Air sampling smoke detection system

Fire Detection

TITANUS *MICRO·SENS*®

Technical Manual

WAGNER®

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Item Number 69-30-0525

Edition 06/13

Supersedes 01/09

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1 General

1.1 Introduction

This manual is for installers of air sampling smoke detection systems, in particular for engineers, technicians, and fitters etc. who have technical knowledge in the field of smoke detection technology but who are possibly working with this device for the first time.

For damage and faults resulting from the non-observance of this manual WAGNER Group GmbH, called WAGNER in the following, does not assume liability.

This manual refers to the air sampling smoke detection systems TITANUS *MICRO·SENS*®. These systems may only be used for early and very early smoke detection.

1.2 Safety information

The following symbols identify parts of the text in this manual which re-quire special attention so that damage can be avoided and so that operations can run smoothly.

⚠ WARNING

This symbol warns against actions,
which might cause damage if it is ignored.

NOTICE

This symbol warns against actions,
which could cause operational breakdowns if it is ignored.

TIP

Operational improvements can be achieved if this symbol is observed.

1.3 Guarantee

The manual is subject to technical modification without notice and makes no claim to completeness.

In principle our “Terms and Conditions of Supply and Assembly” apply. No claims under the guarantee or for liability can be made for damage to persons or property if they are based on one or more of the following causes:

- insufficient observance of the instructions about the design, assembly of the aspirating smoke detection system, assembly of the pipe system, commissioning and maintenance
- use of the aspirating smoke detection system in contravention of the intended use
- insufficient monitoring of working parts
- improperly executed repairs
- unauthorised constructional changes to the aspirating smoke detection system
- force majeure

1.4 Copyright

1.5 Packaging

The individual air sampling smoke detection systems are packed in accordance with the anticipated transport conditions. Exclusively environ-mentally friendly materials were used for the packaging.

The packaging is intended to protect the air sampling smoke detection system from being damaged until it is installed. For that reason, it should only be removed from its packaging shortly before installation.

The packaging material is to be disposed of in accordance with applicable statutory provisions and local regulations.

- Dispose of the packaging materials in an environmentally friendly manner.
- Observe local disposal regulations.

NOTICE

Packaging materials are valuable raw materials and in many cases can be re-used or expediently processed and recycled. Improper disposal of packaging materials can harm the environment.

1.6 Disposal

If no take-back or disposal agreements have been made, disassembled components are to be taken for recycling:

- Take metal parts for scrapping.
- Take plastic parts to be recycled.
- Sort the remaining components by material quality and dispose of them.
- Give batteries to municipal collecting points,
  or send them back to WAGNER Group GmbH.

2 Product Description

2.1 Characteristics of the TITANUS *MICRO·SENS*® aspirating smoke detection system

TITANUS *MICRO·SENS*® is the latest generation of the renowned WAGNER smoke detection systems. The *MICRO·SENS*® can be used for room and equipment protection and for monitoring air conditioning cabinets or air conditioning ducts. Through the innovative ROOM•IDENT process, the system can also locate the site of the fire.

Locating the site of the fire

The unique **ROOM·IDENT** technology makes it possible to determine the location of a fire when monitoring up to 5 separate areas. So that the emergency services can act as quickly as possible, the seat of the fire can be made known, for example, via reaction indicators which are allocated to the various monitoring areas.

Sensitivity

The *MICRO·SENS*® reaction threshold can be set at between 0.1 %/m and 2 %/m light obscuration in steps of 0.1%/m. Using a smoke level indicator, an indicator sensitivity of between 0.05 %/m and 0.2 %/m light obscuration can be achieved. The **HIGH-POWER-LIGHT-SOURCE** light source technology used in TITANUS® systems guarantees homogeneous reaction behavior from different types of fire. The device can provide 2 alarm thresholds (pre alarm and alarm). The pre-alarm threshold is adjustable from 10 - 80 % of the fire alarm threshold.

Intelligent signal processing

THE TITANUS *MICRO·SENS*® has LOGIC·*SENS* intelligent signal processing for avoiding false alarms. Perfected algorithms based on numerous fire trials and decades of experience ensure a high level of safety in differentiating between a false status and a fire event.

Safe airflow monitoring

PIPE·GUARD, the comprehensive package for airflow monitoring, recognises safe breakdowns such as pipe breakages or blocked detection apertures Using dynamic airflow monitoring, the TITANUS *MICRO·SENS*® reacts even to small, quick changes in the airflow and thus makes an important contribution to sabotage safety.

Airflow monitoring is temperature-compensated and can be set to be air pressure-dependent.

Plug and Play Installation and commissioning of the TITANUS *MICRO·SENS*® are simple with the Plug & Play function.
The device base is pre-assembled on site. By pre-setting the detection unit for standard applications, the TITANUS *MICRO·SENS*® is operational immediately after it is inserted in the device base.

Redundancy ventilators For maximum safety, the TITANUS *MICRO·SENS*® can be fitted with redundancy ventilators as an option. During operation of the device with the redundancy ventilator, ROOM•IDENT is not possible.

Network capacity Fitted with a network card, several TITANUS *MICRO·SENS*® devices can be linked together in an Ethernet network. From a central point the user can, for example, via Visu*LAN*T® monitor the whole plant for smoke levels, airflow values etc. In addition, the TITANUS *MICRO·SENS*® can be integrated via the so-called OPC server into existing hazard and building management systems.

Potential free contacts The TITANUS *MICRO·SENS*® has one potential free contact each for alarm and fault So the smoke detection system can be switched to collective and addressable (Via the address module of the particular FAS) recording lines of any central fire alarm systems (FAS). A relay card (optional) can be connected to the TITANUS *MICRO·SENS*® in order to connect the potential-free contact for the pre-alarm to a detector line of a CFDU.

Diagnostics With the DIAG 3 diagnostics device, there is a system available for commissioning, inspection and servicing which makes it possible to configure the device quickly and easily and contain faults. For diagnostics purposes events are stored in the TITANUS *MICRO·SENS*® for 72 hours.

Designing detection points The monitoring surfaces of the detection point type for the TITANUS *MICRO·SENS*® are to be set to match the point-specific smoke alarms. The detection points can thus be designed similar to point-specific smoke alarms in accordance with the particular national regulations.

Patented detection points Wagner's patented detection reducing films, clips and banderols make assembly simple and comfortable and avoid whistling operational noises. An even inflow of air through all the apertures is achieved with a stepped aperture diameter. These are fitted with rapidly checkable identification.

Extensive pipe accessories Extensive range of accessories makes it possible to use the TITANUS® aspirating smoke detection system even under the most difficult of conditions. Products from various types of air filter from condensate traps to blow through devices raise the serviceable life under extreme dusty, humid and excessively cold environmental conditions.

2.2 Areas of Application

The TITANUS *MICRO·SENS*® air sampling smoke detection system is a fire alarm system for the protection of rooms, equipment and air conditioning ducts.

Principle Air samples for a monitoring area are taken through the draw-off holes in a pipe system and fed to the detection unit.

The principle is particularly suitable for areas in which point type alarms are not used or can only be used to a limited extent.

This involves areas in particular …

- where is a high risk of fire,
- where high detection sensitivity is required,
- where false alarms must be avoided,
- which are difficult to access and in which it is difficult to mount and/or inspect point type alarms,
- where interrupting operations for inspection and servicing must be avoided, • which are air conditioned,
- where the height is greater than is allowed for point type alarms,
- where for aesthetic reasons point type alarms are not wanted,
- where there are strong electromagnetic fields,
- which are subjected to high or low temperatures,
- which have a heavy dust load,
- where the fire alarm equipment must be protected against vandalism or sabotage.

Room protection The TITANUS *MICRO·SENS*® is suitable, for example, for monitoring rooms such as, e.g.

- double floors, intermediate ceilings,
- tunnels, ducts, cavities not easily accessible,
- warehouses, deep freeze stores, lift shafts,
- museums, cultural establishments,
- hotel rooms, hospital rooms, offices, prison cells, railway compartments.

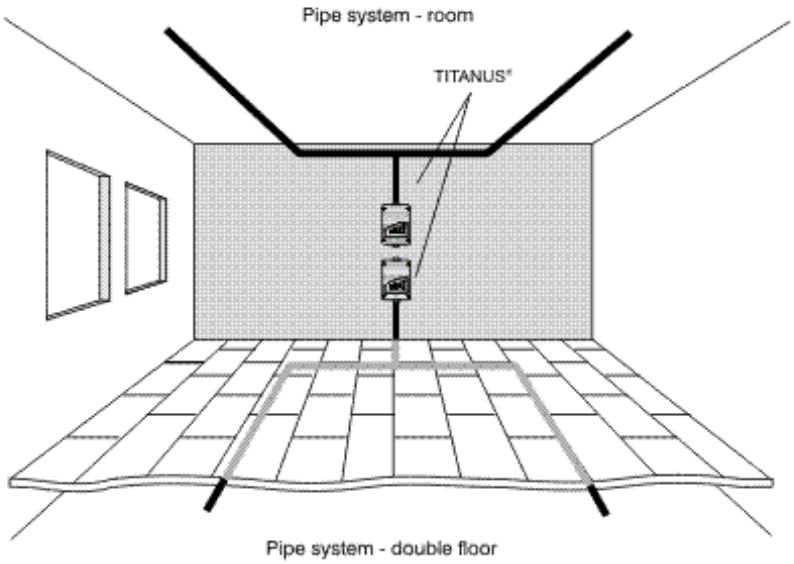


Figure 1: Principle of Room Monitoring with TITANUS MICRO•SENS® Smoke Detection System

Room monitoring with air conditioning

Room monitoring takes place...

- in server rooms with air conditioning,
- in ventilation ducts,
- in double floors, intermediate ceilings,
- in IT rooms, E-distribution rooms, transformer cells,
- for air conditioning cabinets (see Fig. 1.2),
- at bypass of air conditioning ducts.

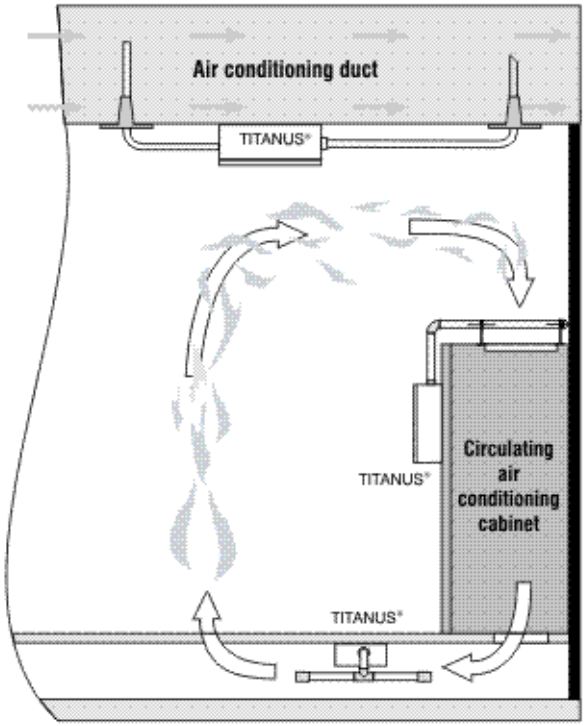


Figure 2: Monitoring options for a circulating air conditioning cabinet or an air conditioning duct (principle representation).

The TITANUS® aspirating smoke detection system can also be used for earliest detection of fires in rooms with special air conditioning.
Its high level of sensitivity means goods and equipment can be reliably monitored. The TITANUS® is therefore especially suitable for areas of application,

- in which because of concentrated high values early intervention is necessary.
- in which equipment must always be operational.
- in which highly sensitive detection is required (e.g. in areas where, because of built-in filter elements, there is a low level of smoke particles in the air).
- in which there are high rates of air change.

Device protection unventilated and force-ventilated equipment / cabinets such as, e.g.

- distribution cabinets, switching cabinets
- telephone switching equipment
- measuring, control and regulation equipment

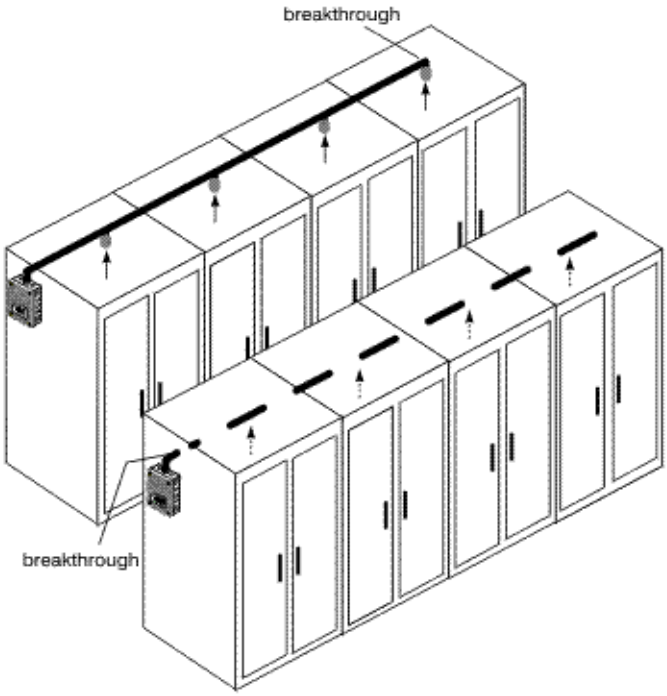


Figure 3: Equipment monitoring principle with air sampling smoke detection system

3 Technical Description

3.1 System Description

The TITANUS *MICRO·SENS*® aspirating smoke detection system comprises a detection unit, device base and pipe system.

The most important components of the TITANUS *MICRO·SENS*® are the sensitive detection unit for picking up smoke aerosols and the aspiration unit with integrated air flow sensor for transporting air samples and for monitoring the pipe system for breaks and blockages.

The pipe system consists essentially of pipe and fittings, in either PVC or ABS plastics.

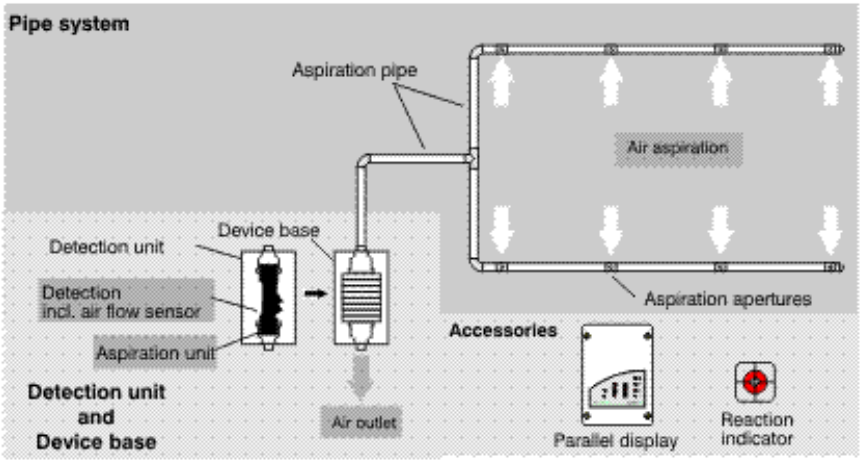


Figure 4: Air sampling smoke detection system TITANUS MICRO•SENS®

To guarantee safe operation even under the most difficult conditions (e.g. recycling area), there are extensive accessories available such as, e.g., an integrated air filter, various external air filters or the blow through device. In very cold areas, a deep freeze version of the TITANUS *MICRO·SENS*® can be used. A redundancy ventilator can be used for applications where there are particular safety requirements.

When fitted to monitor several monitoring areas and blind spots, there are reaction indicators for rapid identification of the seat of the fire and an offset parallel display as a status indicator for the detection unit.

3.1.1 Function

Air samples are taken from the area to be monitored via a pipe system with defined aspiration apertures, using the TITANUS *MICRO·SENS*® aspiration unit and these are sent to the sensitive detection unit (see the following figure).

Locating the site of the fire It is possible to locate the site of the fire using ROOM·IDENT with an I-pipe design for a maximum 5 rooms or pieces of equipment. The operating principle incorporates four phases:

Phase 1 During operating conditions air samples are taken from the pipes covering the various rooms. The samples are taken via fan to the detector unit and analysed for possible smoke particles.

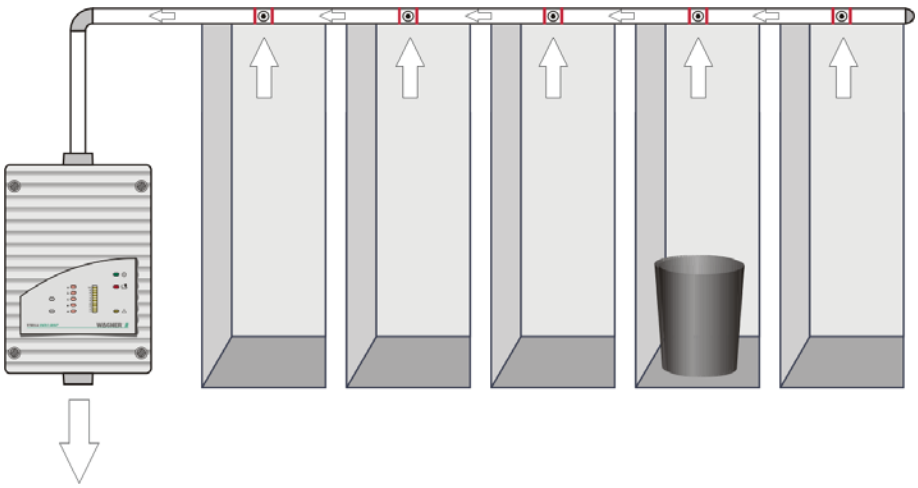


Figure 5: Phase 1 ROOM·IDENT standard operation

Phase 2 The system will activate an alarm once it has reached an alarm threshold level due to the rise of typical smoke aerosols. If „Fire alarm after ROOM·IDENT“ is enabled, then the localisation process will start after an adjustable Action - Alarm threshold. The system will activate an alarm once the localisation is completed.

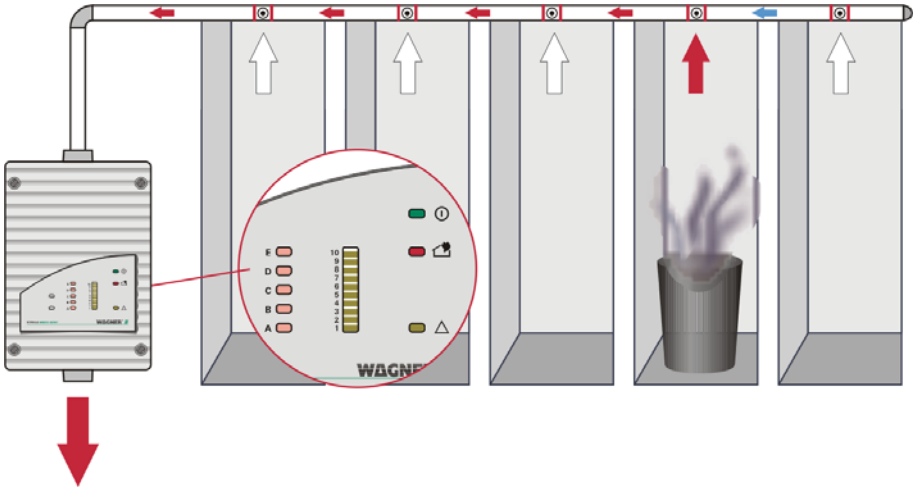


Figure 6: Phase 2 ROOM·IDENT earliest fire detection

Phase 3 In case alarm or at function „Fire alarm after ROOM·IDENT“ once the system has reached the adjustable action the aspiration fan is switched off and a second fan is switched on, blowing out the smoke particles in the opposite direction.

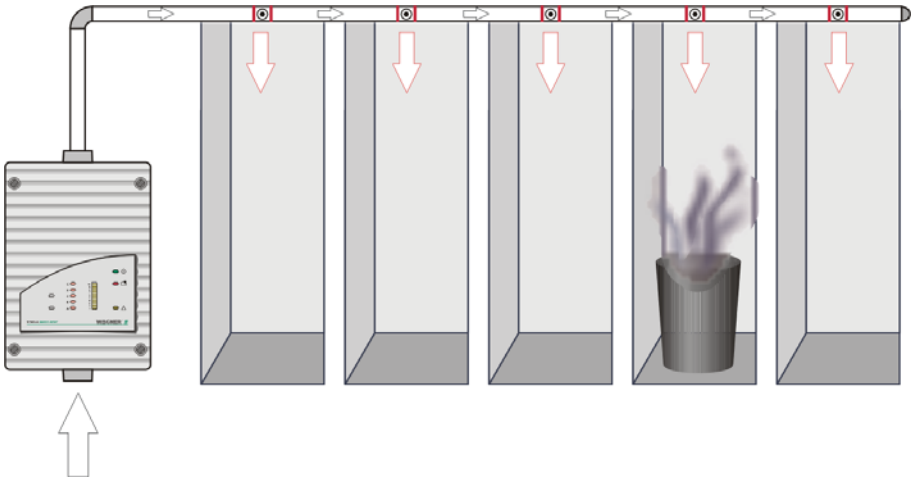


Figure 7: Phase 3 ROOM·IDENT blow through

Phase 4 After the pipe system has been freed from smoke, the airflow is reversed once again and the time it takes for the smoke to reach the detector unit is measured. With this time value the exact location of the smoke source is given and shows which room is affected.

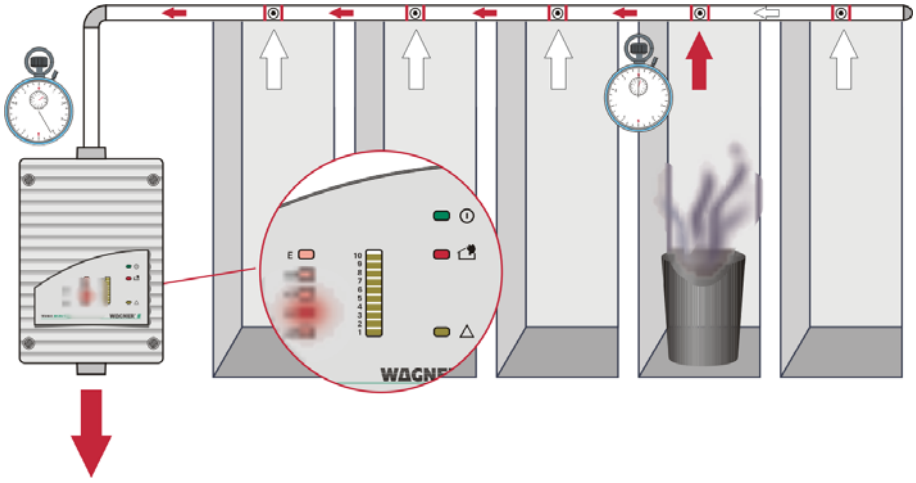


Figure 8: Phase 4 ROOM·IDENT localisation

The alarm is indicated on the TITANUS *MICRO·SENS*® itself, indicated within the monitored area via an optical external alarm indicator. The System with enabled option „Fire alarm after ROOM·IDENT“ will now activate an alarm

Detection Depending on the reaction sensitivity of the detection unit used (which can be 0.1 %/m to 2 %/m light obscuration or 0.5 %/m to 2 %/m light obscuration), the TITANUS *MICRO·SENS*® triggers the main alarm once the corresponding light turbidity is reached. The sensitivity can be set in steps of 0.1 %/m. The alarm is shown on the device via the alarm display and forwarded to a connected fire alarm system (FAS).
By changing the delay time with the diagnosis tool, the forwarding of alarms and faults can be set.
The intelligent LOGIC·*SENS* signal processing device serves to blank out fire-like false alarms and ensures high false alarm safety.

Airflow monitoring An airflow sensor checks the connected pipe system for breaks and blockages.
Depending on the design of the pipe system and the setting on the air-flow sensor, the blockage of just one aspiration aperture can be picked up. The airflow monitoring is temperature-compensated and can be made air pressure-dependent.
At the end of the adjustable delay time, the fault is shown on the smoke detection system and a corresponding message is forwarded to the central fire

alarm point via a contact. The monitoring windows can be adjusted to the environmental conditions.
The principle of the airflow sensor signalling process can be seen in the following figure.

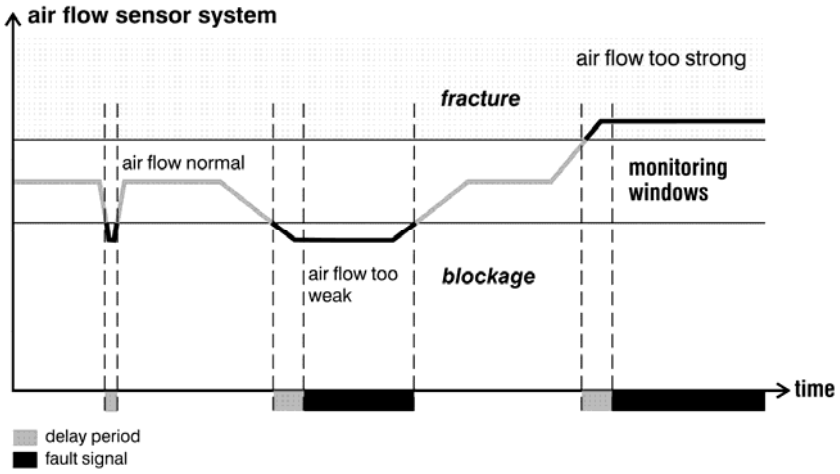


Figure 9: Example signal pattern in the airflow sensor during faults

Device monitoring The detection unit is monitored for dirt and signal fault. Any fault which occurs is displayed at the TITANUS *MICRO·SENS*® and can be forwarded to the FAS via a contact.

Airflow adjustment Airflow adjustment on the TITANUS *MICRO·SENS*® is fully automatic when the detection unit is inserted in the device base, if previously the Jumper X4 had been changed. This plug & play reduces the time needed for commissioning to a minimum. It is also possible, however, to adjust the airflow using the DIAG 3 diagnosis tool. This means the initialisation phase can be carried out in an air pressure-dependent or air pressure-independent manner.

Resetting through FAS A fault message is reset via the connected FAS. If whilst the TITANUS *MICRO·SENS*® is operating an FAS alarm and fault [messages] have to be reset at the same time as the control line, then as an option a reset board can be inserted in a separate housing. The reset board can only be placed in a separate housing and if the idle current on the line is between 5 mA and 50 mA. The line must be switched to dead for resetting. The effect is that when there is any short-term switching off of the line voltage, the alarm and fault messages on the TITANUS *MICRO·SENS*® are automatically reset.

3.2 TITANUS *MICRO·SENS®* and Accessories

3.2.1 Overview

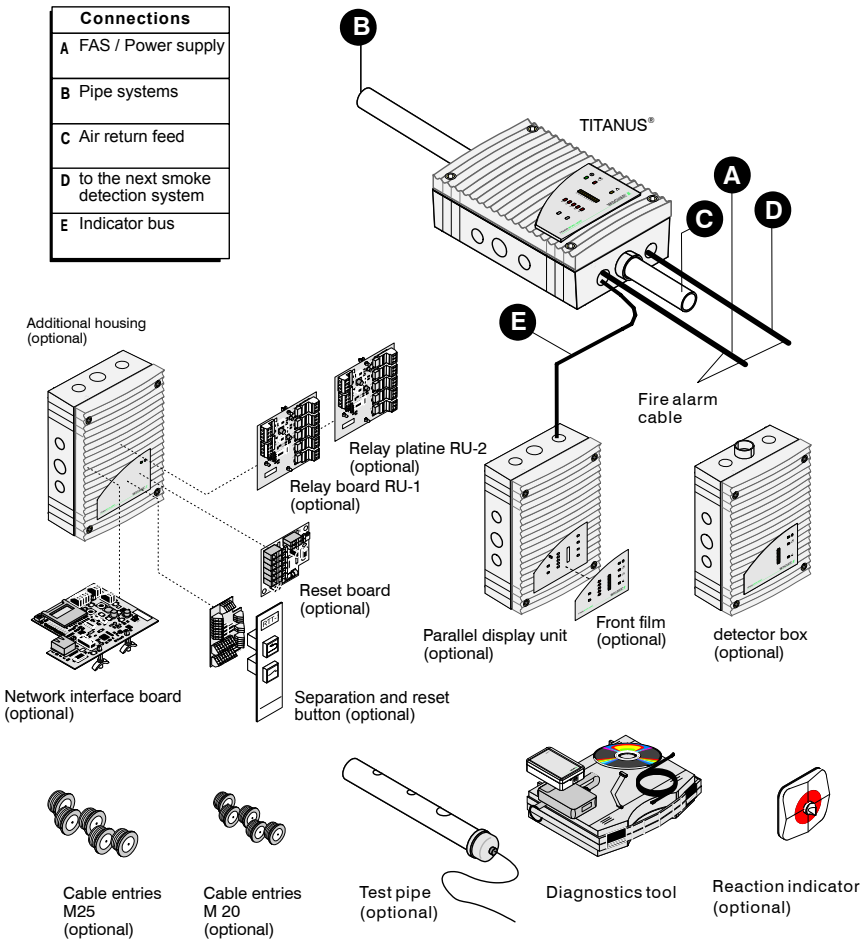


Figure 10: Overview TITANUS MICRO·SENS®

The components shown in the figure are optional.

3.2.2 Air sampling smoke detection system

The TITANUS *MICRO·SENS*® air sampling smoke detection system comprises the following components, device base, detection unit and pipe system:

Device base

- Connections for 25 mm aspiration pipe (in and return)
- Cable feeds
- Potential free contacts for connection to a FAS

Detection unit

- Sensitive detection using the latest technology according to the principle of optical scattered light indicators with integrated airflow monitoring
- Aspiration unit with improved air feed
- Optical displays for smoke levels, fire alarm, action alarm, fault, operation and indication of the location of the seat of fire
- Infrared interface for diagnostics

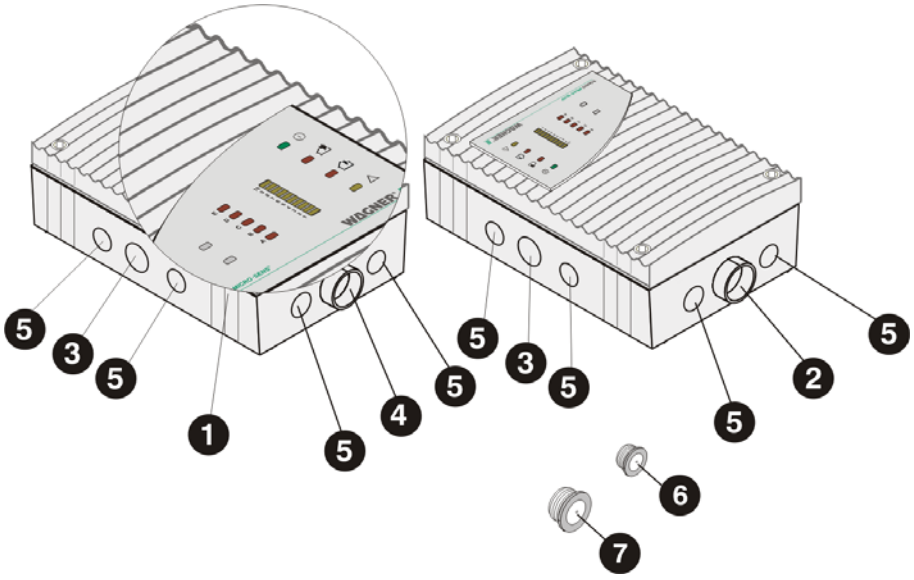


Figure 11: TITANUS MICRO·SENS® displays and connections

Figure 12: TITANUS MICRO·SENS® display variant with smoke levels and fire location

TITANUS *MICRO·SENS®*

Numbers	Function	Explanation
1	Smoke level display 1 to 10 (10 yellow LEDs) (*)	Current smoke level
	Operation (green LED)	Operation display
	Fire alarm (red LED)	Smoke level (where fire alarm threshold is set)
	Action alarm (red LED) (*)	Smoke level (Value as per fire alarm threshold 10 – 80 % adjustable)
	Fault (yellow LED)	Pipe system fault or ventilator breakdown or detector module fault
	Locating the seat of the fire A – E (5 red LEDs) (*)	Locating the seat of fire
	Infrared interface	Commissioning and fault diagnostics
2	Air sampling pipe connection	for Ø 25 mm-pipe system
3	Cable feed, fire alarm cable for switching on FAS and/or power supply (in/out)	2 x M 25
4	Air return pipe connection	for air return
5	Cable feed fire alarm cable	8 x M 20
6	Cable entries (small)	2 x M 20 for cable with Ø of 1 to 13 mm
7	Cable entries (large)	1 x M 25 for cable with Ø 1 to 18 mm

(* optional)

3.2.3 Detector box

External detector boxes can be used in the pipe system in connection with the TITANUS *MICRO·SENS*® smoke detection system.

Use The detector box is used …

- to create a two-detector or two-line dependency,
- to be able to locate the branch affected by smoke in multi-branch pipe systems and/or
- to raise the reaction sensitivity in multi-branch pipe systems

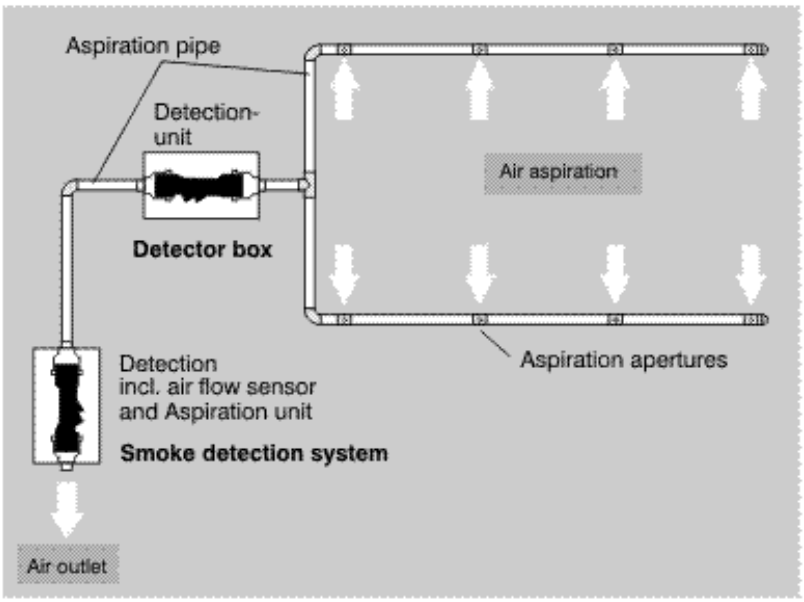


Figure 13: TITANUS MICRO·SENS® function principle with detector box for two-detector or two-line dependency

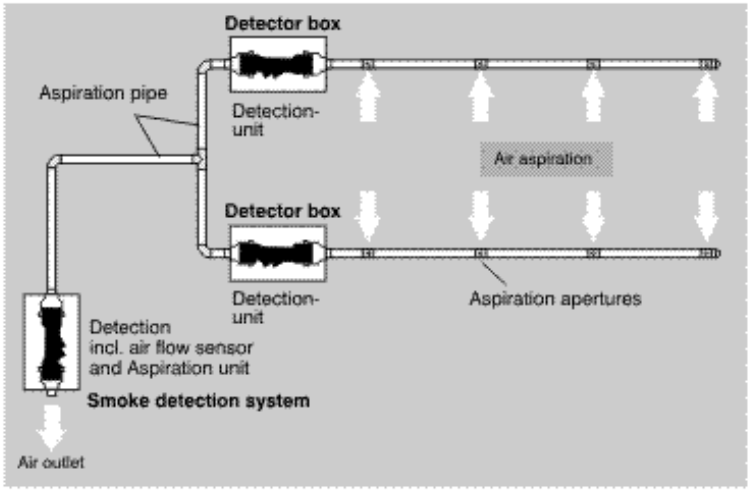


Figure 14: TITANUS MICRO·SENS® function principle with detector box for locating and raising reaction sensitivity

The TITANUS *MICRO·SENS®* detector box comprises the following components:

Device base

- Connections for 25 mm aspiration pipe (in and out)
- Cable feeds
- Potential-free contacts for connection to a FAS

Detection unit

- Sensitive detection with the latest technology according to the principle of optical scattered light detectors
- Optical displays for smoke level, fire alarm, action alarm, fault, operation
- Infrared interface for diagnostics

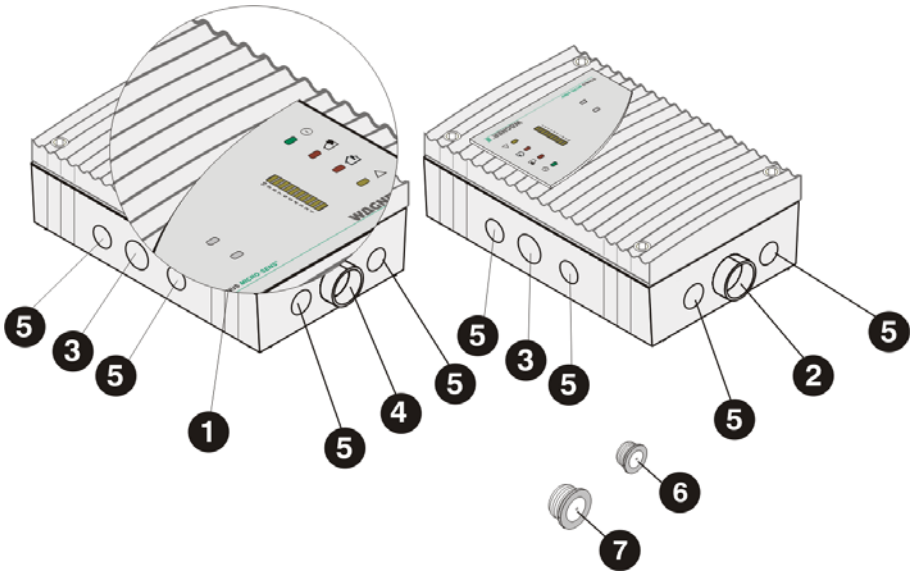


Figure 15: Detector box displays and connections

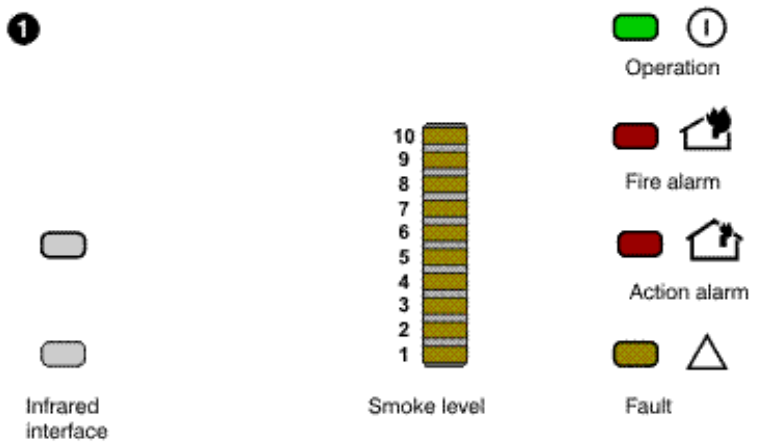


Figure 16: Display variant, detector box with smoke level and action alarm

Detector box

Numbers	Function	Explanation
1	Smoke level display 1 to 10 (10 yellow LEDs) (*)	Current smoke level
	Operation (green LED)	Operation display
	Fire alarm (red LED)	Smoke level (where fire alarm threshold is set)
	Action alarm (red LED) (*)	Smoke level (Value as per fire alarm threshold 10 – 80 % adjustable)
	Fault (yellow LED)	Pipe system fault or ventila-tor breakdown or detector module fault
	Infrared interface	Commissioning and fault diagnostics
2	Air sampling pipe connection	for ø 25 mm-pipe system
3	Cable feed, fire alarm cable for switching on FAS and/or power supply (in/out)	2 x M 25
5	Cable feed fire alarm cable	5 x M 20
6	Cable entries (small)	1 x M 20 for cable with ø of 8 to 12 mm
7	Cable entries (large)	2 x M 25 for cable with ø of 9 to 14 mm (expandable to ø 14 to 18 mm)

(* optional)

3.2.4 Diagnostics tool

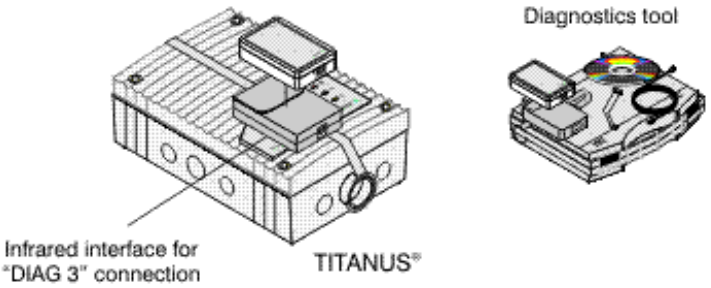


Figure 17: Diagnostics tool for inputting and reading off device data

Using the DIAG 3 diagnosis tool, the device configuration for the TITANUS® can be changed during commissioning. For maintenance and servicing, there is the option with the diagnosis software to display the stored and current device status and error messages from the TITANUS® on a PC or laptop. For the data transfer to the diagnostics equipment the infrared interface of the TITANUS® is used. There is a USB cable for transferring data from the diagnostics equipment to the PC/laptop connection.

TIP
It is recommended that the commissioning statuses are read out, checked and recorded.

Diagnosis messages can be deleted at any time using the DIAG 3 diagnosis tool. If they are not deleted, the messages are stored in the TITANUS® for 72 hours. This allows for evaluation of short, sporadic faults (e.g. in changed operating conditions).

