	4.6	3.6	3.0
B	-	-	4.4	3.6
C	-	-	-	4.0
D				

Table 19: Diameter of aspiration apertures, U-pipe

[1)] Punching diameter of the aspiration-reducing film sheet

5.2.4.3 M-pipe system

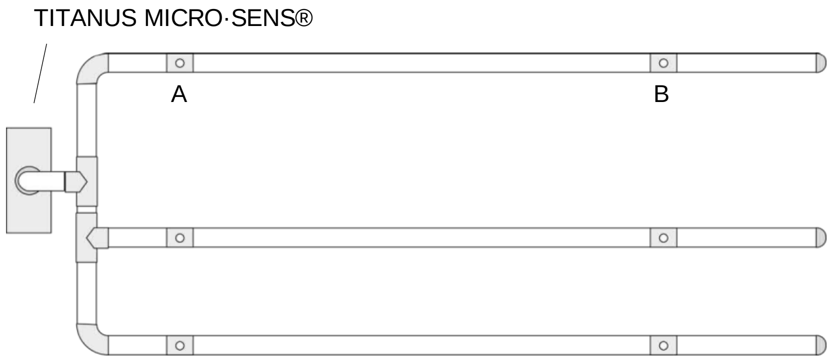


Image 45: M-pipe system

Number of aspiration apertures	3	6
Ø aspiration aperture		
[mm][1)]	5.0	3.6
A	-	4.0
B		

Table 20: Diameter of aspiration apertures, M-pipe

[1)] Punching diameter of the aspiration-reducing film sheet

5.2.4.4 Double U-pipe system

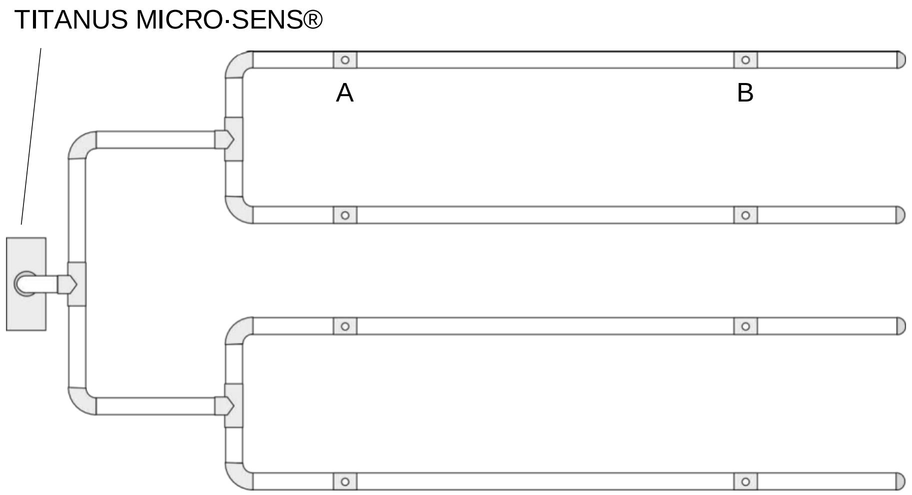


Image 46: Double U-pipe system

Number of aspiration apertures	4	8
Ø aspiration aperture [mm][1)] A B	4.4 -	3.0 3.8

Table 21: Diameter of aspiration apertures, double U-pipe

[1)] Punching diameter of the aspiration-reducing film sheet

5.3 Special project planning

The following are considered special project planning:

- Project planning for single hole monitoring
- Simplified pipe project planning
- Project planning with stubs
- Project planning for forced air flow
- Project planning with aspiration hose
- Project planning with air return

5.3.1 Project planning with single hole monitoring

The following system parameters apply to the detection of an individual or a particular number of blocked aspiration apertures, depending on the pipe configuration.

The specifications from chapter "Project planning guidelines" apply to the project planning. In addition, the following limit values and diameters of the aspiration apertures must be observed. Additional accessories (e.g. air filters or condensate separators) can influence the maximum pipe length.

5.3.1.1 I-pipe system

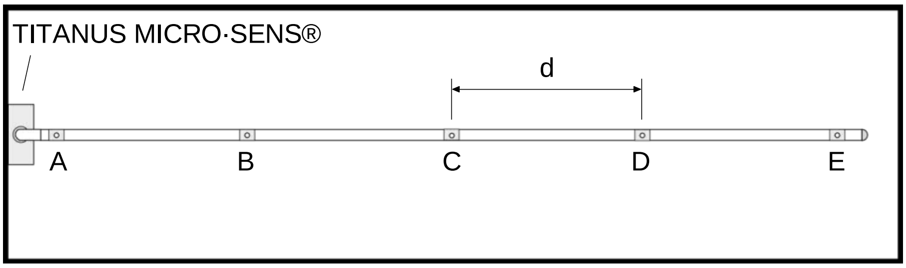


Image 47: I-pipe system for room monitoring

	Limit values
Min. distance between device to first aspiration aperture	2 m
Max. distance between device to first aspiration aperture	20 m
Max. overall pipe length of pipe Ø 25 mm	40 m
Max. overall pipe length with fan voltage 9.0 V; pipe ø 25 mm	30 m
Min. distance between two aspiration apertures (d)	4 m
Max. distance between two aspiration apertures (d)	10 m
Max. number of aspiration apertures (n)	5 units

Table 22: Limit values of I-pipe system for single hole monitoring

Number of aspiration apertures	1	2	3	4	5
Ø aspiration aperture [mm][1)]					
A	6.8	4.6	4.0	3.4	3.0
B	-	5.0	4.2	3.6	3.2
C	-	-	4.4	3.8	3.4
D	-	-	-	4.0	3.6
E	-	-	-	-	3.8

Table 23: Diameter of the aspiration apertures of the I-pipe system for single hole monitoring

[1)] Punching diameter of the aspiration-reducing film sheet

Number of aspiration apertures	2	3	4	5
1 blocked aspiration aperture	±25%	±15%	±10%	-
2 blocked aspiration apertures	O	O	±20%	±15%
3 blocked aspiration apertures	O	O	O	O
4 blocked aspiration apertures	O	O	O	O
5 blocked aspiration apertures	O	O	O	O
… detected with main air flow set to x%				

Table 24: I-pipe system triggering thresholds

- not possible

O not feasible

NOTE

No standard conformity in case of improper project planning

The air flow monitoring should be set to ≤20 % to achieve project planning that complies with AS ISO 7240.

Example

If blockage of two aspiration apertures of a total of five aspiration apertures should be detected, the air flow monitoring setting is to be set to ±15% using the diagnostic tool.

5.3.1.2 U-pipe system

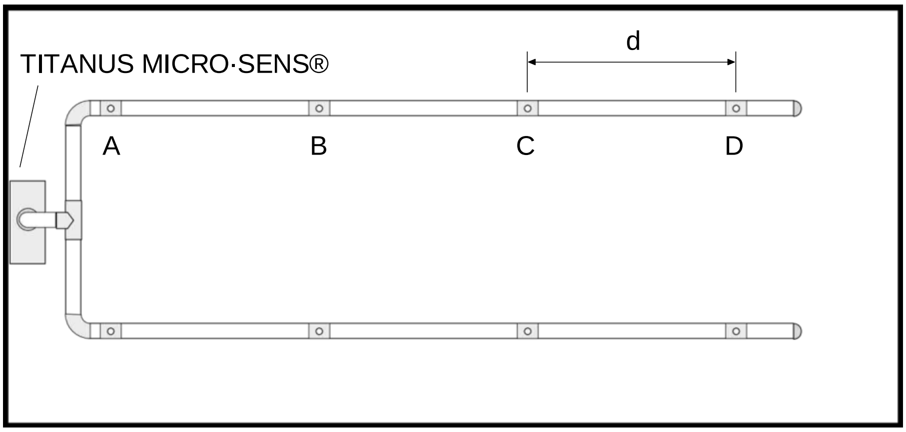


Image 48: U-pipe system for room monitoring

	Limit values
Min. distance between device and T-piece	2 m
Max. distance between device and T-piece	20 m
Max. branch lengths	25 m
Max. overall pipe length of pipe Ø 25 mm	50 m
Max. overall pipe length with fan voltage 9.0 V; pipe ø 25 mm	40 m
Min. distance between two aspiration apertures (d)	4 m
Max. distance between two aspiration apertures (d)	10 m
Max. number of aspiration apertures (n)	8 units

Table 25: Limit values of U-pipe system for single hole monitoring

Number of aspiration apertures	2	4	6	8
Ø aspiration aperture [mm][1)]				
A	6.0	4.2	3.4	3.0
B	-	4.4	3.6	3.0
C	-	-	3.6	3.2
D	-	-	-	3.2

Table 26: Diameter of the aspiration apertures of the U-pipe system for single hole monitoring

[1)] Punching diameter of the aspiration-reducing film sheet

Number of aspiration apertures	2	4	6	8
1 blocked aspiration aperture	±20%	±10%	-	-
2 blocked aspiration apertures	O	±20%	±15%	±10%
3 blocked aspiration apertures	O	O	±25%	±20%
4 blocked aspiration apertures	O	O	O	±30%
5 blocked aspiration apertures	O	O	O	O
6 blocked aspiration apertures	O	O	O	O
7 blocked aspiration apertures	O	O	O	O
… detected with main air flow set to x%				

Table 27: U-pipe system triggering thresholds

- not possible

O not feasible

NOTE

No standard conformity in case of improper project planning

The air flow monitoring should be set to ≤20 % to achieve project planning that complies with AS ISO 7240.

Example If blockage of three aspiration apertures of a total of eight aspiration apertures should be detected, the air flow monitoring setting must be set to ±20% using the diagnostic tool.

5.3.1.3 M-pipe system

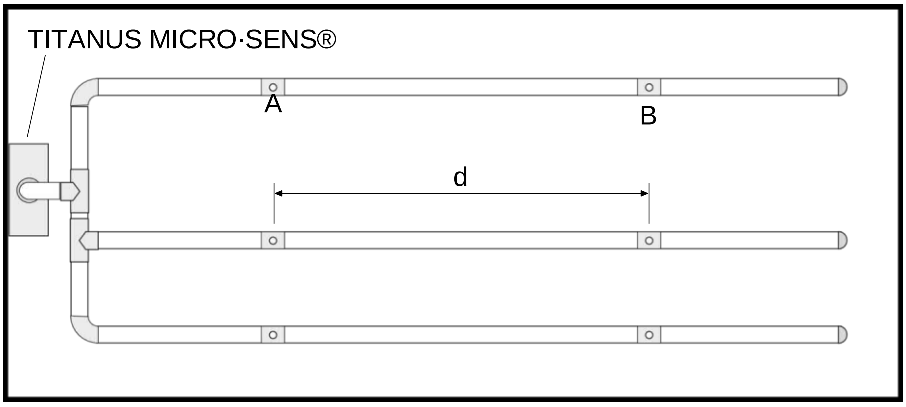


Image 49: M-pipe system for room monitoring

	Limit values
Min. distance between device and T-piece	2 m
Max. distance between device and T-piece	20 m
Max. branch lengths	16.5 m
Max. overall pipe length of pipe Ø 25 mm	50 m
Max. overall pipe length with fan voltage 9.0 V; pipe ø 25 mm	40 m
Min. distance between two aspiration apertures (d)	4 m
Max. distance between two aspiration apertures (d)	10 m
Max. number of aspiration apertures (n)	6 units

Table 28: Limit values of M-pipe system for single hole monitoring

Number of aspiration apertures	3	6
Ø aspiration aperture [mm][1)]		
A	5.0	3.6
B	-	3.8

Table 29: Diameter of the aspiration apertures of the M-pipe system for single hole monitoring

[1)] Punching diameter of the aspiration-reducing film sheet

Number of aspiration apertures	3	6
1 blocked aspiration aperture	±25%	±10%
2 blocked aspiration apertures	O	±25%
3 blocked aspiration apertures	O	O
4 blocked aspiration apertures	O	O
5 blocked aspiration apertures	O	O
6 blocked aspiration apertures	O	O

Table 30: M-pipe system trigger thresholds

- not possible

O not feasible

NOTE

No standard conformity in case of improper project planning

The air flow monitoring should be set to ≤20 % to achieve project planning that complies with AS ISO 7240.

Example If blockage of one aspiration aperture of a total of six aspiration apertures should be detected, the air flow monitoring setting must be set to ±10% using the diagnostic tool.

5.3.1.4 Double U-pipe system

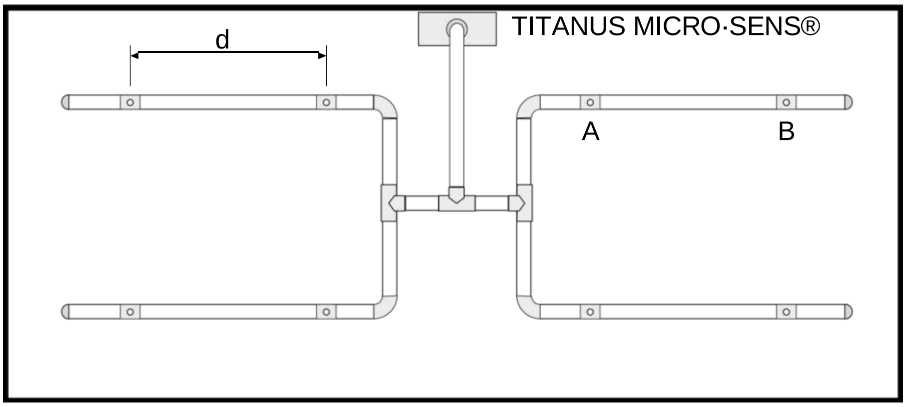


Image 50: Double U-pipe system for room monitoring

	Limit values
Min. distance between device and T-piece	2 m
Max. distance between device and T-piece	20 m
Max. branch lengths	12.5 m
Max. overall pipe length of pipe Ø 25 mm	50 m
Max. overall pipe length with fan voltage 9.0 V; pipe ø 25 mm	40 m
Min. distance between two aspiration apertures (d)	4 m
Max. distance between two aspiration apertures (d)	10 m
Max. number of aspiration apertures (n)	8 units

Table 31: Limit values of double U-pipe system for single hole monitoring

Number of aspiration apertures	4	8
Ø aspiration aperture [mm][1)]		
A	4.4	3.0
B	-	3.2

Table 32: Diameter of the aspiration apertures of the double U-pipe system for single hole monitoring

[1)] Punching diameter of the aspiration-reducing film sheet

Number of aspiration apertures	4	8
1 blocked aspiration aperture	±10%	-
2 blocked aspiration apertures	±25%	±10%
3 blocked aspiration apertures	O	±20%
4 blocked aspiration apertures	O	±30%
5 blocked aspiration apertures	O	O
6 blocked aspiration apertures	O	O

Table 33: Double U-pipe system triggering thresholds

- not possible

O not feasible

> *NOTE*
>
> No standard conformity in case of improper project planning
>
> The air flow monitoring should be set to ≤20 % to achieve project planning that complies with AS ISO 7240.

Example If blockage of three aspiration apertures of a total of eight aspiration apertures should be detected, the air flow monitoring setting must be set to ±20% using the diagnostic tool.

5.3.2 Simplified project planning

Simplified project planning is applied in equipment monitoring and in rooms with small dimensions. The advantage in this project planning is the uniform diameters of the aspiration apertures.

The specifications from chapter "Project planning guidelines" apply to the project planning. In addition, the following limit values and diameters of the aspiration apertures must be observed. Additional accessories (e.g. air filters or condensate separators) can influence the max. pipe length.

5.3.2.1 I-pipe system

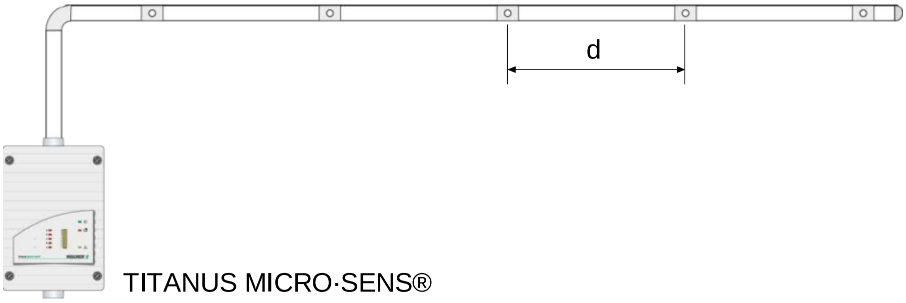


Image 51: I-pipe system, e.g. equipment monitoring

	Limit values
Min. distance between device to first aspiration aperture	2 m
Max. distance between device to first aspiration aperture	20 m
Max. overall pipe length of pipe Ø 25 mm	40 m
Max. overall pipe length with fan voltage 9.0 V; pipe ø 25 mm	30 m
Min. distance between two aspiration apertures (d)	0.1 m
Min. distance between two aspiration apertures (d) for localising the fire site	3 m
Max. distance between two aspiration apertures (d)	4 m
Max. number of aspiration apertures (n)	5 units

Table 34: Limit values of I-pipe for simplified pipe project planning

Number of aspiration apertures	1	2	3	4	5
Ø aspiration aperture [mm][1)]	6.8	4.6	4.0	3.6	3.4

Table 35: Diameter of the aspiration apertures for the I-pipe system with simplified project planning

[1)] Punching diameter of the aspiration-reducing film sheet

5.3.2.2 M-pipe system

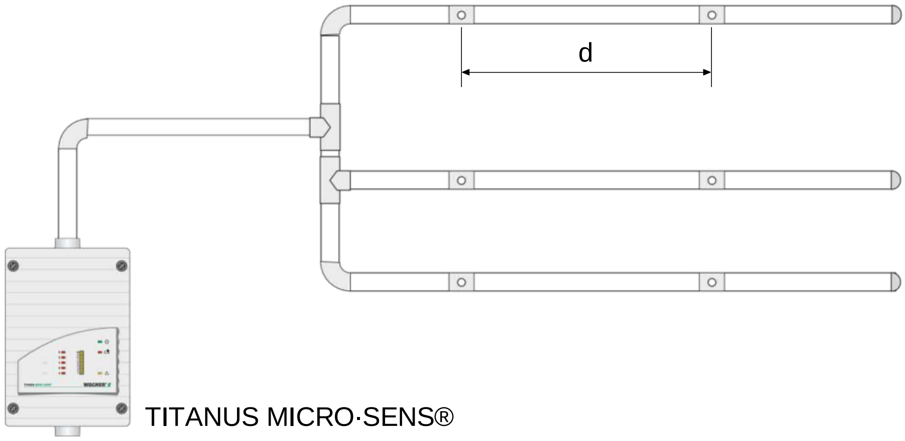


Image 52: M-pipe system, e.g. for equipment monitoring

	Limit values
Min. distance between device and T-piece	2 m
Max. distance between device and T-piece	20 m
Max. branch lengths	16.5 m
Max. overall pipe length of pipe Ø 25 mm	50 m
Max. overall pipe length with fan voltage 9.0 V; pipe ø 25 mm	40 m
Min. distance between two aspiration apertures (d)	0.1 m
Max. distance between two aspiration apertures (d)	4 m
Max. number of aspiration apertures (n) per pipe system	6 units

Table 36: Limit values of M-pipe system for simplified pipe project planning

Number of aspiration apertures	3	6
Ø aspiration aperture [mm][1)]	5.0	3.6

Table 37: Diameter of the aspiration apertures for the M-pipe system with simplified project planning

[1)] Punching diameter of the aspiration-reducing film sheet

5.3.2.3 U-pipe system

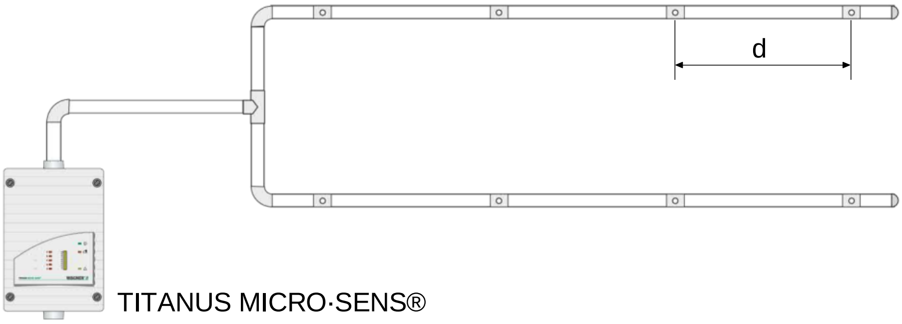


Image 53: U-pipe system, e.g. for equipment monitoring

	Limit values
Min. distance between device and T-piece	2 m
Max. distance between device and T-piece	20 m
Max. branch lengths	25 m
Max. overall pipe length of pipe Ø 25 mm	50 m
Max. overall pipe length with fan voltage 9.0 V; pipe Ø 25 mm	40 m
Min. distance between two aspiration apertures (d)	0.1 m
Max. distance between two aspiration apertures (d)	4 m
Max. number of aspiration apertures (n) per pipe system	8 units

Table 38: Limit values of U-pipe system for simplified pipe project planning

Number of aspiration apertures	2	4	6	8
Ø aspiration aperture [mm][1)]	6.0	4.2	3.4	3.0

Table 39: Diameter of the aspiration apertures for the U-pipe system with simplified project planning

[1)] Punching diameter of the aspiration-reducing film sheet

5.3.2.4 Double U-pipe system

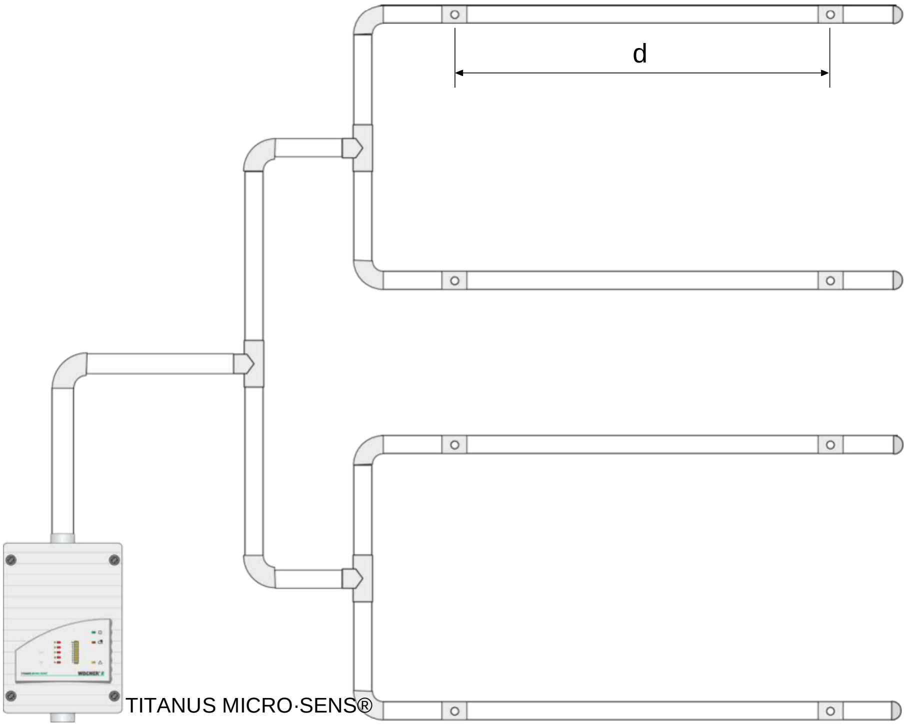


Image 54: Double U-pipe system, e.g. for equipment monitoring

	Limit values
Min. distance between device and T-piece	2 m
Max. distance between device and T-piece	20 m
Max. branch lengths	12.5 m
Max. overall pipe length of pipe Ø 25 mm	50 m
Max. overall pipe length with fan voltage 9.0 V; pipe ø 25 mm	40 m
Min. distance between two aspiration apertures (d)	0.1 m
Max. distance between two aspiration apertures (d)	4 m
Max. number of aspiration apertures (n) per pipe system	8 units

Table 40: Limit values of double U-pipe system for simplified pipe project planning

Number of aspiration apertures	4	8
Ø aspiration aperture [mm][1)]	4.4	3.0

Table 41: Diameter of the aspiration apertures for the double U-pipe system with simplified project planning

[1)] Punching diameter of the aspiration-reducing film sheet

5.3.3 Project planning with stubs

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

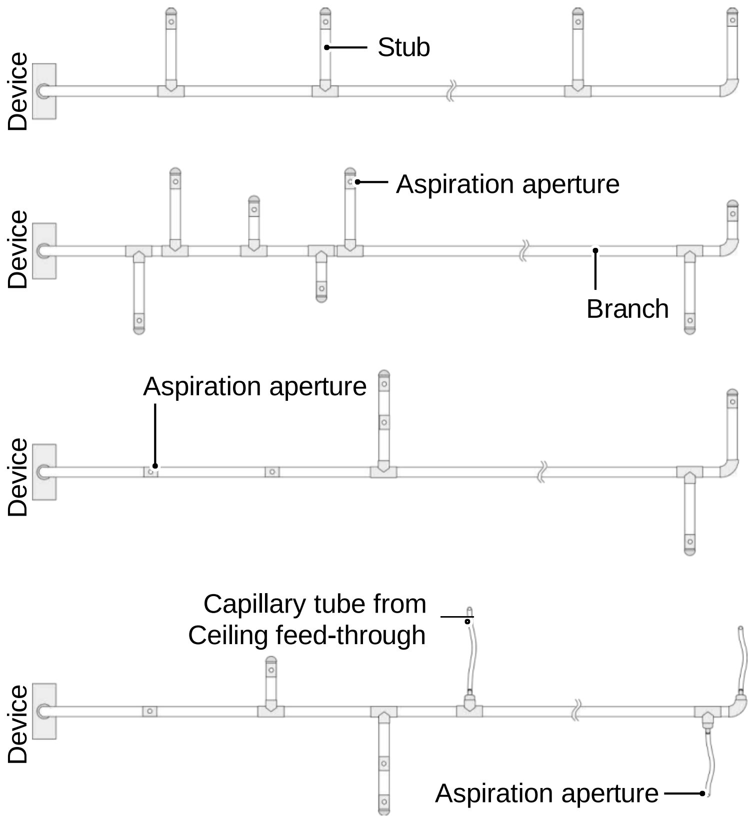


Image 55: Examples of project planning with stubs (as I-pipe system here)

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 TITANUS MICRO·SENS® and the most distant aspiration aperture.

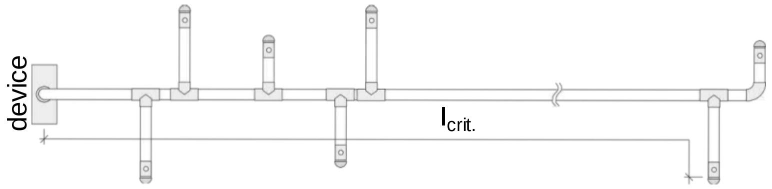


Image 56: Critical length ($l_{crit.}$)

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.

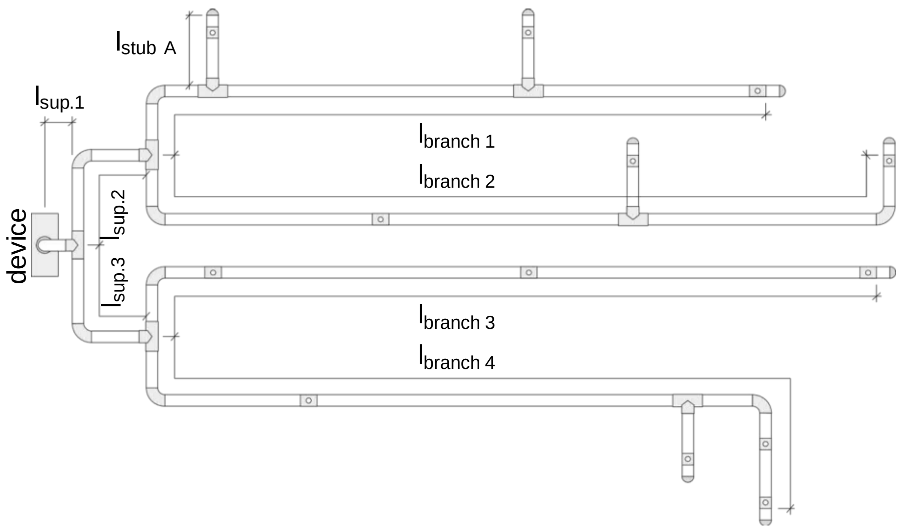


Image 57: Determination of the critical length lcrit. for pipe systems with more than one branch (double U-pipe system here)

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.

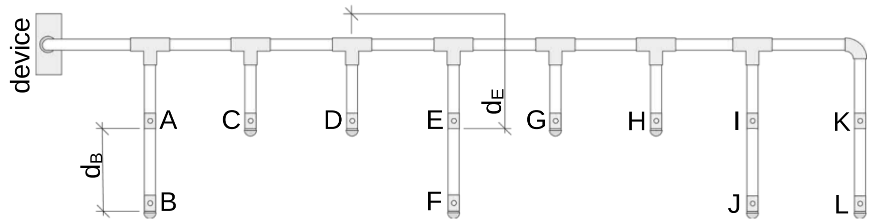


Image 58: Intervals of the aspiration apertures

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

Project planning		d [m]	
		Min.	Max.
Standard		4	10
Special	Chapter ""Project planning with single hole monitoring"	4	10
	Chapter "Simplified project planning"	0.1	4

Table 42: Permissible intervals between the aspiration apertures

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

Diameter of aspiration apertures

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).

