Air Sampling Smoke Detection System TITANUS *SUPER · SENS*®

Technical Manual

WAGNER®

Air Sampling Smoke Detection System

TITANUS *SUPER·SENS*®

Technical Manual
Revision a

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Contents

Contents

Contents

Contents

Contents

Appendix

0 General

0.1 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 *SUPER·SENS*®. These systems may only be used for early and very early smoke detection.

0.2 Safety Information

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

ATTENTION

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

INSTRUCTION

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.

0.3 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

0.4 Copyright

0.5 Packaging

The individual air sampling smoke detection systems are packed in accordance with the anticipated transport conditions. Exclusively environmentally 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.

INSTRUCTION

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.

0.6 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.

1 Product Description

1.1 Characteristics of TITANUS *SUPER·SENS*®

TITANUS *SUPER · SENS*® is the latest generation of the well-proven WAGNER-air sampling smoke detection systems. As highly sensitive device TITANUS *SUPER · SENS*® reaches a detection quality not known so far. In particular, it can be used for room monitoring in case of high value concentration and to control climatic cabinets or climatic ducts in case of high air exchange rates. TITANUS *SUPER·SENS*® can even be used in critical areas such as EDP-rooms.

High Sensitivity

The device has a display sensitivity of 0.0025%/m light obscuration. According to the application further sensitivities can be set at the base board. Thus, a large detection range throughout all typical standard fire types is possible.

Network System

By means of an optional network board several TITANUS *SUPER·SENS*® can be connected to form a network. Through a central network unit the operator can monitor the whole installation as far as smoke level, air flow values etc. are concerned.

Diagnostic Device

The diagnostic device permits a quick and reliable fault localization for maintenance and service. The reading out of the current device state is effected by means of an optical data transmission.

Safe Air Flow Monitoring

Like point-type detectors, which are electronically monitored to detect line fractures and short circuits, air sampling systems require a complex and safe air flow monitoring. The unique air flow sensor technology used in all WAGNER-air sampling systems guarantees the detection of faults such as pipe fracture or blockage of single air sampling points.

The air flow monitoring is temperature compensated and can be independent of the air pressure.

Patented Air Sampling Points

Depending on the required project planning the air sampling points have defined drill hole diameters. For these exact air sampling points WAGNER has developed patented **aspiration-reducing film sheets** with marking tapes and clips that permit an easy mounting and avoid secondary noise e.g. „whistling“.

Temperature Range

TITANUS *SUPER·SENS*® can be operated in a temperature range between -20°C and +60°C. Thus, in contrast to conventional highly sensitive early smoke detection systems operation below 0°C is possible for the first time.

Project Planning of Point-Type Detectors

The air sampling points can be compared to point-type detectors. The monitoring areas comply with the valid national regulations.

Choice of ventilator voltage

The fan voltage can be set according to project planning by re-plugging the plug-in jumpers.

With TITANUS *SUPER·SENS*® devices, the fan voltage can be set between 12 V and 15 V by means of the plug-in jumpers on the base board.

1.2 Areas of Application

The air sampling smoke detection system TITANUS *SUPER·SENS*® is a technology used for early smoke detection and very early smoke detection for rooms and equipment.

Principle

Air samples are drawn from the protected area via a pipe system with defined air sampling points and passed to the detector module.

It is particularly suitable for areas in which point-type detectors cannot be used or only under certain conditions.

In particular these are areas:

- with high fire risk
- where a high detection sensibility is required
- with limited access and where point-type detectors are difficult to install or service
- which are air conditioned
- which have a greater height than admissible for point-type detectors
- where point-type detectors are undesirable for aesthetic reasons
- where electromagnetic fields have an impact
- which are exposed to high or low temperatures
- where filters are required due to impurities in the atmosphere
- which must be protected from vandalism.

Room protection

TITANUS® is suitable for:

Rooms such as:

- floor voids, ceiling voids
- tunnels, ducts, voids with difficult access
- storage areas, high-rack storage, elevator shafts
- museums, cultural centre's
- deep-freeze storage

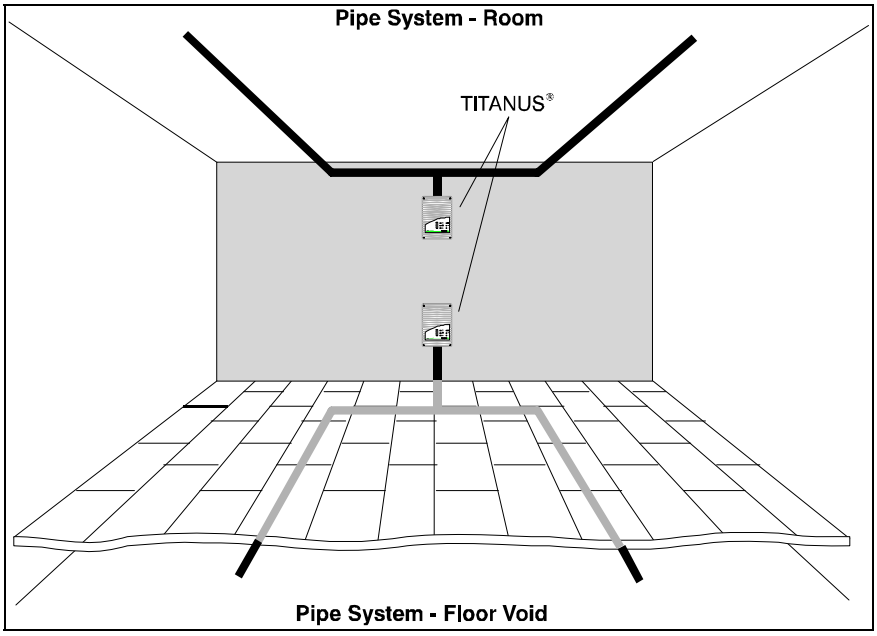

Fig. 1.1: Sketch: room monitoring with the TITANUS® *air-sampling smoke detection system*

Room monitoring with air conditioning

Room monitoring takes place

- in air-conditioned rooms for servicing etc
- in ventilation ducts
- of floor voids, ceiling voids
- in EDP rooms, E-distribution cabinets, transformer cells
- in climatic cabinets (see fig. 1.2) or
- at air conditioning ducts in the by-pass

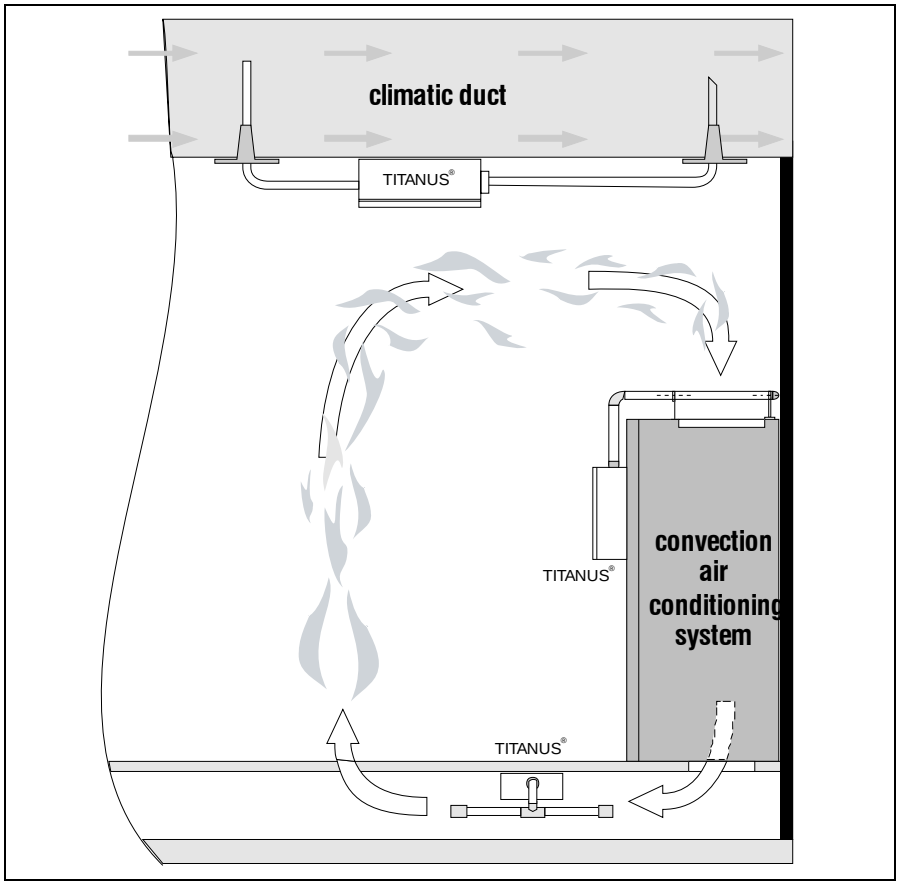

Fig. 1.2: Sketch: Monitoring possibilities of a convection air conditioning cabinet or air conditioning duct

2 Technical Description

2.1 System Description

The air sampling smoke detection system TITANUS® consists of the basic device, the pipe system and accessories.

The most important components of the basic device are the highly sensitive smoke detector to detect the smoke aerosols and the aspiration unit to pass the air samples to the smoke detector as well as the air flow sensor in order to monitor the pipe system for fracture and blockage.

Essentially, the pipe system consists of pipes and fittings made of PVC or ABS plastic.

In order to protect the device many accessories are available as e.g. the air filter and the remote display unit. The remote display unit serves for the display of the state of the basic device during the installation at blind places.

Each air sampling point in the pipe system of TITANUS® represents a ceiling detector.

2.1.1 Function

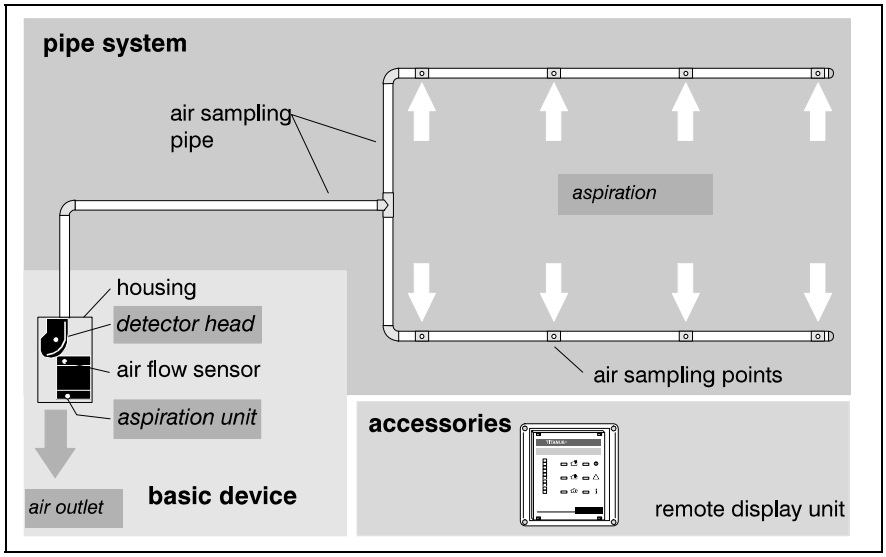

Fig. 2.1: Air sampling system TITANUS®

By means of the aspiration unit in the basic device air samples are drawn from the area to be monitored via a pipe system with defined air sampling points which are then passed to a highly sensitive detector head (refer to Fig. 2.1).

Detector Head

If the detector head detects smoke aerosols in the air sample the current smoke level is indicated by TITANUS® through the level display. The three alarm levels alert, action and fire alarm are indicated by LED's and can be passed to the central fire panel via potential-free contacts. Different delay periods can be set for the alarm levels. In the event of the detector head becoming soiled a drift is effected. The drift complies with the requirements of the valid European standard.

The alert alarm can be set to a latched (standard) or non-latched mode. In contrast to this the action alarm and fire alarm are always set to the latched mode. The alarm indications are to be reset after the cause of the fault has been cleared.

Monitoring of the Detector Head

The detector head is checked for soiling, signal faults, detaching and voltage. A fault is indicated through the fault-LED of TITANUS® and can be passed to the central fire panel via a fault contact.

Air Flow Monitoring

An air flow sensor checks the connected pipe system for fracture and blockage.

Dependent on the pipe system design (refer to chapter 4 "Project Planning") the air flow sensor detects a blockage from 15% of the air sampling points up to the complete blockage and a fracture of the pipe system at the fares point. If the ventilator fails the air flow fault in the pipe system is interrupted and a blockage is indicated. The air flow monitoring is **temperature compensated** and can be set to an **air pressure independent mode**.

After a delay period which can be programmed by switches the fault is indicated at the air sampling smoke detection system and if required, the fault signal is passed to the central fire panel via a fault contact. The thresholds of the monitoring window can be adapted to the ambient conditions (refer to chapter 4 "Project Planning").

The signal curve of the air flow sensor is illustrated in Fig. 2.2..

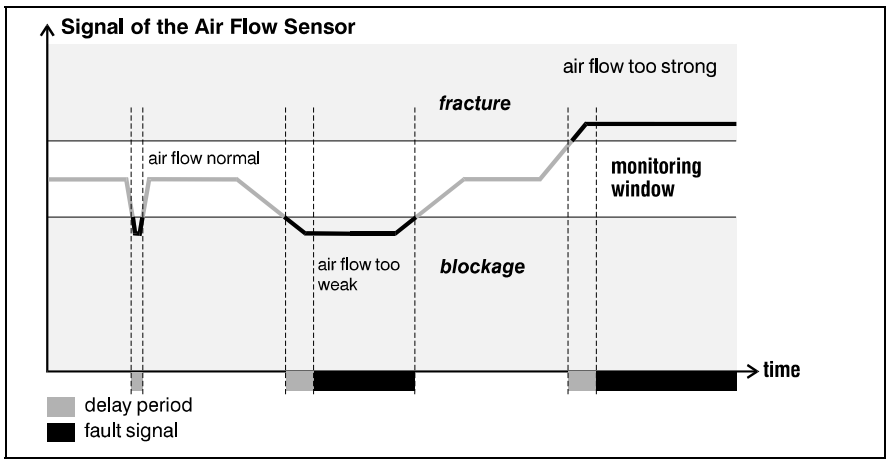

Fig. 2.2: Signal curve of the air flow sensor in case of faults

Fault Display

A detector head or air flow fault causes a fault signal which is indicated at TITANUS®. The fault display can be set to a latched (standard mode) or non-latched mode (refer to page 5.5). In case of a standard mode the fault is to be reset by means of a reset button after the cause has been eliminated.

Reset Button

In order to reset alarm and fault signals TITANUS® is equipped with connectors to which a reset button can be connected.

Reset through Central Fire Panel

The reset is easier through a central fire panel. If the TITANUS® is connected to a central fire panel and it is required to reset alarm and fault signals at the device together with the reset of the detection line a reset board[1] is mounted as an option. It automatically resets the alarm and fault signals at TITANUS® in case of a temporary switch-off of the line voltage.

[1] The reset board can only be used if the quiescent current of the line is at least 5 mA. The line has to be current less during reset.

2.1.2 Features

Sensitivity

The different sensitivities of the detector head can be pre-set through switch settings on the base board so that an optimum adaptation to the given application is possible.

The standard setting of TITANUS® is the display sensitivity 0.01% light obscuration/m (sensitivity level II, refer to Fig. 2.3).

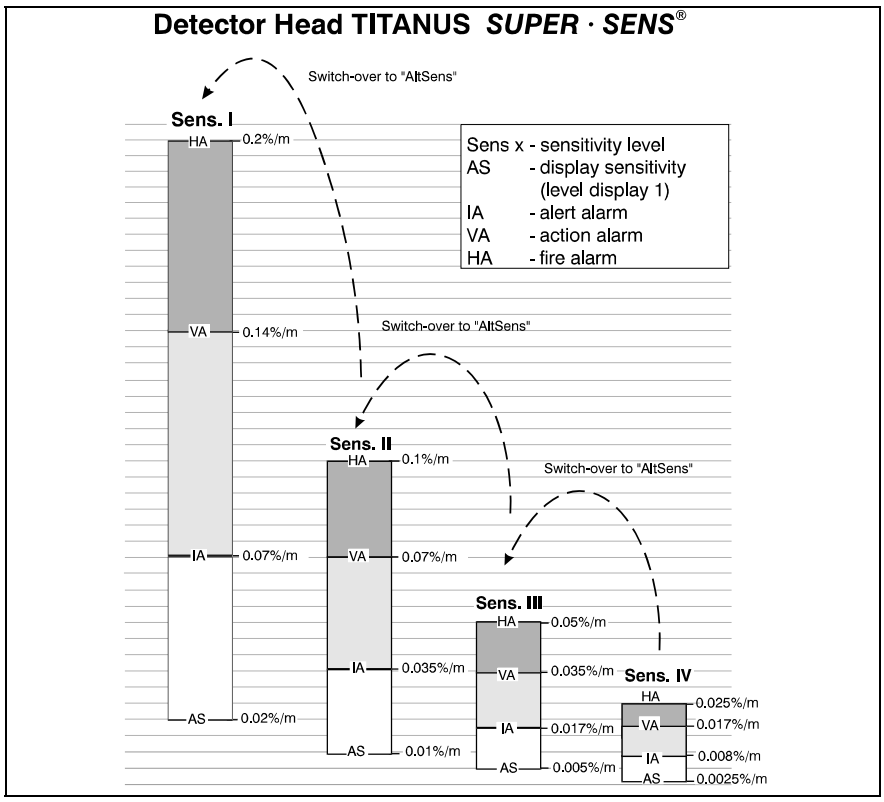

Fig. 2.3: Response sensitivity of the detector head TITANUS®

Dependent on the size of the area to be monitored and the project planning of the pipe system as well as the requirements of the operator the specific sensitivity level can be set according to the application. The four sensitivity levels are adjustable.

Alternative Sensitivity

It is possible to switch-over to an alternative sensitivity “AltSens” with which the device is set one sensitivity level lower than the selected default setting. For this a control voltage of 24V DC must be applied. By removing the 24V DC signal the preset default sensitivity level will automatically be restored. This is for example the case if the air pollution of the area monitored is lower for operation at night without operator and a higher sensitivity of the detector is to be activated (day/night switching). The inverse case is the use of reference detectors if the fresh air is highly polluted. In this case the monitoring detector can be set to a less sensitive level by switching over to "AltSens" so that the highly polluted air will not cause a false alarm.

Relay Outputs

For each alarm threshold (alert, action, fire alarm) and for the collective fault TITANUS® has a potential-free switching-over contact. Thus, the air sampling smoke detection system can be connected to collective and addressable[2] detection lines of any central fire panel.

Air Flow Adjustment

The air flow of TITANUS® is automatically adjusted. The initialization phase is effected dependently on or independently of the air pressure. Thus, commissioning is much easier.

In order to adjust a characteristic air flow of the pipe network the air flow-init process is effected. For each device this process is necessary one time after the installation, after each modification of the pipe system lay-out and after the modification of the ventilator voltage. Thus, the device memorizes the air flow characteristic of the pipe network.

Detector Head Adjustment

At each device start (switch-on of the operating voltage) the detector head is automatically initialized via the device electronics, which permanently checks the data delivered by the detector head for faults.

Pipe System

A pipe system up to a total length of 200 m with a maximum number of 24 air sampling points can be connected to TITANUS®.

Temperature Range

The standard temperature range of TITANUS ® is -20°C up to +60°C.

Diagnostics

By means of a diagnostic device, a PC or laptop TITANUS® can be checked without opening it. Besides the current air flow sensor data and the smoke level values different status values can be read out. Thus, it is easier to detect changed operating conditions for service. Another possibility is to receive the data through a pre-fabricated cable (diagnostic-interface) via a PC.

Recorder Outputs

For long-time recording of the smoke level and the air flow sensor signals TITANUS® has an analogue line recorder output.

Ventilator Voltage

For special project planning's the air transport speed is increased through switching the ventilator voltage from 12 V to 15 V.

[2] Only possible via addressable modules of the corresponding central fire panel.

Network System

The danger management and information system Visu*LAN*® serves the state control of all TITANUS® in the network. Thus, the operator in the control room can centrally monitor the whole installation as far as smoke level, air flow values etc. are concerned. Ground plans of the different buildings and floors are included in Visu*LAN*® and the spatial arrangement of the air sampling smoke detection systems is displayed. A diagnostic window with help texts permits a quick analysis of the causes of the faults. The course of the smoke level and of the air flow values of single TITANUS® is graphically displayed and can be printed. The state of the alarm and fault relays is also displayed by this graph.

2.2 TITANUS® and Accessories

2.2.1 Overview

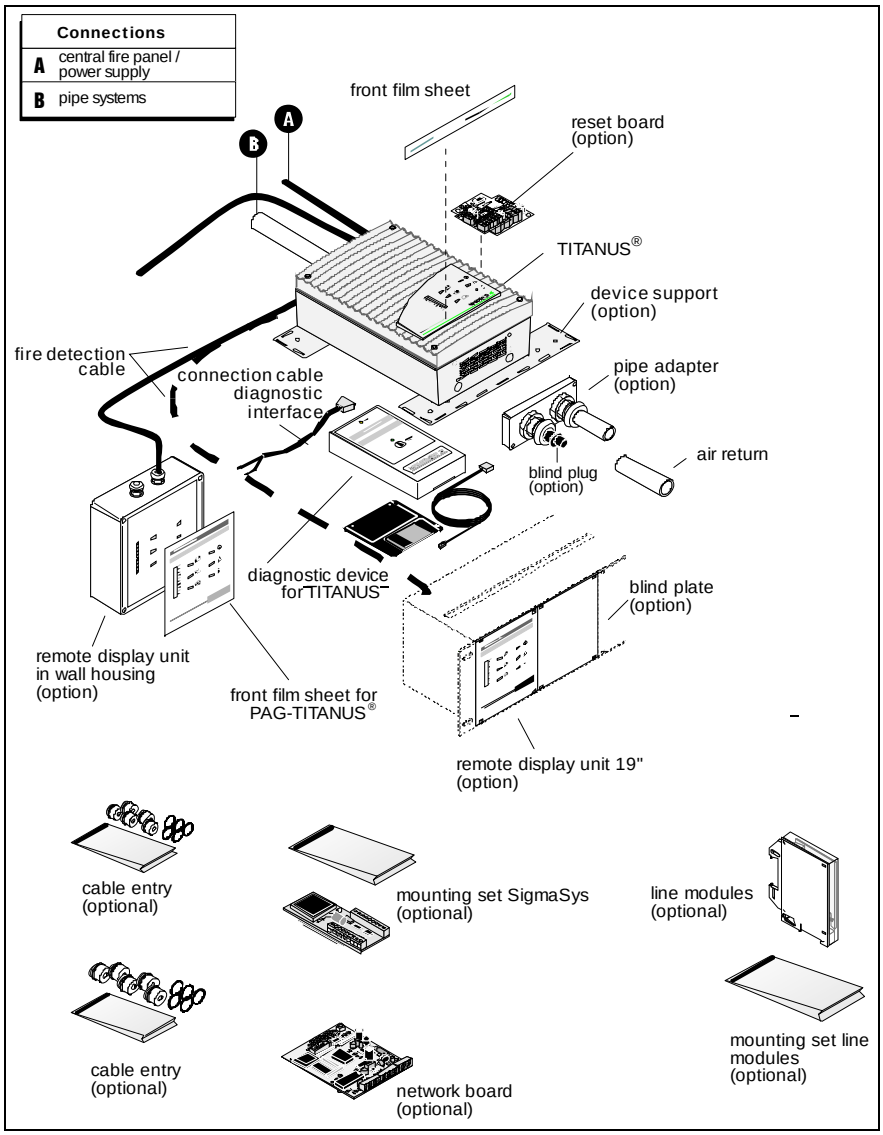

Fig. 2.4: Overview TITANUS®

The further components illustrated in Fig. 2.4 can be used optionally.

2.2.2 Basic device TITANUS®

The basic device TITANUS® consists of the following components:

- plastic housing
- highly sensitive detector head with the latest technology according to optical scattered light detectors
- air sampling unit with air flow monitoring
- optical displays for "smoke level", "alarm", "fault" and "ON"
- infrared-LED to read out the current state of the device
- connector for pipes with an outer diameter of 25 mm
- plastic connection piece with ferrite rings and insulating hose

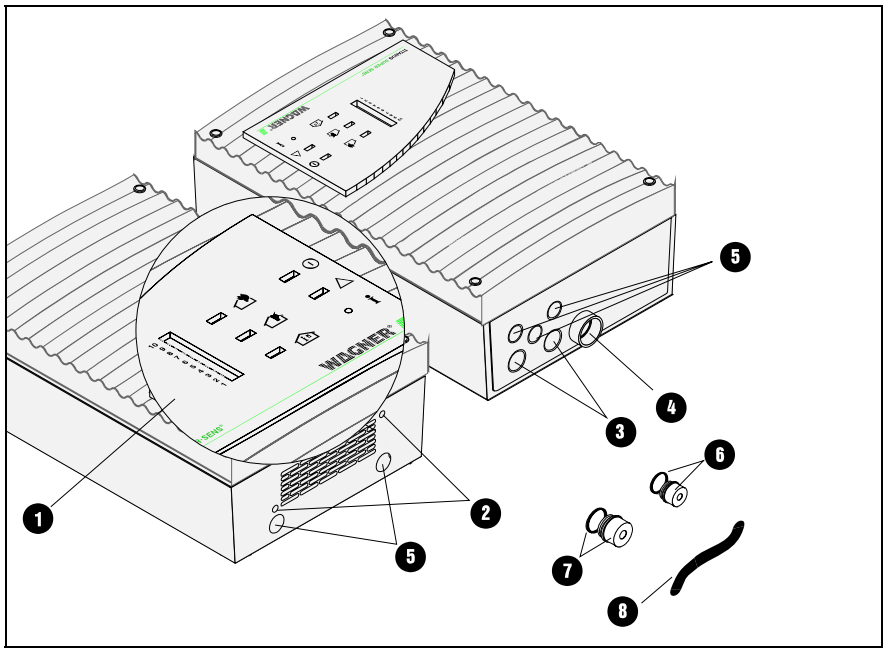

Fig. 2.5: Displays and connections of TITANUS® (explanations in table, page 2-9)

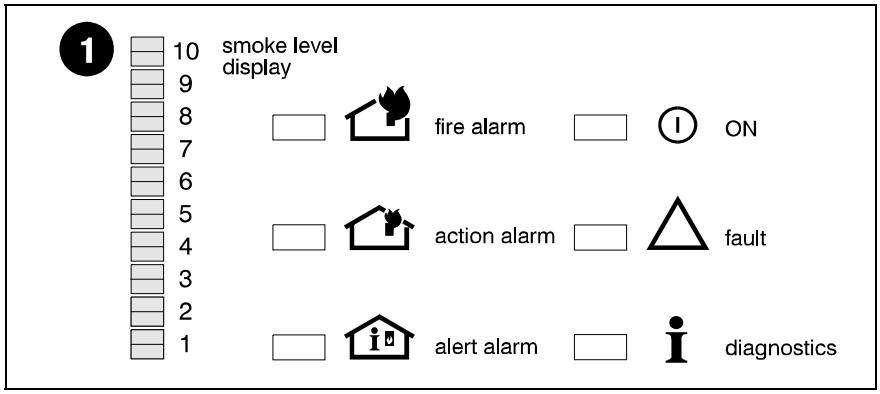

Fig. 2.6: Displays TITANUS® (explanations number 1 in table, page 2-9)

TITANUS®

Numbers in Fig. 2.5	Function	Explanation
1	**displays** (refer to Fig. 2.6)	
	smoke level display 1 to 10 (20 yellow LEDs)	current smoke level
	fire alarm (red LED)	level 10
	action alarm (red LED)	level 7
	alert alarm (red LED)	level 3.5
	fault (yellow LED)	fault pipe system or failure of the ventilator or fault detector head
	ON (green LED)	operation display
	diagnostics (infrared-LED)	data to be transmitted to diagnostic device
2	connector for pipe adapter	to air return
3	cable entry of fire detection cable for connection of central fire panel or power supply (input/output)	2 x PG16
4	connector air sampling pipe	for ∅ 25 mm-pipe system
5	cable entry of fire detection cable for connection of remote display units and network	5 x PG11
6	plastic connection piece and ferrite ring (small)	1 x PG11 for cable between ∅ 8 and 12 mm
7	plastic connection piece and ferrite ring (large)	2 x PG16 for cable between ∅ 9 and 14 mm (extendable to ∅ 14 to 18 mm)
8	insulating hose	∅ 2.5 mm length=250 mm

2.2.3 Diagnostic tool DIAG+

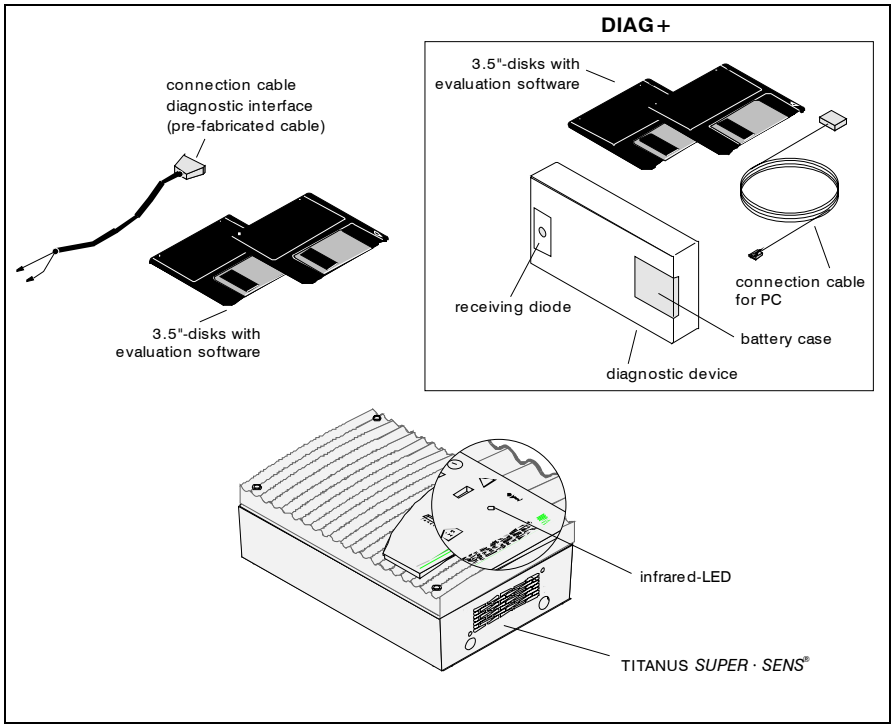

Fig. 2.7: Diagnostic device to read out the state of the device

For maintenance and service the diagnostic device is able to limit the number of faults (refer to Fig. 2.7). The current and memorized state of the device is read out through data transmission on optical basis. TITANUS® has an infrared-LED that continuously sends data.

TITANUS® memorizes set faults and resets for at least 96 hours, even if the cause of the fault has already been eliminated. This allows to analyze even shortly, sporadically occurring environmental influences (e.g. changed operating conditions).

By means of the diagnostic device the smoke level and the air flow can be recorded.

At the bottom side of the diagnostic device there is the receiving diode. In order to receive the data the diagnostic device has to be put on the infra-red-LED of TITANUS®. Via a micro-processor in the diagnostic device the information sent by the air sampling smoke detection system are received and memorized. Through a serial interface cable the memorized data are directly passed to a PC[3]. The data remain in the diagnostic device until another air sampling smoke detection system is analyzed. The evaluation and the display are effected by means of the delivered software.

[3] PC with serial interface (COM1 or COM2) and WINDOWS95

The remote display unit has also an infrared-LED to transmit data to the diagnostic device. Thus, an easy reading out of the data is possible even if TITANUS® is mounted so that it is not readily accessible. Through the central installation of several TITANUS® e.g. in a control room maintenance and service costs can be considerably reduced.

TIP

For the commissioning of TITANUS® the diagnostic device is not necessary. However, it facilitates to log the commissioning data.

As an alternative the connection cable with diagnostic interface (prefabricated cable) is used for the direct data transmission to a PC. This is an advantage for long-time tests to analyze the smoke level or the air flow. The connection of the cable is described in chapter 5.13.

State and fault information

TITANUS® passes the following state information and fault information to the diagnostic device:

Main Window	Current State	Measure/Help Text
pipe fracture	air flow value has exceeded the set threshold	check for pipe fracture, if necessary eliminate the pipe fracture
pipe blockage	air flow value remains under the set threshold or the air filter is blocked or the ventilator fan fails	eliminate the blockage (blowing out), exchange the air filter, send the device to the fabricant
fault air flow sensor	air flow too high or air flow sensor damaged	use the test pipe check the project planning or the tightness effect the air flow-init
fault detector	detector head not installed or connection cable to base board damaged, head control-init fails	mount the detector head, effect the init, check the connection cable to the base board
fault smoke level	light power too small	exchange the detector head
fault temperature sensor	temperature sensor damaged	exchange the base board
fault air pressure value	fault air pressure signal	check the voltage at MP1/MP2 according to air pressure adjustment chart, if not exchange the base board
pre-warning drift	half of the drift threshold has been reached	exchange the detector head
fault drift	the drift threshold has been exceeded	exchange the detector head
sensitivity switched	input "alt Sense" active	the detector head has switched to the next less sensitive level
power supply fault	ventilator fan and parts of the electronic system are current less; switch controller on base board damaged	verify external voltage supply exchange the base board
watchdog activated	This control unit can be activated in case of short EMC-faults.	If the watchdog is activated too often, exchange the base board (Notice: Information is only displayed as stored message!)

Main Window	Current State	Measure/Help Text
fault set value storage	storage faults	initialize the air flow
	no set value stored	initialize the air flow
power ON reset	base board has been set off and on again (Notice: Information only as stored message!)	check the external voltage supply
reset detected	processor of base board has activated reset, (Notice: Information only as stored message!)	A short failure of the external voltage supply can activate a reset. Verify voltage supply and cable connections.