3.2.5 Network Modules

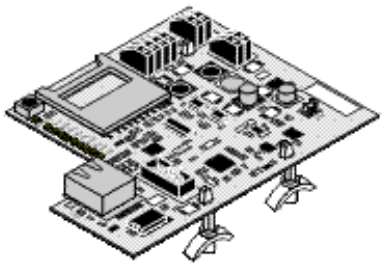


Figure 18: Network card NU-2

The log data and status information of all TITANUS® air sampling smoke detection systems can be stored with the TITANUS® network card. For applications in cold storage, special network modules for the TITANUS® available.

Variants The TITANUS® network module is available in various configurations for the respective areas:

Type	Application				
	TCP/IP	SNMP	Webserver	Datenlogger	Deep freezer
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

TCP/IP With the help of this standard transfer protocol, the TITANUS® air sampling smoke detection system can be connected to the risk management system (e.g Visu*LAN*). All status information, as well as event and log data are available as to the risk management.

SNMP The status information and log data stored in network cards on all TITANUS® air sampling smoke detection systems can be accessed via the SNMP protocol. By installing SNMP management software, customers can constantly visualise and monitor the TITANUS® air sampling smoke detection systems. 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 SNMP-Traps.

Data logger The integrated data logger is used to record event data (alerts and faults) and log data (smoke level, air flow, air flow temperature, detection status, temperature sensors) from TITANUS® air sampling smoke detection system. The event and log data are saved on a memory card at pre-defined logging

intervals of 1-60 seconds. The logged data saved can be analysed in the TITANUS® DataView and TITANUS® EventView software programs supplied.

Web server For network modules with embedded web server, it is possible to display current data and status information device specific on a predefined display panel and is easily accessible via a standard Web browser. The benefit for users is that it is both convenient and easy to use. After successful setup, the information is available immediately without any special network installation required. A special setup of the Web server is not necessary.

Multi-application The TITANUS® network card has four TCP/IP channels that support multi-application operation. Four TCP/IP applications can communicate simultaneously with a network card and additional data logger and SNMP data can be accessed.

NOTICE

When multi-application mode is used, this can cause delayed Website loading in the Web browser.

Write protection Write protection can be activated on the network board via the jumper to protect parameter settings. Once successfully set up, network settings can be protected against overwrite.

3.2.6 Remote displays

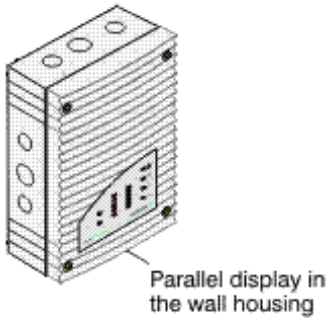


Figure 19: Remote display for wall mounting

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

A remote display can be connected up to a distance of 1000 m. If a second remote display [sic] is connected behind the first one, this can in turn again be 1000 m from the first one. This is possible as each remote display is also a repeater.

The power supply for small distances is direct through TITANUS *MICRO·SENS*®, and for longer distances via an external supply (see Chapter design "Power Supply Calculation").

3.2.7 Reaction indicator

Figure 20: Reaction indicator for locating the site of a fire

When the TITANUS *MICRO·SENS*® is used with fire location, up to 5 addressable reaction indicators can be used via the indicator bus.
The r eaction indicator can be connected up to a distance of 1000 m.

3.3 Pipe system

3.3.1 Overview

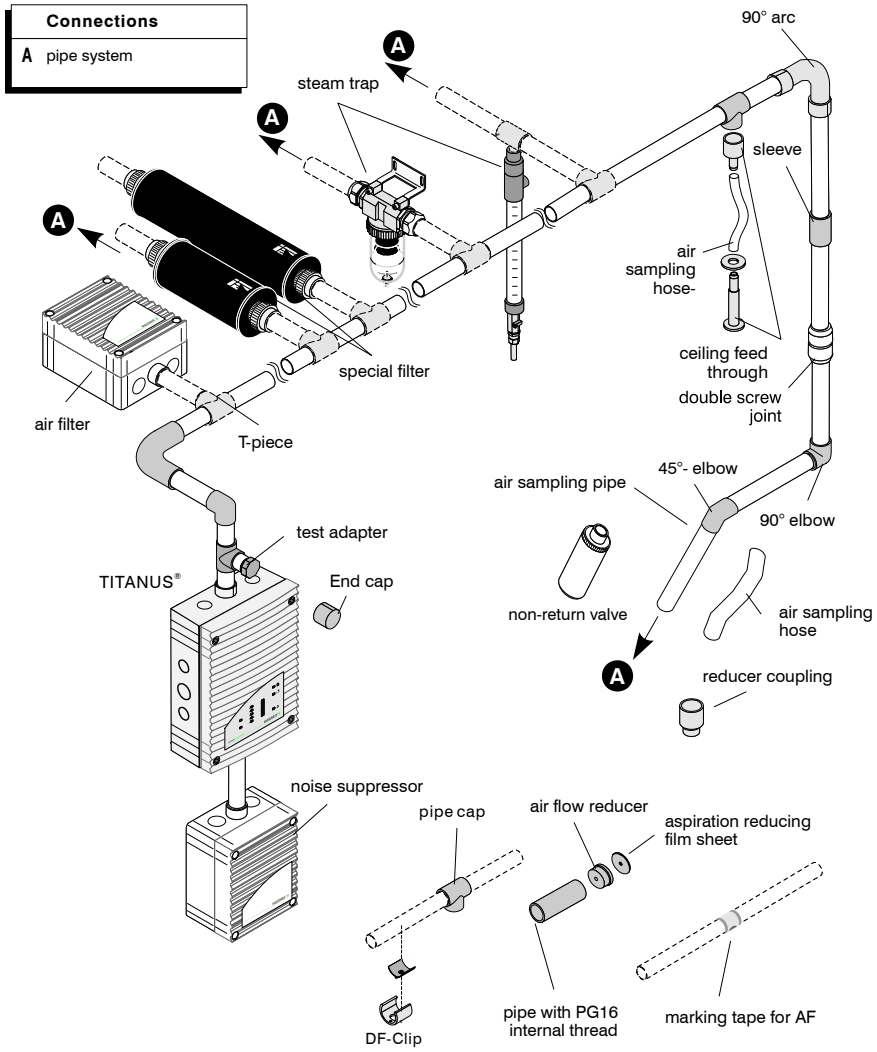


Figure 21: Components of the pipe system for smoke detection systems

The accessories shown in the figure are to be chosen for the particular individual case and can be used in combination.

Free blow device In areas in which there is expected to be an increased occurrence of dust particles or ice formation, blowing through of the aspiration pipe system and aspiration apertures may be necessary. Figures each show the components of a manual and an automatic blowing-out system. Depending on the fre-

quency of blockages, the blow-throng process can be undertaken manually or automatically.

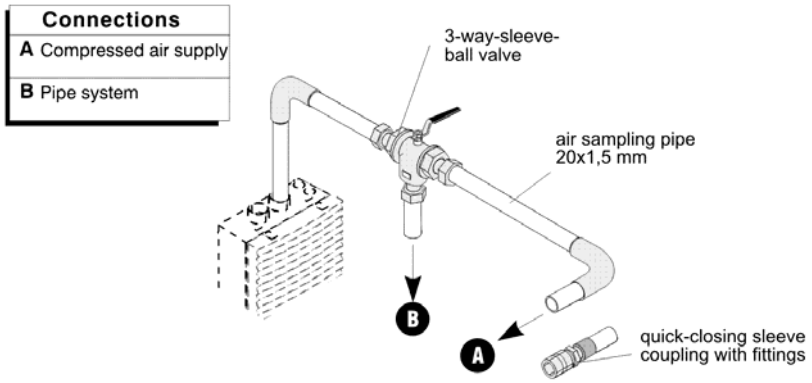


Figure 22: Components of the manual blowing-out system

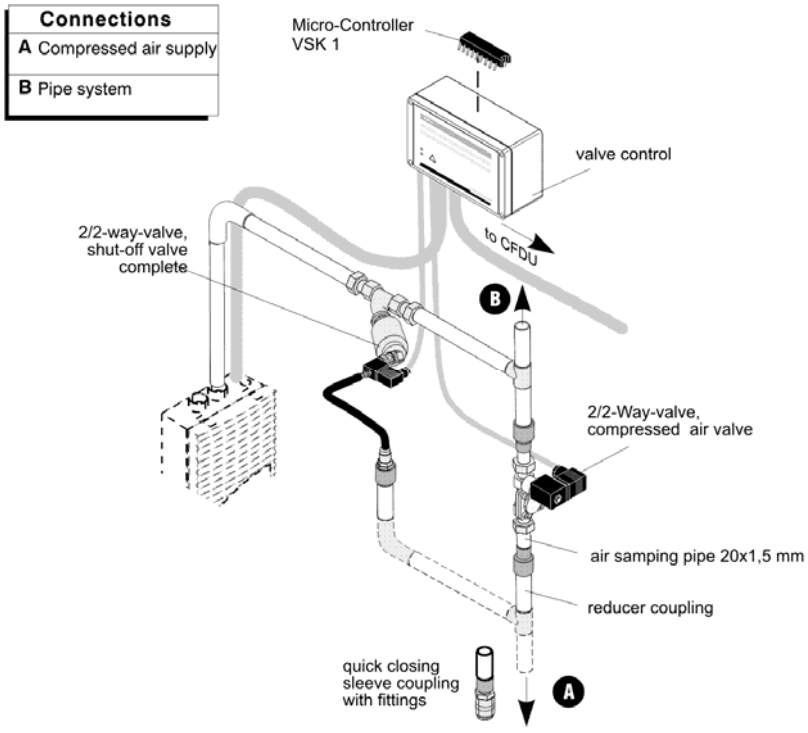


Figure 23: Components of the automatic blowing-out system

3.3.2 Aspiration apertures for room monitoring

3.3.2.1 Aspiration reduction films

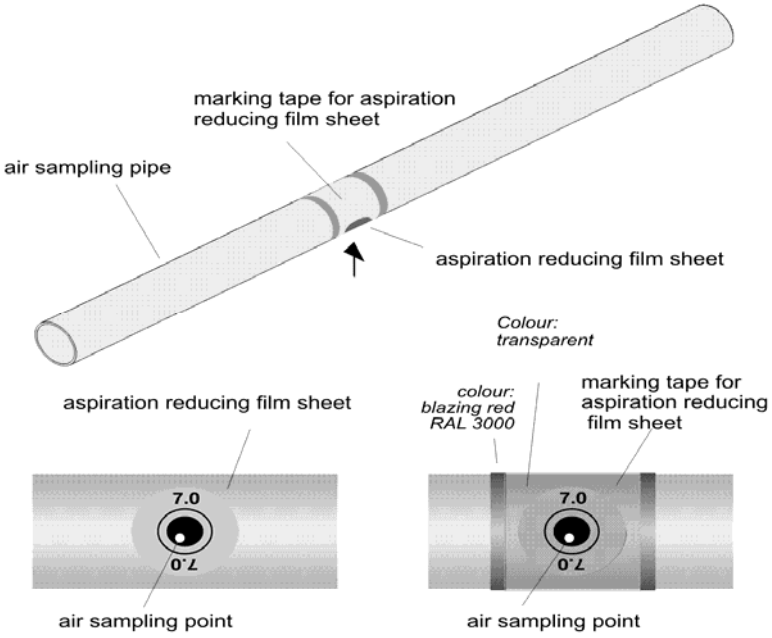


Figure 24: Aspiration aperture with aspiration reduction film and banderol

An air sampling point is a 10 mm-hole in the air sampling pipe covered with a patented aspiration-reducing film sheet with the appropriate opening diameter. The size of the opening depends on the pipe design (see chapter Design, “Pipe Design”).

To prevent the film sheet from coming loose, it is fixed with transparent marking tape with red edges and a 10 mm-hole. The marking tape is fixed to the film sheet in such a way that the air sampling point is not covered and remains visible even at a distance.

The standard type AF-x aspiration reduction films and the type AF- banderol’s are not suitable for use in very low temperature areas.

Aspiration reduction clips are to be used in these areas instead.

3.3.2.2 Aspiration reduction clips

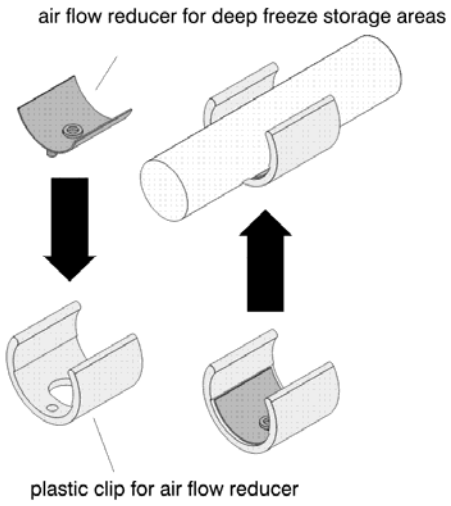


Figure 25: Air flow reducer for dirty areas and deep freeze storage

The air sampling points, when used in areas where blockages can occur, are equipped with a patented plastic clip, type AK-C, and a patented flexible air flow reducer, type AK-x.
When used in deep freeze areas, the flexible air flow reducer near the air sampling points expands and the ice is blasted off during blow-through. The special plastic clip ensures that the air flow reducer remains in place.
For designs in areas requiring a blow-through system (e.g. dusty), air flow reducers with plastic clips are used rather than aspiration-reducing film sheets with marking tapes, because the openings can be blown clear more easily. The plastic clips are more resistant at high pressures and can be cleaned more effectively due to the rubber core.

3.3.3 Ceiling duct for concealed mounting

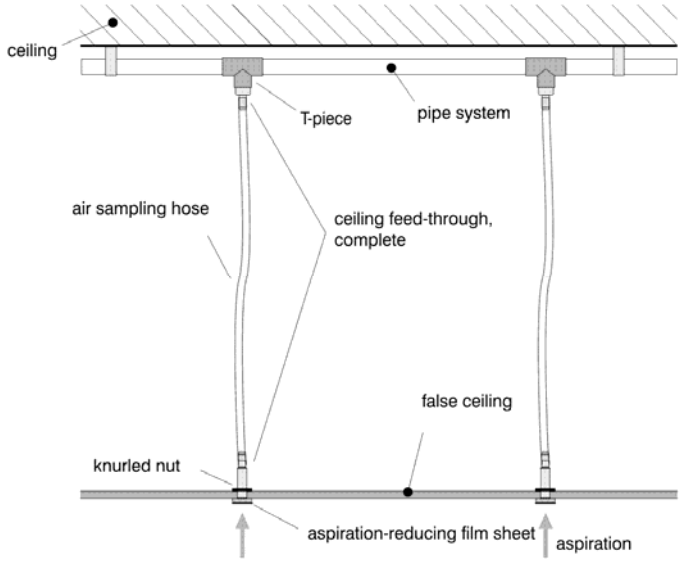


Figure 26: Ceiling feed-through for ceiling voids

Aesthetics If a hidden installation is required for monitoring of the pipe system, it can be installed in the ceiling void. The ceiling feed through are put in the false ceiling. According to the pipe design guidelines the ceiling feed-through are equipped with aspiration-reducing film sheets with defined air sampling points (see chapter Design "Pipe Design") and are connected to the pipe system with air sampling hoses.

If the maximum length of these hoses is 1 m, refer to the pipe design described in chapter "Design". If - due to construction - hose lengths of more than 1 m are required, the air sampling pipe system must be calculated separately (calculation is made by WAGNER).

The ceiling feed through is applicable for false ceiling panels with a thickness of up to approximately 35 mm. The aspiration-reducing film sheets are available in two colours (pure white, RAL 9010 and papyrus white, RAL 9018) and come ins special colours if required.

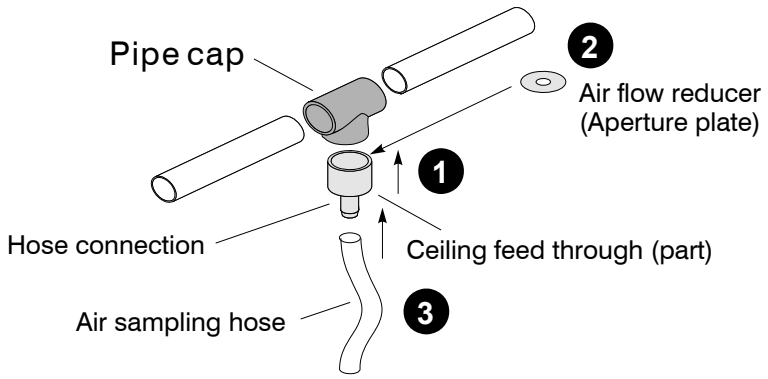


Figure 27: Capillary hose Installation and upstream aperture

For hidden installation in example lamps or stucco, the air sampling hose with upstream aspiration reduction in the tees (pipe caps) are used.

3.3.4 Air filters for dusty areas

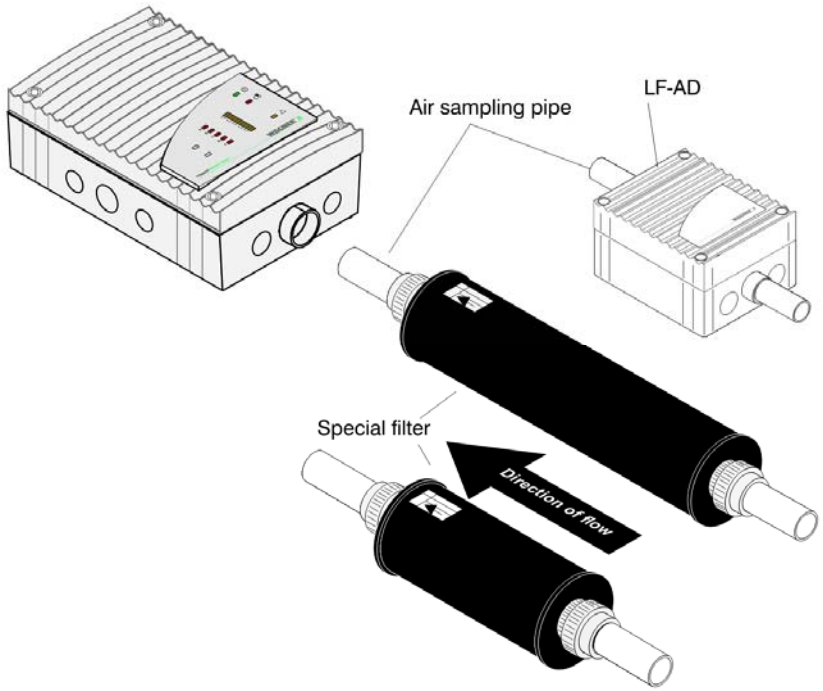


Figure 28: TITANUS MICRO•SENS® with air filter

In areas with interference to the environment such as, e.g. dust, an air filter is to be used to protect the smoke detection system.

Type LF-AD-x air filter The standard air filter used is the type LF-AD-x, consisting of a plastic housing with two pipe connections, used. The air filter is automatically monitored for dirt (blockage) by the TITANUS *MICRO·SENS®* air flow monitoring arrangement. If the air filters are dirty, then the filter inserts must be changed by opening the filter housing.

Special type SF-x filter In extremely dusty areas (e.g. recycling plants) in which the use of an LF-AD is not sufficient, a special filter must be used. The special filter safely holds back the dust particles in a heavily polluted atmosphere using the filter medium. The filter is guaranteed to have an even quality of dust collection right through to the end of its useful life. Two types of special filter are available (type SF-400 and type SF-650), the SF-650 having a longer useful life because of its larger surface area.

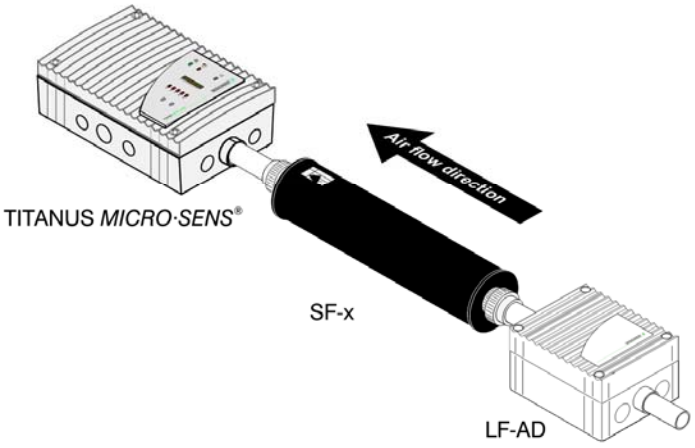


Figure 29: Special Filter and LF-AD

The filter life of special filter can be increased by the use of an upstream filter LF-AD.

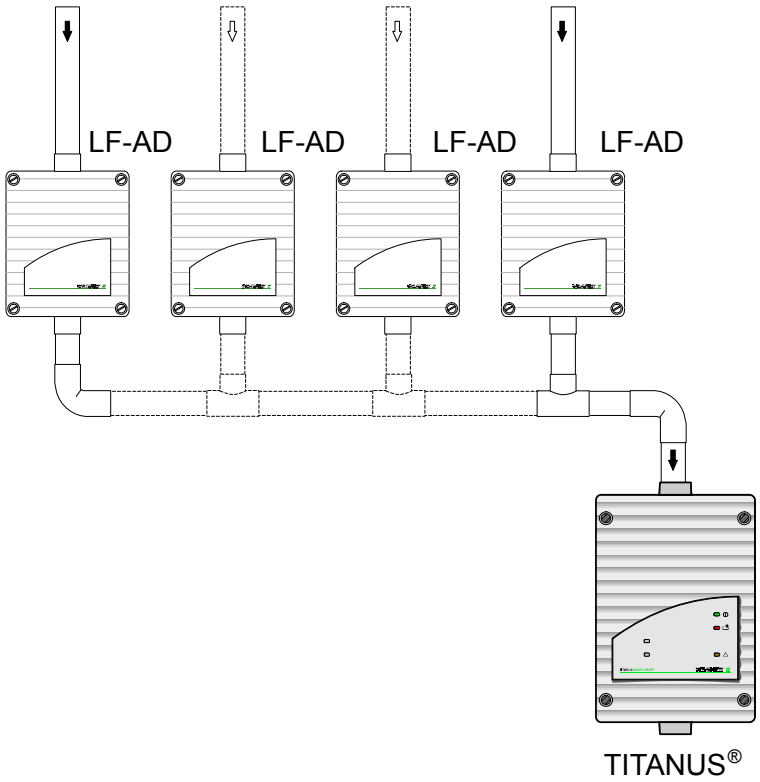


Figure 30: LF-AD filters in multiple sampling pipes

In order to extend the maintenance intervals, one air filter can be installed in every output pipe instead of one air filter inside the main sampling pipe. The same design specifications shall apply as stated in the projection tables in the appendix.

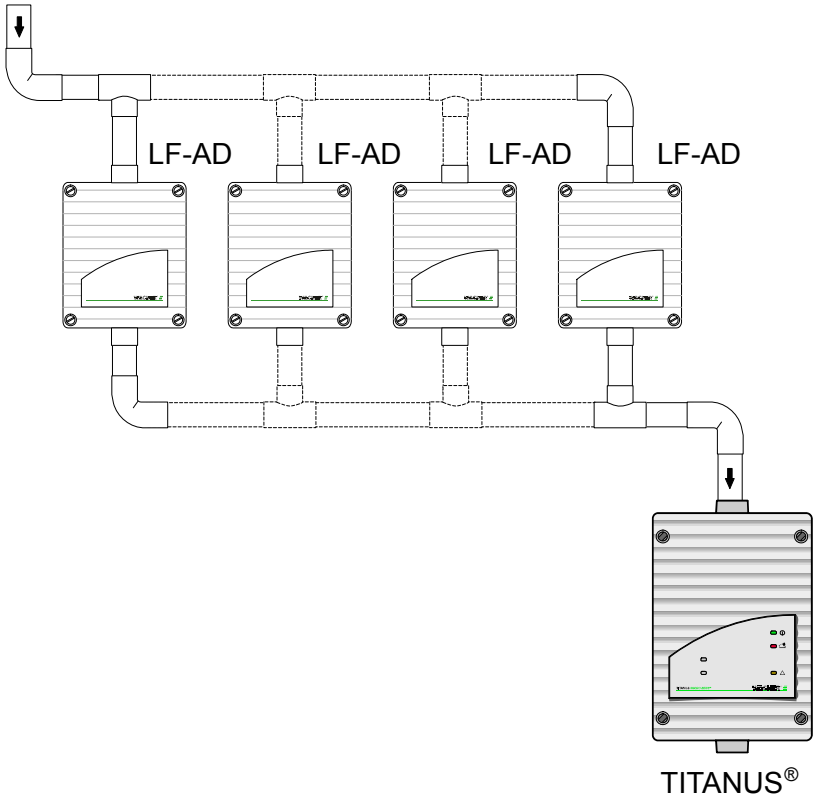


Figure 31: LF-AD filter in the main sampling pipe

Furthermore, in order to extend the maintenance intervals, several air filters can be installed in parallel in the main sampling pipe. This requires the main sampling pipe to be split into one or several pipes and to be equipped with the same air filter or the combination of air filters. The individual pipes can then alternatively be either combined again to one main sampling pipe or be separately continued into the monitoring area(s). The same design specifications for the individual air filters shall apply as stated in the projection tables in the appendix.

3.3.5 Air return for pressure differences and air pollution

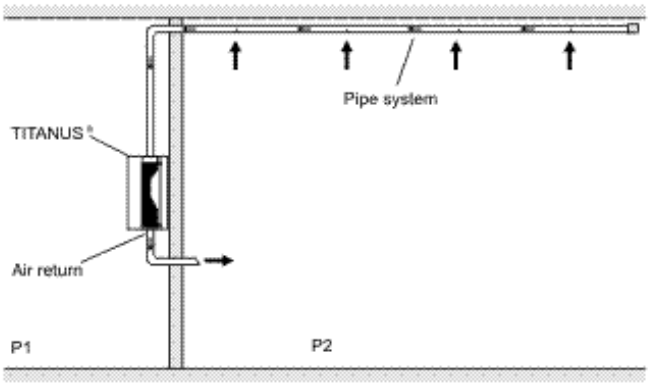


Figure 32: Principle of air return with TITANUS MICRO· SENS®

If TITANUS *MICRO·SENS®* and the pipe system are installed in two areas - P1 and P2 – each with different air pressures, the air must be returned to the pressure area of the pipe system. The air return can be used for pressure compensation or in order to keep the air clean (e.g. from odours) in adjacent rooms.

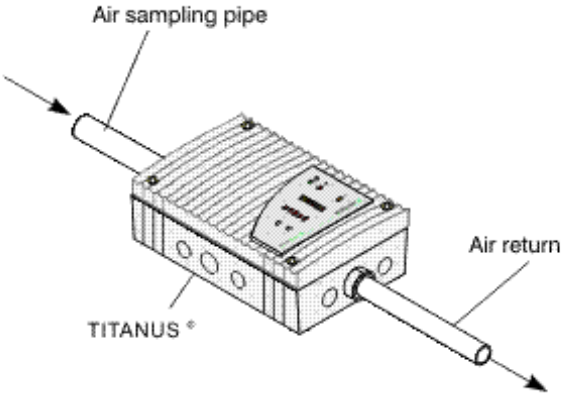


Figure 33: TITANUS MICRO·SENS ® with air return

The air return pipe system is directly connected through the protection grid to the air outlet inside TITANUS *MICRO·SENS®*. As the air return pipe fits precisely into the air outlet a firm hold is ensured.

3.3.6 Noise suppressor

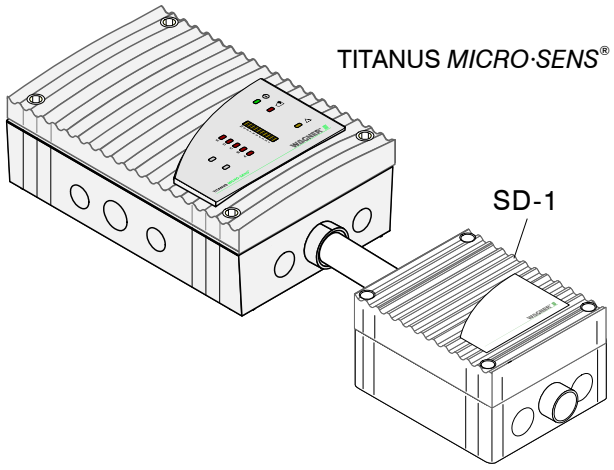


Figure 34: TITANUS MICRO·SENS with noise suppressor

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

The noise suppressor is mounted directly to the air outlet on the TITANUS *MICRO·SENS*®.

3.3.7 Steam trap for humid areas

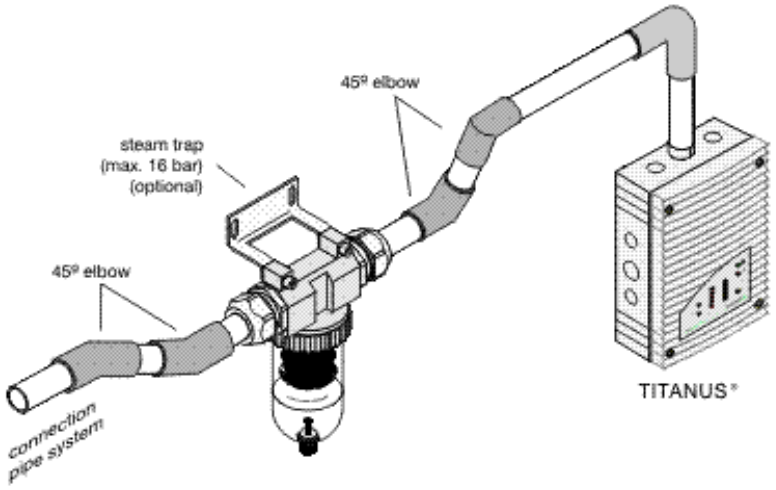


Figure 35: Steam trap to eliminate water vapour from the pipe system and to collect the condensate from the pipe system

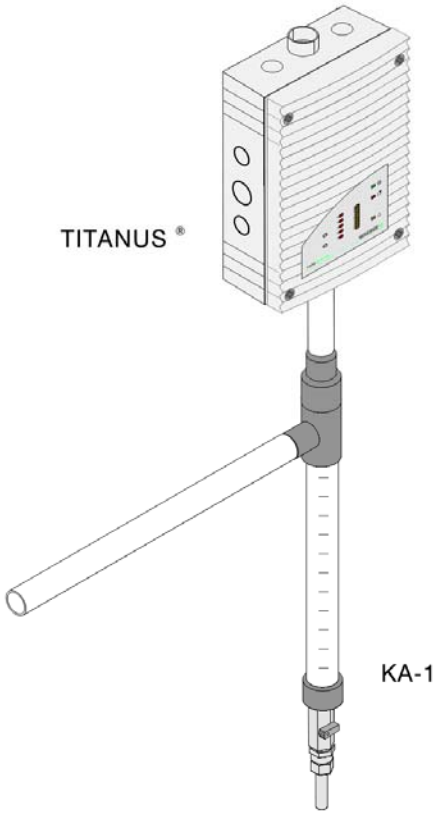


Figure 36: KA-1 to eliminate water vapour from the pipe system and to collect the condensate from the pipe system

The TITANUS *MICRO·SENS*® is used in environments with high humidity condensate can occur in the air sampling system. In order to collect this condensate the steam trap is installed at the deepest point of the pipe system before the air filter and the air sampling smoke detection system. The 45°-elbows permit an optimum distance to the wall.

The steam trap can be operated in a temperature range between 0°C and +50°C. The sinter filter in the steam trap has a pore width of 50 µm and absorbs also coarse dirt particles.

The steam trap is used in the following areas:

Application

- Areas with severely oscillating temperatures and high air humidity
- External areas
- Sauna areas

4 Technical Data

NOTICE

All power consumption figures relate to an ambient temperature of 20°C.

4.1 TITANUS *MICRO·SENS*®

	TITANUS *MICRO·SENS*®

Voltage

Power supply (Ue) Nominal power supply	16 - 30 V DC 24 V DC

Current

	U_L1= 9 V (at 24 V)	U_L1= 10.5 V (at 24 V)	U_L1= 12 V (at 24 V)	U_L1= 13.5 V (at 24 V)
Starting current (1)	150 mA			
Power consumption at idle status (1)	105 mA	125 mA	145 mA	170 mA
Power consumption at alarm status(1) Device variant without smoke level	110 mA	130 mA	150 mA	175 mA
Power consumption at alarm status(1) Device variant with smoke level	140 mA	160 mA	180 mA	205 mA

(1) (without extra modules) U_L = Fan voltage

Outputs

Contact loading capacity of the alarm and fault relay	1A / 30 VDC

Dimension

Dimension (H x W x D mm)	70 x 140 x 222 mm

Weight

Weight	0.8 kg

Noise Level

L_{pa} according to EN ISO 3744, 1995	at 40 dB(A) depending on the configuration and fan voltage

Protection classification

Protection classification (EN 60 529) without air return with pipe piece 100 mm/pipe bend with air return	 IP 20 IP 42 IP 54

Housing

material	plastic (ABS)
colour	papyrus white, RAL 9018

Temperature range

TITANUS *MICRO·SENS*® deep freeze variety	– 20° to +60°C – 40° to +60°C

Humidity

not condensed	max. 95 % rf (without dew)

Fan

Type of construction	axial
service life of fan (12 V)	60.000 h at 24° C

Displays on device

Operation Fire alarm Action alarm Fault Smoke level display Alarm location display	green operating display red alarm display red alarm display (optional) yellow collective fault yellow smoke level display 1 to 10 (10 segments) (optional) 5 red displays (optional)

Infrared interface

Infrared interface	IR Transmitter/ Receiver

Connections

Device connection	Clips for 0.5 – 2.5 mm²-wires
Cable	pair twisted,
Cable feeds device base Device base floor	 8 x M 20 2 x M 25 4 x M 25
conical pipe plug-in connections	1 x for aspiration pipe Ø 25 mm and 1x air return Ø 25 mm

Reaction sensitivity

Detection unit	
DM-TM-10	0.1 to 2.0 % light obscuration/m
DM-TM-50	0.5 to 2.0 % light obscuration/m

4.2 Detection box TITANUS *MICRO·SENS®*

	Detection box

Voltage

Power supply (Ue) Nominal power supply	15 - 30 V DC 24 V DC

with Smoke level and Processor

Power consumption at idle status	30 mA
Power consumption at alarm status Device variant without smoke level	38 mA
Power consumption at alarm status Device variant with smoke level	68 mA

Dimensions

Dimension (H x W x D mm)	70 x 140 x 222 mm

Weight

Weight	0.8 kg

Protection class

Protection class (EN 60 529)	IP 54

Housing

material	plastic (ABS)
colour	papyrus white, RAL 9018

Temperature range

Detection box Deep freeze version	– 20° to +60°C – 40° to +60°C

Humidity

not condensed	max. 95 % rf (without dew)

Displays on device

Operation Fire alarm Action alarm Fault Smoke level display	green operating display red alarm display red alarm display (optional) yellow collective fault yellow smoke level display 1 to 10 (10 segments) (optional)

Infrared interface

Infrared interface	IR Transmitter / Receiver

Connections

Device connection	Clips for 0,5 - 2,5 mm²- wires
Cable	pair twisted
Cable feeds Detection box base Detection box base floor	 8 x M 20 2 x M 25 4 x M 25
conical Pipe plug-in connections	2 x for aspiration pipe ø 25 mm

Reaction sensitivity

Detection unit	
DM-TM-10	0.1 to 2.0 % light obscuration/m
DM-TM-50	0.5 to 2.0 % light obscuration/m

4.3 Accessories TITANUS *MICRO·SENS*®

	Parallel display for TITANUS *MICRO·SENS*®

Parallel display

Voltage Nominal voltage	 24 V
Power consumption (at 24 V) Idle maximum	 15 mA 50 mA
electr. connection lengths	max. 1000 m

Dimension

Dimension (H x W x D mm)	70 x 140 x 200 mm

Weight

Weight	0.6 kg

Protection class

Protection class (EN 60 529)	IP 54

Housing

Material	Plastic (ABS)
Colour	papyrus white, RAL 9018

Temperature range

Parallel display	– 20° to +60°C

Displays on device

Operation	green operating display
Fire alarm	red alarm display
Action alarm	red alarm display (optional)
Fault	yellow collective fault
Smoke level display	yellow smoke level display 1 to 10 (10 segments) (optional)
Alarm location display	5 red displays (optional)

Connections

Clip strip	Clips for max. 2.,5 mm²-wires
Cable	pair twisted,

Cable feeds

Parallel display base	8 x M 20 2 x M 25
Parallel display base floor	4 x M 25

Reaction indicator

Voltage	15 to 30 V DC
Nominal voltage	24 V DC
Power consumption (at 24 V)	
Stand by	2 mA
Blink light	5 mA
Steady burning	8 mA
electr. connection lengths	1000 m
Protection class (EN 60 529)	IP 30

Relay board RU-1/RU-2

Dimensions	98 x 94 mm
Temperature range	-40 °C to +60 °C
Contact loading capacity of the relay contacts	1 A at 30 V DC
Power consumption (at 24 V) RU-1	
Idle status	6 mA
Alarm status	max. 36 mA
Power consumption (at 24 V) RU-2	
Idle status	13 mA
Alarm status	max. 36 mA

Reset board

Power consumption	max. 20 mA

Network module

Power consumption	max. 50 mA

4.4 Pipe System – TITANUS *MICRO·SENS*®

	Pipe System for TITANUS *MICRO·SENS*®

Pipe length

max. pipe length ø 25 mm	50 m
plus max. pipe length ø 12 mm	8 x 3 m
max. no. aspiration apertures	8
max. length aspiration hose per ceiling duct	1 m
Temperature range PVC-pipe ABS-pipe	-0°C..+60° C -40°C..+80° C
max. monitoring surface area	400 m^2

5 Design

5.1 General

The following describes the project planning of the air sampling smoke detection system to EN 54-20 or ISO 7240-20. The basic conditions are described in Chapter 5.1. The basic conditions are described in Chapter 5.1. The project planning is to be conducted in accordance with Chapter 5.2. The limiting project planning instructions in accordance with Chapter 5.2 apply to special applications in addition to Chapter 5.3 These should be taken into consideration at the beginning of project planning for special projects.

Project planning options according to EN 54-20 or ISO 7240-20:

There are various technical solutions to be selected from, depending on the project planning criteria. The chapters for the solutions are listed in the following tables.

Project planning criterion	Technical solution	Basic Principles	Limitations
General area monitoring	Standard project planning	Chapter 5.2	_
Recognition of a failure at an individual aperture	Project planning for individual aperture monitoring	Chapter 5.2	Chapter 5.3.1
Device protection / cabinet monitoring	Simplified pipe project planning	Chapter 5.2	Chapter 5.3.2
Ventilation conduits	Project planning for forced air flow	Chapter 5.2	Chapter 5.3.5

5.1.1 Regulations

The current respective national regulations in each particular country must also be complied with and project planning must be adjusted to such regulations.

EN 54-20 or ISO 7240-20

The air sampling smoke detection systems shall be planned in accordance with the project planning guidelines described in Chapter 5.2.1 in order to be compliant with EN 54-20 or ISO 7240-20.

The following guidelines must also be complied with for systems in accordance with the requirements of VdS Schadenverhütung:

- "Guideline for automatic fire alarm systems, planning and installation", VdS Schadenverhütung GmbH, Cologne, Germany (VdS 2095)
- "Local application protection for electric and electronic equipment rules for planning and installation" guideline, VdS Schadenverhütung GmbH, Cologne, Germany (VdS 2304)
- The technical bulletin “Project Planning for air sampling fire alarms” VdS Schadenverhütung GmbH, Cologne, Germany (VdS 3435)

The following national regulations must also be complied with in Germany, for instance:

- DIN VDE 0833 part 1 and 2 "Alarm systems for fire, intrusion und hold-up"
- Additional regulations for installing fire alarm systems which are laid down by fire authorities and building supervisory boards or building regulation authorities and are only valid locally.

5.1.2 Pipe systems

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 the intake apertures and the pipe system design depends on the size, ventilation and shape of the monitored area. The aspiration apertures should be planned like point-type detectors. The pipe system is to be fitted in accordance with the project planning guidelines in this section while taking the following points into consideration:

Symmetry of the pipe system

To insure equal air intake for all aspiration holes the following rules must be obeyed:

- The length of the shortest and longest branch must not exceed a ratio of **1:2**.
- The number of aspiration holes of the corresponding branches must not exceed a ratio of **1:2**.
- The aspiration holes should be evenly distributed on the corresponding branches.

NOTICE

Each connected pipe system must comply with the design limits of TITANUS® for the selected pipe design (please refer to chapter “Project Planning Limits”):

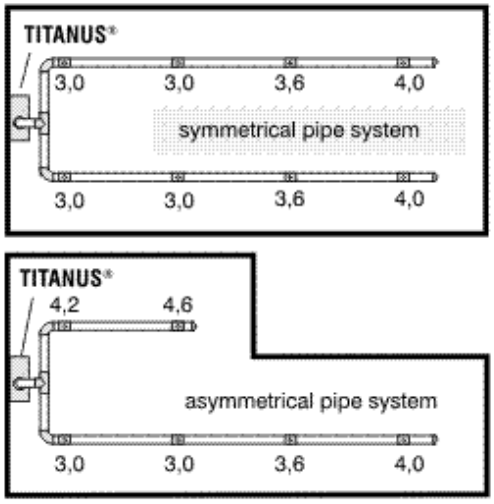


Figure 37: Example of a symmetrical and an asymmetrical U-pipe system

Figure „Example of a symmetrical and an asymmetrical U-pipe system” illustrates exemplary a U-shape pipe system with symmetrical and asymmetrical pipe designs and according to chapter ´Standard Design´ the calculated diameters of the aspiration holes. The diameters of the aspiration holes are determined for each branch of the pipe system separately and are dependent on the total number of aspiration holes of the respective branch. Please refer to chapter “Hole diameters” for corresponding tables with hole diameters.