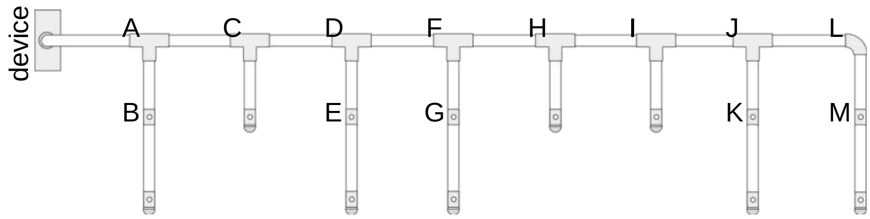


Image 59: Diameter of aspiration apertures

Maximum stub length

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

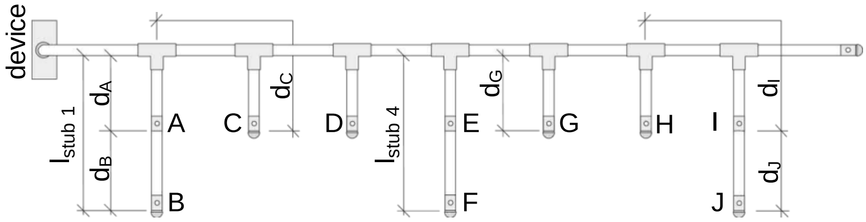


Image 60: Maximum stub length

5.3.4 Project planning with forced air flow

Air conditioning duct monitoring

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

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

There are insufficient empirical values for high-speed systems. For that reason, smoke tests are to be conducted with air conditioning ducts having flow rates higher than 10 m/s to determine the optimum response characteristics.

	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 43: Differences between low-speed and high-speed systems

The rate distribution in an air conditioning duct looks like this:

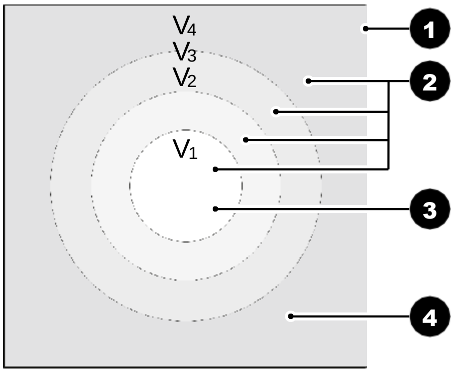


Image 61: Speed distribution in the air-conditioning duct

1	Cross-section of air-conditioning duct
2	Areas V1 … V4
3	Centre of the air-conditioning duct (highest air flow)
4	Outer area of the air-conditioning duct (lowest air flow)

Aspiration

The pipe system must be arranged in area V_1 to V_3 to achieve optimum detection results.

Installation location

The air conditioning duct must be installed as far away as from silencers, air baffles and bends as possible. The reference value for the distance from such obstacles is: at least 3x minimum duct diameter.

If it is absolutely necessary to attach the pipe system directly behind silencers, air baffles or bends, the main flow speed areas have to be monitored.

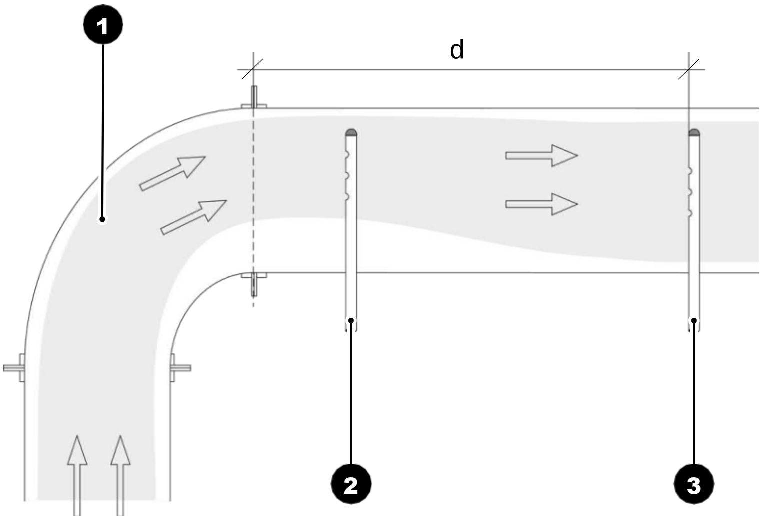


Image 62: Change in direction in the air-conditioning duct without baffles

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

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

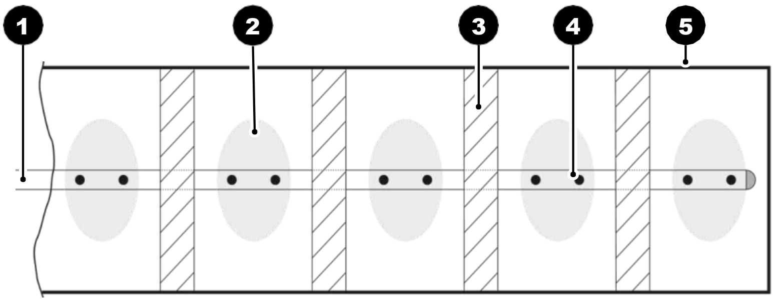


Image 63: Silencer in air-conditioning duct

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 (see following diagram) must be planned for, since the TITANUS MICRO·SENS® and the pipe system are located in different pressure areas.
- The pipe inlets in the duct must be sealed so that they are air tight.
- The part of the pipe system located outside of the duct must be sealed so as to be air tight.

Air return

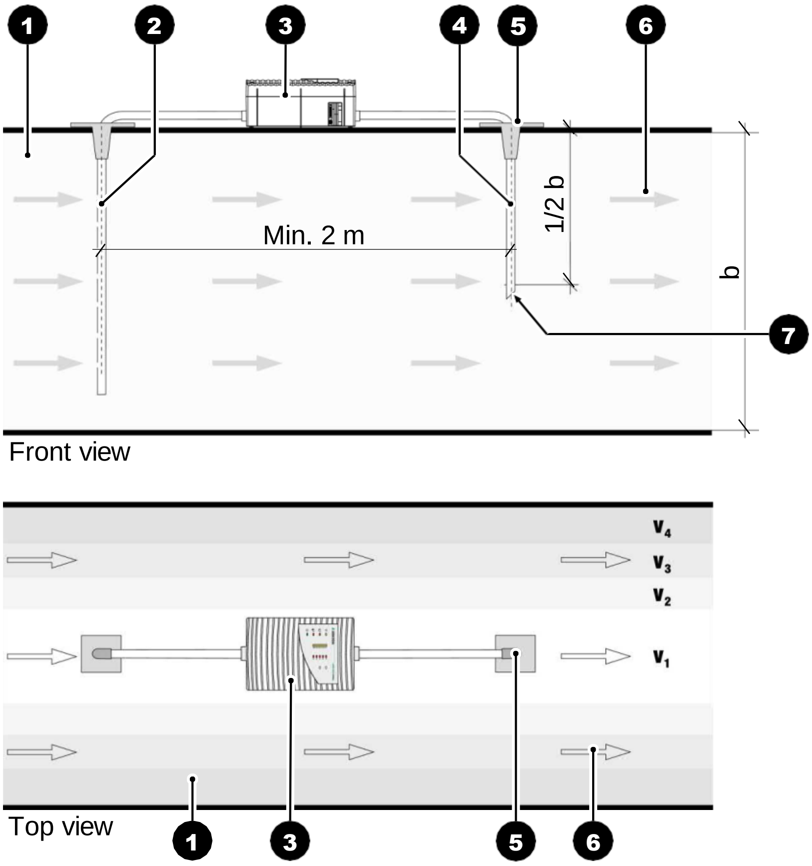


Image 64: Air return in the air-conditioning duct

1	Air-conditioning duct
2	Aspiration
3	TITANUS MICRO·SENS®
4	Air return
5	Duct adapter
6	Air flow
7	45° chamfered end

The open end of the air return pipe is chamfered at an angle of 45°.

The distances of the aspiration apertures to each other and to the wall of the duct are listed in the following table.

	Duct cross-section ≤ 0.5 m²	Duct cross-section > 0.5 m²
Distance of aspiration apertures from the wall	100 to 200 mm	200 to 300 mm
Mutual distance between aspiration apertures	100 mm	150 mm

Table 44: Intervals of the aspiration apertures for air returns

Diameter of aspiration apertures The diameters of the aspiration apertures are obtained from the number of aspiration apertures. The precise value can be found in chapter "Simplified pipeline project planning".

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

Arrangement 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 The following illustration shows two project planning examples of pipe systems in air conditioning ducts.

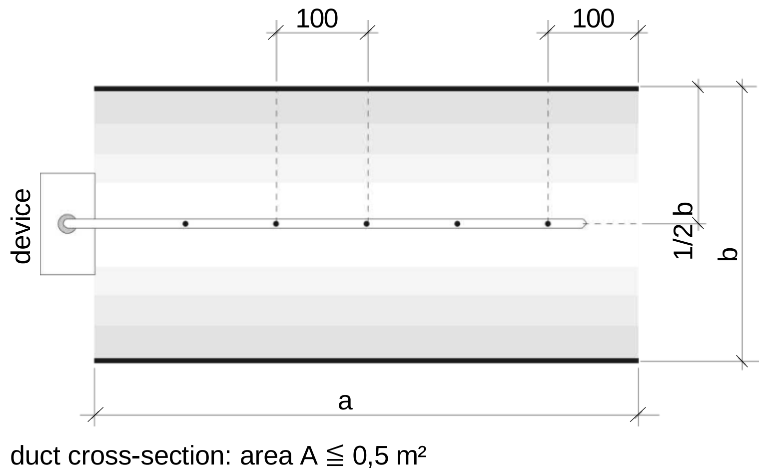


Image 65: Ducts with small duct cross-section

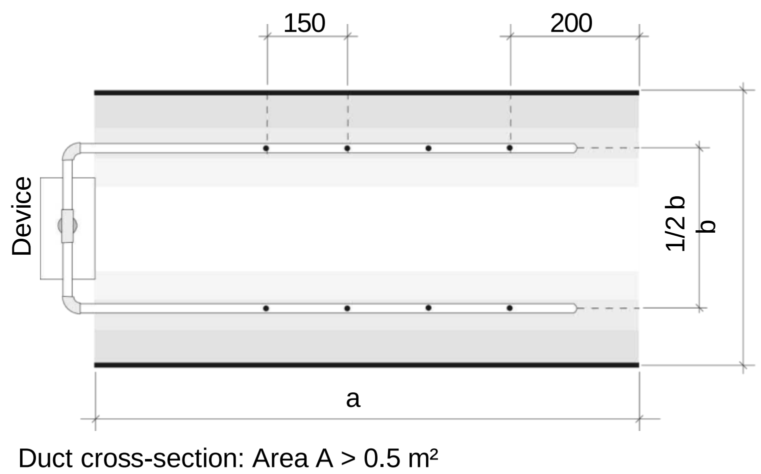


Image 66: Ducts with large duct cross-section

5.3.5 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 obstacles.

The overall aspiration pipe cannot consist of aspiration hose alone.

Aspiration reducers must not be attached to aspiration hoses.

As the use of aspiration hoses can have a negative impact on the transport time, the influence of the used aspiration hose on the permissible overall pipe length must be determined as follows.

Consideration when using the aspiration hose:

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 b and deducted from the permissible overall pipe length.

Aspiration pipe length = overall pipe length – (length of aspiration hose * factor b)

Factors for determining the influence of aspiration hoses on the overall pipe length:

Aspiration hose	Factor b
Type SCH-PG16	1.1
Type SCH-P-25	0.5

Table 45: Factors for determining the influence of aspiration hoses

Example 1: Overall, an aspiration hose type SCH-PG16 with a length of 12 m is to be connected to a TITANUS MICRO·SENS®. The permissible overall pipe length for the entire pipe project planning is 50 m. This results in the following for the maximum overall pipe length including aspiration hose:

Aspiration pipe length = 50 m - (12 m * 1.1) = 36.8 m

Example 2: For the pipe project planning, a total of 45 m aspiration pipe and aspiration hose is connected to a TITANUS MICRO·SENS®. The permissible overall pipe length for the entire pipe project planning can be 50 m according to the project planning table. The following results for the maximum length of the overall aspiration hose type SCH-P-25, 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 b Length of aspiration hose = (50 - 45 m) / 0.5 = 10 m

5.3.6 Project planning with air return

In cases where there are air pressure differences between the area of the TITANUS MICRO·SENS® and the area of the aspiration apertures, air return of the drawn-in sample air into the pressure area of the aspiration apertures may be necessary. For this, a correspondingly long aspiration pipe must be connected to the air outlet of the TITANUS MICRO·SENS®.

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

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

Consideration of air returns:

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

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

Factors for determining the influence of air return on the overall pipe length:

Length of air return	Factor a for air return Ø 25 mm	Factor a for air return Ø 32 mm
0 to 5 m	0.0	0.0
> 5 to 10 m	1.6	0.0
> 10 to 25 m	3.2	1.0

Table 46: Factors for determining the influence of air returns

Example: An air return (Ø 25 mm) of 10 m is to be connected to a TITANUS MICRO·SENS®. The permissible overall pipe length for the pipe system is 50 m. The following results for the maximum aspiration pipe length:

Aspiration pipe length = 50 m – (10 m * 1.6) = 34 m

5.4 Energy supply

NOTE

No standard conformity in case of wrong energy supply

The energy supply of the TITANUS MICRO·SENS® must be approved in accordance with AS 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 TITANUS MICRO·SENS®.

Alarm state

Alarm current

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

- Connected devices
- Any connected accessories

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

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.

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

Standby current

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. . For Australia this is AS 1670.1 Fire detection, warning, control and intercom systems – System design, installation and commissioning – part 1 Fire In accordance with these laws, standards and guidelines, a hold-up time of 72 h (under certain conditions 24 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 TITANUS MICRO·SENS®.

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 TITANUS MICRO·SENS®.

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

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 TITANUS MICRO·SENS® and the pipe system in this chapter.

6.1 General information

The provisions, guidelines and terms listed in the chapter "Project planning" apply.

The following must be observed when installing the TITANUS MICRO·SENS®:

- Interventions, 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 approval).
- All interventions in 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. control panels)
  - Carrying out any potentially required lightning and surge protection measures according to the relevant standards.

NOTE
Danger of device damage due to electrostatic discharge Only perform the following work with the device disconnected from the mains. Do not touch the components of the circuit boards without an anti-static set.

6.2 Determination of installation location

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.

In deep-freeze areas and when using air purge systems, aspiration reducers for deep-freeze applications (aspiration-reducing clips) must be used. For all other applications, aspiration-reducing film sheets must be used.

6.3 Installation of device

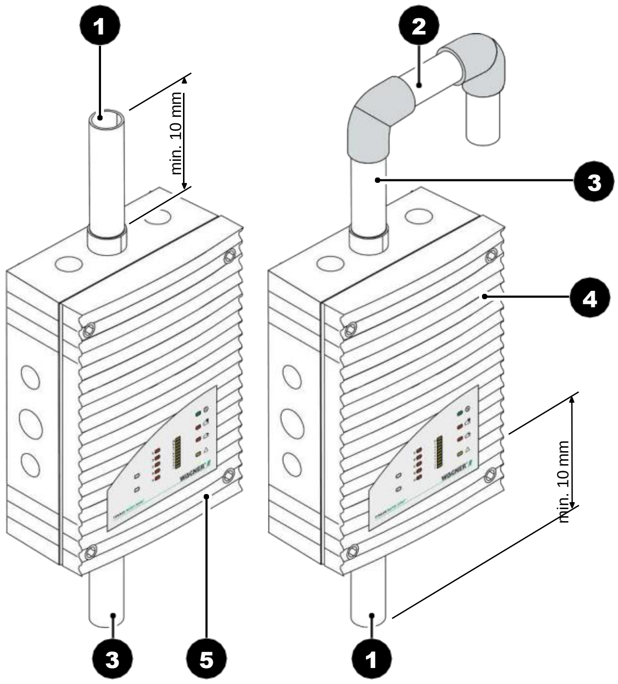


Image 67: Mounting orientation

1	Aspiration pipe
2	Angled pipe
3	Air return
4	TITANUS MICRO·SENS® with top air outlet
5	TITANUS MICRO·SENS® 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.

The device can be installed with the air intake pointing up or down. Rotate the detection unit accordingly by 180°.

Rotating the cover or detection unit

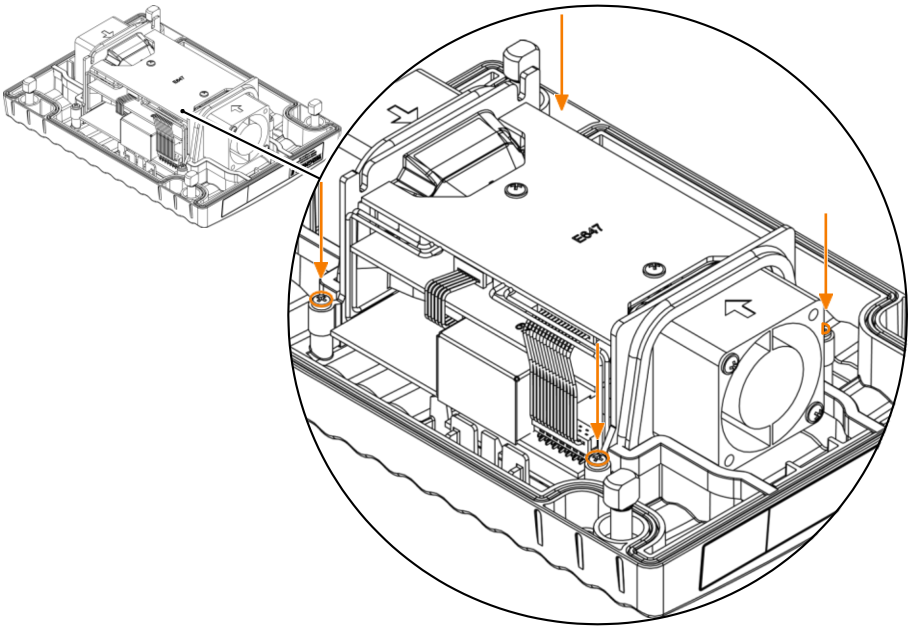


Image 68: Rotate the cover of the detection unit

- ►Loosen the four screws.
- ►Rotate the detection unit by 180°.
- ►Fasten the detection unit again with the four screws.

Wall mounting

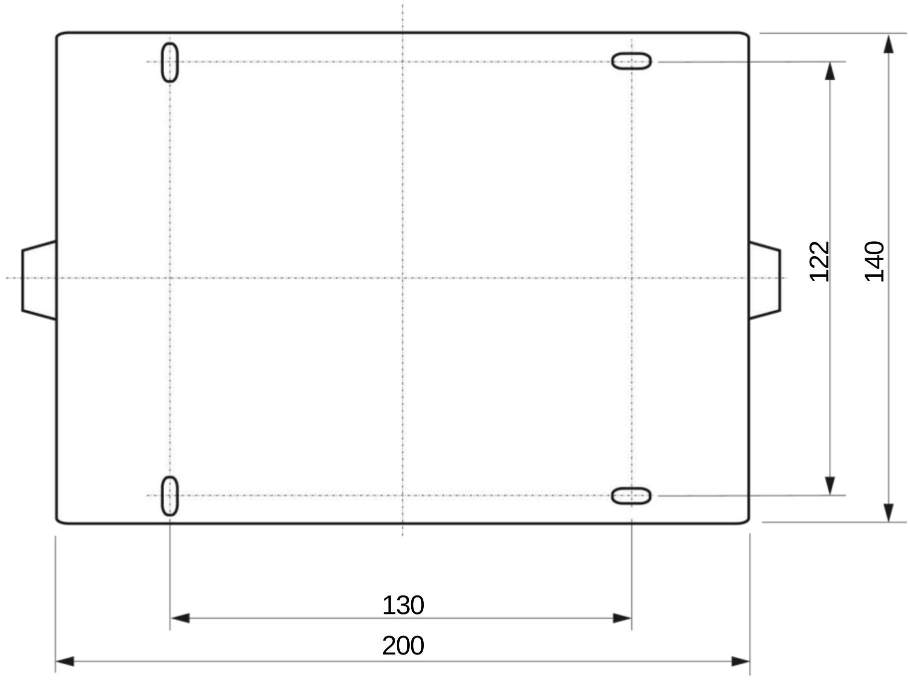


Image 69: Drilling distances of the device base (all data in mm)

Installation materials

Cylinder or flat-head screws

- Thread diameter: max. 4 mm
- Head diameter: max. 8 mm

► 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.

6.4 Establishing the electrical connection

The following steps must be initially performed to prepare the electrical connections:

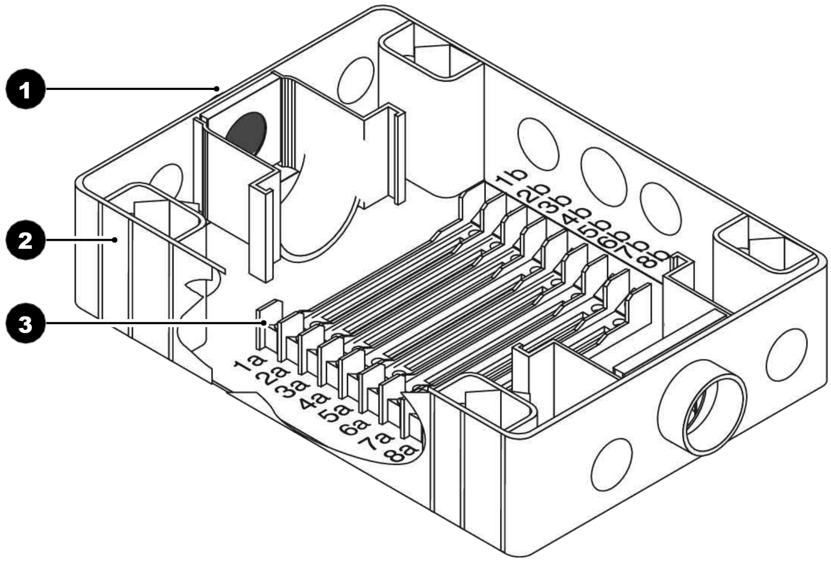


Image 70: Screw terminals in the device base

1	Aspiration pipe connection
2	Device base
3	Terminal block

► Break through the necessary number of cable glands on the device base, e.g. with a screwdriver.

► Insert the M20 or M25 cable entries (device base accessories kit) into the corresponding cable glands.

► Guide the cables through the corresponding cable entries.

NOTE
Risk of short circuit due to cabling error Damage to device possible. Perform all connection work with the device disconnected from the mains.

► Perform wiring according to the following circuit diagram. The electrical connection is carried out via the screw terminals of the device base 1a to 8a and 1b to 8b. Observe the permissible cable diameters of the cable glands of the components to be connected and the permissible wire diameters of the terminals in the device base for 0.5 - 2.5 mm² wires.

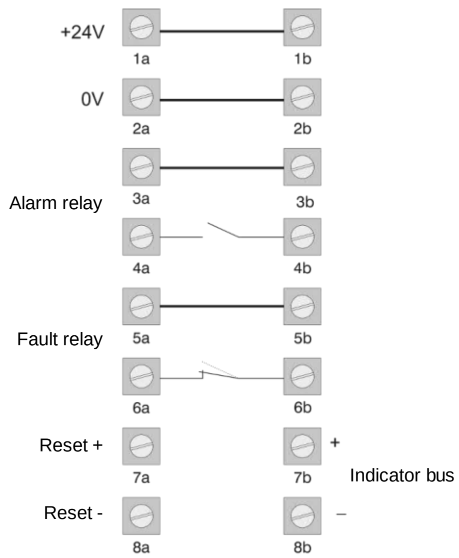


Image 71: Assigning the screw terminals in the device base

Alarm and fault contacts can be used e.g. for connection to an FDCP or for controlling signalling devices, control systems, etc. It is also possible to connect a remote display or response indicators to the indicator bus of the device.

Permanently energising the reset input results in all messages being automatically reset when the cause of the message has been eliminated. A maximum of two relay modules, one remote display, one network module or five response indicators per TITANUS MICRO·SENS® can be connected.

Additional housing

To install accessory modules, a prefabricated mounting plate is screwed into the additional housing.

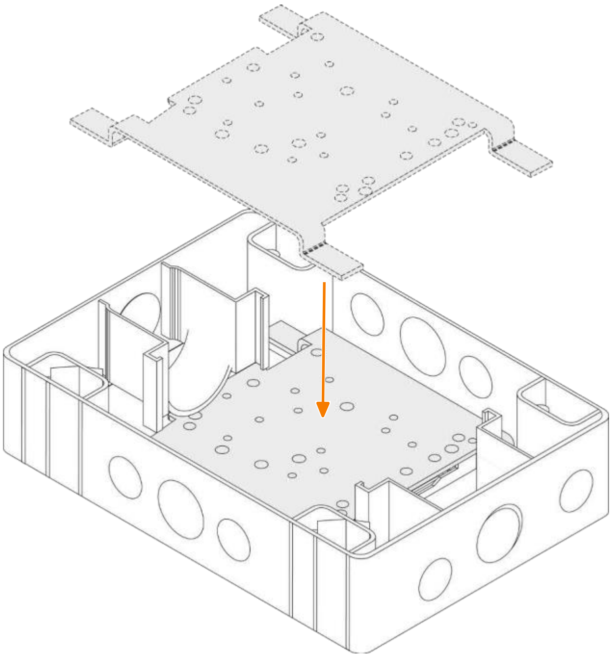


Image 72: Position of the mounting plate in the device base of the additional housing

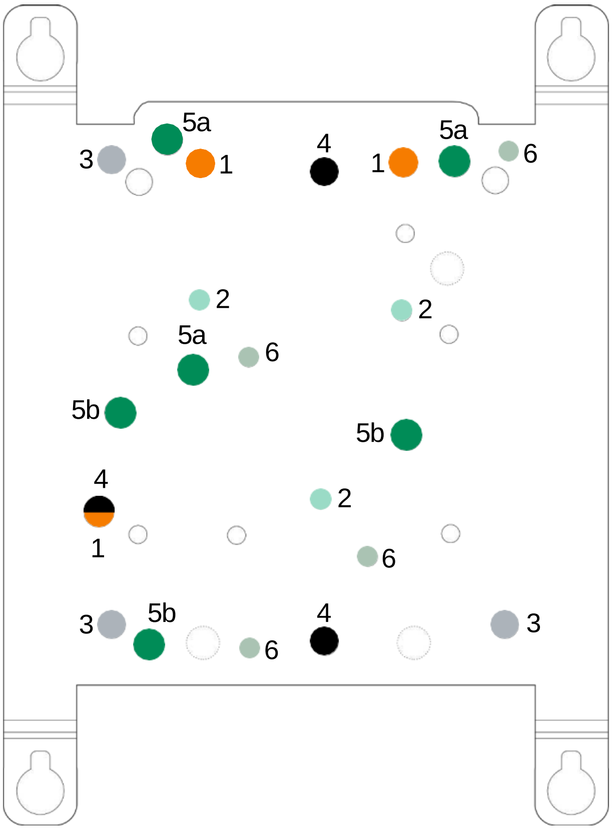


Image 73: Position of the drill holes on the mounting plate of the additional housing

1	Network module
2	Remote display
3	Mounting base for cable ties
4	Relay circuit board RU-1 or RU-2
5a/b	Max. two reset circuit boards
6	Reset and disconnect button circuit board

6.4.1 Connecting to an FDCP, with reset button

Example

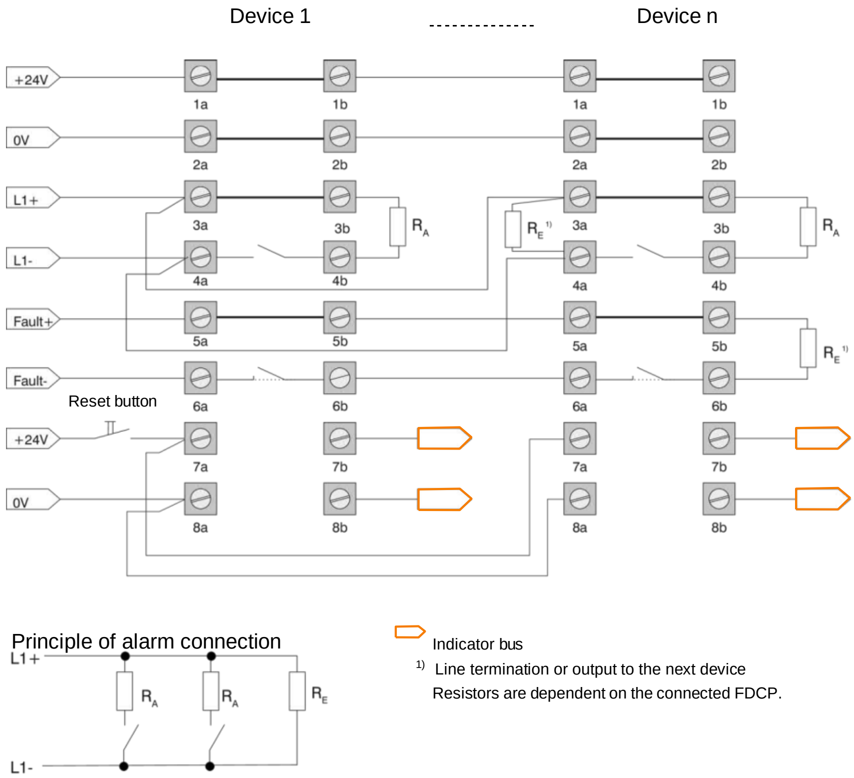


Image 74: Connecting to an FDCP, with reset button

6.5 Inserting and connecting the reset circuit board

The reset circuit board can be optionally used in the TITANUS MICRO·SENS®.

An additional housing is required for the installation of the reset circuit board. It must be installed right next to the TITANUS MICRO·SENS®. If several TITANUS MICRO·SENS® are connected to a detector line, a reset circuit board is only connected to the detector line after the last device.

The reset circuit board can only be used if the standby current of the detector line is between 5 mA and 50 mA and the termination resistor is formed by an ohmic resistance. The reset impulse is triggered if the detector line voltage falls below 3 V within 0.5 s when the FDCP is reset.