Air Flow Menu	Help Text
pipe 1	Air flow value relative to set threshold: 100% = threshold exceeded (fault). For the small or medium threshold an adjustment dependent on the air pressure is required. An adjustment independent of the air pressure is only possible for a large or a very large threshold. The following air flow variations are allowed for an adjustment dependent on the air pressure: • small threshold: ± 90% • medium threshold: ± 50% • large threshold: ± 25% If the air flow value is not within the tolerances the pipe system is to be checked for tightness or blockage of the air sampling points.

TIP

Information of the current smoke level is transmitted. This data is only visible during trend recordings (DiagPlus menu „recordings“).

2.2.4 Remote display units

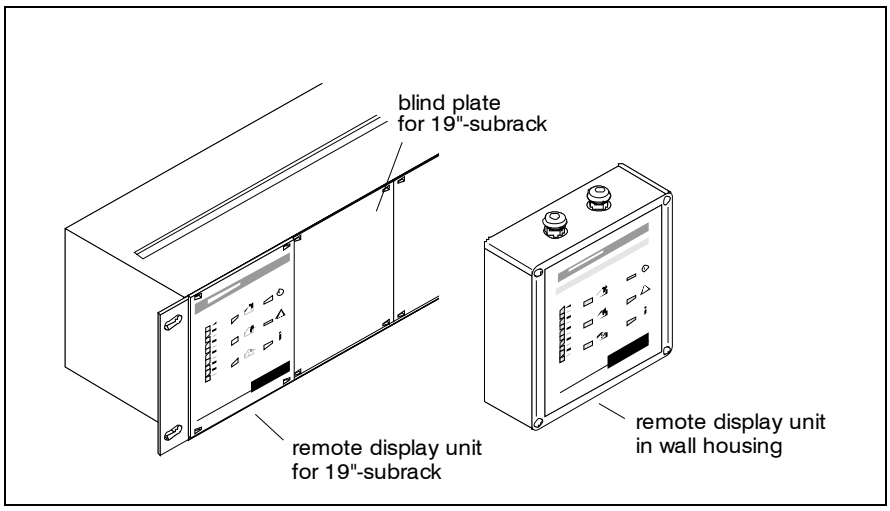

Fig. 2.8: Remote display unit for 19“-subracks and wall mounting

TITANUS® has connectors for a maximum number of two remote display units per device. The displays of the remote display unit are the same as those of the basic device. The remote display units are connected to the base board of TITANUS®.

A remote display unit can be installed in a distance of up to **1000 m**. If two remote display units are mounted at the same time the total length of the connection lines must not be longer than **500 m**.

For small distances the power supply is directly guaranteed by the TITANUS®, for long distances it is guaranteed by an external power supply (refer to chapter 4.8 “Calculation of the Power Supply“).

There are two types of remote display units available (refer to Fig. 2.8):

Types

- for the wall mounting in housing
- for the installation into a 19“-subrack (3 units of height, 21 submultiples of units)

The housing lid of the wall housing type is turn able by 180°, which means that the cable entries can be on the top or on the bottom.

Up to 4 remote display units can be mounted in a 19“-subrack. For unused modules use the corresponding blind plates.

2.2.5 Device supports

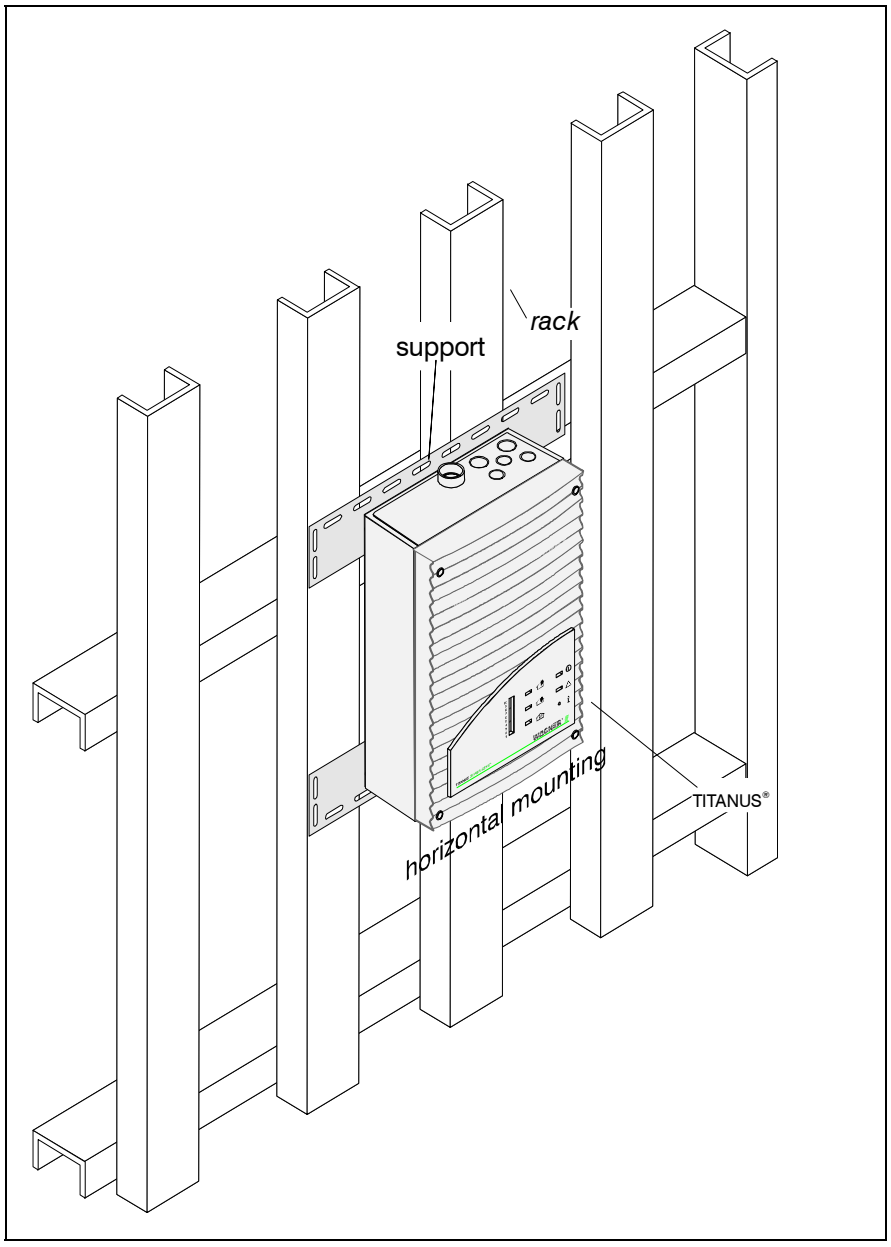

Fig. 2.9: Support for the air sampling smoke detection system TITANUS®

TITANUS® can be directly mounted on a wall. If required, additional supports are available e.g. for the fixing at racks.

2.3 Pipe system

2.3.1 Overview of available pipe components

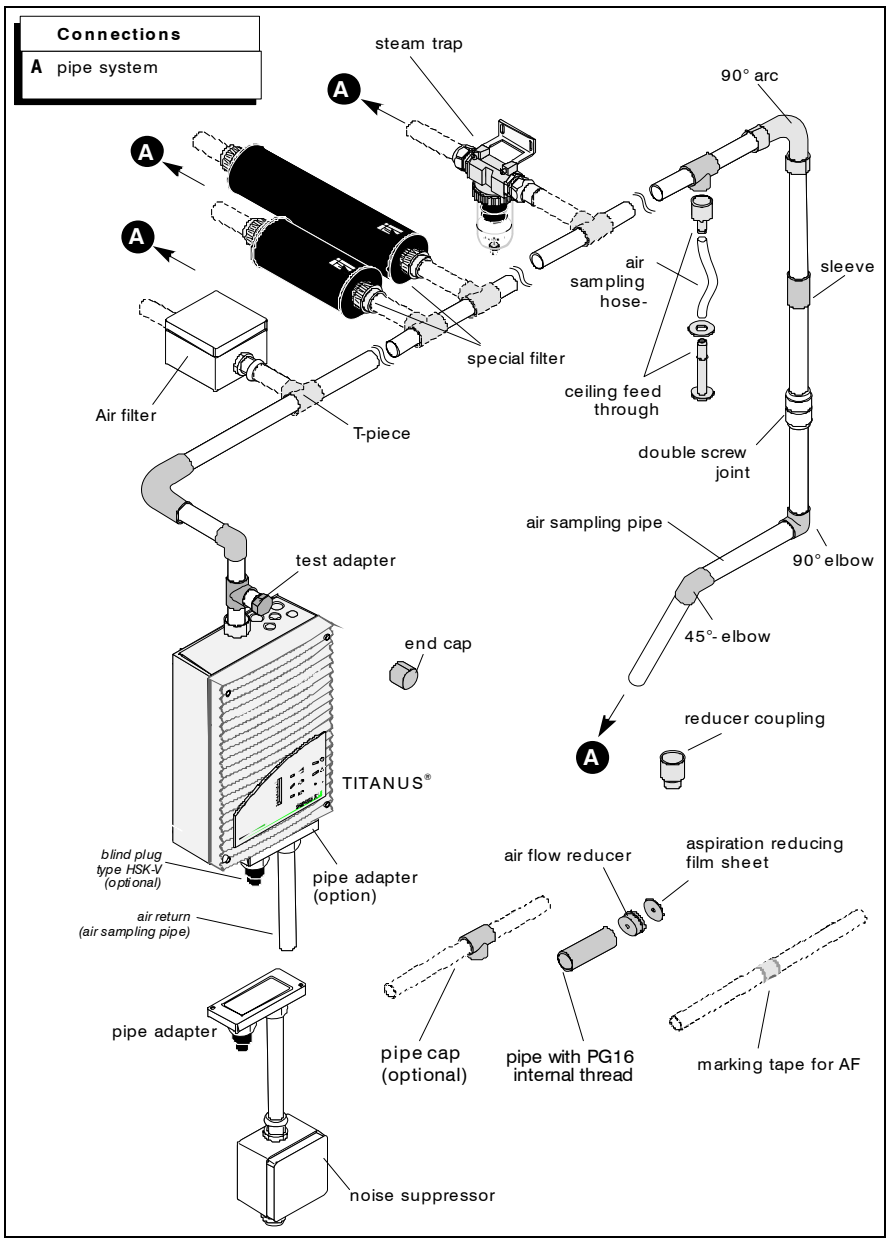

Fig. 2.10: Components for the pipe system

The components illustrated in Fig. 2.10 are to be chosen according to the given application and can be combined.

Blow-through system

In areas where dust particles or icy conditions are possible it might be necessary to blow through the air sampling pipe system and aspiration points. Figs. 2.11 show the components of a manual blow-through system.

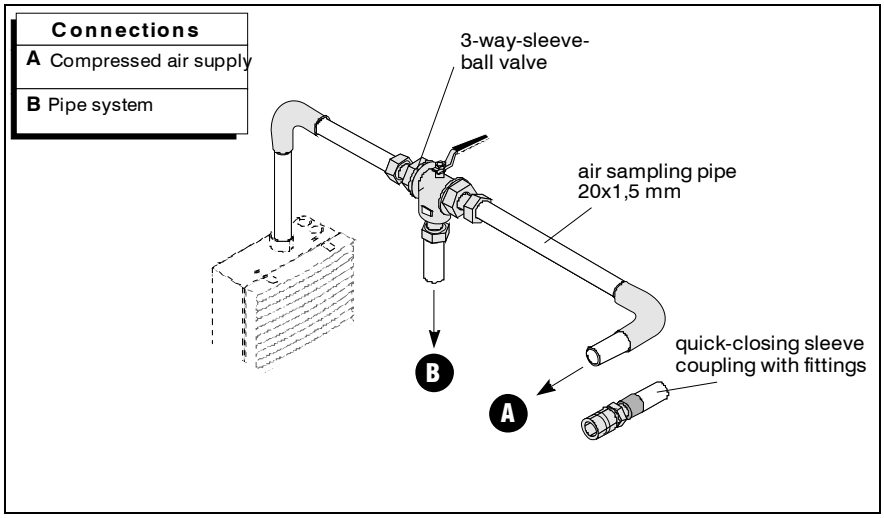

Fig. 2.11: Components for manual blow-through

2.3.2 Air sampling points for room monitoring

2.3.2.1 Aspiration-reducing film sheets

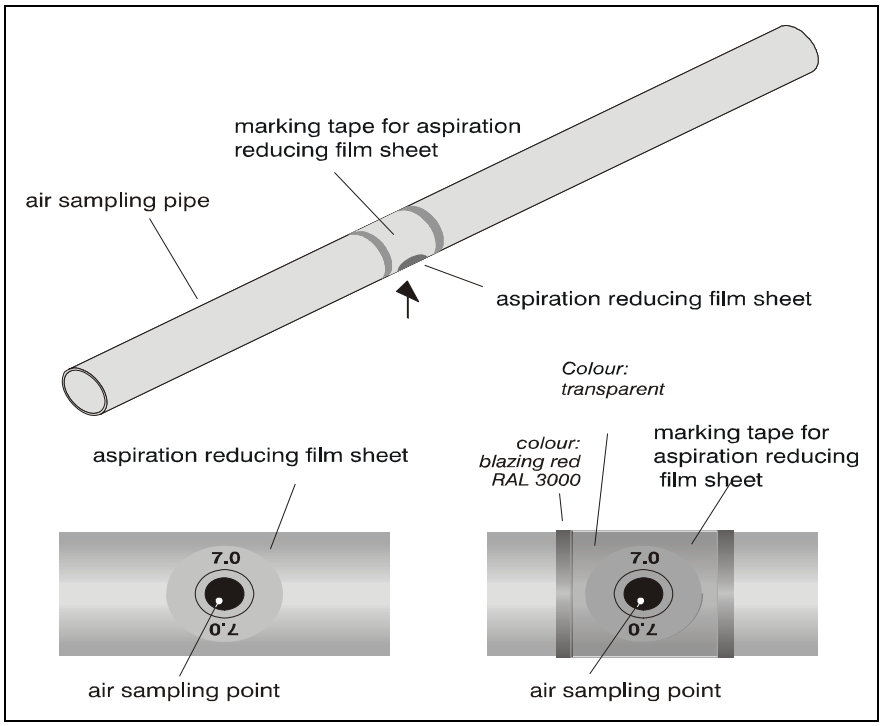

Fig. 2.12: Air sampling point with aspiration-reducing film sheet and marking tape

An air sampling point is a 10 mm-hole in the air sampling pipe. This hole is sealed by means of a patented aspiration-reducing film sheet which has an opening of the required diameter. The size of the opening depends on the design of the pipe system (refer to chapter 4, "Project Planning").

In order to avoid the aspiration-reducing film sheet from loosening it is fixed with a marking tape which is transparent with red edges and a 10 mm-hole. The marking tape is adhered onto the aspiration-reducing film sheet in such a way that the air sampling point will not be covered and remains visible even from far distances.

2.3.2.2 Air flow reducer clips

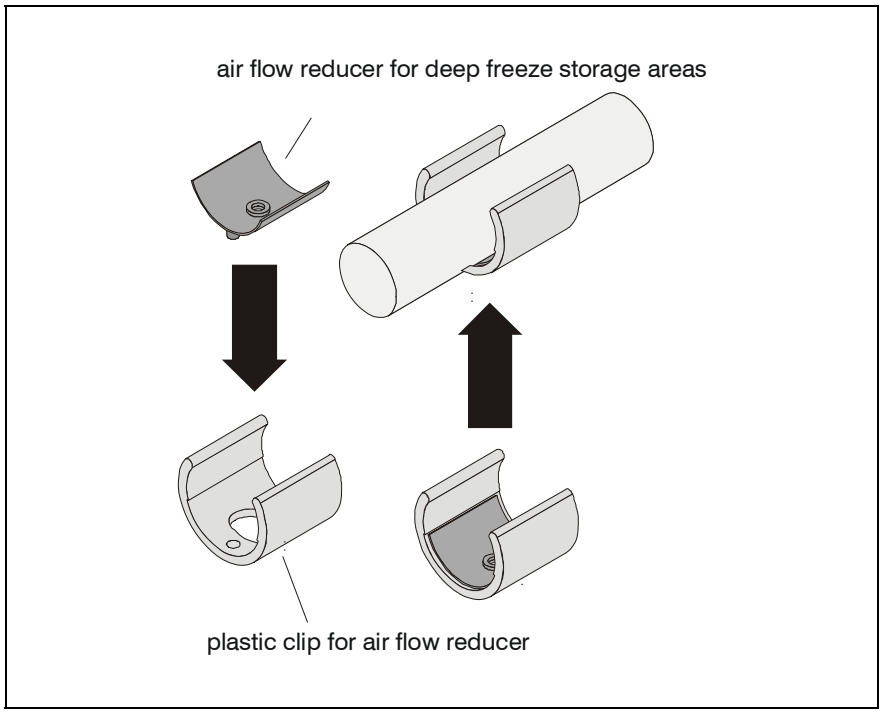

Fig. 2.13: Air flow reducer for dirty areas and deep freeze storage

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 (refer to Fig 2.13).

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.

The standard aspiration-reducing film sheets, type AF-x, and the marking tapes, type AF-BR, are not suitable for deep freeze storage areas.

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.

2.3.3 Ceiling feed-through for hidden installations

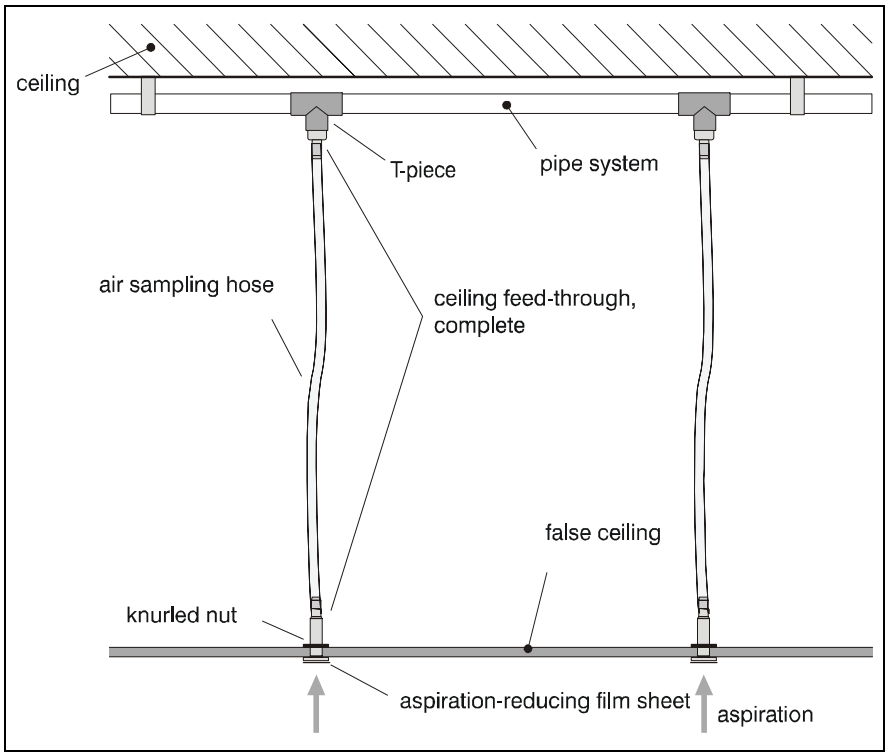

Fig. 2.14: Ceiling feed-through for ceiling voids

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 is 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 4 "Pipe Design") and are connected to the pipe system with air sampling hoses (see fig. 2.14).

If the maximum length of these hoses is 1 m, refer to the pipe design described in chapter 4. If - due to construction - hose lengths of more than 1 m are required, the air sampling pipe system must be calculated separately[3].

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 in special colours if required.

[3] calculation is made by WAGNER

2.3.4 Air filter for dusty areas

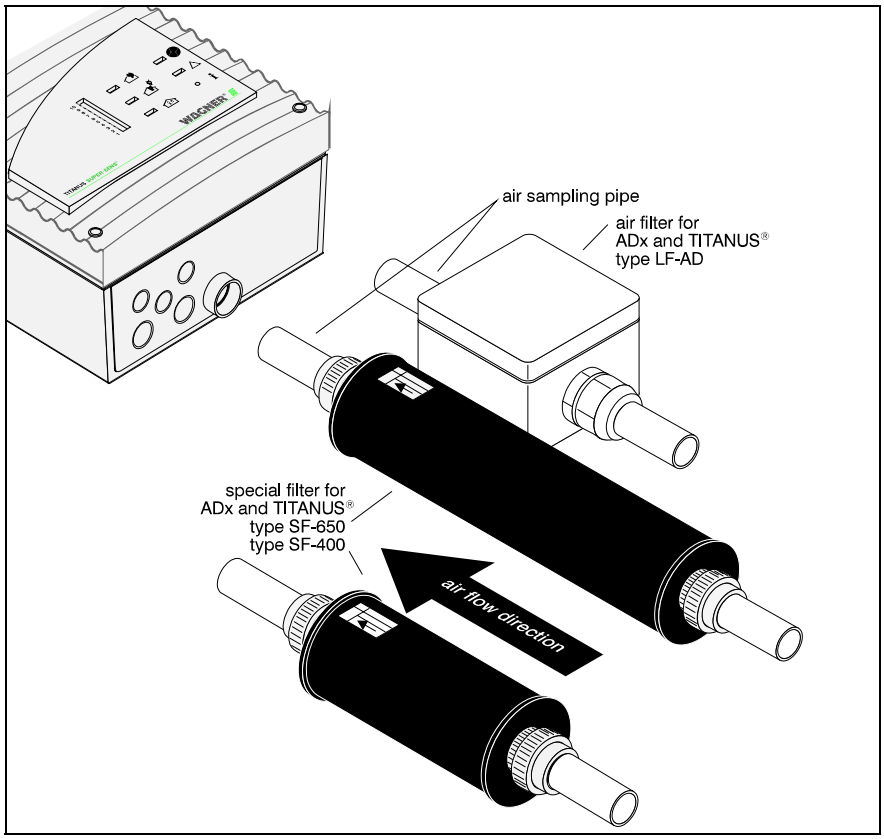

Fig. 2.15: TITANUS® *with air filter*

In highly dusty areas air filters are to be used in order to protect the detector head of the device. These soiling can occur e.g. in areas with fresh air supply.

Air Filter Type LF-AD-x

As standard air filter the air filter type LF-AD consisting of a plastic housing and two PG29-screw joints are used. The multi-layer filter absorbs particles larger than about 15µm.

The air filter is automatically monitored for dirt (blockage) through the air flow monitoring system of the TITANUS *SUPER·SENS*®. If the air filters are blocked they are blown-out together with the pipe system by means of compressed air. After having opened the filter housing it is easy to exchange the filter elements if necessary.

Special Filter Type SF-x

In case of a high amount of dust a special filter type SF-650 or type SF-400 with a larger surface and a longer service life is available. The special filter guarantees a safe filtration of dust and dirt. The particles are separated and permanently kept back from the filter medium. Even if the filter is due to be changed a constant air quality is guaranteed.

2.3.5 Air return for pressurised and dusty areas

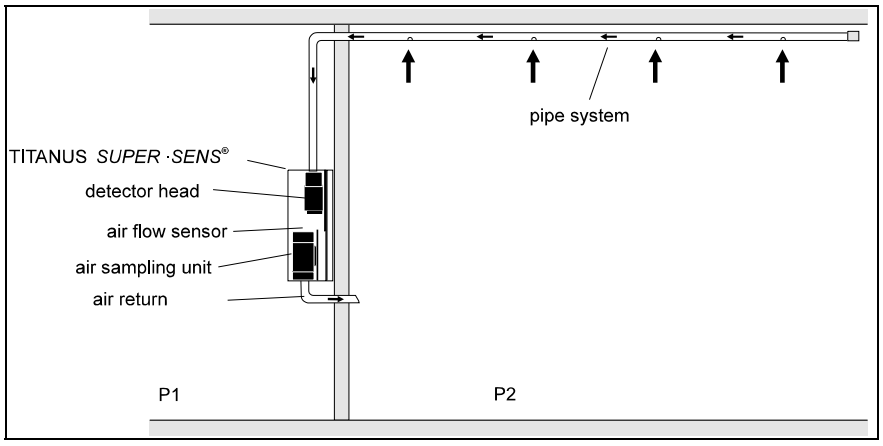

Fig. 2.16: Air return with TITANUS®

If the air sampling smoke detection system TITANUS *SUPER·SENS*® and the pipe system are installed in two areas P1 and P2 with different air pressures the air is to be returned to the pressure area of the pipe system (refer to Fig. 2.16). The air return can be used for a pressure compensation or in order to keep the air clean (e.g. from odours) in neigh boring rooms.

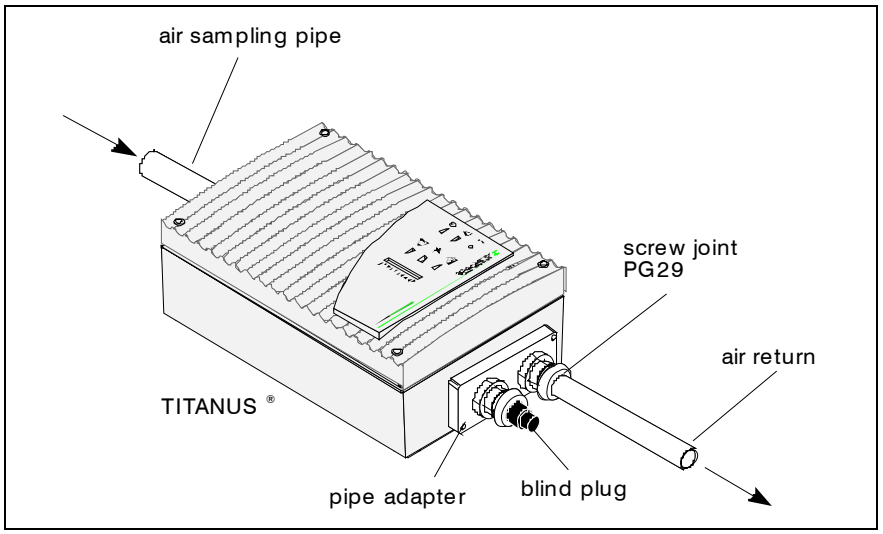

Fig. 2.17: TITANUS® *with pipe adapter*

The return air pipe system is connected to the pipe adapter type RA-AD2 which is mounted onto the air outlets of the TITANUS® (refer to Fig. 2.17). The remaining output of the pipe adapter is closed through a blind plug.

2.3.6 Noise suppressor

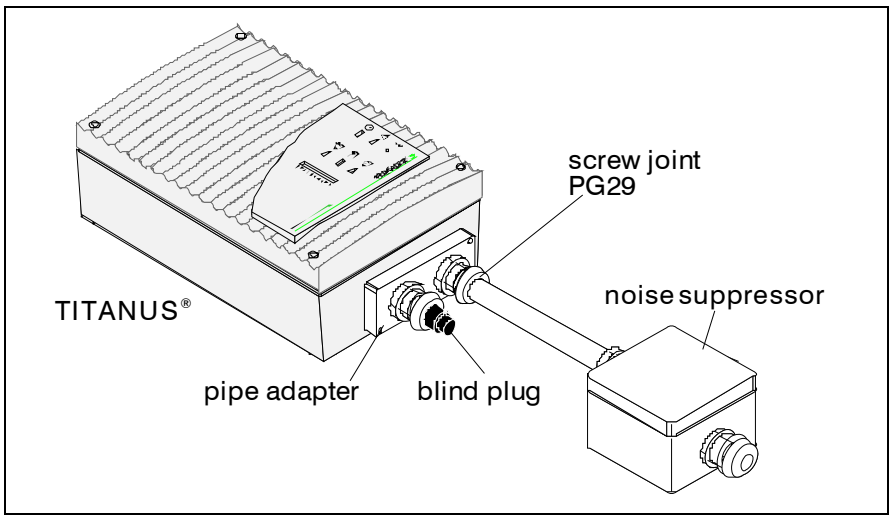

Fig. 2.18: TITANUS® *with noise suppressor*

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® (such as in offices or hospitals).

The noise suppressor is connected to the pipe adapter type RA-AD2 which is mounted onto the air outlets of the TITANUS®.

2.3.7 Steam trap for humid areas

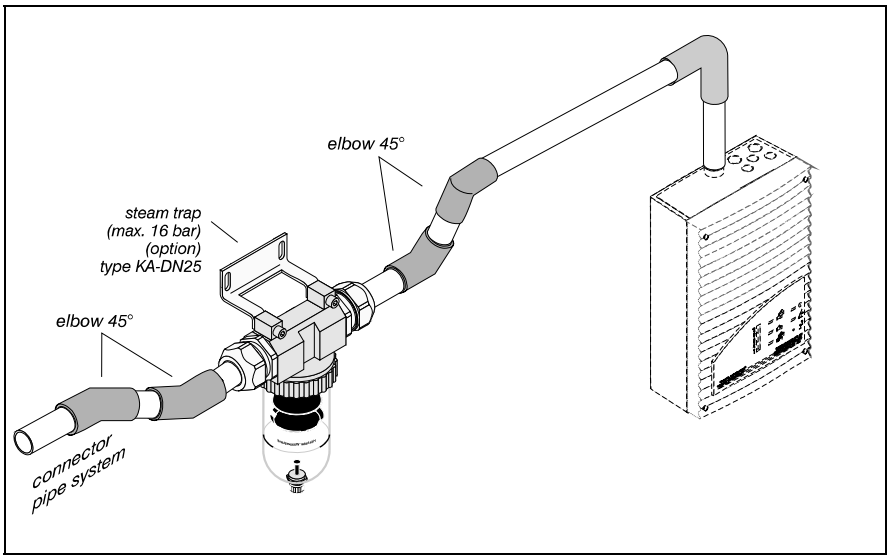

Fig. 2.19: Steam trap to eliminate water vapour from the pipe system and to collect the condensate from the pipe system

If TITANUS® 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 (refer to Fig. 2.19).

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 coarse dirt particles.

The steam trap is used in the following areas:

Application

- areas with high temperature variations
- areas with fresh air supply

3 Technical Data

INSTRUCTION

All listed power values relate to a surround temperature of 20ºC.

3.1 TITANUS®

		TITANUS *SUPER·SENS*®	
Voltage	supply voltage (Ue)	14 to 30 V DC (at 12 V ventilator voltage) min. 17 V DC (at 15 V ventilator voltage)	
	nominal supply voltage	24 V DC	
Current	current consumption quiescent (at 24 V) (without reset board, without network board)	ventilator voltage 12 V 245 mA[1]	ventilator voltage 15 V 370 mA[1]
	current consumption alarm (at 24 V) (without reset board, without network board)	max. 320 mA[1]	max. 430 mA[1]
	current consumption reset board	15 mA	
	current consumption network board	75 mA	
	load on contact of the alarm and fault relays switching power	30 V, 1 A max. 30 W	
Dimensions	dimensions PG-screw joints inclusive (h x w x d mm)	366 x 240 x 132 mm	
Weight	weight (without network board)	2.8 kg	
Humidity	non-condensed	10 to 95 % rf	
Noise Level	L_{wa} according to EN 27779, 1991	50.4 dB(A)	
Protection Class	protection class (DIN IEC 34 part 5)	IP 20	

[1] The current values may vary according to the pipe system.

		TITANUS *SUPER·SENS*®
Housing	material	plastic (ABS)
	color housing	papyrus white, RAL 9018
Temperature Range	TITANUS *SUPER · SENS*®	– 20° to +60°C
Ventilator Fan	construction type	radial
	service life of the ventilator fan (12 V)	65.000 h at 40°C
Displays	displays at the device level display alarm fault ON diagnostics	 smoke level 1 up to 10 (20 segments) alert, action and fire alarm collective fault operation display infrared-LED for device data
Connectors	device connector	terminals for wires of max. 2.5 mm²
	cable	twisted in pairs, optionally shielded or non-shielded
	cable entries	2 x PG16 5 x PG11
	pipe connector	for ABS-pipe ∅ 25 mm
	air return	option
Outputs	pen recorder	analogue output for air flow and smoke level configuration: X4.1 mass (0V) for smoke level X4.2 smoke level (0…max.%/m = 0...4V ± 10%) X4.3 mass (0V) for air flow pipe 1 X4.4 temperature-compensated air flow pipe 1 (1 V to 4,5 V)

	TITANUS *SUPER·SENS*®

Display Sensitivity

Level	Sensitivity
I	0.02% light obscuration/m
II	0.01% light obscuration /m
III	0.005% light obscuration /m
IV	0.0025% light obscuration /m

3.2 Accessories – TITANUS®

	Remote displays for TITANUS *SUPER·SENS*®

Remote Displays

voltage	15 to 30 V DC
current consumption (at 24 V) quiescent maximum	 10 mA 65 mA
electrical connection lengths 1 remote display 2 remote displays	 total length max. 1000 m total length max. 500 m
protection class	IP 45

Displays

displays at the device level display alarm fault ON diagnostics	 smoke level 1 to 10 action, alert and fire alarm collective fault operation display infrared-LED for device data

Connectors

terminal block	terminals for wires of max. 2.5 mm²
cable entry	2 x PG9

3.3 Pipe system TITANUS®

		Pipe system for TITANUS *SUPER·SENS*®
Pipe system	max. pipe length max. number of air sampling points	200 m 24
	max. length of air sampling hose per ceiling lead through	1 m
	temperature range PVC-pipe ABS-pipe	 0°C. ..+60°C -40°C…+80°C
	max. monitoring area	2880 m^2

4 Design

4.1 General

The following describes the project planning of the air sampling smoke detection system to EN 54-20. The basic conditions are described in Chapter 4.1. The project planning is to be conducted in accordance with Chapter 4.2.

The limiting project planning instructions in accordance with Chapter 4.3 apply to special applications in addition to Chapter 4.2 These should be taken into consideration at the beginning of project planning for special projects.

Project planning options according to EN 54-20:

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 4.2	---
Recognition of a failure at an individual aperture	Project planning for individual aperture monitoring	Chapter 4.2	Chapter 4.3.1
Device protection/cabinet monitoring	Simplified pipe project planning	Chapter 4.2	Chapter 4.3.2
Long intake lines	Project planning with long intake lines	Chapter 4.2	Chapter 4.3.3
Ventilation conduits	Project planning for forced air flow	Chapter 4.2	Chapter 4.3.4

4.1.1 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

The air sampling smoke detection systems shall be planned in accordance with the project planning guidelines described in Chapter 4.2.1 in order to be compliant with EN 54-20.