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

Pipe designs 4 types of pipe designs can be selected, depending on the cabinet geometry (see Figure „Project planning“).

I-pipe	An air sampling smoke detection pipe system without branches.
U-pipe	An air sampling smoke detection pipe system which branches into 2 air sampling branches after the connection to the TITANUS *MICRO·SENS*®.
M-pipe	An air sampling smoke detection pipe system which branches into 3 air sampling branches after the connection to the TITANUS *MICRO·SENS*®.
Double-U-pipe	An air sampling smoke detection pipe system which branches into 4 air sampling branches after the connection to the TITANUS *MICRO·SENS*®.

NOTICE

The design for fire location should be the I-pipe configuration.

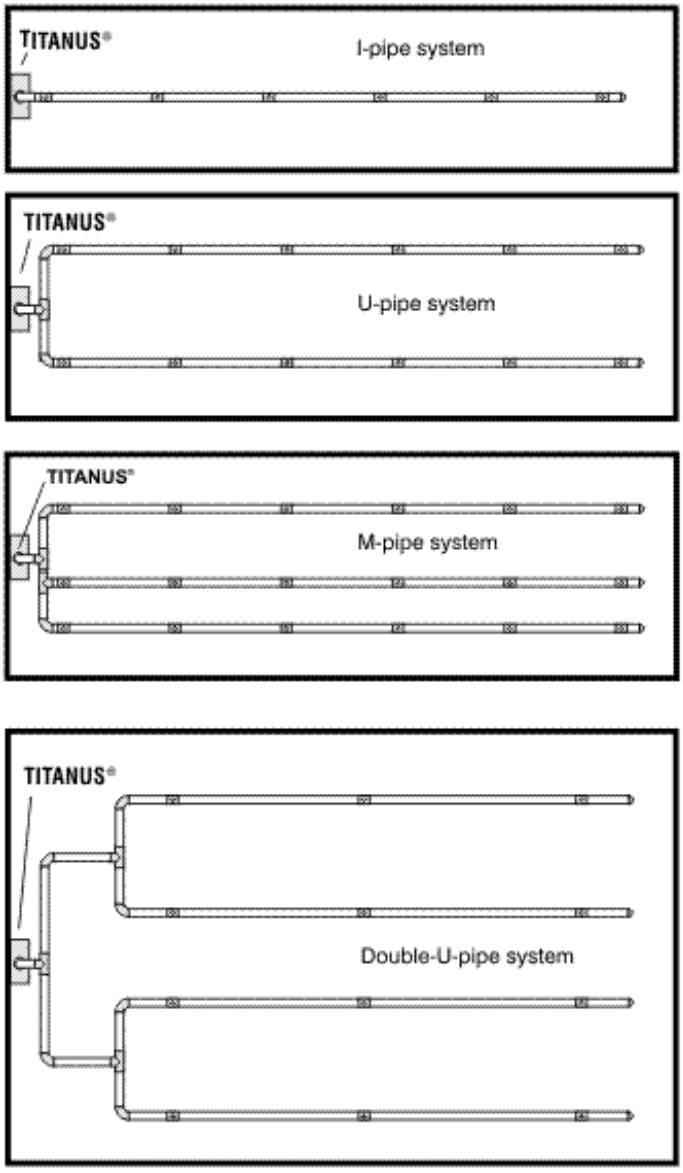


Figure 38: Pipe designs

Direction change Change of direction in the pipe system can increase the flow resistance. Light change of direction (e.g. with 90 ° pipe bends or air sampling hose) are already approved as part of the project according to EN 54-20 or ISO 7240-20 and need not be considered further.
If the pipe system includes 90 ° angles, the maximum overall length of the pipe system will be reduced. In this case, a 90 °-angle corresponds to a straight pipe length of **about 1.5 m** air sampling pipe.

NOTICE

Bends are to be preferred over angles. An excessive number of changes in direction can change the detection time.

Special cases If the pipe system does not match the project planning guidelines described here due to structural constraints. WAGNER should offer could provide individual calculations for such a case.

Checking Check detection reliability with activation tests in cases where use of the system is critical. Also check whether an air flow rate is present at individual aspiration apertures.

TIP

The fan voltage can be increased in order to reduce transport time. Make sure that the current intake increases.

5.1.3 Air flow monitoring

EN 54-20 or ISO 7240-20 requires the recognition of a 20 percent change in the air flow volume by the detector module's air flow sensor system. The activating threshold of the air flow sensor system has to be adjusted to ≤ 20 % in order to achieve this. It is recommended to conduct an air pressure-dependent air flow compensation for both of these settings.

Any threshold desired may be set with systems which do not require EN 54-20 or ISO 7240-20 conformity.

Project planning for the air flow monitoring system in sampling pipes is carried out while taking into consideration the respective national regulations for each country.

Adjusting the air flow sensitivity The air flow sensor sensitivity must be adjusted to the application in question. Breakage and stoppages must be detected reliability with low susceptibility to malfunction.

The activating threshold and for this reason the sensitivity of the air flow sensor is continuously adjustable from 10 – 50 %.

	In conformity with EN 54-20 or ISO 7240-20			
Triggering threshold	10 %	20 %	40 %	50 %
Sensitivity	Very high	High	Medium	Low

TIP

It is recommended to always select the greatest possible level which is permissible according to national standards.

Dynamic air flow sensor system

The device's air flow monitoring enables the system to detect both pipe breakages outside the device and sudden obstruction in individual aspiration apertures (e.g. in the event of sabotage to the pipe system). The dynamic air flow sensor system has been activated via the diagnostics software; the following modifications have to be regarded.

Limitations

The air flow monitoring may only be set, if:

- Project planning according to "Individual aperture monitoring" has been carried out "(see Chap. 5.3.1 "Pipe project planning individual aperture monitoring"),
- the air flow sensor has been compensated depending on the air pressure (see Chap. 8.1.2 "Air pressure dependent air flow compensation") und
- No large air flow fluctuations occur.

Air pressure differences

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

NOTICE

If the air sampling smoke detection system and pipe system are in areas with different air pressure, the air sampled by the TITANUS® should be recirculated in the pipe system pressure area (see Chapter "Air recirculation").

NOTICE

TITANUS *MICRO·SENS®* with active location of the fire must be installed outside the areas to be monitored and without air return.

NOTICE

ROOM·IDENT cannot be used in applications with varying or not consistent air pressure levels. This is due to the fact, that under these conditions the aspirated air needs to be returned to the monitored area. Since air return is not allowed with ROOM·IDENT these applications cannot be served.

5.1.4 Sensitivity

According to EN 54-20 or ISO 7240-20, the sensitivity of a air sampling smoke detection system can be divided into particular fire sensitivity classes. These sensitivity classes describe particular example applications in which the systems can be used. Permissible system project planning can be determined for each classification according to Chapter 5.2.

Air sampling smoke detection systems with a higher sensitivity class according to EN 54-20 or ISO 7240-20 also meet the requirements of the lower classes.

Class	Description	Example application
A	Air sampling smoke detector with very high sensitivity	Very early detection: Highly diluted smoke in air conditioned IT areas IT areas
B	Air sampling smoke detector with increased sensitivity	Early detection: Diluted smoke in conventional (cooled IT areas)
C	Air sampling smoker detector with standard sensitivity	Standard detection: Fire detection with the benefits of air sampling smoke detection systems

NOTICE

The fire sensitivity classes A, B and C can be achieved with each detector module available, depending on the number of aspiration apertures.

The following sensitivities can be adjusted with the different detection units.

	Sensitivity	Sensitivity Standard	Adjustment levels
Detection unit DM-TM-10	0.1 - 2 % /m	0.1 % /m	0.1 % /m
Detection unit DM-TM-50	0.5 - 2 % /m	0.5 % /m	0.1 % /m

Project planning for the monitored surface is always carried out according to national specifications for point-shaped smoke detectors.

5.1.5 Design Limits

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

- The minimum pipe length between 2 aspiration apertures is **0.1 m**.
- The minimum pipe length between 2 aspiration apertures when locating a fire is **3 m**.
- The maximum pipe length between 2 aspiration apertures is **10 m**.
- The maximum monitoring surface area per aspiration aperture corresponds to the monitoring area of a point-specific alarm according to the regulations in the particular national standards.
- Maximum 8 aspiration apertures are possible (Designs / design forms not given in the manual are to be requested).
- Maximum 5 aspiration apertures are possible with site of a fire location.

The maximum overall monitoring surface area for the TITANUS *MICRO·SENS*® and the maximum overall pipe length depend on the design chosen.

max. overall monitoring surface area per TITANUS *MICRO·SENS*®	max. design pipe length *
400 m²	Pipe ø 25 mm: 50 m plus Pipe ø 12 mm: 8 x 3 m

*Depending on the design chosen, restricted values apply in part.

NOTICE

Because of country-specific regulations, there may be restrictions compared to the design limits in the manual!

5.2 Project planning

5.2.1 Project planning guidelines

In order to conduct project planning in accordance with the EN 54-20 or ISO 7240-20 standard, it is necessary to be familiar with particular factors. These are the requirements for the system's sensitivity, the number of aspiration apertures and the accessories necessary for the corresponding application. The pipe system design in conformity with the standard can be determined based on these factors using the following chapter and with the help of the project planning tables in the appendix.

5.2.1.1 Determining the necessary accessories

Since the accessory components, such as filters, have a certain influence on the dimension of the pipe planning, the suitable accessories must be selected for the corresponding application ahead of time. Retrofitting, with a fine filter, for instance, is generally only possible if a more sensitive detector module is being used or a particular reserve has been planned in advance.

NOTICE

Components which have not been approved by WAGNER are used, CE conformity on the basis of EN 54-20 or ISO 7240-20 will not be possible.

The following accessory components should be taken into consideration in the process:

- Air filters
- Steam trap
- VSK stop valves
- Detector box
- *OXY·SENS*® air sampling detector

The SD-1 noise suppressor and the steam trap KA-1 may be used in any case with no project planning restrictions. configuration.

5.2.2 Pipe accessories

Air filters

Type	Application	Examples
LF-AD	Coarse filter for separating particles > approx. 15 µm	Dust, insects, fibres, hair, 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 low concentrations
SF-400	Fine filter for separating particles > approx. 1 µm	As above. Additionally: Fine dust in high concentrations
SF-650	Fine filter for separating particles > approx. 1 µm	As above, but with increased filter lifetime

Steam trap

Type	Application
KA-DN-25	Condensation separator for applications with condensation moisture in the pipe
KA-1	Condensation separator for applications with condensation moisture in the pipe

Sound suppressor

Typ	Application
SD-1	Sound suppressor for areas sensitive to noise

Stop valve

Typ	Application
AVK-PV	Stop valve for VSK cleaning air nozzle
AVK-PV-F	Stop valve for VSK cleaning air nozzle for use in freezer areas

5.2.3 Sensitivity and pipeline project planning

5.2.3.1 Pipeline project planning with pipe accessories

The following project planning tables for pipeline project planning can be found in the appendix for each previously selected pipe accessory.

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

NOTICE

An area can be monitored with more than detection points than required by the national guideline in order to improve an air sampling smoke detection system's detection quality. In such case, the number of normatively required sampling points is to be used in calculating the required sensitivity of an air sampling smoke detection system.

Procedure In the following example, a project plan is supposed to fulfil class B requirements with air filters LF-AD-1, with 4 apertures and without further accessory. The red arrows show the possible project plans with varying pipe shapes and fan voltages.

1.	Selection Selection of the corresponding project planning table based on the air filter to be used (see Chap. 5.2.2)
	Result The project planning table has been 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 apertures has been determined
3.	Selection Determinations on the sensitivity necessary to achieve the sensitivity class
	Result Determination of the detection unit and sensitivity setting
4.	Selection Selection of other pipe components (e.g. steam trap see Chap. 5.2.2 described components)
	Result The project planning table has been determined
5.	Selection Pipe length selection
	Result Determination of the pipe shape and necessary fan voltage

1 Projection with filter LF-AD-1

Type		Sensitivity (% obs/m)	Number of 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	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	C	C	C				
		1,7	B	C	C	C				
		1,8	B	C	C	C				
		1,9	B	C	C	C				
		2	B	C	C					

without additional pipe accessories or with detector box DM-MB-TM-XX

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	
I	≥9	40	40	40	40	40				permitted total pipe length [m]
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 steam trap

Pipe shape	U_{Fan} [V]	1	2	3	4	5	6	7	8	
I	≥9	40	40	40						permitted total pipe length [m]
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	

Results: The following modules may optionally be used with the corresponding settings for class B or A:

- Detection unit DM-TM-10 – with a sensitivity of 0.1 % LT/m to 0.6 % LT/m
- Detection unit DM-TM-50 – with a sensitivity of 0.5 % LT/m to 0.6 % LT/m

Possible system parameters:

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

5.2.4 Aperture diameter

The aperture diameters of the aspiration apertures can be found in the corresponding table for the respective pipe configuration:

I-pipe

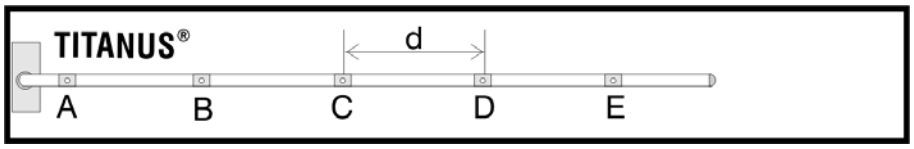


Figure 39: I-pipe system

Aspiration apertures

Number of apertures	1	2	3	4	5
Aspiration aperture Ø in mm*					
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

*) Press cut diameter in aspiration-reducing film sheet

U-pipe

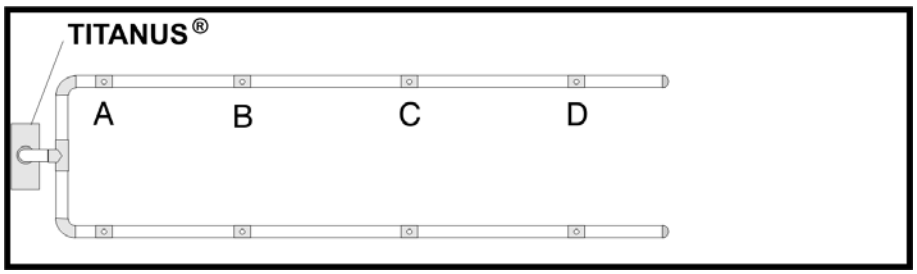


Figure 40: U-pipe system

Aspiration apertures

Number of apertures	2	4	6	8
Aspiration aperture Ø in mm*				
A	6,0	4,2	3,4	3,0
B	—	4,6	3,4	3,0
C	—	—	4,4	3,6
D	—	—	—	4,0

*) Press cut diameter in aspiration-reducing film sheet

M-pipe

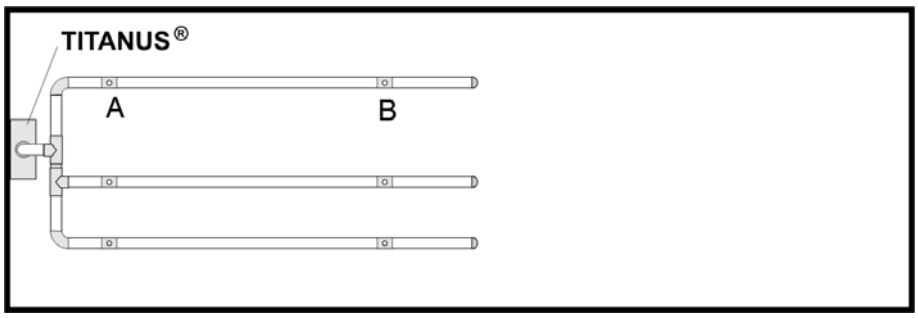


Figure 41: M-pipe system

Aspiration apertures

Number of apertures	3	6
Aspiration aperture ø in mm*		
A	5,0	3,6
B	—	4,0

*) Press cut diameter in aspiration-reducing film sheet

Double U-pipe

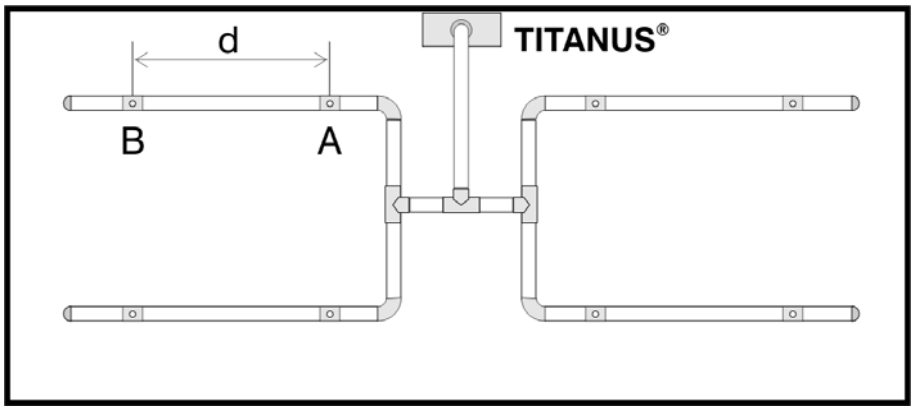


Figure 42: Double U-pipe system

Aspiration apertures

Number of apertures	4	8
Aspiration aperture ø in mm*		
A	4,4	3,0
B	—	3,8

*) Press cut diameter in aspiration-reducing film sheet

5.3 Special project planning

5.3.1 Project planning for individual aperture monitoring

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

The specifications according to Chapter „Planning“ apply to project planning. The following limit values and aperture diameters should also be taken into account. Additional accessories (air filters, condensation separators, etc.) can influence the maximum pipe length.

5.3.1.1 I-Pipe system

1 Pipe system

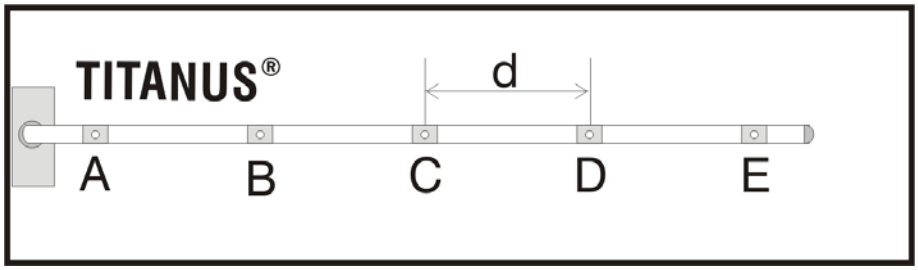


Figure 43: I-Pipe system for area protection

Limit values

min. distance TITANUS® – 1st aspiration aperture	2 m
max. distance TITANUS® – 1st aspiration aperture	20 m
max. overall pipe length per pipe system pipe ø 25 mm plus pipe ø 12 mm	40 m 5 x 3 m
max. overall pipe length per pipe system per with high fan voltage 9,0 V pipe ø 25 mm plus pipe ø 12 mm	30 m 5 x 3m
min. distance between 2 aspiration apertures (d)	4 m
max. distance between 2 aspiration apertures (d)	10 m
max. number aspiration apertures (n) per pipe system	5 no.

Aspiration apertures

Number of apertures	**1**	**2**	**3**	**4**	**5**
Aspiration apertures ø in mm*					
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

*) Press cut diameter in aspiration-reducing film sheet

Trigger Thresholds I-Pipe system

Number of apertures	2	3	4	5
1 blocked aperture	±25 %	±15 %	±10 %	—
2 blocked apertures	O	O	±20 %	±15 %
3 blocked apertures	O	O	O	O
4 blocked apertures	O	O	O	O
5 blocked apertures	O	O	O	O
… is/are recognised when main air flow set x %				

— not possible

O not purposeful

Example If the blockage of 2 aspiration apertures out of a total of 5 aspiration apertures is recognised, then with the help of the diagnostics tool flow monitoring can be set to ±15 %.

NOTICE

For a project planning according to EN 54-20 or ISO 7240-20, the air flow monitoring has to be adjusted to ≤20 % in either case.

5.3.1.2 U-Pipe system

1 Pipe system

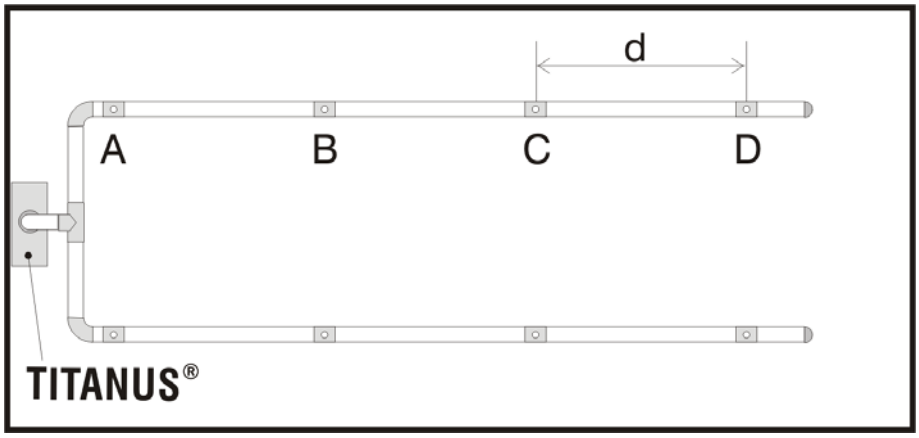


Figure 44: U-Pipe system for area protection

Limit values

min. distance TITANUS® – T piece	2 m
max. distance TITANUS® – T piece	20 m
max. branch length	25 m
max. overall pipe length per pipe system Rohr Ø 25 mm plus pipe Ø 12 mm	 50 m 8 x 3 m
max. overall pipe length per pipe system per with high fan voltage 9,0 V pipe Ø 25 mm plus pipe Ø 12 mm	 40 m 8 x 3m
min. distance between 2 aspiration apertures (d)	4 m
max. distance between 2 aspiration apertures (d)	10 m
max. number aspiration apertures (n) per pipe system	8 Stück

Aspiration apertures

Number of apertures	2	4	6	8
Aspiration apertures Ø in mm*				
A	6,0	4,2	3,4	3,0
B	—	4,4	3,6	3,0
C	—	—	3,6	3,2
D	—	—	—	3,2

*) Press cut diameter in aspiration-reducing film sheet

Trigger Thresholds U-Pipe system

Number of apertures	2	4	6	8
1 blocked aperture	±20 %	±10 %	—	—
2 blocked apertures	O	±20 %	±15 %	±10 %
3 blocked apertures	O	O	±25 %	±20 %
4 blocked apertures	O	O	O	±30 %
5 blocked apertures	O	O	O	O
6 blocked apertures	O	O	O	O
7 blocked apertures	O	O	O	O
… is/are recognised when main air flow set x %				

— not possible

O not purposeful

Example If the blockage of 3 aspiration apertures out of a total of 8 aspiration apertures is recognised, then with the aid of the diagnostics tool, air flow monitoring can be set to ±20 %.

NOTICE

For a project planning according to EN 54-20 or ISO 7240-20, the air flow monitoring has to be adjusted to ≤20 % in either case.

5.3.1.3 M-Pipe system

1 Pipe system

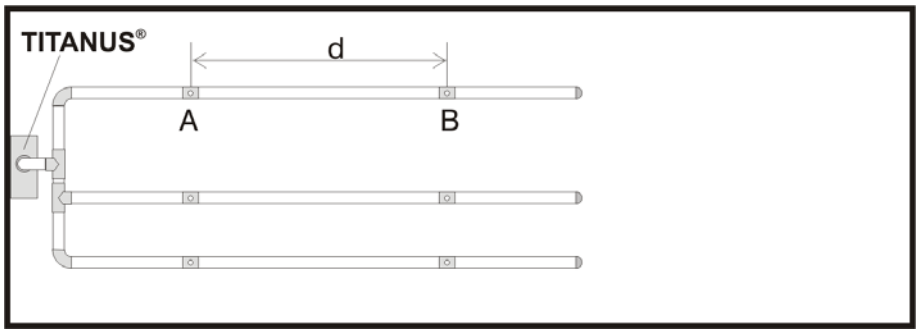


Figure 45: M-Pipe system for area protection

Limit values

min. distance TITANUS® – T piece	2 m
max. distance TITANUS® – T piece	20 m
max. branch length	16.5 m
max. overall pipe length per pipe system pipe ø 25 mm plus pipe ø 12 mm	 50 m 8 x 3 m
max. overall pipe length per pipe system per with high fan voltage 9,0 V pipe ø 25 mm plus pipe ø 12 mm	 40 m 6 x 3m
min. distance between 2 aspiration apertures (d)	4 m
max. distance between 2 aspiration apertures (d)	10 m
max. number aspiration apertures (n) per pipe system	6 no.

Aspiration apertures

Number of apertures	**3**	**6**
Aspiration apertures ø in mm* A B	 5,0 —	 3,6 3,8

*) Press cut diameter in aspiration-reducing film sheet

Trigger Thresholds M-Pipe system

Number of apertures	**2**	**6**
1 blocked aperture	±25 %	±10 %
2 blocked apertures	O	±25 %
3 blocked apertures	O	O
4 blocked apertures	O	O
5 blocked apertures	O	O
6 blocked apertures	O	O
… is/are recognised when main air flow set x %		

O not purposeful

Example If the blockage of 1 aspiration apertures out of a total of 6 aspiration apertures is recognised, then with the aid of the diagnostics tool, air flow monitoring can be set to ±10 %.

NOTICE

For a project planning according to EN 54-20 or ISO 7240-20, the air flow monitoring has to be adjusted to ≤20 % in either case.

5.3.1.4 Doppel-U-Pipe system

1 Pipe system

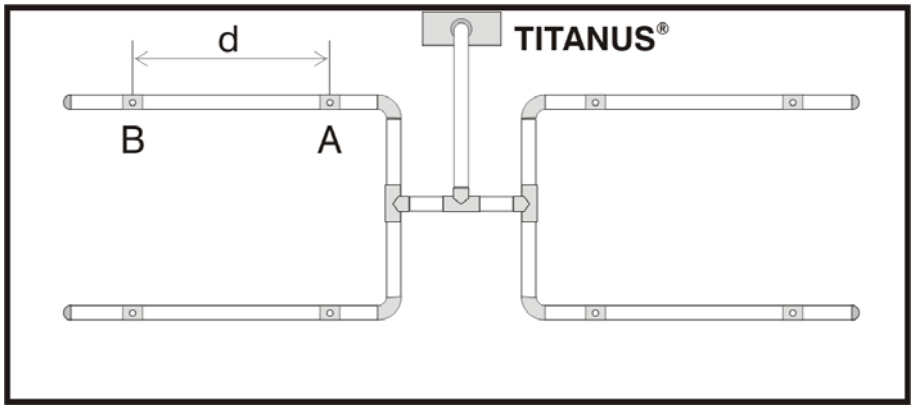


Figure 46: Double-U-Pipe system for area protection

Limit values

min. distance TITANUS® – T-no.	2 m
max. distance TITANUS® – T-no.	20 m
max. branch length	12.5 m
max. overall pipe length per pipe system pipe ø 25 mm plus pipe ø 12 mm	50 m 8 x 3 m
max. overall pipe length per pipe system per with high fan voltage 9,0 V pipe ø 25 mm plus pipe ø 12 mm	40 m 8 x 3m
min. distance between 2 aspiration apertures (d)	4 m
max. distance between 2 aspiration apertures (d)	10 m
max. number aspiration apertures (n) per pipe system	8 no.

Aspiration apertures

Number of apertures	4	8
Aspiration apertures ø in mm*		
A	4,4	3,0
B	—	3,2

*) Press cut diameter in aspiration-reducing film sheet

Trigger Thresholds double-U-pipe system

Number of apertures	2	6
1 blocked aperture	±10 %	—
2 blocked apertures	±25 %	±10 %
3 blocked apertures	O	±20 %
4 blocked apertures	O	±30 %
5 blocked apertures	O	O
6 blocked apertures	O	O
… is/are recognised when main air flow set x %		

— not possible

O not purposeful

Example If the blockage of 3 aspiration apertures out of a total of 8 aspiration apertures is recognised, then with the aid of the diagnostics tool air flow monitoring can be set to ±20 %.

NOTICE

For a project planning according to EN 54-20 or ISO 7240-20, the air flow monitoring has to be adjusted to ≤20 % in either case.

5.3.2 Simplified pipe design

Simplified pipe design is used for equipment protection and in areas with small dimensions. The advantage of this design is the unified diameters of the aspiration apertures.

For the project planning's, the specifications according to chapter 5.2 apply. Furthermore, the following limit values and opening diameters have to be considered. Additional accessories (air filter, steam traps etc.) can influence the maximum pipe length.

5.3.2.1 I-Pipe system

1 Pipe system

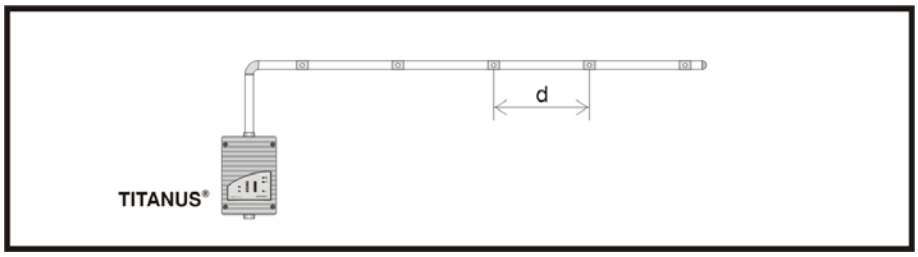


Figure 47: I-Pipe system, e.g. for equipment protection

Limit values

min. distance TITANUS® – 1st aspiration aperture	2 m
max. distance TITANUS® – 1st aspiration aperture	20 m
max. overall pipe length per pipe system pipe ø 25 mm plus pipe ø 12 mm	40 m 5 x 3 m
max. overall pipe length per pipe system per with high fan voltage 9,0 V pipe ø 25 mm plus pipe ø 12 mm	30 m 5 x 3m
max. number aspiration apertures (n) per pipe system	5 no.
min. distance between 2 aspiration apertures (d)	0.1 m
max. distance between 2 aspiration apertures (d)	4 m
minimum distance for fire site location between the aspiration apertures (d)	3 m

Aspiration apertures

Number of apertures	1	2	3	4	5
Aspiration aperturesø in mm*	6,8	4,6	4,0	3,6	3,4

*) Press cut diameter in aspiration-reducing film sheet

5.3.2.2 U-Pipe system

1 Pipe system

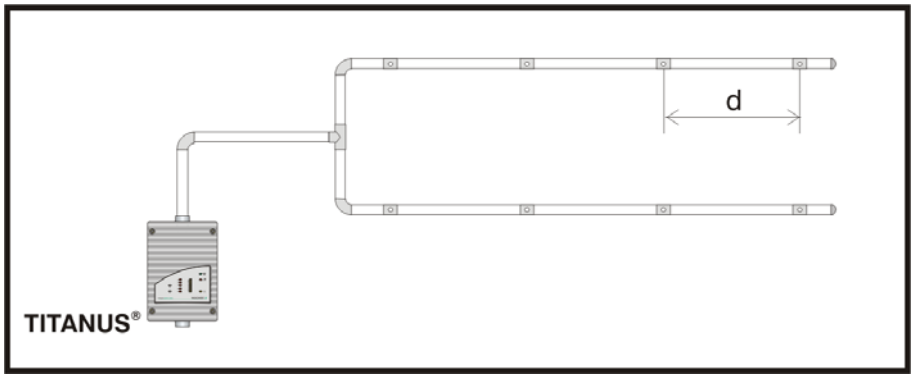


Figure 48: U-Pipe system, e.g. for equipment protection

Limit values

min. distance TITANUS® – T piece	2 m
max. distance TITANUS® – T piece	20 m
max. branch length	25 m
max. overall pipe length per pipe system pipe ø 25 mm plus pipe ø 12 mm	50 m 8 x 3 m
max. overall pipe length per pipe system per with high fan voltage 9,0 V Rohr ø 25 mm plus pipe ø 12 mm	40 m 8 x 3m
max. number of aspiration apertures (n) per pipe system	8 no.
min. distance between 2 aspiration apertures (d)	0.1 m
max. distance between 2 aspiration apertures (d)	4 m

Aspiration apertures

Number of apertures	**2**	**4**	**6**	**8**
Aspiration apertures ø in mm*	6,0	4,2	3,4	3,0

*) Press cut diameter in aspiration-reducing film sheet

5.3.2.3 M-Pipe system

1 Pipe system

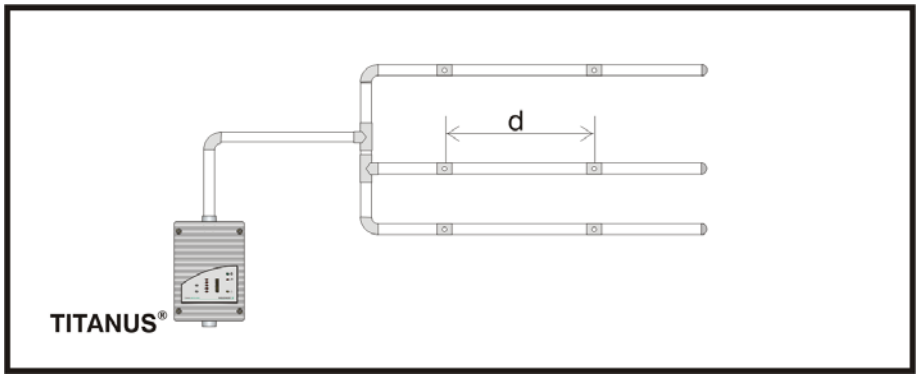


Figure 49: M-Pipe system, e.g. for equipment protection

Limit values

min. distance TITANUS® – T piece	2 m
max. distance TITANUS® – T piece	20 m
max. branch length	16.5 m
max. overall pipe length per pipe system Rohr Ø 25 mm plus pipe Ø 12 mm	50 m 8 x 3 m
max. overall pipe length per pipe system per with high fan voltage 9,0 V pipe Ø 25 mm plus pipe Ø 12 mm	40 m 6 x 3m
max. number aspiration apertures (n) per pipe system	6 no.
min. distance between 2 aspiration apertures (d)	0.1 m
max. distance between 2 aspiration apertures (d)	4 m

Aspiration apertures

Number of apertures	**3**	**6**
Aspiration apertures Ø in mm*	5,0	3,6

*) Press cut diameter in aspiration-reducing film sheet

5.3.2.4 Double U-pipe system

1 Pipe system

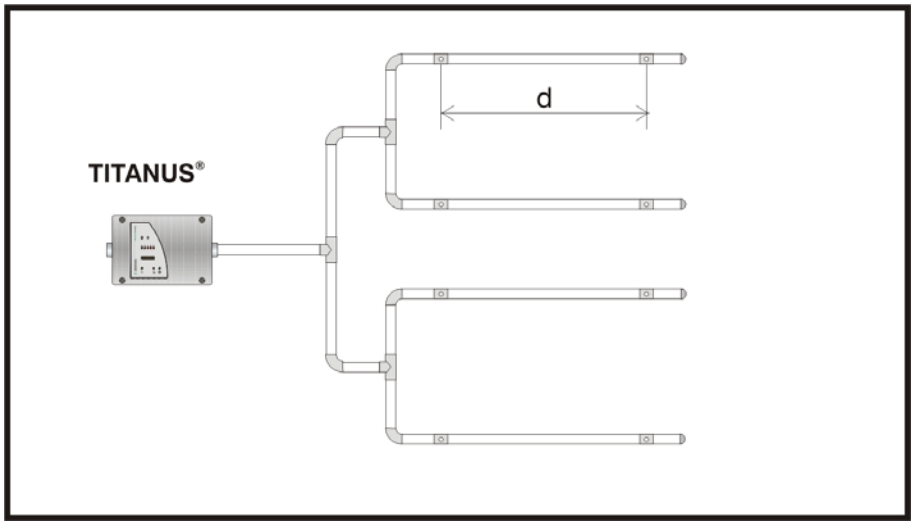


Figure 50: Double U-pipe system, e.g. for equipment protection

Limit values

min. distance TITANUS® – T piece	2 m
max. distance TITANUS® – T piece	20 m
max. branch length	12.5 m
max. overall pipe length per pipe system pipe ø 25 mm plus pipe ø 12 mm	 50 m 8 x 3 m
max. overall pipe length per pipe system per with high fan voltage 9,0 V pipe ø 25 mm plus pipe ø 12 mm	 40 m 8 x 3m
max. number aspiration apertures (n) per pipe system	8 no.
min. distance between 2 aspiration apertures (d)	0.1 m
max. distance between 2 aspiration apertures (d)	4 m

Aspiration apertures

Number of apertures	**4**	**8**
Aspiration apertures ø in mm*	4,4	3,0

*) Press cut diameter in aspiration-reducing film sheet

5.3.3 Project planning with branch pipe

Project planning with branch pipe are suitable for sampling points which are located distantly from the main run of the pipe system.

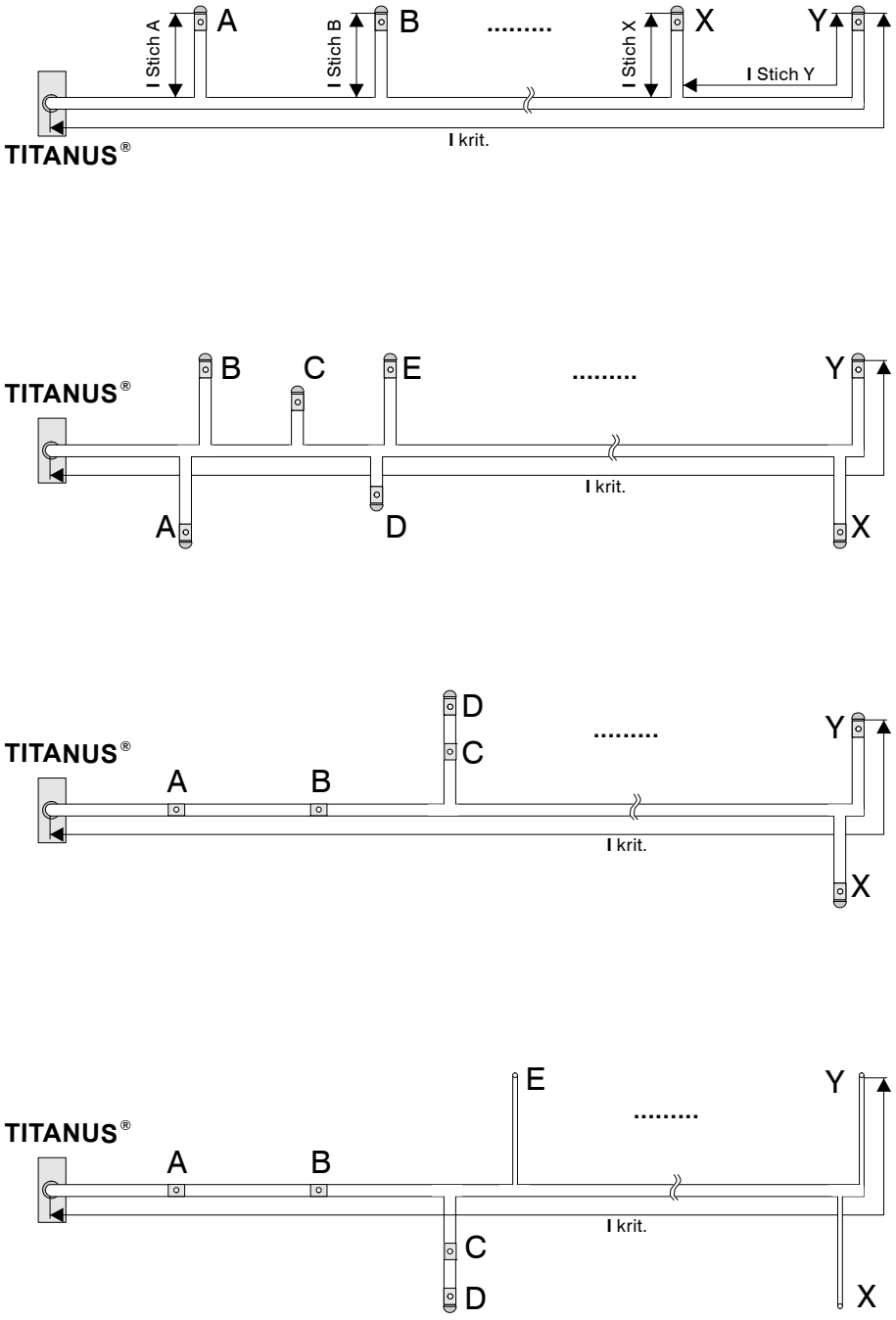


Figure 51: Project planning with branch pipe

The branch pipes must be projected in accordance to the figure (project planning with branch pipes). The project planning of I-pipe described in the

figure must be copied to every single sampling branch of other pipe forms (U, M, double-U pipe system).

Referring to the project planning with burs please notice that the “critical length” ($l_{krit.}$)of a project planning does not exceed the maximum total length of pipe respectively of branch (referring to U, M, double-U pipe system). The critical length described the sampling point which is located most distantly from TITANUS®.

Two aspiration apertures in total can be projected on each branch pipes at which the minimal and maximum distance between the aspiration apertures must be respected.

Opening diameter

The opening diameters are valid for the projected aspiration apertures in accordance with the chapter „Opening diameter for standard project planning“.