The formulas shown for calculation of the standby current and the termination resistor of the detector line take the ideal status of signal evaluation into consideration.

Line standby current

The standby current $I_{standby}$ of the detector line must be calculated as shown below:

$$I_{standby} = \frac{U_{DL}}{R_{ER}}$$

Variable/ constant	Unit	Description
$I_{standby}$	A	Standby current
U_{DL}	V	Detector line voltage (DL = Detector Line)
R_{ER}	Ω	Resistor (ER = End Reset)

Termination resistor

The reset circuit board emulates the detector line termination resistor. It is recalculated and installed on the reset circuit board (connection X1). If no acknowledgement is achieved by means of the calculated termination resistor of the reset circuit board, the value of the termination resistor must be reduced by approx. 20%.

The value of the termination resistor R_{ER} is calculated 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)

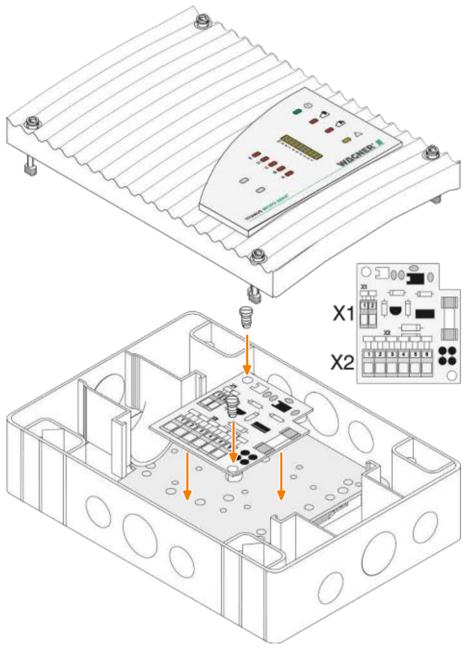


Image 75: Inserting the reset circuit board into the additional housing

The following work steps must be performed to install the reset circuit board in the additional housing:

- ►Use a screwdriver to loosen the four screws on the additional housing.
- ►Insert the calculated termination resistor (termination resistor is not supplied, power ¼ W) R_{ER} into connection terminal X1.
- ►Fix the reset circuit board with three plastic spacers on the mounting plate (see figure "Fixing points") in the additional housing.
- ►Connect the reset circuit board according to the following connection diagram (terminal strip 8a/b).

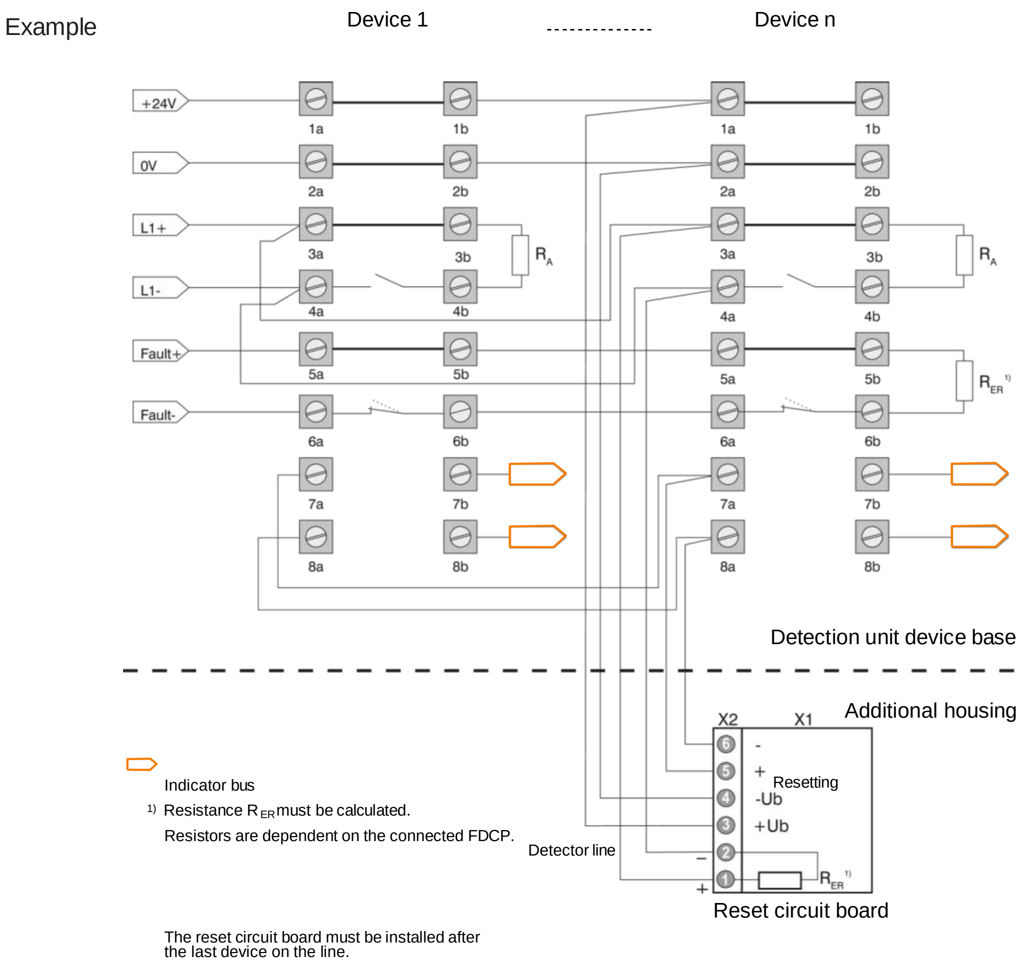


Image 76: Connecting to an FDCP, with reset circuit board

► Fasten the cover again with a screwdriver by tightening the four screws on the device cover.

6.6 Inserting and connecting the reset and disconnect button circuit board

An additional housing is required to install the reset or disconnect button. It must be installed right next to the TITANUS MICRO·SENS®.

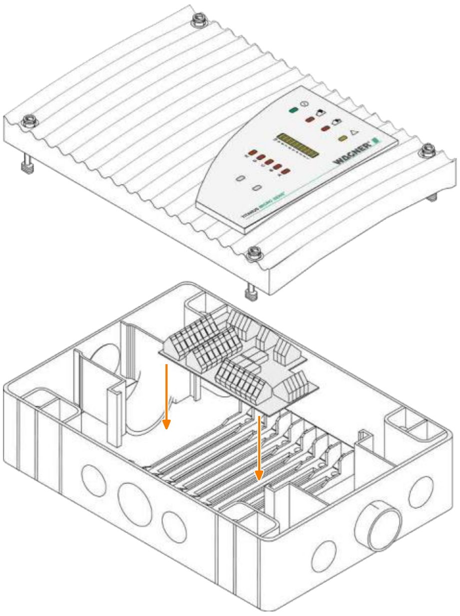


Image 77: Inserting the reset and disconnect button circuit board into the additional housing

To install the reset and disconnect button circuit board, proceed as follows:

- ►Use a screwdriver to loosen the four screws on the additional housing.
- ►Press the spacers into the mounting plate (see figure "Fixing points") of the additional housing. The reset and disconnect button circuit board is then engaged in the spacers with the holes provided for this purpose.
- ►Perform wiring according to the following circuit diagram.

Example

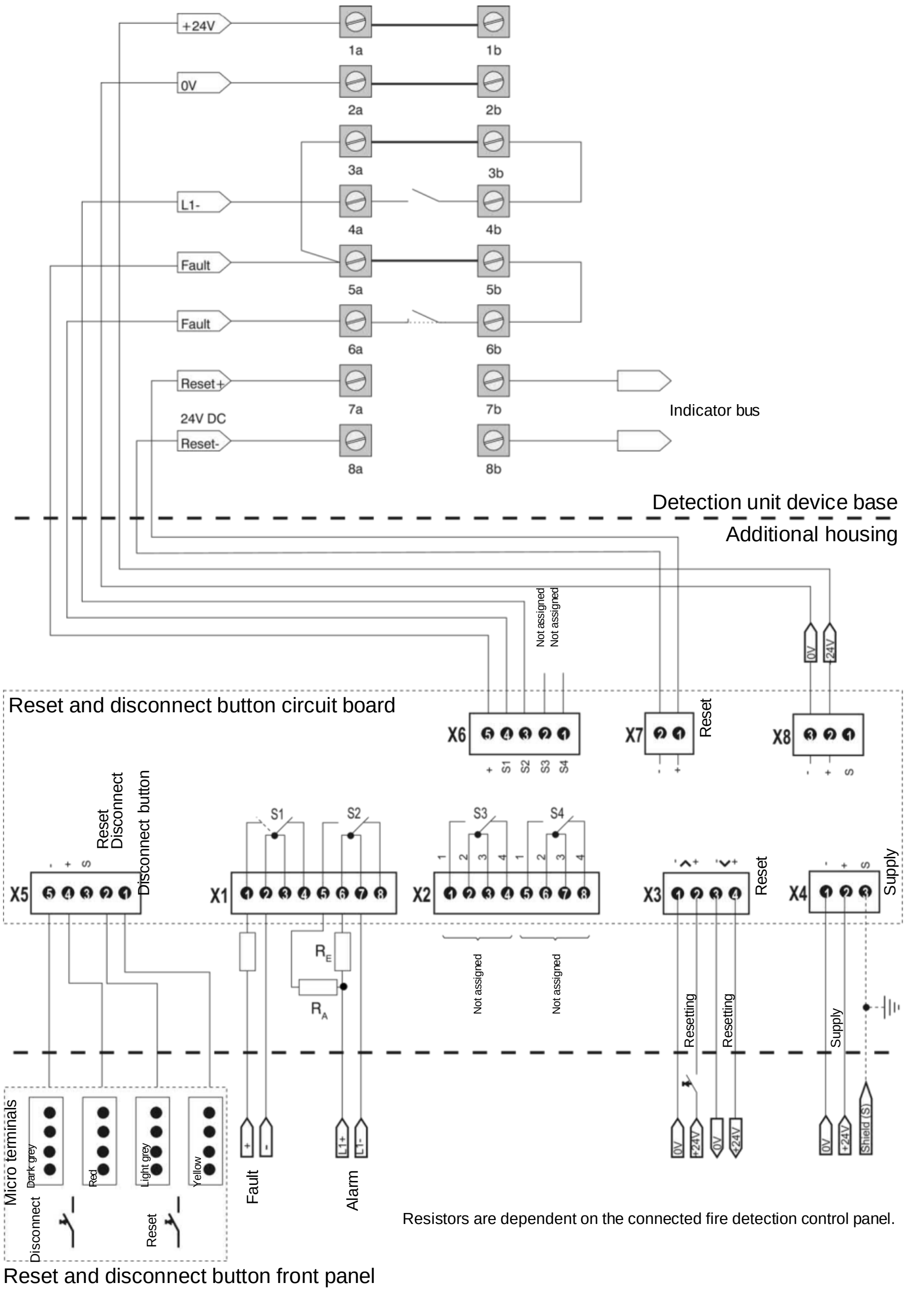


Image 78: Connection with reset and disconnect button

► Fasten the cover again with a screwdriver by tightening the four screws on the device cover.

6.7 Inserting and connecting relay module type RU-1/RU-2

A maximum of two relay modules can be connected to the device.

An additional housing is required to install each of the relay modules. It must be installed right next to the TITANUS MICRO·SENS®.

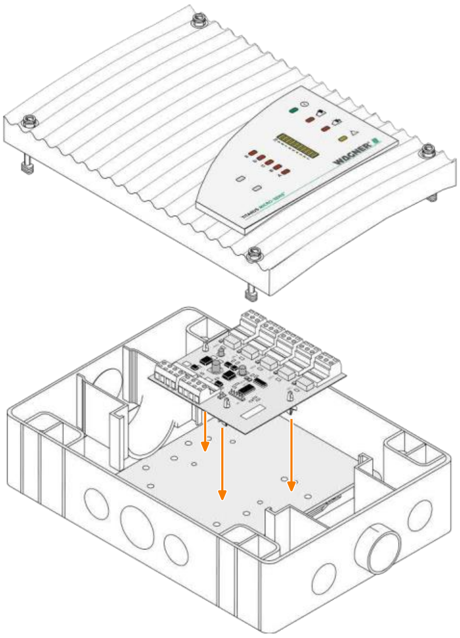


Image 79: Inserting the relay module into the additional housing

To install the relay modules, proceed as follows:

- ▶ Loosen the four screws on the additional housing.
- ▶ Press the spacers (accessories) into the mounting plate (see figure "Fixing points") of the additional housing.
- ▶ Press the relay module with the holes provided for this purpose into the spacers until they engage.

NOTE
Risk of short circuit due to cabling error Damage to device possible. Perform all connection work with the device disconnected from the mains.

►Perform the wiring according to one of the following circuit diagrams. Observe the permissible cable diameters of the screw connections for the components to be connected and the permissible wire diameters of the terminals in the device base for 0.5 - 2.5 mm² wires.

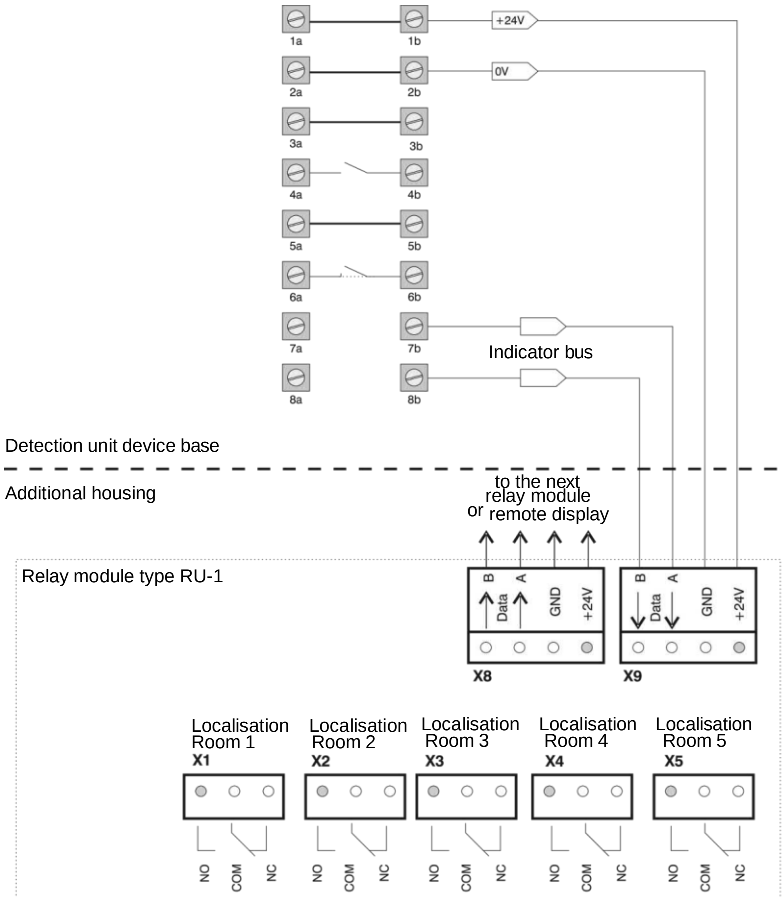


Image 80: Example: Connection with relay module type RU-1

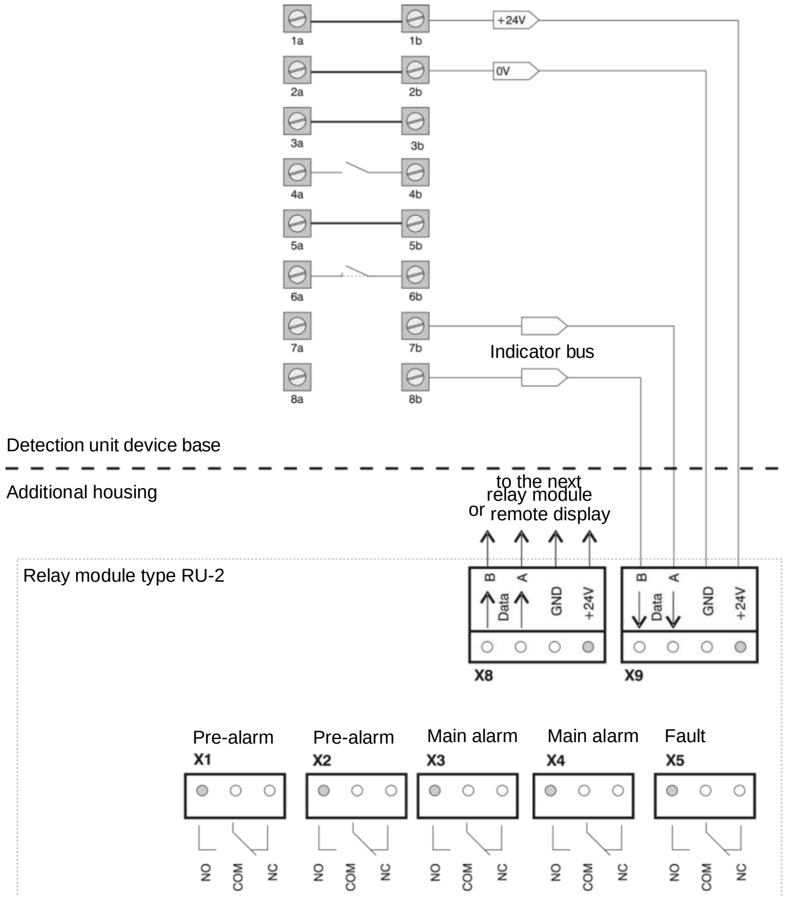


Image 81: Example: Connection with relay module type RU-2

► Fasten the cover again with a screwdriver by tightening the four screws on the device cover.

6.8 Inserting and connecting network module

The network module connects the network to the TITANUS MICRO·SENS®.

TIP
The network should only be set up in consultation with the customer's system administrator(s). Only use a shielded Ethernet cable CAT5 or higher.

An additional housing is required to install the network module. It must be installed right next to the TITANUS MICRO·SENS®.

NOTE
Danger of device damage due to electrostatic discharge Only perform the following work with the device disconnected from the mains. Do not touch the components of the network module without an anti-static set. The button for deactivating the memory card is an exception.

TIP
All network modules are allocated the same IP address by the manufacturer. Ensure that the standard IP address (192.168.1.5) has not been allocated in the network as this can otherwise cause network interference. The IP address can only be changed using the software "TITANUS® LanXpress".

LITERATURE
You will find more information in the technical manual "TITANUS networking".

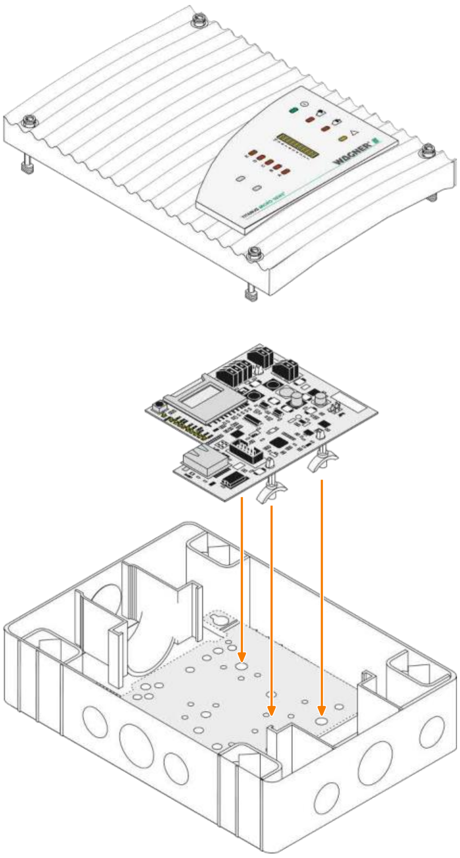


Image 82: Inserting the network module into the additional housing

To install the network module, proceed as follows:

►Loosen the four screws on the additional housing.

- ▶ Attach the spacers (included with the installation kit) on the assembly holes (pos. A) of the mounting plate.

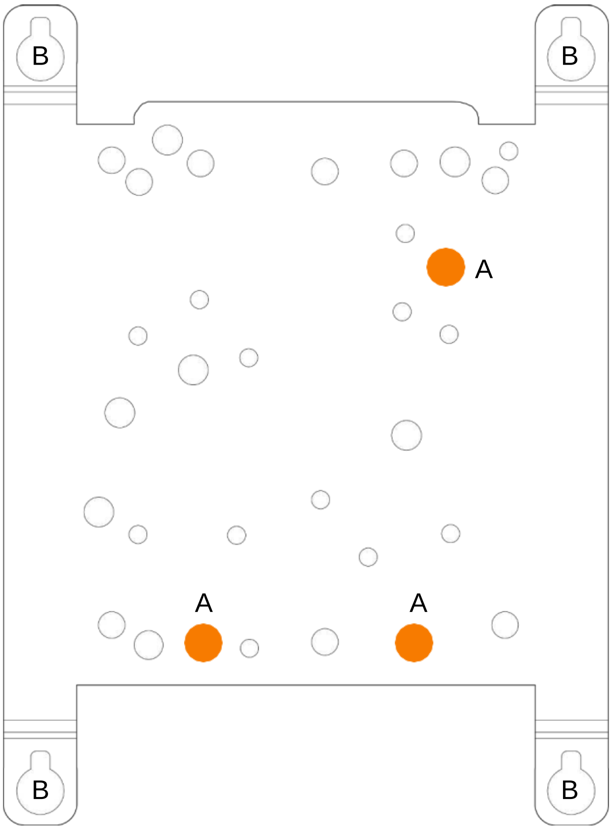


Image 83: Fixing points for network module on the mounting plate of additional housing

- ▶ Fasten the mounting bases for cable ties to the bottom part of the housing by means of a fastening screw on the mounting plate (pos. B). Two mounting bases and cable ties are supplied with the additional housing.
- ▶ Open the required, pre-stamped cable glands (max. 8x M20 and 6x M25) in the additional housing. Use a screwdriver if required.
- ▶ Attach cable entries (M20 or M25) to the open cable glands. Then press the cable entries into the corresponding opening.
- ▶ Connect a battery and memory card to the network module (included in the scope of delivery for type NU-2-D, NU-2-DO, NU-2-D-F and NU-2-DO-F). Pay attention to the correct polarity during the installation!
- ▶ Mount the network module with the three attached spacers on the installation plate.

►For the required wiring, lead the connecting cable(s) (max. 1.5 mm^2) through the prepared cable entries. The cable(s) are secured by the mounting base(s) and cable tie(s).

►Connect the network module as indicated in the following connection diagram. Make sure to fasten the split ferrite to the Ethernet network cable in the housing.

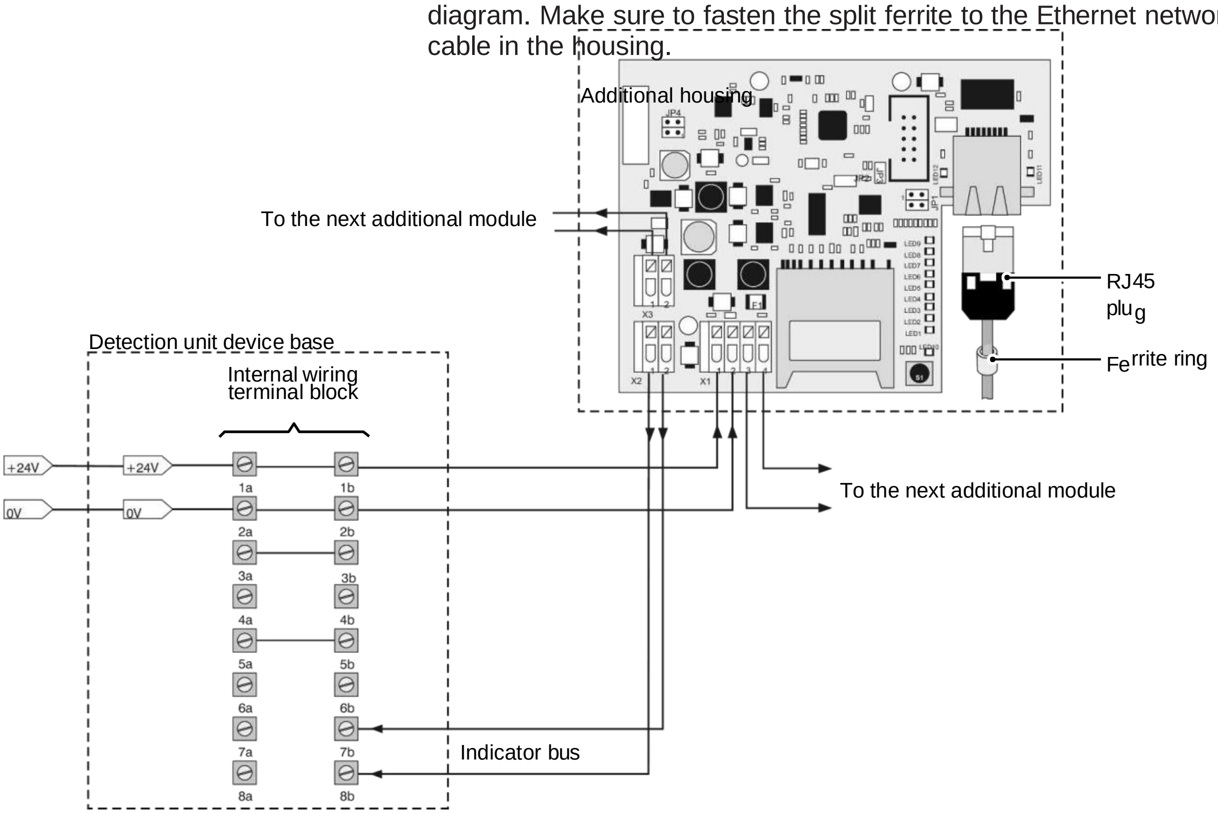


Image 84: Connecting network module

►Fasten the cover again with a screwdriver by tightening the four screws on the device cover.

6.9 Connecting remote display

A maximum of two remote displays can be connected to the device.

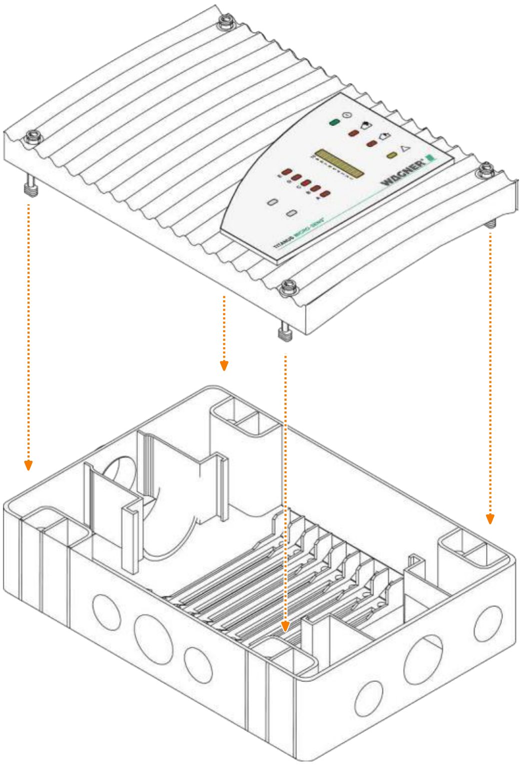


Image 85: Remote display

To connect the remote display, proceed as follows:

- ►Loosen the four screws on the housing cover.
- ►Feed the fire alarm cable through a cable entry of the device base.

►Perform wiring according to the following circuit diagram.