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.

4.1.2 Pipe system

When planning the pipe system, it must be ensured that reliable fire detection is guaranteed for any fire present in an installation or in a monitored area. Fig. 4.1 depicts an example of a U-pipe system with symmetrical or asymmetrical design and the diameters of the aspiration apertures calculated according to Chapter 4.6.2 “Standard planning.”

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:

Symmetrical design

The pipe system should preferably have a symmetrical design, i.e.:

- equal number of aspiration apertures per pipeline branch
- equal lengths of pipeline (must not exceed ± 20 % deviation)
- equal distance between neighbouring aspiration apertures on the smoke aspiration pipe (must not exceed ± 20 % deviation)

Asymmetrical design

The following specifications apply in the event that pipe system must be laid out asymmetrically due to structural conditions (see also Fig. 4.1):

- The number of aspiration apertures as well as the length of the shortest and longest pipeline branch in the pipe system must not exceed a quantity or length ratio of **1:2.**
- The distances between adjacent aspiration apertures in the sampling pipe must be identical (should not exceed deviation of ±20%).
- The diameters of the aspiration apertures are determined for each pipeline branch individually and depend on the number of aspiration apertures on the pipeline branch in question. The commensurate aperture diameters can be found in the tables in Chap. 4.2.4.

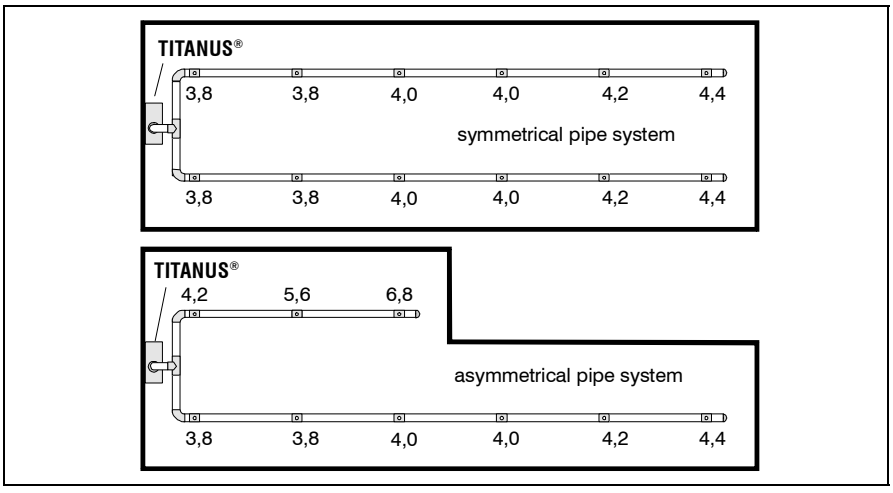

Fig. 4.1: Example of a symmetrical and an asymmetrical U-pipe system

Longer pipe intake lines

Pipes with a diameter of 32mm or 40mm may be used for long pipe intake lines in accordance with the chapter "Special project planning".

This reduces the air resistance of the pipe intake line or makes it possible to achieve a greater equilibrium for sampling via outgoing transmission lines.

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 4.2).

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®.
M-pipe	An air sampling smoke detection pipe system which branches into 3 air sampling branches after the connection to the TITANUS®.
Double U-pipe	An air sampling smoke detection pipe system which branches into 4 air sampling branches after the connection to the TITANUS®.

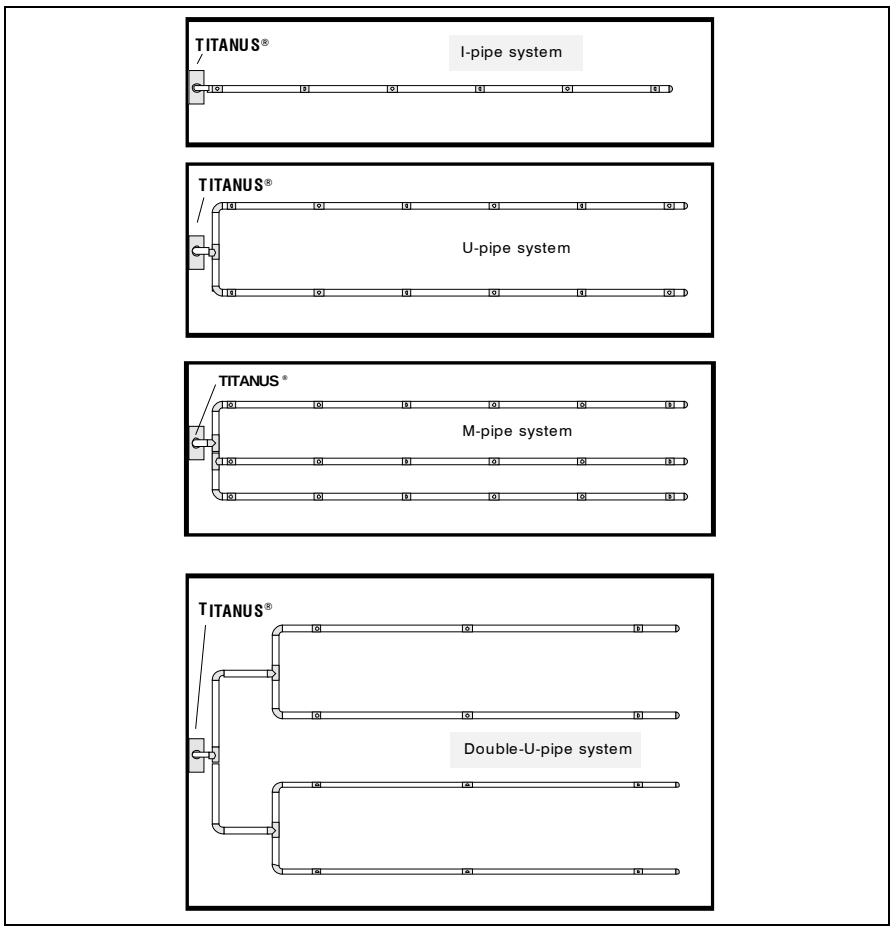

Fig. 4.2: Pipe designs

Direction change

Angles and bends in the pipe system increase flow resistance. For that reason, it is necessary to limit the number of them to the amount required.

It is preferable to use bends, since angles have a higher flow resistance. Angles should therefore only be used where they are necessary due to structural constraints.

	Corresponds to a straight pipe length of
Angle	1.5 m
Bend	0.3 m

If the pipe system includes angles or bends, the maximum overall length of the pipe system will be reduced.

INSTRUCTION

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 make the 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

In order to increase the transport speed in critical areas the ventilator voltage can be set from 12 V to 15 V. Make sure that the current intake increases.

4.1.3 Air flow monitoring

EN 54-20 requires the recognition of a 20 percent change in the air flow volume by the detector module's air flow sensor system. In order to accomplish this, the air flow sensor system's triggering threshold must be set to level III. But level I and II may also be set as an alternative. 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 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.

Graduation of the Air Sampling Points

For a symmetric detection it is necessary that all air sampling points have nearly the same air throughput. For this reason with large distances between the air sampling points (> 2 m) the air sampling point diameters have to become larger towards the end of the pipe. The required diameters are given in the tables of the chapter 4.2.4.

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 triggering threshold and the air flow sensor sensitivity can be adjusted in 4 levels.

Level	**I**	**II**	**III**	**IV**
	In conformity with EN 54-20			
Triggering threshold	Small	Medium	Large	Very large
Sensitivity	Very high	High	Medium	Low

TIP

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

Level I limitations The air flow monitoring may only be set to level I if:

- Project planning according to “Individual aperture monitoring” has been carried out (see Chap. 4.3.1 “Pipe project planning individual aperture monitoring”),
- the air flow sensor has been compensated depending on the air pressure (see Chap. 7.1.2 “Air pressure dependent air flow compensation") and
- No large air flow fluctuations occur.

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

INSTRUCTION

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 re-circulated in the pipe system pressure area (see Chapter 2.3.5 “Air recirculation”).

4.1.4 Sensitivity

According to EN 54-20, 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 4.2.

Air sampling smoke detection systems with a higher sensitivity class according to EN 54-20 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
B	Air sampling smoke detector with increased sensitivity	**Early detection:** Diluted smoke in conventional cooled IT areas.
C	Air sampling smoke detector with standard sensitivity	**Standard detection:** Fire detection with the benefits of air sampling smoke detection systems

INSTRUCTION

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

The table shows the selectable sensitivity levels of the TITANUS®:

	Activation sensitivity (smoke level 10, fire alarm)
Level I	0.2% light obscuration/m
Level II	0.1% light obscuration/m (Standard)
Level III	0.05% light obscuration/m
Level IV	0.025% light obscuration/m

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

4.1.5 Project planning limits

The following limit values must be complied with at all times with the TITANUS® **per pipe system connected**:

- The minimum pipe length between 2 aspiration apertures is **4 m**.
- The maximum pipe length between 2 aspiration apertures is **12 m**.
- The maximum overall pipe length is 200 m.
- The maximum monitoring area per sampling aperture corresponds to the monitoring area of point-shaped detectors in accordance with the applicable project planning guideline.
- A maximum of **24** aspiration apertures are possible per detector module.

The maximum overall monitoring area, the maximum overall pipe length and the maximum number of aspiration apertures are independent of the project planning selected, as are the restrictions from national regulations.

4.2 Project planning

4.2.1 Project planning guidelines

In order to conduct project planning in accordance with the EN 54-20 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.

4.2.1.1 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.

INSTRUCTION

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

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

- Air filter
- Steam trap
- Detector box
- *OXY·SENS*® air sampling detector

The SD-1 noise suppressor may be used in any case with no project planning restrictions.

4.2.2 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

Sound suppressor

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

4.2.3 Sensitivity and pipeline project planning

4.2.3.1 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

INSTRUCTION

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 without air filters, with 8 apertures and with the additional use of a condensation separator. 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. 4.2.2) **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 detector module and sensitivity setting
4.	**Selection** Selection of other pipe components (e.g. steam trap and detonation protection see Chap. 4.2.2 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 without filter

Sensitivity (% obs/m)		Number of apertures														
		1	2	3	4	5	6	7	8	9	10	11	12	13	-----	24
0,025	(HA)	A	A	A	A	A	A	A	A	A	A	A	A	A		A
0,05	(HA)	A	A	A	A	A	A	A	A	A	A	A	A	A		A
0,1	(HA)	A	A	A	A	A	A	A	A	A	A	A	A	B		B
0,2	(HA)	A	A	A	A	A	A	B	B	B	B	B	B	B		B

without pipe accessories

Pipe shape	U_{Fan} [V]	Number of apertures															permitted total pipe length [m]
		1	2	3	4	5	6	7	8	9	10	11	12	13	-----	24	
I	12	70	70	70	70	70	70	70	70	70							
	15	100	100	100	100	100	100	100	00	100	100	100	100				
U	12	120	120	120	120	120	120	120	20	120	120	120	120				
	15	150	150	150	150	150	150	150	50	150	150	150	150	150			
M	12	180	180	180	180	180	180	180	80	180	180	180	180	180			
	15	200	200	200	200	200	200	200	200	200	200	200	200	200		200	
Double -U	12	180	180	180	180	180	180	180	80	180	180	180	180	180			
	15	200	200	200	200	200	200	200	200	200	200	200	200	200		200	

with detector box

Pipe shape	U_{Fan} [V]	Number of apertures															permitted total pipe length [m]
		1	2	3	4	5	6	7	8	9	10	11	12	13	-----	24	
I	12	70	70	70	70	70	70	70									
	15	100	100	100	100	100	100	100	00	100							
U	12	120	120	120	120	120	120	120	20	120	120	120	120				
	15	150	150	150	150	150	150	150	50	150	150	150	150	150			
M	12	180	180	180	180	180	180	180	80	180	180	180	180	180			
	15	200	200	200	200	200	200	200	200	200	200	200	200	200		200	
Double -U	12	180	180	180	180	180	180	180	80	180	180	180	180	180			
	15	200	200	200	200	200	200	200	200	200	200	200	200	200		200	

with detector box and *OXY·SENS* or with steam trap

Pipe shape	U_{Fan} [V]	Number of apertures															permitted total pipe length [m]
		1	2	3	4	5	6	7	8	9	10	11	12	13	-----	24	
I	12	60	60	60	60	60	60										
	15	70	70	70	70	70	70	70									
U	12	90	90	90	90	90	90	90	90	90	90						
	15	130	130	130	130	130	130	130	130	130	130	130	130	130			
M	12	120	120	120	120	120	120	120	120	120	120	120	120				
	15	170	170	170	170	170	170	170	170	170	170	170	170	170			
Double -U	12	140	140	140	140	140	140	140	140	140	140	140	140	140			
	15	200	200	200	200	200	200	200	200	200	200	200	200	200		200	

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

- setting the sensitivity on 0,025 % LT/m
- setting the sensitivity on 0,05 % LT/m
- setting the sensitivity on 0,1 % LT/m
- setting the sensitivity on 0,2 % LT/m

Possible system parameters:

- U- pipe system
  - 12 V fan voltage, max. 90 m overall pipe length
  - 15 V fan voltage, max. 130 m overall pipe length
- M- pipe system,
  - 12 V fan voltage, max. 120 m overall pipe length
  - 15 V fan voltage, max. 170 m overall pipe length
- Double U- pipe system,
  - 12 V fan voltage, max. 140 m overall pipe length
  - 15 V fan voltage, max. 200 m overall pipe length

4.2.4 Aperture diameter

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

I-Pipe

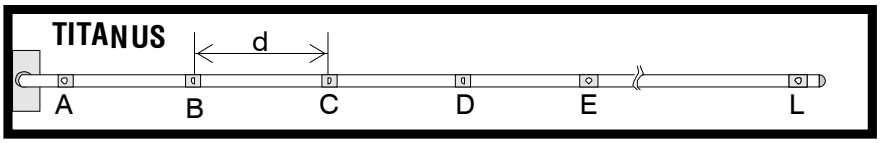

Fig. 4.3: I –pipe system

Aspiration apertures

Number of apertures	1	2	3	4	5	6	7	8	9	10	11	12
Sampling aperture ∅ in mm[1)]												
A	10.0	6.0	5.2	4.6	4.2	3.8	3.6	3.4	3.0	3.0	2.5	2.5
B	—	6.8	5.2	4.6	4.2	3.8	3.6	3.4	3.0	3.0	2.5	2.5
C	—	—	5.6	4.6	4.4	4.0	3.8	3.4	3.2	3.0	3.0	3.0
D	—	—	—	5.0	4.4	4.0	3.8	3.4	3.4	3.0	3.0	3.0
E	—	—	—	—	4.4	4.2	3.8	3.6	3.6	3.4	3.0	3.0
F	—	—	—	—	—	4.2	3.8	3.8	3.6	3.4	3.4	3.0
G	—	—	—	—	—	—	4.0	3.8	3.6	3.6	3.4	3.2
H	—	—	—	—	—	—	—	4.0	3.8	3.6	3.4	3.2
I	—	—	—	—	—	—	—	—	3.8	3.6	3.6	3.2
J	—	—	—	—	—	—	—	—	—	3.8	3.8	3.2
K	—	—	—	—	—	—	—	—	—	—	3.8	3.8
L	—	—	—	—	—	—	—	—	—	—	—	4.0

[1] Press cut diameter in aspiration-reducing film sheet

U-Pipe

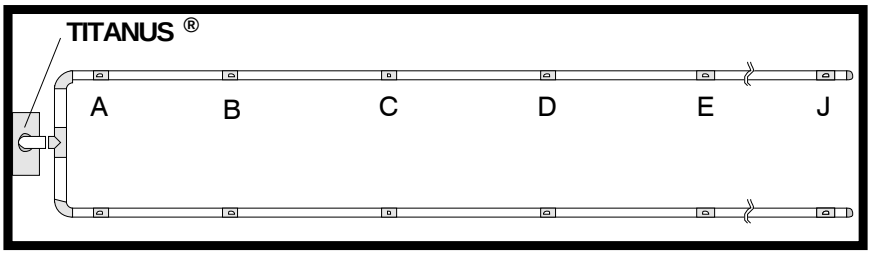

Fig. 4.4: U –pipe system

Aspiration apertures

Number of apertures	2	4	6	8	10	12	14	16	18	20
Sampling aperture ∅ in mm²)										
A	7.0	6.8	4.2	4.6	4.2	3.8	3.4	3.2	3.0	2.5
B	—	7.0	5.6	4.6	4.4	3.8	3.4	3.2	3.0	2.5
C	—	—	6.8	5.2	4.4	4.0	3.6	3.2	3.0	3.0
D	—	—	—	5.2	4.4	4.0	3.8	3.4	3.2	3.0
E	—	—	—	—	4.6	4.2	3.8	3.6	3.2	3.0
F	—	—	—	—	—	4.4	4.0	3.6	3.2	3.0
G	—	—	—	—	—	—	4.2	3.8	3.4	3.2
H	—	—	—	—	—	—	—	4.0	3.8	3.2
I	—	—	—	—	—	—	—	—	4.0	3.8
J	—	—	—	—	—	—	—	—	—	4,0

M-Pipe

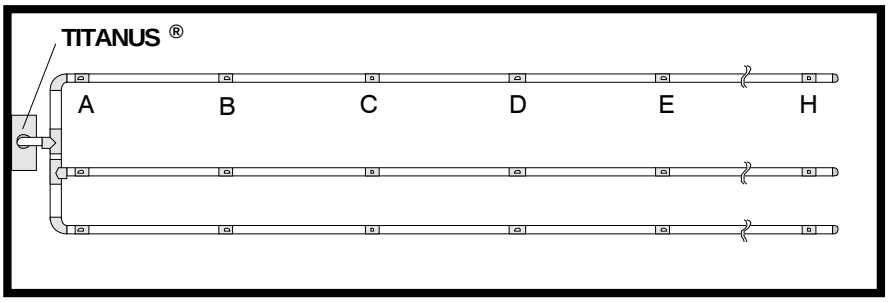

Fig. 4.5: M –pipe system

Aspiration apertures

Number of apertures	3	6	9	12	15	18	21	24
Sampling aperture ∅ in mm²)								
A	7.0	5.0	3.8	3.4	3.0	2.5	2.5	2.0
B	—	5.6	4.2	3.6	3.2	2.5	2.5	2.0
C	—	—	5.0	4.0	3.2	3.0	2.5	2.5
D	—	—	—	4.2	3.6	3.4	3.0	2.5
E	—	—	—	—	4.0	3.4	3.0	2.5
F	—	—	—	—	—	3.8	3.2	3.0
G	—	—	—	—	—	—	3.6	3.4
H								3.6

[2] Press cut diameter in aspiration-reducing film sheet

Double-U-pipe

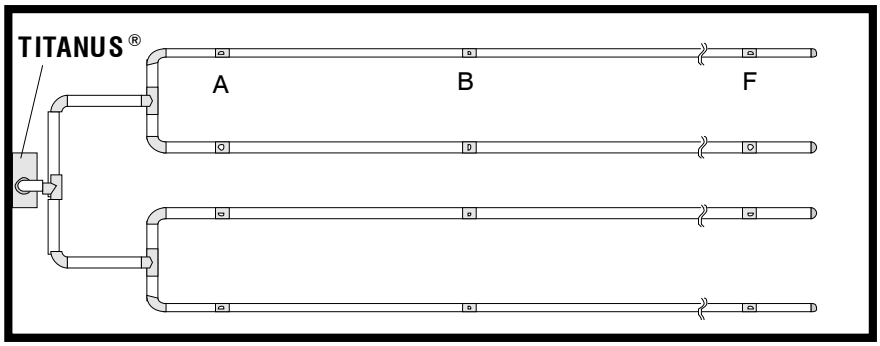

Fig. 4.6: Double-U-pipe system

Aspiration apertures

Number of apertures	4	8	12	16	20	24
Sampling aperture ∅ in mm[3])						
A	6.0	4.2	3.4	2.5	2.0	2.0
B	—	4.6	3.6	3.0	2.5	2.0
C	—	—	3.8	3.2	2.5	2.5
D	—	—	—	3.8	3.0	2.5
E	—	—	—	—	3.8	2.5
F	—	—	—	—	—	3.6

[3] Press cut diameter in aspiration-reducing film sheet

4.3 Special project planning

4.3.1 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 4.2 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.

4.3.1.1 I-Pipe system

TITANUS®

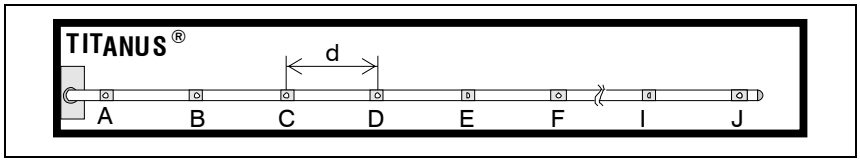

Fig. 4.7: I-Pipe system for area protection

Limit values

Min. distance from TITANUS® to 1st sampling aperture	4 m
Max. distance from TITANUS® to 1st sampling aperture	20 m
Max. Distance from 1st sampling aperture to last	50 m
Max. Overall pipe length per pipe system	70 m
Min. distance between 2 aspiration apertures (d)	4 m
Max. distance between 2 aspiration apertures (d)	12 m
Max. number of aspiration apertures (n) per pipe system	10 pcs.

Aspiration apertures

Number of apertures	2	3	4	5	6	7	8	9	10
Sampling aperture ∅ in mm[4]									
A	6,8	5,2	4,4	3,8	3,4	3,2	3,0	3,0	3,0
B	6,8	5,6	4,6	4,0	3,6	3,4	3,0	3,0	3,0
C	—	5,6	5,0	4,2	3,6	3,4	3,2	3,2	3,2
D	—	—	5,2	4,4	3,8	3,6	3,2	3,2	3,2
E	—	—	—	4,6	4,0	3,8	3,4	3,4	3,4
F	—	—	—	—	4,0	4,0	3,6	3,6	3,6
G	—	—	—	—	—	4,2	3,8	3,8	3,8
H	—	—	—	—	—	—	4,0	3,8	3,8
I	—	—	—	—	—	—	—	4,0	4,0
J	—	—	—	—	—	—	—	—	4,0

I-pipe system triggering thresholds

Triggering threshold

Number of apertures	2	3	4	5	6	7	8	9	10
1 blocked aperture	III	III	III	III	II	II	I	I	—[5]
2 blocked apertures	○[6]	○	III	III	III	III	II	II	I
3 blocked apertures	○	○	○	○	III	III	III	III	II
4 blocked apertures	○	○	○	○	○	○	III	III	III
5 blocked apertures	○	○	○	○	○	○	○	○	III
… has/have been detected at setting level x									

Example **If blockage of 1 aspiration apertures of a total of 9 aspiration apertures is intended to be detected, the air flow monitoring setting switch should be set to level I.**

INSTRUCTION

Air flow monitoring level I, II or III should be set in any case for project planning in conformity with EN 54-20.

[4] Press cut diameter in aspiration-reducing film sheet
[5] — not possible
[6] ○ not purposeful

4.3.1.2 U-Pipe system

TITANUS®

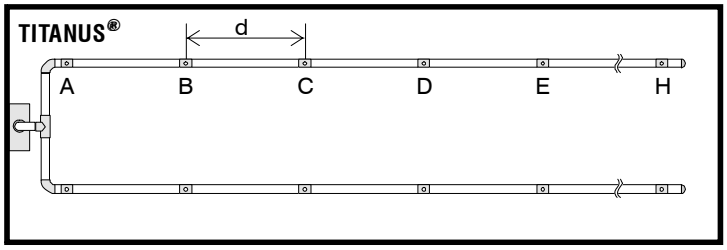

Fig. 4.8: U-Pipe system for area protection

Limit values

Min. distance from TITANUS® to T-piece	4 m
Max. distance from TITANUS® to T-piece	20 m
Max. Branch length	60 m
Max. Overall pipe length per pipe system	120 m
Min. Distance between 2 aspiration apertures (d)	4 m
Max. Distance between 2 aspiration apertures (d)	12 m
Max. number of aspiration apertures (n) per pipe system	16 pcs.

Aspiration apertures

Number of apertures per pipe system	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**
Sampling aperture ∅ in mm[7])								
A	7,0	5,0	4,0	3,6	3,0	3,0	3,0	2,5
B	—	5,2	4,2	3,6	3,2	3,0	3,0	2,5
C	—	—	4,4	3,8	3,2	3,2	3,0	2,5
D	—	—	—	3,8	3,4	3,2	3,2	3,0
E	—	—	—	—	3,4	3,4	3,2	3,0
F	—	—	—	—	—	3,4	3,4	3,0
G	—	—	—	—	—	—	3,4	3,2
H	—	—	—	—	—	—	—	3,2

[7] Press cut diameter in aspiration-reducing film sheet

U-pipe system triggering thresholds

per pipe system

Number of apertures	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**
1 blocked aperture	III	II	I	I	—[8]	—	—	—
2 blocked apertures	○[9]	III	II	II	I	I	—	—
3 blocked apertures	○	○	III	II	II	II	I	—
4 blocked apertures	○	○	○	III	III	II	II	I
5 blocked apertures	○	○	○	○	III	III	III	II
6 blocked apertures	○	○	○	○	○	III	III	III
7 blocked apertures	○	○	○	○	○	○	III	III
8 blocked apertures	○	○	○	○	○	○	III	III
… has/have been detected at setting level x								

Example **If blockage of 2 aspiration apertures of a total of 8 aspiration apertures is intended to be detected, the air flow monitoring setting switch should be set to level II.**

INSTRUCTION

Air flow monitoring level I, II or III should be set in any case for project planning in conformity with EN 54-20.

[8] — not possible
[9] ○ not purposeful

4.3.1.3 M-Pipe system

TITANUS®

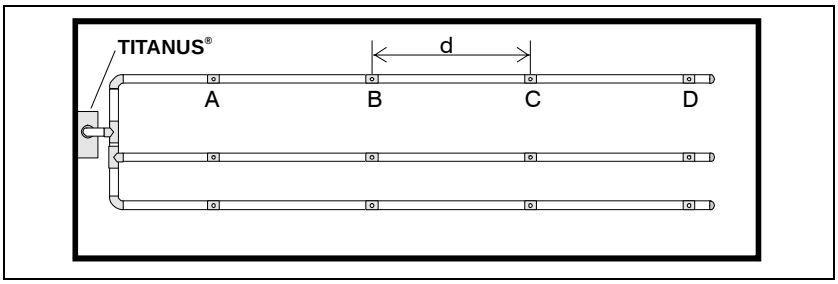

Fig. 4.9: M-Pipe system for area protection

Limit values

Min. distance from TITANUS® to T-piece	4 m
Max. distance from TITANUS® to T-piece	20 m
Max. Branch length	50 m
Max. Overall pipe length per pipe system	150 m
Min. Distance between 2 aspiration apertures (d)	4 m
Max. Distance between 2 aspiration apertures (d)	12 m
Max. number of aspiration apertures (n) per pipe system	12 pcs.

Aspiration apertures

Number of apertures per pipe system	**3**	**6**	**9**	**12**
Sampling aperture ∅ in mm[10])				
A	5,6	4,0	3,4	3,0
B	—	4,2	3,6	3,0
C	—	—	3,8	3,2
D	—	—	—	3,4

[10] Press cut diameter in aspiration-reducing film sheet

M-pipe system triggering thresholds

per pipe system

Number of apertures	**3**	**6**	**9**	**12**
1 blocked aperture	III	II	I	—[11]
2 blocked apertures	○[12]	III	III	I
3 blocked apertures	○	III	III	III
4 blocked apertures	○	○	III	III
5 blocked apertures	○	○	○	III
6 blocked apertures	○	○	○	III
… has/have been detected at setting level x				

Example **If blockage of 3 aspiration apertures of a total of 9 aspiration apertures is intended to be detected, the air flow monitoring setting switch should be set to level III.**

INSTRUCTION

Air flow monitoring level I, II or III should be set in any case for project planning in conformity with EN 54-20.

[11] — not possible
[12] ○ not purposeful

4.3.1.4 Double-U-Pipe system

TITANUS®

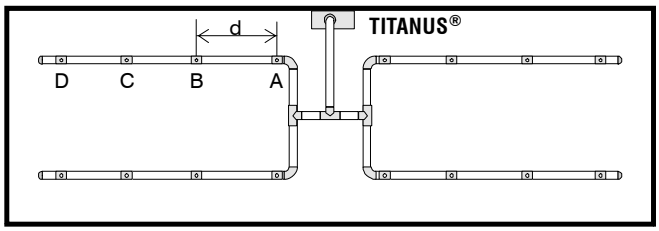

Fig. 4.10: Double -U-Pipe system for area protection

Limit values

Min. distance from TITANUS® to T-piece	4 m
Max. distance from TITANUS® to T-piece	20 m
Max. Branch length	30 m
Max. Overall pipe length per pipe system	120 m
Min. Distance between 2 aspiration apertures (d)	4 m
Max. Distance between 2 aspiration apertures (d)	12 m
Max. number of aspiration apertures (n) per pipe system	16 pcs.

Aspiration apertures

Number of aspiration apertures per pipe system	**4**	**8**	**12**	**16**
Sampling aperture ∅ in mm[13])				
A	5,0	3,6	3,0	2,5
B	—	3,6	3,0	2,5
C	—	—	3,0	2,5
D	—	—	—	2,5

[13] Press cut diameter in aspiration-reducing film sheet

Double U-pipe system triggering thresholds

per pipe system

Number of apertures	4	8	12	16
1 blocked aperture	II	I	—	—[14]
2 blocked apertures	III	I	I	—
4 blocked apertures	○[15]	III	II	I
6 blocked apertures	○	○	III	II
8 blocked apertures	○	○	III	III
… has/have been detected at setting level x				

Example If blockage of **2** aspiration apertures of a total of **8** aspiration apertures is intended to be detected, the air flow monitoring setting switch should be set to **level I.**

INSTRUCTION

Air flow monitoring level I, II or III should be set in any case for project planning in conformity with EN 54-20.

[14] — not possible
[15] ○ not purposeful

4.3.2 Simplified pipe project planning

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

The specifications according to Chapter 4.2 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.

4.3.2.1 I-pipe system

TITANUS®

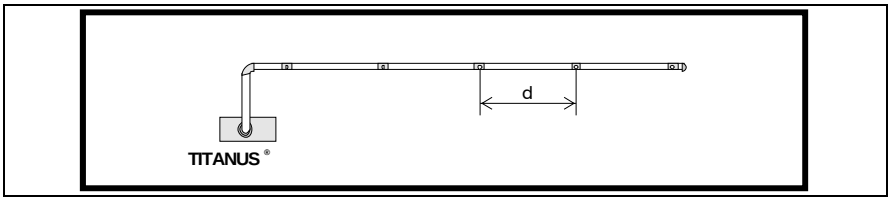

Fig. 4.11: I-pipe system, such as for equipment protection

Limit values

Min. distance from TITANUS® to 1st sampling aperture	2 m
Max. distance from TITANUS® to 1st sampling aperture	10 m
Max. distance from the 1st sampling aperture to the last sampling aperture	18 m
Max. overall pipe length Ø 25 mm	20 m
Max. number of aspiration apertures (n) per pipe system	10 pcs.
Minimum distance between aspiration apertures (d)	0,5 m
Maximum distance between aspiration apertures (d)	2 m

Aspiration apertures

Number of apertures	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
∅ of all aspiration apertures in mm[16])	6,0	5,0	4,4	4,0	3,6	3,6	3,6	3,4	3,4

[16] Press cut diameter in aspiration-reducing film sheet

4.3.2.2 U-pipe system

TITANUS®

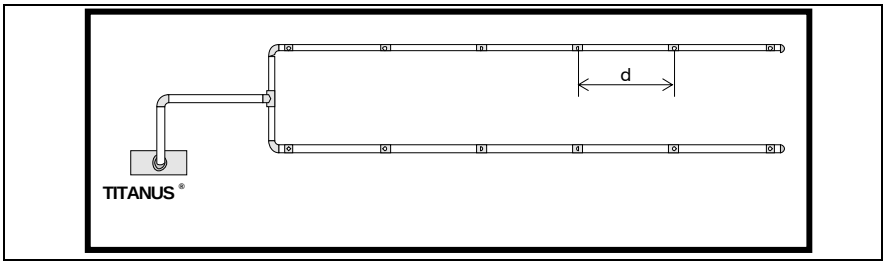

Fig. 4.12: U-pipe system, such as for equipment protection

Limit values

Min. distance from TITANUS® to 1st sampling aperture	2 m
Max. distance from TITANUS® to 1st sampling aperture	10 m
Max. distance from the 1st sampling aperture to the last sampling aperture	9 m
Max. overall pipe length Ø 25 mm	20 m
Max. number of aspiration apertures (n) per pipe system	14 pcs.
Minimum distance between aspiration apertures (d)	0,5 m
Maximum distance between aspiration apertures (d)	2 m

Aspiration apertures

Number of apertures	**2**	**4**	**6**	**8**	**10**	**12**	**14**
∅ of all aspiration apertures in mm[17])	7,0	5,0	4,4	3,8	3,2	3,0	3,0

[17] Press cut diameter in aspiration-reducing film sheet

4.3.2.3 M-pipe system

TITANUS®

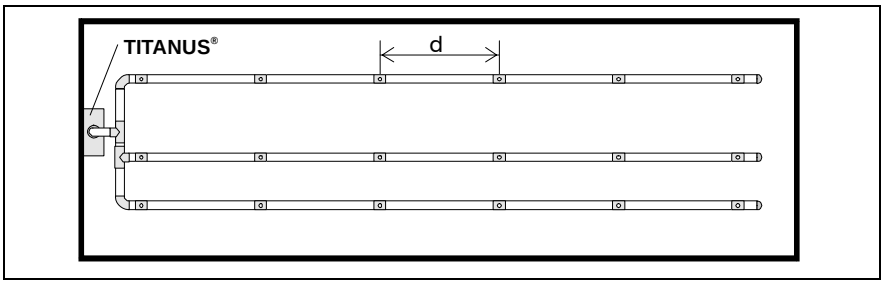

Fig. 4.13: M-pipe system, such as for equipment protection

Limit values

Min. distance from TITANUS® to 1st sampling aperture	2 m
Max. distance from TITANUS® to 1st sampling aperture	10 m
Max. distance from the 1st sampling aperture to the last sampling aperture	6 m
Max. overall pipe length Ø 25 mm	20 m
Max. number of aspiration apertures (n) per pipe system	15 pcs.
Minimum distance between aspiration apertures (d)	0,5 m
Maximum distance between aspiration apertures (d)	4 m

Aspiration apertures

Number of apertures	**3**	**6**	**9**	**12**	**15**
∅ of all aspiration apertures in mm[18])	6,0	4,2	3,6	3,0	2,5

[18] Press cut diameter in aspiration-reducing film sheet

4.3.2.4 Double U-pipe system

TITANUS®

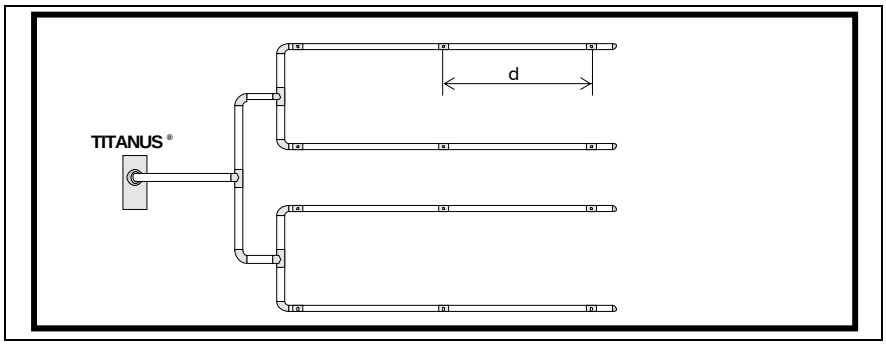

Fig. 4.14: Double U-pipe system, such as for equipment protection

Limit values

Min. distance from TITANUS® to 1st sampling aperture	2 m
Max. distance from TITANUS® to 1st sampling aperture	10 m
Max. distance from the 1st sampling aperture to the last sampling aperture	5 m
Max. overall pipe length Ø 25 mm	20 m
Max. number of aspiration apertures (n) per pipe system	12 pcs.
Minimum distance between aspiration apertures (d)	0,5 m
Maximum distance between aspiration apertures (d)	2 m

Aspiration apertures

Number of apertures per pipe system	**4**	**8**	**12**
∅ of all aspiration apertures in mm[19])	5,0	3,8	3,0

[19] Press cut diameter in aspiration-reducing film sheet

4.3.3 Project planning with long intake lines

Project planning for long pipe intake lines may **only** be carried out under use of pipes with a diameter of 32 mm **or** 40 mm.