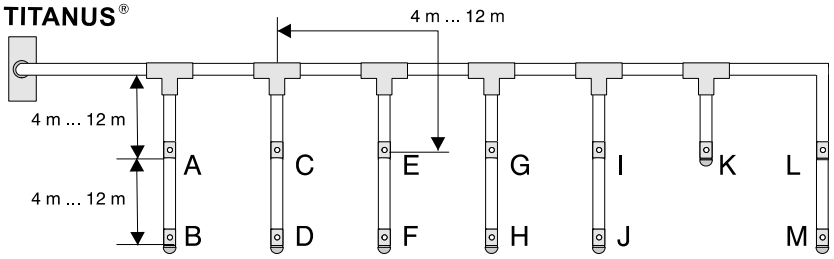


Figure 52: Distances of apertures with branch pipes

Distances of apertures

The distance between the T-piece and the following branch pipe as well as the pipe length between aspiration apertures on the branch pipes must not exceed 12 m in total.

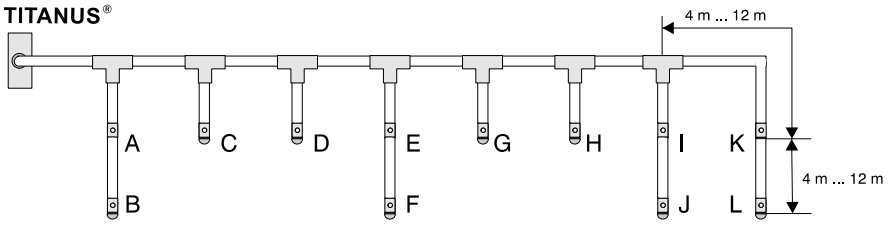


Figure 53: Maximum branch pipe

Maximum length of branch pipe

The length of pipe between the last T-piece and the last aspiration apertures is the length of branch pipe. All other branch pipes need to be shorter. Two aspiration apertures in total can be projected on each branch pipe.

TIP

If the maximum distance is exceeded a correction by an additonal aspiration aperture on a branch pipe can be done. In this connection please notice that two aspiration apertures in total can be projected on each branch pipe.

NOTICE

When the fire location (ROOM·IDENT) localization must only be one aspiration aperture per branch pipe can are projected. At least 3m distance must be maintained between the suction port of the first branch pipe and each configured subsequent aspiration aperture.
Folgen

5.3.4 Project design for forced air flow

Monitoring air conditioning ducts

Air conditioning plants are divided into low-speed and high-speed plants (see table below). The information given in this chapter applies **only to low-speed plants**. There is insufficient information from experience with high-speed plants. Where air conditioning ducts have flow speeds of more than 10 m/s, therefore, smoke testing must be carried out for the best reaction behavior to be determined.

	Low-speed systems	High-speed systems
Flow speed	maximum 6 bis10 m/s	> 10 m/s
Duct cross-section	large	small
Differential pressures along the flow direction	small	large

The speed distribution in an air conditioning duct looks as follows:

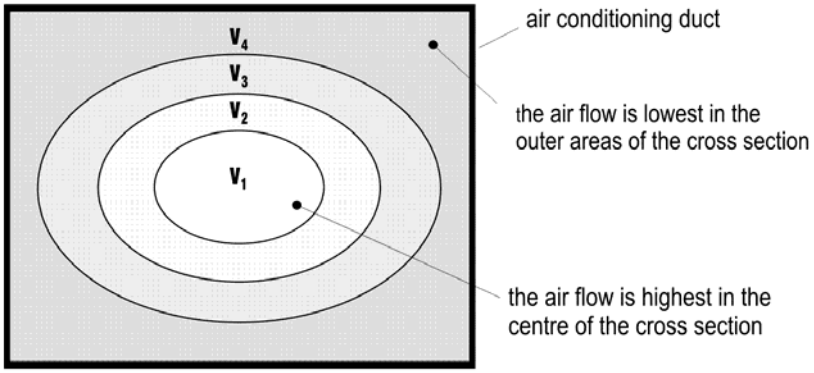


Figure 54: Speed distribution in an air conditioning duct

Aspiration

To achieve optimum detection results, the pipe system must be arranged in the area v_1 to v_3.

Location of the pipe system

To achieve the best location for constructing the pipe system, the exhaust duct should be as far as possible from sound dampers, air baffle plates and kinks. The guideline figure for the distance from such “obstacles” is at least 3 x the smallest duct diameter.

If it is absolutely essential to fit the pipe system directly behind baffle plates, sound dampers or bends, the main speed areas must be monitored.

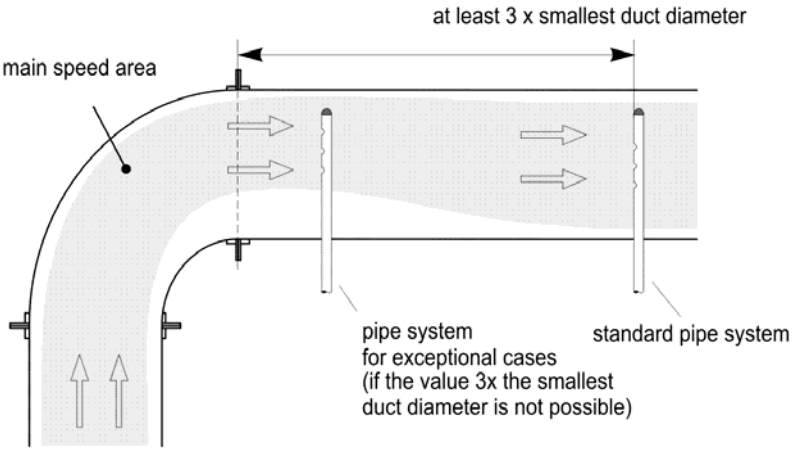


Figure 55: Duct direction change without baffle plates

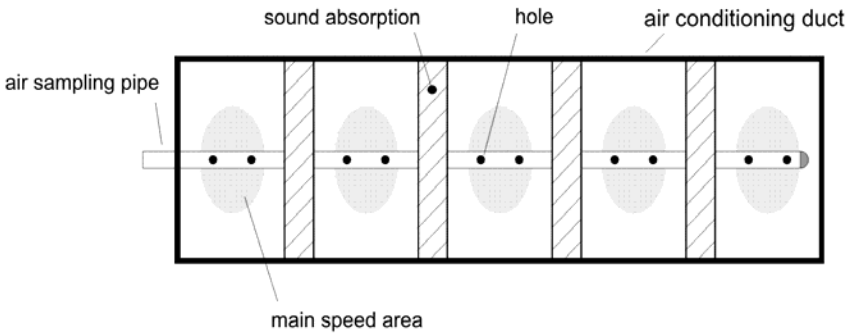


Figure 56: Sound dampers in a duct

When a pipe system is built into air conditioning ducts, the following must be observed:

- As the TITANUS® and the pipe system are in different pressure areas, there must be an air return arrangement (see following page).
- The pipe entries into the duct must be sealed air-tight.
- The part of the pipe system which is outside the duct must be bonded air-tight.

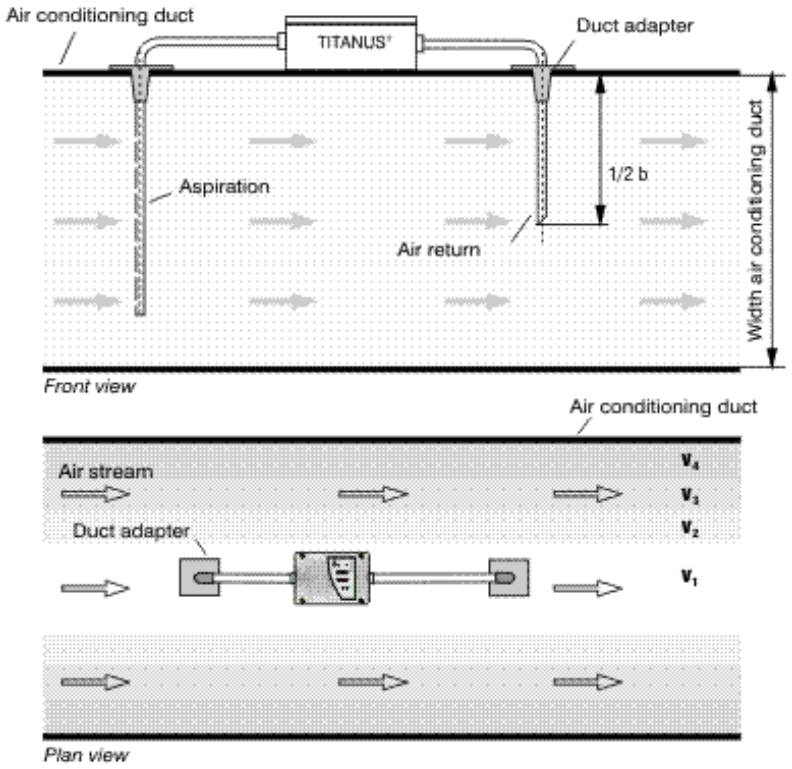


Figure 57: Air return

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

The distance between the aspiration apertures and between them and the duct wall is shown in the following table.

Bore distance

	Duct cross section ≤ 0,5 m²	**Duct cross section > 0,5 m²**
Distance from aspiration apertures to the wall	100 to 200 mm	200 to 300 mm
Distance between the aspiration apertures	100 mm	150 mm

Sampling aperture diameter

The diameter of the sampling aperture results from the number of aspiration apertures. The precise value can be found in Chapter "Simplified pipeline project planning".

The pipe is concluded with an end cap without a bore.

Arrangement

The aspiration apertures should be arranged against the air flow.

During project planning, it is to be taken into account that the air conditioning ducts for mounting the pipe system are often only accessible from two sides.

Example The following illustration depicts two project planning examples of pipe systems in air conditioning ducts.

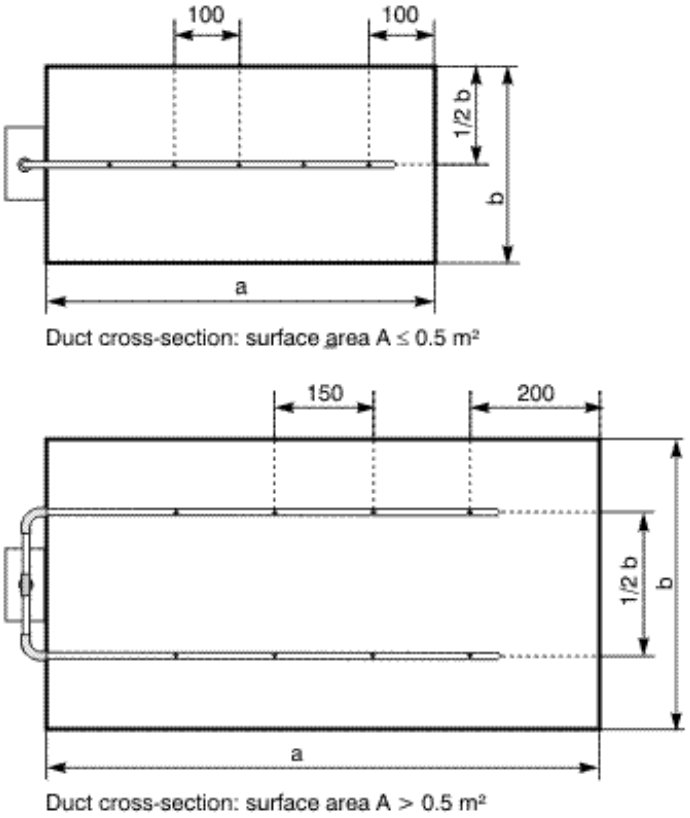


Figure 58: Ducts with small and large duct cross-section

5.3.5 Project design with air sampling hose

The application of an air sampling hose can be useful if several direction changes on a short distance of a pipe system is required, e. g. for avoiding any obstacles.
As the transport time can be manipulated negatively by application of an air sampling hose, the influence of the used air sampling hose is to be determined on the allowed total length of pipe as follows.

Consideration during application of air sampling hose:

For calculation the maximum length of air sampling pipe with air sampling hose, the length of the air sampling hose must be multiplied by the certain factor b and deducted from the allowed total length of pipe.

Air sampling pipe length = Total pipe length – (Length of the air sampling hose * Factor b)

Factor for calculation of the air sampling hoses length:

Air sampling hose	Factor b
Type SCH-PG16	1,1
Type SCH-P25	0,5

Example 1: Altogether, the air sampling hose of type SCH-PG16 with a length of 12 m shall be connected to a TITANUS® air sampling smoke device. The allowed total length of pipe is 50 m. The result for the maximum air sampling pipe inclusive air sampling hose is:

Air sampling pipe length = 50 m - (12 m * 1,1) = 36,8 m

Example 2: In case of a pipe project planning, 45 m of air sampling pipe and air sampling hose shall be connected to a TITANUS® air sampling smoke device. In accordance to the project planning scale, the allowed total length of pipe can be 50 m for the complete pipe project planning. The result for the maximum length of the complete air sampling hose of type SCH-P25, which can be integrated within the pipe project planning, after formula adjustment is:

Length of the air sampling hose = (Total pipe length - Air sampling pipe lenght) / Factor b
Length of the air sampling hose = (50 - 45 m) / 0,5 = 10 m

NOTICE

The complete air sampling pipe must not consist of a single air sampling hose.

NOTICE

Aspiration reduction must not put about the air sampling hose.

5.3.6 Project planning with air return

In some cases, in which differences of air pressure between the area of air sampling device and the area of air sampling point exist, a channel of air pressure of the aspirated test air in the pressure area of air sampling points can be necessary. Therefore, an air sampling hose with a right length should be connected on the air outlet of the air sampling device.
As the transport time of an air sampling smoke detection device can be manipulated negatively by an air return, the influence of the air return to the allowed total length of pipe is to be respected.
An air return with a pipe with Ø 40 mm has no influence and can be projected and/or retrofitted without reducing the total pipe length and / or retrofitted.

Consideration of air returns:

For calculation the maximum length of air sampling pipe, the length of the air return must be multiplied by the certain factor a and deducted from the allowed total length of pipe.

Air sampling pipe lenght = Total pipe length – (Length of the air return * Factor a)

Factors to calculate the lengths of air return (∅ 25 mm):

Length of the air return	Factor a
0 bis 5 m	0,0
> 5 bis 10 m	1,6
> 10 bis 25 m	3,2

Factors to calculate the lengths of air return (∅ 32 mm):

Length of the air return	Factor a
0 bis 5 m	0,0
> 5 bis 10 m	0,0
> 10 bis 25 m	1,0

Example: An air return (∅ 25 mm) from 10 m to be connected to a TITANUS®. The allowed total length of pipe is 50 m. The result for the maximum air sampling pipe is:

Air sampling pipe lenght = 50 m – (10 m * 1,6) = 48,4 m

5.4 Power supply

The alarm-ready status in the fire protection system and the aperture of an alarm are taken into account when rating the external mains supply. In the system's alarm-ready status, the mains supply must supply standby current to the air sampling smoke detection systems and ensure that the emergency power batteries are charging in accordance with DIN VDE 0833 Part 1 (80% load in 24 hours).

NOTICE

The mains supply of the air sampling smoke detection systems shall be approved according to EN 54-4.

Power calculation

The following formulae apply in case of alarm:

Room protection

$$I_{total,room} = I_{alarm} \cdot n_{\max.area} + I_{quiescent}(n - n_{\max area}) \leq I_{power\,sup\,ply,\max.}$$

Equipment protection

$$I_{total\ \ equipment} = I_{alarm} \cdot \sqrt{n} + I_{quiescent}\ (n - \sqrt{n}) \leq I_{\max.power}$$

The current for charging the accus is calculated by the following formula:

Charging current

$$I_{charging} \approx \frac{0{,}8 \cdot K_{nominal}}{24}$$

$$I_{total,equipment} = I_{quiescent} \cdot n + I_{\text{charging}} \leq I_{\text{powersupply,max.}}$$

I_{total}	=	*total current of all connected air sampling systems [A]*
$I_{power\ supply,\ max.}$	=	*max. supply current of the power supply unit [A]*
n	=	*total number of all air sampling systems connected to a power supply unit*
$N_{max.\ area}$	=	*total number of all air sampling systems in the area with the highest power consumption*
I_{alarm}	=	*alarm current of an air sampling system [A]*
$I_{quiescent}$	=	*quiescent current of an air sampling system [A]*
$K_{nominal}$	=	*nominal capacity of the accumulators [Ah]*
$I_{charging}$	=	*charging current of the accumulators (within 24 h 80% of the nominal capacity) [A]*

NOTICE

The higher figure of the total current calculated (I_{total}) is used to design the power supply!

The power consumption of the TITANUS® can be found in Chapter, "Technical Data".

Line calculation

The maximum line length results from the permitted line drop on the feed. The permitted line drop is the difference resulting from the stand-by accus discharge voltage (21.5 V) and the lower operating voltage limit of the aspiration smoke detection system.

$$L_{\max} = \frac{\gamma \cdot \Delta U \cdot A}{I_{total} \cdot 2}$$

Lmax	=	*Maximum line length in [m]*
A	=	*Wire cross-section in [mm²]*
Itotal	=	*Total current of the aspiration smoke detection system in [A]*
γ	=	*Conductivity: Cu=57m/Ωmm²*
ΔU	=	*Max.line drop on the feed*

To guarantee the tightness of the housing seal, the appropriate cable throughput for the particular cable must be selected.

- M 25- cable throughput: ∅ 9 to 14 mm
- M 20- cable throughput: ∅ 8 to 12 mm

Emergency Supply Calculation

The nominal capacity is calculated by means of the following formula:

$$K_{nominal} = (I_{quiescent} \cdot n \cdot t + I_{total} \cdot 0.5h) \cdot 1.25$$

Knominal	=	*nominal capacity of the emergency supply accumulators [Ah]*
t	=	*required bridging time [h]*

The factor 1.25 in the equation is only to be observed if bridging times are smaller equal to [sic] 24 hours.

6 Installation

6.1 General

The regulations, guidelines and instructions given in chapter "Design" are valid.

When installing the TITANUS *MICRO·SENS*® air sampling system, the following must be taken into consideration:

1. there should be no changes made to the equipment. Where this is unavoidable the operator, manufacturer and/or supplier must be in-formed (written approval).
2. any changes in the supply network (230 V/400 V supply) and external supply systems must be carried out by the system owner. This includes e.g.:
   - the primary connection of the supply units
   - any connections to external systems (e.g. central units)
   - planning of possible additional lightning protection and voltage surge protection, which conform to standards

6.2 Installation site

6.2.1 Fitting the TITANUS ®

When choosing the installation site, ensure that the notices can be easily seen.

NOTICE

When choosing the installation site, ensure that it is not within a space where doors open.

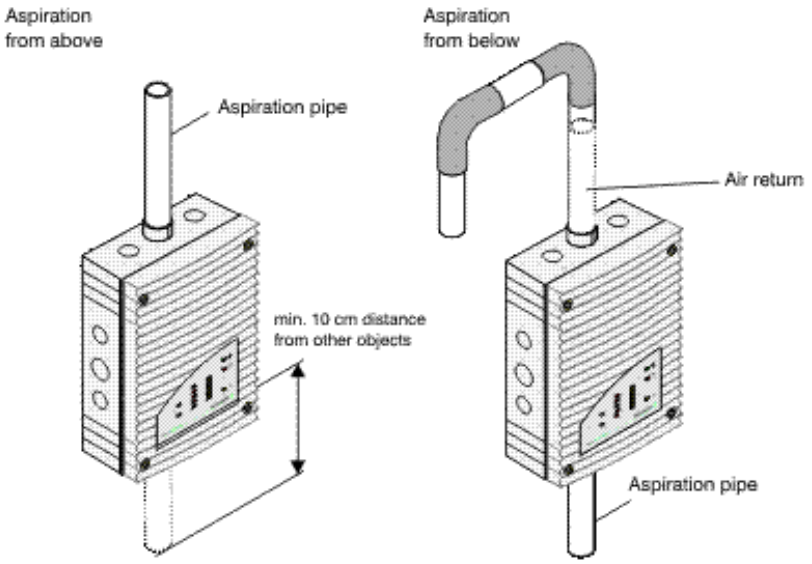


Figure 59: Installation of TITANUS®

Aspiration from above Ensure that the air outlet from the aspirating smoke detector is not blocked. Maintain a distance of **at least 10 cm** between the air outlet from the TITANUS *MICRO·SENS*® and surrounding objects (e.g. wall).

Aspiration from below If the TITANUS *MICRO·SENS*® is installed with the aspiration pipe underneath, ensure that no foreign bodies or drops of water can get into the air

outlet aperture which in this case is facing upwards. For that reason, use a short pipe angled downwards.

⚠ WARNING

With aspiration from below, the housing cover on the TITANUS *MICRO·SENS*® must be turned by 180°.

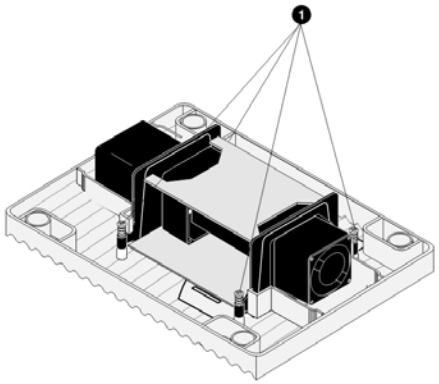


Figure 60: Turn the cover of the TITANUS MICRO·SENS® detection unit

To turn the cover of the TITANUS *MICRO·SENS*® detection unit by 180o, the following steps must be taken:

Turn cover

1. Turn cover (Position as shown in Figure).
2. Now turn the cover and fix the detection unit again with the 4 screws.

Installation equipment

TITANUS®	Cylinder or flat head screws – Thread diameter: max. 4 mm – Head diameter: max. 8 mm

Hole distances

The dimensions (all dimensions in mm) of the holes for fixing the TITANUS *MICRO·SENS*® are shown in the following Figures.

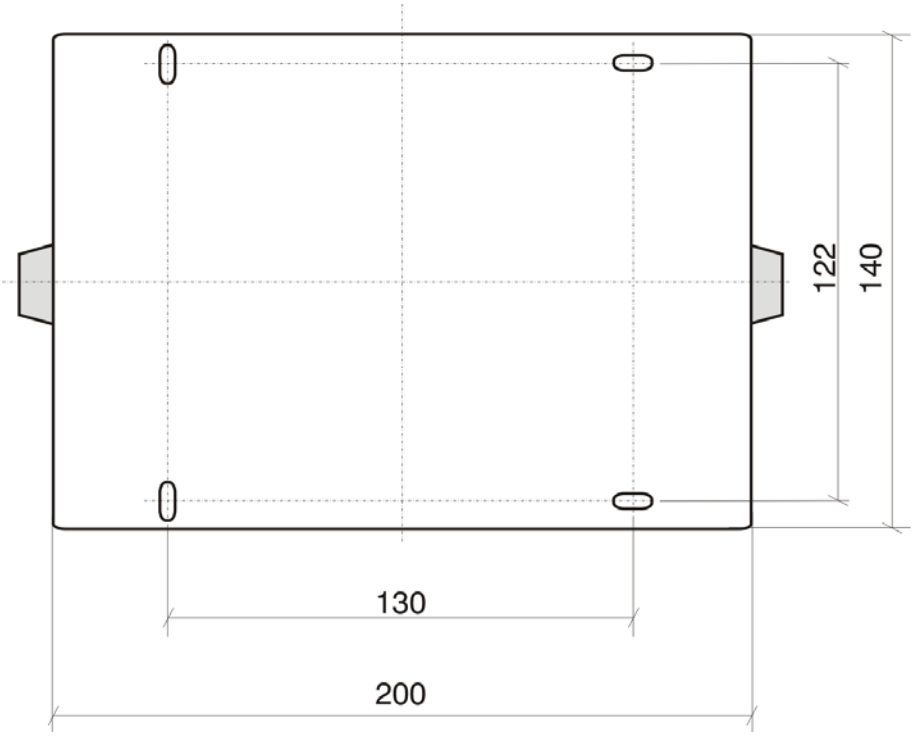


Figure 61: Hole distances TITANUS MICRO·SENS® base unit

6.2.2 Connecting the air sampling pipe

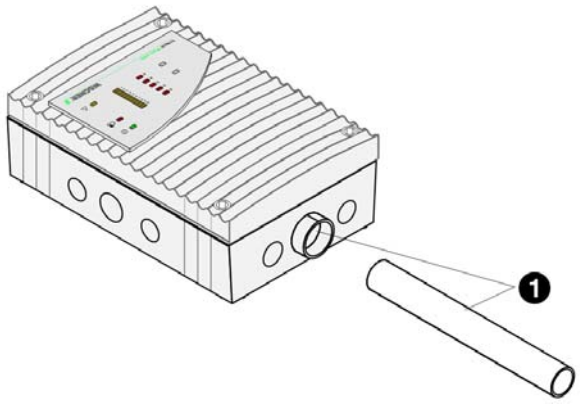


Figure 62: Connecting the air sampling pipe to the TITANUS®

When connecting the air sampling pipe to the TITANUS *MICRO·SENS®* the following steps must be taken:

Connecting the air sampling pipe

1. To join the air sampling pipe to the TITANUS *MICRO·SENS®* push it into the pipe connection provided for the purpose.

NOTICE

Under no circumstances use adhesive to join the air sampling pipe and pipe connection together.
Where there are widely oscillating temperatures, the pipe must be fixed firmly immediately in front of the device such that the pipe is not pulled out of the connection by changes in length which occur (see Chapter „Installation pipe system“).

6.3 Incorporation and electrical connection of additional modules

To prepare the electrical connections, the following steps must first be taken:

1. Make the number of cable entries required on the device base unit, e.g. with a screwdriver.
2. Put the cable entries M20 and/or M25 into the corresponding cable holes.
3. Feed the cable through the corresponding cable holes.

NOTICE

2x M20 and 1x M25 cable entries are supplied with the device.

The electrical connection is made via screw terminals 1a to 8a and 1b to 8b on the TITANUS *MICRO·SENS*® base unit. In so doing, note the permitted cable cross-sections on the threaded joints and the permitted wire cross-sections on the terminals for a max. 0.5 mm² - 2.5 mm² wires.

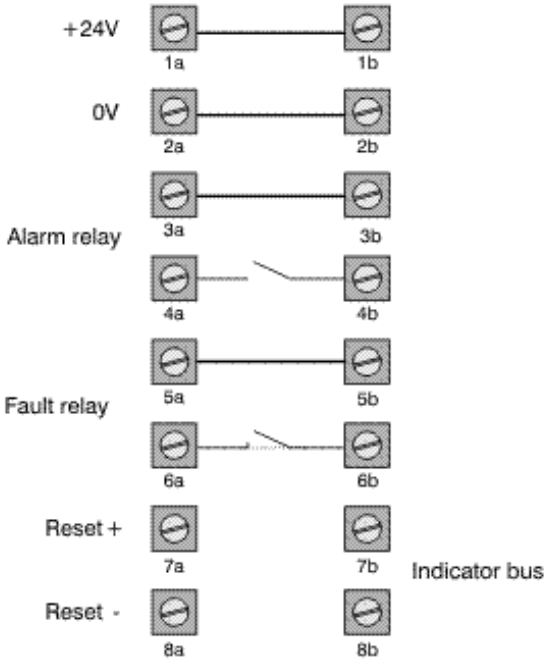


Figure 63: Layout of screw terminals in the device base unit

⚠ WARNING

Carry out all connection work to the device with the power off!

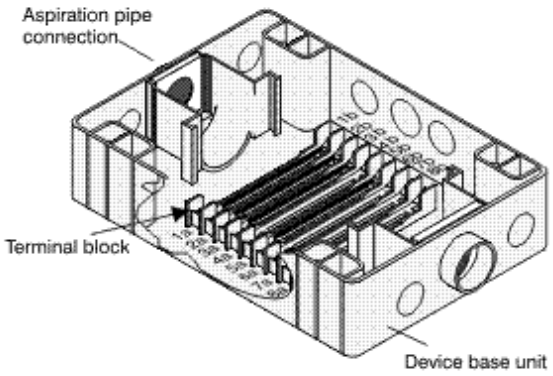


Figure 64: Arrangement of screw terminals in the device base unit

Alarm and fault contact can be used, for example, to connect to a FAS or to control signals, guidance systems etc. There is also the option of connecting a parallel display or reaction indicators to the device indicator bus.

NOTICE

Permanent wiring in the reset input leads to all messages being automatically reset when the cause of the message has been removed.

Additional housing

If additional modules or a parallel display are used, then an installation plate is screwed into the base unit of the additional housing.

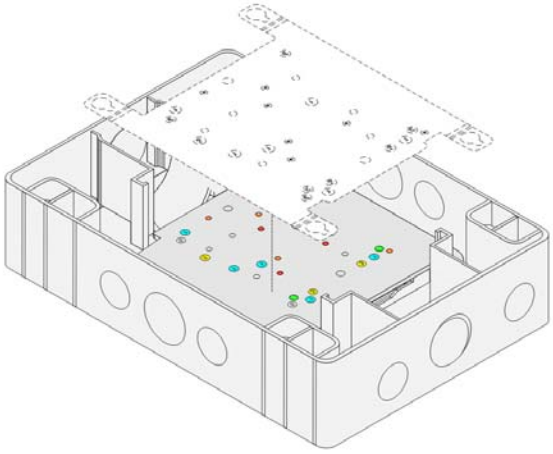


Figure 65: Positioning of the installation plate in the additional housing base unit

The installation plate is for all additional modules and prefabricated for the parallel display switching power supply.

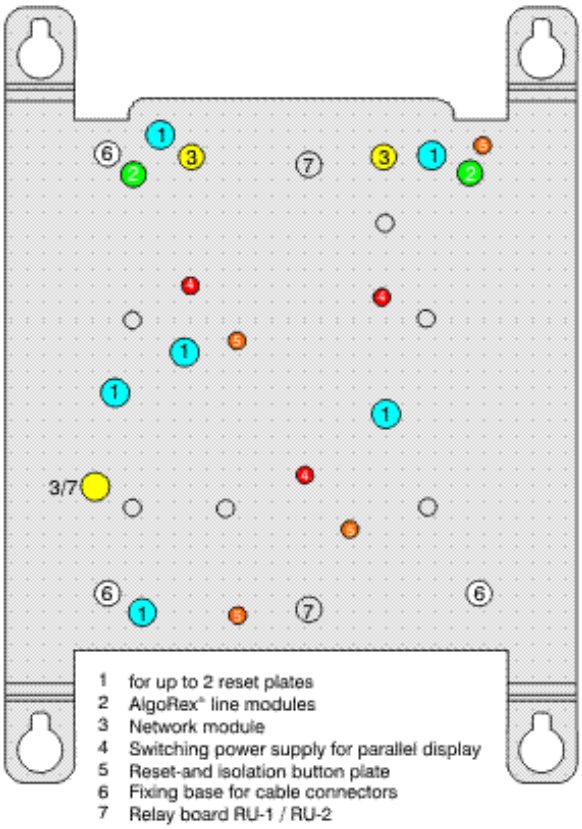


Figure 66: Arrangement of holes on the installation plate of the additional housing

6.4 Connection to FAS, with reset button

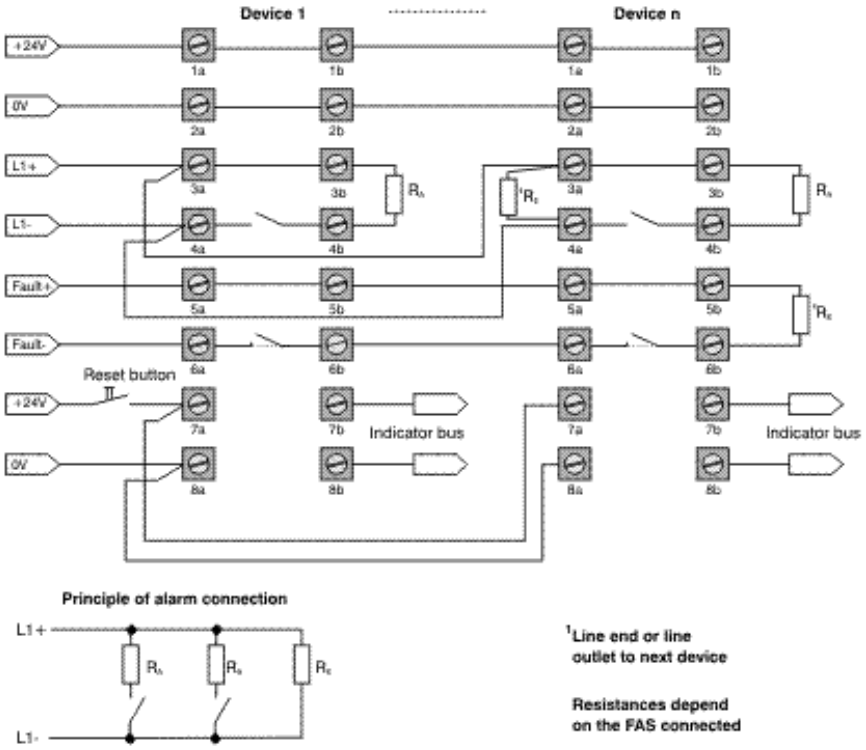


Figure 67: Example of connecting TITANUS MICRO·SENS® to a FAS and reset button

6.5 Incorporating the reset board

The reset board can be used as an option for the TITANUS *MICRO·SENS®*. The reset board is mounted in an additional housing. If several TITANUS *MICRO·SENS®* are connected to a detection line, then the reset board is only connected into the detection line after the last TITANUS *MICRO·SENS®*. The electrical connection to the reset board is as per the switching plan (see Figure “Fitting the rest board into the TITANUS *MICRO·SENS®* additional housing“).

NOTICE

The reset board can only be used if the idling current on the detection line is between 5 mA and 50 mA and the detection line terminal has an ohmic resistance. The reset impulse is triggered if the line voltage falls below 3V when the central unit is reset.

Line idling current

The idling current I_R on the line is calculated as follows:

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

where R_E = *Original terminating resistor of the line in [Ω]*
U_L = *Line voltage in [V]*
I_R = *Idle current on the line in [A]*

The formulae shown for calculating the terminating resistor and the idling current on the detection line take account of the ideal status for signal evaluation.
If no acknowledgement is given from calculating the reset board terminating resistor, the value of the terminating resistor must be reduced by about 20 %.

Terminating resistor

The reset board balances the detection line terminating resistor. It is calculated afresh and incorporated in the reset board (Connection X1, see Figure “Fitting the rest board into the TITANUS *MICRO·SENS®* additional housing“). The value of the terminating resistor R_{ER} is calculated as follows:

$$R_{ER} = \frac{(U_L - 2{,}7V)}{I_R}$$

where R_{ER} = *Terminating resistor on the reset board in [Ω]*

U_L = *Line voltage in [V]*

I_R = *Idling current on the line in [A]*

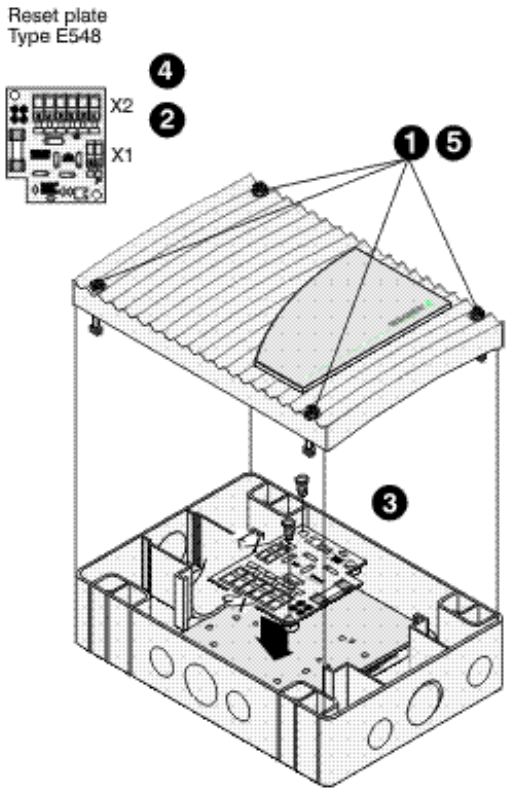


Figure 68: Fitting the rest board into the TITANUS MICRO·SENS® additional housing

Fitting To fit the reset board into the TITANUS *MICRO·SENS®* additional housing, the following steps must be taken:

1. Using a screwdriver, loosen the four screws on the additional housing cover.
2. Put the terminating resistor (Terminal resistor not supplied, performance ¼ W) R_{ER} as calculated into the connecting terminal X1.
3. Fix the reset board to the installation board with 3 plastic spacers (for fixing points see Figure "Arrangement of holes on the installation plate of the additional housing") in the additional housing.
4. The electrical connection (terminal strip 8a/b) is described in section 6.5.1.
5. Fix the cover on again by screwing down the four screws on the device cover firmly using a screwdriver.

6.5.1 Connection to a FAS, with reset board

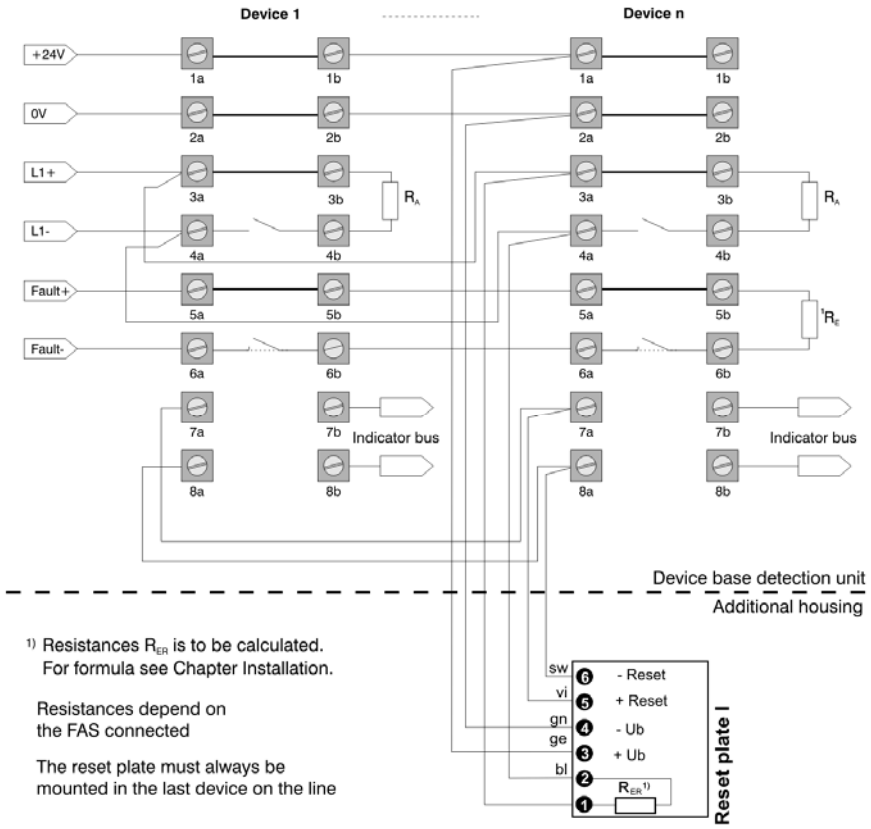


Figure 69: Example of connecting a TITANUS MICRO·SENS® to a FAS and reset board

6.6 Incorporating the reset and isolating button board

If a reset or isolating button is needed, the plate must be fitted into an additional housing.

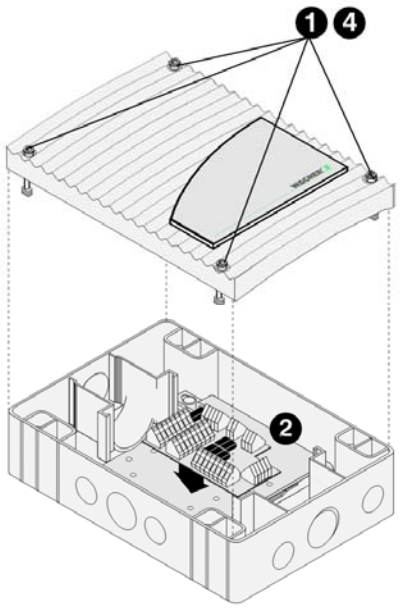


Figure 70: Incorporating the reset and isolating board into the housing

Fitting Proceed as follows to incorporate the reset and isolating button board:

1. Using a screwdriver, loosen the four screws on the additional housing cover.
2. Push the spacer blocks into the installation board (for fixing points see Figure "Arrangement of holes on the installation plate of the additional housing") on the additional housing. The reset and isolating button board is then engaged with the spacer blocks using the holes provided.
3. Feed the wires through as per the following switching plan.
4. Fit the cover again, using a screwdriver to fit the four screws on the device cover firmly.