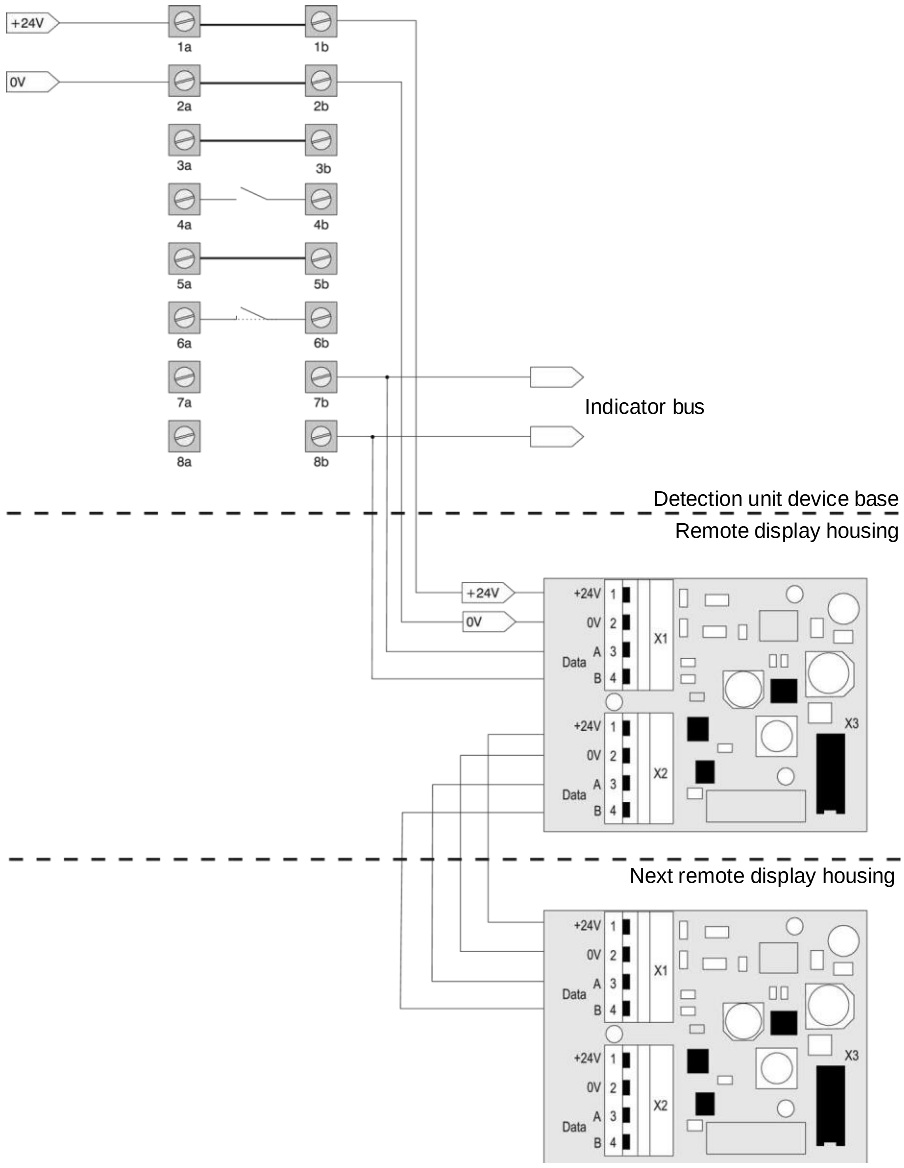


Image 86: Connecting the remote display

6.9.1 Attaching the front film sheet

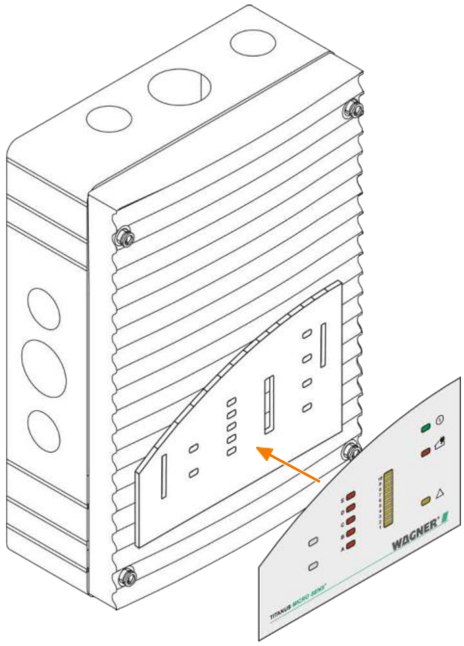


Image 87: Attaching the front film sheet to the remote display

With the remote display, the cable entry can be at the top, bottom or side without having to rotate the cover.

For the remote display, a front film sheet with the same information as the TITANUS MICRO·SENS® must be ordered and installed.

6.10 Connecting and addressing the response indicator

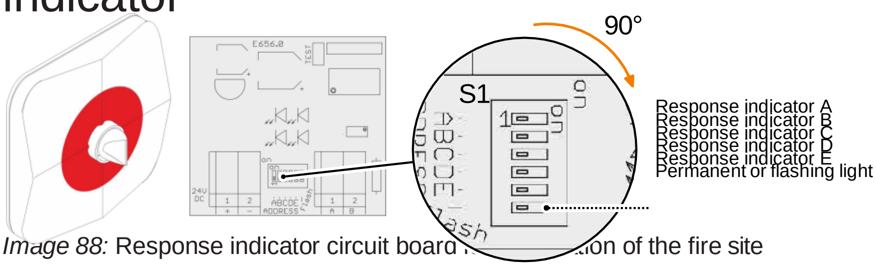


Image 88: Response indicator circuit board ... ion of the fire site

To connect the response indicator, proceed as follows:

- ►Push a latch on the response indicator cover by using a screwdriver.
- ►Remove the cover.

►Perform wiring according to the following circuit diagram.

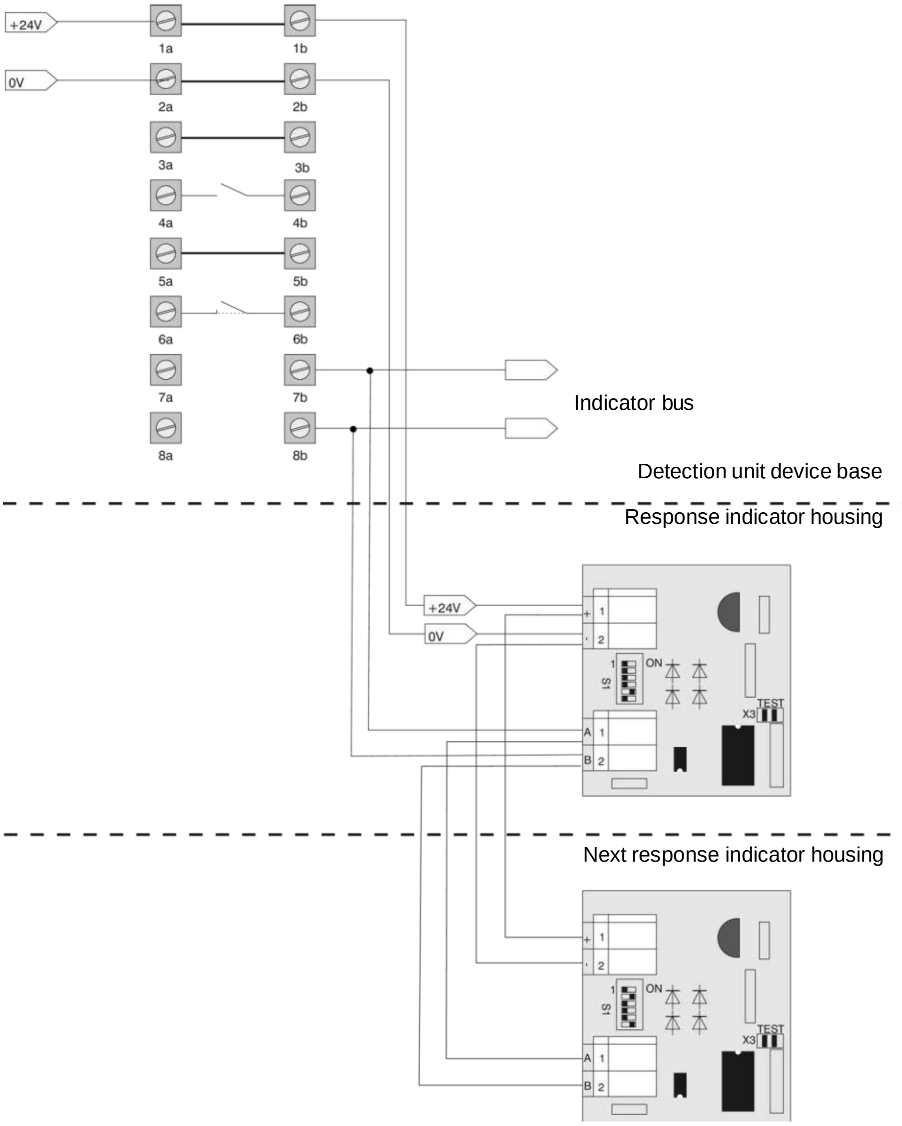


Image 89: Connection of the response indicator

► Example: Address the response indicator according to desired alarm site indication with DIL switch S1 (A corresponds to the aspiration aperture closest to the TITANUS MICRO·SENS®). Additionally, choose between permanent or flashing light.

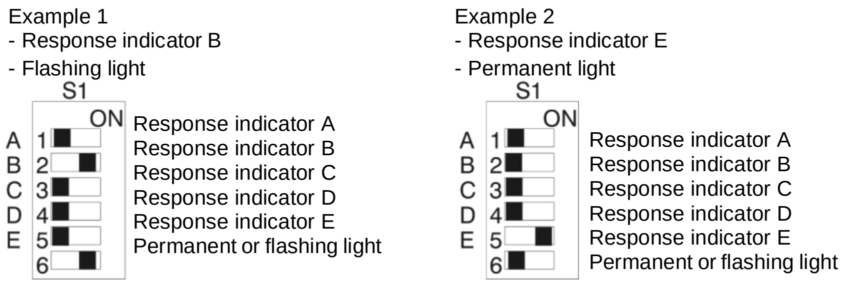


Image 90: Example of addressing the response indicators

► Fasten the cover of the response indicator again.

The response indicators must be tested using the diagnostic software, see chapter "Commissioning".

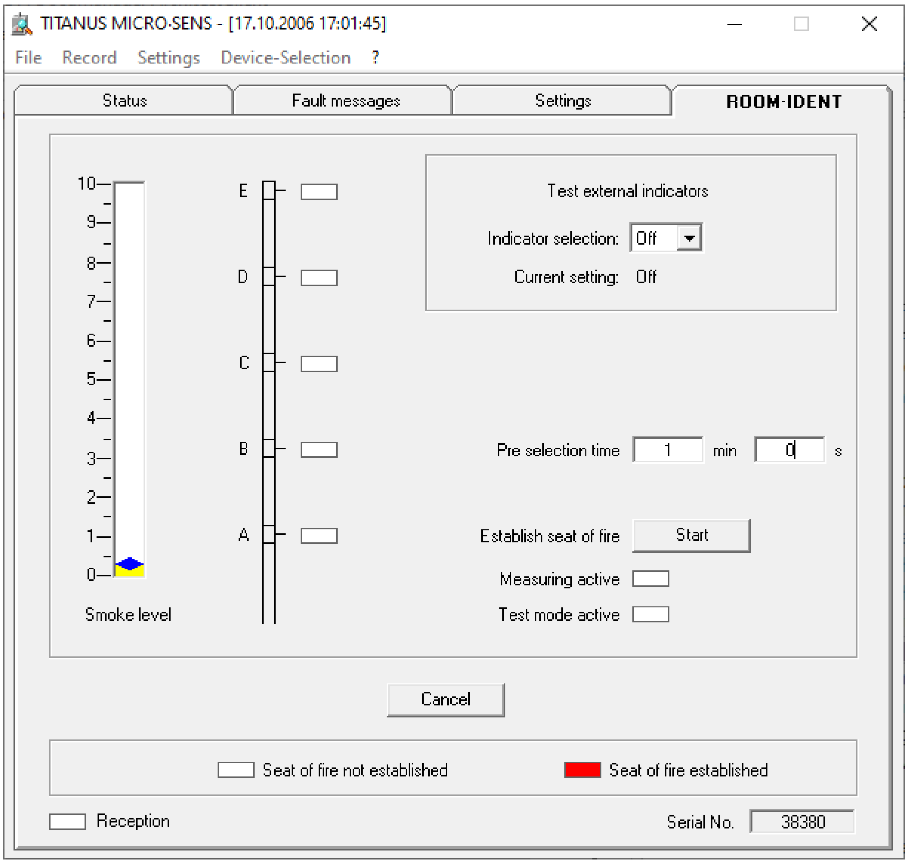


Image 91: Testing of the response indicators in the diagnostic tool

6.11 Inserting the detection unit in the device base

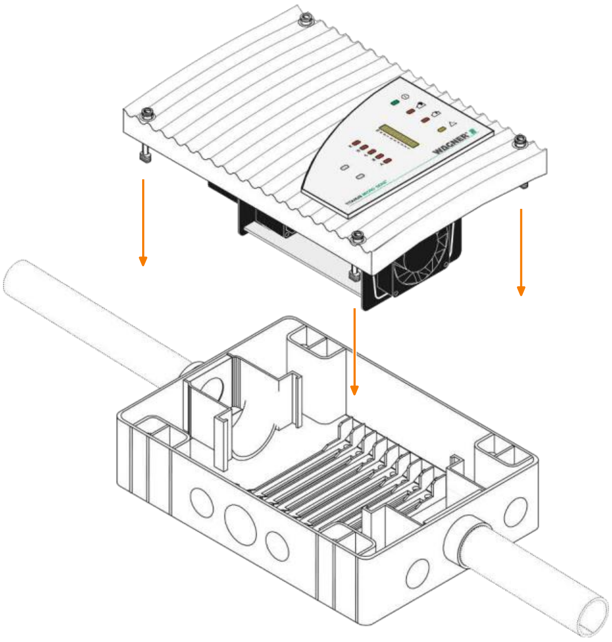


Image 92: Inserting the detection unit

NOTE
Danger of device damage due to electrostatic discharge Only perform the following work with the device disconnected from the mains. Do not touch the components of the circuit boards without an anti-static set.

To insert the detection unit, proceed as follows:

- ►Insert the detection unit into the pre-assembled device base. Pay attention to the mechanical coding, which prevents the unit from being twisted.
- ►Tighten the four cover screws using a screwdriver.

6.12 General information on the pipe system

The pipes, hoses and fittings used for the pipe system must 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	125 N
Impact resistance	0.5 kg, drop height of 100 mm
Temperature range	-15 to +60°C

Table 47: Requirements for the pipe components according to class 1131

When setting up the pipe system, pay attention to the temperature range under "Technical data" and "Pipe system".

The following pipes/aspiration hoses as well as the related fittings are to be used to configure the pipe system:

	Outside diameter	Inside diameter ABS	Inside diameter UPVC
Aspiration pipe	25 mm	21.4 mm	21.2 mm
Aspiration hose (Type SCH-P-25)	25 mm	-	18.5 mm
Aspiration hose (Type SCH-PG16)	21.1 mm	16.4 mm	-

Table 48: Components for setting up the pipe system with Ø 25 mm

6.12.1 Length alterations on the pipe system

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

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 δUPVC = 0.08 mm/m°C δABS = 0.101 mm/m°C

Pipe clips

For 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.

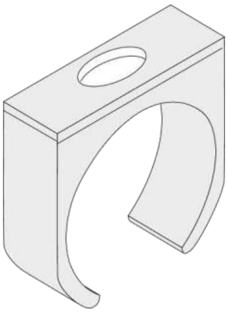


Image 93: Pipe clip type NG 23

For the first clip in the pipe system after the pipe connection on the TITANUS MICRO·SENS®, use a type that does not allow length extension. Type NG23 plastic pipe clips are used as standard to install the pipe system (ø 25 mm).

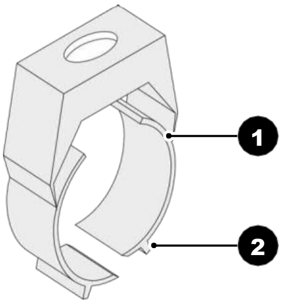


Image 94: Pipe clip type CLIC-PA

1	First engaging
3	Second engaging

For monitoring areas with high temperature differences (up to -40 °C), plastic pipe clamps type CLIC-PA are used. These have two fastening points for fixing the pipe:

Position 1 (first engaging)
Locks the pipe, allowing length extension (used in deep freeze applications).

Position 2 (second engaging)

Fixes the pipe and does not allow pipe extension.

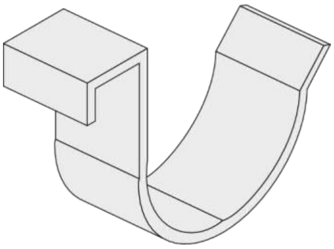


Image 95: Spring steel clip type SNAP CLIP-SC

For high-bay warehouses and monitoring areas with temperatures up to -40 °C, spring steel clips type SNAP CLIP SC are used.

6.13 Installation of the pipe system

Aspiration pipe ABS (halogen-free)	Aspiration pipe PVC
ABSR-2518	R-2519
ABSR-3220	R-3218
ABSR-4025	R-4019

Table 49: Pipe types

The pipe system must be installed according to project specifications and taking into account the project planning guidelines (see section "Project planning").

Minimise the pipe lengths and changes of direction. Angles have extremely high flow resistance. Therefore, they are only to be used where they cannot be avoided due to structural constraints. If necessary, the pipe length must then be reduced in relation to the angles used (one angle corresponds to a straight pipe length of 1.5 m).

TIP

Elbows are to be given absolute priority over angles. An excessive number of elbows and angles reduces the air flow speed in the aspiration pipe, thus increasing the detection time.

Make sure the pipe system is firmly in place; it must not sag nor must it be possible to displace it. Fasten the pipe with pipe clips without rubber inserts. The intervals between the pipe clips should not exceed 80 cm. In case of high temperature fluctuations, reduce the intervals between the pipe clips to maximum 30 cm.

TIP

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

- ►Cut the pipes to length with a metal saw / pipe shears or a pipe cutter (38 mm).
- ►Deburr the cut edges.
- ►Remove any shavings from the cut edges.

⚠ 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.

► Remove dirt and grease from the bonding surfaces using Tangit cleaner.

► Glue the pipe transitions so they are airtight with the respective fittings using Tangit glue.

► Close open pipe ends with end caps.

► After completing the pipe system, check for the following:

- Leaks (e.g. due to damage)
- Incorrect connections
- Correct aspiration aperture project planning

6.14 Installation of the aspiration pipe

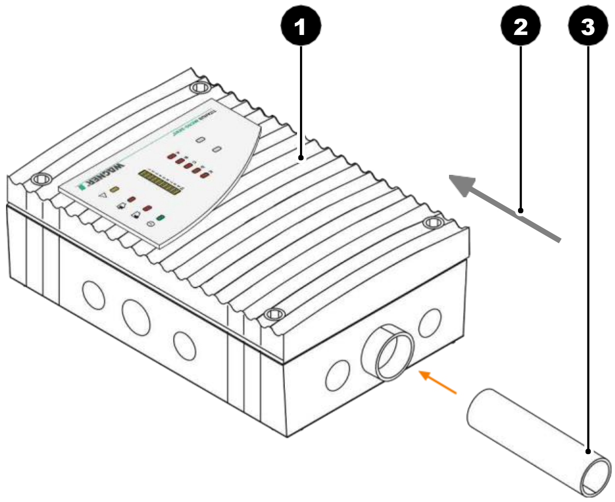


Image 96: Installation of the aspiration pipe

1	TITANUS MICRO·SENS®
2	Direction of flow
3	Aspiration pipe

TIP
Never use glue to join the aspiration pipe and the pipe connection. If there are great variations in temperature, the pipe must be attached very close to the device, so that the pipe does not come out of the pipe connection due to fluctuations in length which may occur (see section "Pipe installation").

► Insert the aspiration pipe into the pipe connection provided for this purpose.

6.15 Installation of the aspiration hose

Aspiration hose polyamide	Aspiration hose PVC
SCH-PG16	SCH-P-25

Table 50: Aspiration hose types

The aspiration hose must be used taking into account the project planning guidelines (see chapter "Project planning").

The overall aspiration pipe cannot consist of aspiration hose alone.

Air flow reducers must not be attached to the air sampling hose.

- ▶ Cut the aspiration hose to length with a metal saw / pipe shears or a pipe cutter (38 mm).
- ▶ Deburr the cut edges.
- ▶ Remove any shavings from the cut edges.

⚠ 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.

- ▶ Remove dirt and grease from the bonding surfaces using Tangit cleaner.
- ▶ Glue the aspiration hose transitions so they are airtight with the respective fittings using Tangit glue.

Type SCH-PG16

- ▶ Glue the aspiration hose into the hose screw connection type SCH-PG16-VO using ABS glue.
- ▶ Twist the hose screw connection into the relevant pipe with inner thread type ABSR-2518-PG16.

Type SCH-P-25

- ▶ Glue the aspiration hose with UPVC adhesive in fittings/sleeves of a pipe system with a 25 mm outer diameter.
- ▶ After completing the pipe system, check for the following:
  - Leaks (e.g. due to damage)
  - Incorrect connections
  - Correct aspiration aperture project planning

6.16 Installation of aspiration apertures

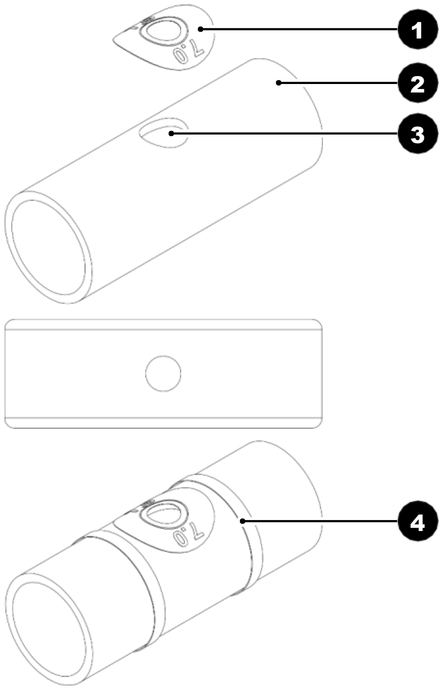


Image 97: Aspiration aperture, aspiration-reducing film sheet and marking tape

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.

6.17 Installation of aspiration-reducing clips

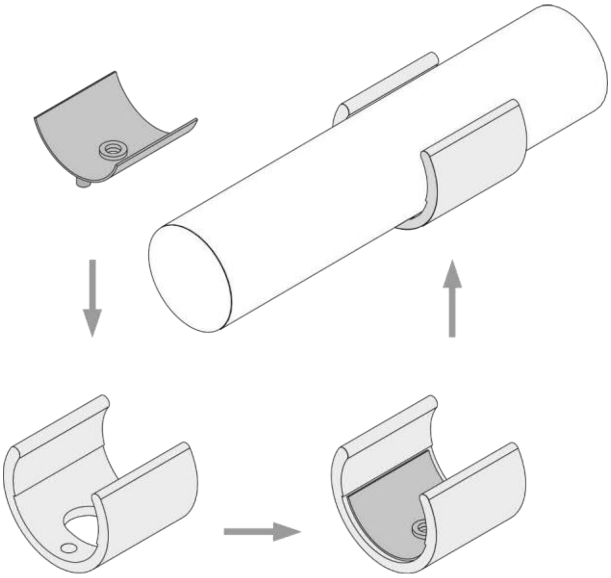


Image 98: Installation of aspiration-reducing clips

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-reducer according to the project planning guidelines.

► Insert the aspiration-reducer into a plastic clip for aspiration reducers type AK-Cx.

► Fasten the aspiration-reducer clip centrally over the drill hole. The diameter of the opening in the aspiration-reducing film sheet must not be changed.

6.18 Installation of the ceiling feed-through

An aspiration hose 12x9 mm is required for mounting ceiling feed-throughs. The length of the aspiration hose per ceiling feed-through is limited to a maximum of 1 m.

6.18.1 Mounting ceiling feed-through for suspended ceilings

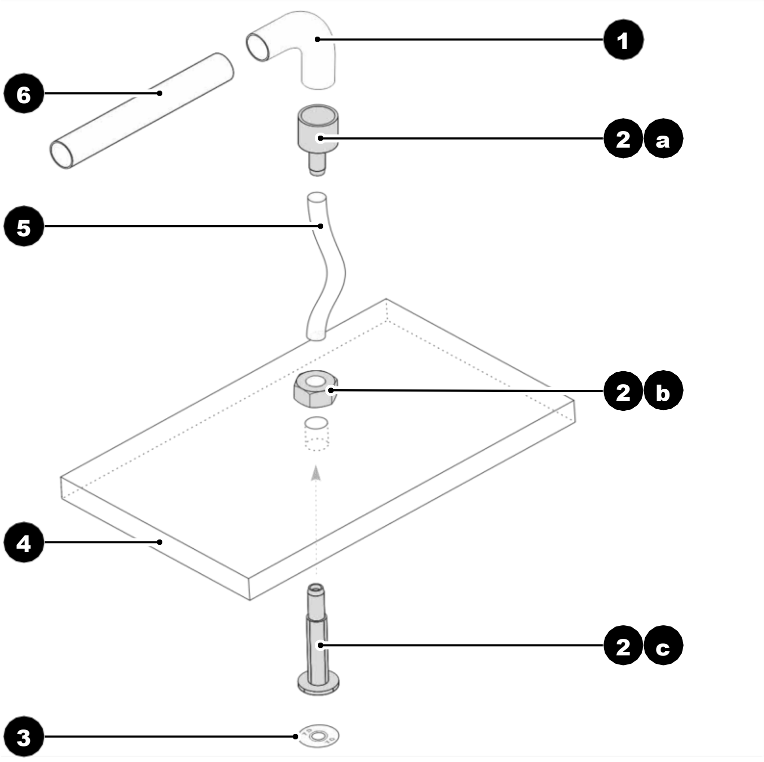


Image 99: Overview of ceiling feed-throught components

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

The following work steps are required to install a ceiling feed-through:

⚠ 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, remove dirt and grease from the bonding surfaces with Tangit cleaner.

► Glue the hose connection with the respective T-piece to the aspiration pipe using Tangit glue.

► Drill a Ø 13 mm hole in the suspended ceiling for each ceiling feed-through.

► Install the ceiling feed-through by removing the nut, sliding the part with the hose nozzle out through the bottom of the drill hole, then re-placing the nut on top of the suspended ceiling and tightening.

► Determine the required length for the aspiration hose and cut it to size.

► Attach the cut hose to the hose nozzle of the ceiling feed-through and the hose connection on the T-piece of the aspiration pipe. Heat the hose with a hot air blower if 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.

► Glue the required aspiration reducing film sheet to the ceiling feed-through according to the project planning guidelines.

6.18.2 Installation of the ceiling feed-through for special applications

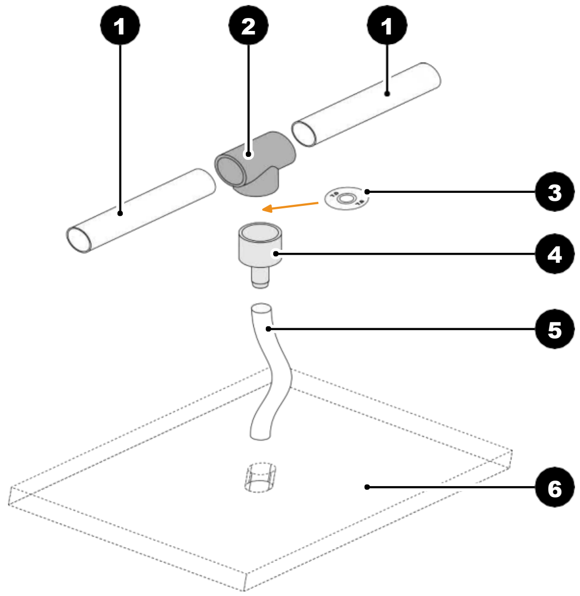


Image 100: Ceiling feed-throught with upstream aspiration-reducing film sheet

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

NOTE

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 following work steps are required to install a ceiling feed-through:

⚠ 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, remove dirt and grease from the bonding surfaces with Tangit cleaner.

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.

- ► Glue the required aspiration reducing film sheet to the T-piece according to the project planning guidelines.
- ► Glue the hose connection with the respective T-piece to the aspiration pipe using Tangit glue.
- ► Drill a Ø 12 mm hole in the suspended ceiling for each ceiling feed-through.
- ► Determine the required length for the aspiration hose and cut it to size.
- ► Insert the cut aspiration hose through the suspended ceiling and onto the hose connector on the T-piece of the aspiration pipe. Heat the hose with a hot air blower if necessary.
- ► Glue the aspiration hose into the drill hole of the suspended ceiling using Tangit glue.

6.19 Installation of pipe system on forced air flow monitoring

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

6.19.1 Detection of supply and exhaust air openings

If air is sampled in forced air flows (e.g. by means of ventilation or air conditioning systems), the aspiration apertures must be aligned with the air flow. Position the aspiration apertures as shown below:

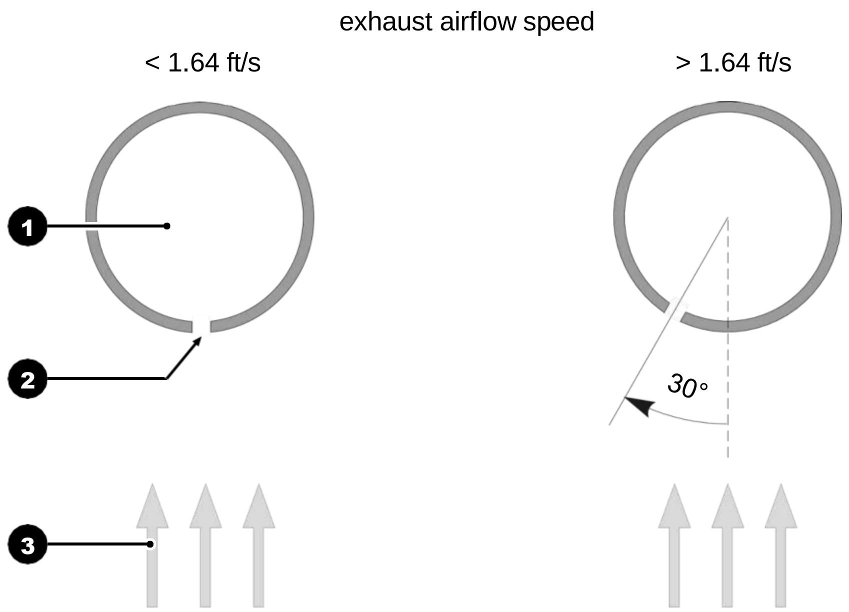


Image 101: Position the aspiration apertures according to the exhaust air flow speed

1	Aspiration pipe
2	Aspiration aperture
3	Air flow

6.19.2 Detection in the bypass

Refer to the chapter "Installing the pipe system" and "Air return" for information on connecting the air return.

For project planning of TITANUS MICRO·SENS® in these areas, see the chapters "Special project planning" and "Project planning for forced air flow".