INSTRUCTION

Observe national regulations during project planning!

The pipe intake line here refers to the pipe system between the air sampling smoke detection system and the last T-piece (U- and double U-pipe system) and/or the 1st sampling aperture (I-pipe system).

The general pipeline project planning is limited by the use of long pipe intake lines as follows:

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

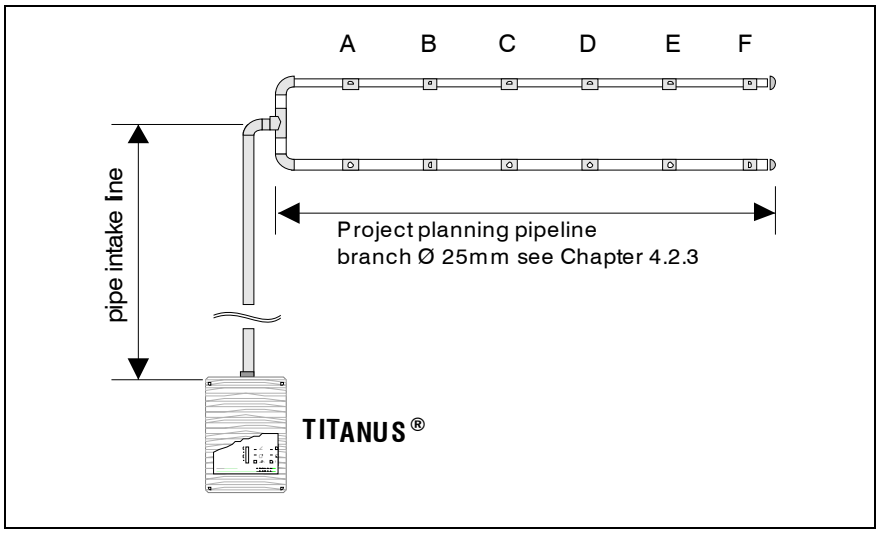

Fig. 4.15: Example of a pipe system for project planning with long pipe intake lines

4.3.4 Project planning for forced air flow

INSTRUCTION

In case of project planning with forced air flow, please select the highest alarm level according to the international specifications.

4.3.4.1 Detection of climatic cabinets with circulating air

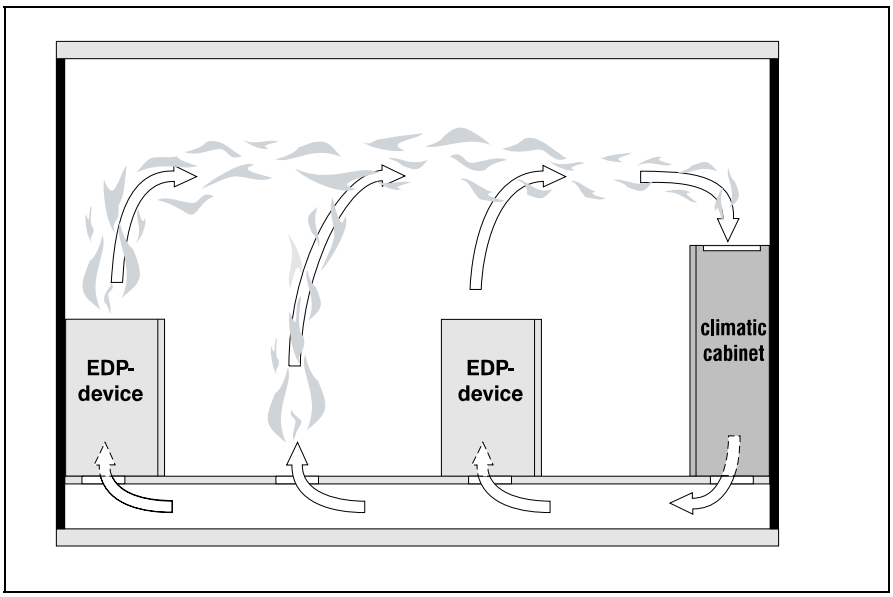

Fig. 4.16: Air flow in climatic cabinets with circulating air (air circulator)

Due to the known flow conditions a simplified pipe installation is especially suitable for rooms which are ventilated by means of climatic cabinets with circulating air.

INSTRUCTION

The pipe system is to be installed outside of the pressure area as detection in this area is not reliable due to high pressure and flow conditions!

The warmed up air in the room (e.g. caused by EDP-units) is aspirated through openings in the ceiling void or directly through air inlets of a climatic cabinet with circulating air. The air in the device is pressed by filter elements, if necessary, cooled or warmed up and then blown into the floor void of the room at the bottom side of the climatic cabinet. This results in an „air circulator“ which circulates the whole air in the room.

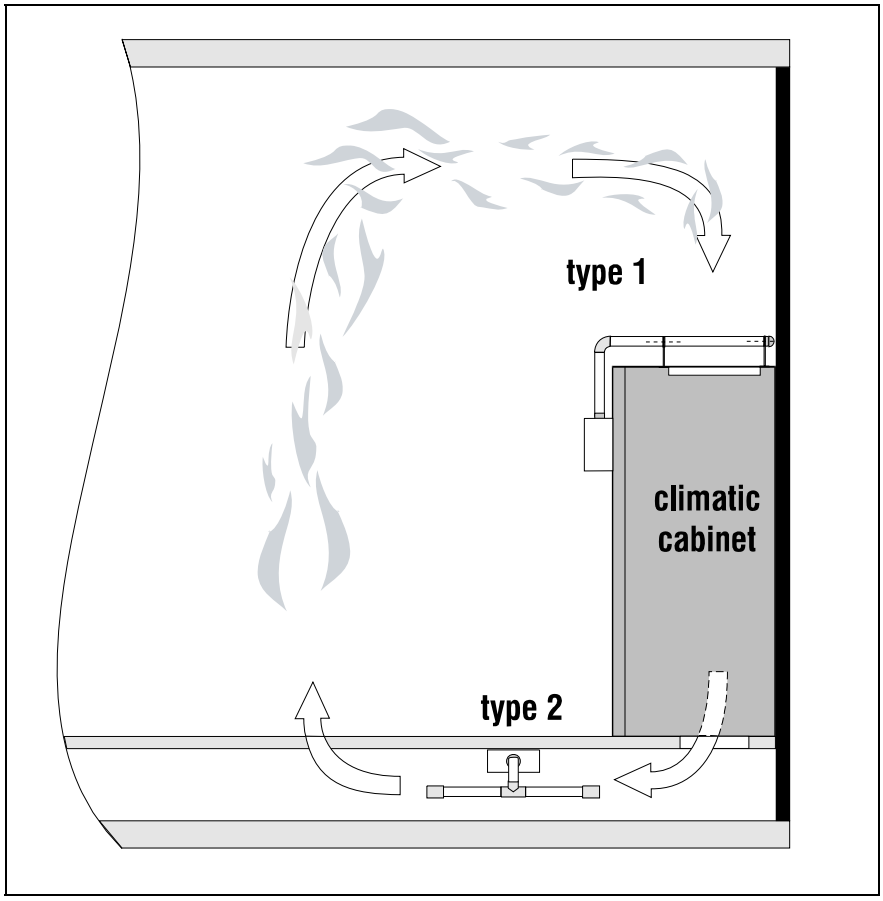

Fig. 4.17: Monitoring possibilities of a climatic cabinet with circulating air

A room as illustrated in Fig. 4.17 is monitored by mounting a pipe system at the **air inlet of the climatic cabinet with circulating air** (refer to type 1).

It is possible to install the pipe system at the air outlet (in the floor void) if no smoke particles are filtered in the climatic cabinet (refer to type 2).

ATTENTION

In case of a detection through a pipe system before the air inlet or after the air outlet of a climatic cabinet with circulating air it is important that the room is not monitored if the climatic cabinet(s) is (are) not in operation.

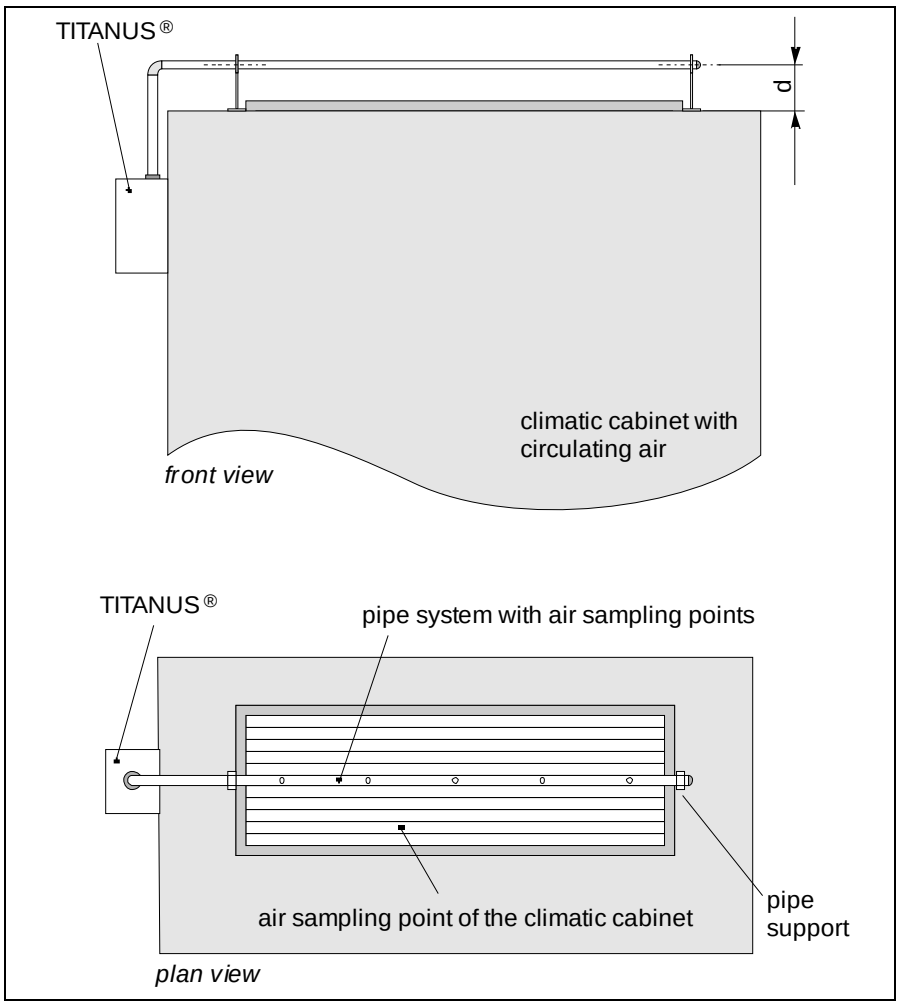

Fig. 4.18: Pipe system in front of the air inlet of a climatic cabinet with circulating air

High aspiration potential

If the climatic cabinets have a high aspiration potential the flow speed near the air inlets or air outlets is very high. Therefore, a high pressure is produced which affects the response behaviour during the smoke detection. In such cases the **pipe system is to be removed from the pressure area** or is installed in a distance at which the air speed is ≤ 2 m/s (refer to Fig. 4.18). If this is not possible for constructional reasons an air return is to be installed.

The pipe system in the floor void is also to be installed outside of the pressure area. The distance to the air outlet can be up to 1 m.

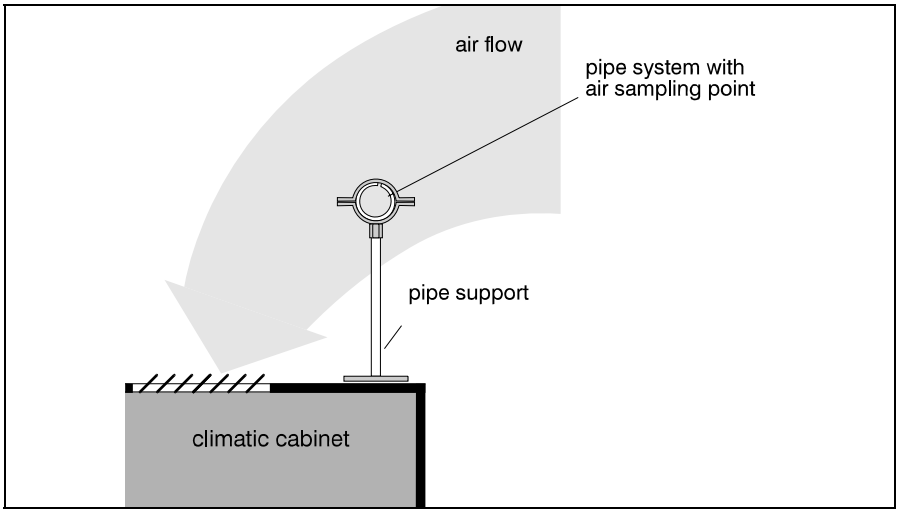

Fig. 4.19: Monitoring of climatic cabinets (scheme)

Air Sampling Points

The air sampling points of the pipe system have to point towards the air flow (refer to Fig. 4.19). The optimum angle to the air flow direction is to be determined through a smoke test.

The distance of the air sampling points depends on the design of the air inlet of the climatic cabinet. The air inlet of a climatic cabinet with circulating air e.g. is often divided through lamellas or sound absorbers. The distance between the air sampling points of the pipe system is to be chosen in such a way that the air sampling area is completely monitored.

The size of the diameters is based on the number of air sampling points. For the exact values please refer to chapter 4.3.2 "Simplified Project Planning".)

Several climatic cabinets with 1 TITANUS®

Several climatic cabinets can be monitored by means of one TITANUS® if the following conditions are met:

- The climatic cabinets have to have the same design and have to be operated with the same voltage.
- The climatic cabinets are always operated simultaneously (tandem operation).

ATTENTION

In case of mutual operation the pipe system cannot be considered as symmetric anymore. TITANUS® is therefore in an unallowable operating state. Thus, only a limited smoke detection is possible.
The customer is explicitly to be informed about this.

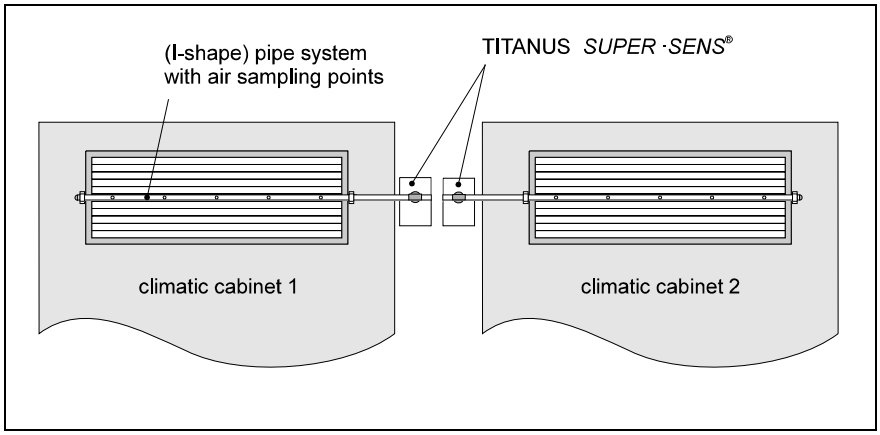

Fig. 4.20: Monitoring of 2 climatic cabinets with two TITANUS®

Several climatic cabinets with several TITANUS®

If the conditions (same design of the climatic cabinets, tandem operation etc.) cannot be fulfilled a separate pipe system and one TITANUS® is to be installed at each climatic cabinet (refer to Fig. 4.20)

4.3.4.2 Detection of air conditioning ducts

Air conditioning duct monitoring

Air conditioners are distinguished between low-speed and high-speed systems (see table below). The specifications provided in this chapter apply **only to low-speed systems**. There are not enough empirical values available for high-speed systems. For that reason, smoke tests should be conducted with air conditioning ducts having flow rates higher than 10 m/s and the optimum response characteristics should be determined.

	Low-speed systems	**High-speed systems**
Flow rate	10 m/s maximum	> 10 m/s
Duct cross section	Large	Small
Pressure differential along the direction of flow	Low	High

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

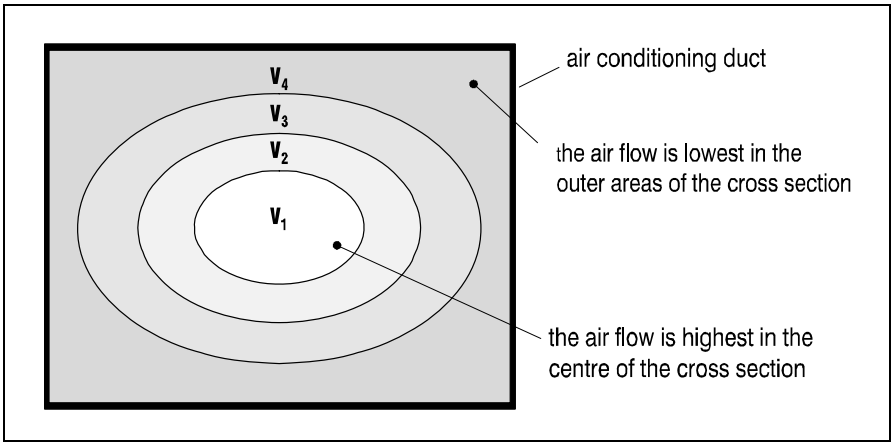

Fig. 4.21: Rate distribution in an air conditioning duct with $v_1 > v_2 > v_3 > v_4$

Sampling

The pipe system should be arranged in area v_1 to v_3 in order to achieve optimum detection results.

Installation location of the pipe system

The air exhaust duct should be chosen as the installation location of the pipe system and should be as far away from sound suppressors, air baffles and bends as possible. The benchmark for the distance from such 'obstacles' is: At least 3x the smallest duct diameter.

If it is absolutely necessary to attach the pipe system directly behind baffles, sound suppressers or angles, the main flow speed areas will have to be monitored (see Fig. 4.22/23).

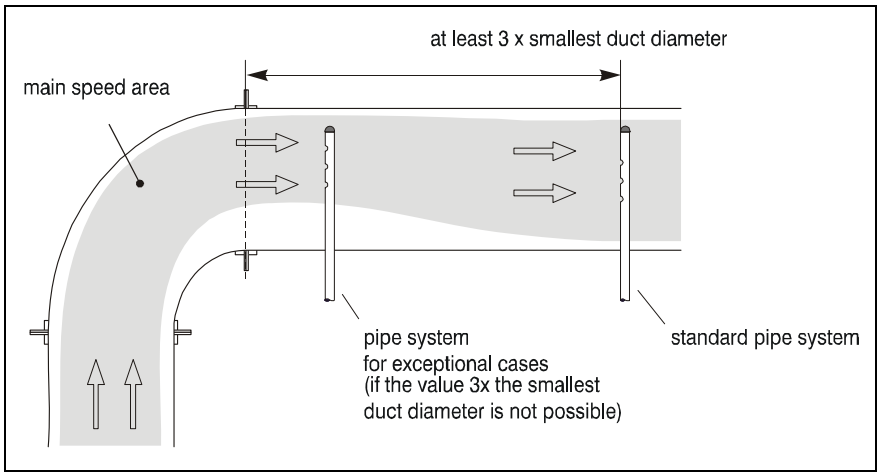

*Fig. 4.22: Change in direction of a duct **without** baffles*

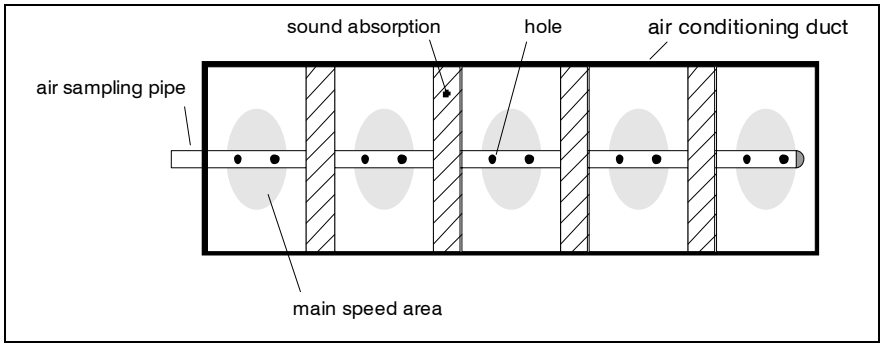

Fig. 4.23: Sound suppressors in a duct

The following must be taken into consideration when installing a pipe system in air conditioning ducts:

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

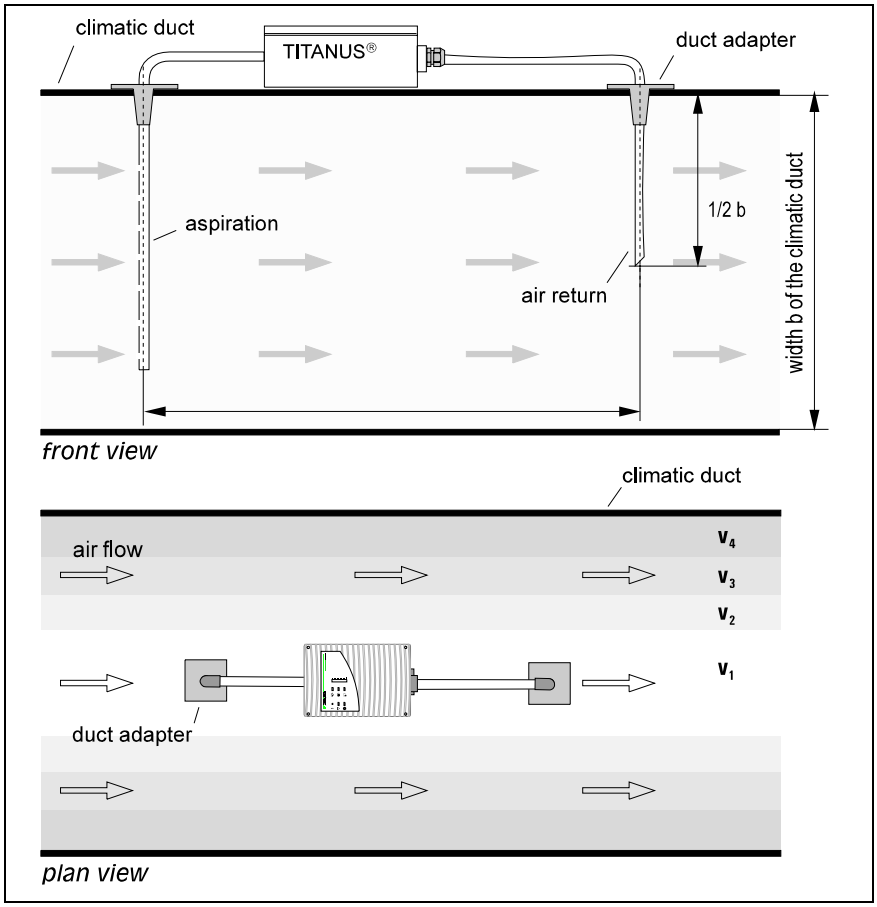

Fig. 4.24: Air return

Air return

The air return must take place at a distance of at least 2 m from the sampling. The open end of the air recirculation should be bevelled at a 45° angle (see Fig. 4.24).

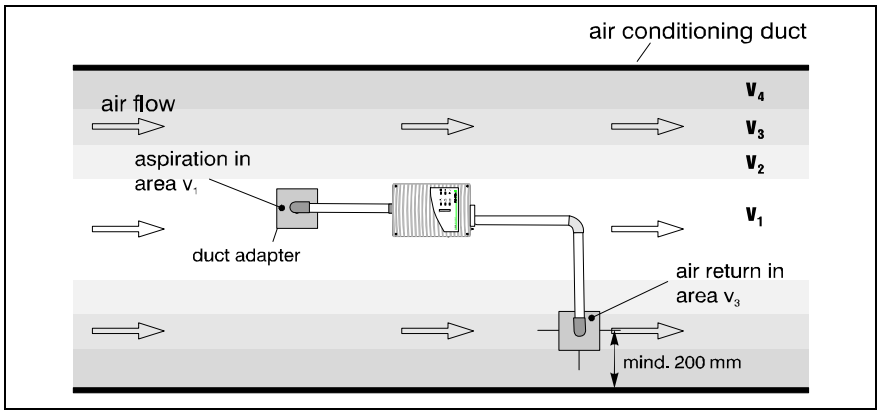

Fig. 4.25: Offset air recirculation reengagement

If a distance of 2 m cannot be maintained, the pipes will have to be arranged in an offset manner. This make makes it possible to achieve a drop of pressure between the intake air and exhaust air, since the pipes are located in different flow rate areas.

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

Bore distance

	Duct cross section ≤ 0.5 m²	**Duct cross section > 0.5 m²**
Distance from aspiration apertures to wall	100 to 200 mm	200 to 300 mm
Distance of aspiration apertures to one another	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 4.3.2 "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.

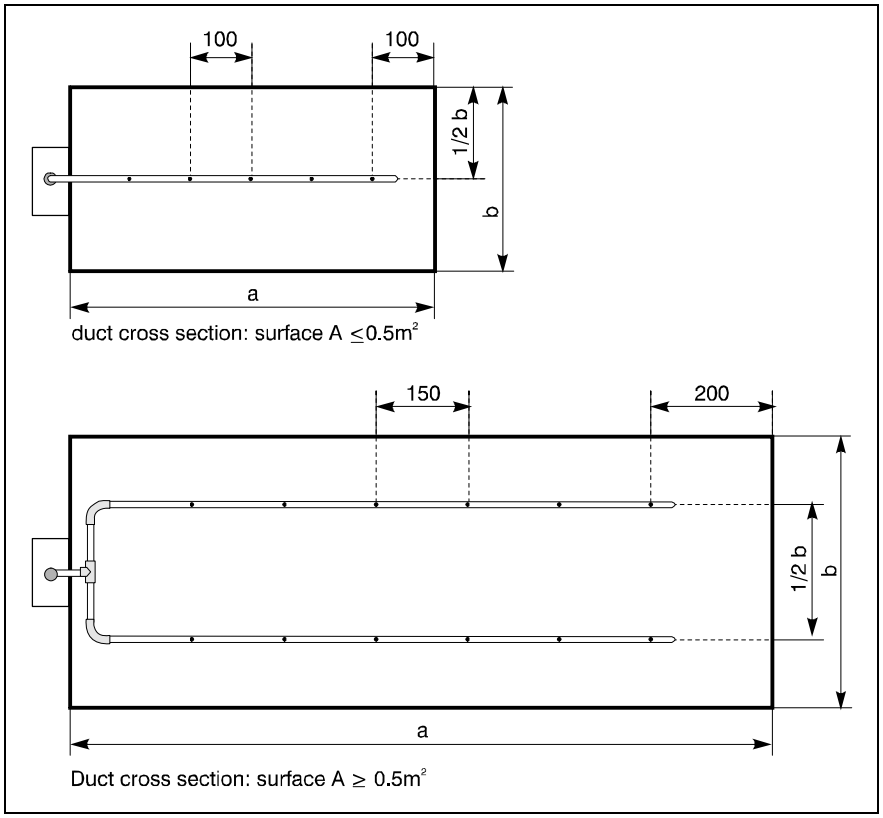

Fig. 4.26: Ducts with small and large duct cross-section

4.4 Mains 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.[20]

The following formulae apply in the event of an alarm:

Current calculation

The current in the event of an alarm is calculated using the following formula:

Room Protection

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

Equipment Protection

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

The power for charging the batteries is calculated as follows:

Charging Current

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

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

I_{total} = *total power supply of all connected air sampling systems in [A]*

$I_{powersupply,\ max.}$ = *max. supply current of the power supply unit in [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 in [A]*

$I_{quiescent}$ = *quiescent current of an air sampling system in [A]*

$K_{nominal}$ = *nominal capacity of the batteries in [Ah]*

$I_{charging}$ = *charging current of batteries (within 24h 80% of nominal capacity in [A]*

INSTRUCTION

The calculated total current (*I ges*) with the highest value is used for the configuration of the power supply units!

The power consumption of TITANUS® is listed in chapter 3, "Technical Data".

20 80% load in 24 hours

Line calculation

The maximum line length results from the permissible drop in voltage on the input line. The permissible drop in voltage is the difference of the final discharging voltage of the emergency power battery (21.5 V) and the lowermost operating voltage limit of the air sampling smoke detection systems.

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

L_{max} = *maximum length of line in [m]*
A = *cable cross sectiont in [mm²]*
I_{total} = *total current of air sampling systems in [A]*
γ = *conductivity: Cu=57m/Ωmm²*
ΔU = *max. voltage drop of the feeding line*

A suitable cable feed through should be selected for the existing cable in order to ensue that the housing is tight.

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

Emergency power calculation

The nominal capacity is calculated using the following formula:

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

$K_{nominal}$ = *nominal capacity of emergency power batteries [Ah]*
t = *required bridging time in [h]*

The factor 1.25 of the equation is only relevant in case of a bridging time of 24 hours or less.

5 Installation of TITANUS®

5.1 General

The regulations, guidelines and instructions given in chapter 4.1 are valid.

When installing the TITANUS® 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 informed (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

5.2 Opening the TITANUS® air sampling smoke detection system

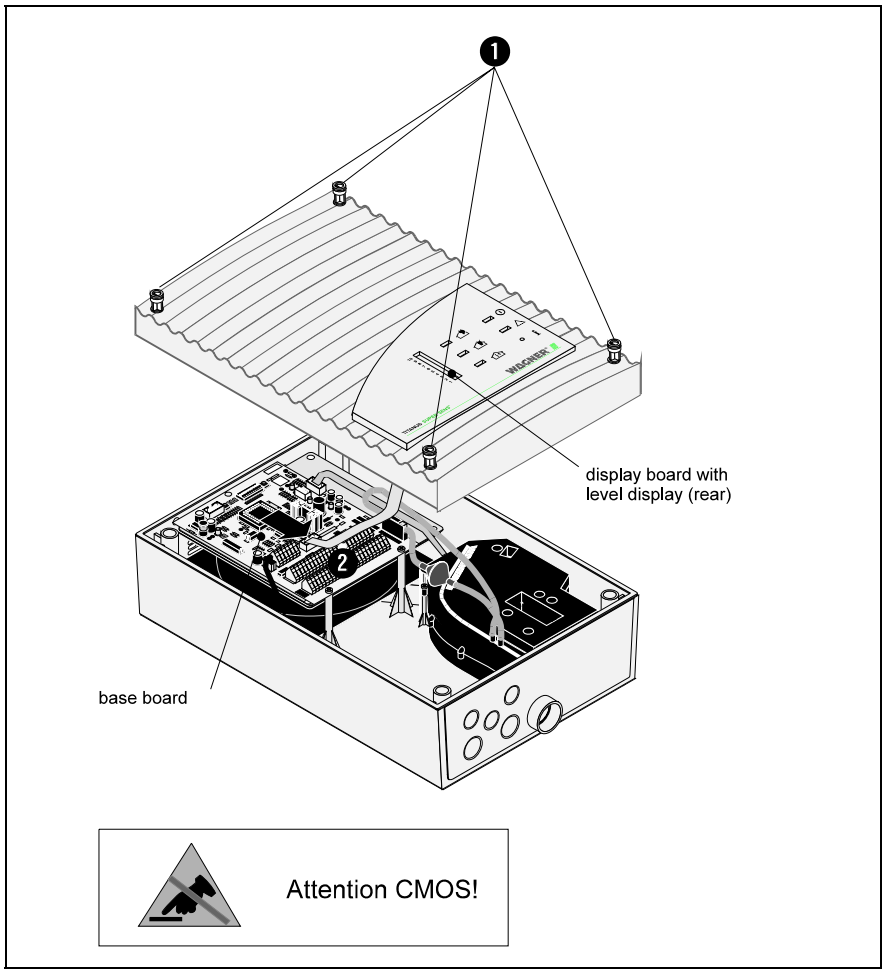

Fig. 5.1: Opening the TITANUS® *air sampling smoke detection system*

ATTENTION

The components on the base board are not allowed to be touched without an antistatic set (except for DIL-switches and buttons)!