6.6.1 Function switching plan, reset and isolating button board

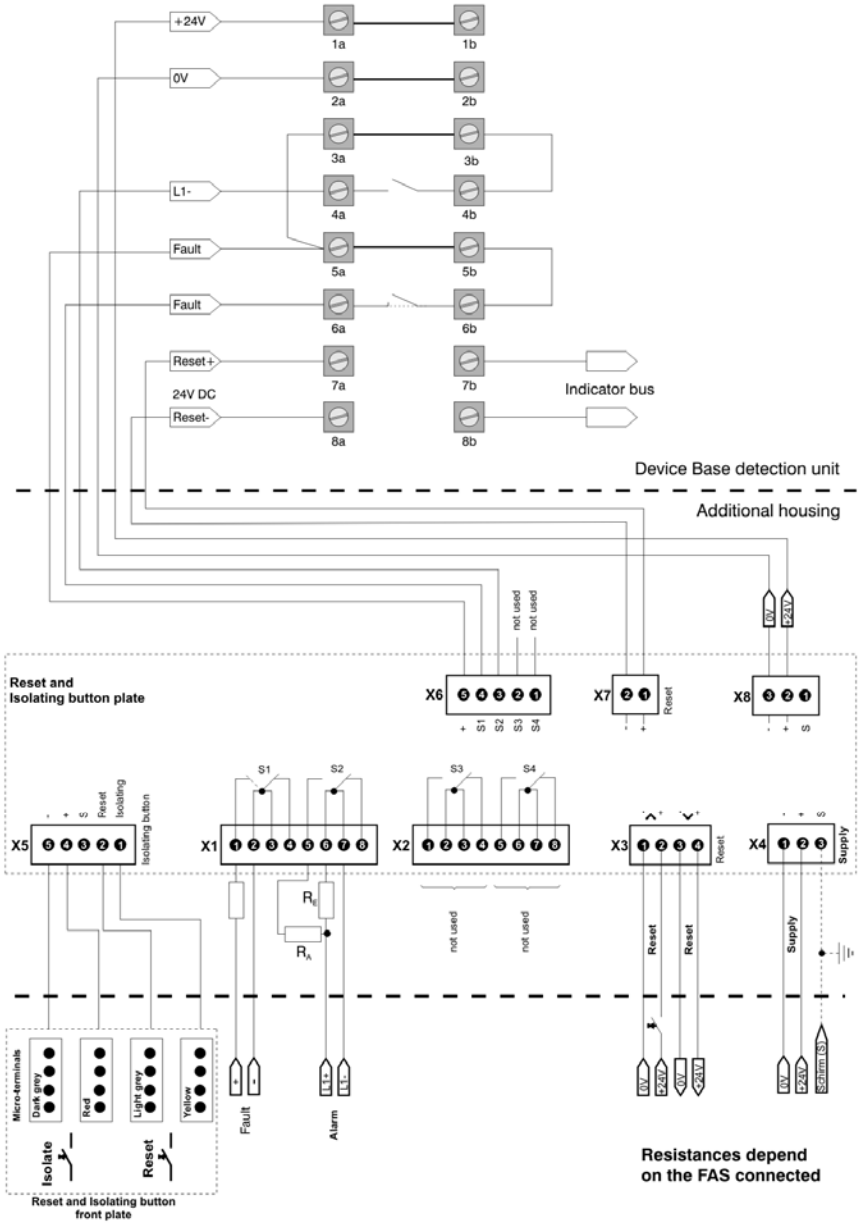


Figure 71: Example of TITANUS MICRO·SENS® connections with reset and isolating button board

6.7 Incorporating the relay board RU-1 / RU -2

If a relay board are needed, the board must be fitted into an additional housing.

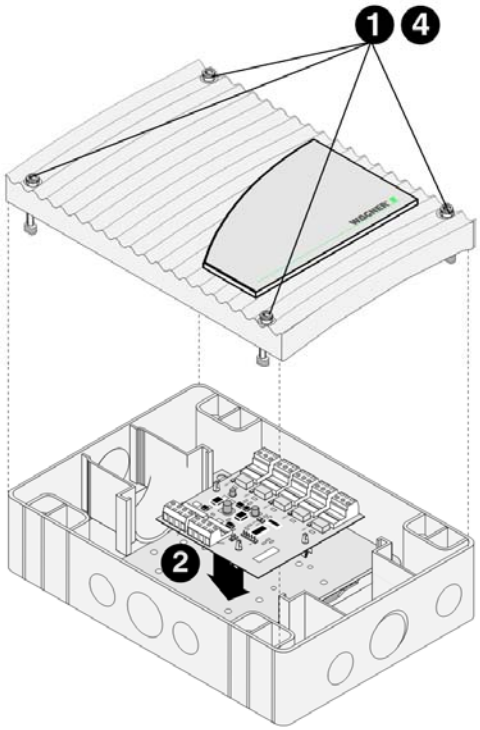


Figure 72: Incorporating the relay board into the TITANUS MICRO·SENS® additional housing

Fitting Proceed as follows to incorporate the relay board:

1. Using a screwdriver, loosen the four screws on the additional housing cover.
2. Push the spacer blocks into the installation board (for fixing points see Figure "Arrangement of holes on the installation plate of the additional housing") on the additional housing. The relay board is then engaged with the spacer blocks using the holes provided.
3. Feed the wires through as per the following switching plan.
4. Fit the cover again, using a screwdriver to fit the four screws on the device cover firmly.

NOTICE

An additional housing of TITANUS MICRO·SENS® is required per relay board. Maximal 2 relay boards or remote display units can be connected to the device.

6.7.1 Function switching plan, relay board RU-1

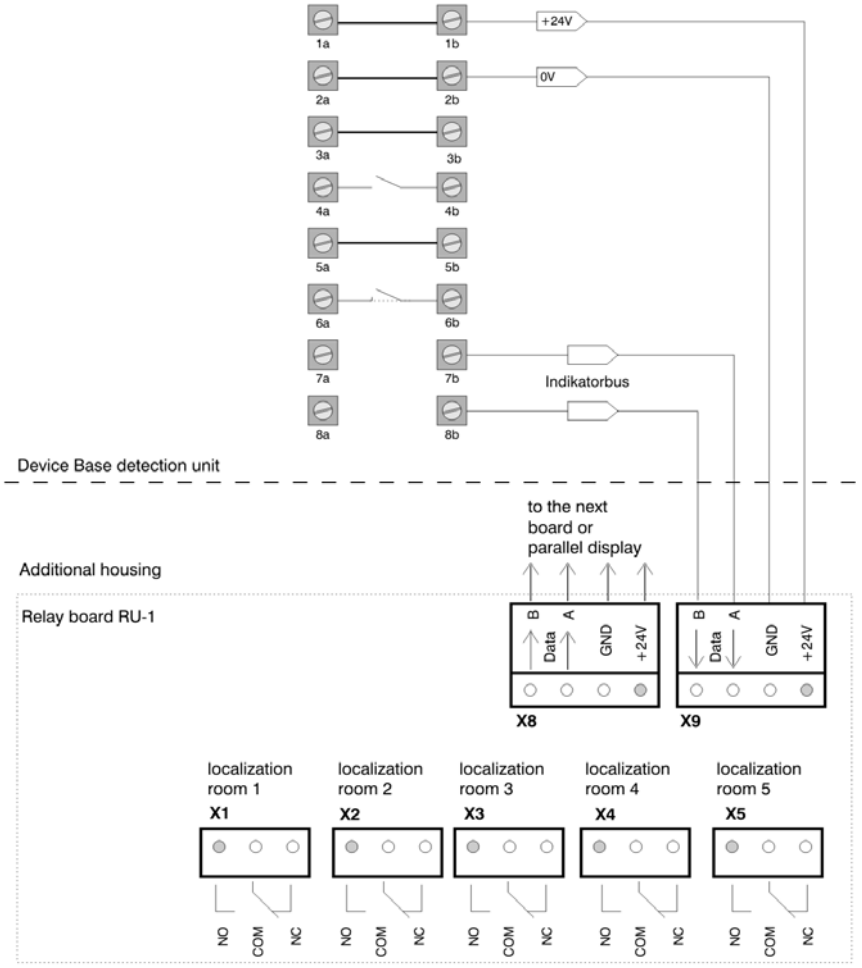


Figure 73: Example of TITANUS MICRO·SENS® connections with relay board RU-1

6.7.2 Function switching plan, relay board RU-2

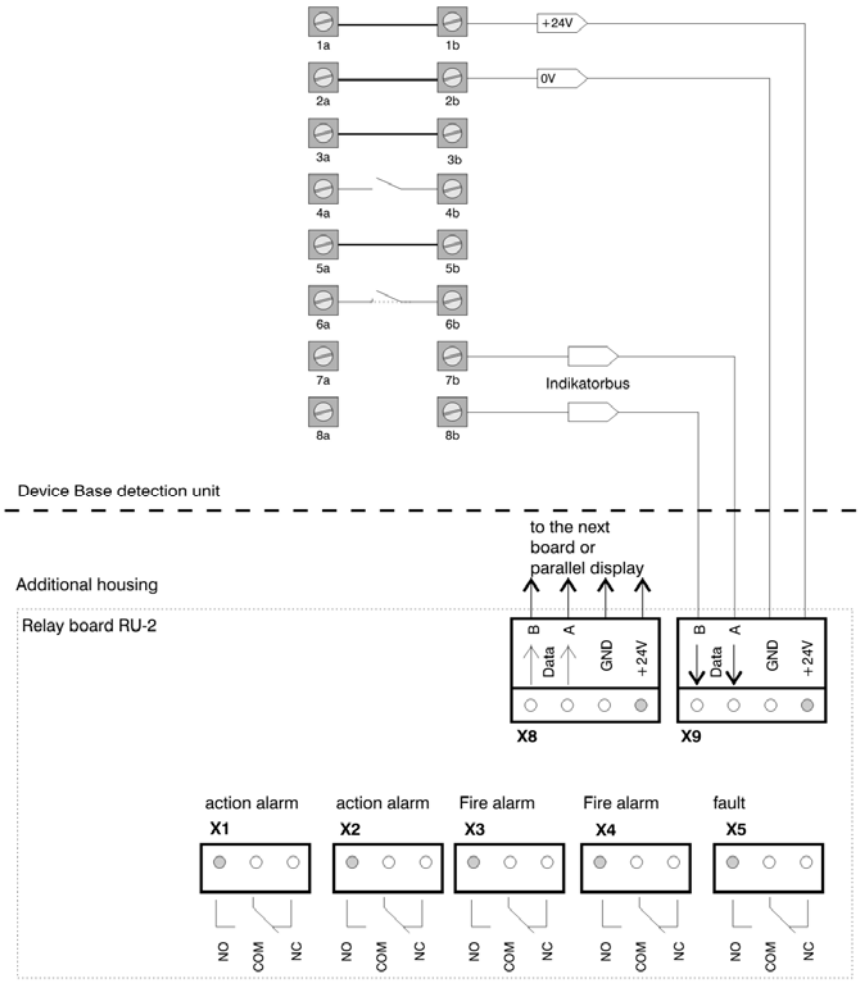


Figure 74: Example of TITANUS MICRO·SENS® connections with relay board RU-2

6.8 TITANUS *MICRO·SENS*® in the network

⚠ WARNING

Do not touch the components on the main board without an anti-static set (with the exception of the DIL switch and button)!

⚠ WARNING

Only carry out assembly and connection work when the device is disconnected from the power supply.

6.8.1 Installing the network module in the TITANUS *MICRO·SENS*®

⚠ WARNING

Housing for TITANUS® accessories is required for installing the network card.

⚠ WARNING

Mount the TITANUS® accessories housing directly next to the air sampling smoke detection system.

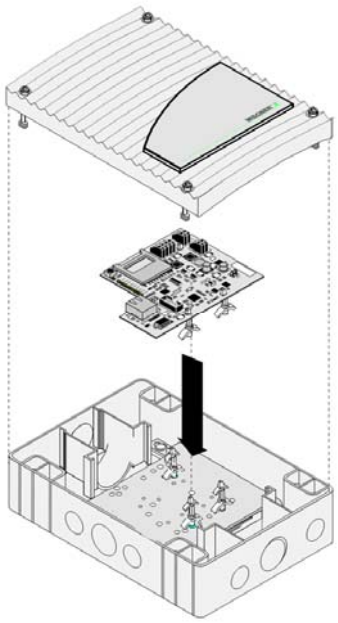


Figure 75: Installing the TITANUS MICRO·SENS® network module

To install the network module, first open the TITANUS® accessories housing. Follow these steps:

1. Use a screwdriver to loosen the four screws on the auxiliary housing cover.
2. Attach the spacers (included with the installation kit) on the assembly holes (pos. A) of the installation plate.
3. Use each of the four fastening screws to fasten each of the cable tie mounts required for the strain relief of the cable(s) to the installation plate (pos. B) located on the base of the housing.
   Two cable tie mounts and two cable ties are included with the TITANUS®-accessories housing.
4. Open the required, pre-stamped cable feeds (max. 8 x M20 and 6 x M25) in the TITANUS® auxiliary housing. If necessary, use a screwdriver to help.
5. Attach M20 or M25 cable guides to the opened cable feeds. Then press the cable gland(s) into the corresponding opening.
6. Connect the battery and insert the memory card into the network module (only included with types NU-2-D, -DO,-D-F, -DO-F).
7. Mount the network module with the three attached spacers on the installation plate.

8. For the cabling, route the connection cable(s) (max. 1.5 mm²) through the prepared cable gland(s). The cable(s) are secured in position with the cable tie mount(s) and cable ties.
9. Connect the network module as indicated in the following wiring diagram.

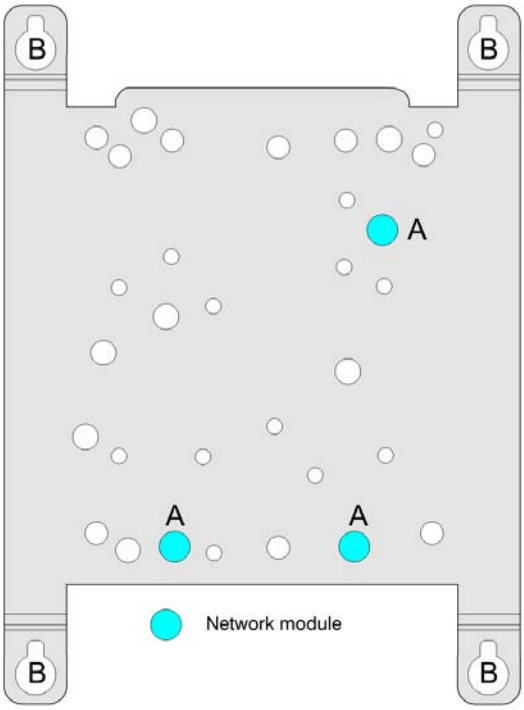


Figure 76: Fastening points on the network module installation plate

⚠ WARNING

All network cards are assigned the same IP address by the manufacturer. It is necessary to ensure that the standard IP address (192.168.1.5) has not been allocated in the network as this can otherwise cause network interference.

10. Once successfully installed, close the cover by securely tightening the four screws on the cover using a screwdriver.
11. Reconnect the voltage supply.

6.8.2 Connecting the network module to the TITANUS *MICRO·SENS®*

The network module connects the network to the TITANUS *MICRO·SENS®*. The electrical connection required for the air sampling smoke detection system circuit board is illustrated below.

NOTICE

The network may only be set up in consultation with the customer's system administrator(s).

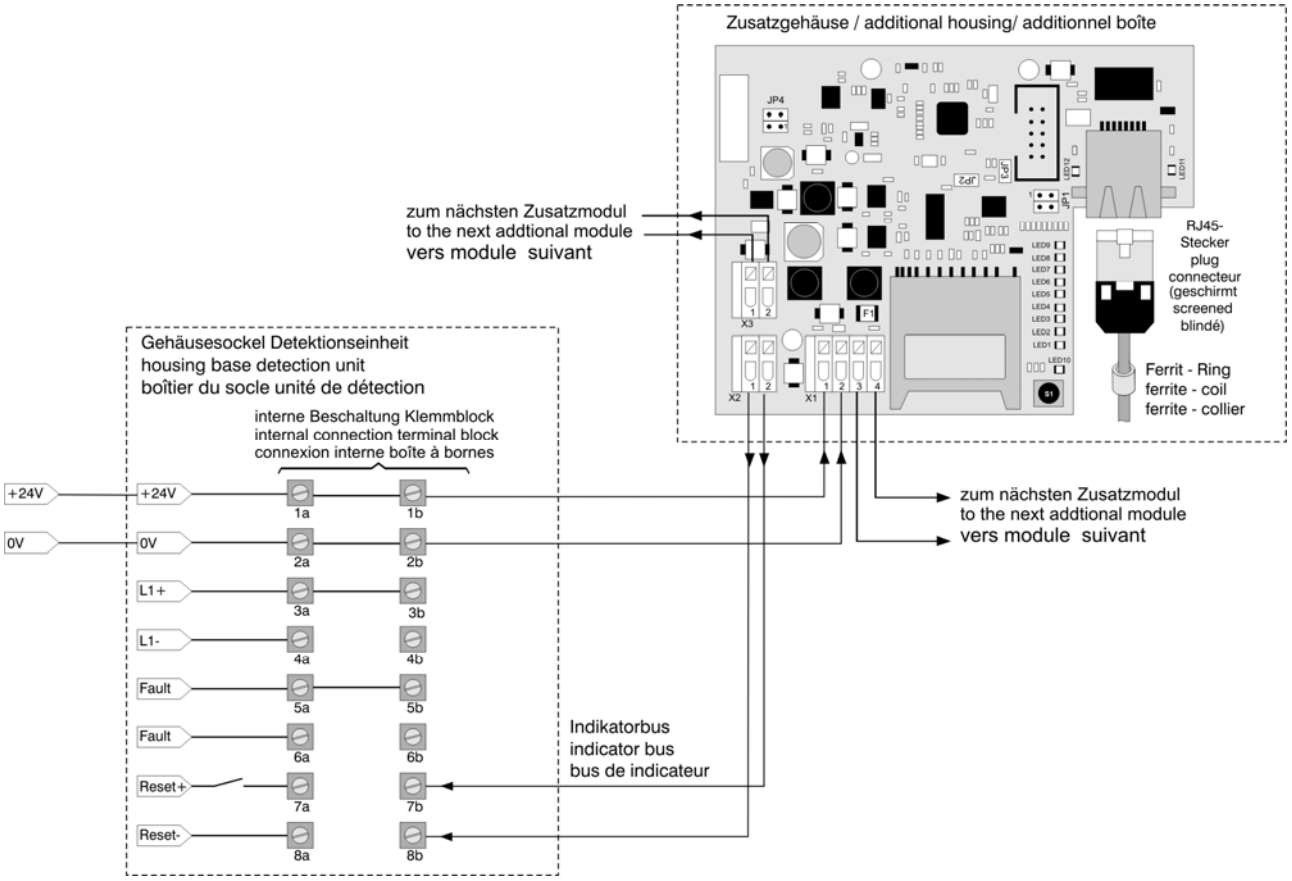


Figure 77: Connecting the TITANUS MICRO·SENS®

6.9 Remote displays

6.9.1 Connecting the remote displays to TITANUS *MICRO·SENS®*

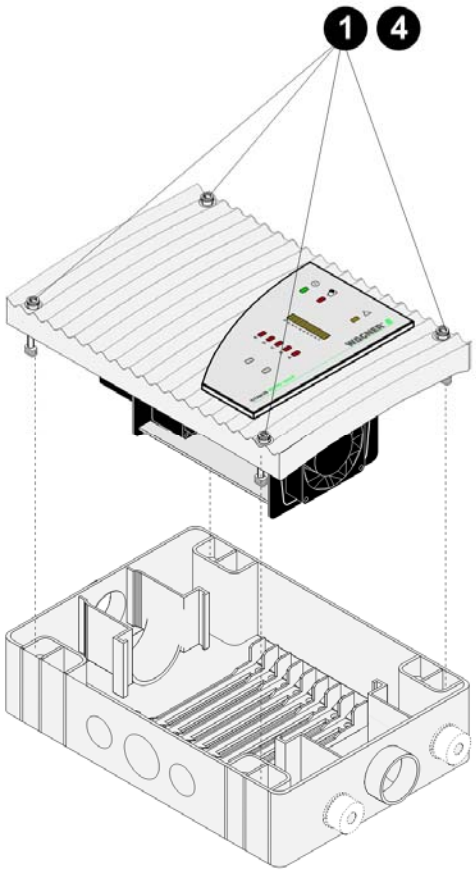


Figure 78: Connection of remote display to TITANUS MICRO•SENS®

To connect the remote display, take the following steps:

1. Using a screwdriver loosen the four screws on the TITANUS *MICRO·SENS®* detection unit.
2. Feed the fire alarm cable through the cable entry on the TITANUS *MICRO·SENS®* device base unit.
3. Feed the wires to the terminal block on the base unit according to the switching plan.

4. Refit the detection unit by using a screwdriver to screw the four screws on the detection unit of the device cover down firmly.

6.9.2 Remote display housing

Fitting the front film

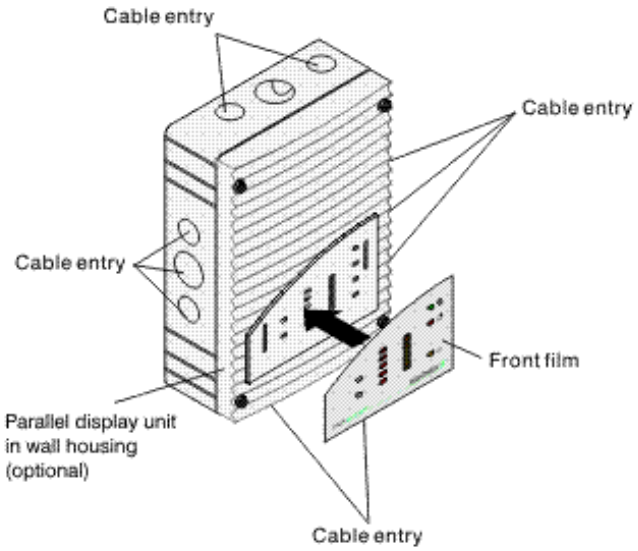


Figure 79: Fitting the front film for the remote display

With the remote display the cable entry can be above, below or at the side without the cover having to be turned. The switching power supply for the remote display is fitted to the installation plate of the remote display housing (for fixing points see Figure "Arrangement of holes on the installation plate of the additional housing").

Wall fixing The device base unit for a parallel display is screwed directly onto a wall.

Installation equipment

Parallel display	Cylinder or flat head screws – Thread diameter: max. 4 mm – Head diameter: max. 8 mm

Hole distances The drilling template is shown in this chapter for assembly / installation (all dimensions in mm).

6.9.3 Electrical connection

Connect the remote displays via the terminal block 7b and 8b indicator bus on the device base unit of the TITANUS *MICRO·SENS®*. The power is supplied via TITANUS *MICRO·SENS®* or for greater distances, externally. Calculate the lines as for TITANUS *MICRO·SENS®*, in accordance with Chapter Design "Power Supply".

You must comply with the permitted cable cross-sections for the particular cable throughputs and the permitted wire cross-sections for the terminals (see Chapter "Technical Data ").

Remote display Connect the remote display to the TITANUS *MICRO·SENS®* with the power off as follows:

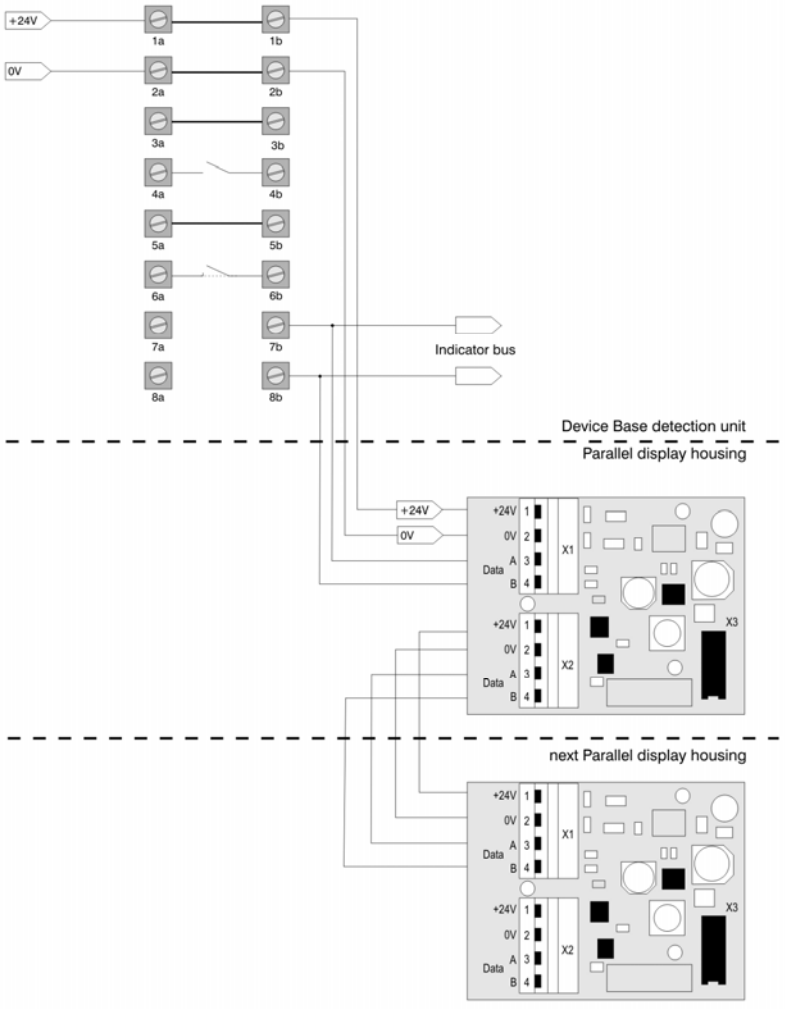


Figure 80: Connecting the parallel display to TITANUS MICRO·SENS®

NOTICE

Maximal 2 relay boards or remote display units can be connected to the device.

6.10 Reaction indicator

6.10.1 Addressing the reaction indicators

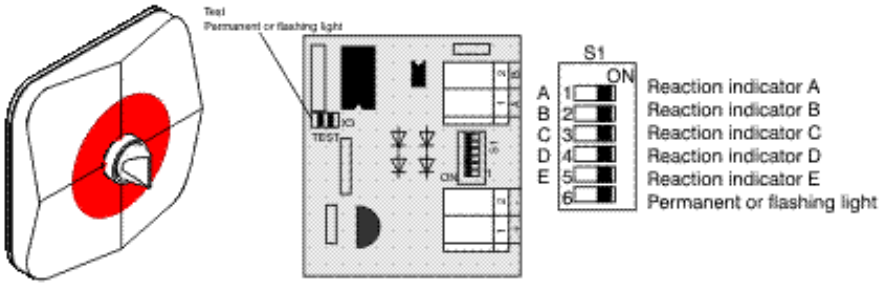


Figure 81: Reaction indicator board with fire location

Addressing the up to 5 reaction indicators happens by setting up switch S1 on the board.

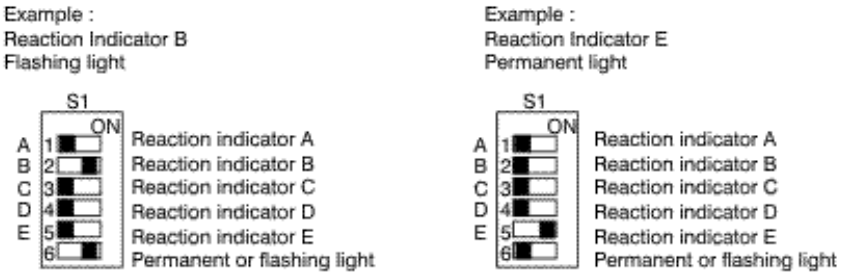


Figure 82: Example of addressing the reaction indicators

The reaction indicators are tested using the diagnostic tool (see Chapter Commissioning).

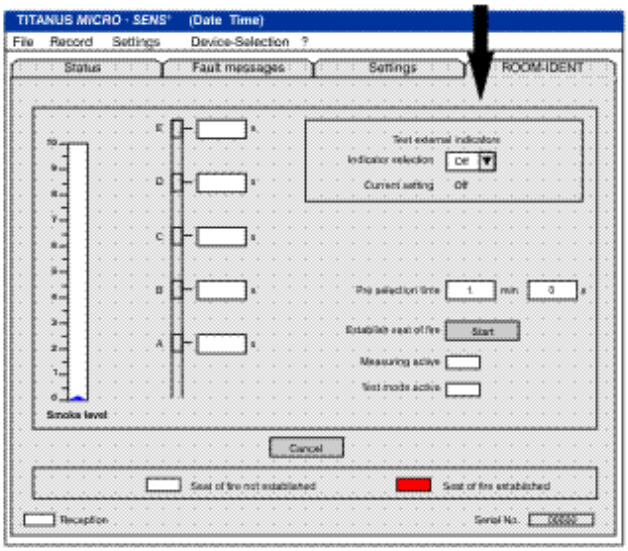


Figure 83: Testing the reaction indicators by menus of the diagnostic tool

6.10.2 Connecting the reaction indicator to the TITANUS *MICRO·SENS®*

Connect the reaction indicators via terminal block 7b and 8b indicator bus on the TITANUS *MICRO·SENS®* device base unit. Power is supplied by the TITANUS *MICRO·SENS®*.

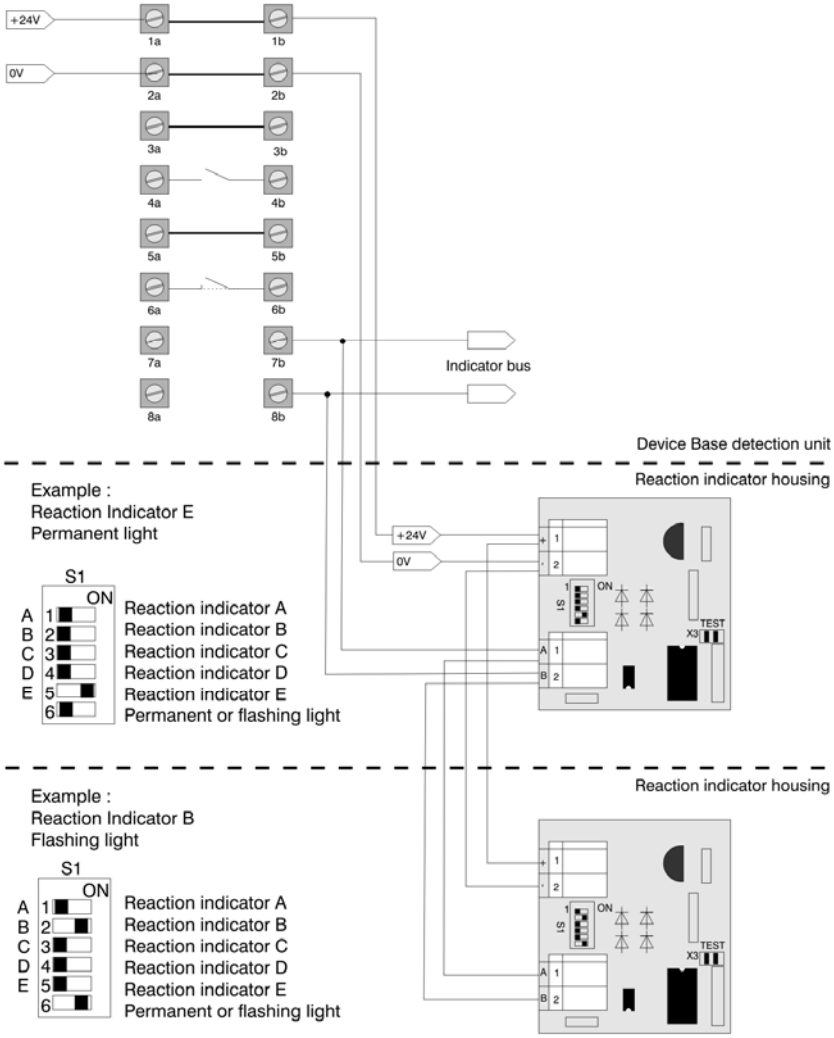


Figure 84: Connecting the reaction indicators to TITANUS MICRO·SENS®

6.11 Inserting the detection unit in the device base unit

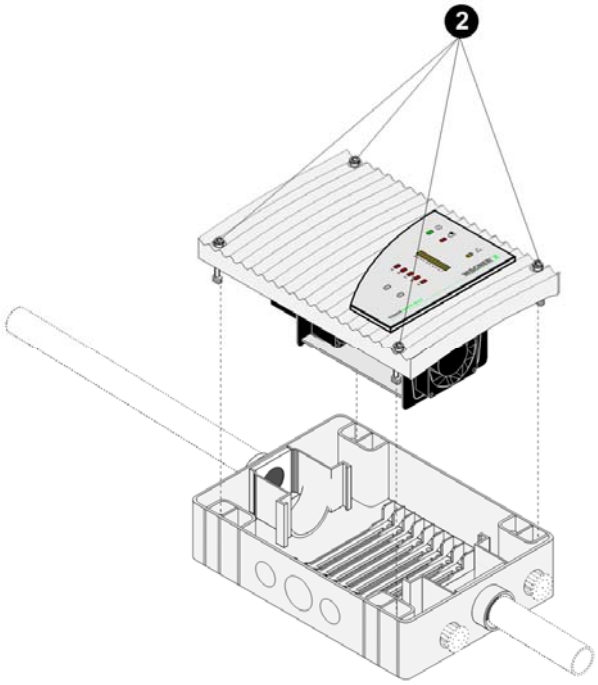


Figure 85: Installing the TITANUS MICRO•SENS®

⚠ WARNING

The components on the board are to be protected against damage from electrostatic charges.

Proceed as follows to insert the TITANUS *MICRO·SENS®* in the device base unit:

1. Put the device in the pre-mounted device base. When inserting the detection unit, note the mechanical coding, this protects the device against twisting.
2. Screw the four screws on the detection unit down tight using a screwdriver.

6.12 Settings

6.12.1 Detection Unit

All settings are undertaken using the diagnostic tool. Installation of the diagnostic tool for TITANUS *MICRO·SENS*® and its application are described in Chapter Commissioning.

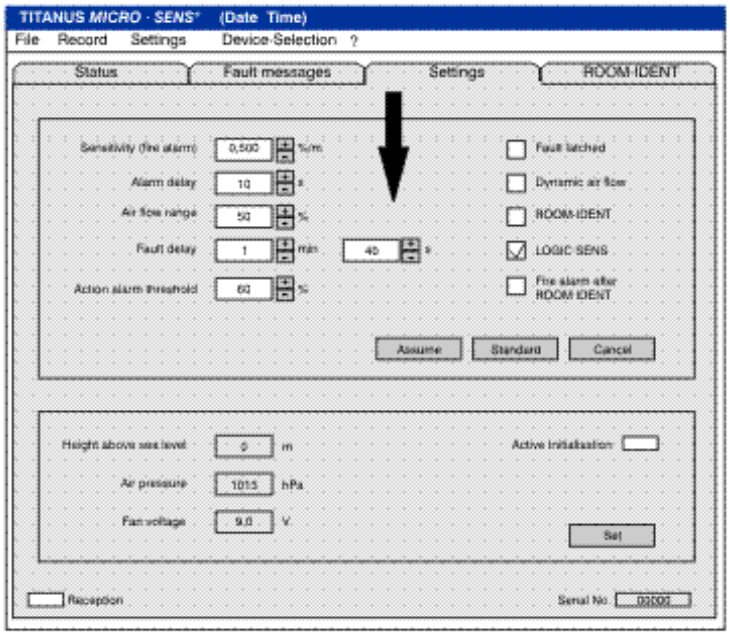


Figure 86: Sensitivity, Alarm Delay, Air Flow Area and Fault Delay settings

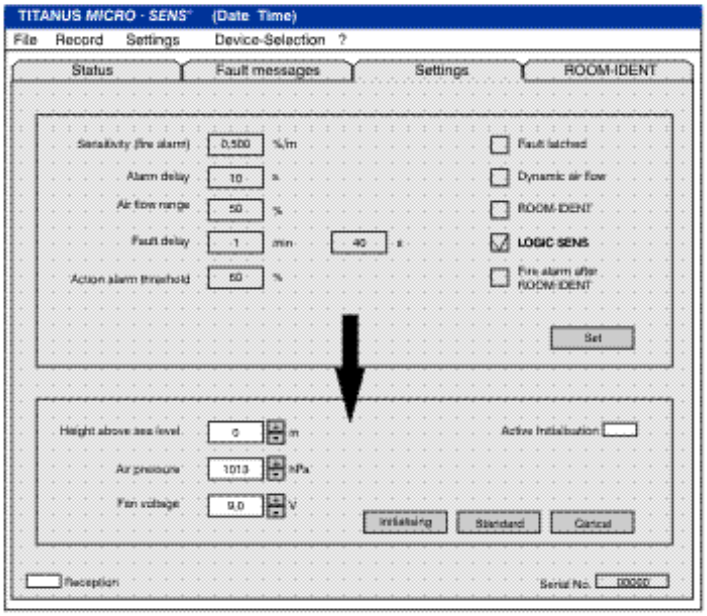


Figure 87: Height, Air Pressure and Fan Voltage settings

In the diagnostic software, the current TITANUS *MICRO·SENS*® figures are displayed on the Settings screen.
The figures can be changed by pressing the Settings button.

6.12.1.1 Setting reaction sensitivity

The sensitivity (fire alarm) of the detection unit can be set using the TITANUS *MICRO·SENS*® diagnostic tool.

	Sensitivity	Sensitivity Standard	Settings stages
Detection Unit DM-TM-10	0.1 - 2 %/m	0.1 %/m	0.1 %/m
Detection Unit DM-TM-50	0.5 - 2 %/m	0.5 %/m	0.1 %/m

6.12.1.2 Delay time for triggering the alarm

The standard set for the delay time for the alarm threshold can be changed using the diagnostic tool. The standard delay time for the alarm is set to 10 secs. If the smoke level during operation rises to the alarm threshold, the delay time starts running. Only when the delay time has run out and if the smoke levels are still rising is the message forwarded. In this way false alarms caused by short-term loads (e.g. dust) can be avoided.

	Alarm-delay	Alarm-delay Standard	Settings stages
Detection Unit DM-TM-10	0 s – 60 s	10 s	1 s
Detection Unit DM-TM-50	0 s – 60 s	10 s	1 s

TIP
The alarm delay time should be set to 0 seconds only for testing purposes.

6.12.1.3 Threshold for air flow monitoring

The threshold for air flow monitoring can be changed for the detection unit by using the diagnostic tool for TITANUS *MICRO·SENS*®.

	Threshold	Threshold Standard	Settings stages
Detection Unit DM-TM-10	10 % - 50 %	20 %	1 %
Detection Unit DM-TM-50	10 % - 50 %	20 %	1 %

Select the trigger threshold in accordance with Chapter, "Design"

6.12.1.4 Delay time for air flow fault

If you want to change the delay time for forwarding an air flow fault, this can be done by using the diagnostic tool for TITANUS *MICRO·SENS*®.

	Fault delay	Fault delay Standard	Settings stages
Detection Unit DM-TM-10	1 s – 60 min	100 s	1 s
Detection Unit DM-TM-50	1 s – 60 min	100 s	1 s

The standard delay time setting is 100 seconds. In areas with time-limited fault variables (e.g. air pressure oscillations), then depending on the duration of the fault variables, other delay times should be set.

6.12.1.5 Action-Alarm Threshold

Action-Alarm threshold changes for „Fire alarm after ROOM·IDENT“ can be carried out by the diagnostic tool for TITANUS *MICRO·SENS*®.

	Action alarm	Action alarm Standard	Settings stages
Detection Unit DM-TM-10	10 – 80 %	60 %	1 %
Detection Unit DM-TM-50	10 – 80 %	60 %	1 %

Default value for action-alarm threshold is set to 60% of the fire alarm threshold.

6.12.1.6 Fault display

The displaying of collective fault (air flow and detection unit fault) can, as preferred, be set to storing or not storing (standard). This is activated or de-activated by using the diagnostic tool for TITANUS *MICRO·SENS*®.

	Fault storing	**Fault not storing Standard**
Detection Unit DM-TM-10	off – on	off
Detection Unit DM-TM-50	off – on	off

6.12.1.7 Dynamic air flow

The dynamic air flow is activated or deactivated by using the diagnostic tool for TITANUS *MICRO·SENS*®.

	Dynamic air flow	**Dynamic air flow Standard**
Detection Unit DM-TM-10	off – on	off
Detection Unit DM-TM-50	off – on	off

6.12.1.8 ROOM·IDENT

Location of a fire is activated or deactivated by using the diagnostic tool for TITANUS *MICRO·SENS*®.

	ROOM·IDENT	**ROOM·IDENT Standard**
Detection Unit DM-TM-10	off – on	off
Detection Unit DM-TM-50	off – on	off

6.12.1.9 LOGIC·*SENS*

LOGIC·*SENS* intelligent signal processing can be activated or deactivated by using the diagnostic tool for TITANUS *MICRO·SENS*®. If signal evaluation is switched on, LOGIC·*SENS* prevents false alarms by recognising short-term fault variables.

	LOGIC·*SENS*	**LOGIC·*SENS* Standard**
Detection Unit DM-TM-10	off – on	on
Detection Unit DM-TM-50	off – on	on

6.12.1.10 Fire Alarm threshold after ROOM·IDENT

It can be useful for certain applications to activate the alarm after the localisation of the fire has completed. By using the diagnostic tool for TITANUS *MICRO·SENS*® it is possible to enable or disable the function „Fire alarm after ROOM·IDENT“. Please note, that the function „ROOM·IDENT" has to be enabled as well when using this option. Otherwise localisation will not be performed.

	Fire alarm after ROOM·IDENT	**Fire alarm after ROOM·IDENT Standard**
Detection Unit DM-TM-10	off – on	off
Detection Unit DM-TM-50	off – on	off

“Fire alarm after ROOM·IDENT“ is disabled by default.

6.12.1.11 Setting the fan voltage

The standard setting for the ventilator voltage is 9 V. In critical applications the ventilator voltage can be set higher by using the TITANUS *MICRO·SENS*® diagnostic tool, to raise the transport speed in the pipe system and thus guarantee faster detection where there are longer pipe runs.

	Fan voltage	Fan voltage Standard	Settings stages
Detection Unit DM-TM-10	9 V – 13.5 V	9 V	0.1 V
Detection Unit DM-TM-50	9 V – 13.5 V	9 V	0.1 V

⚠ WARNING

If the TITANUS *MICRO·SENS*® fan voltage is changed, the device automatically carries out air flow initialisation.

6.12.1.12 Inputting the current air pressure

The current air pressure for the monitoring area must be input by using the TITANUS *MICRO·SENS*® diagnostic tool if air pressure-dependent adjustment is required.

The standard setting is 1013 hPa, corresponding to the average air pressure at sea level.

6.12.1.13 Inputting height above Normal Sea Level (NN)

The figure for the height above normal sea level is that for the installation site of the TITANUS *MICRO·SENS*® above sea level. The figure is input by using the diagnostic tool. The standard setting is 0 m. The figure has to be changed if the device's air flow sensory analysis has to be balanced because of the air pressure (see chapter commissioning).