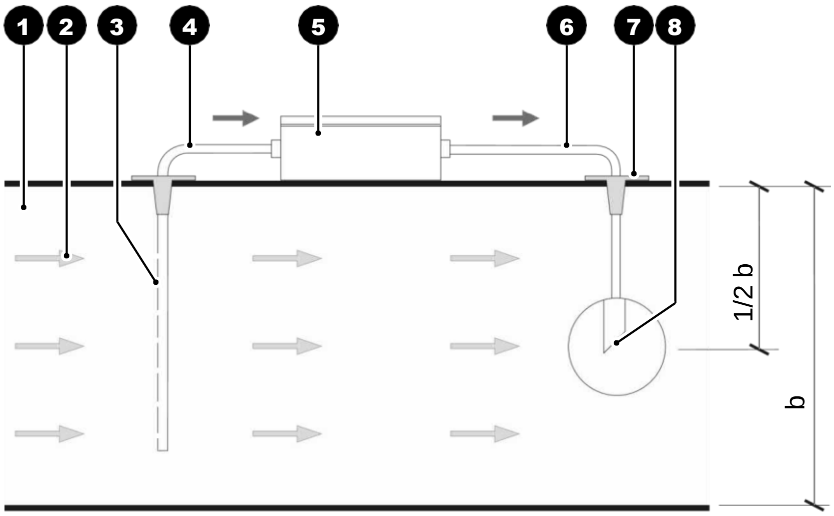


Image 102: Positioning the air return using the air conditioning duct (bypass) as an example

1	Air-conditioning duct
2	Air flow
3	Aspiration apertures
4	Aspiration pipe
5	TITANUS MICRO·SENS®
6	Air return
7	Duct adapter
8	45° angle (at the open end of the air return)

6.20 Installing the air filter or special filter

An air filter must be installed before the air inlet of a TITANUS MICRO·SENS®.

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

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

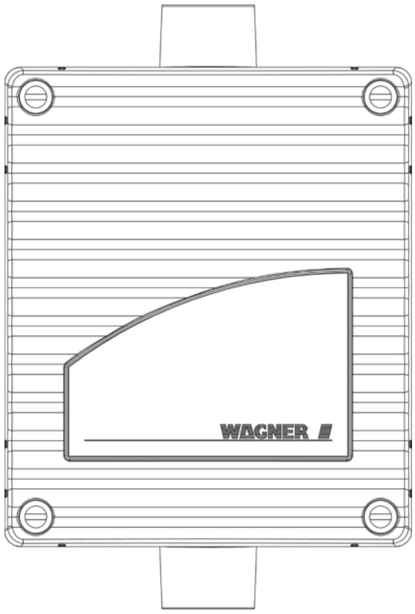


Image 103: Air filter type LF-AD and LF-AD-x

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.

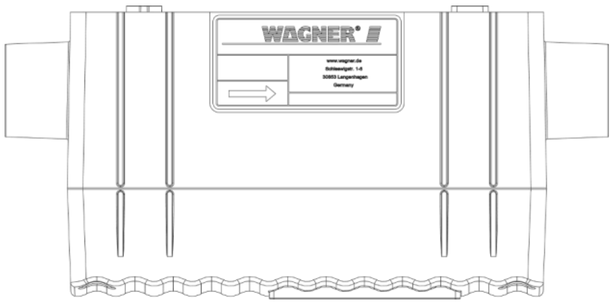


Image 104: Direction of flow air filter type LF-AD and LF-AD-x

►Mark the drilling intervals on a wall.

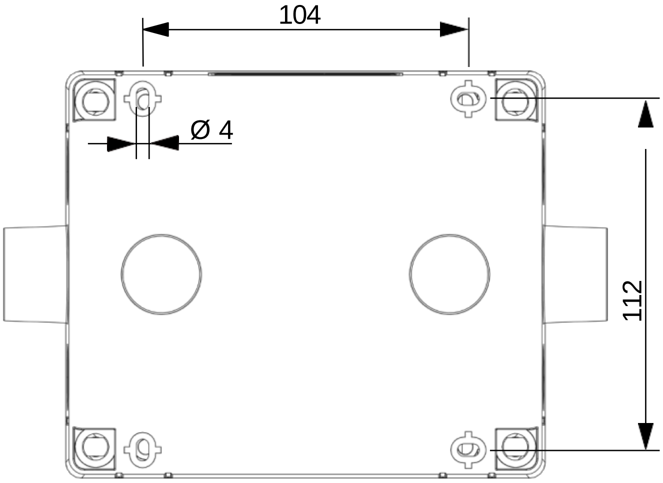


Image 105: Drilling intervals air filter type LF-AD and LF-AD-x

►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 special filter type SF-400/650

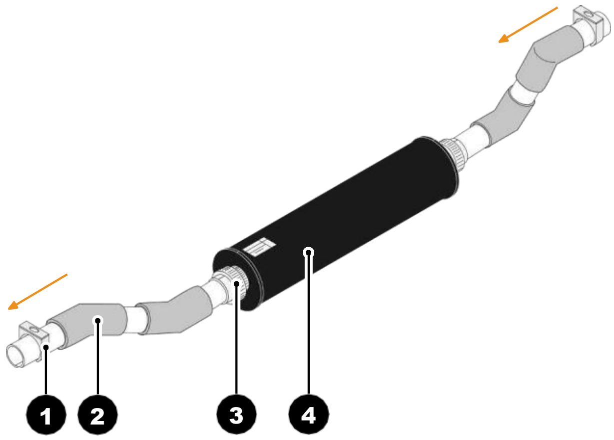


Image 106: Installing the special filter

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

To install or uninstall the special filter, use the two PVC transition screw connections on the filter ends.

To achieve the appropriate wall distance, 45° angles must be installed. In front of and after the mounting position, the pipe system must be fastened with clamps.

- ▶ Glue the PVC transition screw connections to the pipe system. Observe the flow direction that is specified on the type plate of the filter housing.
- ▶ Fasten the special filter using 45° angles and clamps in the installed pipe system.

Installation materials

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

6.20.3 Installing a combination of air filter and special filter

When using special filter and air filter in combination, the air filter must be installed downstream of the special filter, viewed from the TITANUS MICRO·SENS®.

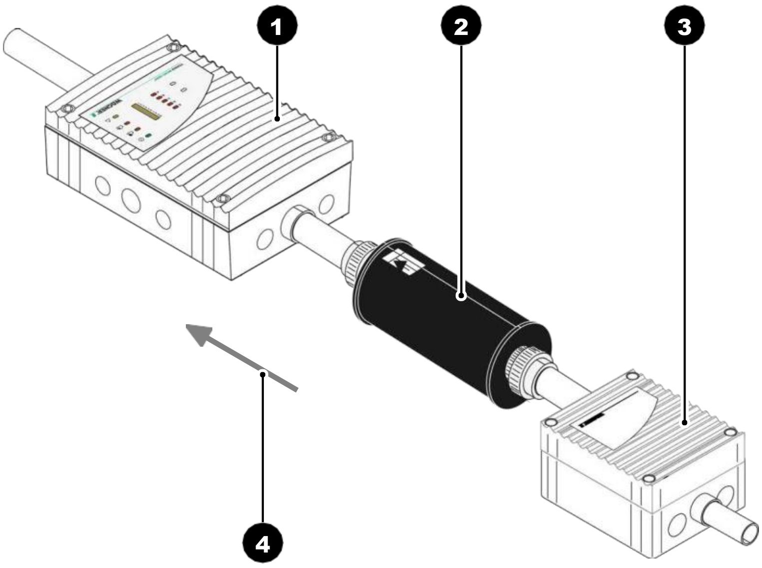


Image 107: Installing air filter and special filter in combination

1	TITANUS MICRO·SENS®
2	Special filter SF-x
3	Air filter LF-AD-x
4	Direction of flow

6.21 Installation of air return

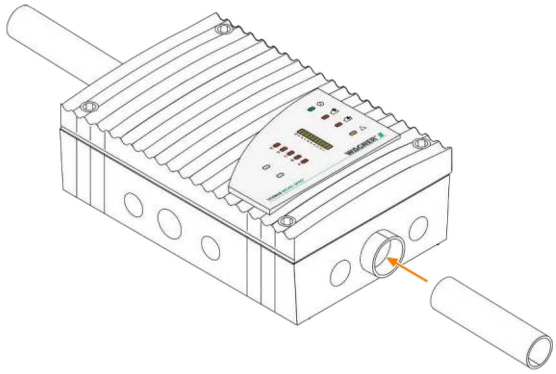


Image 108: Installation of air return

- ►Insert the aspiration pipe for air return into the pipe connection of the TITANUS MICRO·SENS® provided for this purpose. A secure hold is achieved because the air return pipe fits precisely into the pipe connection.
- ►Fasten the aspiration pipe for air return firmly in front of the TITANUS MICRO·SENS®. This is done to prevent the aspiration pipe for air return from being pulled out of the pipe connection due to any changes in length that may occur (see chapter "Length alterations on the pipe system").

6.22 Installing a silencer

A silencer should be installed downstream of the air outlet of a TITANUS MICRO·SENS®.

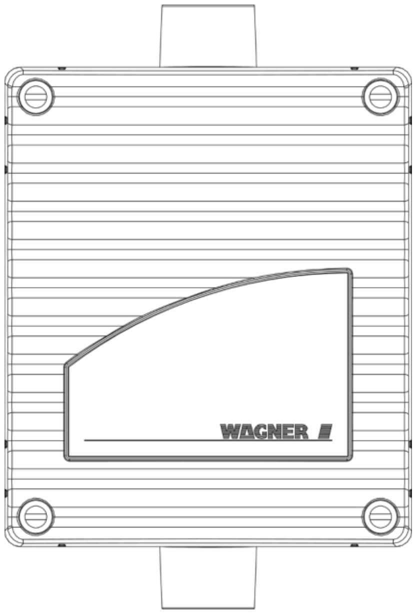


Image 109: Silencer type SD-1

► 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.

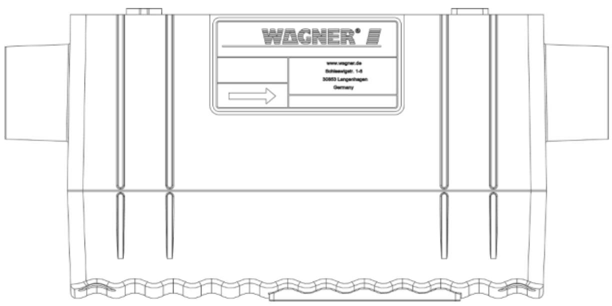


Image 110: Direction of flow for silencer type SD-1

► Mark the drilling intervals on a wall.

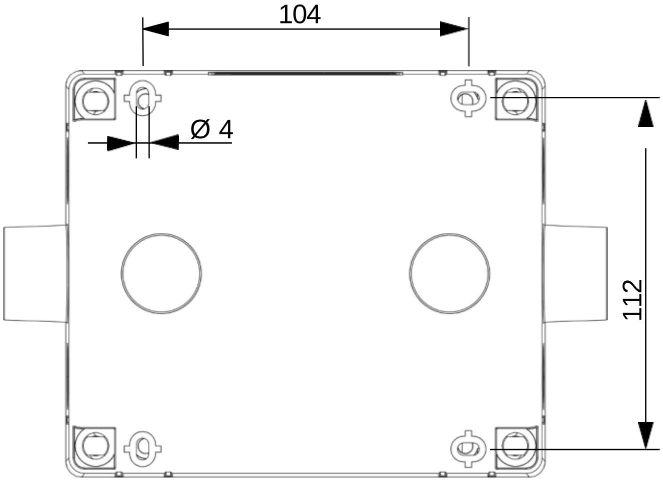


Image 111: Drilling intervals for silencer type SD-1

► 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 (ABS/PVC)

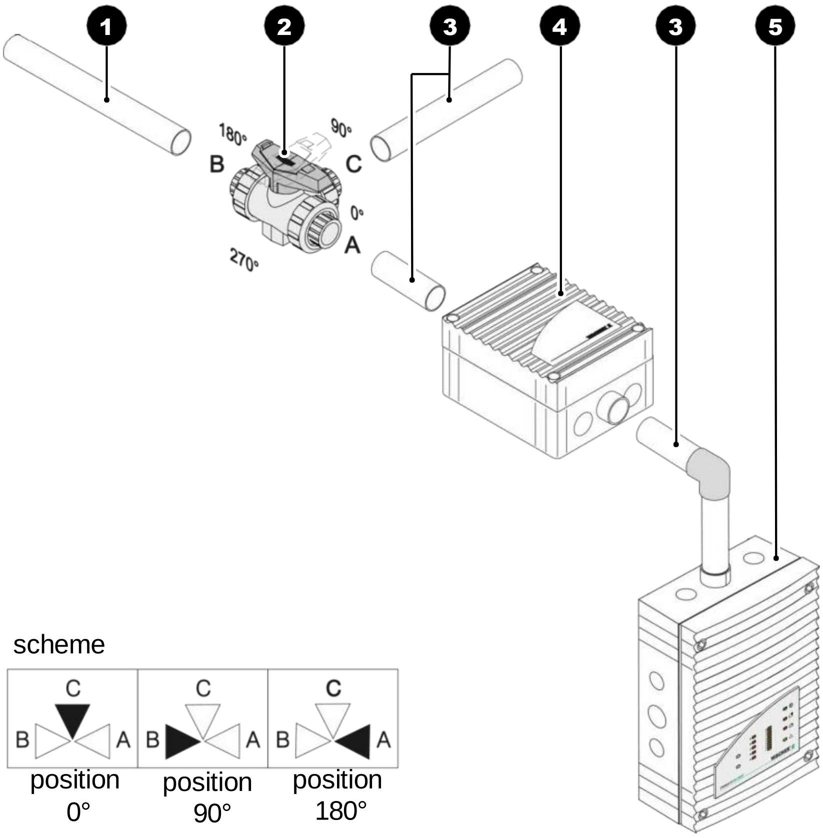


Image 112: Installing a 3-way ball valve made of ABS/PVC

▷	open
▶	closed
1	Compressed air connection
2	3-way ball valve
3	Pipe system
4	Air filter (optional)
5	TITANUS MICRO·SENS®

Switching is done between fire detection (90° position) and purging (270° position).

To install or remove the 3-way ball valve, use the three union nuts.
Observe the assignment of connections (see diagram) during assembly:

- ►Install the pipe system on connection C.
- ►Install the TITANUS MICRO·SENS® on connection A or B.
- ►Install the compressed air supply on the remaining connection A or B.

6.23.2 3-way ball valve (metal)

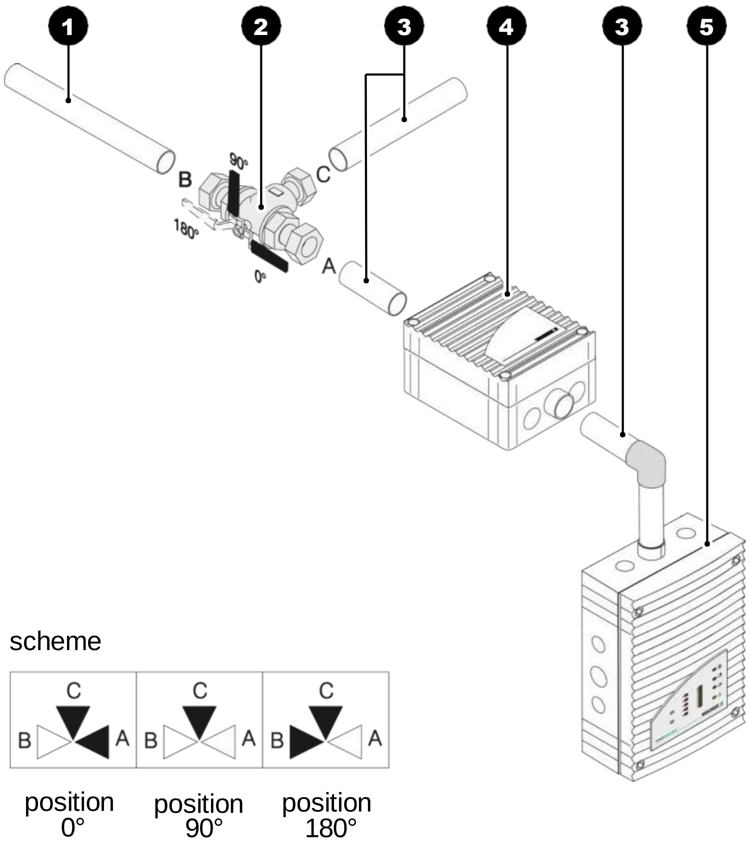


Image 113: Installing the metal 3-way ball valve

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

Switching is done between fire detection (0° position) and purging (180° position).

To install or remove the 3-way ball valve, use the three transition screw connections.

Observe the assignment of connections (see diagram) during assembly:

- ▶ Install the pipe system on connection C.

► Install the TITANUS MICRO·SENS® on connection A or B.

► Install the compressed air supply on the remaining connection A or B.

6.24 Installation of the condensate separator

The condensate separators are used to collect and drain precipitated water vapour and condensate from the pipe system.

6.24.1 Condensate separator type KA-1

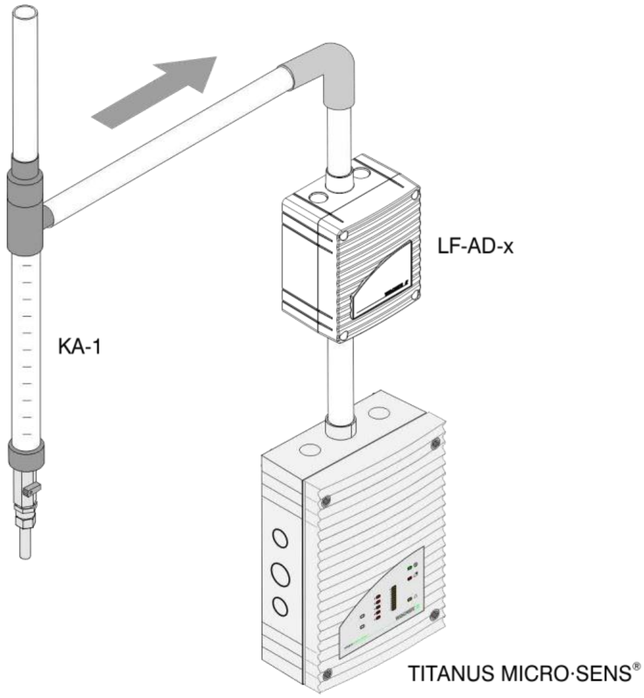


Image 114: Condensate separator type KA-1

Install the condensate separator at the lowest point of the pipe system and upstream of the air filter (optional) and the TITANUS MICRO·SENS®.

► Place the condensate separator in the intended position and fasten it using 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.

6.24.2 Condensate separator type KA-DN 25

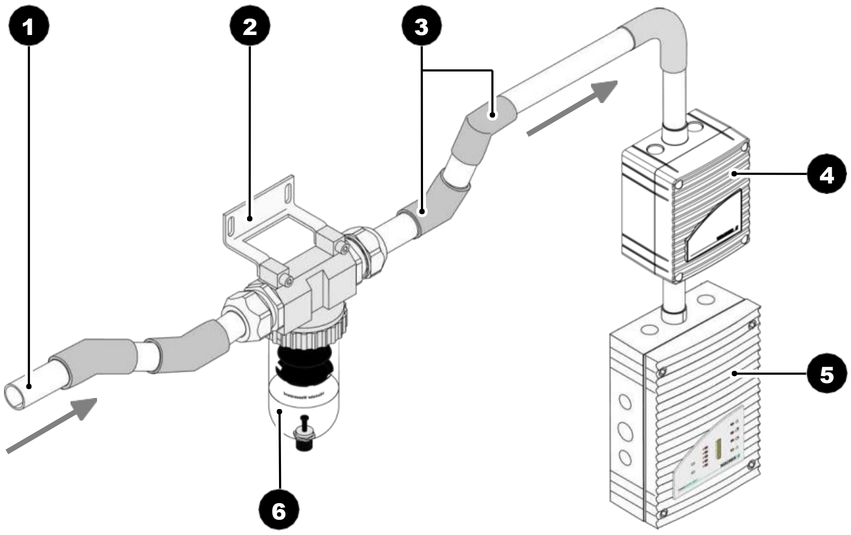


Image 115: Condensate separator type KA-DN 25

1	Aspiration pipe
2	Bracket
3	45° angle
4	Air filter type LF-AD-x
5	TITANUS MICRO·SENS®
6	Condensate separator type KA-DN 25

Install the condensate separator at the lowest point of the pipe system and upstream of the air filter (optional) and the TITANUS MICRO·SENS®.

► Prepare the pipe system with two 45° angles each for connection to the condensate separator.

► Install the condensate separator in the pipe system using the cable inlet glands. Pay attention to the direction of flow, which is indicated by a direction arrow on the housing of the condensate separator.

► Fasten the condensate separator using the bracket and two screws as well.

6.25 Installation of test adapter

A test adapter must be installed upstream of the air inlet of a TITANUS MICRO·SENS®.

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.

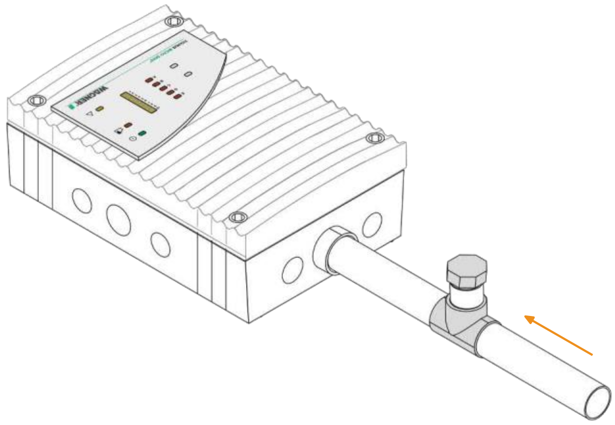


Image 116: Installing the test adapter

⚠ 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 commissioning in this section.

TIP
All stored and current diagnostic data as well as settings made of the TITANUS MICRO·SENS® 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.

7.1 Commissioning the detection unit

► Check the pipe system for completeness and functionality.

► Check the device base for correct wiring.

► Check the correct connection of the pipe system to the device base.

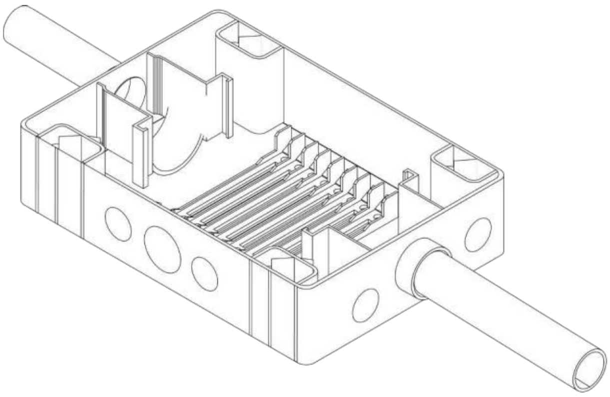


Image 117: Checking the correct connection of the pipe system

► Decide whether commissioning of the detection unit should be done as plug-and-play commissioning (independent of air pressure) or by means of the diagnostic software.

7.1.1 Plug-and-play commissioning

In the case of plug-and-play commissioning, the default settings are not changed.

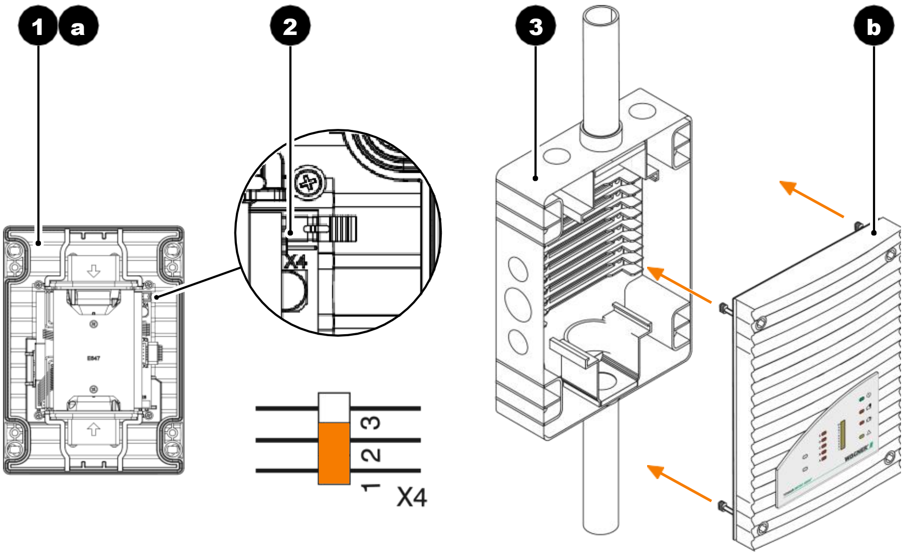


Image 118: Inserting the detection unit in the device base

1	Housing cover with detection unit
1a	Interior view
1b	Front view
2	X4 (pin 1 … 3) on circuit board
3	Device base

▶ Reconnect jumper X4 (pin 1,2 or 2,3).

▶ Check the type of calibration against the test record.

▶ Insert the detection unit into the device base. Pay attention to the mechanical coding, which prevents the TITANUS MICRO·SENS® from being twisted.

➜ Air flow calibration is carried out automatically, independent of the air pressure. An air pressure-dependent calibration can only be carried out using diagnostic software. Make sure that the air flow is not affected during the initialisation phase.

▶ Make sure that the operating LED on the unit is flashing.

▶ Make sure that the operating LED is permanently illuminated after the initialisation phase.

7.1.2 Commissioning using diagnostic tool

In the case of commissioning using the diagnostic tool, the default settings can be changed. Data transmission is bidirectional via the infrared interface on the front of the TITANUS MICRO-SENS®.

- ►Insert the detection unit into the device base. Pay attention to the mechanical coding, which prevents the TITANUS MICRO·SENS® from being twisted.
- ►When using the diagnostic software on the service PC for the first time, install the software (see chapter "Installing the diagnostic software").
- ►Before connecting the diagnostic interface to the service PC for the first time, install the appropriate USB driver for your operating system (see chapter "Installing the USB driver"). Make sure that you have admin rights
- ►Connect the diagnostic interface to the service PC via the USB cable.

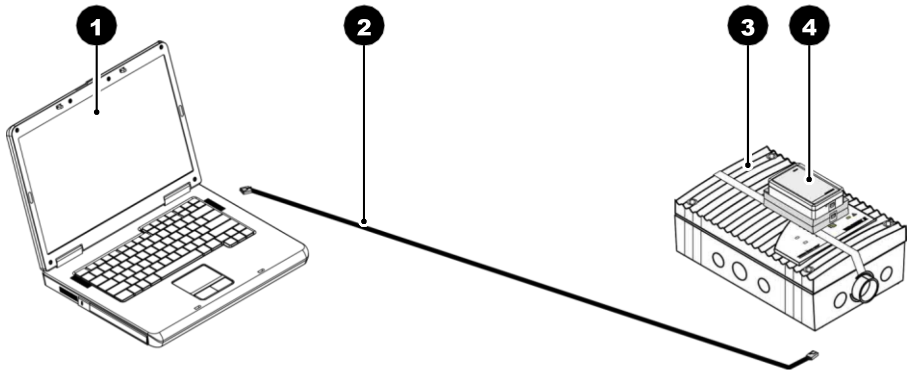


Image 119: Connecting diagnostic interface to PC

1	Service PC
2	USB cable
3	TITANUS MICRO·SENS®
4	Diagnostic interface

- ►Open the diagnostic software.

7.1.2.1 Installation of diagnostic software

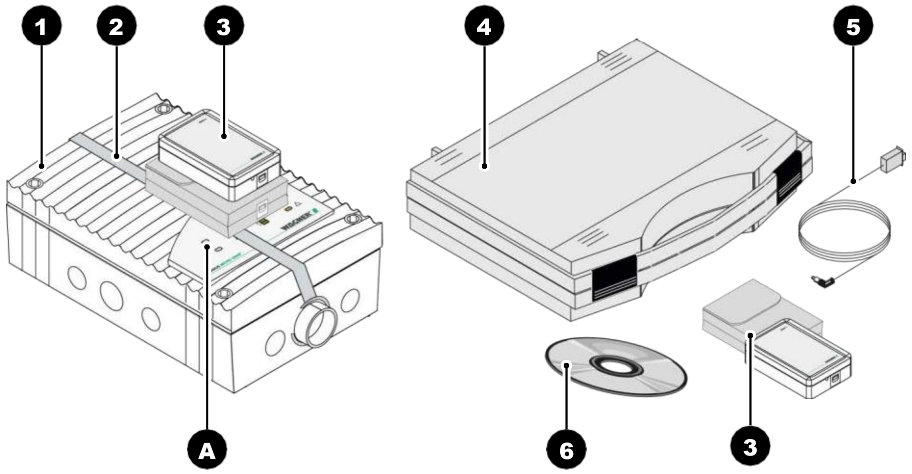


Image 120: Diagnostic tool to transfer and read out device data

1	TITANUS MICRO·SENS®
2	Bracket
3	Diagnostic interface (in case)
4	Case
5	Connection cable
6	CD-ROM
A	Infrared interface

TIP
If a function cannot be changed in the diagnostic software, it is greyed out. Unavailable functions are hidden in the respective screen.

The diagnostic software must be installed on the service PC. The installation is done using a CD-ROM from the diagnostic tool case or using a zip file from the Intranet download section of the WAGNER Group GmbH.

► Open the file "Setup.exe".

► Follow the instructions of the installation program.

7.1.2.2 Installation of USB driver

The USB driver for the diagnostic software must be installed on the service PC. The installation is done using a CD-ROM from the diagnostic tool case or using a file from the Intranet download section of the WAGNER Group GmbH.

- ►Make sure that you have admin rights on the service PC.
- ►In the "Driver" or "DiagInterfaceDriver" subfolder, open the installation file for your operating system.
  x64-based processor = 64-bit operating system
  x86-based processor = 32-bit operating system
- ►Follow the instructions of the installation program.

7.1.2.3 Interface and operation of the diagnostic software

▶ Start the diagnostic software.

▶ Make sure that a TITANUS MICRO·SENS® is detected and the diagnostic software goes to the following screen via the current unit number.