Antistatic set	ESD- protective mat set, e.g. type 8531 (art.-no. 85-20-4900)

In order to open TITANUS *SUPER · SENS*® follow the steps below (refer to Fig. 5.1).

1. Loosen the four screws on the housing lid and lift the lid carefully.
2. Pull the cable off the display board. Now remove the lid.

5.3 Settings

5.3.1 Base board

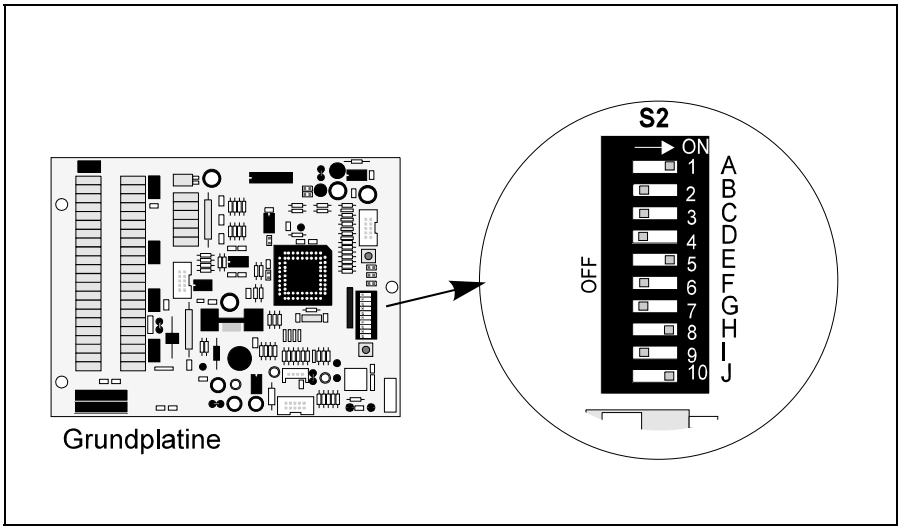

Fig. 5.2: Settings on the base board of TITANUS®

TIP

Contact I (9) of the switch S2 has no function.

5.3.1.1 Delay Period of the Air Flow Fault

Delay Period

Set the delay period for the transmission of the fault signal via the switch S2 (A, B) on the base board (refer to Fig. 5.2) of TITANUS®.

Setting of the Delay Period	Switch S2 Contact A (1)	Switch S2 Contact B (2)
0.5 minutes	off	on
2 minutes (standard)	on	off
15 minutes	on	on
60 minutes	off	off

As a standard a delay period of 2 minutes is set. In areas with faults limited in time (e.g. air pressure variations) other delay periods – depending on the duration of the faults – should be set.

5.3.1.2 Activating Threshold of the Air Flow Monitoring

Set the activating threshold of the air flow fault via the switch S2 (C, D) on the base board (refer to Fig. 5.2) of TITANUS®.

Level	Activating Thresholds	Switch S2 Contact C (3)	Switch S2 Contact D (4)
I	small	on	off
II	medium	off	on
III	large (standard)	off	off
IV	very large	on	on

Choose the activating threshold acc. to chapter 4, "Project Planning".

5.3.1.3 Delay Period of the Alarm Activation

The delay period for the alarm thresholds can be set via the switch S2 (E, F). As a standard the delay period for alert, action and fire alarm is set to 10 s. If the smoke level increases during operation so that one of the alarm thresholds is reached the delay period starts. After the delay period has been expired the signal is transmitted if the alarm remains activated. Thus, a false alarm can be avoided in case of short interferences (dust).

Alarm Delay Period	Switch S2 Contact E (5)	Switch S2 Contact F (6)
0 seconds	off	off
10 seconds (standard)	on	off
30 seconds	off	on
60 seconds	on	on

TIP

For TITANUS® with a sensitivity level IV an alarm delay period of 30 s is recommended.

5.3.1.4 Setting of the Response Sensitivity

The sensitivity of the detector head is usually set via the switch S2 (G, H) on the base board (refer to Fig. 5.2) of TITANUS®. The following table shows the response sensitivity (fire alarm) of TITANUS®.

Level	**TITANUS®**	**Switch S2 Contact G (7)**	**Switch S2 Contact H (8)**
I	0,2%/m	on	on
II	0,1%/m (Standard)	off	on
III	0,05%/m	on	off
IV	0,025 %/m	off	off

5.3.1.5 Fault and Alert Alarm Display

The display for collective faults (air flow and detector head fault) as well as the display and signal of the alert alarm can be set latched (standard) or non-latched. A homogenous setting can only be effected via switch S2, contact J (refer to Fig. 5.2) of TITANUS®.

Fault and Alert Alarm Signal	**Switch S2 Contact J (10)**
latched (standard)	on
non-latched	off

5.3.1.6 Alarm Thresholds

TITANUS® has three alarm thresholds, to which a defined bargraph-level as threshold value belongs. The sensitivity at the smoke level display 10 depends on the chosen response sensitivity (refer to tables in chapter 5.3.1.4).

Alarm thresholds at the 4 sensitivity levels:

Alarm Level	**Alarm threshold at …**		
fire alarm	100%	level 10	of the chosen response sensitivity
action alarm	70%	level 7	(=sensitivity at
alert alarm	35%	level 3,5	smoke level display 10)

After the action and the fire alarm thresholds have been reached it is always necessary to reset. The reset of the alarm is described in detail on page 2.1.1 “Function“.

INSTRUCTION

A reset option according to chapter 2.1.1 "Function" has to be installed!

5.3.1.7 Setting of the Ventilator Voltage

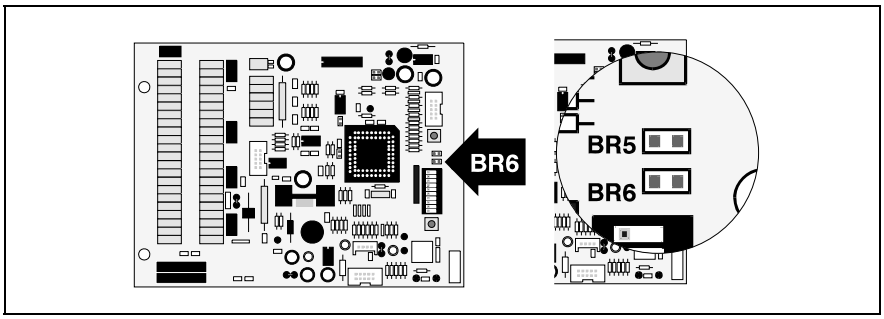

Fig. 5.3: Switching of the ventilator voltage on the base board

The standard setting of the ventilator voltage is 12 V. In critical areas the ventilator voltage can be switched from 12 V to 15 V through closing the bridge BR 6 in order to increase the transport speed in the pipe system and to permit a quicker detection.

INSTRUCTION

Re-initialize the air flow if you change the ventilator voltage. Close or open the bridge only when the device is switched-off.
The bridge BR5 serves internal diagnostic purposes and has **always** to be open.

5.4 Installation of the reset board

As an option the reset board can be installed into TITANUS®. If several TITANUS *SUPER · SENS*® are connected to one detection line the reset board is only installed into the last device on the detection line (refer to Fig. 5.4).

INSTRUCTION

The reset board can only be used if the quiescent current of the detection line is at least 5 mA and if the end of the detection line is an ohmic resistor.

End of line resistor

The reset board replaces the detection line resistor. It is re-calculated and is installed on the reset board (connector X1, refer to Fig. 5.4). The value of the end of line resistor R_{ER} is to be calculated as follows:

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

where R_{ER} = *end of line resistor on the reset board in* Ω
U_L = *line voltage in V*
I_R = *quiescent current of the line in [A]*

Quiescent current of the line

The quiescent current I_R of the line is to be calculated as follows:

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

where R_E = *original end of line resistor in* Ω
U_L = *line voltage in V*
I_R = *quiescent current of the line in [A]*

The formulas to calculate the end of line resistor and the quiescent current of the detection line consider the ideal state of the signal evaluation.

If acknowledgement is not possible by means of the calculated end of line resistor of the reset board the value of the end of line resistor is to be reduced by about 20%.

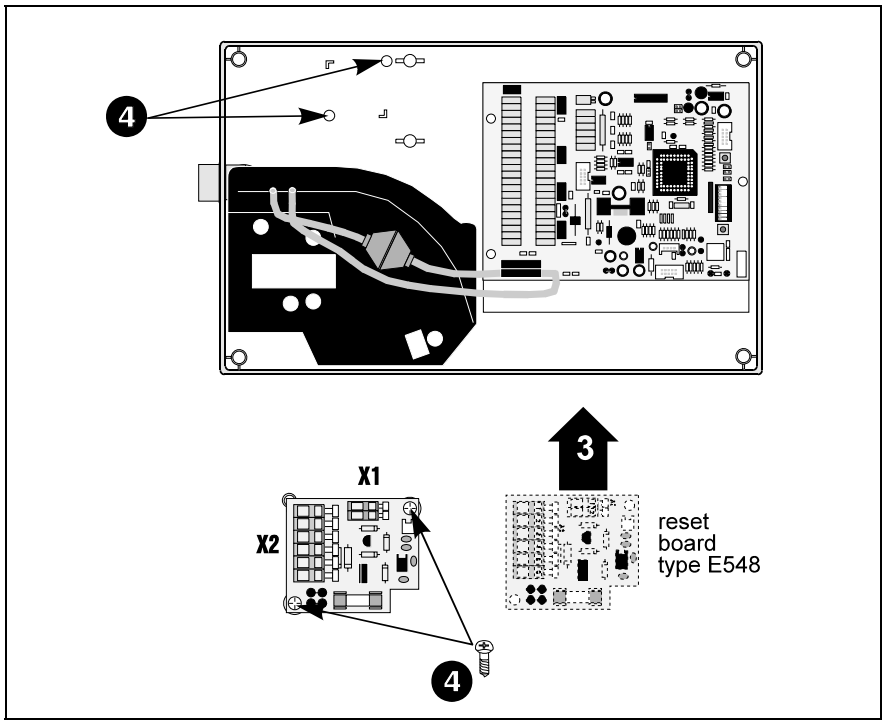

Fig. 5.4: Installation of the reset board in TITANUS®

Installation in TITANUS®

In order to install the reset board in TITANUS® the following steps are to be followed (refer to Fig. 5.4):

1. Loosen the four screws on the housing lid of TITANUS® and lift it up carefully.
2. Pull the cable of the display board off the base board. Now remove the housing lid.
3. Place the calculated end of line resistor[1] R_{ER} into the connection terminal X1.
4. Attach the reset board by means of 2 plastic screws (KB 30x8). Use the plastic mounting posts of the TITANUS®-housing.
5. Fix the cable of the display board at the base board and close the housing lid.
6. Attach the lid by means of the four screws.

The electrical connector (X2) is described in section 5.6.4.

[1] end of line resistor not included, power 1/4W

5.5 Mounting Location

5.5.1 Fixing of the air sampling system TITANUS®

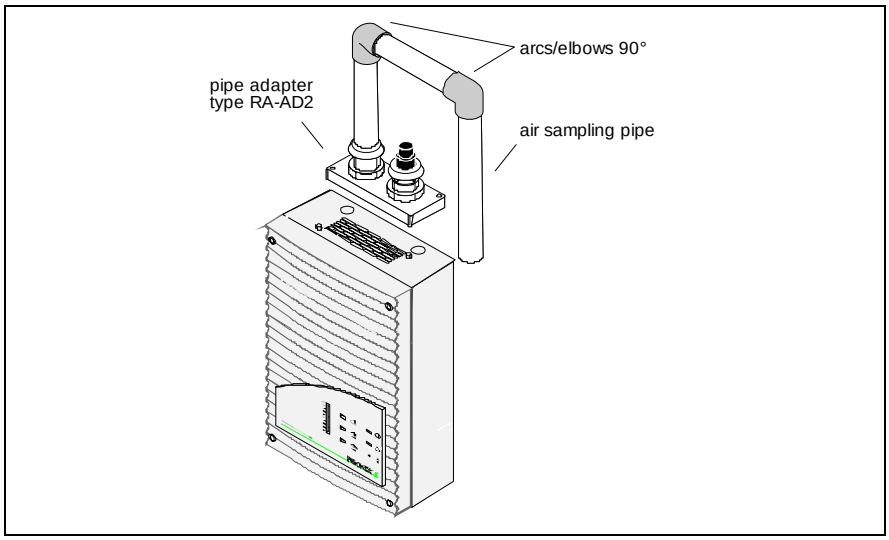

Fig. 5.5: Protection against impurities and dripping water during the installation of TITANUS®

Mount the air sampling system so that the displays are clearly visible. If necessary install a remote display unit. The air sampling smoke detection system is either directly mounted on a wall with its bottom casing or by means of a special support (refer to chapter 2.2.5 "Device Supports").

The air outlet of the air sampling smoke detection system is not allowed to be blocked. The distance between the air outlet of TITANUS® and e.g. a wall is to be at least 10 cm.

The air sampling system TITANUS® can be mounted with the air sampling pipe connectors pointing upwards or downwards. If necessary turn the lid by 180°.

Aspiration Downwards

If TITANUS® is mounted with the air sampling pipe connectors pointing downwards it is to be guaranteed that no impurities or dripping water enter the air outlet which then points upwards. If necessary use the pipe adapter with a short pipe curving downwards (refer to Fig. 5.5).

Mounting Material

TITANUS®	cylinder or flat head screws – diameter of thread: max. 6 mm – diameter of head: 10 up to 12 mm
Support (type H-AD2)	cylinder or flat head screws – diameter of thread: max. 4 mm – diameter of head: 5 up to 7 mm

Distances of the Holes

The distances of the holes are given in the following figures (all dimensions in mm).

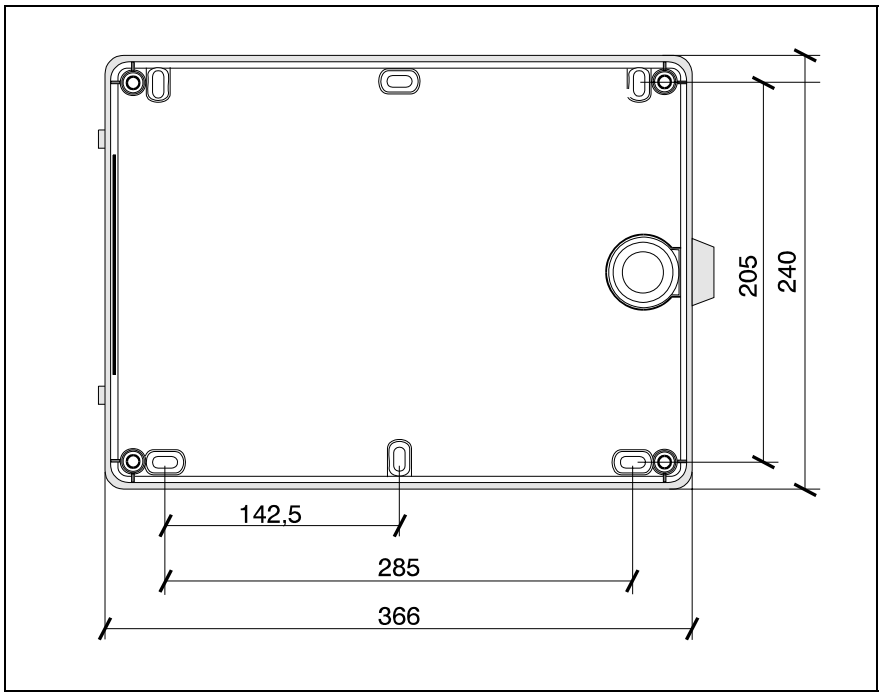

*Fig. 5.6: Hole distances TITANUS® **without** support*

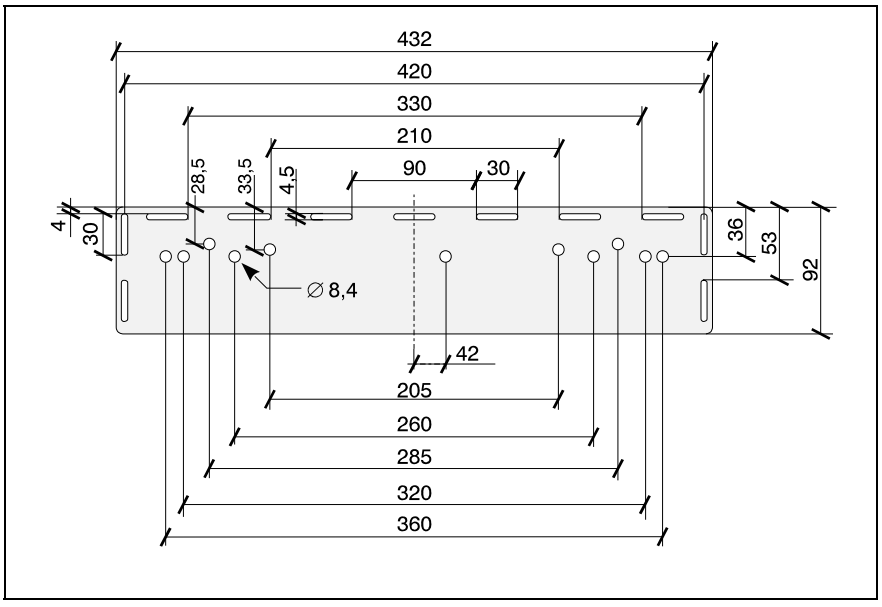

Fig. 5.7: Hole distances of the support type H-AD2

5.5.2 Connection of the air sampling pipe

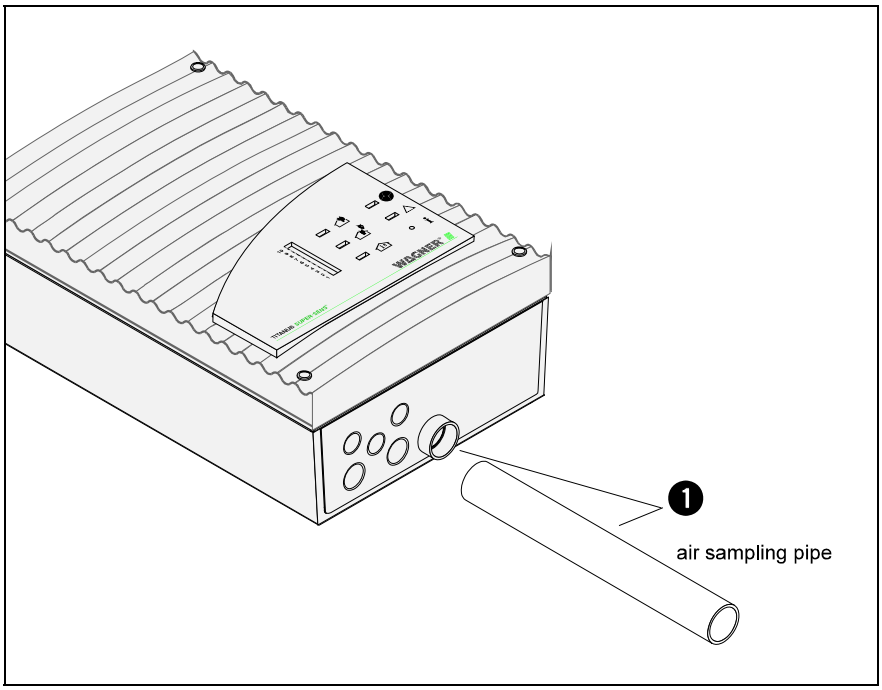

Fig. 5.8: Connection of the air sampling pipe to the TITANUS®

Connection of air sampling pipe

❶ In order to connect the air sampling pipe to TITANUS®, attach the pipe to the corresponding jack (refer to Fig. 5.8).

INSTRUCTION

Do not use any adhesive to connect the air sampling pipe with the jack.

5.6 Electrical Connection

In order to prepare the electrical connections follow the steps below:

1. Break through the cable entries e.g. by means of a screw driver.
2. Attach the plastic connection pieces PG16 or PG11.
3. Pass the cable through the corresponding PG-entries and a ferrite ring each.
4. Pass the metallic grounding cable through the insulating hose.

INSTRUCTION

Insulate the metallic grounding cable by the included hose so that a contact with the metallic detector head is avoided.

The electrical connection is effected via terminal block X1 and X2 on the base board of TITANUS®. Pay attention to the allowed cable cross sections of the corresponding screw joint and the allowed wire cross sections of the terminals (refer to chapter 3 "Technical Data").

The relay contacts on the base board can be used e.g. for the connection to a central fire panel or the triggering of signal devices, guiding systems etc.

If the "alt Sense"-output has a permanent voltage of +24V the sensitivity is automatically switched to the next less sensitive level.

TIP

If the voltage at the reset-input is permanently +24V all signals (action and fire alarm included) are automatically reset if the cause of the fault has been eliminated (action and fire alarm are non-latched).

ATTENTION

Connection works are only allowed if the device is current less.

5.6.1 Connection diagram

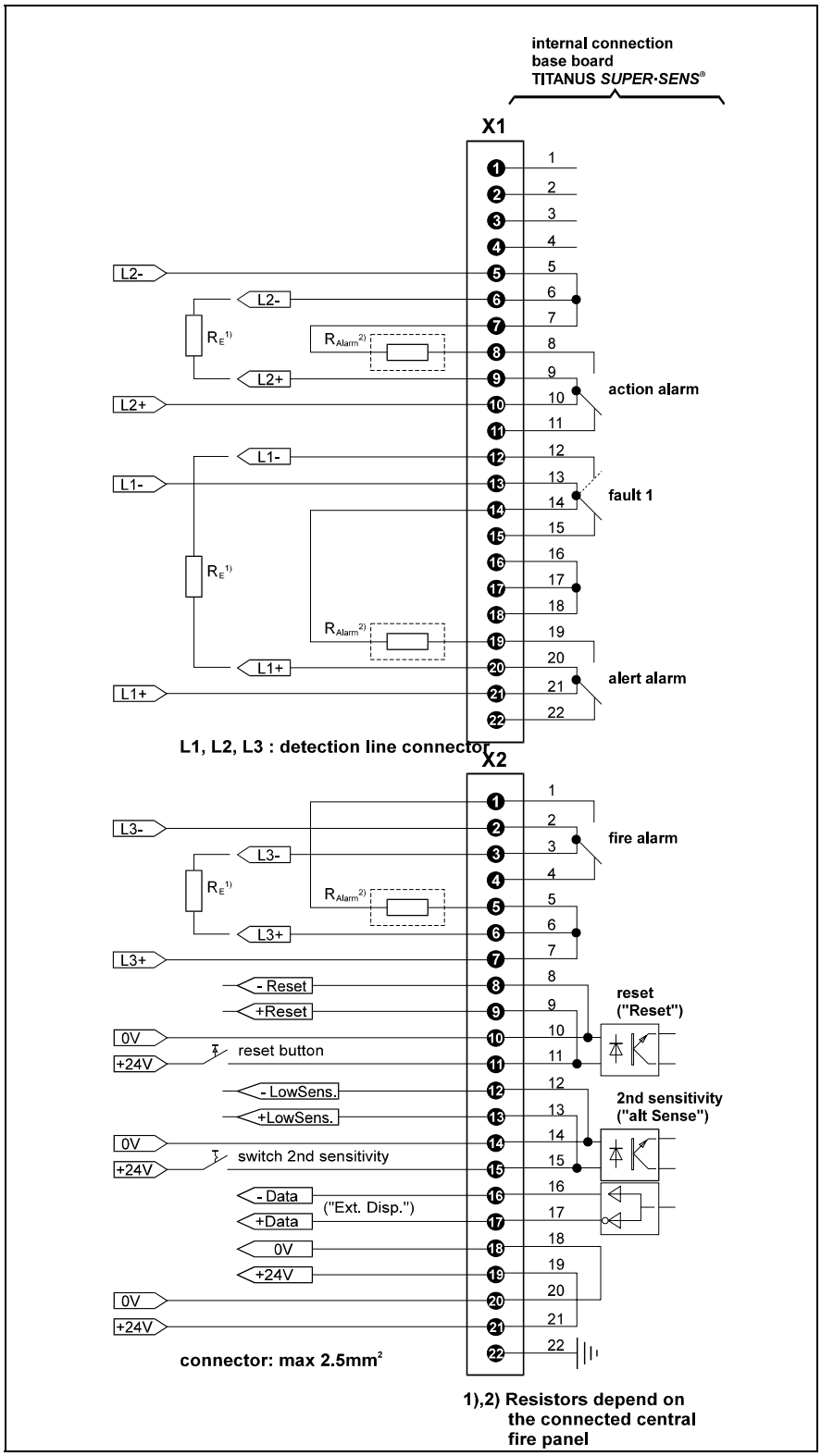

Fig. 5.9: Overview of terminals of TITANUS®

5.6.2 Connection without central fire panel

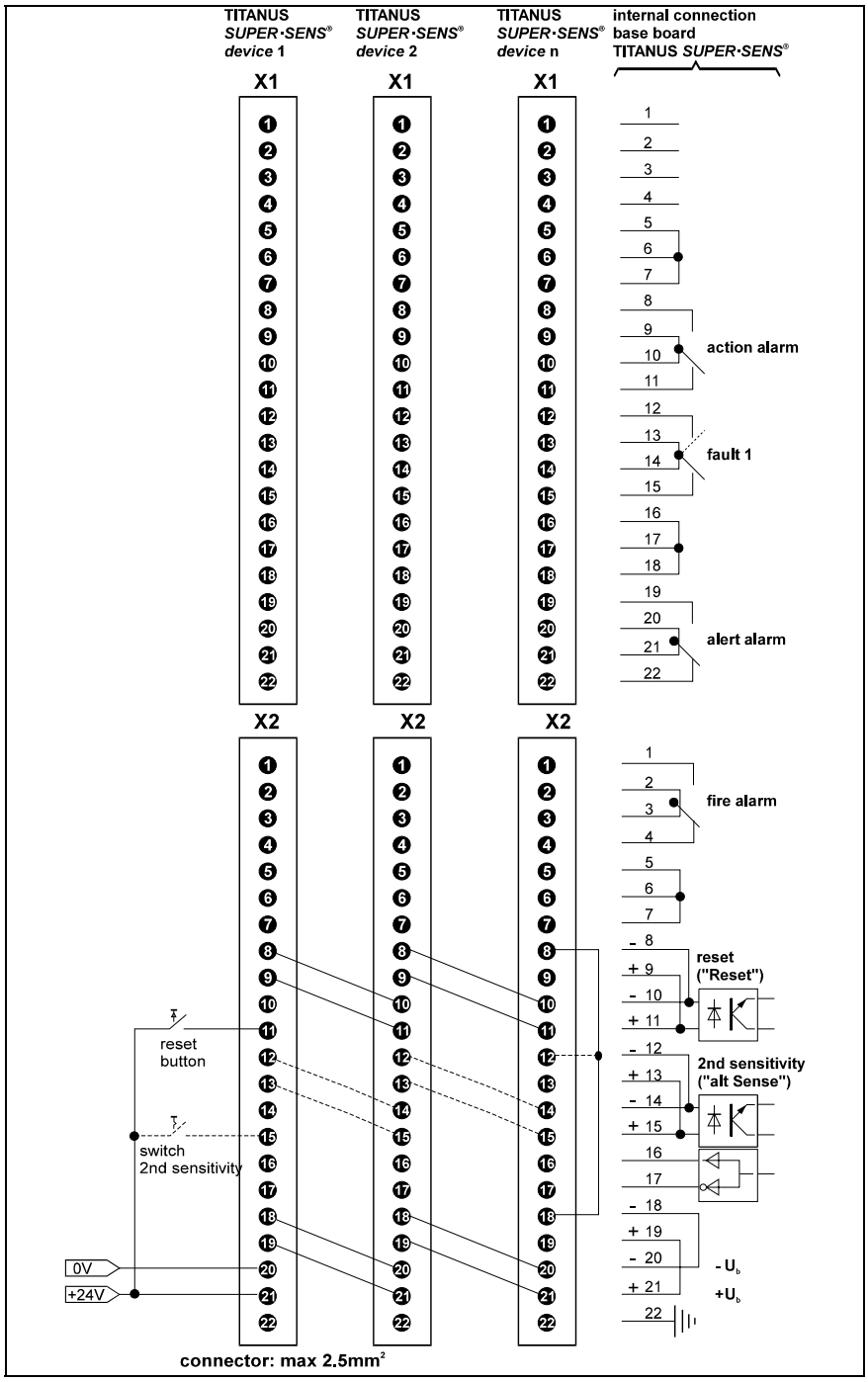

Fig. 5.10: Example of the connection of several TITANUS® *without central fire panel, with reset button and switch to change-over to 2nd sensitivity*

INSTRUCTION

Prefer shielded cables in order to increase the safety against faults.

5.6.3 Connection to central fire panel with reset button or relay contact

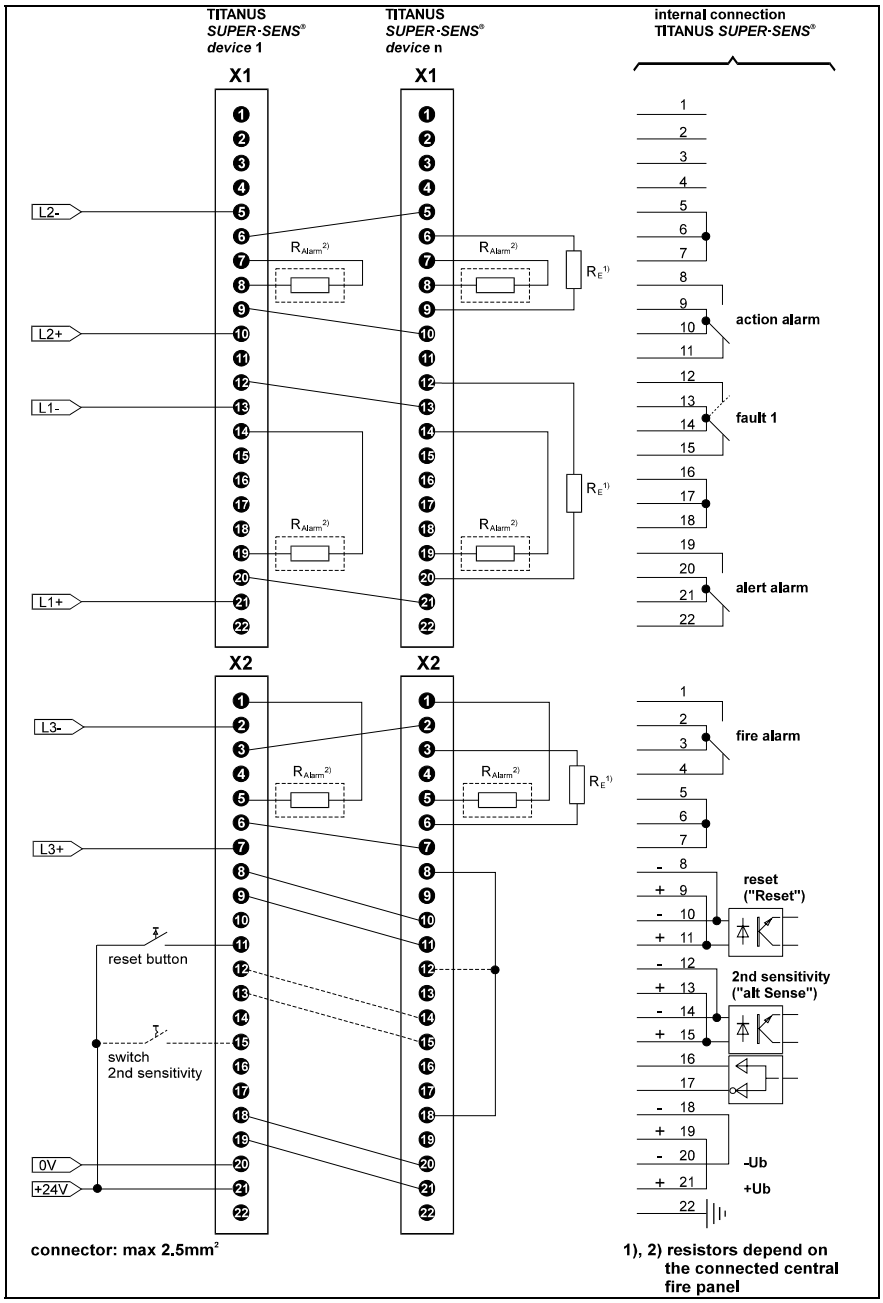

Fig. 5.11: Connection of several TITANUS® *with central fire panel, reset button and switch to change over to 2nd sensitivity*

INSTRUCTION

Prefer shielded cables in order to increase the safety against faults.