⚠ WARNING

If the standard setting for air pressure or the height above sea level is changed, the TITANUS *MICRO·SENS*® air flow is automatically re-initialised.

6.13 Data Logging

A simple device check can be run using the diagnostic tool. By reading messages and statuses, the diagnostic program offers a considerably simplified service. DIAG 3 can be fastened to the TITANUS *MICRO·SENS®* by an device bracket or attached in a straight line (±10°) of up to 3 m distance to the infrared interface.

The data are read via an infrared interface on the TITANUS *MICRO·SENS®* using the DIAG 3 which is connected to the USB interface on the PC by a USB cable.

Commissioning of the diagnostic software is described in Chapter “Commissioning”.

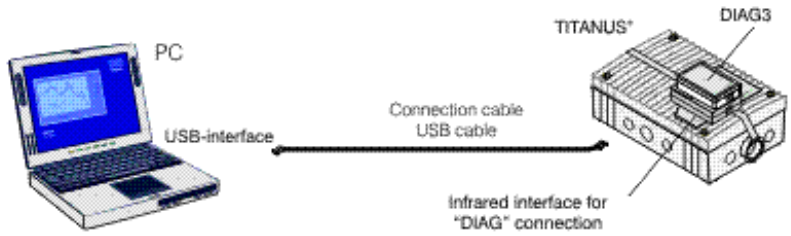


Figure 88: Connecting a PC to the TITANUS MICRO·SENS®

TIP
It is recommended that, in order to check the device settings later, they are stored and archived after commissioning.

7 Installation Pipe System

7.1 General assembly

The pipes, hoses and fittings used for the pipe system must always meet requirements for Class 1131 in accordance with EN 61386-1, 2004.
Class 1131 puts the following requirements on the pipe system used:

Characteristics	Severity code
Compression resistance	125 N
Impingement resistance	0.5 kg, drop height at 100 mm
Temperature range	-15 °C to +60 °C

In principle, the following pipes as well as the related fittings are to be used in configuring the pipe system:

	External diameter	Internal diameter ABS	Internal diameter PVC
Air sampling pipe	25 mm	21.4 mm	21.2 mm
Air sampling hose (Typ SCH-P-25)	25 mm	-	18.5 mm
Air sampling hose (Typ SCH-PG-16)	21.1 mm	16.4 mm	-

⚠ WARNING

Take note of the temperature range specified in the “Technical data” chapter under “Pipe system” when configuring the pipe system.

7.1.1 Mounting pipe system

The pipe system must be designed according to the requirements of the project and the pipe design guidelines (see chapter Design "Pipe Design").

1. Cut the pipes with a pipe cutter or a metal saw. Chips must be removed and rough edges trimmed.
2. Before gluing, remove any dirt and grease from the joints with the recommended cleaning agent. Glue the pipe ends to the corresponding fittings so that they are airtight.

Air sampling pipe halogen free	Air sampling pipe (PVC)	Cleaning agent	Adhesive	Pipe cutter
ABSR-2518, ABSR-3220, ABSR-4025	R-2519, R-3218, R-4019	Tangit cleaner	Tangit adhesive	Pipe cutter or 38 mm saw

⚠ WARNING

Adhesives and cleaning products contain solvents and are flammable. It is essential to observe the supplier's safety information before processing.

3. Keep the pipe lengths and direction changes to a minimum. Elbows and bends have an extremely high flow resistance. Use them only where this is unavoidable. Should this be necessary, the pipe length must then be reduced in relation to the fitted bends (an elbow equals a straight piece of pipe of 1.5m).

NOTICE

Arcs should be used instead of elbows. An excessive number of bends and angles reduce the air velocity in the air sampling pipe and thus increase the detection time.

4. The pipes must be installed in such a way that they do not sag or move. They are fixed with pipe clips without rubber core. The space between the pipe clips should be no more than 80 cm. Reduce the space between clips to no more than 30 cm if there are high temperature variations.

NOTICE

Do not use pipe clips with rubber cores as these do not expand lengthwise and the pipes would sag or crack.

5. Close open pipe ends with end caps.

NOTICE

After pipe installation is complete, check for the following:
- air tightness (e.g. due to damage)
- any faulty connections
- correct projection of the aspiration aperture

7.1.2 Mounting air sampling hose

The air sampling hose should be used in compliance with the design guidelines (see chapter "Design").

1. Cut the air sampling hose with a pipe cutter or a metal saw. Chips must be removed and rough edges trimmed.
2. Before gluing, remove any dirt and grease from the joints with the recommended cleaning agent. Glue the hose ends to the corresponding fittings so that they are airtight.

air sampling hose halogen free	Air sampling hose (PVC)	Cleaning agent	Adhesive	Pipe cutter
SCH-PG16	SCH-P-25	Tangit cleaner	Tangit adhesive	Pipe cutter or 38 mm saw

⚠ WARNING

Adhesives and cleaning products contain solvents and are flammable. It is essential to observe the supplier’s safety information before processing.

Glue the air sampling hose as follows:

Type SCH-PG16 Stick the air sampling hose by ABS glue into the hose bolting type SCH-PG-16-VO. Turn the hose bolting into the specified pipe with female thread type ABSR-2518-PG16.

Type SCH-P-25 Stick the air sampling hose by ABS glue into pipe fittings respectively sleeves of a pipe system with 25 mm external diameter.

NOTICE

After pipe installation is complete, check for the following:

- air tightness (e.g. due to damage)
- any faulty connections
- correct projection of the aspiration aperture

NOTICE

The complete air sampling pipe must not consist solely of air sampling hose.

NOTICE

Air flow reducers should not be applied to the air sampling hose.

7.2 Linear expansion of the pipe system

Linear expansions (lengthening or shortening) of the pipe system are caused by variations in temperature. An increase in temperature results in lengthening of the pipe, a decrease in temperature shortens the pipe. It is very important to take this into consideration if the installation temperature differs considerably in comparison to the operating temperature.
The length change can be calculated with the following formula:

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

ΔL	=	*Linear expansion in [mm]*
L	=	*Length of the pipe to be calculated in [m]*
ΔT	=	*maximum temperature difference in (°C)*
δ	=	*Length change co-efficient in mm/m°C* *δPVC = 0,08 mm/m°C* *δABS = 0,101 mm/m°C*

For example, a temperature variation of 10 ºC in an ABS pipe with a length of 10 m results in an expansion of 10.1 mm.

Pipe clips As a rule, plastic pipe clips, type 23, are used for the installation of pipe systems (ø 25 mm).
They do not allow for linear expansion and in areas with high temperature variations the plastic pipe shells, type CLIC-PA must be used. (see fig. "Pipe clips").

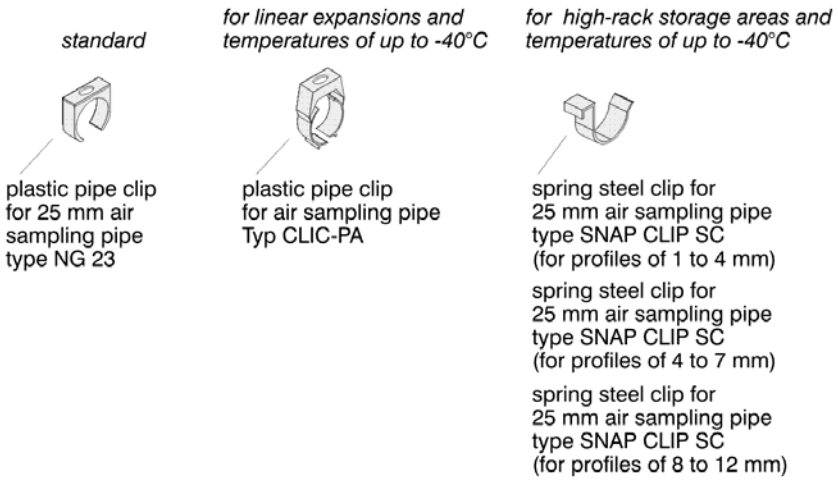


Figure 89: Pipe clips

There are two fixing points for the plastic pipe clip CLIC-PA when installing the pipes:

Position 1 (first locking into place)

Fixes the pipe so that a linear expansion is possible (used in deep freeze areas, if necessary).

Position 2 (second locking into place)

Fixes the pipe and avoids linear expansions.

Pipe Clips for ø 25 mm	Type
standard pipe clips	pipe clip type NG 23 (ø 25 mm)
pipe clips for areas with high temperature differences and deep freeze areas	plastic pipe clip type CLIC-PA (ø 25 – 28 mm)
pipe clips for deep-freeze areas and high rack storage areas	spring steel clip type SNAP CLIP SC (for profiles 1-4 mm) spring steel clip type SNAP CLIP SC (for profiles 4-7 mm) spring steel clip type SNAP CLIP SC (for profiles 8-12 mm)

7.3 Patented air sampling points

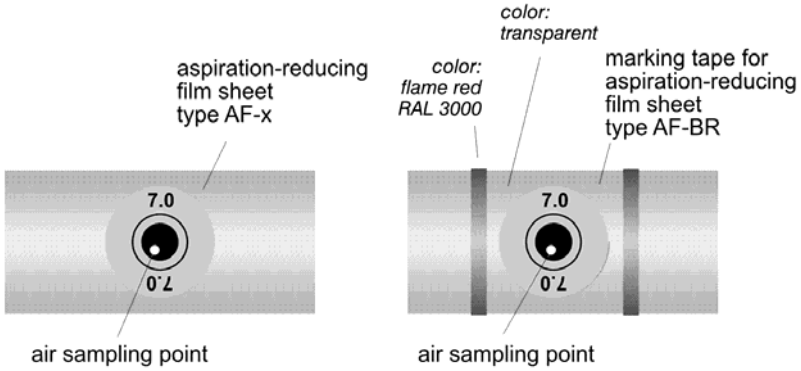


Figure 90: Example of an aspiration aperture with aspiration-reducing film sheet

Aspiration aperture

Design aspiration apertures (bore holes) and their positioning according to project requirements and pipe design guidelines.

Air sampling holes

1. Bore a hole with a 10mm drill at a right angle to the pipe.
2. Carefully deburr the holes.
3. Clean the area around the hole (around the whole pipe) from dirt and grease with Tangit cleaner.
4. Select the size of the aspiration-reducing film sheet according to the pipe design guidelines.
5. Stick the aspiration-reducing film sheet over the bore hole (see following figure point 1).
6. Prevent the film sheet from coming loose by sticking marking tape over it (see following figure point 2).

NOTICE

The perforations in the aspiration-reducing film sheet and the marking tape are to be placed exactly on the hole in the pipe. The diameter of the perforation in the aspiration-reducing film sheet must not be changed.
Avoid touching the adhered in order to keep it free from dust and fat.

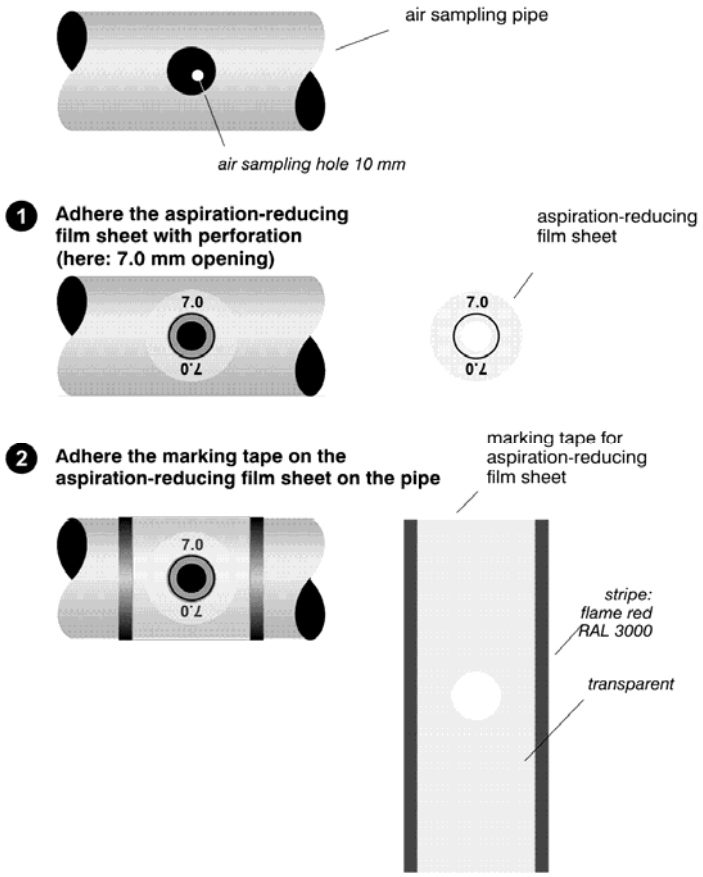


Figure 91: Attaching the aspiration-reducing film sheet

7.4 Ceiling lead through

7.4.1 Ceilings feed-through for false ceiling

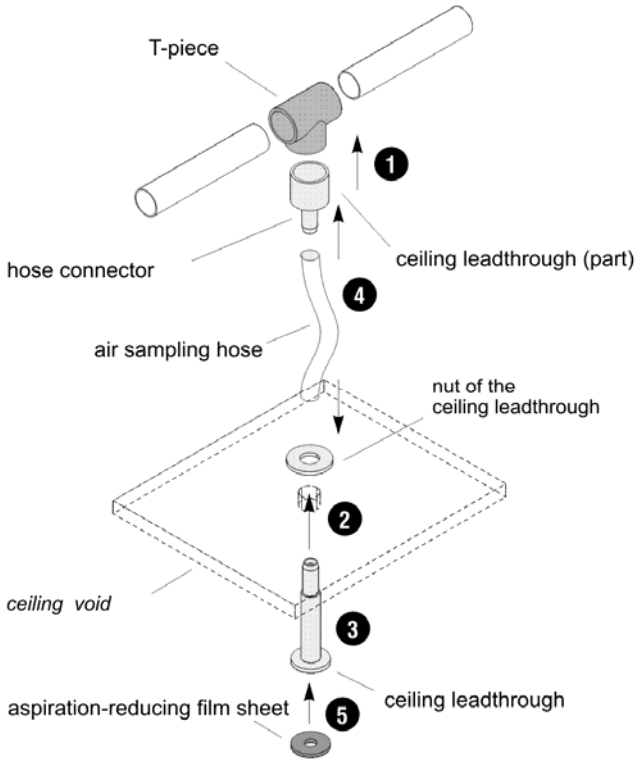


Figure 92: Installation of ceilings feed-through

To install the ceiling feed-through use the following steps:

1. Before gluing remove dirt and grease with the recommended cleaner.
2. Glue the hose connector to the corresponding T-piece with Tangit glue.
3. For each ceiling feed-through drill a hole of ･ 13mm through the false ceiling.
4. Install the lead-through by first removing the nut, pushing the hose sleeve from the bottom through the bore hole and then re-placing and tightening the nut above the false ceiling.
5. Determine the required length and cut the air sampling hose. Attach the hose to the sleeve of the ceiling feed-through and the hose connector at the T-piece of the air sampling pipe. If necessary soften the hose ends with a hot air fan.

6. Stick the correct aspiration-reducing film sheet (according to pipe design guidelines) to the ceiling feed-through.
   The aspiration-reducing film sheets are available in two colours. Depending on the colour of the ceiling, either type AFW-x (pure white, RAL 9010) or type AF-x (papyrus white, RAL9018) are used. On request, film sheets in special colours are produced.

NOTICE

The perforation of the aspiration-reducing film sheet must be placed exactly over the opening of the ceiling lead-through and the diameter of the hole in the film sheet must not be altered.
To keep the gluing surface of the film sheet free of dust and grease, avoid any contact.

7.4.2 Other ceilings feed-through

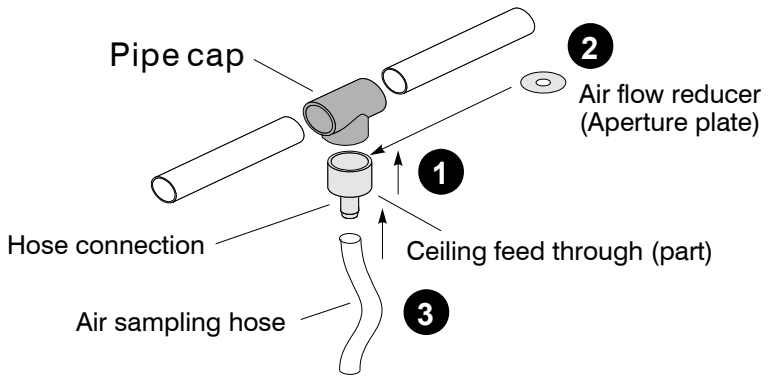


Figure 93: Assembling of capillary hose and up-streamed blind

To install the ceiling feed-through use the following steps:

1. Before gluing remove dirt and grease with the recommended cleaner.
2. Stick the correct aspiration-reducing film sheet (according to pipe design guidelines) to the ceiling feed-through.
3. Stick the hose pin with the certain pipe cap along the air sampling hose by tangit glue.
4. For each ceiling feed-through drill a hole of ∅ 12 mm through the false ceiling.
5. Calculate the necessary length for air sampling hose and cut it. Tuck the cut hose through the intermediate ceiling and on the hose pin at the pipe

cap of the air sampling pipe. If necessary, please heat the hose by hot air gun.

NOTICE

The whole of aspiration reducing film sheet must be located over the opening of pipe cap directly. The diameter of opening in the aspiration reducing film sheet must not be changed.
To keep the glued surface of the film clean from dust and grease, please avoid any contact.

⚠ WARNING

The air sampling hose cannot be monitored during the application of ceiling ducts with up-streamed aspiration reduction within the T-pieces (pipe caps).

7.5 Monitoring in forced air flow systems (ventilation or climatic applications)

7.5.1 Detection at air inlets/outlets

NOTICE

If aspiration takes place in a forced air flow system (ventilator, climatic systems), the air sampling points must be positioned in the air flow. Place the air sampling points as shown in following figure.

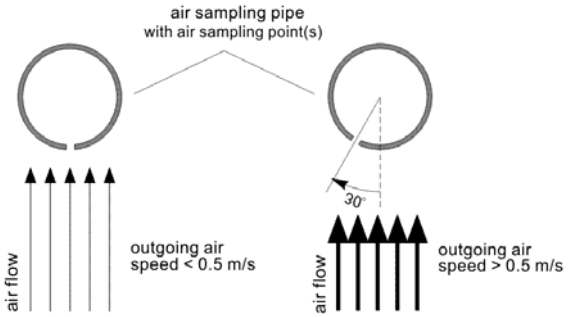


Figure 94: Positioning of air sampling point, depending on air speed

7.5.2 Detection in bypass systems

For connection of air return refer to chapter Installation Pipe System "Air Return".

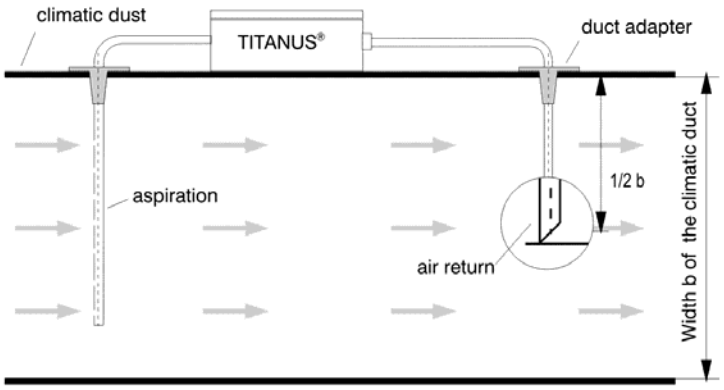


Figure 95: Positioning of air return, example of a climatic duct (bypass)

For the pipe design of air sampling smoke detection in these areas see chapter Design “Pipe Design for Forced Air Flow“.

7.6 Filter

7.6.1 Installation of air filter, type LF-AD-x

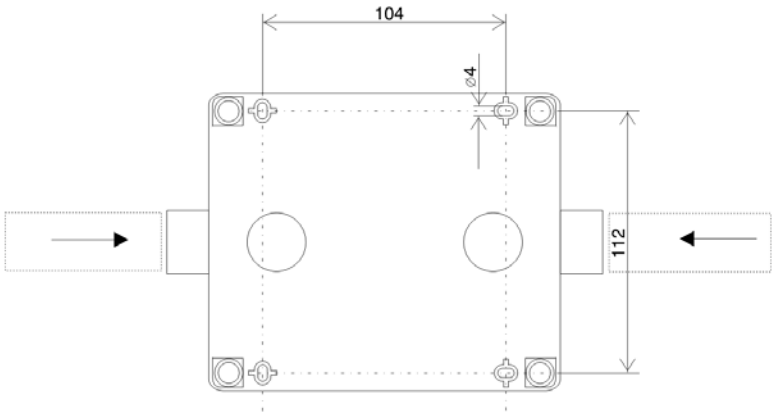


Figure 96: Spacing for bore holes on base of air filter housing

Air filter LF-AD-x

1. To connect to the air sampling pipe with the air filter, insert the air sampling pipe in the provided pipe connectors of the filter.
2. When installing the filter, ensure that the direction of air flow is shown at the side of the housing's bottom part.
3. Screw the bottom part of the housing directly to the wall.

NOTICE

Never use glue to connect the air sampling pipe and pipe connectors.
If severe variations in temperature are expected, then it is required to fix the pipe right before the air filter in order to avoid elongation (see chapter installation of the pipe system „Linear expansion of the pipe system“) of the pipe and therefore possible loss of pipe connectivity (pipe contraction).

Installation Material

Air filter	cylinder or flat-head screws – thread diameter: max. 4 mm – head diameter: 5 to 7 mm

7.6.2 Mounting of the special filter type SF-400/650

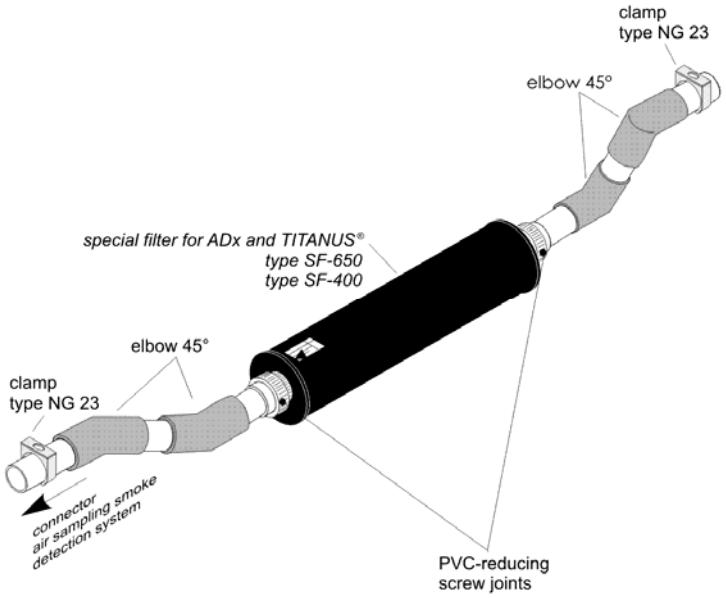


Figure 97: Mounting of the special filter into the pipe system

Special filter SF-x

1. To install or un-install the special filter use the two PVC reducer screw joints at both filter ends.
2. Glue the reducer couplings into the pipe system.
3. When installing the special filter, note the flow direction shown on the filter housing.
4. Clamp the special filter with a 45º elbow piece to the pipe system.

Installation material

Air filter	PVC or ABS pipe fittings – 45°-elbows

When using a combination of special filter type SF-x and air filter type LF-AD please install the air filter after the special filter, viewed from the aspiration system.

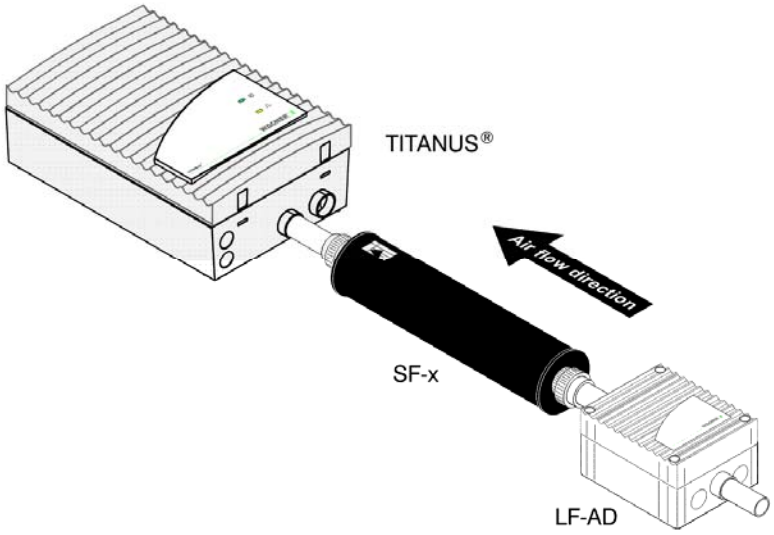


Figure 98: TITANUS® with special filter and LF-AD

To mount the air filter LF-AD, perform the steps of the assembly instructions (see chapter Installation of the pipe system „ Installation of air filter, type LF-AD-x“).

7.7 Air return

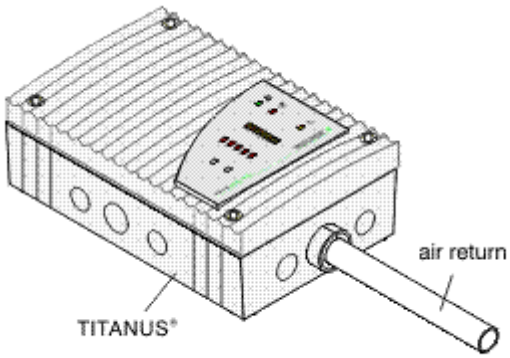


Figure 99: Mounting of the air return

Feed the air return into the pipe connection provided on the air sampling smoke detection system. As the air return pipe sits perfectly in the connection, it will be held securely.

NOTICE

The air return is to be fixed immediately in front of the device, so that the pipe is not pulled out of the pipe connection by any changes in length which occur (see Chapter "Linear expansion of the pipe system").

7.8 Noise suppressor

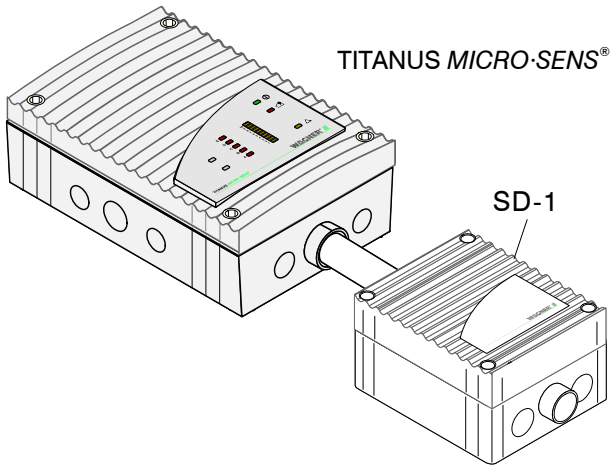


Figure 100: Mounting of noise suppressors

1. Pass the pipe (∅ 25 mm) through the opened feed-through in the protection grid and fix it with the existing pipe collar in the air outlet of TITANUS®. As the air return pipe fits exactly into the exit air opening, a tight fit is ensured.
2. In order to connect the aspiration pipe with the noise suppressor please insert the aspiration pipe into the designated pipe connectors of the noise suppressor.
3. When installing the absorbing duct, ensure that the direction of air flow is shown at the side of the housing's bottom part.
4. Screw the bottom part of the housing directly to the wall.

NOTICE

Never use glue to connect the air sampling pipe and pipe connectors.
If severe variations in temperature are expected, then it is required to fix the pipe right before the air filter in order to avoid elongation (See chapter installation of the pipe system "Linear expansion of the pipe system") of the pipe and therefore possible loss of pipe connectivity (pipe contraction).

Installation material

Noise suppressor	Cylinder or flat-head screws – thread diameter: max. 4 mm – head diameter: 5 to 7 mm

7.9 3-Way ball valve

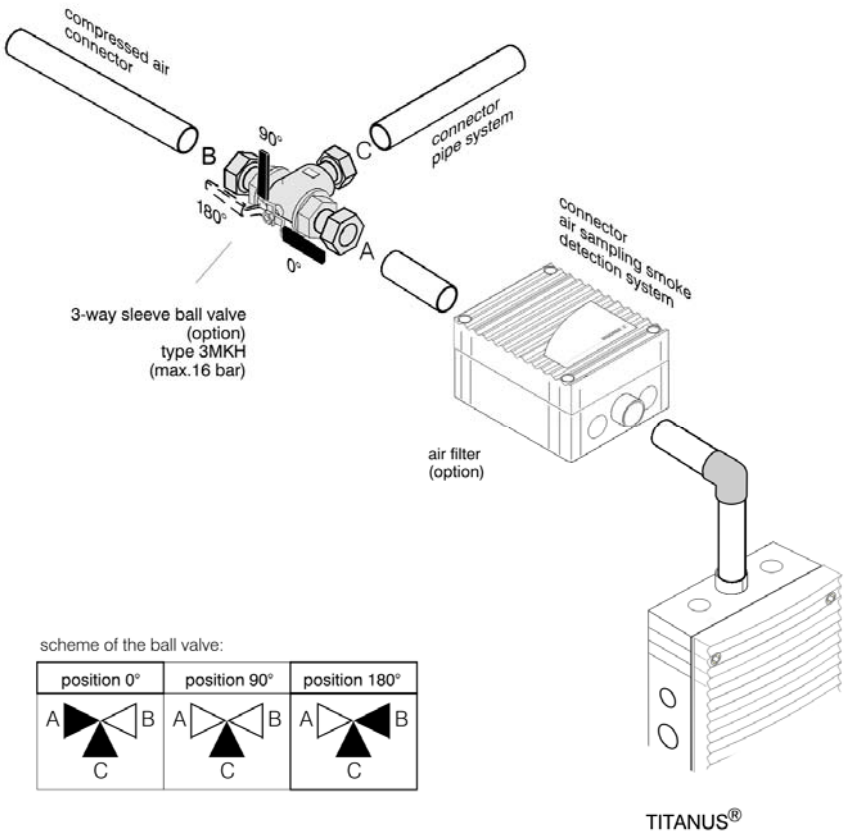


Figure 101: Installation of 3-way ball valve

The ball valve is used for blowing through with compressed air (preferably) or pressed air. Switching occurs between detection (position 0º) and blow-through (position 180º). Connect the ball valve to the pipe system via reducing screw-joints.

NOTICE

Pressed air is compressed, non-purified surround air, containing humidity. Compressed air is purified and de-humidified. If device and the pipe system are located in areas below freezing, compressed air must be used for blow-through.

Connections During installation, ensure that the correct connections are made (see diagram):

- Connect the air sampling pipe system to C.
- Connect device to A or B and the com-pressed/pressed air to the remaining connection.

7.10 Steam trap

7.10.1 Steam trap type KA-DN-25

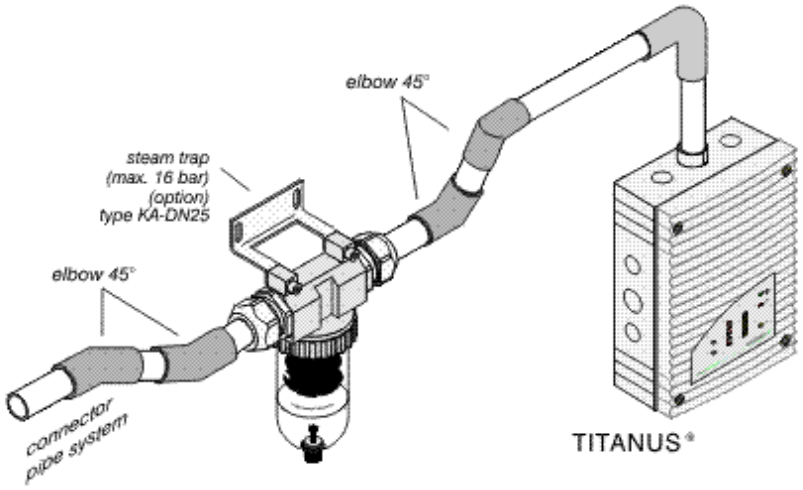


Figure 102: Mounting of the steam trap type KA-DN-25 to the pipe system

Install the steam trap at the lowest point of the pipe system behind the air filter and TITANUS® - device and fasten it with PG screw joints.

NOTICE

Two 45º elbows are required on each connection end for the installation of the steam trap to the pipe system.

Connection

When installing the steam trap, note the direction of air flow (see arrow on housing of steam trap).

1. Prepare the pipe system with two 45° elbows at each end of the steam trap and connect it to the PG screw joints.
2. Additionally, secure the steam trap with two screws and the support.

7.10.2 Steam trap type KA-1

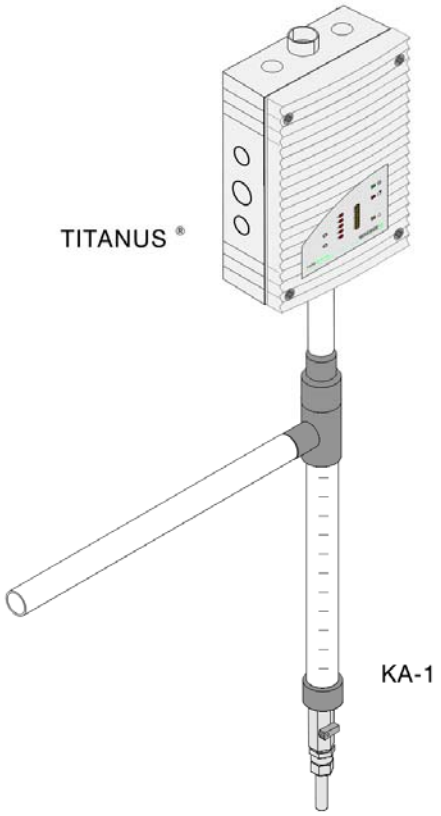


Figure 103: Mounting of the steam trap type KA-1 to the pipe system

Install the steam trap at the lowest port of the pipe system behind the air filter and TITANUS® – device. Glue the air-tight pipe system with steam trap.

Connection

1. Place the steam trap to the intended position and fasten the steam trap with two 40 mm pipe clamps.
2. Glue the air-tight pipe system with steam trap.

7.11 Test adapter

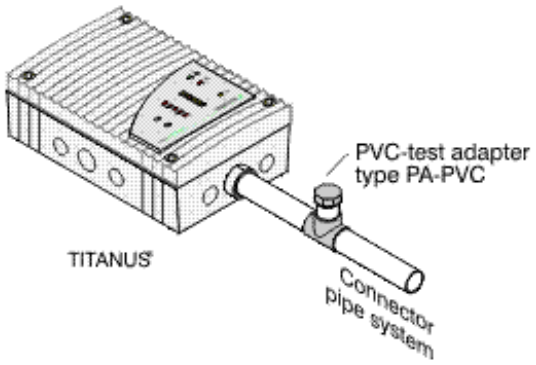


Figure 104: Installing the test adapter in the pipe system

The test adapter is stuck into the pipe system immediately next to the air sampling smoke detection system. The test adapter must always be closed during normal operation and is only opened for maintenance and service purposes, to introduce test gas or smoke.

⚠ WARNING

After testing detection in the air sampling smoke detection system and alarm forwarding, the test adapter must be closed again, otherwise there will be an air flow fault!

8 Commissioning

NOTICE

At commissioning, the test record should generally be stored in DIAG 3. This is required for later assessment of data such as the air flow figure, type of adjustment (see Chapter 8.1), commissioning temperature, air pressure and height above sea level.

8.1 Commissioning the detection unit

Before the detection unit is used, the pipe system must be installed in full, be operational and be connected to the TITANUS *MICRO·SENS*® device base.

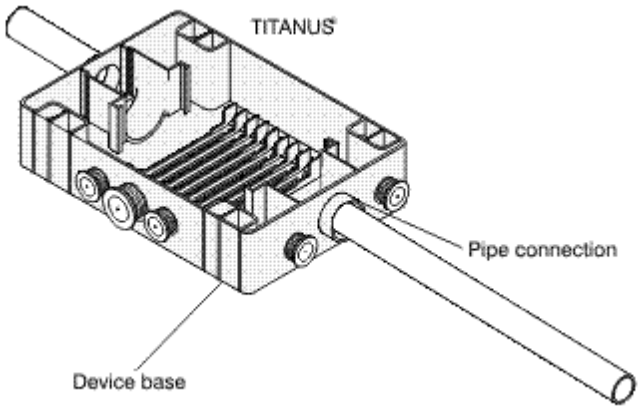


Figure 105: Check whether the pipe system is correctly connected

At commissioning, the TITANUS *MICRO·SENS*® detection unit is to be inserted in the pre-mounted device base which has been checked to ensure it is correctly wired.

NOTICE

When inserting the detection unit, take note of the mechanical coding which protects the device against twisting.

8.1.1 Plug and Play Commissioning

With Plug and Play commissioning the standard settings are not changed. Air flow adjustment happens automatically when the detection unit is put in place.

NOTICE

If air flow adjustment is to happen automatically when the detection unit is inserted, the Jumper X4 (PIN 1,2 or PIN 2,3) must be changed.

When the TITANUS *MICRO·SENS*® is initialising, the green operating display flashes. When initialising is complete, the operating display changes to a permanent light.
During the initialising phase, the TITANUS *MICRO·SENS*® air flow should not be influenced.

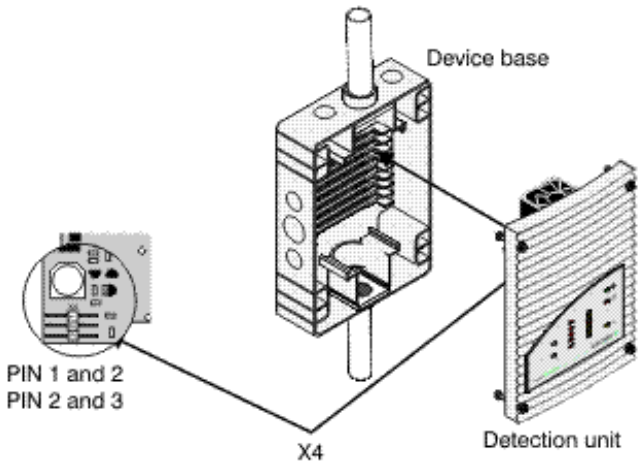


Figure 106: Inserting the detection unit into the device base

8.1.2 Commissioning with the diagnostics tool

If the diagnostics tool is used for commissioning, the pre-set settings can be changed.
Air flow adjustment can then be carried out in either an air pressure-dependent or an air pressure-independent manner. Air flow initialising is

started using the diagnostics tool. During initialising the green operating display flashes. When initialising is complete, the operating display changes to a permanent light.

During the initialising phase, the TITANUS *MICRO·SENS*® air flow should not be influenced.

When commissioning is completed, a test record should be generated using the diagnostics tool.

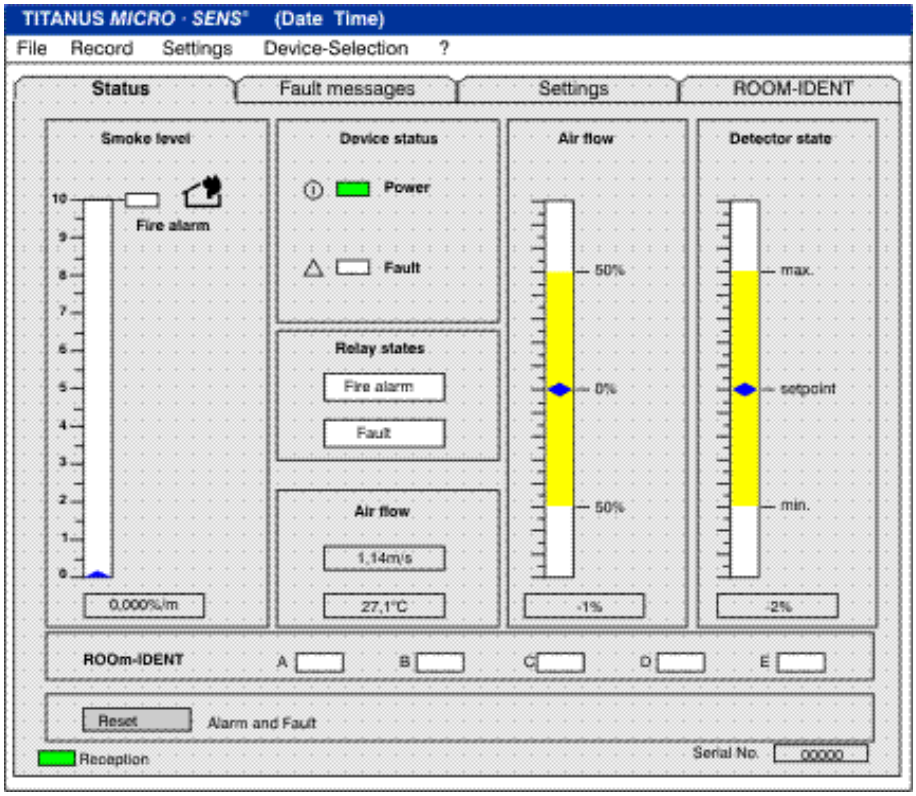
8.2 Installing diagnostics software

NOTICE

If a function cannot be modified in the diagnostics tool, this is highlighted in grey. If a function is not available, the display in that particular screen is blank.