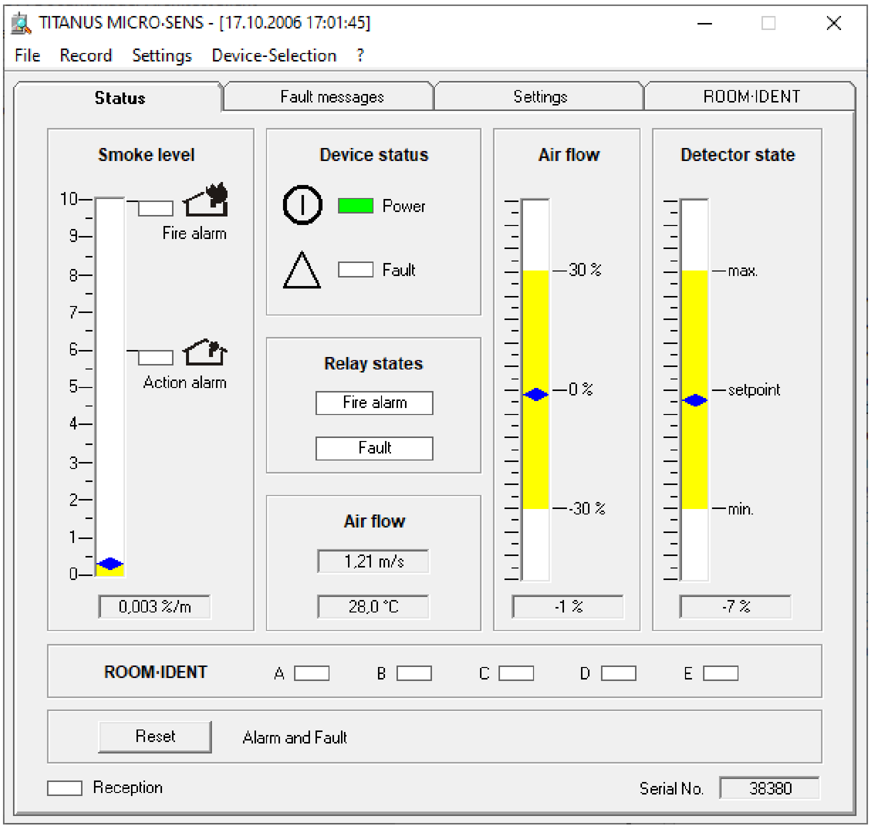


Image 121: States of the detected unit

▶ If necessary, select the correct COM interface. To do this, go to "Settings" and "Interface" in the menu bar.

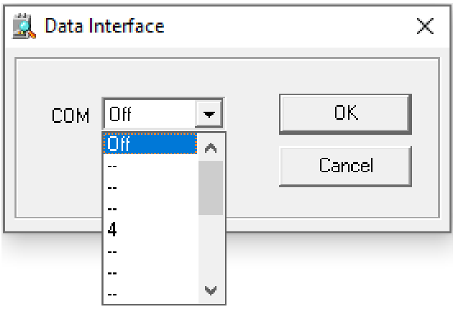


Image 122: Data interface (COM port)

➜ The current data from the unit is shown on the screen of the service PC.

7.2 Making settings using the diagnostic software

All settings are made via the diagnostic software.

In the "Settings" menu, the currently set values of the TITANUS MICRO·SENS® are displayed.

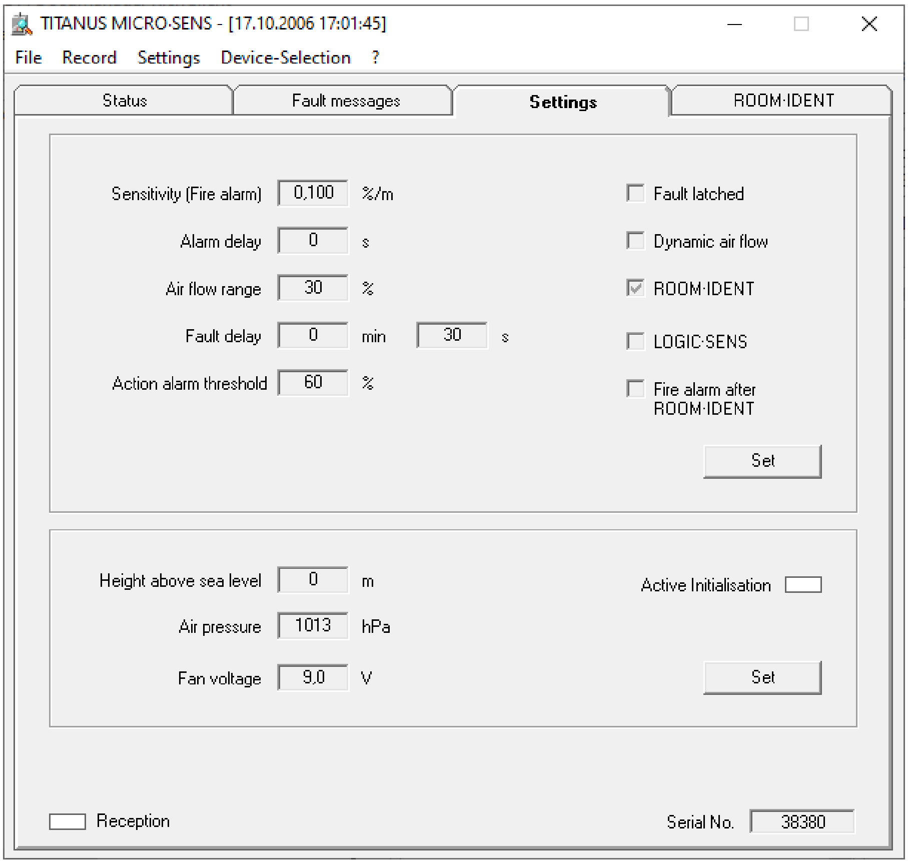


Image 123: Tab "Settings"

Clicking the "Set" button allows you to change the values.

Image 124: Making settings

7.2.1 Selecting the sensitivity (MA)

Detection unit	Sensitivity [% light obscuration/m]	Default setting [% light obscuration/m]	Setting levels [% light obscuration/m]
DM-TMx-xx-10-x	0.1 - 2	0.1	0.1
DM-TMx-xx-50-x	0.5 - 2	0.5	0.1

Table 51: Sensitivities (main alarm)

7.2.2 Setting the alarm delay

If the smoke level rises during operation up to the alarm threshold, the delay time starts to run. The signal is only forwarded when the delay period comes to an end if the smoke level persists. This means that a false alarm can be prevented in case of short-term loads (e.g. dust).

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

Detection unit	Delay time [s]	Default setting [s]	Setting levels [s]
DM-TMx-xx-10-x	0 - 60	10	1
DM-TMx-xx-50-x	0 - 60	10	1

Table 52: Alarm delay

7.2.3 Setting the air flow range

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

NOTE
No standard conformity in case of improper project planning The air flow monitoring should be set to ≤20 % to achieve project planning that complies with AS ISO 7240.

Detection unit	Activation threshold [%]	Default setting [%]	Setting levels [%]
DM-TMx-xx-10-x	10 - 50	20	1
DM-TMx-xx-50-x	10 - 50	20	1

Table 53: Air flow range

7.2.4 Setting the fault delay

In monitoring areas with temporary fault variables (e.g. air pressure fluctuations), other delay times should be set according to the duration of the fault variables.

> *NOTE*
>
> No standard conformity in case of improper project planning
>
> For project planning that complies with AS ISO 7240-20, the delay time must be set to ≤ 300 seconds.

Detection unit	Fault warning delay	Default setting [s]	Setting levels [s]
DM-TMx-xx-10-x	30 s - 60 min	100	1
DM-TMx-xx-50-x	30 s - 60 min	100	1

Table 54: Fault warning delay

7.2.5 Setting the pre-alarm threshold (optional)

Changing the pre-alarm threshold for the option "Main alarm after ROOM IDENT" is possible as a percentage of the main alarm sensitivity.

Detection unit	Pre-alarm threshold [%]	Default setting [%]	Setting levels [%]
DM-TMx-xx-10-x	10 - 80	60	1
DM-TMx-xx-50-x	10 - 80	60	1

Table 55: Pre-alarm threshold

7.2.6 Activating or deactivating the memory fault display

The display for collective faults (air flow and detection unit fault) can optionally be set to "saving" or "non-saving".

Detection unit	Saving fault activated	Default setting
DM-TMx-xx-10-x	off - on	off
DM-TMx-xx-50-x	off - on	off

Table 56: Saving fault display

7.2.7 Activating or deactivating dynamic air flow

Detection unit	Dynamic air flow activated	Default setting
DM-TMx-xx-10-x	off - on	off
DM-TMx-xx-50-x	off - on	off

Table 57: Dynamic air flow

7.2.8 Activating or deactivating ROOM·IDENT (optional)

This function must be activated if the function "Main alarm after ROOM IDENT" is to be activated (see chapter "Activating or deactivating main alarm after ROOM IDENT (optional)"). Otherwise, there is no localisation of the fire site.

Detection unit	ROOM·IDENT activated	Default setting
DM-TMx-xx-10-x	off - on	off
DM-TMx-xx-50-x	off - on	off

Table 58: ROOM·IDENT

7.2.9 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.

Detection unit	LOGIC·SENS activated	Default setting
DM-TMx-xx-10-x	off - on	on
DM-TMx-xx-50-x	off - on	on

Table 59: LOGIC·SENS

7.2.10 Activating or deactivating main alarm after ROOM·IDENT (optional)

NOTE

No standard conformity in case of improper project planning

The function "Main alarm after ROOM IDENT" is not AS ISO 7240-20 compliant.

For certain applications, it may be useful to trigger the alarm only after localising the fire site. If this function is to be activated, the "ROOM IDENT" function must also be activated (see chapter "Activating or deactivating ROOM IDENT (optional)"). Otherwise, there is no localisation of the fire site.

Detection unit	Main alarm after ROOM·IDENT activated	Default setting
DM-TMx-xx-10-x	off - on	off
DM-TMx-xx-50-x	off - on	off

Table 60: Main alarm after ROOM·IDENT

7.2.11 Setting the height above sea level

The altitude value corresponds to the height of the TITANUS MICRO·SENS® installation site above sea level. The value must be changed if the air flow sensors of the TITANUS MICRO·SENS® have to be adjusted to air pressure. If the height above sea level is changed, the air flow of the TITANUS MICRO·SENS® is automatically initialised again.

7.2.12 Setting the current air pressure

The current air pressure in the monitoring area must be entered if an air-pressure-dependent adjustment is required. The default setting corresponds to the mean air pressure at sea level. If the air pressure is changed, the TITANUS MICRO·SENS® automatically performs an air flow initialisation.

7.2.13 Setting the fan voltage

In critical applications, the fan voltage can be increased to increase the transport speed in the pipe system and thus ensure faster detection for longer pipe lengths. If the fan voltage is changed, the TITANUS MICRO·SENS® automatically performs an air flow initialisation.

Detection unit	Fan voltage [V]	Default setting [V]	Setting levels [V]
DM-TMx-xx-10-x	9 - 13.5	9	0.1
DM-TMx-xx-50-x	9 - 13.5	9	0.1

Table 61: Fan voltage

7.3 Calibration of air flow sensor

TIP

Check the cover screws of the TITANUS MICRO·SENS® for tightness before starting air flow initialisation.

Air flow initialisation of the TITANUS MICRO·SENS® is successfully completed when the following state occurs for a duration of 2 minutes:

- the temperature fluctuates by less than 0.1 K
- the air flow does not fluctuate too strongly (temperature control)
- the fan voltage can be set properly, fan and fan power supply operate normally

Air flow initialisation can take up to a maximum of 2 hours.

Air flow initialisation is cancelled immediately if one of the following faults occurs:

- Temperature measurement defective
- Air flow measurement defective
- Fan control defective

Types of calibration

The calibration of the air flow sensor can:

- be performed independently of the current air pressure. Pay attention to the limitations (see chapter "Project planning" and "Air flow monitoring").
- be carried out depending on the current air pressure to compensate the influence of air pressure fluctuation.

►Enter all values determined in the following steps into the test record (see chapter "Annex").

7.3.1 Air pressure-independent calibration

The air pressure-independent adjustment of the TITANUS MICRO·SENS® is carried out completely automatically each time the detection unit is inserted into the device base and the jumper X4 is reconnected or via the diagnostic software.

The alarm detection is fully functional during the initialisation phase. During this time, the operating indicator flashes and there must be no air flow interference. Once initialisation has finished, the operating indicator is permanently illuminated and the air flow sensor has determined its target value for the connected pipe system.

7.3.2 Air pressure-dependent calibration

The air pressure-dependent calibration of the TITANUS MICRO·SENS® can only be carried out using the diagnostic software. Furthermore, a barometer (recommended: digital precision pocket barometer GPB 1300, Greisinger electronic GmbH) is required for this type of calibration.

► In the "Settings" tab, press the lower button "Set" to be able to adjust the values.

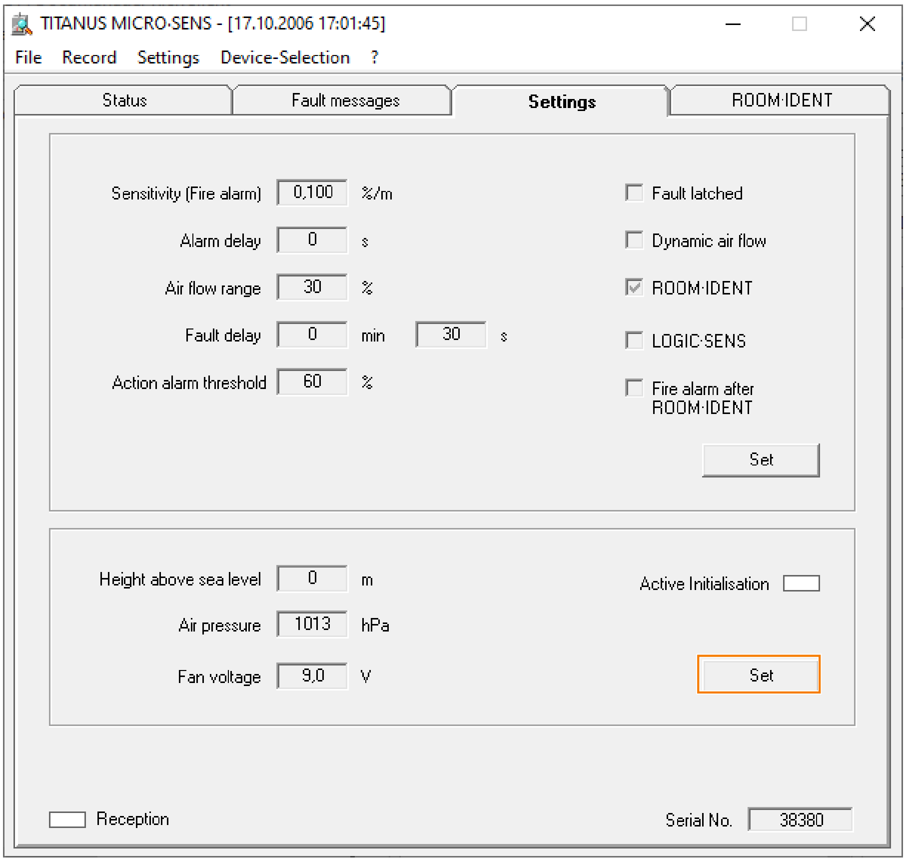


Image 125: Diagnostic software button "Create" under "Settings"

► Determine the height above sea level at the installation site of the TITANUS MICRO·SENS®.

► Measure the air pressure with the barometer. Make sure that the air flow sensor is not adjusted to 0% if the measured air pressure does not match the corresponding annual mean for the current altitude.

▶ Press the button "Initialize". Make sure that the air flow is not affected during the initialisation phase.

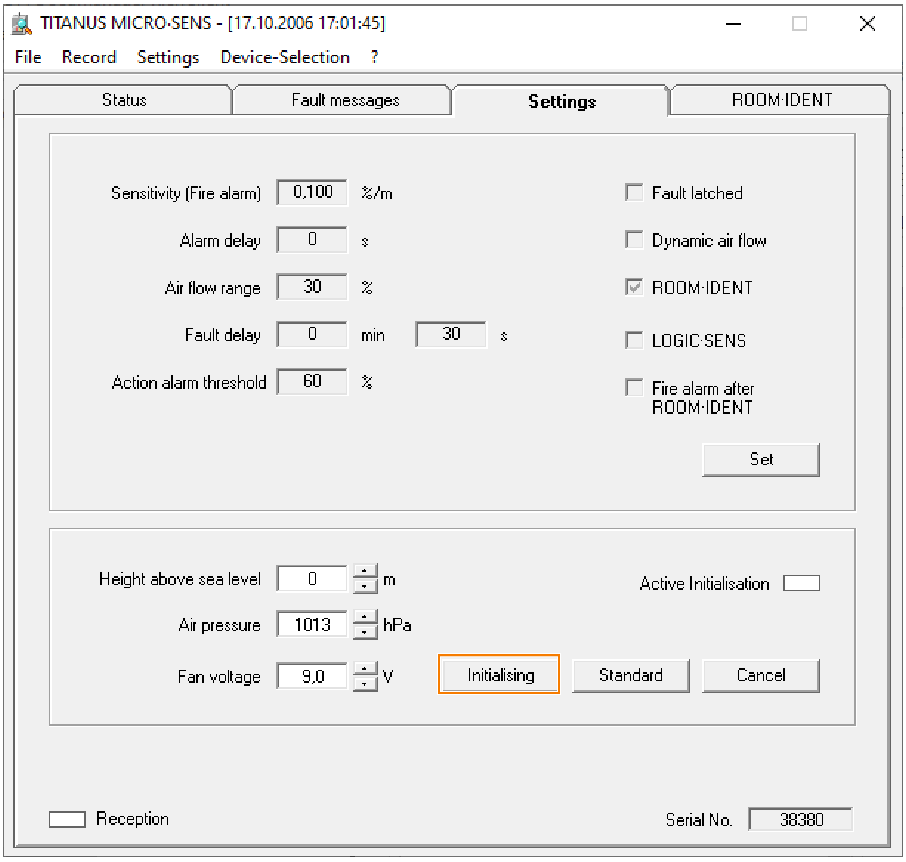


Image 126: Diagnostic software button "Initialize" under "Settings"

▶ Make sure that the operating LED on the unit is flashing.

▶ Make sure that the operating LED is permanently illuminated.

7.4 Checking the detection unit and alarm signal transmission

Trigger the TITANUS MICRO·SENS® and check the transmission path to the FDCP as follows:

- ▶ Enter all values determined in the following steps into the test record (see chapter "Annex").
- ▶ Spray test aerosol either into the first aspiration aperture or into the test adapter of the pipe system. The alarm can also be triggered by an activated smoke stick.
- ▶ Make sure that the alarm is displayed on the unit.
- ▶ Make sure that the alarm LED is flashing during the set delay time.
- ▶ Make sure that the alarm LED is permanently illuminated after the set delay time has elapsed. If this is not the case, check whether:
  - the display circuit board is connected.
  - there is a defect in the device.
  - the detection unit has to 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.
- ▶ Make sure that the LOGIC SENS function is activated. To test the alarm triggering by means of test aerosol or smoke stick, it must be deactivated. This will accelerate the alarm evaluation.

7.5 Checking the air flow monitoring and fault signal transmission

The following steps cannot be carried out until the air flow sensor has been successfully calibrated (see chapter "Calibration of air flow sensor").

▶ Enter all values determined in the following steps into the test record (see chapter "Annex").

Breakage

Check the detection of a pipe breakage:

▶ Loosen the pipe at the connection to the device or open the test adapter.

▶ Check that the fault LED on the unit goes from flashing to permanent light and that the fault is displayed on any connected FDCP.

▶ Optionally, check the values of the air flow sensor using the diagnostic software and service PC.

Blockage

Check the detection of a blockage:

▶ Block the aspiration apertures with adhesive tape.

▶ Check that the fault LED on the unit goes from flashing to permanent light and that the fault is displayed on any connected FDCP.

▶ Optionally, check the values of the air flow sensor using the diagnostic software and service PC.

Troubleshooting

If the air flow faults are not correctly detected, check whether:

- all aspiration apertures are 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 connected.
- any filter elements are clean.
- any ball valves and purge valves are in "operating position".

▶ If no defect is found during the inspection, check the air flow monitoring (see chapter "Function test").

7.6 Function test

If the TITANUS MICRO·SENS® cannot be calibrated, check its functionality using the test pipe, digital fine pressure gauge with adapter, service PC and diagnostic software.

The following describes the complete function test with digital fine pressure gauge type GDH 01 AN. A limited function test is also possible without a digital fine pressure gauge.

7.6.1 Preparing for the function test

- ►Make sure that the TITANUS MICRO·SENS® is in operation for at least 30 min.
- ►Disconnect the pipe system from the TITANUS MICRO·SENS®. After expiration of the adjusted air flow fault delay time, the device should report a fault. If no air flow fault is detected, the device is defective.
- ►Connect the test pipe.

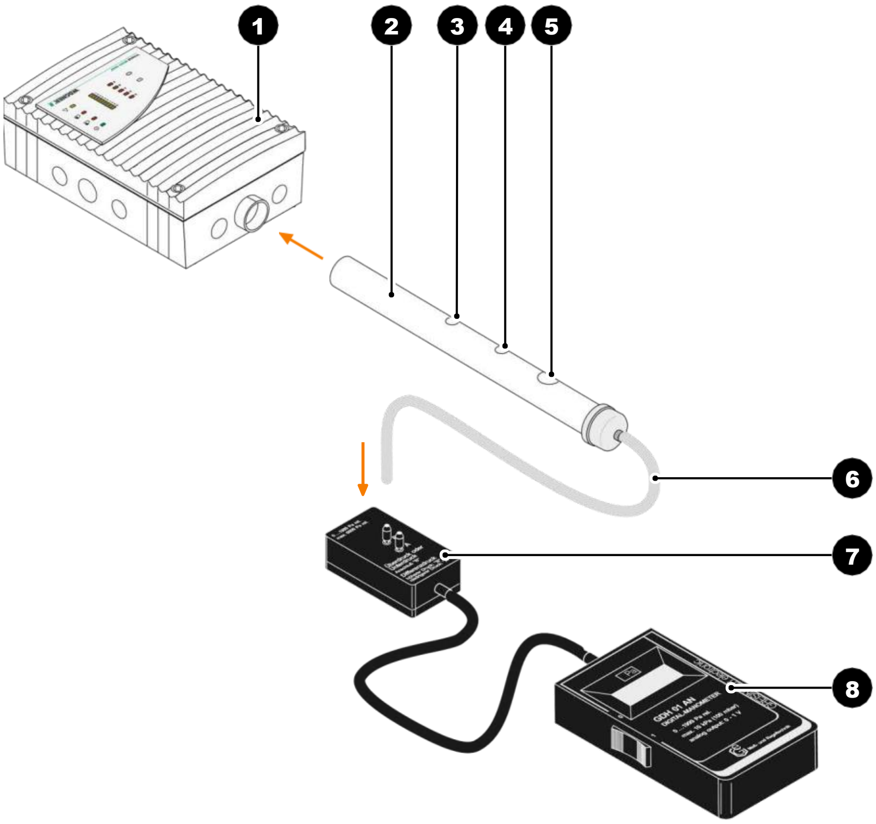


Image 127: Preparing the functionality

1	TITANUS MICRO·SENS®
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)

► Connect the pressure measurement hose of the test pipe to the adapter (connection B). When performing a limited function check without a digital fine pressure gauge, the pressure measurement hose connection must be closed.

► Connect the service PC and TITANUS MICRO·SENS® using the diagnostic tool.

► Start the diagnostic software.

►On the "Settings" tab, change the following settings:

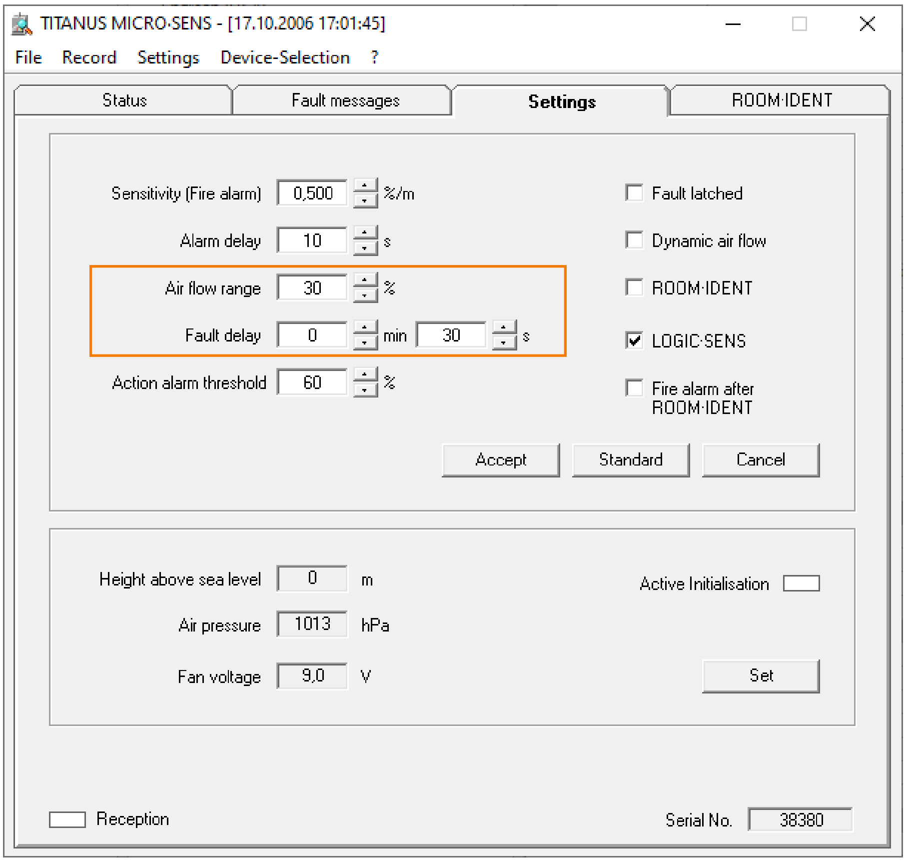


Image 128: Settings for function test (top)

Image 129: Settings for function test (bottom)

7.6.2 Performing the function test

- ▶ Save the settings of the TITANUS MICRO·SENS® via the device log (text file) or make note of the settings.
- ▶ Close all the test pipe aspiration apertures with adhesive tape.
- ▶ Make sure that the vacuum generated by the TITANUS MICRO·SENS® reaches approx. 80 Pa after a short start-up time.

► Make sure that the device reports the following faults within 30 s:
- “Detector module fault“
- "Air flow too low (static evaluation)"

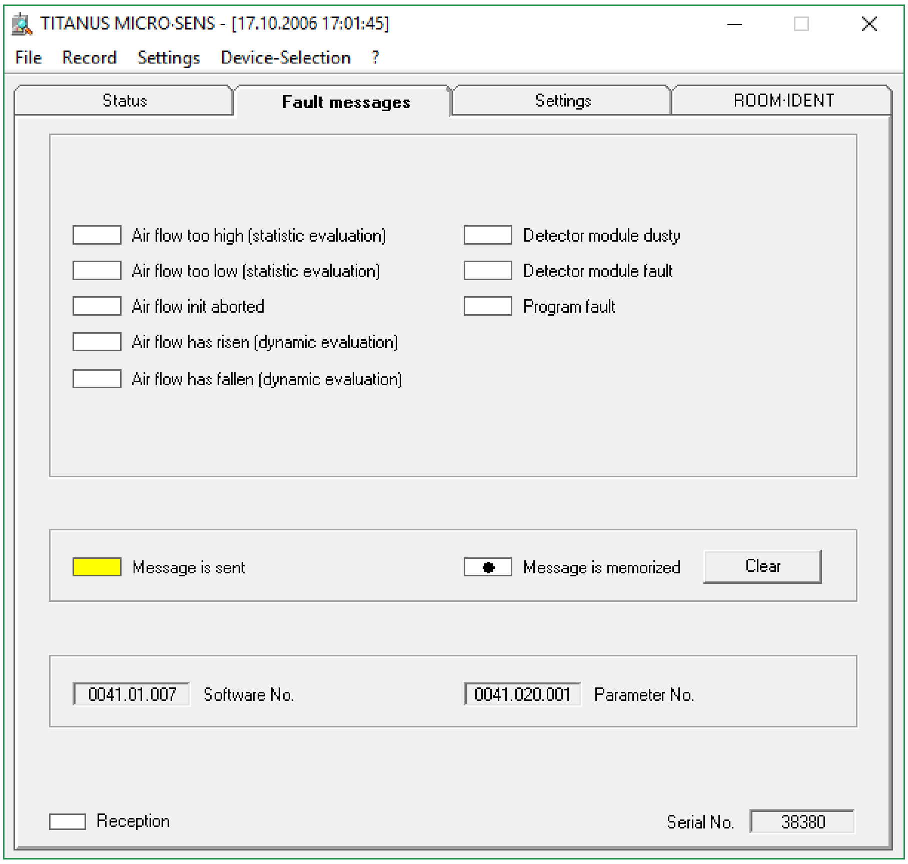


Image 130: Tab "Fault messages"

► Open the Ø 4.6 and 4.2 mm aspiration apertures on the test pipe.

▶ Click the "Initialize" button to start air flow initialisation.