5.6.4 Connection to central fire panel with reset board

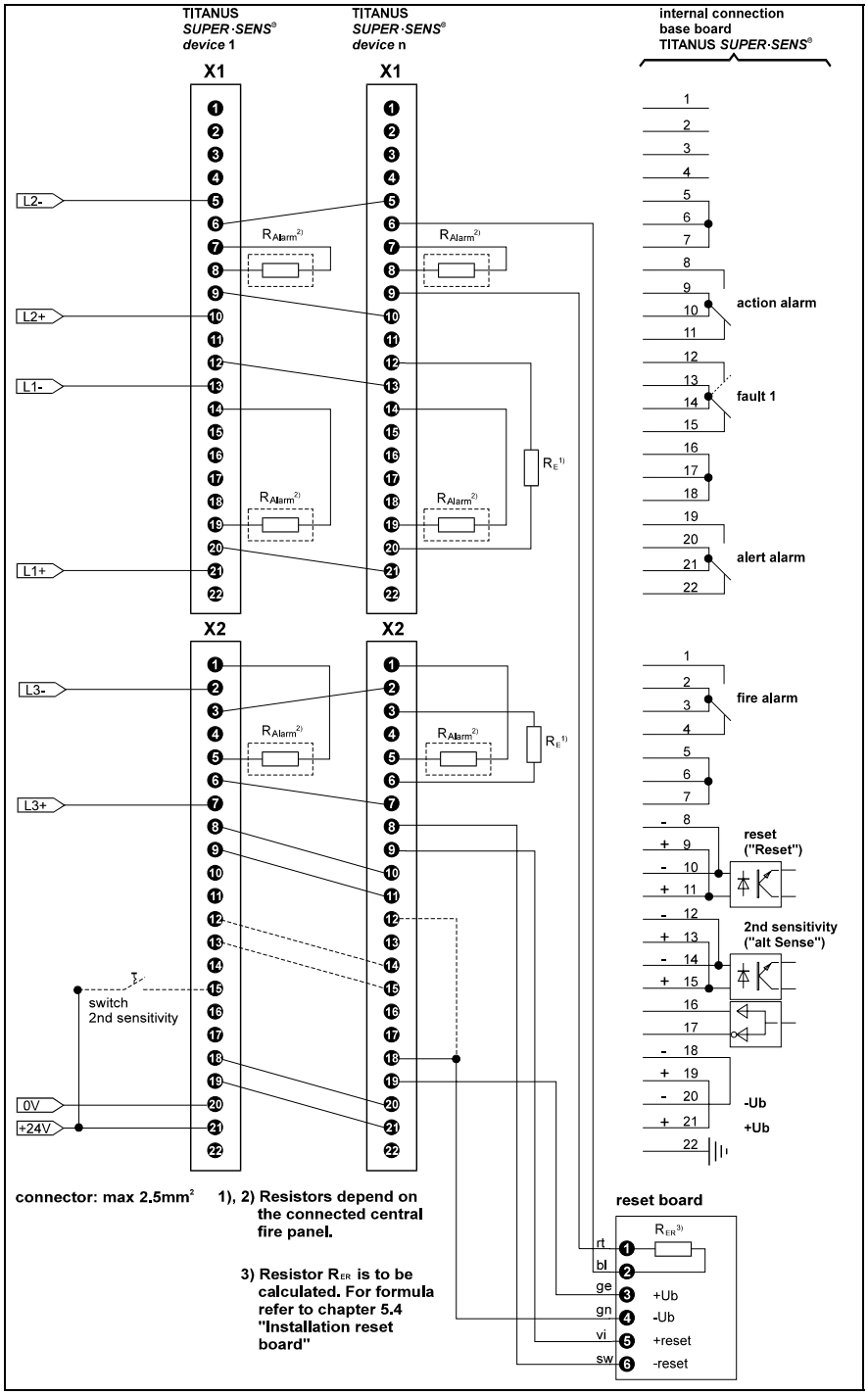

Fig. 5.12: Connection of several TITANUS® *with central fire panel, reset board and switch to change over to 2nd sensitivity*

INSTRUCTION

Prefer shielded cables in order to increase the safety against faults.

5.7 Application of TITANUS® and fire detction system *AlgoRex*®

In general, there are different possibilities to connect the potential-free alarm and fault contacts of the air sampling smoke detection system TITANUS® to the smoke detection system *AlgoRex*®.

- the collective connection
- the use of line modules of the AnalogPLUS®-technology
- the connection by means of interactive line modules

5.7.1 Collective connection

TITANUS® can be connected to a collective line board (belongs to the central unit) of the smoke detection system *AlgoRex*®. For each used alarm contact a collective detection line is required. It is possible to connect the fault contact either separately to the collective line board or to integrate it into the alert alarm-detection line. Fig. 5.13 illustrates the correct connection at TITANUS®.

INSTRUCTION

Pay attention to the correct polarity when using the 5.6V-Z-diodes.

5.7.1.1 Connection diagram collective

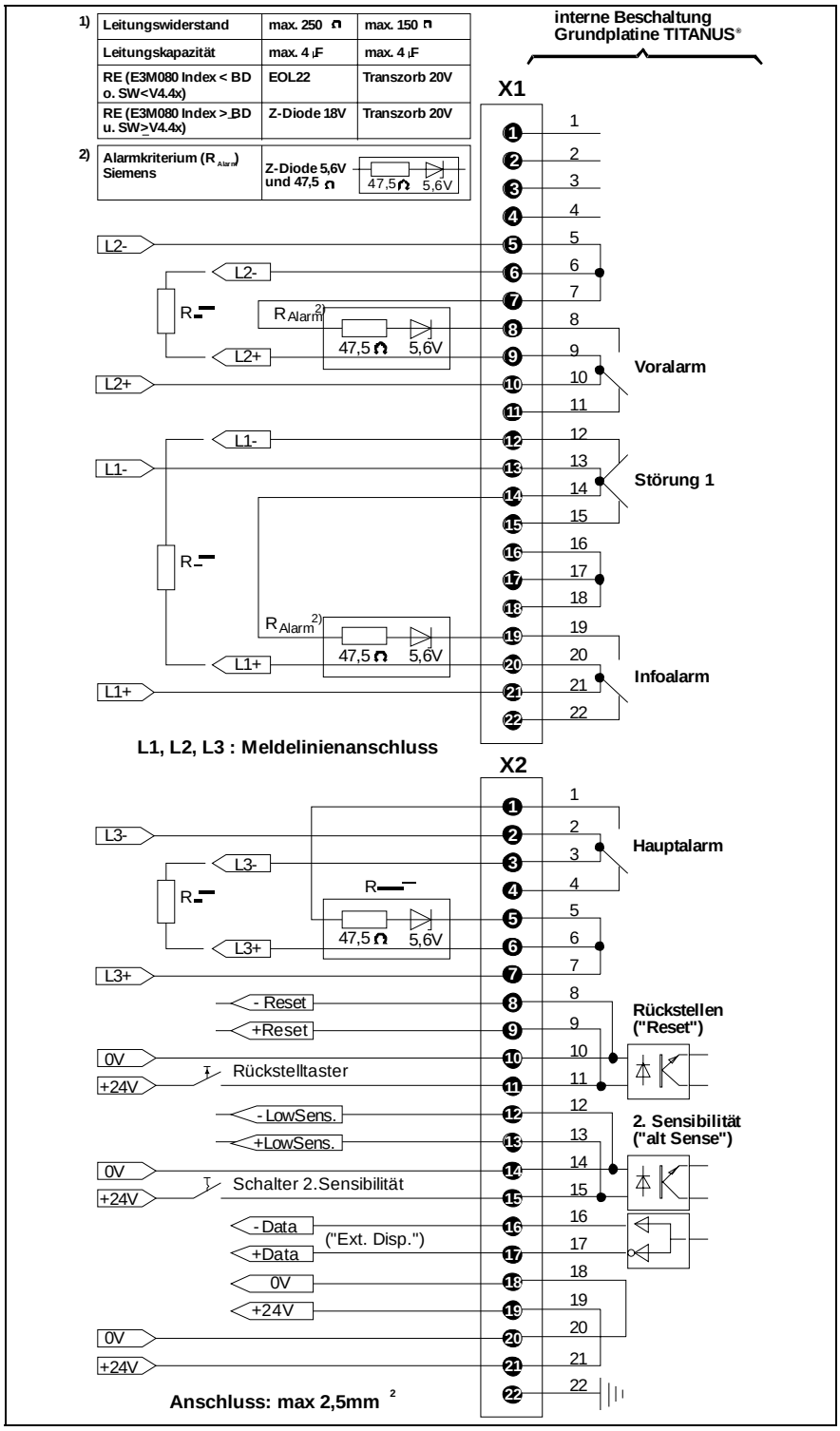

Fig. 5.13: Collective connection TITANUS® *with reset button and switch to change-over to 2nd sensitivity*

5.7.2 Application of TITANUS® with *AlgoRex*® line modules

TITANUS® can be connected to the *AlgoRex*®-smoke detection system through specific line modules (AnalogPLUS® or interactive). The installation of max three line modules directly into the housing of TITANUS® is possible.

5.7.2.1 Installation of *AlgoRex*®-line modules in the TITANUS®- housing

TITANUS® is delivered without line modules and corresponding mounting kit type KIT_MSLB. The modules are to be mounted in order to complete the device. First of all open the device according to chapter 5.2.

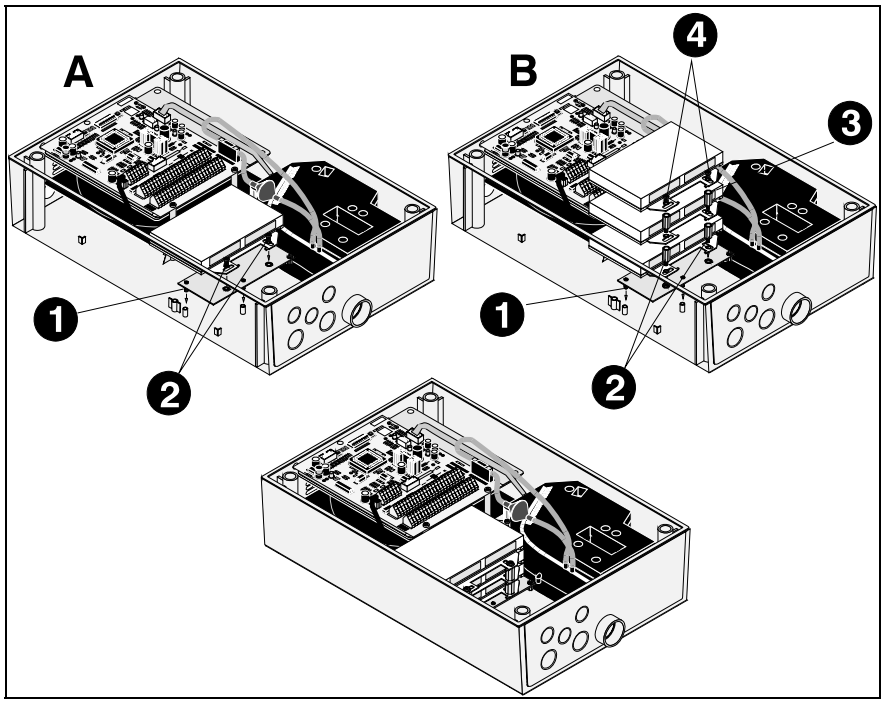

Fig. 5.14: Mounting of the line modules into TITANUS®

In order to mount the line modules follow the steps below.

A. Mounting of one module:

1. Fix the mounting sheet steel by means of the two included sheet metal screws at the bottom of the housing.
2. Place the module on the insert nuts of the mounting sheet steel and fix it by means of the two included M4x6-tallow-drop screws and the plain washers.

B. Mounting of up to three modules:

1. Fix the mounting sheet steel by means of the two included sheet metal screws at the bottom of the housing.
2. Place the module on the insert nuts of the mounting sheet steel and fix it by means of the two distance bolts and the plain washers.
3. Place the second module exactly above the first module and attach it...
   - 3a ... by means of the two included M4x6-tallow-drop screws and the plain washers if you do not want to use a third module.
   - 3b ... by means of two distance bolts and the plain washers if you want to use a third module.
4. If required place the third module exactly above the second module and attach it by means of the two included M4x6-tallow-drop screws and the plain washers.

5.7.2.2 TITANUS® and AnalogPLUS-Technology

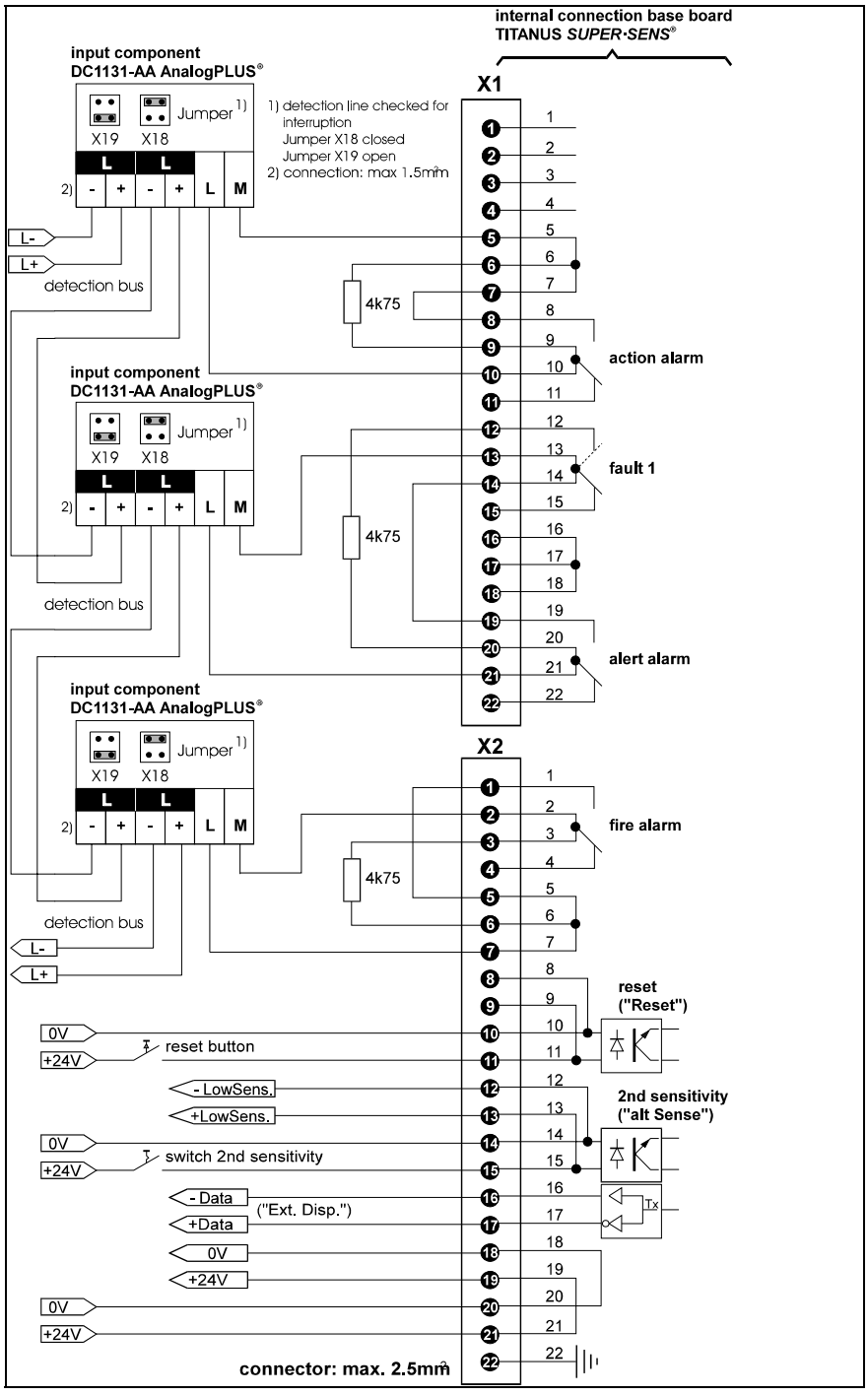

Fig. 5.15: Connection with AnalogPlus-technology

INSTRUCTION

Pay attention to the installation instructions delivered together with each line module.

5.7.2.3 TITANUS® and interactive Technology

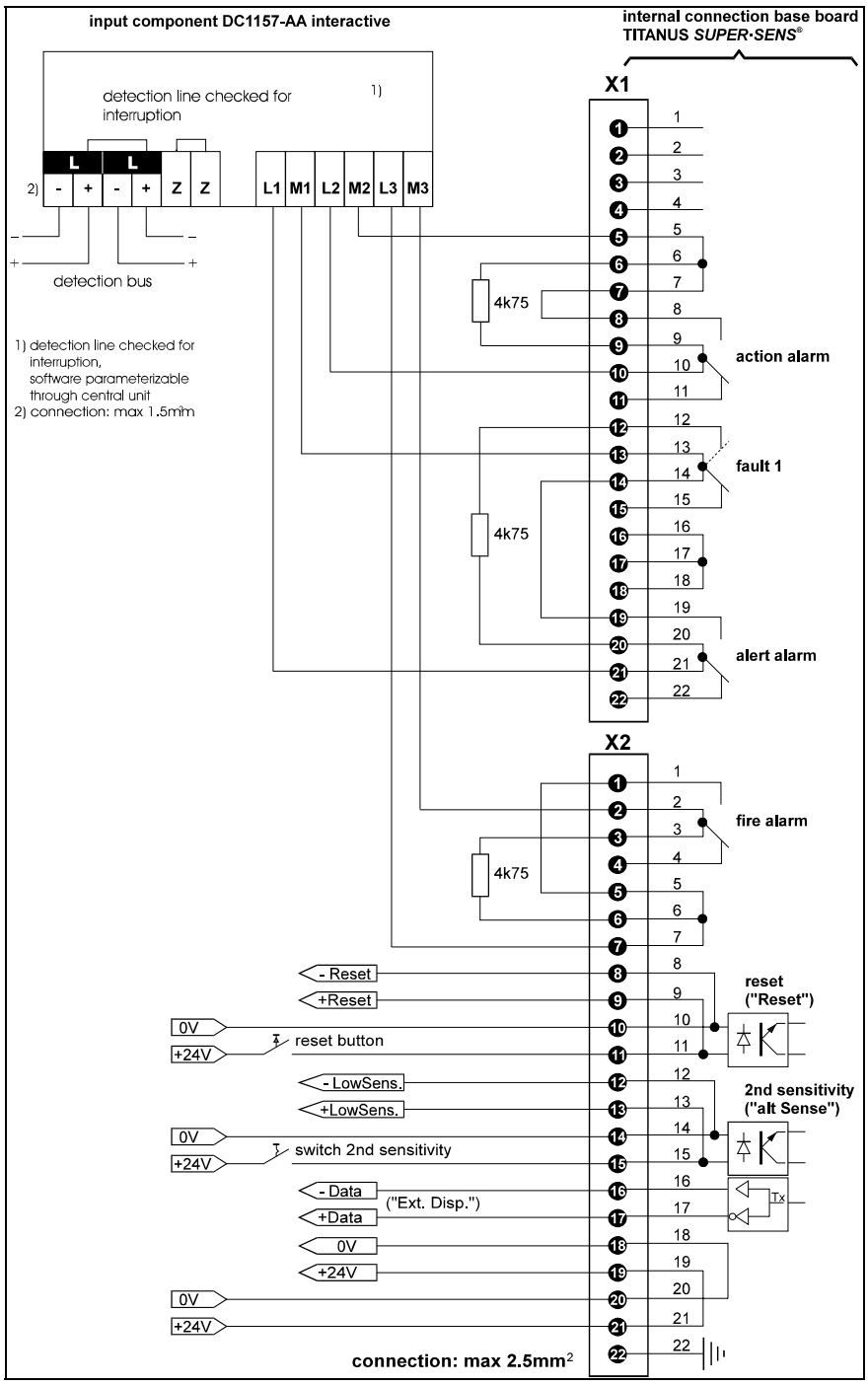

Fig. 5.16: Connection with interactive technology

INSTRUCTION

Pay attention to the installation instructions delivered together with each line module.

5.8 Application TITANUS® and SigmaSys-Technology

The use of the Siemens SigmaSys-technology in TITANUS® requires the installation of the contact coupler SPF 5300 into the air sampling smoke detection system.

The installation of this coupler is necessary in order to integrate alarm and fault messages into the detection loop.

The contact coupler SPF 5300 is delivered by Siemens AG

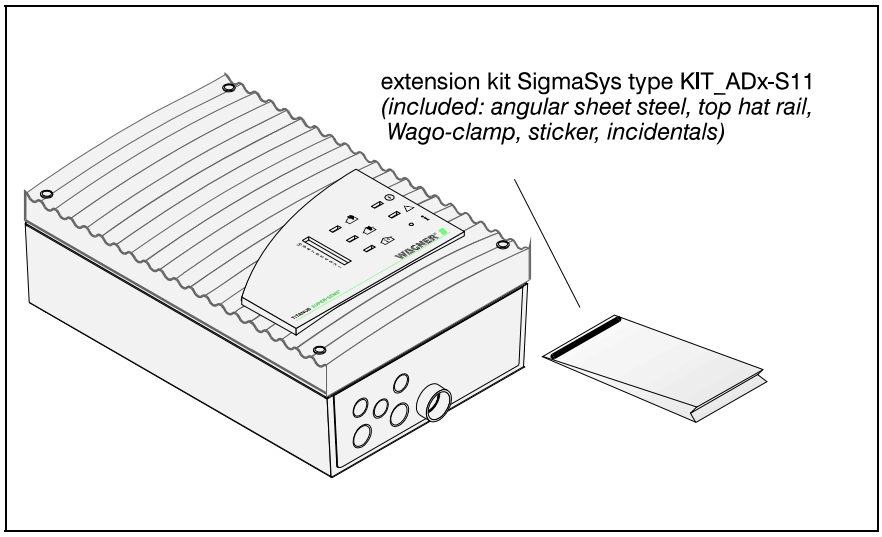

Fig. 5.17: TITANUS® *with extension kit for SigmaSys*

TITANUS® is delivered without contact coupler and extension kit. In order to complete the device the contact coupler is to be installed (refer to chapter 5.8.1).

5.8.1 Mounting of the contact coupler SPF 5300 for the extension

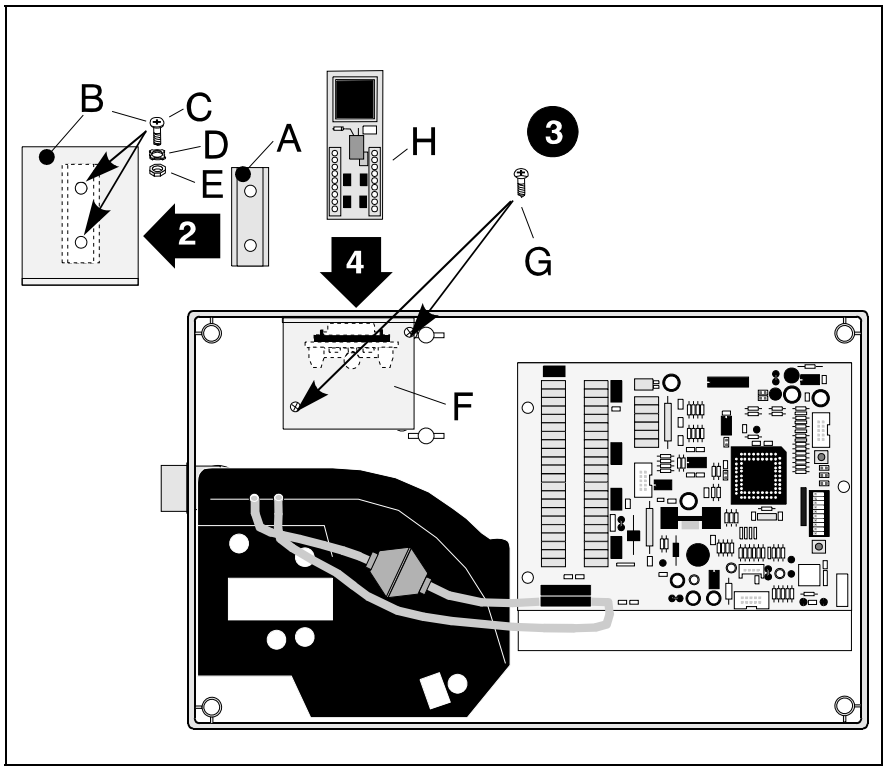

Fig. 5.18: Mounting of the contact coupler SPF 5300

Mounting in TITANUS®

In order to install the contact coupler SPF 5300 into the air sampling smoke detection system TITANUS® follow the steps below:

1. Open the device according to chapter 5.2.
2. Screw the top hat rail (A) onto the support angle (B). Use 2 flat head screws (C) M3x6, 2 tooth lock washers (D) and 2 hexagon nuts (E) M3.
3. Screw the support angle and the top hat rail (F) into the air sampling system. Use the 2 self-cutting screws (G).
4. Lock the SigmaSys-contact coupler SPF 5300 (H) edgewise on the top hat rail.
5. Connect the contact coupler (H) to TITANUS® according to the connection plan (refer to chapter 5.8.2).

5.8.2 Electrical Connection

The contact coupler is connected via the terminal blocks X1/ X2 on the connection board of TITANUS® and via the terminal block of the contact coupler SPF 5300. Pay attention to the permitted cable cross sections of the corresponding screw joint and the permitted wire cross sections of the terminals (refer to chapter 3 "Technical Data").

TITANUS® with Contact Coupler

Connection of TITANUS® and contact coupler SPF 5300

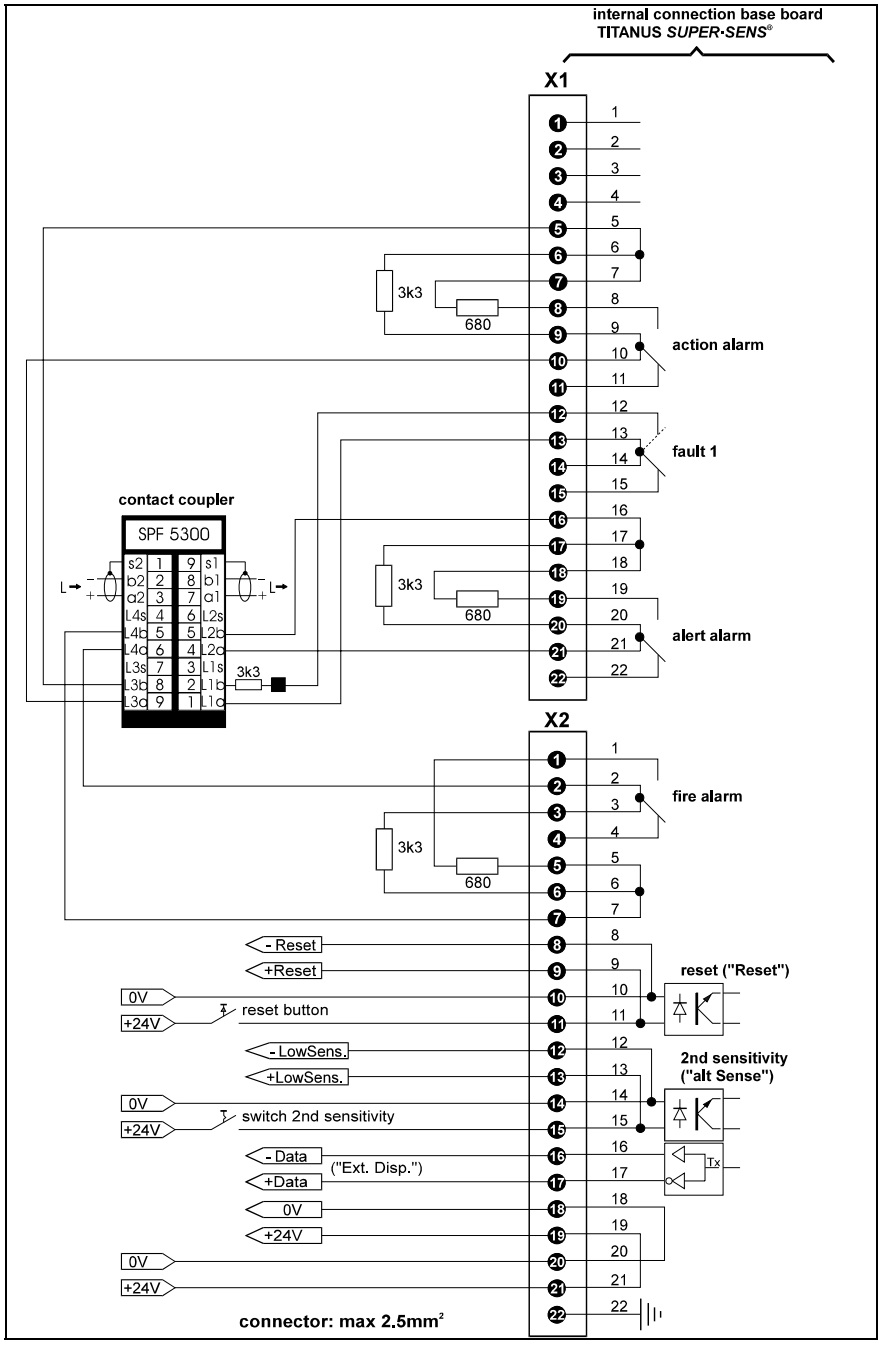

Fig. 5.19: Connection with contact coupler SPF 5300 and TITANUS®

5.9 TITANUS® in the network system

As an option several TITANUS® can be connected to form a network. This network system permits the operator to monitor the states of all connected TITANUS®. The courses of the smoke level, the air flow values or the alarm and fault states e.g. are transmitted via the bus system.

For the operation of TITANUS® in the network a special PC-software and a network board are necessary which are both not included.

5.9.1 Installation network board in TITANUS®

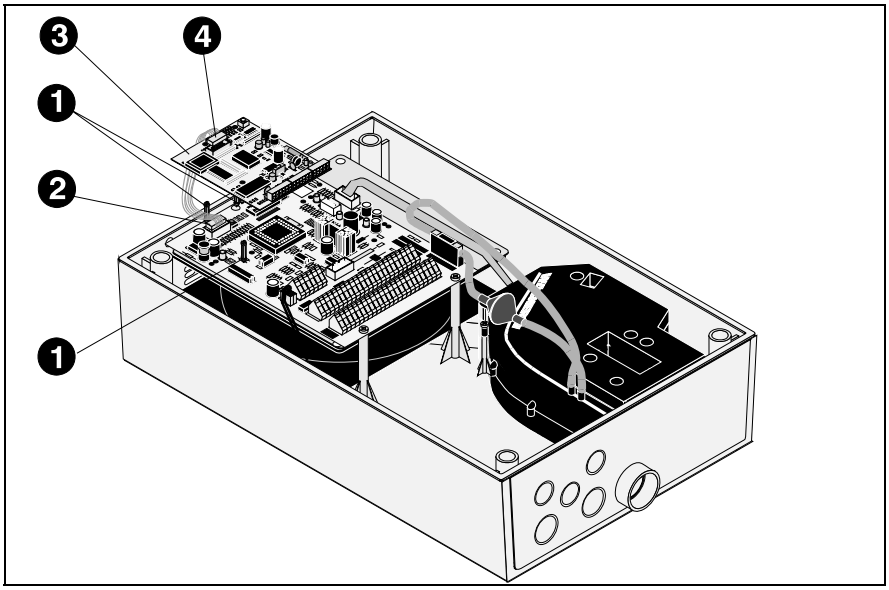

Fig. 5.20: Installation network board in TITANUS®

In order to install the network board open the air sampling smoke detection system according to chapter 5.2. Then, follow the steps below:

1. Lock the three plastic distance pins in the prepared drill holes of the TITANUS® -base board.
2. Attach the 10-pole connection cable to plug X5 (SCI) of the TITANUS®-base board.
3. Lock the network board in the three plastic distance pins.
4. Attach the 10-pole connection cable with plug X2 of the network board.

5.9.2 Connecting the network module

The network module connects the bus system with TITANUS®. Fig. 5.23 shows the electronic connections which must be carried out.

INSTRUCTION

To operate TITANUS® within the network, further data about the bus system and PC software are required.