The DIAG 3 diagnostics tool is to be used for function testing. Take the following steps:

1. Install the diagnostics software on a laptop or PC (Laptop or PC with a USB interface). The operating systems can be Windows 2000, XP, Vista and 7 (with current service package).
2. The TITANUS MICRO·SENS® data are transferred in both directions via the infrared interface on the front of the device. The DIAG3 interface is connected to the PC using the enclosed USB cable.
3. The diagnostics software is started via the DIAG3 button.
4. If the DIAG3 recognises a TITANUS MICRO·SENS®, the software goes via the current device number into the following screen.



5. The current TITANUS MICRO·SENS® data are shown on the PC screen.

NOTICE

For correct colour representation, the monitor used and the graphics card must be able to show more than 256 colours.

8.3 Air flow sensor adjustment

NOTICE

Air flow initialising for the TITANUS *MICRO·SENS*® is completed successfully if a stable status for temperature and air flow is set for a period of 2 minutes. The maximum duration is 2 hours.

Air flow initialising for the TITANUS *MICRO·SENS*® is completed successfully if for a period of 2 minutes the following status is set:

- the temperature oscillates by less than 0.1 K and,
- the air flow does not oscillate too much (temperature regulation) and,
- the fan voltage can be set properly, ventilator and fan power supply working normally.

The maximum duration is 2 hours.

Air flow initialising is interrupted immediately if any of the following errors occur:

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

Types of adjustment

- Adjustment can be conducted independently of the current air pressure. The restrictions for this kind of adjustment can be found in Chapter Design "Air Flow Monitoring".
- The air flow sensor can be adjusted as a function of the current air pressure.

In order to be able to assess the air flow sensor figure correctly during maintenance work, record the type of adjustment in each case in the test records.

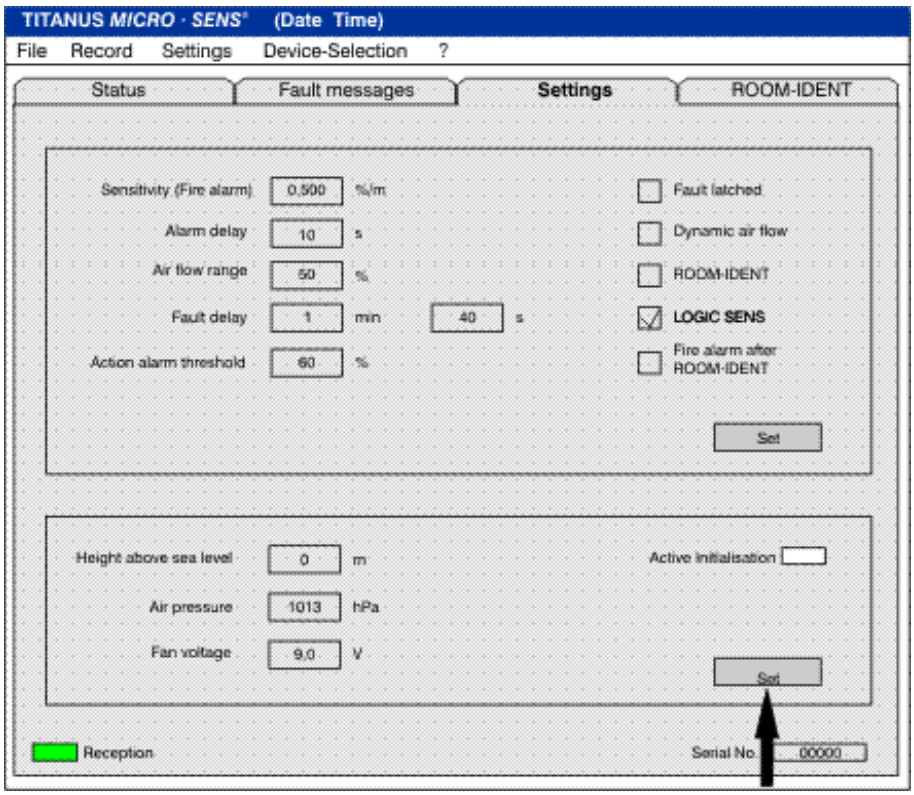
8.3.1 Air Pressure-Independent Adjustment

Air pressure-independent adjustment for the TITANUS *MICRO·SENS*® happens completely automatically each time the detection unit is inserted into the device base and the Jumper X4 is changed or via the diagnostics tool. During the learning phase, the alarm detection is fully functional. During this time the operating display flashes and there must be no air flow influences. When initialising is completed, the operating display changes to a permanent light and the air flow sensor has determined its ideal value for the connected pipe system.

8.3.2 Air Pressure-Dependent Adjustment

This kind of adjustment can only be carried out by using the diagnostics tool. A barometer (Recommended: Digital precision pocket barometer GPB 1300, Greisinger electronic GmbH) is required for air pressure-dependent adjustment of the air flow sensor. The following steps must be taken:

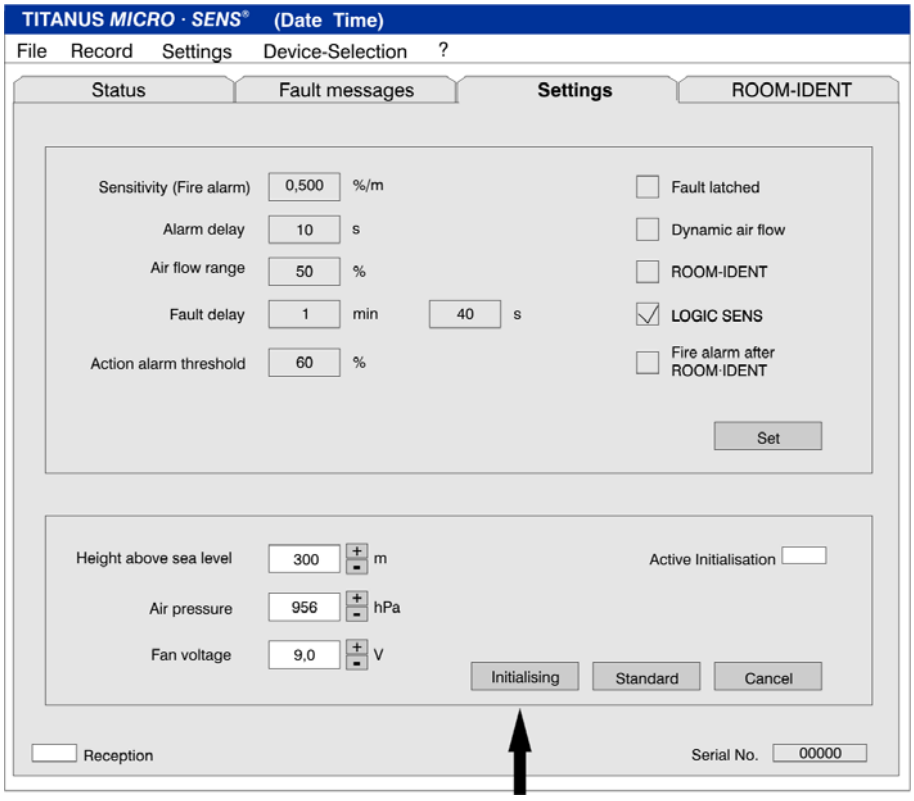
1. Press the “Settings” button so that you can change the figures in the diagnostics tool on the “Settings” screen.



2. Determine the height above sea level (NN) at the aspirating smoke detection system installation site and enter it in the “Settings“ screen.
3. 3. Using a hand-held barometer, measure the air pressure and enter this figure in the “Settings” screen in the diagnostics tool as well.

NOTICE

If this measured air pressure does not correspond to the annual average for that height, then the air flow sensor will not adjust to 0 %.



4. Press the “Initialise” button.

8.4 Testing the detection unit and alarm forwarding

Trigger the TITANUS *MICRO·SENS*® and test the transmission route to the FAS as follows:

1. Spray the test aerosol either into the first aspiration aperture or into the TITANUS *MICRO·SENS*® pipe system test adapter.
2. Proceed on the basis of the following table.

Check whether ...	If this is not the case ...
the alarm on the air sampling smoke detection system is displayed.	check whether the display plate is connected. there is a fault in the air sampling smoke detector change the detection unit.
the alarm is transmitted to the FAS and notified on the associated line.	check the transmission routes.

NOTICE

If the LOGIC·*SENS* is set to “ON” in the “Settings” screen of the diagnostics tool (see Chapter Installation "Settings"), then this must be set to "OFF" for testing triggering the alarm with the test aerosol, in order to speed up alarm assessment.

NOTICE

Note all test data in the test record.

8.5 Testing air flow monitoring

⚠ WARNING

The following steps can only be taken after air flow adjustment as described in Chapter "Air Flow Sensor Adjustment" has been carried out.

Pipe breaks Test that a pipe breaks will be recognised:

1. Loosen the pipe at the connection to the TITANUS *MICRO·SENS*® or open the test adapter.
2. Check whether the fault display on the aspirating smoke detector is flashing.
3. Check the air flow sensor data using the DIAG3 diagnostics tool and a PC or laptop.
4. Enter the result in the test record.

Blockage Test that a blockage will be recognised:

1. Depending on the air flow monitoring arrangement designed in, close the corresponding number of aspiration apertures with some sticky tape.
2. Check whether the fault display on the aspirating smoke detector is flashing.
3. Check the air flow sensor data using the DIAG3 diagnostics tool and a PC or laptop.
4. Enter the result in the test record.

Trouble shooting If air flow faults are not correctly recognised by the device, proceed as follows:

Check whether ...

1. All holes are free.
2. The pipe system has any breaks or cracks.
3. All pipe connections are sealed.
4. The fan can blow freely.
5. The correct aspiration reducing films have been used.

If a defect is found, the functioning of the TITANUS *MICRO·SENS*® or the air flow sensor will be tested using a test pipe or the diagnosis software (see section "Testing the air flow sensory analysis function").

8.6 Testing fault forwarding

⚠ WARNING

The following steps can only be taken after air flow adjustment as described in section "Air Flow Sensor Adjustment" has been carried out.

Test fault forwarding.

Check when testing air flow monitoring whether a fault is displayed on the TITANUS *MICRO·SENS*® and if applicable the FAS.

8.7 Testing the air flow sensor analysis function

If the TITANUS *MICRO·SENS*® cannot be adjusted, test how it is functioning by means of a test pipe, a digital precision manometer, a PC and the diagnostics tool.

Complete function testing using the digital precision manometer is described below. Limited function testing can also be carried out without the digital precision manometer.

8.7.1 Preparations for function testing

1. Release the pipe system from the TITANUS *MICRO·SENS®*.

NOTICE

After the pipe system is released from the TITANUS *MICRO·SENS®* and the air flow fault delay time has elapsed, it signals a fault. If no air flow fault is recognised, the device is defective.

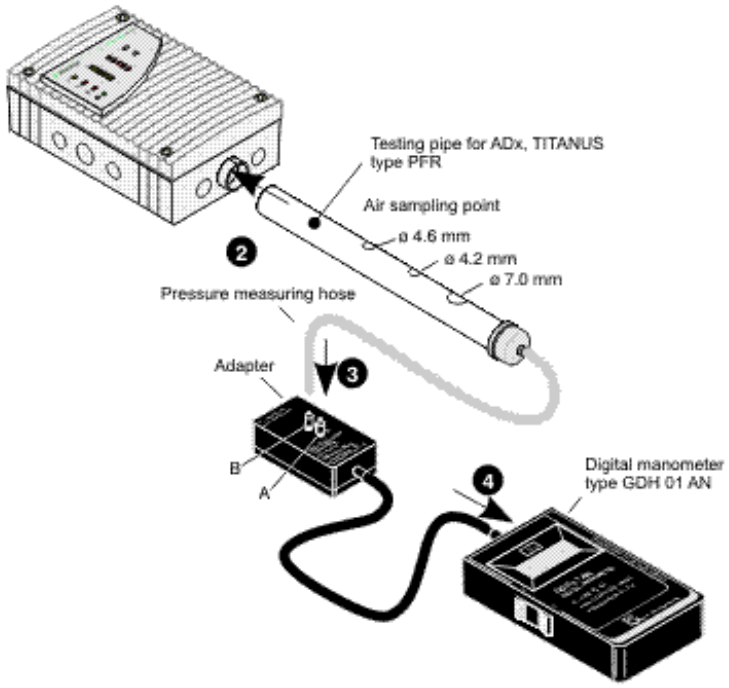
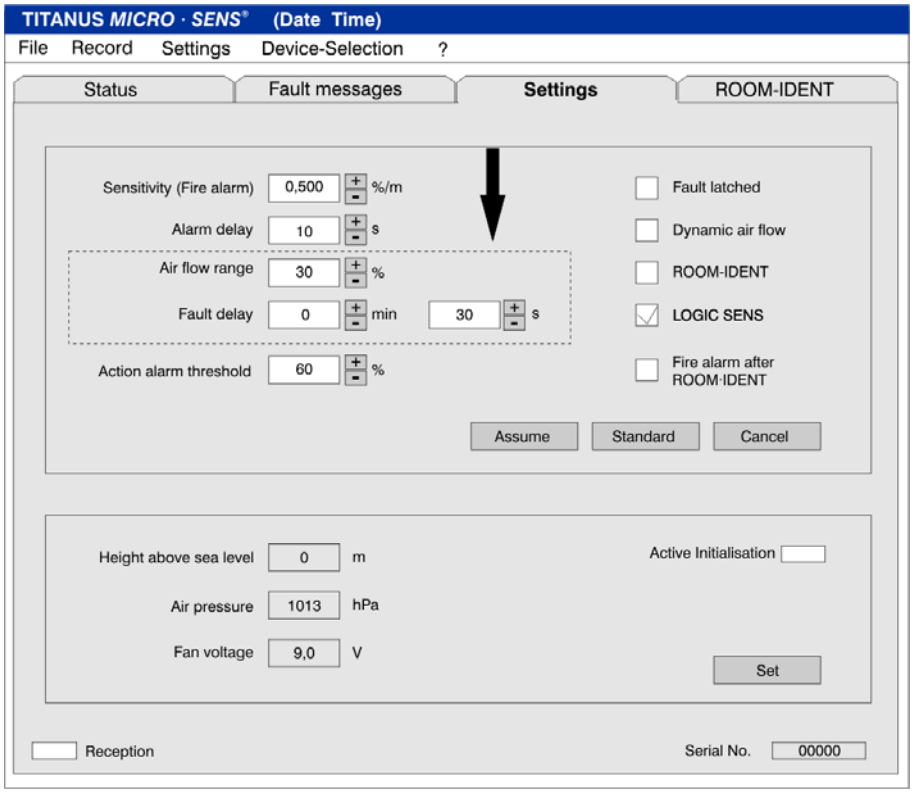
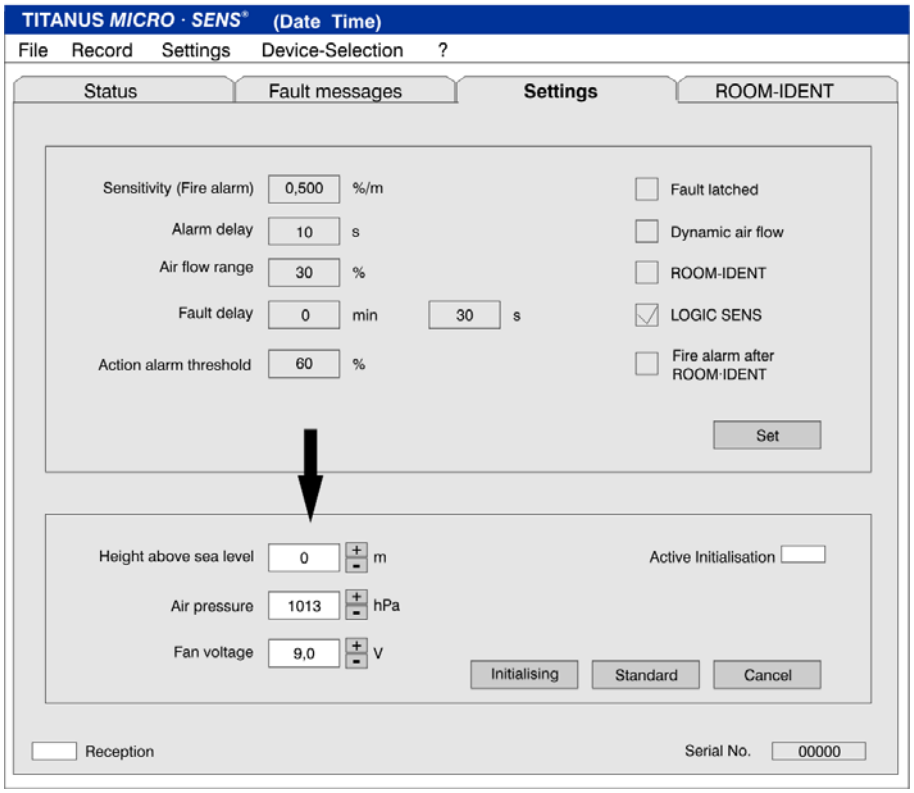


Figure 107: Checking the functioning of the TITANUS MICRO·SENS®

2. Connect the test pipe.
3. 3. Attach the pressure measuring tube to the adapter connection B. For limited function testing without the digital precision manometer, the pressure measuring tube connection on the test pipe is to be closed.
4. Connect the PC to the TITANUS *MICRO·SENS®* through the diagnostics interface and start the diagnostics program.
5. In the diagnostics tool, open the “Settings“ screen and set the following settings for function testing:


TITANUS MICRO · SENS® (Date Time)
File Record Settings Device-Selection ?
Status
Fault messages
Settings
ROOM-IDENT
Sensitivity (Fire alarm) 0,500 %/m
Alarm delay 10 s
Air flow range 30 %
Fault delay 0 min 30 s
Action alarm threshold 60 %
Fault latched
Dynamic air flow
ROOM-IDENT
LOGIC SENS
Fire alarm after ROOM·IDENT
Assume
Standard
Cancel
Height above sea level 0 m
Air pressure 1013 hPa
Fan voltage 9,0 V
Active Initialisation
Set
Reception
Serial No. 00000


TITANUS MICRO · SENS® (Date Time)
File Record Settings Device-Selection ?
Status
Fault messages
Settings
ROOM-IDENT
Sensitivity (Fire alarm) 0,500 %/m
Alarm delay 10 s
Air flow range 30 %
Fault delay 0 min 30 s
Action alarm threshold 60 %
Fault latched
Dynamic air flow
ROOM-IDENT
LOGIC SENS
Fire alarm after ROOM·IDENT
Set
Height above sea level 0 m
Air pressure 1013 hPa
Fan voltage 9,0 V
Active Initialisation
Initialising
Standard
Cancel
Reception
Serial No. 00000

8.7.2 Carrying out function testing

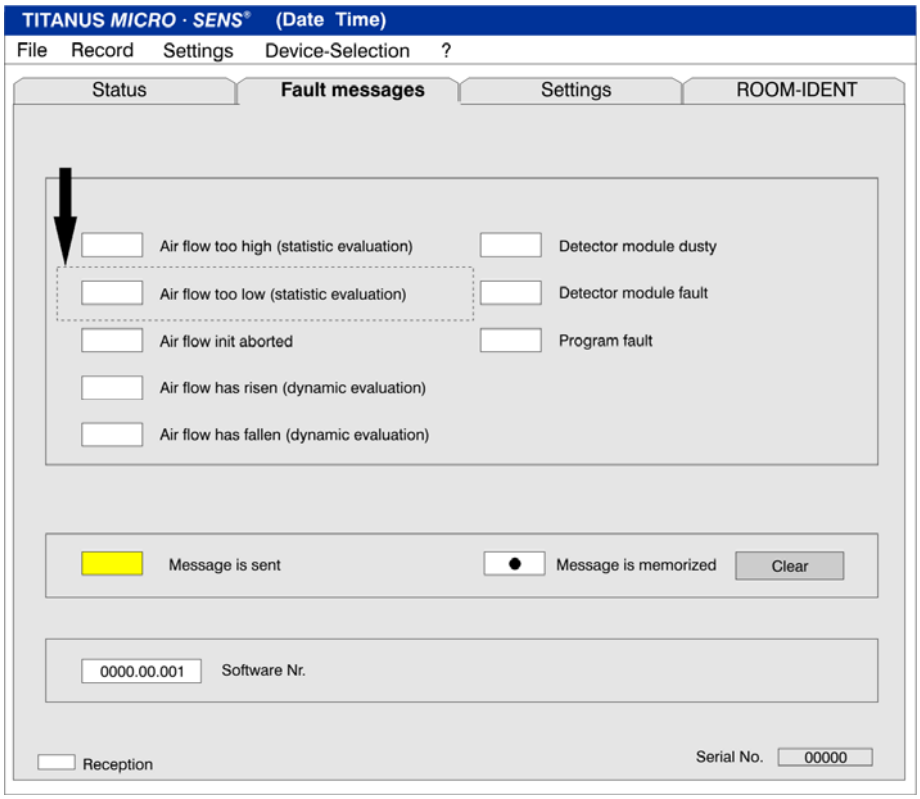
NOTICE

After function tests are completed, the original settings must be restored. So you should record these data (e.g. using the device protocol as stored text files).

1. Close all the aspiration holes on the test pipe with some sticky tape. The negative pressure generated by the TITANUS *MICRO·SENS*® must, after a short running time, be 80 Pa. For limited function testing without the digital precision manometer, this step is omitted.

NOTICE

After the aspiration holes are closed, within 30 secs the device signals the faults “Detection unit defective “and “Air flow too low (statistical evaluation)“.



2. Release the 4.6 mm and the 4.2 mm aspiration holes on the test pipe again.
3. Now click on the lower “Set“ button in the “Settings“ screen and start air flow initialising by pressing the “Initialise“ button.
   The fault messages and displays must go out. The “Initialising active“ field in the “Settings“ screen of the diagnosis tool flashes for the duration of initialising.
4. After initialising, close the 4.2 mm aspiration hole on the test pipe with some sticky tape.
   After about 5 secs, the fault display on the device must start to flash.
   After about 35 secs, the fault display on the device must be permanently on. The device signals the fault “Air flow too low (statistical evaluation)“.
   The air flow figure is about –35 %.
5. Open the 4.2 mm aspiration hole again.
   After a few seconds, the fault display on the TITANUS *MICRO·SENS*® must stop flashing.
6. Open the 7.0 mm aspiration pipe on the test pipe.
   After about 5 secs the fault display on the device must start to flash.
   After about 35 secs, the fault display on the device must be permanently on. The device signals the fault “Air flow too high (statistical evaluation)“.
   The air flow figure is about +85 %.
7. Close the 7.0 mm aspiration hole again.
   The fault display on the TITANUS *MICRO·SENS*® must stop flashing after a few seconds.
8. Remove the test pipe and re-connect the pipe system.

After function tests are completed, the original settings must be restored. Commissioning the TITANUS *MICRO·SENS*® is to be repeated from section “Air Flow Sensor Adjustment“.

Connection testing

Test whether ...

1. The pipe system is firmly connected to the TITANUS *MICRO·SENS*® pipe connection.
2. All pipe fittings are glued and the pipe system is sealed tight. For this, first close all aspiration apertures (e.g. with insulating tape). Using a flow measurement device, measure the air flow at the aperture for the air flow return.

3. The correct aspiration reducing films have been stuck to the aspiration apertures.

NOTICE

After the air flow sensor is adjusted (section "Air Flow Sensor Adjustment ") no more changes should be made to the pipe system.
If changes are necessary later, the air flow sensor must be adjusted again.

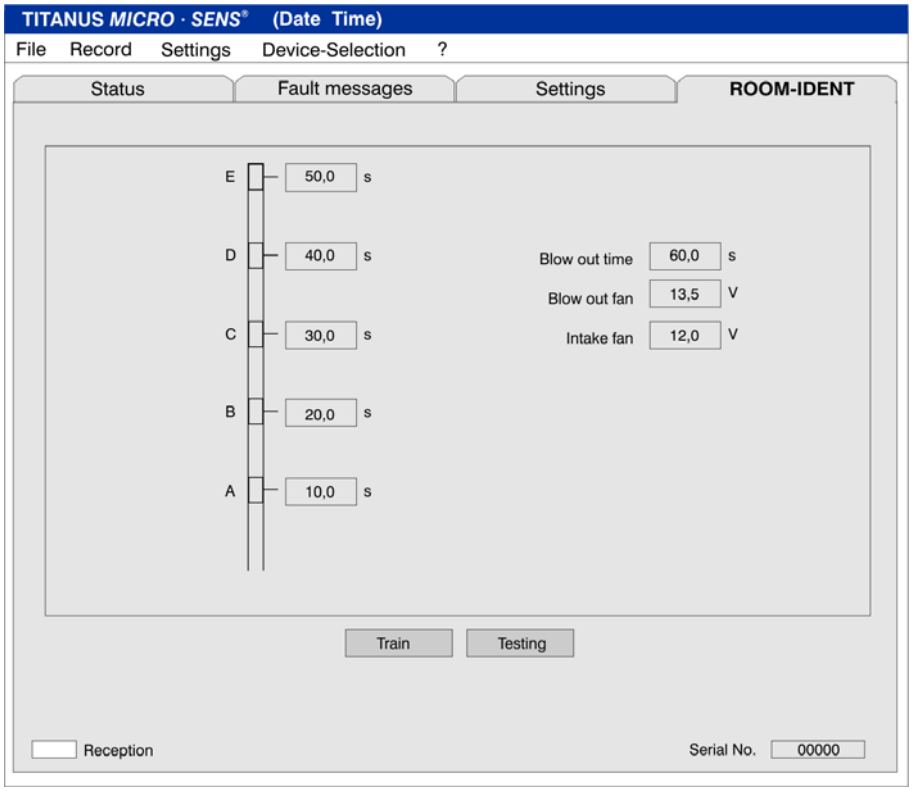
After function tests are completed, the device and the pipe system must be re-commissioned from section "Air Flow Sensor Adjustment.

NOTICE

After commissioning is completed, the settings should be recorded using the diagnosis tool and stored. A print-out of the settings should be filed with the project documents for subsequent follow-up work.

8.8 Commissioning fire seat location

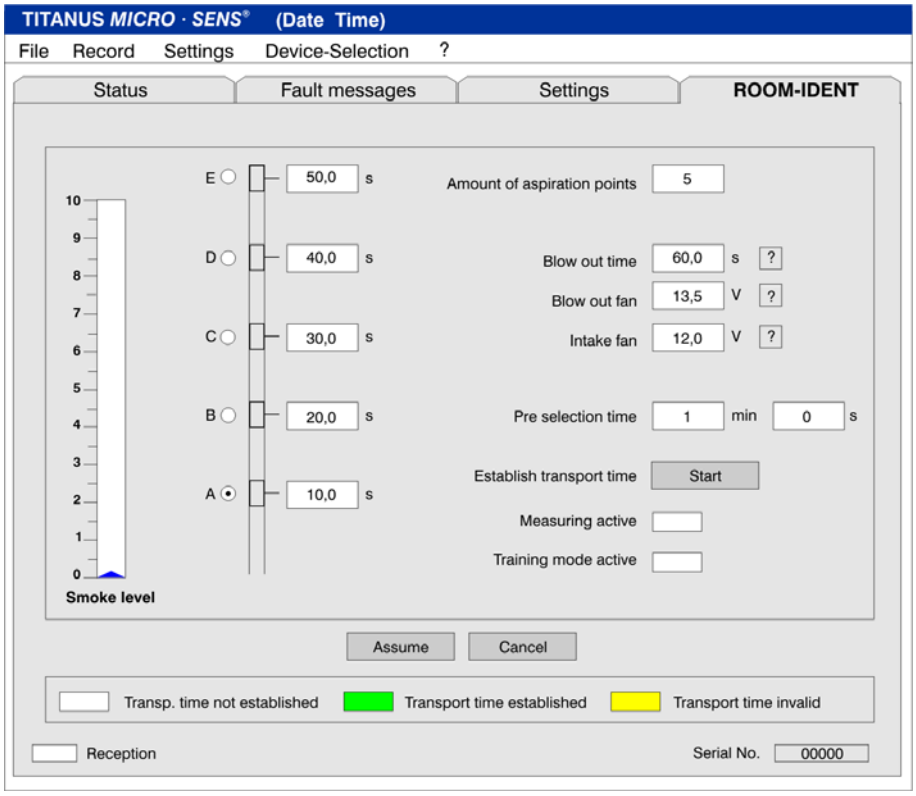
Locating the seating of a fire is undertaken using the diagnostics tool in the „ROOM·IDENT“ screen.



The Learn button opens the view with figures which can be set for determining the transport times for locating fire at the areas A –E (see next screen).

NOTICE

Commissioning for localisation is the same procedure for « Fire alarm after „ROOM·IDENT“ and „ ROOM·IDENT“.



First the number of aspiration apertures then the blow through time and blow through and aspiration fan voltage must be entered.
Click on the question mark for help.

? Blow through time help

Blow through time (for blow through fan voltage 13.5 V)
During blow through time the smoke is blown backwards out of the pipe. The blow through time can be selected from the following table (intermediate values = next largest value):

Pipe Length (m)	Time (secs)
10	80
15	97
20	113
25	130
30	147
35	163
40	180

1 second should be added to the blow through time for each pipe bend or angle.

? Blow through fan

The operating voltage for the blow through fan should if possible be kept at 13.5 V for location. It can be changed as follows for special applications:

Operating Status	Voltage (V)
- for an optimum (short) blow through time	13.5 V
- for longer blow through times - for lower voltage drops with smaller cable cross-sections	9.0 - 13.4 V

The value selected is stored permanently in the TITANUS *MICRO·SENS*® and used for each location procedure.

NOTICE

Under certain circumstance the blow through time may not be sufficient to blow through the pipe, if too low a blow through ventilator voltage was selected. This can cause a false fire site to be displayed.

? Aspiration fan help

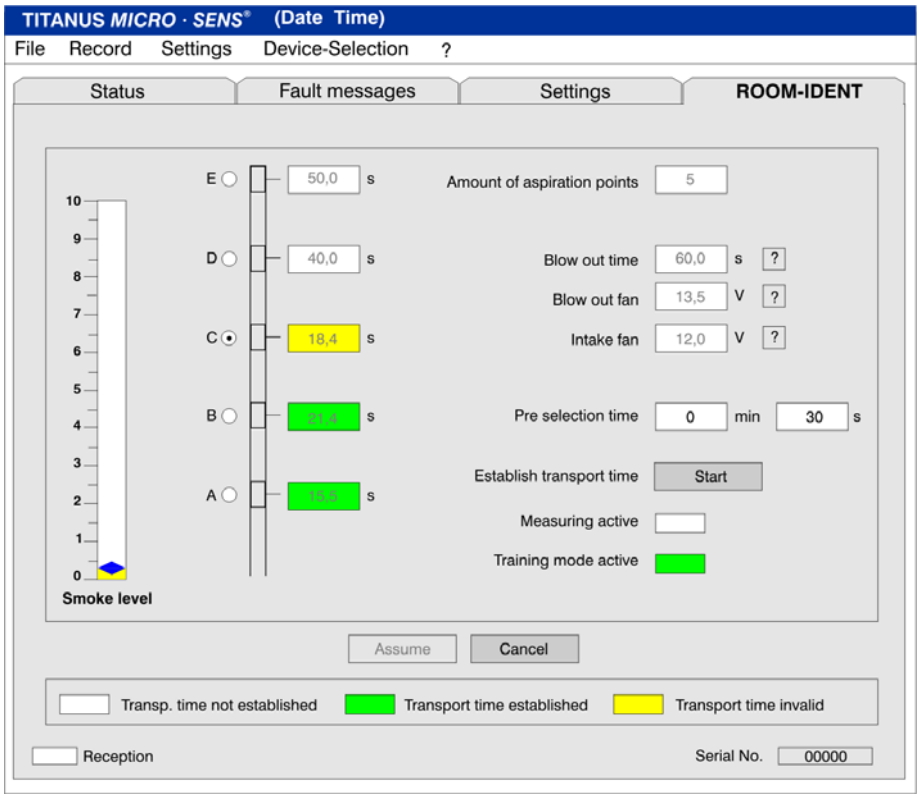
The operating voltage for the aspiration fan must be selected so that a time difference of about 2 to 4 seconds between two neighbouring aspiration apertures is not undercut. If the time differences are too short, then when there is an alarm, a false fire location may be displayed. As the air flow between aperture A and B is the highest, then with a normal design this has the shortest time.

The following table contains guideline figures for setting the operating voltage:

Distance A - B (m)	max. Voltage (V)
3	9,0
4	9,8
5	10,7
6	11,5
7	12,4
from 8 m	13,2

The aspiration point for which the transport time is to be determined is now selected by clicking. For each aspiration point selected, the pre-selected time required for reaching the aspiration point and providing the smoke must be entered. When the pre-selected time has lapsed, the particular smoke detection point must be charged with smoke. There must be smoke at the aspiration point for another 10 to 15 seconds after the pre-selected time has lapsed.

Before starting to determine the transport time, check by using a bargraph (smoke level) that there is no smoke in the aspiration pipe.



After starting to determine the transport time, the learn mode is active and TITANUS *MICRO·SENS*® switches to blowing out the aspiration pipe. The display for the aspiration point in question is yellow.

After the pre-selected time has lapsed, the TITANUS *MICRO·SENS*® switches to aspirate. At this point, there must be smoke at the aspiration point selected.

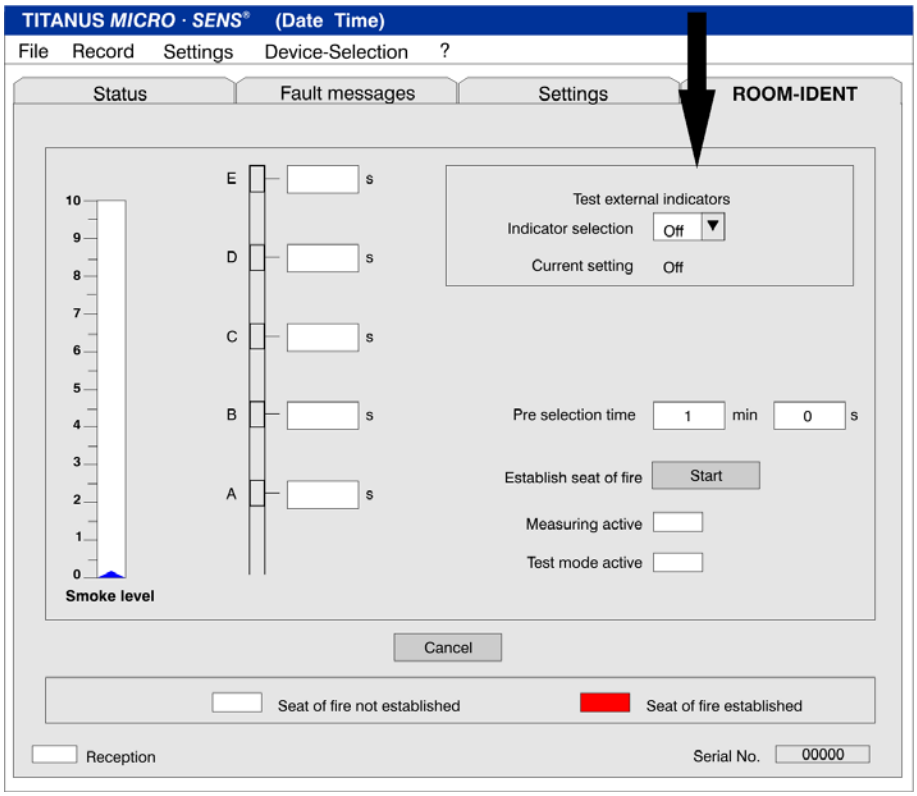
If the TITANUS *MICRO·SENS*® detects the smoke, the smoke level indicates this. The display for the aspiration point selected goes green and the time determined is entered.

The learn mode for the aspiration point selected is thereby closed.

8.9 Commissioning the reaction indicators

An indicator is selected in the “ROOM·IDENT” screen for testing the address setting for the reaction indicators during commissioning. You can then test whether the right reaction indicator is lit up and as set is either flashing or on permanently.

Before quitting the “ROOM·IDENT“ screen, the reaction indicator selection must be set to “Off“ and “Current Setting“ must also be at “Off“.



9 Maintenance

9.1 Visual check

Check whether ...

- when the pipe system is freely accessible it is firmly mounted and undamaged.
- the aspiration apertures on the pipe system are free.
- aspiration pipe and connection cable are firmly connected.
- the TITANUS *MICRO·SENS*® is undamaged.

9.2 Testing detector and alarm forwarding

Proceed as described in Chapter Commissioning" Detection Unit and Alarm Forwarding". Also check the detection unit visually for external dirt or damage and if necessary make replacements.

NOTICE

A hardware error on the detection unit is displayed in the “Messages” screen of the diagnostics tool.

9.3 Testing pipe system

Test the aspiration apertures on the pipe system for blockage, in areas in which dust particles or icing may be found. If necessary, blow the pipe system and aspiration apertures free with compressed air. Use a portable compressed air bottle to do this (blow through device) or press the manual blow through equipment installed on site.

⚠ WARNING

Before blowing through the pipe system, separate the TITANUS *MICRO·SENS*® from the pipe system, as otherwise the air flow sensor will be damaged.

9.4 Exchanging the detection unit

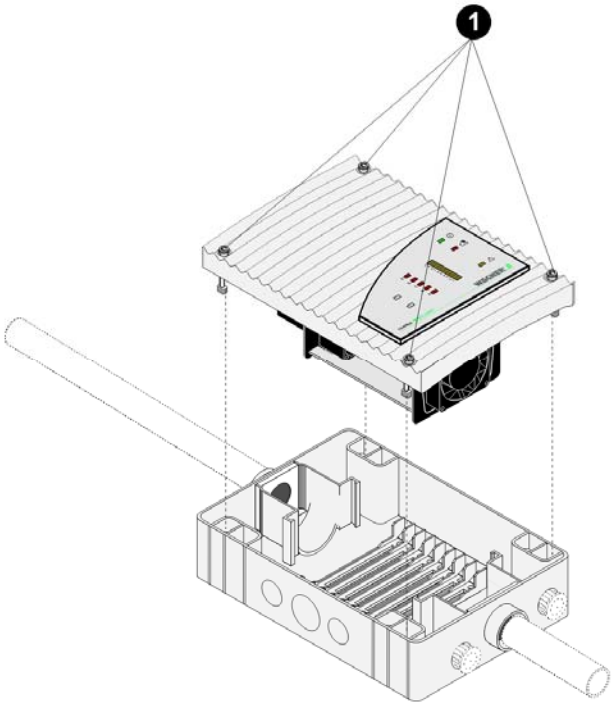


Figure 108: Exchanging the detection unit

1. With the aid of a screwdriver, loosen the four screws on the detection unit and remove it from the device base.
2. When inserting the new detection unit, note the mechanical coding, this protects the device against twisting.
   Change the jumper X4.
3. Now with the aid of a screwdriver, screw the four screws on the detection unit down firmly again.
4. The device initialises automatically when the jumper X4 is changed.

9.5 Exchanging the air filter for the device base

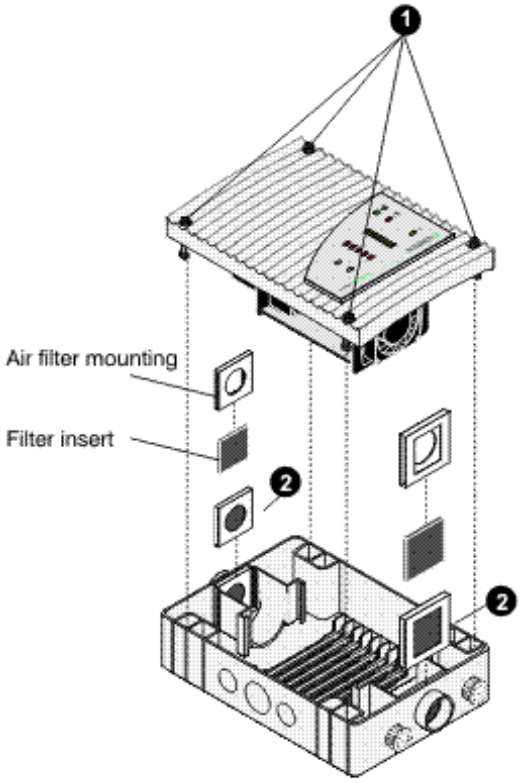


Figure 109: Exchanging the type AF-HBTM air filter in the TITANUS MICRO·SENS® device base

1. With the aid of a screwdriver, loosen the four screws on the detection unit and remove it from the device base.
2. Pull both filter mountings out of the device base and remove the filter inserts. Conduct a visual check for dirt and if necessary change the filters. Then replace the filter mounting.
3. Now with the aid of a screwdriver screw the four screws on the detection unit down again firmly.
4. The device initialises automatically when the jumper X4 is changed.