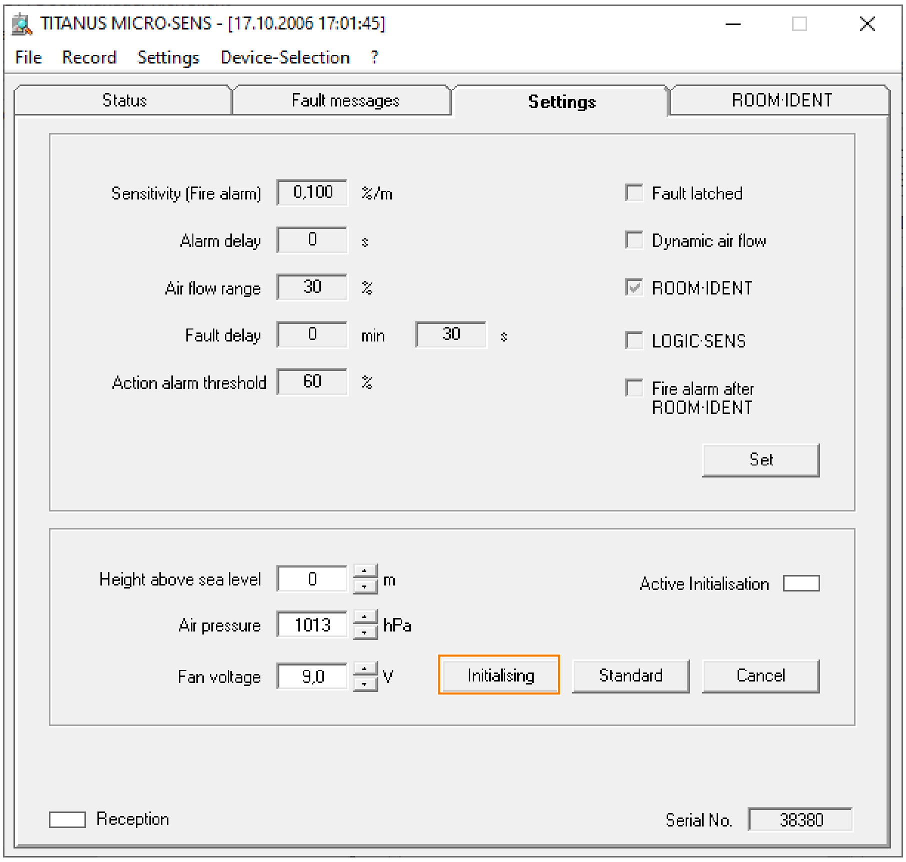


Image 131: Start initialisation

▶ Make sure that the "Initialisation active" LED flashes for the duration of the initialisation phase.

▶ Make sure that the fault LEDs have gone out.

➜ Initialisation is complete.

▶ Close the Ø 4.2 mm aspiration aperture on the test pipe with adhesive tape.

▶ Make sure that the fault LED begins to flash after approx. 5 s.

▶ Make sure that the fault LED on the device is lit up permanently after approx. 35 s.

▶ Make sure that the device reports the fault "Air flow too low (static evaluation)".

▶ Make sure that the air flow value is approx. -35%.

▶ Open the Ø 4.2 mm aspiration aperture on the test pipe.

▶ Make sure that the fault LED has gone out after a few seconds.

▶ Open the Ø 7.0 mm aspiration aperture on the test pipe.

▶ Make sure that the fault LED begins to flash after approx. 5 s.

▶ Make sure that the fault LED on the device is lit up permanently after approx. 35 s.

▶ Make sure that the device reports the fault "Air flow too high (static evaluation)".

▶ Make sure that the air flow value is approx. +85%.

▶ Close the Ø 7.0 mm aspiration aperture on the test pipe with adhesive tape.

▶ Make sure that the fault LED has gone out after a few seconds.

▶ Remove the test pipe.

▶ Connect the pipe system to the TITANUS MICRO·SENS®.

▶ Restore the saved (see device log) or noted settings.

➜ The function test is complete.

▶ Repeat device commissioning from the section "Calibration of air flow sensor". 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 changes are required.

TIP
It is recommended to print out the device log after completing commissioning and keep it with the system documentation so that device settings can be checked at a later date. Alternatively, the diagnosis file can be saved.

7.7 Commission ROOM·IDENT

The localisation of the fire site (ROOM·IDENT) is put into operation using the diagnostic software.

Commissioning of ROOM·IDENT does not differ for the "ROOM·IDENT" and "Fire alarm after ROOM·IDENT" functions.

► Press the "Train" button to be able to set all values for localising the fire site.

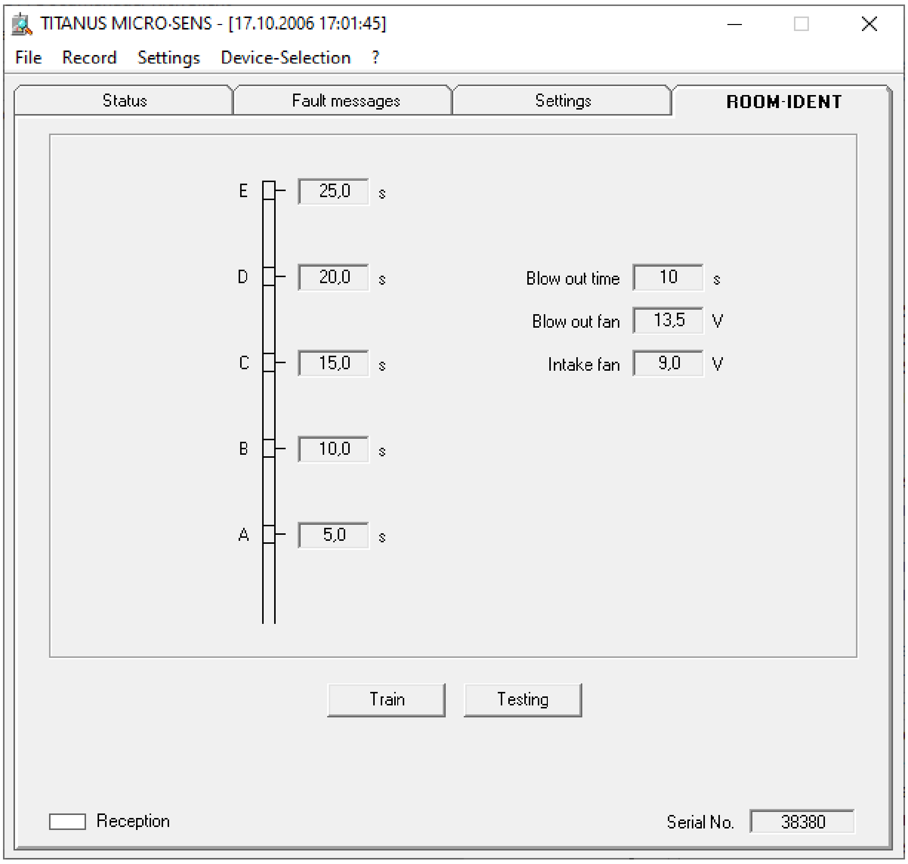


Image 132: Tab ROOM·IDENT

►Enter the number of aspiration apertures.

Image 133: Tab ROOM·IDENT

TIP
Pressing the "?" (question mark) button opens a web help with information on the values to be entered.

►Enter the purge time.

The selected value is permanently saved in the TITANUS MICRO·SENS® and used for every localisation procedure. If the voltage of the purge fan is set too low, the purge time may not be sufficient to purge the pipe system. This can cause a false fire site to be displayed in the event of an alarm.

"Purge time" web help

During the purge time (device switches to purge mode), the air samples drawn in by the TITANUS MICRO·SENS® are discharged from the aspiration pipe system via the aspiration apertures.

For devices with a serial number greater than 187000, the air purge time must be calculated according to the following formula:

$$t_{free} = t_{max\_aspirating} \cdot 1{,}1$$

Variable/ constant	Unit	Description
t_{free}	s	Required purge time
$t_{max\_aspirating}$	s	Maximum determined aspiration time

Example

$$t_{max\_aspirating} = 66\ \mathrm{s}$$

$$t_{free} = 66\ \mathrm{s} \cdot 1{,}1 = 72{,}6\ \mathrm{s} = 73\ s$$

The calculated purge time is to be rounded up to whole seconds and the value thus obtained is to be entered under "Blow out time".

For all devices where the serial number is less than 187000, select the purge time according to the following table (intermediate values = next higher value). Add 1 s to the respective purge time for each pipe bend or elbow.

Pipe length [m]	Purge time [s]
10	80
15	97
20	113
25	130
30	147
35	163
40	180

Table 62: Purge time

► Enter the voltage of the purge fan.

"Purge fan" web help

In order to achieve the shortest possible and thus optimum purge time, it is recommended to leave the voltage of the purge fan at 13.5 V (default).

However, in systems where the capacity of the available power supply has already reached its limits and/or where there is increased voltage loss on the device supply cable due to long cable lengths, it may make sense to reduce the voltage of the purge fan.

NOTE

Reducing the voltage of the purge fan only makes sense if the voltage of the aspiration fan is less than or equal to the voltage of the purge fan.

To reduce the current consumption of the unit during the purge process, the voltage of the purge fan can be changed as follows:

Application	Purge fan voltage [V]
For optimum purge time	13.5
For lower current consumption or lower voltage loss during the purge process	9 … 13.4

Table 63: Purge fan

► Enter the voltage of the aspiration fan.

"Aspiration fan" web help

During the localisation of the fire site, the aspiration fan may have to be supplied with a different voltage than during normal operation.

The operating voltage of the aspiration fan must be selected in such a way that a running time difference of min. 2 s is maintained between two aspiration apertures located in succession during fire site localisation. As the air flow speed is highest between aspiration aperture A and B in symmetrical pipe systems, the shortest transport times within the pipe system result here.

The following table provides some guideline values for setting the voltage of the aspiration fan during a localisation procedure.

Aspiration aperture spacing A – B [m]	Suction fan voltage [V]
3	9.0
4	9.8
5	10.7
6	11.5
7	12.4
from 8	13.2

Table 64: Aspiration fan

Determining the transport time

► Select the aspiration aperture whose transport time you want to determine, e.g. aspiration aperture C.

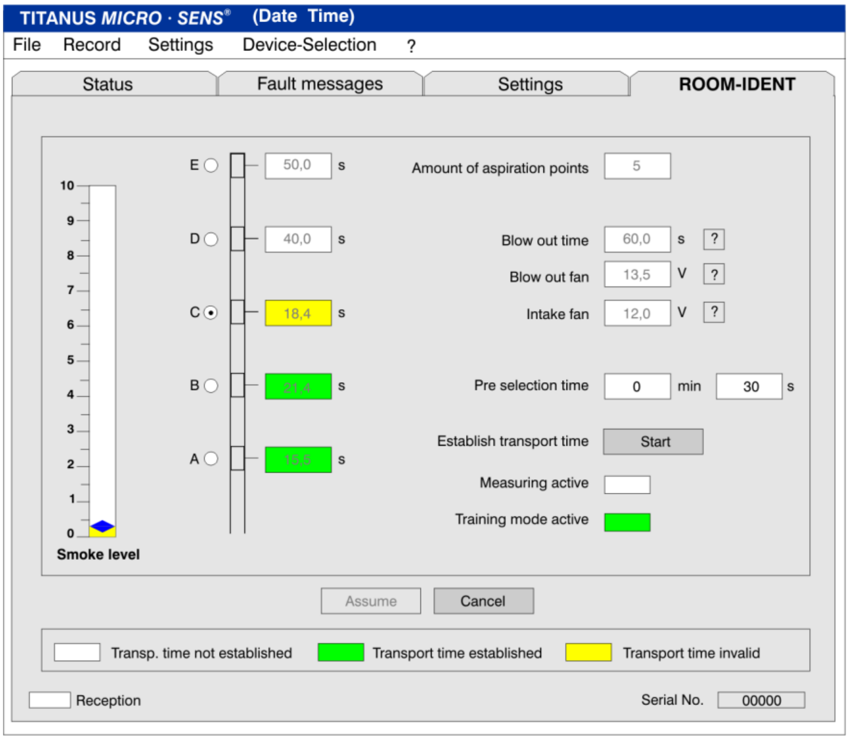


Image 134: ROOM·IDENT tab

► Enter the pre-selection time necessary to reach the aspiration aperture and supply the smoke.

► Make sure that at the end of the pre-selection time selected, the respective aspiration aperture is supplied with smoke.

► Make sure that the smoke is available at the aspiration aperture for another 10 to 15 s after the pre-selection time has elapsed.

► Use the smoke level indicator to check that there is no smoke in the aspiration pipe.

► Press the "Start" button to activate the learning mode.

► Make sure that the TITANUS MICRO·SENS® switches to purging of the aspiration pipe.

► Make sure that the LEDs "Measuring active" and "Training mode active" are illuminated.

► Make sure that the TITANUS MICRO·SENS® switches to aspiration after the pre-selection time has elapsed. At this stage, the smoke must be available at the aspiration aperture selected.

- ►Make sure that the TITANUS MICRO·SENS® detects the smoke and indicates this via the smoke level indicator. The alarm site indicator of the selected aspiration aperture turns green and the determined time is entered.
  - ➜The teach-in mode for the selected aspiration aperture is now complete.
- ►Repeat the process for all other aspiration apertures.
- ►Click "Accept" to permanently save the data once all aspiration apertures have been taught in.

7.8 Commissioning response indicators

The response indicators are commissioned using diagnostic software.

► Press the "Testing" button to be able to select a response indicator.

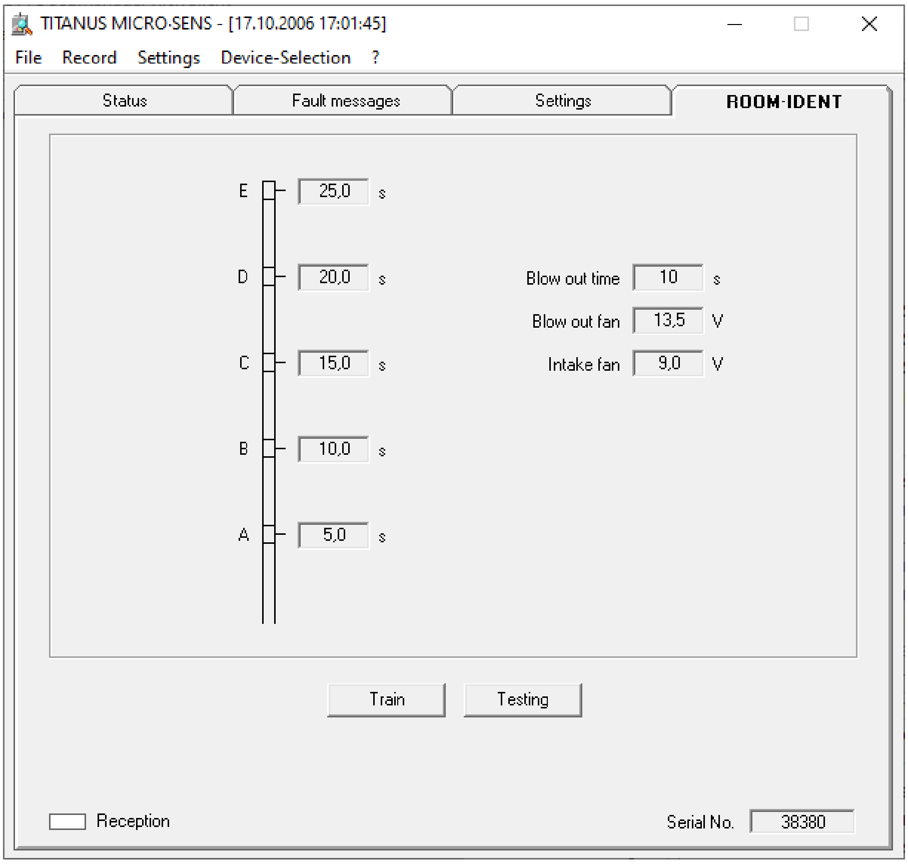


Image 135: Tab "ROOM·IDENT"

► Select a response indicator to check the address setting.

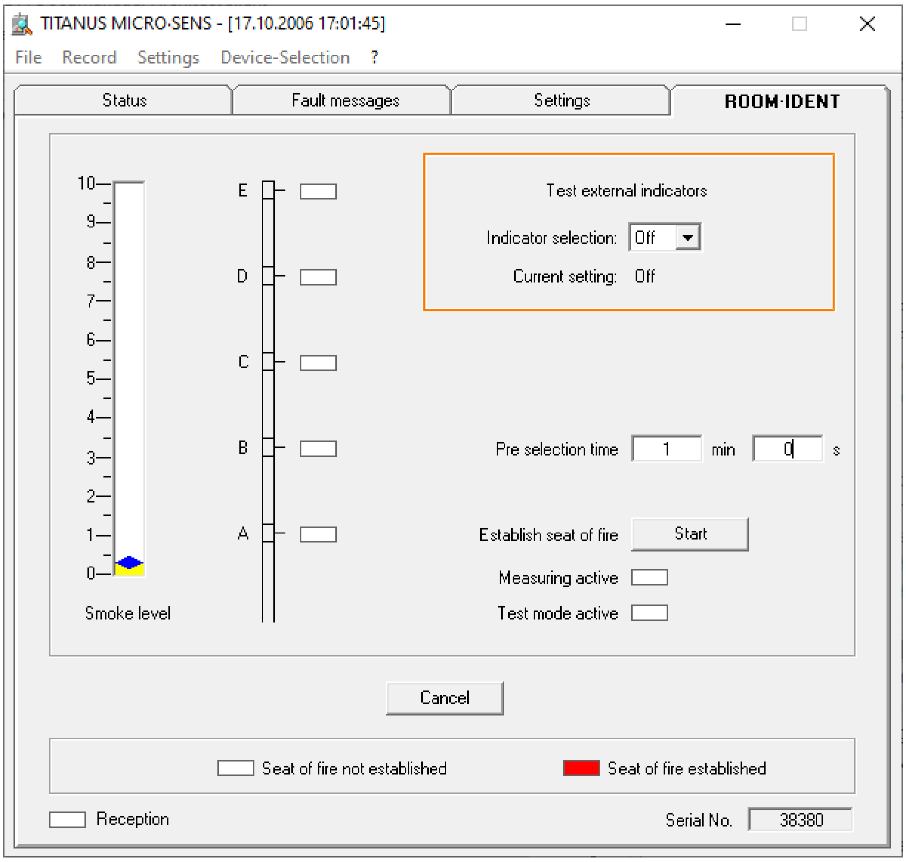


Image 136: Tab "ROOM·IDENT" response indicators

► Check that the correct response indicator is flashing or illuminated at the installation location.

► Repeat the process for all other aspiration apertures.

► Before exiting the "ROOM·IDENT" tab, set the selection to "Off".

➜ The "Currently set" information field is also set to "Off".

8 Maintenance

You will find information about maintenance in this section.

The test record must be completed during the maintenance (see chapter "Appendix"). The test record is required for the subsequent evaluation of the data (e.g. air flow value, air pressure and temperature during maintenance).

8.1 Maintenance intervals

Maintenance includes regular inspections. The TITANUS MICRO·SENS® is initially inspected during commissioning and then annually.

The following checks must be performed during each maintenance:

Type of test	Further information see chapter …
Visual inspection	“Visual inspection”
Checking the detection unit and alarm transmission	“Checking the detection unit and alarm signal transmission”
Checking the pipe system	“Pipe system check”
Checking the air flow calibration	“Checking the air flow sensor calibration”
Testing ROOM IDENT and response indicator	“Checking ROOM·IDENT and response indicators”
Checking the air flow monitoring and fault signal transmission	“Checking the air flow monitoring and fault signal transmission”

Table 65: Maintenance intervals

In addition to annual maintenance, the national provisions or standards regarding the purpose of use as well as any requirements specific to the application must be considered.

8.2 Visual inspection

Check whether...

- the pipe system is firmly in place and undamaged if it is easy to access.
- the aspiration apertures of the pipe system are clear.
- the aspiration pipe and connecting cables are securely connected.
- the TITANUS MICRO·SENS® is undamaged.

8.3 Checking the detection unit and alarm signal transmission

Any hardware defects in the detection unit are shown under the "Fault messages" tab of the diagnostic software.

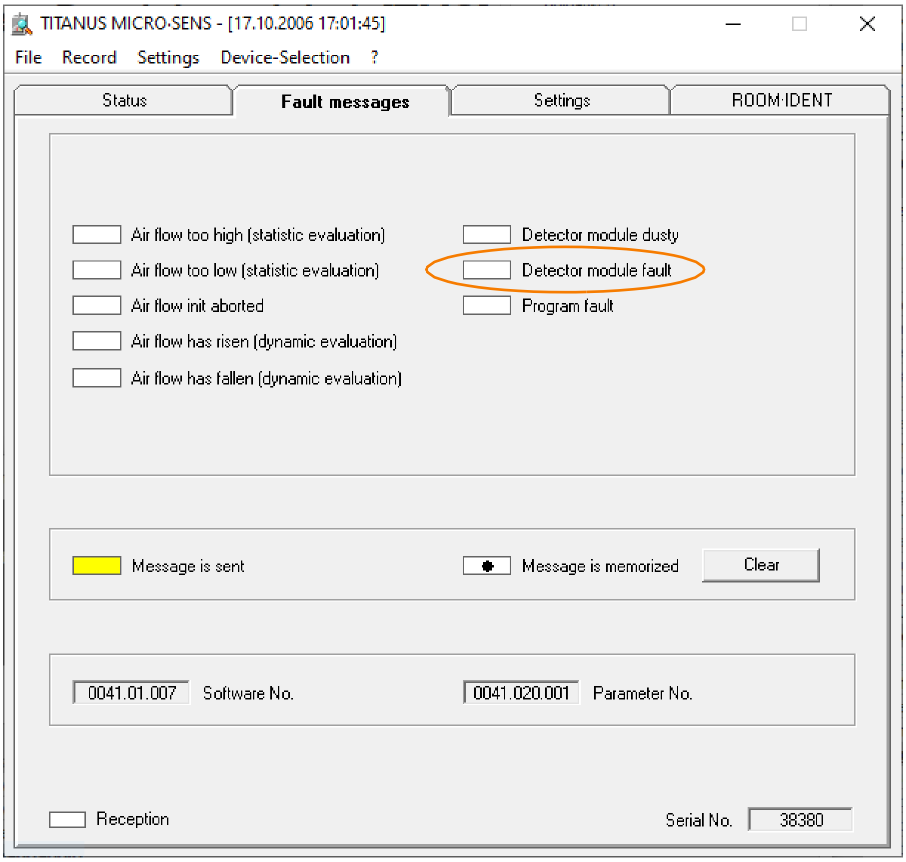


Image 137: Tab "Fault messages" detection unit

- ▶Visually check the detection unit for dirt or damage on the outside and replace the unit if necessary.
- ▶Check the detection unit and the alarm transmission according to chapter "Commissioning" and "Checking the detection unit and alarm signal transmission".

8.4 Pipe system check

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 TITANUS MICRO·SENS® 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.

If the aspiration apertures are blocked, the pipe system must be purged (see chapter "Purging the pipe system").

8.4.1 Purging the pipe system

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.

A single purging process must be fully completed within 50 s. If another purging process is required, the above procedure is to be repeated after 120 s at the earliest.

8.4.1.1 3-way ball valve (ABS/PVC)

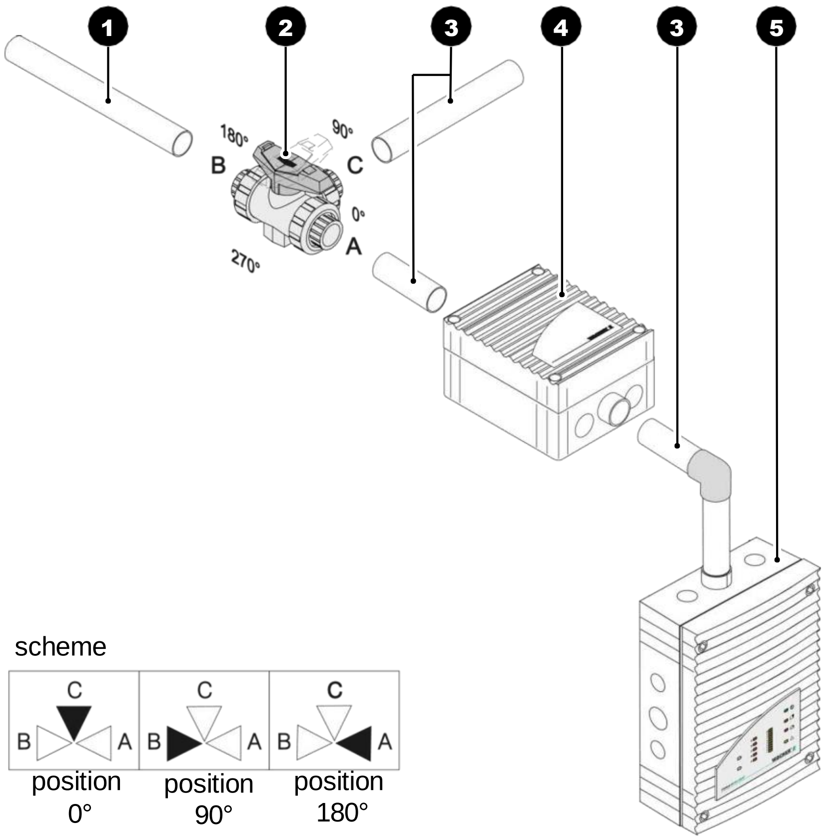


Image 138: Installing a 3-way ball valve made of ABS/PVC

	open
	closed
1	Compressed air connection
2	3-way ball valve
3	Pipe system
4	Air filter (optional)
5	TITANUS MICRO·SENS®

- ▶ Make sure that a compressed air supply is available at the 3-way ball valve.
- ▶ Move the lever of the ball valve from the 90° setting (operating position) to the 270° setting.
- ▶ Make sure that the TITANUS MICRO·SENS® is disconnected from the pipe system to be purged.
- ▶ Purge the pipe system for 10 s.

- ▶ Move the lever of the ball valve to the 0° or 180° setting.
- ▶ Make sure that the TITANUS MICRO·SENS® is disconnected from the pipe system and the compressed air supply.
- ▶ Wait approx. 20 s. The dust and dirt stirred up in the pipe system settles and thus cannot be drawn in via the TITANUS MICRO·SENS®.
- ▶ Move the lever of the ball valve to the 90° setting within 10 s.
- ▶ Make sure that the purged pipe system is connected to the TITANUS MICRO·SENS® again.

8.4.1.2 3-way ball valve (metal)

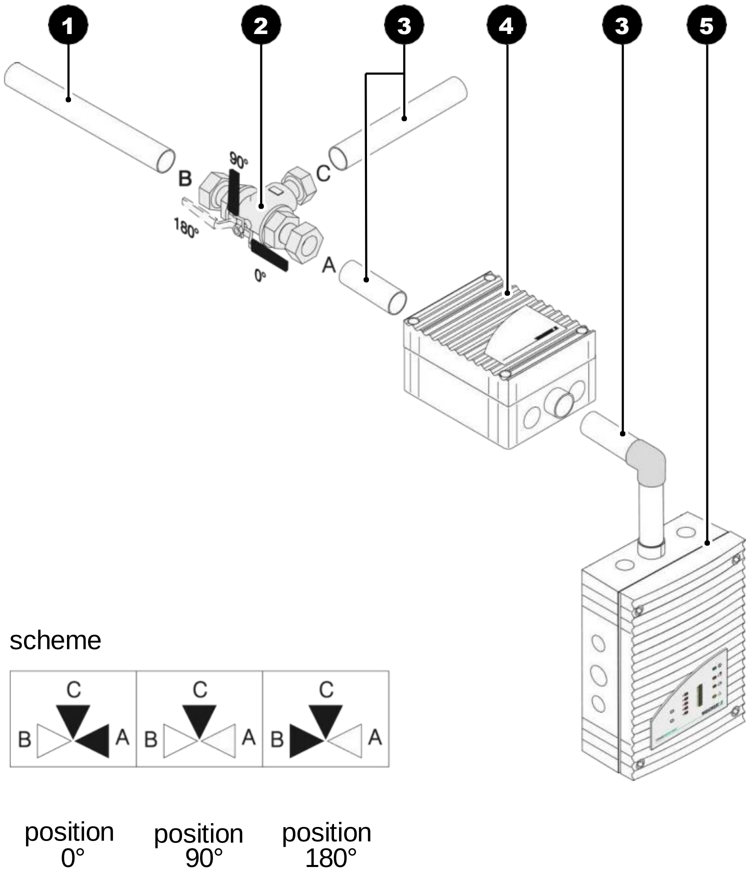


Image 139: Installing the metal 3-way ball valve

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

- ▶ Make sure that a compressed air supply is available at the 3-way ball valve.
- ▶ Move the lever of the ball valve from the 0° setting (operating position) to the 180° setting.
- ▶ Make sure that the TITANUS MICRO·SENS® is disconnected from the pipe system to be purged.
- ▶ Purge the pipe system for 10 s.

▶ Move the lever of the ball valve to the 90° setting.

▶ Make sure that the TITANUS MICRO·SENS® is disconnected from the pipe system and the compressed air supply.

▶ Wait approx. 20 seconds. The dust and dirt stirred up in the pipe system settles and thus cannot be drawn in via the TITANUS MICRO·SENS®.

▶ Move the lever of the ball valve to the 0° setting within 10 s.

▶ Make sure that the purged pipe system is connected to the TITANUS MICRO·SENS® again.

8.5 Replacing the detection unit

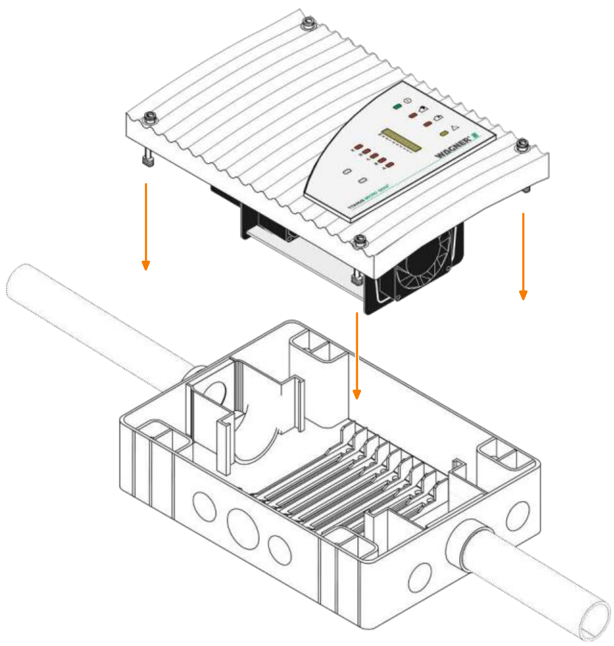


Image 140: Replacing the detection unit

▶ Unfasten the four cover screws of the detection unit using a screwdriver.