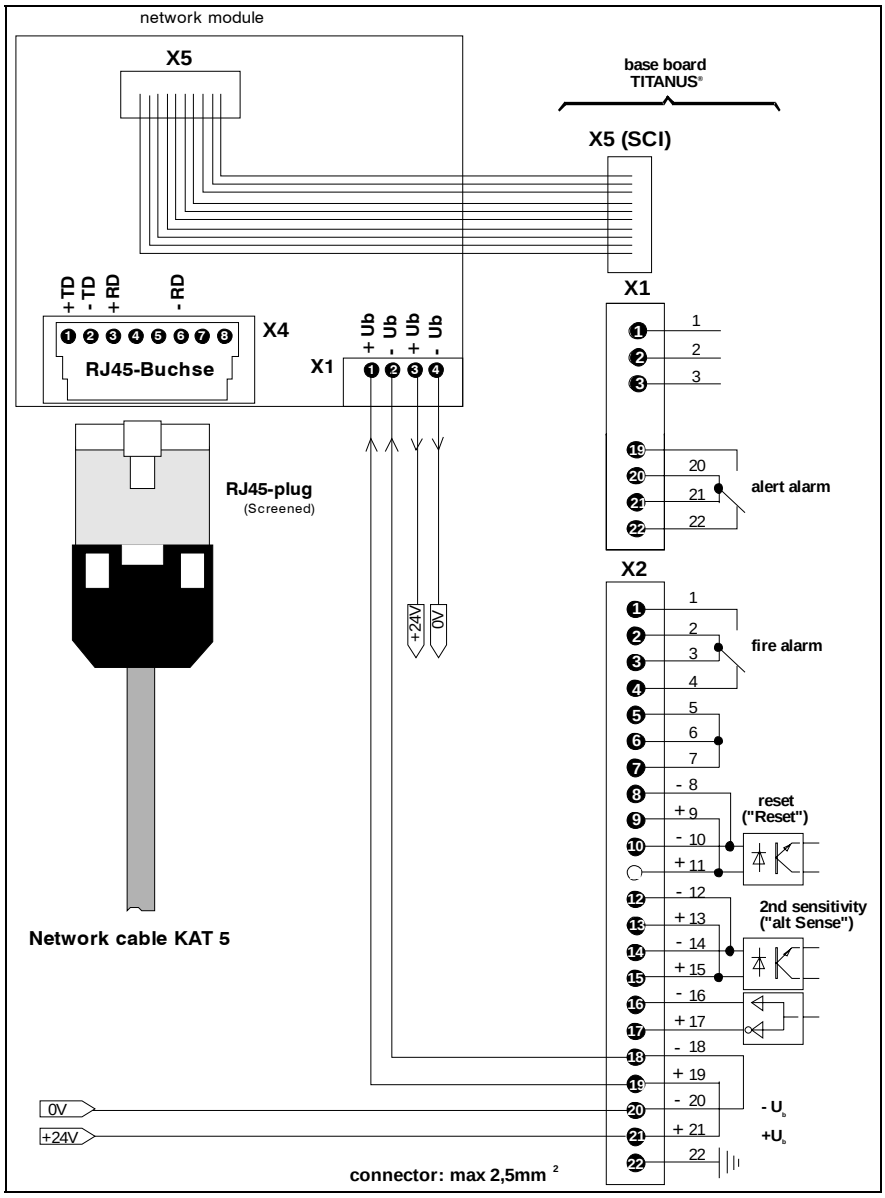

Fig. 5.21: Connecting the network board

5.10 Remote display units

5.10.1 Connection of the remote display unit to TITANUS®

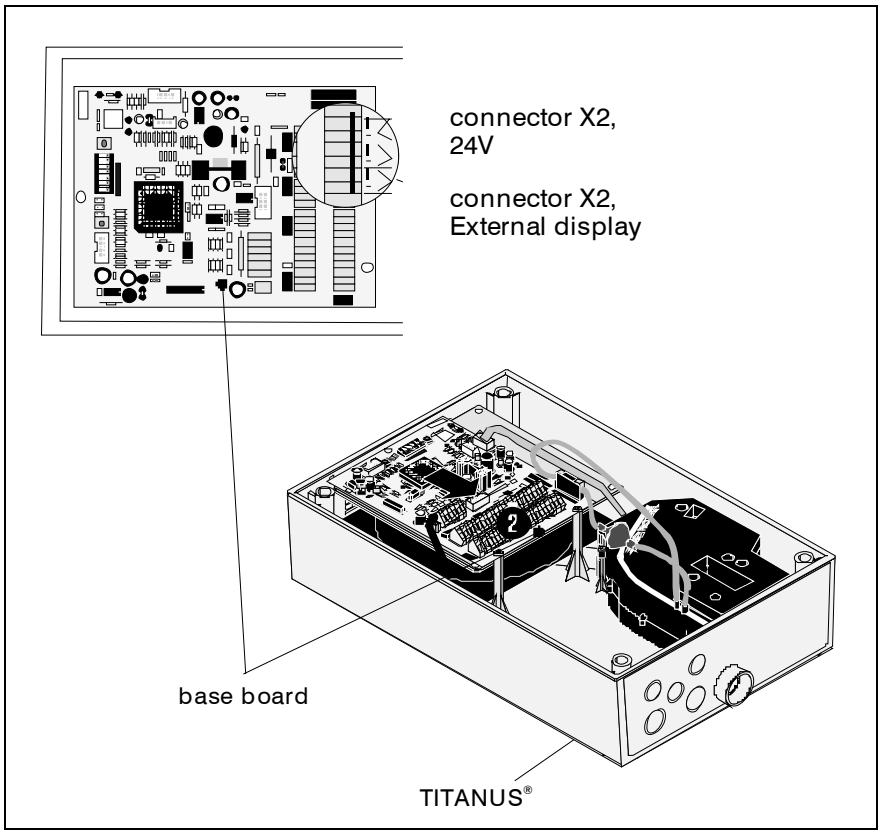

Fig. 5.22: Connection remote display to TITANUS®

In order to install the remote display follow the steps below (refer to Fig. 5.22):

1. Loosen the four screws on the housing lid TITANUS® and lift it carefully.
2. Pull the cable of the display board from the base board. Now remove the housing lid.
3. Break through the cable entries and attach the plastic connection pieces PG11.
4. Pass the fire detection cable through the PG11-connection piece of TITANUS® and a ferrite ring.
5. Connect the remote display to 24V and to the terminal X2.
6. Attach the cable of the display board at the base board and close the housing lid.
7. Fix the housing lid by means of the four screws.

5.10.2 Remote display housing design

Application of the front film sheet

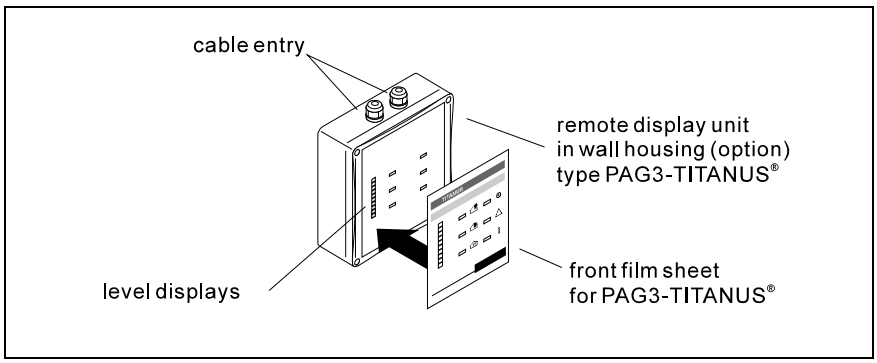

Fig. 5.23: Application of the front film sheet to the remote display

The lid of the remote display can be turned by 180°. This allows the cable entries to be placed either on the top or on the bottom (refer to Fig. 5.23).

Wall Mounting

The remote display in the housing is directly screwed to a wall with its bottom casing**.**

Mounting Material

Remote Display Unit	cylinder or flat-head screws – thread diameter: max. 4 mm – head diameter: 5 to 7 mm

Distances of the Holes

The drill hole distances are illustrated in the following figure (all dimensions mm).

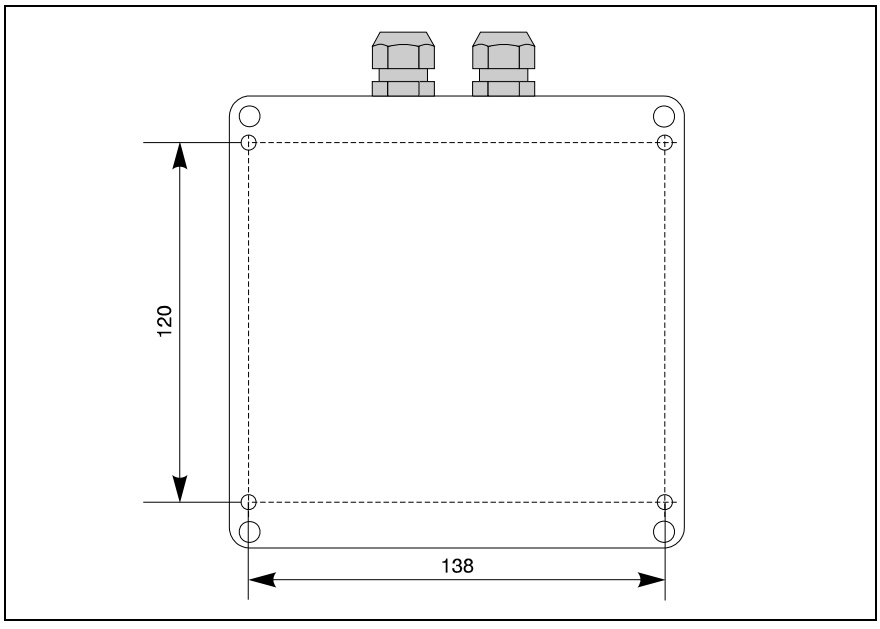

Fig. 5.24: Drill hole distances in the housing

5.10.3 Remote display unit for 19" sub-rack

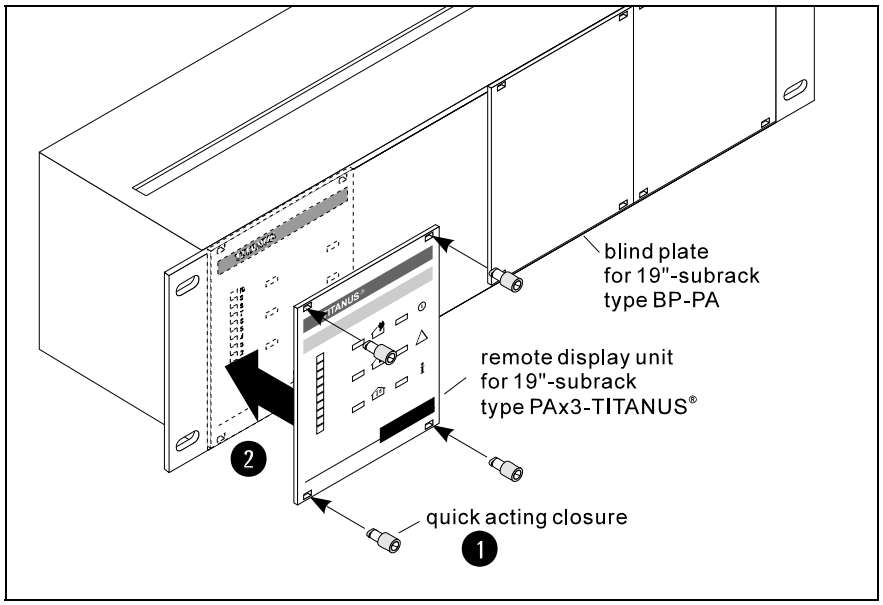

Fig. 5.25: Remote display and blind plate for 19"-subrack

1. To prepare the remote display and the blind plate for the installation lock the included quick acting closures into the rectangular perforations of the front plate.
2. Place the quick acting closures into the sub-rack and fix them in the sub-rack by a quarter turn.
3. For the electrical connection refer to Fig. 5.26.

5.10.4 Electrical Connection

The remote displays – mounted either in a housing or in a 19“-subrack – are connected via the terminal block X2 on the base board in TITANUS®. The power is either supplied by TITANUS® or, for longer distances, by external units. The necessary line calculations are similar to those for the TITANUS® as described in chapter 4.8 "Power Supply".

Pay attention to the allowed cable cross sections of the corresponding screw joints and the allowed wire cross sections of the terminals (refer to chapter 3 "Technical Data").

Remote Display

Connect the **current less** remote display to TITANUS® as follows:

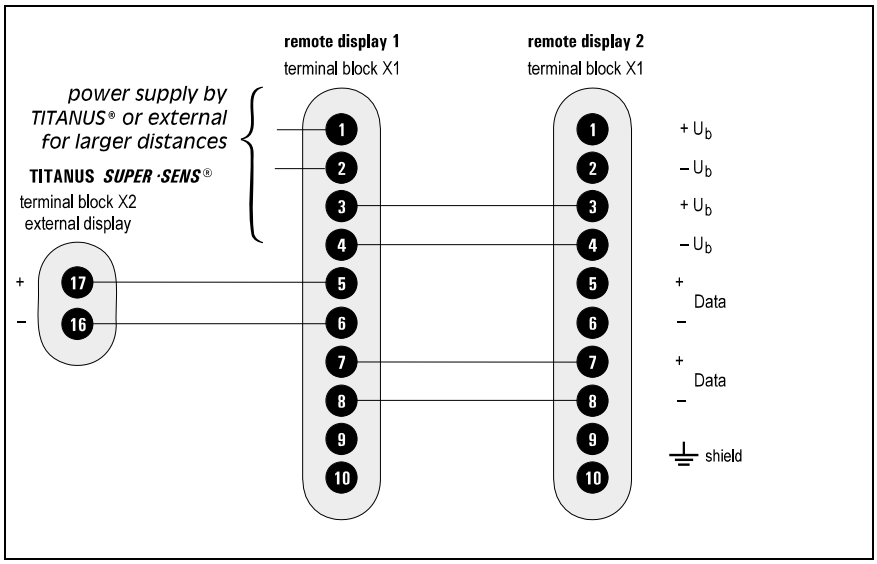

Fig. 5.26: Connection of the remote display to the TITANUS®

5.11 Data Log

The device can be tested by means of a diagnostic device. Besides the current air flow sensor data different status values can be read out, which helps to register modified operating conditions during service. In addition, air flow values can be directly read out by means of a laptop. A third possibility is to receive this data through a pre-fabricated cable (diagnostic interface) via a PC. The two wires (wh, br) of the pre-fabricated cable are connected to the terminals X2.16 and X2.17 of TITANUS® or to the terminals X1.7 and X1.8 ("+ Data" und "- Data") of the remote display unit (refer to Fig. 5.27). The Sub-D-plug with 9 poles is linked to the COM-Port (COM1 or COM2) of the PC and the diagnostic software is started.

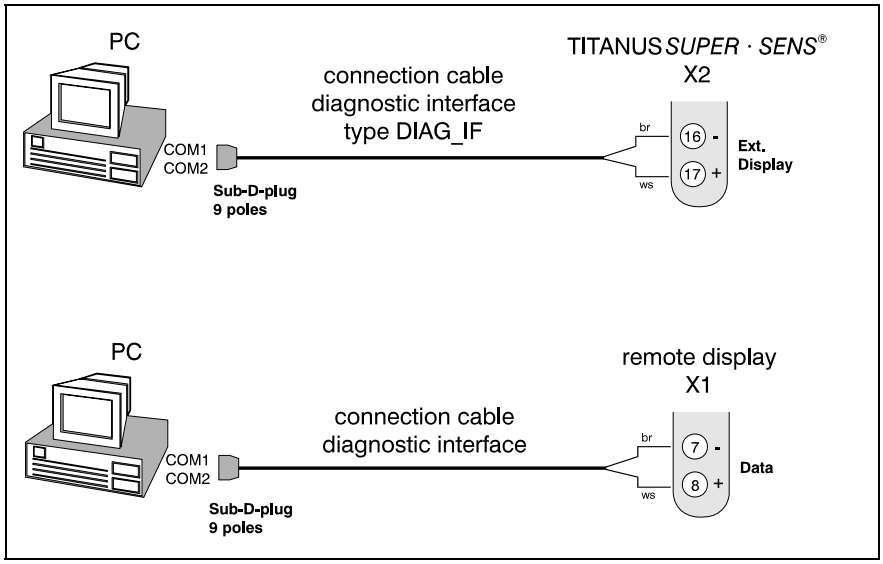

Fig. 5.27: PC-connection via the diagnostic interface

Via the terminal block X4 on the base board air flow and smoke level values of TITANUS® can be recorded by means of the line recorder (refer to Fig. 5.28).

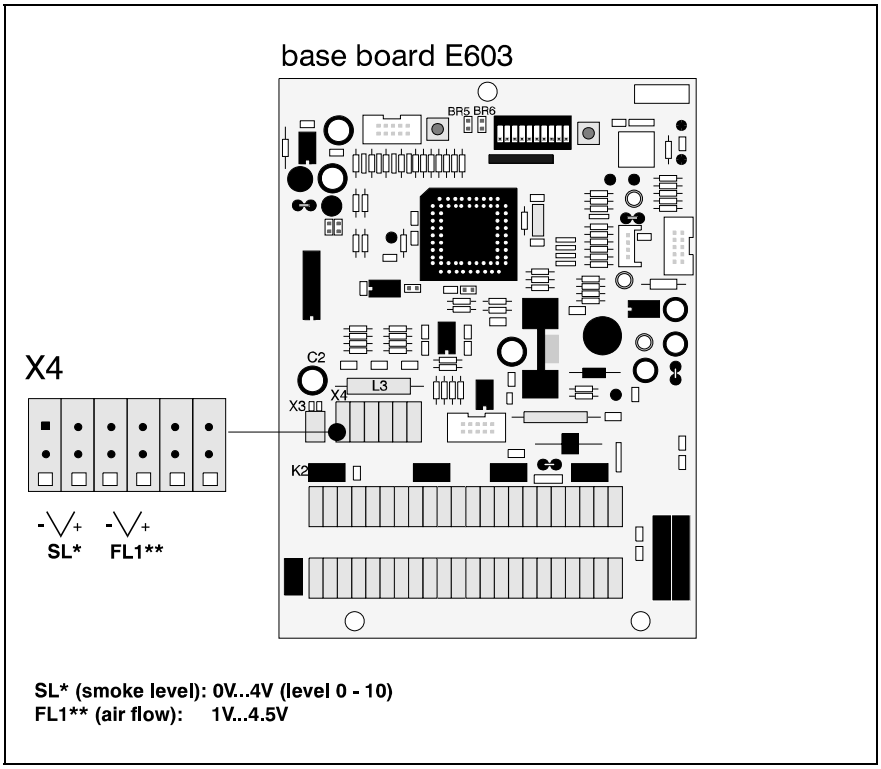

Fig. 5.28: Connection of the line recorder to the base board

INSTRUCTION

The bridge BR5 has to be open in order to record data!

6 Installation of the pipe system

The pipes 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	**PVC**
air sampling pipe	25 mm	21,4 mm	21,2 mm

The following pipes and related fittings are to be used for pipe systems with long pipe intake line (see also Chapter 4.3.3 “Project planning with long pipe intake line”):

	external diameter	**internal diameter**	
		ABS	**PVC**
air sampling pipe	32 mm	28 mm	28,4 mm
air sampling pipe	40 mm	35 mm	36,2 mm

ATTENTION

Take note of the temperature range specified in the “Technical data” chapter under “3.3 Pipe system” when configuring the pipe system.

Installation instructions

The pipe system must be designed according to the requirements of the project and the pipe design guidelines (see chapter 4 "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 38mm saw

ATTENTION

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[1].

INSTRUCTION

Arcs should be used instead of elbows. If there are too many direction changes, an air flow fault can occur in TITANUS® and detection time can be affected.

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 pipes clips should be no more than 80cm. Reduce the space between clips to no more than 30cm if there are high temperature variations.

[1] An arc equals a straight piece of pipe of 0.3m
an elbow equals a straight piece of pipe of 1.5m


INSTRUCTION

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 cap.


INSTRUCTION

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

6.1 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 = inear 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
δ_{PVC} = 0.08 mm/m°C
δ_{ABS} = 0.101 mm/m°C

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

Pipe clips

As a rule, plastic pipe clips, type 23, are used for the installation of pipe systems (∅ 25mm). 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. 6.1).

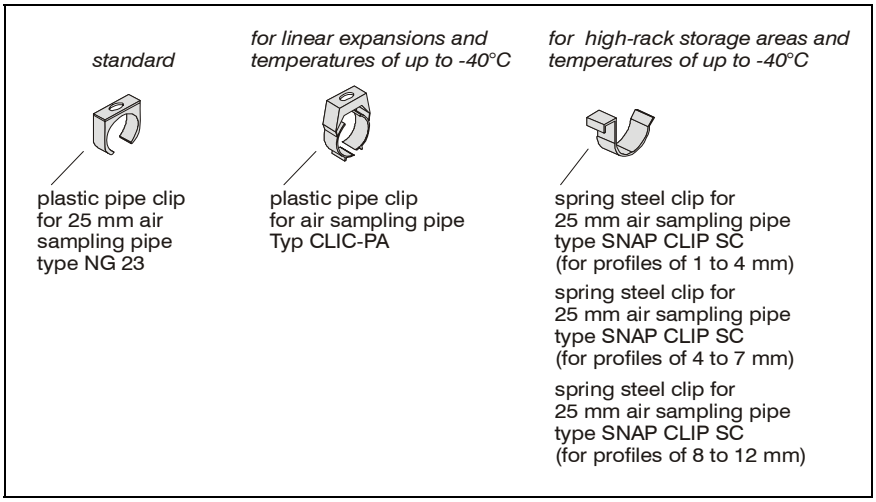

Fig. 6.1: Pipe clips

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

1. **Position 1 (first locking into place):**
   Fixes the pipe so that a linear expansion is possible (used in deep freeze areas, if necessary).
2. **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)

6.2 Patented air sampling points

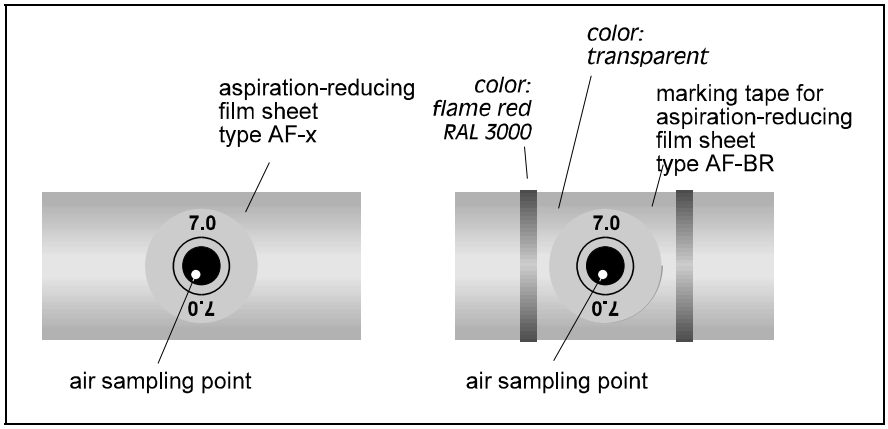

Fig. 6.2: Example of an air sampling point with aspiration-reducing film sheet

Air sampling point Design air sampling points (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 de-burr 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 fig. 6.3, ❶).
6. Prevent the film sheet from coming loose by sticking marking tape over it (see fig. T.3, ❷).

INSTRUCTION

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 adherend in order to keep it free from dust and fat.

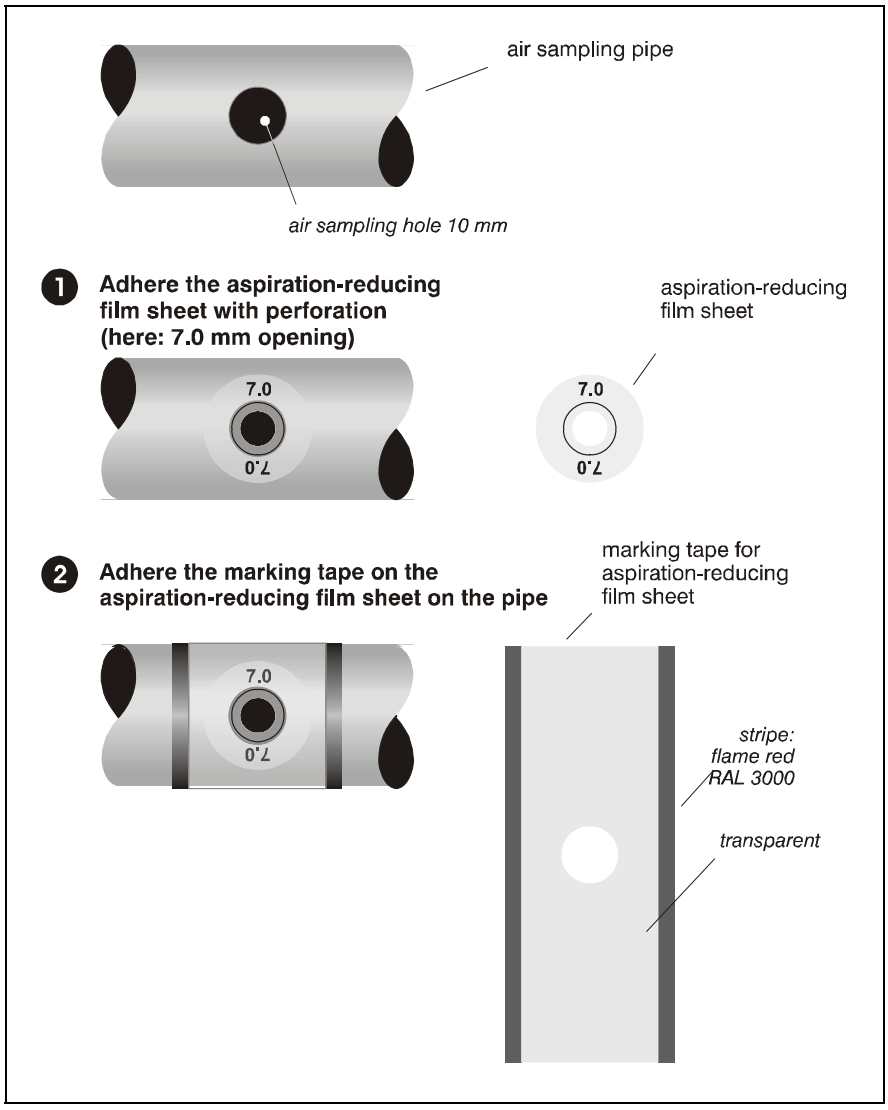

Fig. *6.3: Attaching the aspiration-reducing film sheet*

6.3 Ceiling lead through

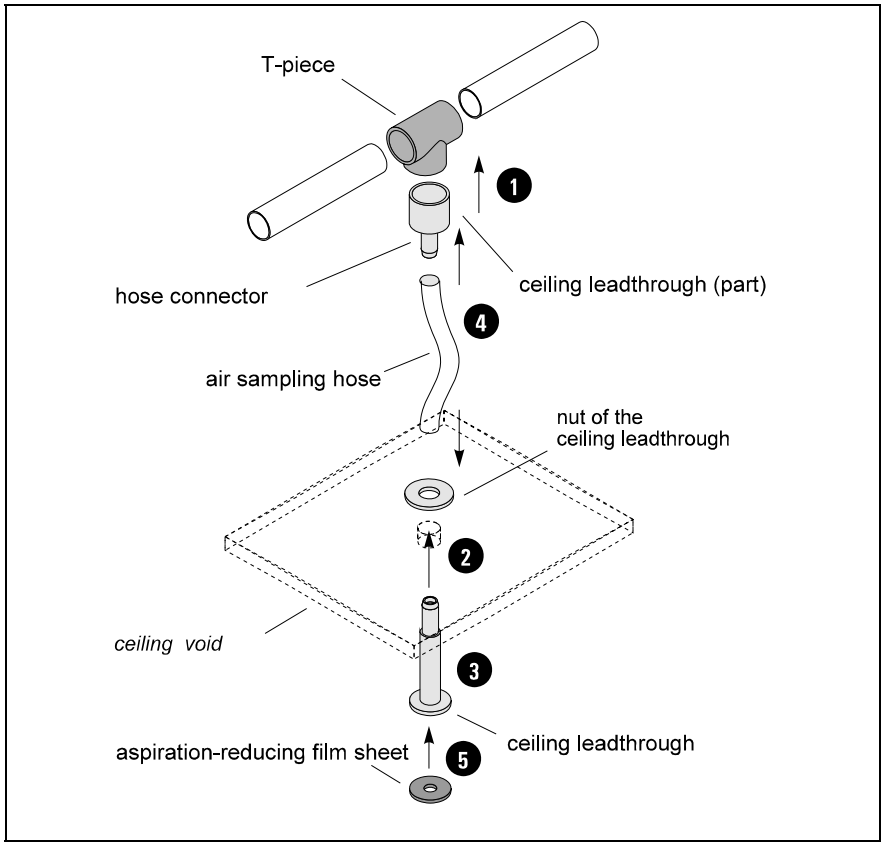

Fig. 6.4: To install the ceiling feed-through use the following steps:

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, RAL 9018) are used. On request, film sheets in special colours are produced.

INSTRUCTION

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.

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

6.4.1 Detection at air inlets/outlets

INSTRUCTION

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 fig. 6.5.

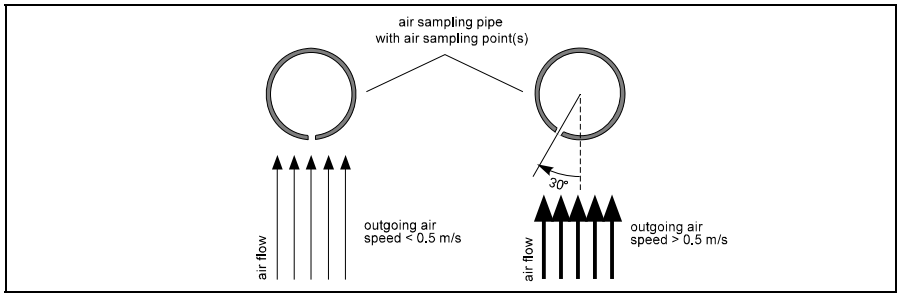

Fig. 6.5: Positioning of air sampling point, depending on air speed

6.4.2 Detection in bypass systems

For connection of air return refer to chapter 6.6 "Air Return".

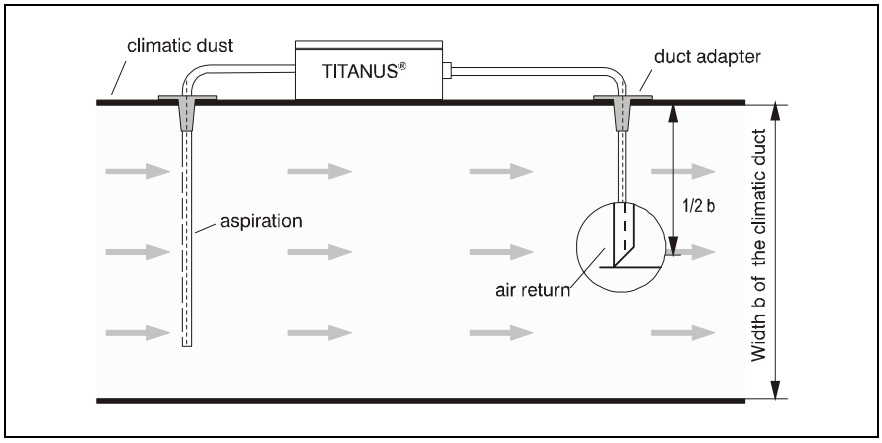

Fig. 6.6: Positioning of air return, example of a climatic duct (bypass)

For the pipe design of TITANUS® in these areas see chapter 4.3.4 “Pipe Design for Forced Air Flow“.

6.5 Filter

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

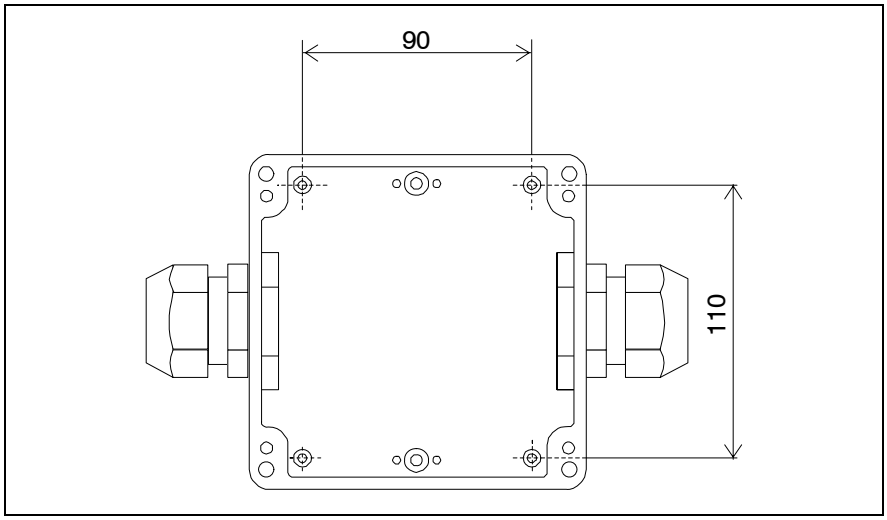

Fig. *6. 7: Spacing for bore holes on base of air filter housing*

Air Filter LF-AD-x

1. To fit the filter into the pipe system, use the two PG29 filter screw-joints.
2. Fix these screw-joints in the same way as the pipe adapter.
3. When installing the filter, 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.

Installation Material

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

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

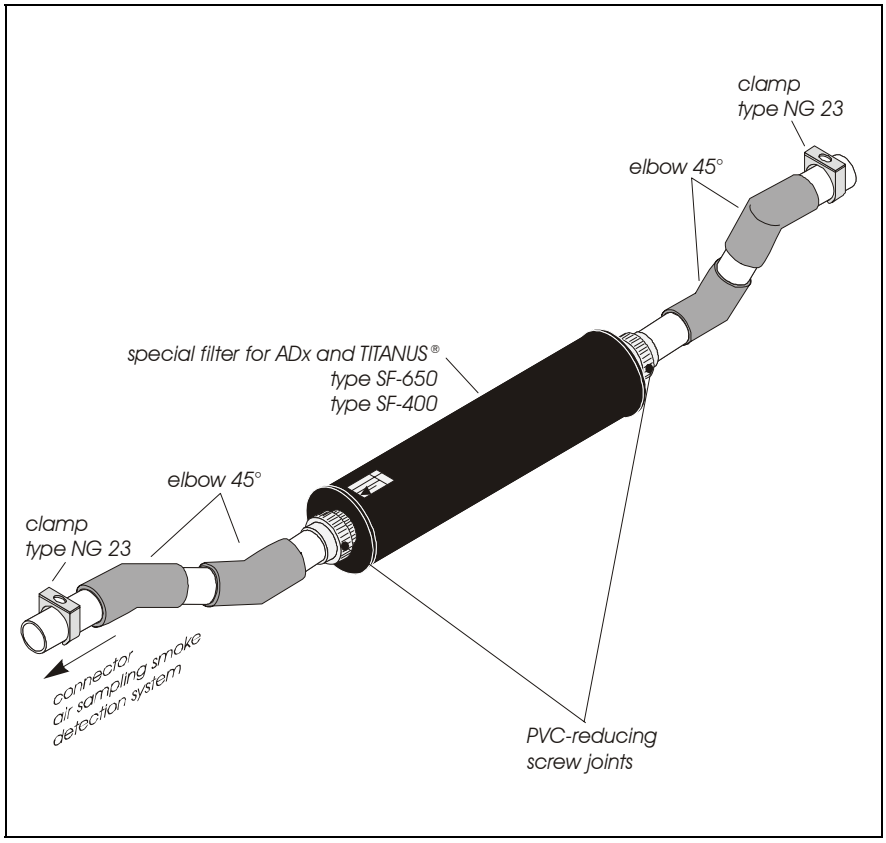

Fig. 6.8: Mounting of the special filter into the pipe system

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

Special Filter	PVC or ABS pipe fittings – 45° elbows

6.6 Air return

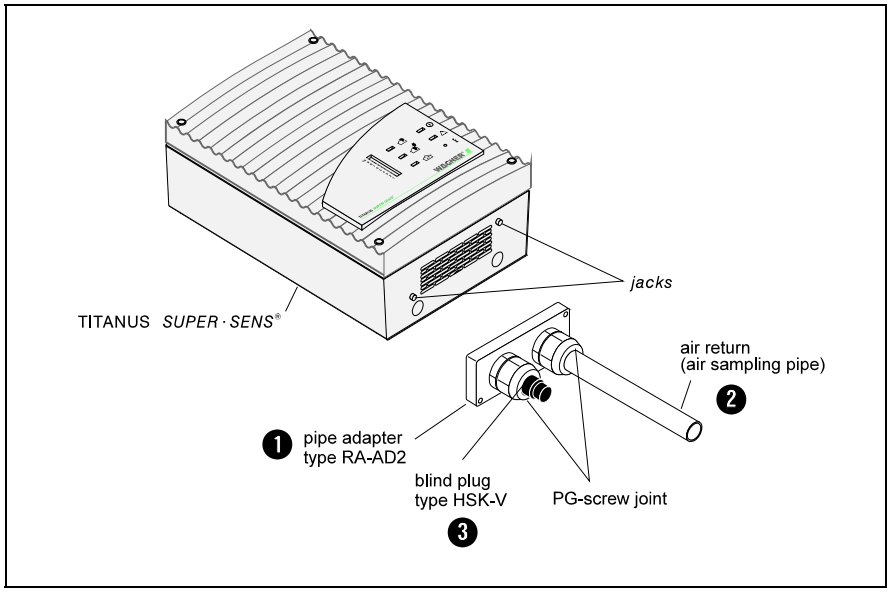

Fig. 6.9: Mounting of the pipe adapter

1. The pipe adapter for the air return is mounted onto the air outlet openings of TITANUS®. To fix the pipe adapter use the two jacks next to the air outlet openings.