9.6 Changing the filter on the type LF-AD-x air filter

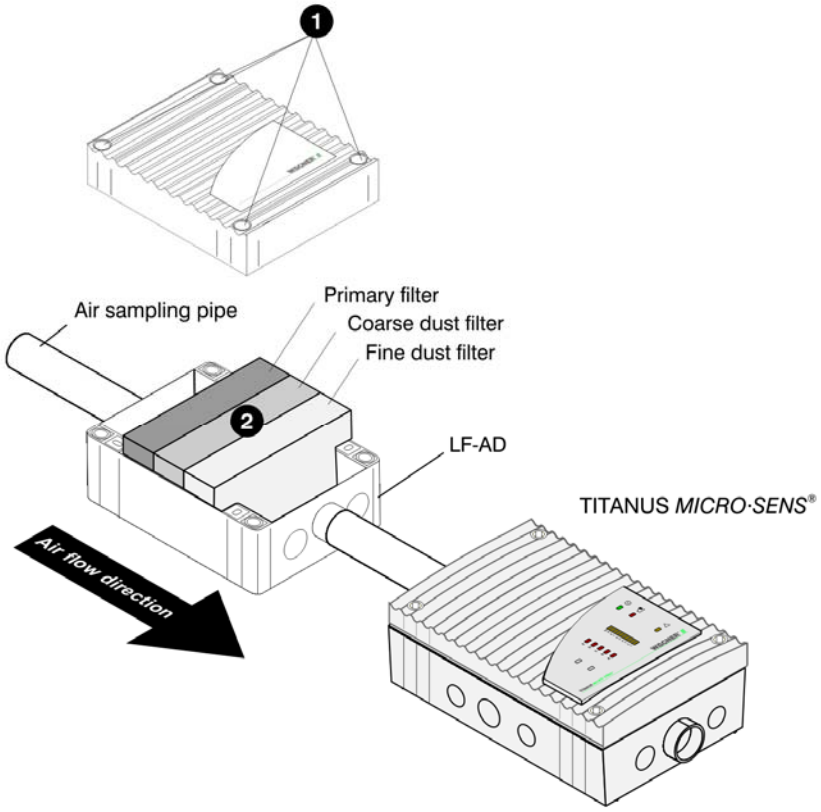


Figure 110: Changing the filter Inserts

To clean or change the filter inserts, proceed as follows:

1. Loosen the four screws and remove the housing cover.
2. Remove the filter inserts and check them visually for dust. If slightly dirty, the filter inserts can be cleaned. If they are very dirty, they must be changed.
3. Clean the housing inner carefully of all dust deposits. Now insert the cleaned or new filter inserts in the correct order. The correct sequence is shown on the information plate on the housing base.
4. Replace the housing cover and screw it down again.

TIP

When used where there is mainly fine dust, three optional fine dust filters can be used.

NOTICE

Opening the device cover on the LF-AD air filter on the TITANUS *MICRO·SENS*® can lead to an air flow fault.

9.7 Changing the filter on the SF 400/650 special filter

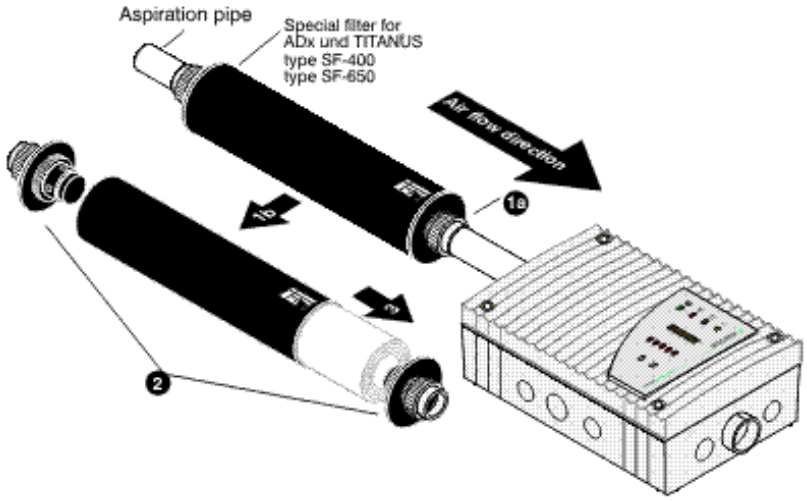


Figure 111: Changing the filter element

To change the filter element, proceed as follows:

1. Loosen the two PVC transition threaded joints on the special filter (1a) and remove it (1b).
2. Loosen both screwed plugs on the filter housing.
3. Remove the old filter element. Put the new filter element into the filter housing.
4. Screw both screwed plugs to the filter housing.
5. Replace the special filter in the pipe system and fix it with the PVC transition threaded joints.

NOTICE

When the special filter is being installed, pay attention to the through flow direction!

NOTICE

Opening the special filter will produce an air flow fault on the TITANUS *MICRO·SENS*®.

9.8 Pipe system blow through process

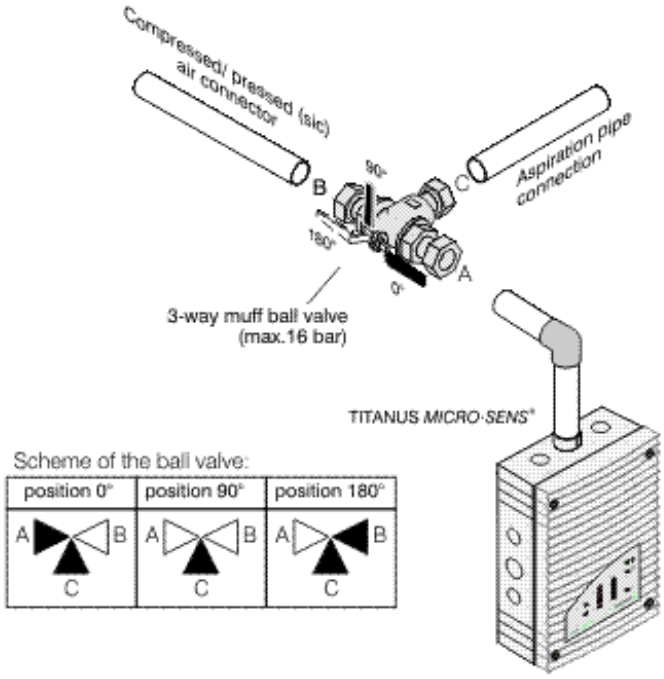


Figure 112: Lever position on the ball valve

The pipe system manual blow through process should be conducted in the following stages:

1. Connect the compressed air supply needed for free-blowing the pipe system (compressor or mobile free-blow device) via the quick release coupling muff to the 3-way muff ball valve on the pipe system to be blown through.
2. Separate the pipe system to be blown through by the 3-way muff ball valve from the corresponding device, by moving the ball valve lever from the 0° operating position to the 180° position (see Figure "Lever position on the ball valve").
3. Blow the pipe system free manually for about 10 seconds.
4. Put the ball valve lever into the 90° position. In this position, the device cannot be connected either to the pipe system or the compressed or pressed air supply connection. Wait about 20 seconds so that the dust and dirt stirred up in the pipe system can settle and thus not be aspirated via the air sampling smoke detection system.

5. Re-connect the free-blown pipe system to the corresponding device within 10 seconds by setting the ball valve back to the 0° position.

9.9 Checking the air flow sensor adjustment

Test the air flow sensor value using the diagnosis software.

Operating principle

Whilst the connected pipe system is initialising, the device first stores the measured actual value of the air flow as an ideal value, via integrated air flow monitoring. This ideal value thereafter serves as the reference value for further evaluation of any air flow fault. Depending on the air flow threshold selected (see Chapter Design, section on Adjusting Air Flow Sensitivity), the current air flow value can oscillate more or less around this ideal value during operating, without triggering an air flow fault. Only if the air flow threshold selected is exceeded is the air flow fault signalled by the device and can thus be forwarded.

Checking the actual value

The tolerance range for the air flow threshold selected as well as the actual and ideal values are shown in the diagnosis software. The limits correspond to the air flow range set. Check the deviation of the actual value from the ideal value. If it deviates by > ±3/4 from the set threshold, you should test the pipe system as a precaution (on this, see section "Clearing Air Flow Fault").

NOTICE

The current air flow value cannot deviate from the ideal value just because of a fault in the pipe system (break or blockage) but also because of air pressure oscillations in the environment.

air pressure-dependent

To ensure that the device operates long-term without faults, the air flow sensor must be adjusted to be air pressure-dependent (see Chapter Commissioning). It is only with this type of adjustment that small air pressure oscillations lie within the monitoring window and thus within the permitted tolerance range.

⚠ WARNING

If the air flow change has been set at less than 30 %, there must be air pressure-dependent adjustment.

air pressure-dependent If the sensor adjustment is air pressure-independent, oscillations in the air pressure can lead to undesirable air flow faults. At more than 30 % air flow change the air flow sensor adjustment must be air pressure-independent and it must be ensured that no oscillations in air pressure can occur in the surrounding environment.

⚠ WARNING

If it cannot be ensured that no oscillations in air pressure will occur in the surrounding environment, the air flow sensor must definitely be air pressure-dependent adjusted.

Clearing air flow fault If air flow adjustment was conducted as air pressure-dependent and the actual value is still no longer within the tolerance range for the air flow threshold selected (air flow fault signalled by the device), then there must be another fault variable apart from any air pressure or temperature oscillation.

1. In this case, test that the pipe system is sealed tight and not blocked (see Chapter Commissioning).

NOTICE

If during fault location the pipe network was changed, the original pipe system configuration must be restored after fault location is completed and the air flow again adjusted.

2. If this test does not show any defects, check air flow monitoring by connecting the test pipe and carrying out the function test described in Chapter Commissioning. If the function test shows no deviations from the described procedure, it is certain that there is no defect in air flow monitoring.

⚠ WARNING

If there is a defect in air flow monitoring, only authorised personnel may change the detection unit!

3. Adjust again with the pipe system connected.

NOTICE

You must record the type of adjustment (air pressure-dependent or air pressure-independent) and possibly the figures for air pressure, height above sea level and voltage set, in the testing records.

4. Note the current air flow value during this maintenance session or check it at the latest at the next inspection.

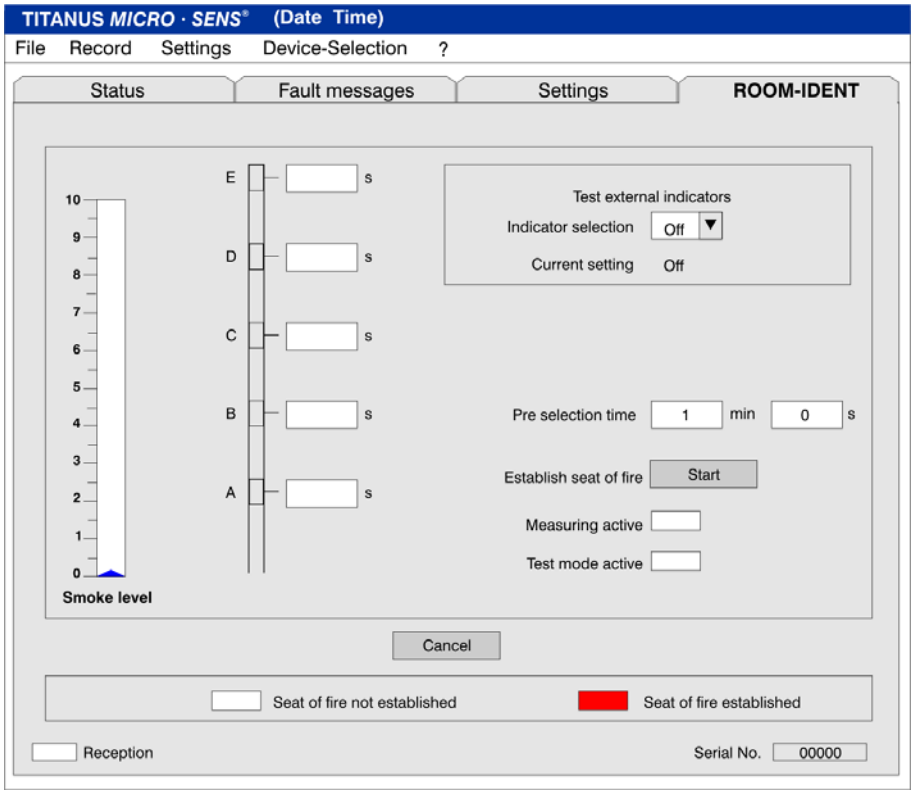
TIP

With the aid of the diagnosis software, all stored and current device data and the settings input using the diagnosis tool can be stored as files.

5. If there is a similar ideal value deviation as before, interfering environmental influences are the cause of this deviation. If these negative influences cannot be stopped from affecting air flow monitoring, the air flow range must be increased.

9.10 Testing fire seat location and the reaction indicators

Testing fire seat location and the reaction indicators.



At the first location screen “ROOM·IDENT“ (see figure in chapter Commissioning „Localisation of the fire location“) the button “Test” needs to be prened in order to open this screen. To test, select the “Pre selection time” and then click on Start to deter-mine the seat of fire.

The TITANUS *MICRO·SENS*® switches to blowing out the aspiration pipe. The particular aspiration point must be charged with smoke until the pre-selected time has elapsed. There must still be smoke at the aspiration point for 10 to 15 seconds after the pre-selected time has expired.

After the pre-selected time has elapsed, the TITANUS *MICRO·SENS*® switches to aspiration and the time measured until the smoke is detected determines the aspiration point. Check whether it is the right aspiration point.

9.11 Testing Air Flow Monitoring

A break or a blockage in a pipe is displayed on the diagnostics tool “Message” screen. Test air flow monitoring in accordance with the instructions described in Chapter Commissioning "Air Flow Monitoring".

9.12 Testing Fault Forwarding

A fault is displayed on the TITANUS *MICRO·SENS*® and possibly on the FAS.

Proceed as described in Chapter Commissioning "Fault Forwarding".

9.13 Maintenance Intervals

The maintenance includes regular servicing. The air sampling smoke detection systems are checked during commissioning and annually thereafter.

For each service, the following checks must be carried out:

Type of Check	**Measure**	**Other Information in Chapter**
Servicing	Visual check Detection unit and alarm forwarding Check pipe system Air flow sensor adjustment Air flow monitoring Fault forwarding	Maintenance Maintenance Maintenance Maintenance Maintenance Commissioning

In addition to the annual maintenance national regulations and standards referring to the intended use must be considered, as well as application-specific requirements, if necessary.

Appendix

Projection Tables

System Product List

Inspection Protocol

Glossary

Conformity certification pursuant to EU

Classification TITANUS *MICRO·SENS*®
Projection without filter

Type	Sensitivity (% Lt/m)	Number of points							
		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	C	C	C				

Without pipe accessories or with detector box or VSK

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	
I	≥9	40	40	40	40	40				permitted total pipe length [m]
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 steam trap or with VSK and detector box

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	
I	≥9	40	40	40						permitted total pipe length [m]
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	

Classification TITANUS *MICRO·SENS*®
Projection with air filter LF-AD

Type	Sensitivity (% Lt/m)	Number of points							
		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	C	C	C				
	1,8	B	C	C	C				
	1,9	B	C	C	C				
	2	B	C	C	C				

Without additional pipe accessories or with detector box or VSK

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	
I	≥9	40	40	40	40	40				permitted total pipe length [m]
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 steam trap or with VSK and detector box

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	
I	≥9	40	40	40						permitted total pipe length [m]
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	

Classification TITANUS *MICRO·SENS*®
Projection with air filter LF-AD-1

Type		Sensitivity (% Lt/m)	Number of points							
			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	C	C	C				
		1,7	B	C	C	C				
		1,8	B	C	C	C				
		1,9	B	C	C	C				
		2	B	C	C					

Without additional pipe accessories or with detector box

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	
I	≥9	40	40	40	40	40				permitted total pipe length [m]
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 steam trap or with VSK and/or detector box

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	
I	≥9	40	40	40						permitted total pipe length [m]
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	

Classification TITANUS *MICRO·SENS*®
Projection with air filter LF-AD-2

Type		Sensitivity (% Lt/m)	Number of points							
			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	C	C	C				
		1,5	B	C	C	C				
		1,6	B	C	C	C				
		1,7	B	C	C					
		1,8	B	C	C					
		1,9	B	C	C					
		2	B	C	C					

Without additional pipe accessories or with detector box

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	
I	≥9	40	40	40	40	40				permitted total pipe length [m]
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* und and detector box or with steam trap or with VSK and detector box

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	
I	≥9	40	40	40						permitted total pipe length [m]
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	

Classification TITANUS *MICRO·SENS*®
Projection with SF-400 / SF-650

Type	Sensitivity (% Lt/m)	Number of points							
		1	2	3	4	5	6	7	8
DM-TM-10	0,1	A	B	B	B	C	C	C	C
	0,2	B	B	C	C	C	C		
	0,3	B	C	C	C				
	0,4	B	C	C					
DM-TM-50	0,5	C	C						
	0,6	C	C						
	0,7	C							
	0,8	C							
	0,9	C							
	1	C							
	1,1	C							
	1,2	C							
	1,3	C							
	1,4								
	1,5								
	1,6								
	1,7								
	1,8								
	1,9								
	2								

Without additional pipe accessories

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	
I	≥9	40	40	40	40					permitted total pipe length [m]
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

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	
I	≥9	40	40	40						permitted total pipe length [m]
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	

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit

Air Sampling Smoke Detection Systems

AD-05-1500	detector box insert TITANUS MICRO·SENS	pc.
<P> <Z>	type DM-MB-TM-10	
<2> <>		
AD-05-1505	detector box insert TITANUS MICRO·SENS	pc.
<P> < >	type DM-MB-TMV-10	
<2> <>		
AD-05-1510	detector box insert TITANUS MICRO·SENS	pc.
<P> <Z>	type DM-MB-TM-B-10	
<2> <>		
AD-05-1515	detector box insert TITANUS MICRO·SENS	pc.
<P> < >	type DM-MB-TMV-B-10	
<2> <>		
AD-05-1520	detector box insert TITANUS MICRO·SENS	pc.
<P> <Z>	type DM-MB-TM-50	
<2> <>		
AD-05-1525	detector box insert TITANUS MICRO·SENS	pc.
<P> < >	type DM-MB-TMV-50	
<2> <>		
AD-05-1530	detector box insert TITANUS MICRO·SENS	pc.
<P> <Z>	type DM-MB-TM-B-50	
<2> <>		
AD-05-1535	detector box insert TITANUS MICRO·SENS	pc.
<P> < >	type DM-MB-TMV-B-50	
<2> <>		
AD-05-3500	Device base TITANUS MICRO·SENS	pc.
<P> <Z>	type HB-TM	
<2> <>		
AD-05-3510	device base TITANUS MICRO·SENS	pc.
<P> < >	type HB-TM-U	
<2> <>		
AD-05-4000	detection unit TITANUS MICRO·SENS	pc.
<P> <Z>	type DM-TM-10	
<2> <>		

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit
AD-05-4010 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-R-10	pc.
AD-05-4020 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-B-10	pc.
AD-05-4030 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-RB-10	pc.
AD-05-4040 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-Z-10	pc.
AD-05-4050 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-ZB-10	pc.
AD-05-4100 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-10-F	pc.
AD-05-4120 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-B-10-F	pc.
AD-05-4300 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-50	pc.
AD-05-4310 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-R-50	pc.
AD-05-4320 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-B-50	pc.
AD-05-4330 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-RB-50	pc.

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit
AD-05-4340 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-Z-50	pc.
AD-05-4350 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-ZB-50	pc.
AD-05-4410 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-10-U	pc.
AD-05-4415 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-R-10-U	pc.
AD-05-4420 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-B-10-U	pc.
AD-05-4425 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-RB-10-U	pc.
AD-05-4430 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-50-U	pc.
AD-05-4435 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-R-50-U	pc.
AD-05-4440 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-B-50-U	pc.
AD-05-4445 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-RB-50-U	pc.
AD-05-4500 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-50-F	pc.

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit
AD-05-4520 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-B-50-F	pc.
AD-05-4521 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-10	pc.
AD-05-4522 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-R-10	pc.
AD-05-4524 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-B-10	pc.
AD-05-4525 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-RB-10	pc.
AD-05-4527 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-Z-10	pc.
AD-05-4528 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-ZB-10	pc.
AD-05-4529 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-10-F	pc.
AD-05-4530 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-B-10-F	pc.
AD-05-4531 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-50	pc.
AD-05-4532 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-R-50	pc.

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit
AD-05-4534 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-B-50	pc.
AD-05-4535 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-RB-50	pc.
AD-05-4537 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-Z-50	pc.
AD-05-4538 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-ZB-50	pc.
AD-05-4539 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-50-F	pc.
AD-05-4540 <P> <Z> <2> <>	detection unit TITANUS MICRO·SENS type DM-TMV-B-50-F	pc.
AD-05-4550 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-50-U	pc.
AD-05-4560 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-R-50-U	pc.
AD-05-4565 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-B-50-U	pc.
AD-05-4570 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-RB-50-U	pc.
AD-05-4575 <P> < > <2> <>	detection unit TITANUS MICRO·SENS type DM-TM-10-U	pc.

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit
AD-05-4580	detection unit TITANUS MICRO·SENS	pc.
<P> < >	type DM-TM-R-10-U	
<2> <>		
AD-05-4585	detection unit TITANUS MICRO·SENS	pc.
<P> < >	type DM-TM-B-10-U	
<2> <>		
AD-05-4590	detection unit TITANUS MICRO·SENS	pc.
<P> < >	type DM-TM-RB-10-U	
<2> <>		

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit

Front Film Sheets

AD-10-1400	Front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FW-TM	
<2> <>		
AD-10-1410	Front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FW-TM-R	
<2> <>		
AD-10-1420	Front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FW-TM-B	
<2> <>		
AD-10-1430	Front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FW-TM-RB	
<2> <>		
AD-10-1440	Front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FW-TMV	
<2> <>		
AD-10-1450	Front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FW-TMV-R	
<2> <>		
AD-10-1460	Front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FW-TMV-B	
<2> <>		
AD-10-1470	Front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FW-TMV-RB	
<2> <>		
AD-10-1500	front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FW-AB-1	
<2> <>		
AD-10-1510	front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FS-AB-1	
<2> <>		
AD-10-1700	front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FS-TM	
<2> <>		

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit
AD-10-1710	front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FS-TM-R	
<2> <>		
AD-10-1720	front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FS-TM-B	
<2> <>		
AD-10-1730	front film sheet TITANUS MICRO·SENS	pc.
<P> <Z>	type FS-TM-RB	
<2> <>		

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

--

order no.	description	unit

Accessory

02-60-0640	push button	pc.
<P> <Z>	type R13-527A	
<0> <>		
09-20-5481	reset board	pc.
<P> <Z>	type E548/c	
<2> <>		
09-20-6100	GSM module TITANUS	pc.
<P> <Z>	type GU-1	
<2> <AM>		
09-20-6140	Network module TITANUS	pc.
<P> <Z>	type NU-2	
<2> <>		
09-20-6400	Network module TITANUS	pc.
<P> < >	type NU-2-D	
<2> <>		
09-20-6405	Record module TITANUS	pc.
<P> < >	type NU-2-DO	
<2> <>		
09-20-6410	Network module TITANUS	pc.
<P> < >	type NU-2-D-F	
<2> <>		
09-20-6415	Record module TITANUS	pc.
<P> < >	type NU-2-DO-F	
<2> <>		
09-20-6680	TITANUS relay module	pc.
<P> <Z>	type RU-1	
<2> <>		
09-20-6681	TITANUS relay module	pc.
<P> <Z>	type RU-2	
<2> <>		
AD-05-0563	Diagnostic tool	pc.
<P> <Z>	type DIAG 3/a	
<3> <>		

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit
AD-05-0580	test unit for device base	pc.
<P> <Z>	type DIAG-Con	
<2> <AM>		
AD-05-0590	smoke pen	pc.
<P> <Z>	type CT-1	
<0> <>		
AD-05-0595	holding device for smoke pen	pc.
<P> <Z>	type AK-CT-1	
<0> <>		
AD-05-0597	smoke candles for smoke pen	pc.
<P> <Z>	type SP-CT-1 (set = 6 candles)	
<0> <>		
AD-05-0930	Cable glands	pc.
<P> <Z>	type M20-MS (PU=100 Pcs.)	
<0> <>		
AD-05-0940	Cable glands	pc.
<P> <Z>	type M25-MS (PU=100 Pcs.)	
<0> <>		
AD-05-0950	Cable glands	pc.
<P> <Z>	type M20 (PU=100 pcs.)	
<0> <>		
AD-05-0955	Cable glands	pc.
<P> <Z>	type M25 (PU=100 pcs.)	
<0> <>		
AD-05-0960	Screwable cable glands	pc.
<P> <Z>	type Snaptec M20 (PU=50 pcs.)	
<0> <>		
AD-05-2000	response indicator	pc.
<P> <Z>	type DJ-TM	
<0> <>		
AD-05-2100	parallel display TITANUS MICRO·SENS	pc.
<P> <Z>	type RD-TM	
<2> <>		

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit
AD-05-5200	housing for TITANUS accessories	pc.
<P> <Z>	type AB-1	
<2> <>		
AD-10-0550	Test pipe for air sampling systems	pc.
<P> <Z>	type DIAG-Pipe	
<2> <>		
AD-10-4200	reset and disconnecting button	pc.
<P> <Z>	type RTT-1	
<3> <>		
AD-10-4730	TITANUS Networktools	pc.
<P> < >	type CD-1	
<0> <>		
BM-05-1705	double input module "AnalogPLUS"	pc.
<P> <Z>	type DC 1131-31	
<2> <AM>		
BM-05-1750	input module "Interactive"	pc.
<P> <Z>	type DC 1157-AA, VdS-no.: G 299 031	
<1> <AM>		
LS-05-0500	VisuLAN T	pc.
<P> <Z>	type BS-VLT-1	
<1> <>		
LS-05-0700	VisuLAN T - OPC-Server	pc.
<P> < >	type OPC-VLT-1	
<1> <>		
LS-05-0710	VisuLAN T - Communication-Module	pc.
<P> < >	type ES-VLT-COM	
<1> <>		
LS-05-0720	VisuLAN T - Interface GSM-Modem	pc.
<P> < >	type ES-VLT-GSM-1	
<1> <>		
LS-05-0730	VisuLAN T - Text-to-Speech module	pc.
<P> < >	type ES-VLT-TTS	
<1> <>		

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit
LS-05-0740	VisuLAN T - Datapoint extension	pc.
<P> < >	type ES-VLT-DP-1	
<1> <>		
LS-05-0750	VisuLAN T - Extension License	pc.
<P> < >	type EL-VLT-1	
<1> <>		
LS-05-0760	VisuLAN T - Software Update	pc.
<P> < >	type US-VLT-1	
<1> <>		

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit

Spare parts

09-20-6500	display board	pc.
<P> <Z>	type DB-TM	
<3> <>		
09-20-6550	indicator bus adapter	pc.
<P> <Z>	type IA-TM	
<3> <>		
10-60-0695	operat.device reset and discon. button	pc.
<P> <Z>	type RTT-1	
<2> <>		
AD-05-0570	Transport case for diagnostic tool	pc.
<P> <Z>	type DIAG-Case	
<0> <>		
AD-05-0575	Adapter cable for diagnostic interface	pc.
<P> <Z>	type AC-DIAG 3	
<2> <>		
AD-05-0578	Connecting cable f. diagnostic interface	pc.
<P> <Z>	type CC-DIAG 3	
<0> <>		
AD-05-0628	Diagnostic interface	pc.
<P> <Z>	type IF-DIAG 3	
<2> <>		
AD-05-0630	board for reset and disconnecting button	pc.
<P> <Z>	type RTT-1	
<2> <>		
AD-05-0635	Holding device for diagnostic interface	pc.
<P> <Z>	type DIAG 3-Clip/a	
<3> <>		
AD-05-0637	Holding device for diagnostic interface	pc.
<P> <Z>	type DB-DIAG 3-TM	
<3> <>		
AD-05-0639	Holding device for diagnostic interface	pc.
<P> <Z>	type DB-DIAG 3-TR	
<3> <>		

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit
AD-05-3550	replacement parts for device base	pc.
<P> <Z>	type SP-TM-1	
<0> <>		
AD-05-3560	lid screws	pc.
<P> <Z>	type SP-TM-3 (PU=10 pcs.)	
<0> <>		
AD-05-3570	jumper for the air flow initialisation	pc.
<P> <Z>	type SP-TM-2 (PU=10 pcs.)	
<0> <>		
AD-05-3580	air filter	pc.
<P> <Z>	type SP-TM-5 (PU=10 pcs.)	
<3> <>		
AD-05-4400	set of seals for the detection unit	pc.
<P> <Z>	type SP-TM-4	
<0> <>		
AD-10-4720	Storage card	pc.
<P> < >	type SC-1	
<0> <>		
AD-10-4725	Storage card	pc.
<P> < >	type SC-1-F	
<0> <>		
AD-10-4740	Battery	pc.
<P> < >	type BT-1	
<0> <>		

TITANUS MICRO·SENS, Subsidiary-Delivery Transaction

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order no.	description	unit

Phase-out

AD-05-0560	diagnostic tool	pc.
<P> < >	type DIAG 3	
<2> <AM>		
AD-05-4315	detection unit TITANUS MICRO·SENS	pc.
<P> < >	type DM-TM-R-50/a	
<2> <AM>		

Testing record for Aspirating Smoke Detection System of the TITANUS *MICRO · SENS*® type

Device number							
Detection unit serial number							
Device base serial number							
	Measure/ + Setting	Measure / + Setting	Measure/ + setting	Measure/ + Setting	Measure/ + Setting	Measure/ + Setting
Commissioning						
Visual check (✓/ –)						
Low pressure [Pa]						
Sensitivity [%/m]						
Alarm delay [s]						
Air flow range [10-50%]						
Fault delay [min]						
Fault storing (ja/nein)						
Dynamic air flow (ja/nein)						
Location (ja/nein)						
LOGIC · *SENS* (ja/nein)						
Air pressure-dependent adjustment (ja/nein)						
Air pressure-independent adjustment (ja/nein)						
Height [m ü. NN.]						
Air pressure [hPa]						
Ventilator voltage [9-13,5V]						
Air flow range [m/s]						
Temperature [°C]						
Blockage Fault						
LED flashing (✓/ –)						
Relay drops out after delay time (✓/ –)						
Signal forwarding to fire alarm system (✓/ –)						
Cause removed, LED out (✓/ –)						
Relay picks up after threshold undercut (✓/ –)						
Cause removed, LED stored (✓/ –)						
Relay remains down for at least 100 secs (✓/ –)						
Break Fault						
LED flashing (✓/ –)						
Relay drops out after delay time (✓/ –)						
Signal forwarding to the FAS (✓/ –)						
Cause removed, LED out (✓/ –)						
Relay picks up after threshold undercut (✓/ –)						
Cause removed, LED stored (✓/ –)						
Relay remains down for at least 100 secs (✓/ –)						
Main Alarm						
LED flashing (✓/ –)						
Relay picks up after delay time (✓/ –)						
Signal forwarding to FAS (✓/ –)						
LED stored (✓/ –)						
Relay stored (✓/ –)						
***Location* (ROOM-IDENT)**						
Free blow time [10-255s]						
Free blow ventilator [9-13,5V]						
Aspiration ventilator [9-13,5V]						
LED Location long-term aspiration aperture A (yes/no) / [s]						
LED Location long-term aspiration aperture B (yes/no) / [s]						
LED Location long-term aspiration aperture C (yes/no) / [s]						
LED Location long-term aspiration aperture D (yes/no) / [s]						
LED Location long-term aspiration aperture E (yes/no) / [s]						
Reaction Indicator						
Aspiration aperture A (yes/no)						
Aspiration aperture B (yes/no)						
Aspiration aperture C (yes/no)						
Aspiration aperture D (yes/no)						
Aspiration aperture E (yes/no)						

Issuer: …… **Signature: ……**

Key:	✓ O.K.
	– not O.K.

Glossary

Technical Term	*Definition*
	A
Aerosol Also: smoke aerosol	An aerosol is a floating particle in the microscopic or submicroscopic particle size range. It consist of unburned parts of the fire load, intermediate products of the oxidation and finely divided carbon (soot).
Air flow sensor	Sensor for monitoring the total air flow in the pipe system, i.e. checking the pipe system for blockage and fracture; depending on the demands of the air flow monitor →single-hole monitoring and the detection of a fracture at the end of the pipe system are possible.
Air sampling smoke detection system	An active system producing under-pressure for air sampling with a ventilator, integrated in the system. The air samples are then passed to a detection unit (smoke detector, detector head or detector module).
Alarm	a) Acoustic and/or optical signal activated through →smoke detectors to indicate a fire. b) Freely adjustable alarm threshold. The activation of the alarm definitely means the detection of a fire. The fire department is informed.
Alarm condition	The condition of a fire detection installation or a part of it as a reaction to an existing danger.
Alarm current	An increased voltage in the →alarm condition (→quiescent current).
Automatic smoke detectors	These detect and analyse physical parameters which lead to danger-warning signals. Automatic smoke detectors are e.g. point-type detectors and →air sampling smoke detection systems.
	C
Central fire panel	Central part of a fire detection installation which supplies the detectors with power, displays received signals optically and acoustically and, if required, transmits them and checks the installation for faults.
Collective detection systen	Conventional line detection technology for which all detectors, connected to the same line, have the same collective address (common indication and operation without identification of the individual detector).

C	
Collective effect	A phenomenon common only to air sampling smoke detection systems. The sensitivity of the individual detection points (smoke sampling points), in contrast to point-type detectors, does not remain constant. The sensitivity of the individual air sampling points depends on the → response sensitivity and the number of air sampling points.
Collective fault	A non-differentiated, i.e. non-localisable →fault signal which reports to a superior system.
Contact load	Contact load describes the maximum load at which a relay contact can be switched.
D	
Detection line	Monitored transmission line (→primary line) to which the smoke detectors are connected with the →central fire panel.
Detection reliability	This is the measure of reliability with which phenomena are detected and reported and for which a detection system is used.
Detection unit	The sensitive detection unit is picking up smoke aerosols.
Detector group	Collection of smoke detectors in a →detection line for which a separate display is installed in the →central fire panel.
DIL switch	**D**ual **I**n **L**ine; e.g. to set the response sensitivity, the air flow sensor, the delay period for →alarm and fault, to set the fault display to latched or non-latched and to activate or deactivate → LOGIC·*SENS*.
Drift	Method of compensating detector soiling which could change the quiescent signal by moving the zero point.
E	
Electromagnetic compatibility (EMC)	This is the ability of an electrical or electronic system to operate correctly in its electromagnetic environment and have no adverse affect on this environment.
End-of-line resistor	Element at the end of a →detection or control line to check the line for broken wires and short circuits.
F	
Fault signal	Signal indicating a deviation from the desired value in the →smoke detection installation.
Fire load	The fire load corresponds to the amount of heat of all combustible materials of a fire section, depending on its surface area.

Fire monitor	Part of a →central fire panel to identify fire in the protected area.
Fire section	Isolated section in a building (special construction) which avoids or slows down the spreading of a fire to a neighboring section.
Fire-resistant collar	Constructions which avoids flame/smoke spreading in cable ducts as well as in recesses and break-through for wiring in walls and ceilings.
I	
Interactive detector	Detector series with highest detection reliability for evaluation and decision logistics with interactive signal processing based on programmable algorithms. The detectors can be parameterized; they can be optimally programmed in software for the requirements of the installation location.
Interference	Interferences in smoke detection installations are external values which can impair the proper functioning of a smoke detection installation.
L	
Line module	By means of line modules (AnalogPLUS® or interactive) TITANUS *MICRO·SENS*® can be connected to the *AlgoRex*®-smoke detection system.
LOGIC·*SENS*	Via the LOGIC·*SENS* switch the intelligent signal processing can be activated. It permits analysis of the measured smoke level by comparing the smoke data with known parameters, thus detecting interferences and avoiding false alarms.
Loop line	→Detection line which forms a loop from the central fire panel via the →smoke detectors and back to the central fire panel to increase operation reliability.
M	
Monitoring area	Area which is monitored by an automatic smoke detector.
Monitoring window	The normal air flow lies within an adjustment range between a defined upper and lower value. This range is the monitoring window.
N	
Nominal gap width	Maximum gap in the housing of the detonation prevention device without an ignition spark being flashed from the device to the potentially explosive area.

P	
Primary line	Primary lines are transmission lines permanently and automatically checked for short circuit and interruption. They serve the transmission of important function signals of smoke detection systems.
Plug and Play	Installation and commissioning of the air sampling smoke detection system are simple with the Plug & Play function.
PIPE·GUARD	**PIPE·GUARD**, the comprehensive package for airflow monitoring, recognises safe breakdowns such as pipe breakages or blocked detection apertures.
Q	
Quiescent current	Current on the detection line in its normal operational state, →alarm current
R	
Response sensitivity	The response sensitivity describes the sensitivity at which an alarm is activated (→detector module sensitivity).
ROOM·IDENT	The **ROOM·IDENT** technology makes it possible to to locate a fire in seat monitoring up to 5 separate areas.
S	
Scattered light smoke detectors	Scattered light smoke detectors are optical smoke detectors. They use the phenomenon of scattered light through smoke particles which changes the signal at the light diode.
Secondary line	Non-monitored transmission lines.
Sensitivity	The TITANUS *MICRO·SENS*® reaction threshold can be set at between 0.5 %/m and 2 %/m light extinction in steps of 0.1%/m.
Single hole monitoring	Detection of changes (e.g. blockages) of the diameter of each single air sampling point.
Smoke detector	Smoke detectors react to combustible particles and/or →aerosols (floating particles) in the air.
T	
Temperature compensation	The air flow in the pipe system is not falsified by temperature variations when using temperature compensation.

Two-detector dependency	A system to verify alarm states. The fire alarm is activated after two detectors of a →detector group have raised the alarm. When the first detector has given an internal alarm a control function can be activated.
Two-group dependency	System to verify alarm states. The fire alarm is activated after one detector of each of two related →detector groups have raised the alarm.
V	
Value concentration	The value concentration is an important factor for the evaluation of the risk of fire. It is calculated with the values to be protected. An added consideration is the replace ability of the endangered goods, which will be nearly impossible in the case or cultural assets.

EG-KONFORMITÄTSERKLÄRUNG

EC-DECLARATION OF CONFORMITY

Der Unterzeichner, der den nachstehenden Hersteller vertritt,
The undersigned, representing the following manufacturer

WAGNER Group GmbH
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D-30853 Langenhagen
Germany

erklärt hiermit, dass folgende Ansaugrauchmelder für Brandmeldeanlagen ab Serien-Nr. 348 000:
hereby declare that the following aspirating smoke detectors for fire detection systems from serial no. 348 000:

Gerät / Device	Typ / Type
TITANUS *MICRO·SENS*®	- DM-TM-10, DM-TM-R-10, DM-TM-B-10, DM-TM-RB-10, DM-TM-Z-10, DM-TM-ZB-10, DM-TM-50, DM-TM-R-50, DM-TM-B-50, DM-TM-RB-50, DM-TM-Z-50, DM-TM-ZB-50, DM-MB-TM-10, DM-MB-TM-B-10, DM-MB-TM-50, DM-MB-TM-B-50 - DM-TMV-xx-xx, DM-MB-TMV-xx-xx (Versionen mit Voralarm / Versions with prealarm) - DM-TMx-L1-xx-xx, DM-MB-TMx-L1-xx-xx (LSNi-Versionen / LSNi versions) - DM-TMx-xx-xx /a (ROOM·IDENT bei Voralarm / ROOM·IDENT at prealarm) - DM-TMx-xx-xx-F, DM-MB-TMx-xx-xx-F (Tiefkühl-Versionen / for cold store ware houses)

in Übereinstimmung mit den Bestimmungen der nachstehenden EG-Richtlinien sind:
are in conformity with the regulations of the following EC-Directives:

EG-Richtlinie	EC-Directive
- EMV-Richtlinie 2004/108/EG	- EMC Directive 2004/108/EC

Ort, Datum:
Place, Date:

Langenhagen, 27.06.2013 / 2013-06-27

Leiter Entwicklung:
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IBAN: DE85 2505 0180 0002 0489 57
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Hallbaum-Bank Hannover
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Anhang: EMV-Richtline 2004/108/EG *(EG-Konformitätserklärung vom 27.06.2013)*

Appendix: EMC Directive 2004/108/EC *(EC-Declaration Of Conformity 2013-06-27)*

Produktbezeichnung / Product Identification:

Gerät / Device	Typ / Type
TITANUS *MICRO·SENS*®	- DM-TM-10, DM-TM-R-10, DM-TM-B-10, DM-TM-RB-10, DM-TM-Z-10, DM-TM-ZB-10, DM-TM-50, DM-TM-R-50, DM-TM-B-50, DM-TM-RB-50, DM-TM-Z-50, DM-TM-ZB-50, DM-MB-TM-10, DM-MB-TM-B-10, DM-MB-TM-50, DM-MB-TM-B-50 - DM-TMV-xx-xx, DM-MB-TMV-xx-xx (Versionen mit Voralarm / Versions with prealarm) - DM-TMx-L1-xx-xx, DM-MB-TMx-L1-xx-xx (LSNi-Versionen / LSNi versions) - DM-TMx-xx-xx /a (ROOM·IDENT bei Voralarm / ROOM·IDENT at prealarm) - DM-TMx-xx-xx-F, DM-MB-TMx-xx-xx-F (Tiefkühl-Versionen / for cold store ware houses)

Die Übereinstimmung des (der) bezeichneten Produkte(s) mit den Vorschriften der **EMV-Richtlinie 2004/108/EG** wird nachgewiesen durch die vollständige Einhaltung folgender harmonisierter Europäischer Norm(en) und/oder Spezifikationen oder Teilen von diesen:

The conformity of the characterized product(s) with the regulation of **EMC Directive 2004/108/EC** is proved by the total compliance with the following harmonized EC-standard(s) and/or specifications or parts of them:

Harmonisierte EG-Norm / Harmonized EC-Standard
- EN 50130-4:1995 + A1:1998 + A2:2002 + Corr. 2003 (Elektromagnetische Störfestigkeit / Electromagnetic Immunity)
- EN 61000-6-3:2007 (Elektromagnetische Störausstrahlung / Electromagnetic Emission)

Zugehörige Dokumentation / Accompanying Documentation:

Prüfberichts-Nummer / Test Report Number	Datum / Date
- 2004254 (RS Schwarze)	13.12.2004 / 2004-12-13
- 2006083 (RS Schwarze)	04.05.2006 / 2006-05-04
- 2008084 (RS Schwarze)	06.05.2008 / 2008-05-06
- 2010044 (RS Schwarze)	23.02.2010 / 2010-02-23
- 2010078 (RS Schwarze)	08.04.2010 / 2010-04-08
- 2010247 (RS Schwarze)	29.11.2010 / 2010-11-29

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