▶ Lift the detection unit out of the device base.

▶ Reconnect jumper X4 (pin 1,2 or 2,3) on the new detection unit.

▶ Determine the type of calibration against the test record.

▶ Insert the new detection unit into the device base. Pay attention to the mechanical coding, which prevents the unit from being twisted.

→ Air flow calibration is carried out automatically, independent of the air pressure. If the TITANUS MICRO·SENS® was previously calibrated depending on the air pressure, carry out another air pressure-dependent calibration using the diagnostic software after replacing the detection unit. Make sure that the air flow is not affected during the initialisation phase.

▶ Make sure that the operating LED on the unit is flashing.

▶ Make sure that the operating LED is permanently illuminated after the initialisation phase.

▶ Tighten the four cover screws by using a screwdriver.

8.6 Replacing filter elements in the device base

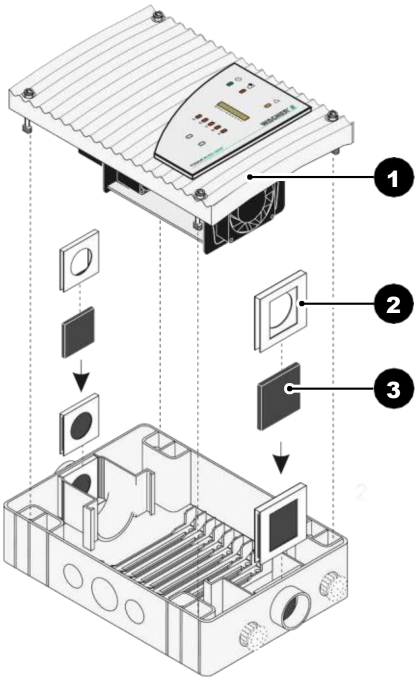


Image 141: Replacing filter elements in the device base

1	Detection unit
2	Bracket for filter element
3	Filter element

▶ Unfasten the four cover screws of the detection unit using a screwdriver.
▶ Lift the detection unit out of the device base.
▶ Pull both air filter brackets out of the device base.
▶ Remove the filter elements.
▶ Visually check the filter elements for dirt and replace them if necessary.
▶ Reinsert the air filter brackets.
▶ Tighten the four cover screws by using a screwdriver.

8.7 Replacing the filter elements of air filter type LF-AD-x

TIP
Opening the filter after the expiry of the adjusted delay time can lead to an air flow fault.

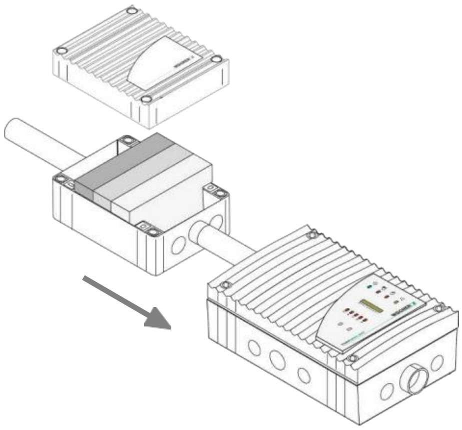


Image 142: Replacing the air filter elements

- ▶ Unfasten the four cover screws by using a screwdriver.
- ▶ Remove the housing cover.
- ▶ Remove the filter elements.
- ▶ Visually check the filter elements for dirt and replace them if necessary. The filter elements can be cleaned if the dirt level is low.
- ▶ Carefully clean off any dust deposits from the inside of the housing.
- ▶ Insert the cleaned or new filter elements. Make sure that the air filter elements are inserted in the correct order as indicated on the information plate at the bottom of the housing.
- ▶ Put the housing cover back on.
- ▶ Tighten the four cover screws by using a screwdriver.

8.8 Replacing the filter elements of special filter type SF-400 / 650

Removing the special filter leads to an air flow fault on the TITANUS MICRO·SENS®.

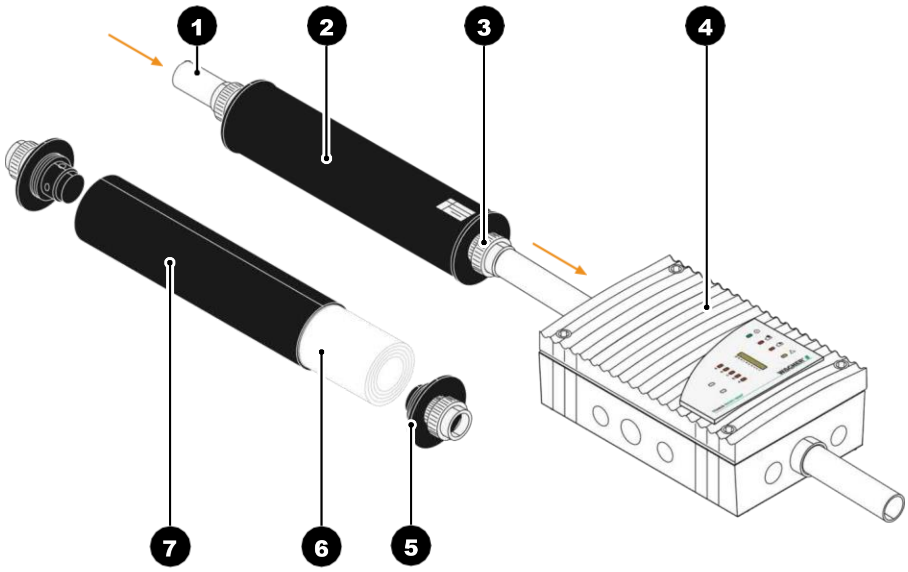


Image 143: Replacing the filter elements of the special filter

1	Pipe system
2	Special filter type SF-400, SF-650
3	PVC transition screw connections
4	TITANUS MICRO·SENS®
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.
- ▶ Loosen one of the two screw-in plugs on the filter housing.
- ▶ Remove the filter element.
- ▶ Insert the new filter element into the filter housing.
- ▶ Screw the screw-in plug into the filter housing.
- ▶ Re-insert the special filter into the pipe system. Observe the flow direction that is specified on the type plate of the filter housing.

▶ Tighten the PVC transition screw connections.

8.9 Checking the air flow sensor calibration

NOTE

No standard conformity in case of improper project planning

The air flow monitoring should be set to ≤20 % to achieve project planning that complies with AS ISO 7240.

TIP

Always record the type of calibration (air pressure-dependent or -independent) and, if applicable, the values of height above sea level, air pressure, temperature and voltage set in the test record (see chapter "Appendix").

The air flow value is checked using the diagnostic software. This shows the tolerance range of the selected trigger threshold as well as the actual and target values. The limits correspond to the preset air flow range.

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.

▶ Check the deviation of the actual value from the target value.

▶ Make sure that there is a deviation of > ±3/4 of the set trigger threshold.

▶ The pipe system should be checked as a preventive measure (see the section "Rectifying air flow faults" in this chapter).

Air pressure-dependent calibration

In order to ensure fault-free long-term operation of the unit, the air flow sensor must be calibrated depending on the air pressure (see chapters "Commissioning" and "Calibration of air flow sensor"). Only with this type of calibration are slight air pressure fluctuations still within the monitoring window and therefore in the permissible tolerance range.

Air pressure-independent calibration

If an air pressure-independent calibration has been carried out, fluctuations in the air pressure can lead to undesirable air flow faults. If the air flow range is set to >30%, the air flow sensor may be calibrated independent of the air pressure. You must also make sure that no air pressure fluctuations can occur in the immediate vicinity.

If air pressure fluctuations in the immediate vicinity cannot be ruled out, the air flow sensor must be calibrated depending on air pressure.

Rectifying air flow faults

- ▶ Make sure that an air pressure-dependent calibration has been carried out.
- ▶ Make sure that the actual value is outside the tolerance range of the selected trigger threshold (air flow fault is indicated by the device).
- ▶ Check the pipe system for breakage or blockage (see chapters "Commissioning" and "Checking the air flow monitoring and fault signal transmission").
- ▶ Restore the original configuration of the pipe network if it has been changed during troubleshooting.
- ▶ Make sure that checking the pipe system for breakage or blockage did not reveal any defects.
- ▶ Connect the test pipe.
- ▶ Carry out a function check (see chapters "Commissioning" and "Function test").
  - ➜ If no deviations are detected in the process described during the function test, this confirms there is no defect in the air flow monitoring system.
- ▶ Perform another calibration with the pipe system connected.
- ▶ Save all previously saved or current device data as well as any settings made as a file using the diagnostic software.
- ▶ Observe the current air flow 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.
- ▶ Increase the air flow range if the negative influences on the air flow monitoring system cannot be eliminated.

8.10 Checking ROOM·IDENT and response indicators

►Open the "ROOM·IDENT" tab in the diagnostic software.

►Press the "Testing" button.

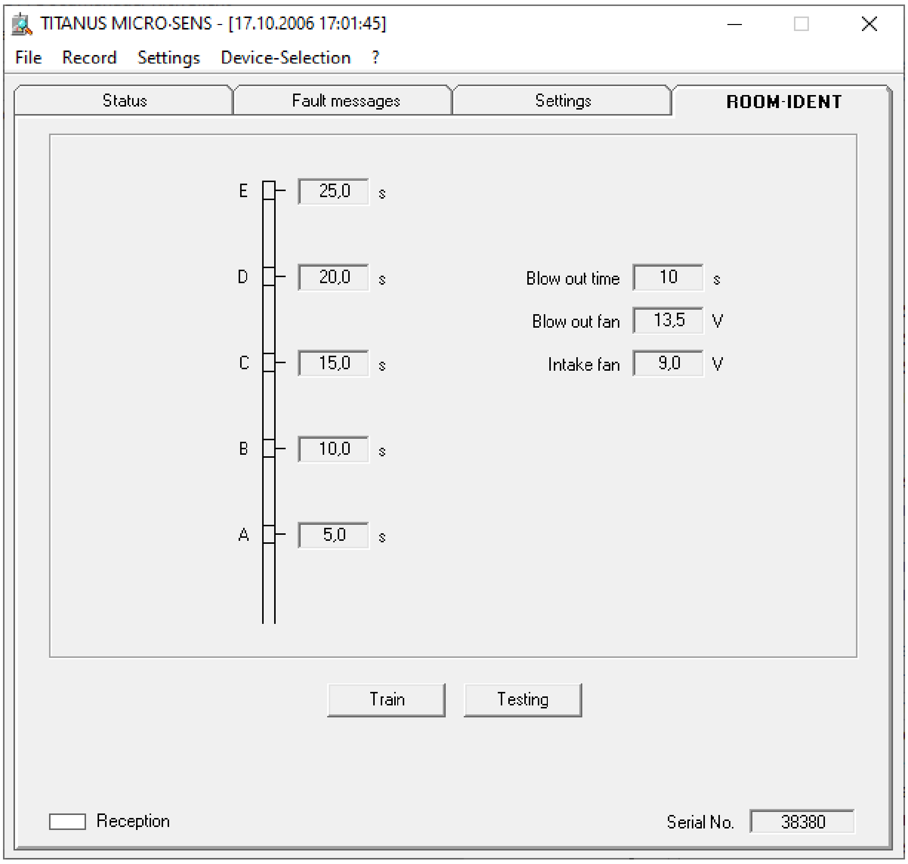


Image 144: "ROOM IDENT" tab

▶ Enter the pre-selection time needed to reach the desired aspiration aperture and supply it with smoke.

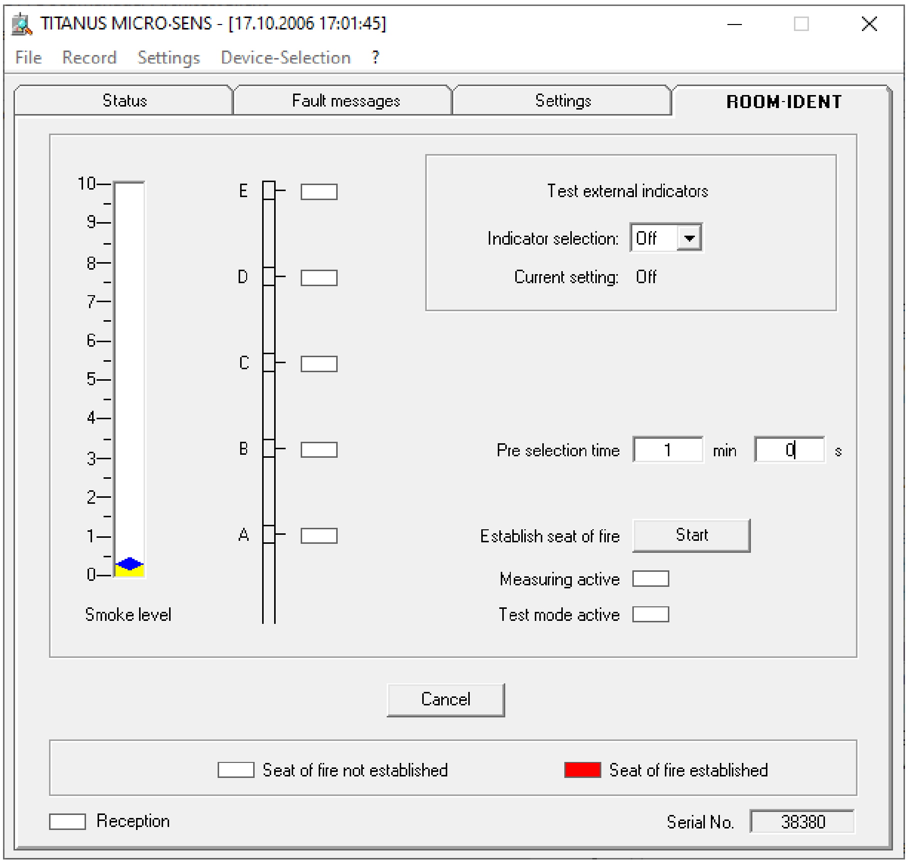


Image 145: Checking ROOM·IDENT and response indicators

▶ Press the "Start" button to start the test.

▶ Make sure that the TITANUS MICRO·SENS® switches from aspiration mode to purge mode.

▶ Make sure that the "Measuring active" and "Test mode active" buttons are illuminated.

▶ Go to the corresponding aspiration aperture quickly.

▶ Supply test smoke to the aspiration aperture before the selected preselection time has elapsed.

▶ Make sure that the generated trail of smoke is drawn into the aspiration aperture.

▶ Wait approx. 5 to 10 seconds before stopping the supply of test smoke.

▶ Make sure that the TITANUS MICRO·SENS® switches from purge mode back to aspiration mode after the pre-selection time has elapsed.

- ►Check by means of diagnostic software whether the correct aspiration aperture has been identified.
- ►Repeat this test for all taught in aspiration apertures.

8.11 Checking the air flow monitoring and fault signal transmission

A breakage or blockage of the pipe system is displayed in the diagnostic software under the "Fault messages" tab, on the outside of the TITANUS MICRO·SENS® and on any connected FDCP.

- ►Check the air flow monitoring and fault signal transmission according to chapter "Commissioning" and "Checking the air flow monitoring and fault signal transmission".

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).

Air flow sensor

For monitoring the entire air flow 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"

Alarm location display

LED to indicate the localised fire site on the device for a maximum of five separate monitoring areas (A-E). See also "Fire site localisation"

Alarm state

Condition of a fire alarm system or part of it, in response to an existing hazard.

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.

Detection unit

Optimised modular scattered light smoke detectors for use in aspirating smoke detectors with special air supply.

Detector line

Monitored transmission path through which the fire alarm can be connected to the fire detector control panel. See also "Primary line"

Detector line (addressable)

Line technology in which the connected participants, e.g. fire detectors, couplers, input or output modules, are each given their own address (individual display and operation, with identification of the individual detectors).

Detector line (collective)

Line technology in which the connected detectors form a common (collective) address (common display and operation, without identification of the individual detectors).

DIL switch

Dual in line for setting e.g. the addressing and display type of response indicators.

Display sensitivity

Sensitivity level at which the unit starts detecting smoke particles (level 1). It is represented by means of a bar graph. See also "Response sensitivity"

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.

FDU

See "Fire detection unit"

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

Part of a fire detection system that monitors a suitable physical parameter continuously or at successive time intervals. The parameter is used to detect a fire in the monitoring area. See also "Fire detector (automatic)" and "Fire detector (non-automatic)".

Fire detector (automatic)

Detectors that detect and evaluate physical parameters used to create hazard alarms, e.g. point detectors, multi-point detectors, linear detectors; see also "Aspirating smoke detector".

Fire detector (non-automatic)

Detectors that must be operated directly or indirectly by persons.

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.

Fire site localisation

Accurate determination of the fire site when monitoring a maximum of five separate monitoring areas. See also "Alarm location display"

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 air flow is between a defined top and bottom value.

PIPE·GUARD

Comprehensive air flow monitoring package that reliably detects faults such as breakage or blockage of aspiration apertures.

Plug-and-play

Function that enables the aspirating smoke detector to be easily installed and commissioned. For standard applications, the detection unit is immediately ready for operation after installation in the device base.

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.

Response indicator

Optical remote display to indicate the alarm status of a concealed mounted aspirating smoke detector.

Response sensitivity

Sensitivity level at which a main alarm is triggered (all LEDs light up). See also "Display sensitivity"

Ring

See "Ring line"

Ring line

Detection line that is routed from the fire detection control panel via the individual fire detectors and back to the fire detection control panel to increase operational safety.

ROOM·IDENT

See "Fire site localisation"

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"

Temperature compensation

The air flow in the pipe is not disturbed by temperature changes.

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"

Two-line dependency

See "Dual detection dependency"

Appendix

See also

- "Project planning tables with air filters" [➔ 234]
- "Test record" [➔ 239]

Module		Sensitivity [% Lt/m]	Number of aspiration apertures							
			1	2	3	4	5	6	7	8
DM-TM-10		0.1	A	A	A	A	A	A	A	A
		0,2	A	A	A	A	A	A	B	B
		0,3	A	A	A	A	B	B	B	B
		0,4	A	A	A	B	B	B	B	C
	DM-TM-50	0,5	A	A	B	B	B	B	C	C
		0,6	A	A	B	B	B	C	C	C
		0,7	A	B	B	B	C	C	C	C
		0,8	A	B	B	C	C	C	C	C
		0,9	A	B	B	C	C	C	C	C
		1	A	B	B	C	C	C	C	C
		1,1	A	B	C	C	C	C	C	C
		1,2	A	B	C	C	C	C	C	C
		1,3	B	B	C	C	C	C	C	
		1,4	B	B	C	C	C	C		
		1,5	B	B	C	C	C	C		
		1,6	B	C	C	C	C	C		
		1,7	B	C	C	C	C			
		1,8	B	C	C	C	C			
		1,9	B	C	C	C	C			
		2	B							

Pipe shape	Fan voltage [V]	Number of aspiration apertures							
		1	2	3	4	5	6	7	8
without pipe accessories or with detector box or VSK									
I	≥ 9	40	40	40	40	40			
U	≥ 9	50	50	50	50	50	50	50	50
M	≥ 9	50	50	50	50	50	50	50	50
Double U	≥ 9	50	50	50	50	50	50	50	50
with *OXY-SENS®* and detector box or with condensate separator or with VSK and detector box									
I	≥ 9	40	40	40					
U	≥ 9	50	50	50	50	50	50		
M	≥ 9	50	50	50	50	50	50		
Double U	≥ 9	50	50	50	50	50	50	50	50

permissible total pipe length [m]

Classification of TITANUS *MICRO·SENS®* and *MICRO·SENS®*- LSNi
Project planning with air filter type LF-AD

Module	Sensitivity [% Lt/m]	Number of aspiration apertures							
		1	2	3	4	5	6	7	8
DM-TM-10	0.1	A	A	A	A	A	A	A	A
	0,2	A	A	A	A	A	B	B	B
	0,3	A	A	A	B	B	B	B	B
	0,4	A	A	B	B	B	B	C	C
DM-TM-50	0,5	A	A	B	B	B	C	C	C
	0,6	A	B	B	B	C	C	C	C
	0,7	A	B	B	C	C	C	C	C
	0,8	A	B	B	C	C	C	C	C
	0,9	A	B	C	C	C	C	C	C
	1	A	B	C	C	C	C	C	C
	1,1	B	B	C	C	C	C	C	
	1,2	B	B	C	C	C	C		
	1,3	B	C	C	C	C	C		
	1,4	B	C	C	C	C			
	1,5	B	C	C	C	C			
	1,6	B	C	C	C	C			
	1,7	B							
	1,8	B							
	1,9	B							
	2	B							

Pipe shape	Fan voltage [V]	Number of aspiration apertures							
		1	2	3	4	5	6	7	8
without pipe accessories or with detector box or VSK									
I	≥ 9	40	40	40	40	40			
U	≥ 9	50	50	50	50	50	50	50	50
M	≥ 9	50	50	50	50	50	50	50	50
Double U	≥ 9	50	50	50	50	50	50	50	50
with *OXY-SENS®* and detector box or with condensate separator or with VSK and detector box									
I	≥ 9	40	40	40					
U	≥ 9	50	50	50	50	50	50		
M	≥ 9	50	50	50	50	50	50		
Double U	≥ 9	50	50	50	50	50	50	50	50

permissible total pipe length [m]

Classification of TITANUS *MICRO·SENS®* and *MICRO·SENS®*- LSNi
Project planning with air filter type LF-AD

		Number of aspiration apertures							
Module	**Sensitivity [% Lt/m]**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
DM-TM-10	0.1	A	A	A	A	A	A	A	A
	0,2	A	A	A	A	B	B	B	B
	0,3	A	A	A	B	B	B	B	B
	0,4	A	A	B	B	B	B	C	C
DM-TM-50	0,5	A	B	B	B	C	C	C	C
	0,6	A	B	B	B	C	C	C	C
	0,7	A	B	B	C	C	C	C	C
	0,8	A	B	B	C	C	C	C	C
	0,9	A	B	C	C	C	C	C	C
	1	B	B	C	C	C	C	C	
	1,1	B	B	C	C	C	C	C	
	1,2	B	B	C	C	C	C		
	1,3	B	C	C	C	C	C		
	1,4	B	C	C	C	C			
	1,5	B	C	C	C	C			
	1,6	B							
	1,7	B							
	1,8	B							
	1,9	B							
	2	B							

		Number of aspiration apertures							
Pipe shape	**Fan voltage [V]**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
without pipe accessories or with detector box									
I	≥ 9	40	40	40	40	40			
U	≥ 9	50	50	50	50	50	50	50	50
M	≥ 9	50	50	50	50	50	50	50	50
Double U	≥ 9	50	50	50	50	50	50	50	50
with *OXY-SENS®* and detector box or with condensate separator or with VSK and detector box									
I	≥ 9	40	40	40					
U	≥ 9	50	50	50	50	50	50		
M	≥ 9	50	50	50	50	50	50		
Double U	≥ 9	50	50	50	50	50	50	50	50

permissible total pipe length [m]

Classification of TITANUS *MICRO·SENS®* and *MICRO·SENS®*- LSNi
Project planning with air filter type LF-AD-2

Module	Sensitivity [% Lt/m]	Number of aspiration apertures							
		1	2	3	4	5	6	7	8
DM-TM-10	0.1	A	A	A	A	A	A	A	A
	0,2	A	A	A	A	B	B	B	B
	0,3	A	A	B	B	B	B	C	C
	0,4	A	A	B	B	B	C	C	C
DM-TM-50	0,5	A	B	B	B	C	C	C	C
	0,6	A	B	B	C	C	C	C	C
	0,7	A	B	C	C	C	C	C	C
	0,8	A	B	C	C	C	C	C	C
	0,9	B	B	C	C	C	C	C	
	1	B	B	C	C	C	C		
	1,1	B	C	C	C	C	C		
	1,2	B	C	C	C	C			
	1,3	B	C	C	C	C			
	1,4	B							
	1,5	B							
	1,6	B							
	1,7	B							
	1,8	B							
	1,9	B							
	2	B							

Pipe shape	Fan voltage [V]	Number of aspiration apertures							
		1	2	3	4	5	6	7	8
without pipe accessories or with detector box									
I	≥ 9	40	40	40	40	40			
U	≥ 9	50	50	50	50	50	50	50	50
M	≥ 9	50	50	50	50	50	50	50	50
Double U	≥ 9	50	50	50	50	50	50	50	50
with *OXY-SENS®* and detector box or with condensate separator or with VSK and detector box									
I	≥ 9	40	40	40					
U	≥ 9	50	50	50	50	50	50		
M	≥ 9	50	50	50	50	50	50		
Double U	≥ 9	50	50	50	50	50	50	50	50

permissible total pipe length [m]

Classification of TITANUS *MICRO·SENS®* and *MICRO·SENS®*- LSNi
Project planning with air filter type LF-AD-2

Module	Sensitivity [% Lt/m]	Number of aspiration apertures							
		1	2	3	4	5	6	7	8
DM-TM-10	0.1	A	B	B	B	C	C	C	C
DM-TM-10	0,2	B	B	C	C	C	C		
DM-TM-10	0,3	B	C	C	C				
DM-TM-10	0,4	B	C	C					
DM-TM-50	0,5	C	C						
DM-TM-50	0,6	C	C						
DM-TM-50	0,7	C							
DM-TM-50	0,8	C							
DM-TM-50	0,9	C							
DM-TM-50	1	C							
DM-TM-50	1,1	C							
DM-TM-50	1,2	C							
DM-TM-50	1,3	C							
DM-TM-50	1,4								
DM-TM-50	1,5								
DM-TM-50	1,6								
DM-TM-50	1,7								
DM-TM-50	1,8								
DM-TM-50	1,9								
DM-TM-50	2								

Pipe shape	Fan voltage [V]	Number of aspiration apertures							
		1	2	3	4	5	6	7	8
without additional accessories									
I	≥ 9	40	40	40	40	40			
U	≥ 9	50	50	50	50	50	50		
M	≥ 9	50	50	50	50	50	50		
Double U	≥ 9	50	50	50	50	50	50	50	50
with detector box and/or VSK and/or LF-AD									
I	≥ 9	40	40	40					
U	≥ 9	50	50	50	50	50	50		
M	≥ 9	50	50	50	50	50	50		
Double U	≥ 9	50	50	50	50	50	50	50	50

permissible total pipe length [m]

Test record TITANUS *MICRO·SENS* ®

		Device identification				
Device number						
Basic device serial number						
Date						
		Measuring and adjustment values				
Commissioning						
Visual inspection	(✓/ –)					
Air flow	[m/s]					
Temperature	[°C]					
Air pressure-dependent calibration	(yes/no)					
Air pressure-independent calibration	(yes/no)					
Detection unit and alarm transmission	(✓/ –)					
Air flow monitoring and fault signal transmission	(✓/ –)					
Negative pressure	[Pa]					
Diagnostic software settings						
Sensitivity (main alarm)	[%/m]					
Alarm delay	[s]					
Air flow range	[%]					
Fault warning delay	[min/s]					
Pre-alarm threshold	[%]					
Saving fault activated	(yes/no)					
Dynamic air flow activated	(yes/no)					
***ROOM·IDENT* activated**	(yes/no)					
***LOGIC·SENS* activated**	(yes/no)					
Main alarm according to *ROOM·IDENT* activated	(yes/no)					
Height above sea level 1)	[m]					
Air pressure 1)	[hPa]					
Fan voltage	[V]					
Device log archived (diagnostic software)	(✓/ –)					
Breakage fault						
LED flashes	(✓/ –)					
Relay drops off after delay time	(✓/ –)					
Signal transmission to fire detection control panel	(✓/ –)					
Cause rectified, LED off	(✓/ –)					
Relay picks up after threshold is undershot	(✓/ –)					
Cause rectified, LED saved	(✓/ –)					
Relay remains dropped for min. 100 s	(✓/ –)					
Blockage fault						
LED flashes	(✓/ –)					
Relay drops off after delay time	(✓/ –)					
Signal transmission to fire detection control panel	(✓/ –)					
Cause rectified, LED off	(✓/ –)					
Relay picks up after threshold is undershot	(✓/ –)					
Cause rectified, LED saved	(✓/ –)					
Relay remains dropped for min. 100 s	(✓/ –)					
Main alarm						
LED flashes	(✓/ –)					
Relay picks up after delay time	(✓/ –)					
Signal transmission to fire detection control panel	(✓/ –)					
LED saved	(✓/ –)					
Relay saved	(✓/ –)					
Fire site localisation (*ROOM·IDENT*)						
Purge time	[s]					
Voltage of the purge fan	[V]					
Voltage of the aspiration fan	[V]					
LED localisation continuous aspiration aperture A or R1	(✓/ –) | [s]					
LED localisation continuous aspiration aperture B or R2	(✓/ –) | [s]					
LED localisation continuous aspiration aperture C or R3	(✓/ –) | [s]					
LED localisation continuous aspiration aperture D or R4	(✓/ –) | [s]					
LED localisation continuous aspiration aperture E or R5	(✓/ –) | [s]					
Response indicators						
Aspiration aperture A	(✓/ –)					
Aspiration aperture B	(✓/ –)					
Aspiration aperture C	(✓/ –)					
Aspiration aperture D	(✓/ –)					
Aspiration aperture E	(✓/ –)					

Key

✓ **O.K.**

– **not O.K.**

1) **In case of air pressure-dependent calibration**

Issuer: ………………………...…………………… Signature: ………………