   Mount the pipe adapter with sealing by means of the two screws.

2. Connect the air return (air sampling pipe).
   (like connection air sampling pipe to TITANUS®)

3. Close the second PG-screw joint through a blind plug.

6.7 Noise suppressor

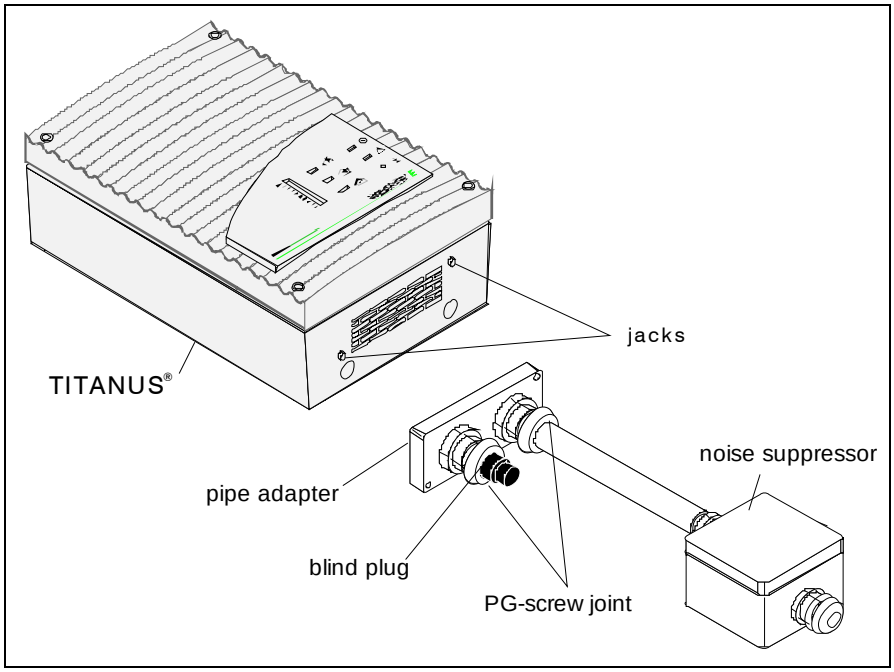

Fig. 6. 10: Mounting of noise suppressor

❶ The pipe adapter for the noise suppressor is mounted onto the air outlet openings of TITANUS®. To fix the pipe adapter use the two jacks next to the air outlet openings.

Mount the pipe adapter with sealing by means of the two screws.

❷ Pass the pipe (∅ 25mm) 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.

❸ Use the sound suppressor's PG29 screw connection in order to connect the noise suppressor to the pipe.

❹ When installing the absorbing duct, ensure that the direction of air flow is shown at the side of the housing's bottom part.

❺ Screw the bottom part of the housing directly to the wall.

❻ Close the second PG-screw joint through a blind plug.

Installation material

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

6.8 3-Way ball valve

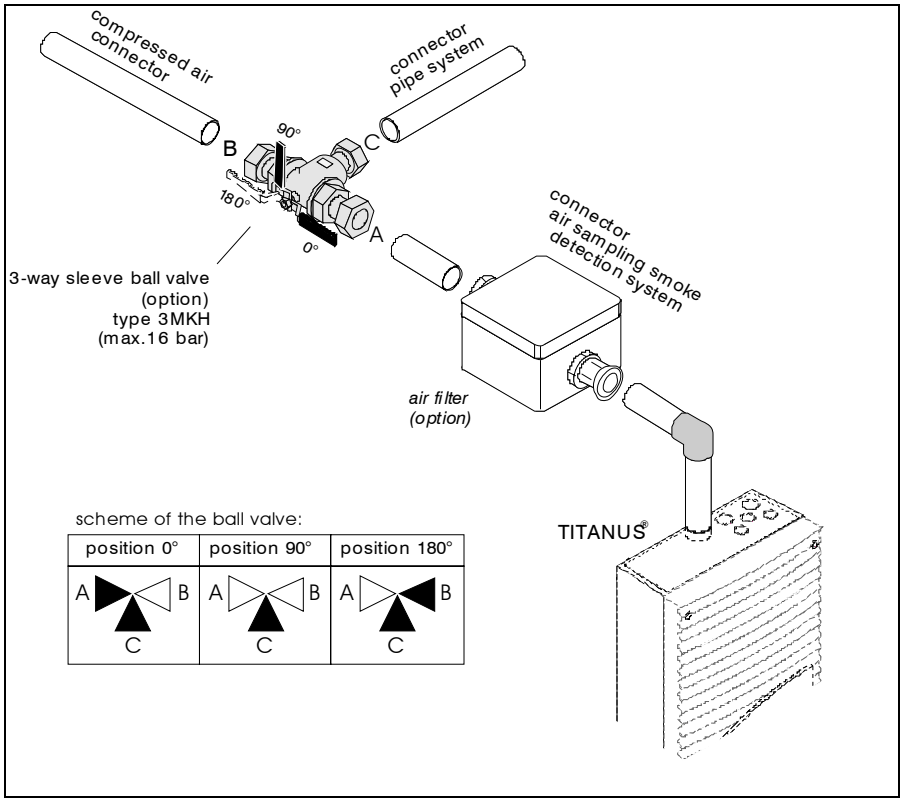

Fig. 6.11: Montage des 3-Wege-Kugelhahns

The ball valve is used for blowing through with compressed air (preferably) or pressed air[2]. Switching occurs between detection (position 0º) and blow-through (position 180º). Connect the ball valve to the pipe system via reducing screw-joints.

Connections

During installation, ensure that the correct connections are made (see diagram in fig. 6.11):

- connect the air sampling pipe system to C.
- connect TITANUS® to A or B and the compressed/pressed air to the remaining connection.

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

The following steps should be taken for the blow-through process:

1. Connect the compressed air supply (compressor or mobile blow-through device) for the blow-through of the pipes to the 3-way sleeve ball valve via the quick-acting coupling sleeve.
2. Separate the pipes to be blown through from the relevant device via the 3-way ball valve by re-setting the ball valve from operating position 0º to 180º (see fig. 6.11).
3. Manually blow the pipe system through for 10 seconds.
4. Set the ball valve to 90°. In this position the device is neither connected to the pipe system nor the pressed or compressed air supply. Wait for about 20 seconds so that the dust and dirt disturbed in the pipe system can settle and not be aspirated by the smoke detection system.
5. Re-connect the blown-through pipes with the device within the next 10 second by re-positioning the ball valve to 0º.

INSTRUCTION

A single blow-through process must be completed in 50 seconds. If a blow-through process is carried out within this time and the device re-connected with the pipe system, the fault alarm “air-flow sensor module fault” is not activated. If another blow-through process is necessary, the above process must be repeated **at the earliest after 120 seconds.**

6.8 Steam trap

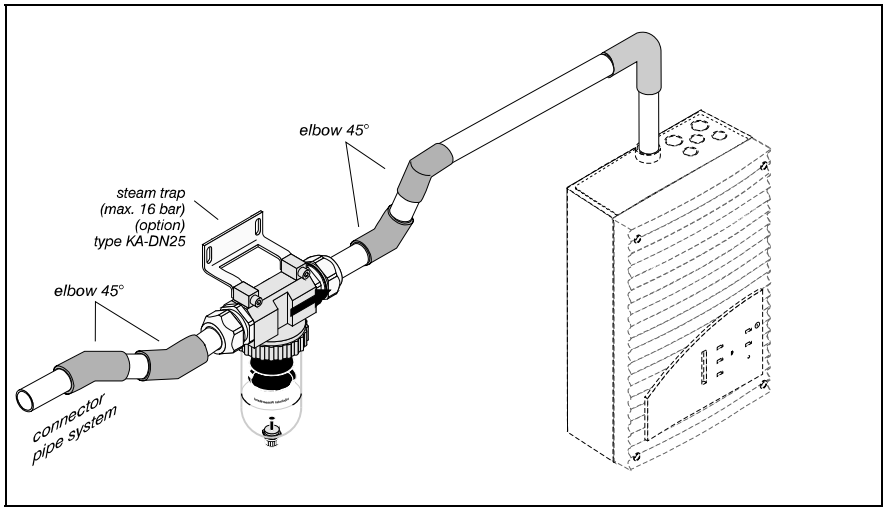

Fig. 6.12: Installation of steam trap to pipe system

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

INSTRUCTION

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.
1. Additionally, secure the steam trap with two screws and the support.

6.9 Test adapter

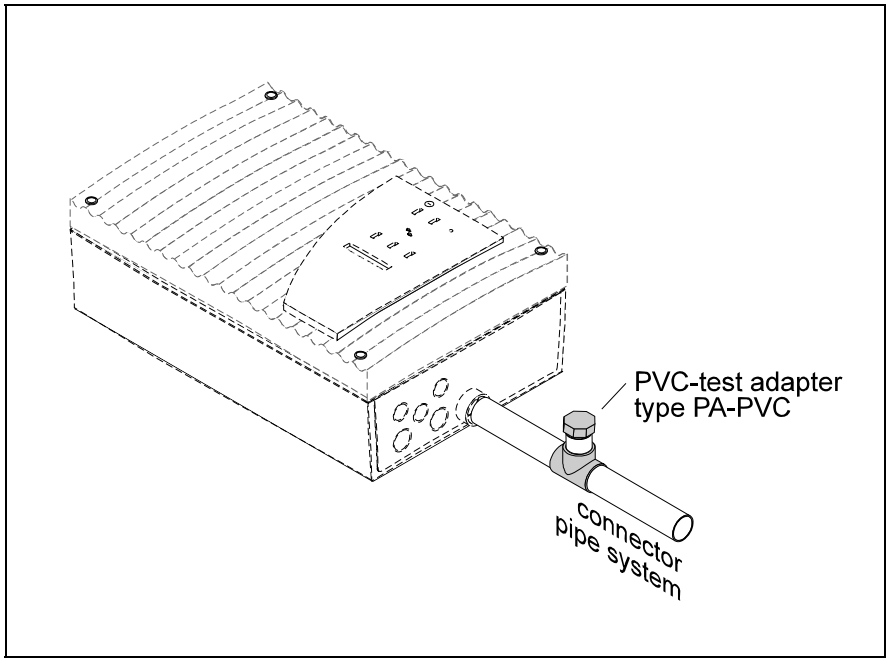

Fig. 6.13: Mounting of the test adapter at the pipe system

The test adapter is glued into the pipe system close to the air sampling system. It must always be closed during normal operation and is only opened for repair and maintenance in order to introduce test gas or smoke.

ATTENTION

After testing the detector module in the smoke detection system and the alarm relay, the test adapter must be closed again in order to avoid a possible air flow fault!

7 Commissioning

INSTRUCTION

For a later verification of the air flow value register the commissioning temperature, air pressure and height above sea level in the commissioning protocol.

Check of Settings

Before the commissioning check the settings of TITANUS® (chapter 5.3 "Settings"). Then, connect TITANUS® to the power supply.

INSTRUCTION

After max. 4 minutes the detector head of TITANUS® is ready for operation.

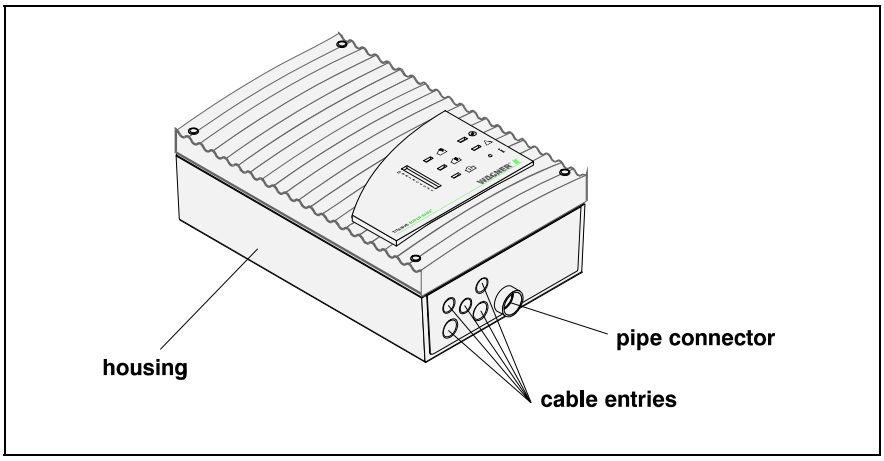

Fig. 7.1: Check for tightness

For the commissioning of TITANUS *SUPER · SENS*® install the complete pipe system and connect it.

Check

Verify if...

1. the pipe system is correctly attached to the pipe connector of TITANUS®.
2. all pipe fittings are glued and the pipe system is airtight.
3. the air sampling points are fitted with the correct aspiration-reducing film sheets.

After the adjustment of the air flow sensor (chapter 7.1 "Adjustment Air Flow Sensor") modifications are not allowed anymore. If modifications are effected later on the air flow sensor is to be re-adjusted.

7.1 Adjustment air flow sensor

INSTRUCTION

In order to adjust TITANUS® correctly to the pipe system, the device must be in operation for at least 30 minutes.

Adjustment Types

- The air flow sensor adjustment depends on the current air pressure (refer to chapter 7.1.1 "Adjustment Dependent on the Air Pressure"). Refer to the air pressure adjustment charts in the appendix.
- The adjustment can be independent of the current air pressure (refer to chapter 7.1.2 "Adjustment Independent of the Air Pressure").

In any case the adjustment type is to be written down in the commissioning protocol in order to judge the air flow sensor value correctly when the system is maintained.

7.1.1 Adjustment dependent on the air pressure

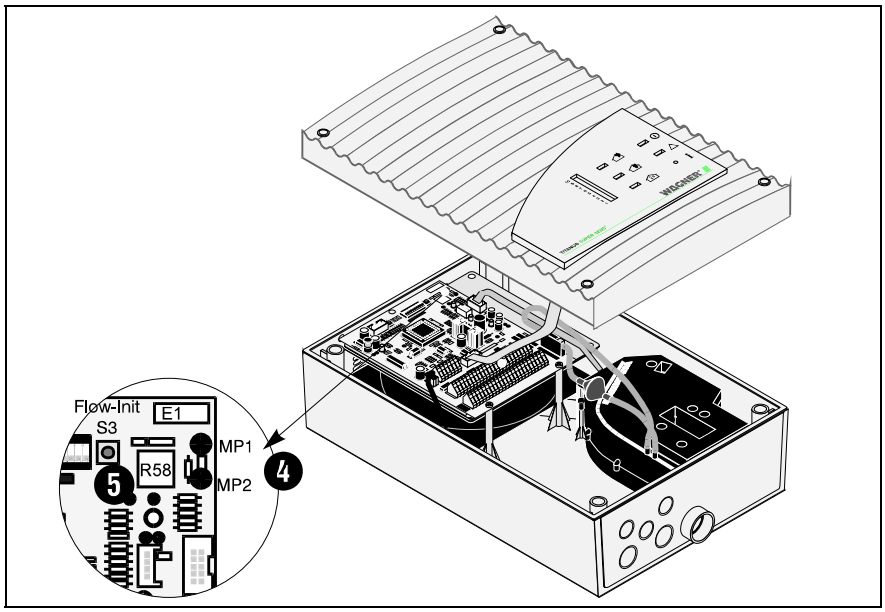

Fig. 7.2: Adjustment dependent on the air pressure of the air flow sensor of TITANUS®

For the adjustment dependent on the air pressure of the air flow sensor a barometer[1] is necessary. Follow the steps below:

1. Determine the height above sea level of the mounting location of the air sampling smoke detection system and register the value in the commissioning protocol.
2. Measure the air pressure by means of the pocket barometer and register the value in the commissioning protocol.
3. Determine the adjustment value for the air flow sensor according to the air pressure adjustment charts (refer to appendix) and register the value in the commissioning protocol. Pay attention that the adjustment chart corresponds to the project planning of the pipe system.
4. Connect the measuring device to the test jacks MP1 (+), MP2 (-) (refer to Fig. 7.2). Pay attention to the polarity. Choose the "V-DC"-range of the measuring device. The standard voltage at the measuring points is 2.5 V.
5. Set the trimming potentiometer R58 to the determined value of the air pressure adjustment chart by means of a small screw driver. A tolerance of ± 100 mV is allowed.
6. Proceed according to chapter 7.1.2 "Adjustment Independent of the Air Pressure".

[1] Recommendation: digital precision pocket barometer GPB 1300, Greisinger electronic GmbH

7.1.2 Adjustment independent of the air pressure

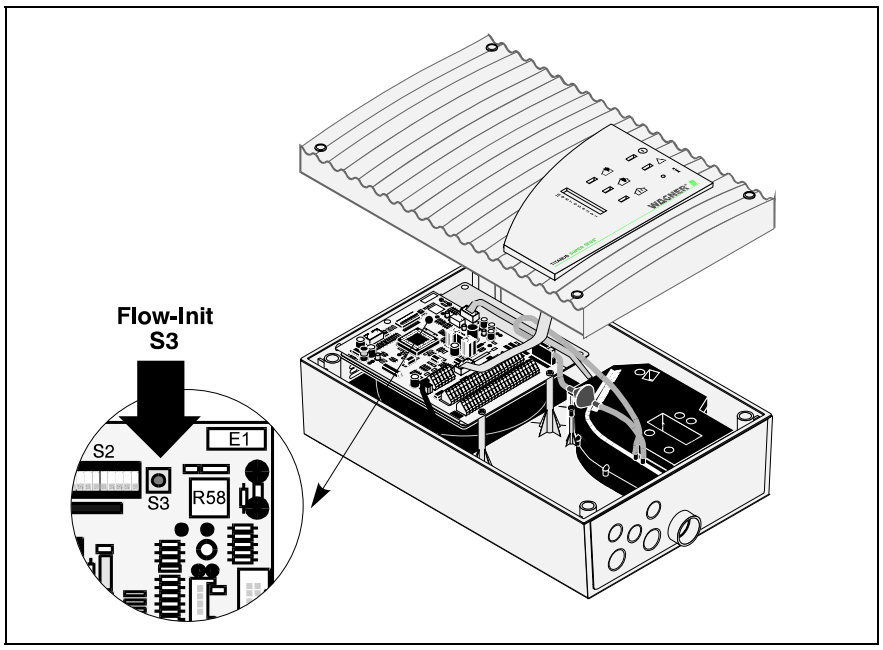

Fig. 7.3: Adjustment independent of the air pressure of the air flow sensor of TITANUS®

In order to adjust the air flow sensor independently of the air pressure press the Flow-Init-button (S3) on the base board of TITANUS® (refer to Fig. 7.3).

- After having pressed the button close the housing of TITANUS®.
- Fix the housing top by means of the screws.
- Verify if the housing lid is fixed tightly.

The learning phase of TITANUS® is about 5 minutes. During this phase the operating-LED flashes and changing of the air flow are not allowed. After the initialization the operating-LED lights permanently and the air flow sensor has determined its current value for the connected pipe system.

7.2 Detector head and alarm transmission

Trigger the alarm of the smoke detector and check the transmission to the central fire panel as follows:

1. Spray test aerosol either into the first air sampling point or into the test adapter of TITANUS®.
2. Follow the steps in the table.

Check to see if...	**If this is not the case...**
the air sampling smoke detection system displays an alarm.	1. verify that the display board is connected. 2. the air sampling system is damaged. 3. exchange the detector head.
the alarm signal is transmitted to the central fire panel and on the corresponding line.	1. check the transmission cables.

INSTRUCTION

Record all tested data in the inspection protocol.

7.3 Air Flow Monitoring

Pipe Fracture

Verify the detection of pipe fractures:

1. Loosen the connection between pipe and TITANUS® or open the test adapter.
2. Verify if the fault display of the air sampling smoke detection lights.
3. Check optionally the data of the air flow sensor by means of the diagnostic device and a PC or laptop.
4. Register the result in the commissioning protocol.

Blockage

Verify the detection of blockages:

1. Close the necessary number of air sampling points by means of adhesive tape according to the project planning of the air flow monitoring.
2. Verify if the fault display of the air sampling smoke detection system lights.
3. Check optionally the data of the air flow sensor by means of the diagnostic device and a PC or laptop.
1. Register the result in the commissioning protocol.

Trouble Shooting If faults in the air flow are not correctly detected by the device do the following:

Check to see if...

1. all air sampling points are free.
2. the pipe system has fractures or cracks.
3. all pipe connections are tight.
4. the ventilator is unblocked.
5. the correct aspiration-reducing film sheets have been used.

If no faults are detected the functionality of TITANUS® or the air flow sensor is checked by means of the testing pipe or through the diagnostic evaluation (refer to chapter 7.5 "Operational Check of TITANUS® ").

7.4 Fault signal transmission

INSTRUCTION

The following steps can only be effected 5 minutes after having triggered the air flow adjustment according to chapter 7.1 "Adjustment of the Air Flow Sensor".

1. Check the fault signal transmission.

Check the air flow monitoring (according to the following section) to see if the fault is still indicated at TITANUS® and, if necessary, at the central fire panel.

7.5 Operational check of TITANUS®

If it is not possible to adjust TITANUS® check the functionality by means of the testing pipe and a digital manometer or the diagnostic device. During this check TITANUS® is to be operated.

7.5.1 Preparation of the operational check

1. Set the switches on the base board (refer to Fig. 7.3) according to the following table:

Switch base board air flow monitoring

Switch S2			
Contact A (1)	Contact A (1)	Contact A (1)	Contact A (1)
off	on	off	off
delay period 0.5 min		activating threshold large	

Switch base board detector sensitivity

Switch S2			
Contact E (5)	Contact F (6)	Contact E (7)	Contact F (8)
on	off	off	on
alarm/delay period 10 s		response sensitivity (HA) 0.1%/m	

Switch base board fault signal

Switch S2 Contact J (10)
off
non-latched

2. Remove the pipe system from TITANUS®.

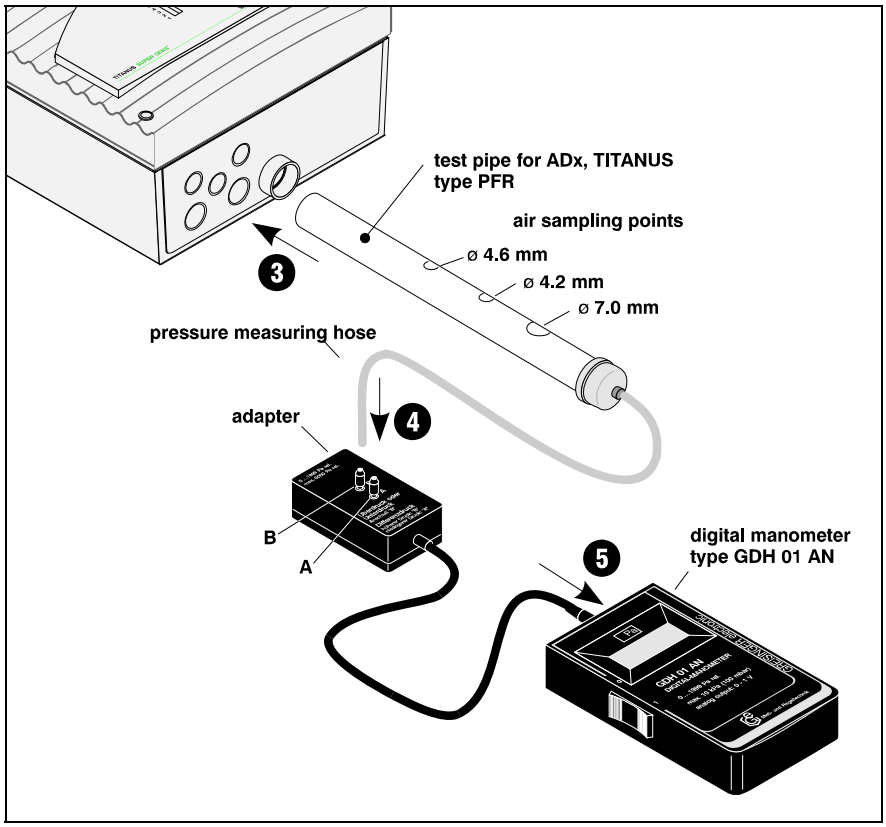

Fig. 7.4: Operational check of TITANUS®

3. Connect the test pipe.
4. Connect the pressure measuring hose to the adapter connector B.
5. Connect the 4-pole plug of the adapter to the digital manometer and switch it on.

7.5.2 Operational Check

The operational check can be effected with or without a digital manometer. In the following the complete check is described. If during the operational check the values vary from those given in the following TITANUS® or its air flow sensor are damaged.

1. Close all air sampling points of the test pipe by means of adhesive tape.
   After a short initiation period (approximately 20 s) the depression generated in TITANUS® is to be between 155 Pa und 190 Pa.
2. Unblock at each test pipe the 7.0 mm and the 4.2 mm-air sampling point.
   Press the Init-button (S3) on the base board and close the housing lid. The operating-LED flashes and the fault-LED has to extinguish.

3. Close the 4.2 mm-air sampling points of the test pipe by means of adhesive tape after the learning phase.
   After approximately 75 s the fault display of TITANUS® has to start flashing.
4. Open the 4.2 mm-air sampling points.
   The fault display of TITANUS® has to extinguish again.
5. Open the 4.6 mm-air sampling points at the testing pipe.
   After about 85 s the fault display of TITANUS® has to start flashing.
6. Close the 4.6 mm-air sampling points again.
   The fault display of TITANUS® has to extinguish again.

For the operational check the diagnostic device or the connection cable with the diagnostic interface can be used as an option. The following steps are to be considered:

Diagnostic device	**Connection cable with diagnostic interface**
1. The diagnostic device is connected to a PC[1] (COM1, COM2)	1. The connection cable is connected to a PC[1] (COM1, COM2)
2. The diagnostic program is started.	
3. The receiving-LED of the diagnostic device is put over the infrared-diagnostic LED of TITANUS® and is operated through pressing the ON-button.	3. The connection cable is connected to the terminals X 2.16 und X 2.17 with its remaining end (2 wires).
3a. The display of the diagnostic device is flashing every second as long as the device is put over the infrared-LED, which means as long as data are transmitted.	
4. The current data of TITANUS *SUPER · SENS* ® are visualized on the PC-screen.	

After a fault has been eliminated the settings of switch S1 are to be reset to the original state.

The commissioning is to be repeated from chapter 7.1 "Air Flow Sensor Adjustment" on.

[1] PC with serial interface and WIN 95

8 Maintenance

8.1 Visual Check

Check to see if

- the pipe system is mounted tightly, undamaged and easily accessible.
- the air sampling points of the pipe system are unblocked.
- the air sampling pipe and the connection cable are connected tightly.
- the device support is fastened properly – if installed.
- the air sampling smoke detection system is damaged-

8.2 Smoke Detector and Alarm Transmission

Proceed according to chapter 7.2 "Detector Head and Alarm Transmission". In addition, check the detector head through visual check for external dirt and, if necessary, exchange it. Pay attention to the drift display at the diagnostic device.

8.3 Pipe System

In areas where dust particles or icings may occur check the pipe system and the air sampling points for blockage. If necessary, blow-out the pipe system and the air sampling points by means of compressed air. Use prophylactic ally a transportable compressed air bottle (blowing-out system) or the installed manual blowing-out system.

ATTENTION

Before the pipe system is blown-out disconnect TITANUS® from the pipe system in order to avoid damaging the air flow sensor.

INSTRUCTION

In order to adjust TITANUS® correctly to the pipe system, the device must be in operation for at least 30 minutes.

8.4 Exchange of the Detector Head

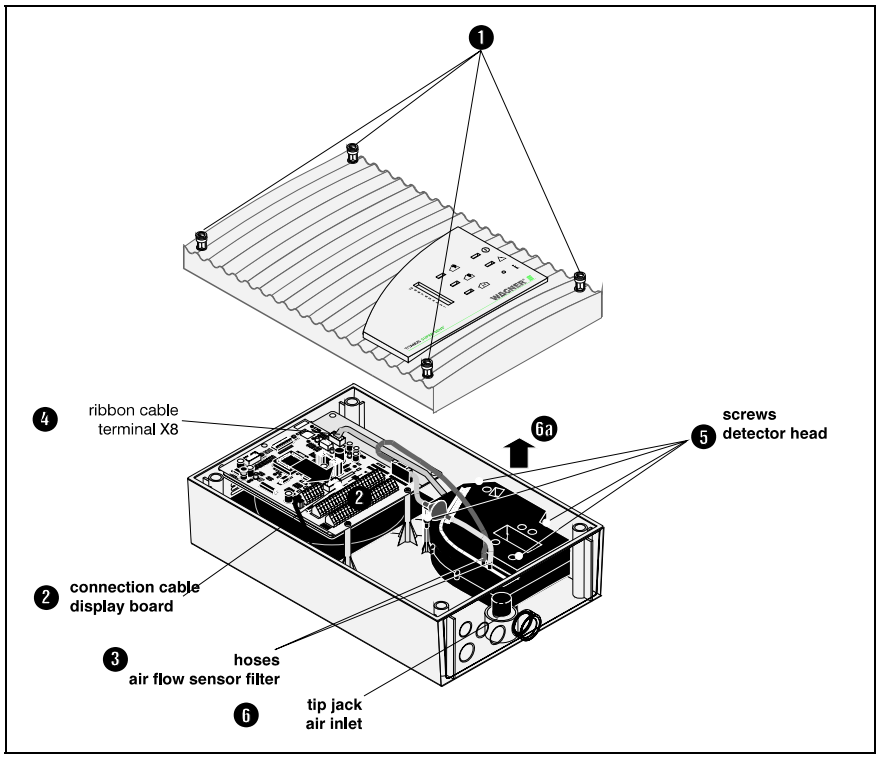

Fig. 8.1: Exchange of the detector head

1. Loosen the four screws on the housing lid of TITANUS® and lift it carefully.
2. Pull the connection cable of the display board off the base board. Now remove the housing lid.
3. Pull the two hoses of the air flow sensor filter off the detector head.
4. Loosen the ribbon cable X8.
5. Loosen the four screws of the detector head support.
6. Pull the detector head out of the tip jack of the air inlet and remove the head (6a).
7. Place the new detector head in the housing so that it is exactly attached to the tip jack of the air inlet.
8. Fix the four screws of the detector head support.
9. Attach the ribbon cable X8.
10. Fix the two hoses of the air flow sensor filter at the detector head.
11. Attach the cable of the display board to the base board.
12. Replace the housing lid and fix it by the four screws.

INSTRUCTION

In order to adjust TITANUS® correctly to the pipe system, the device must be in operation for at least 30 minutes.

8.5 Exchange of the air flow sensor filter

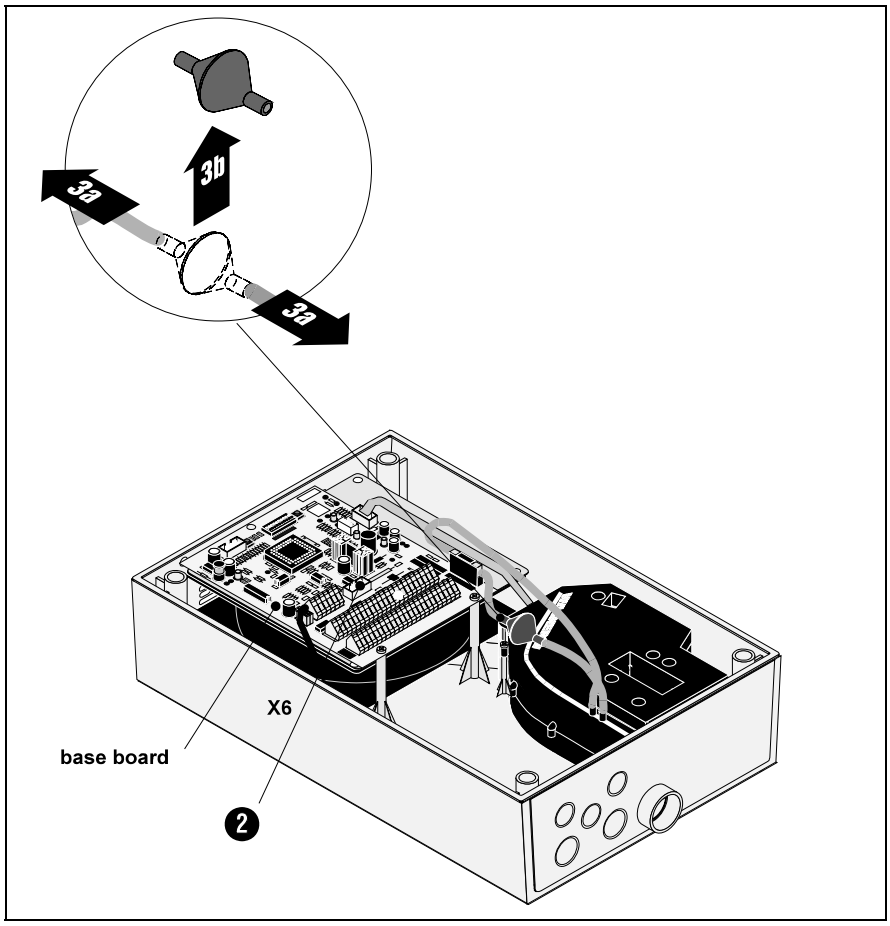

Fig. 8.2: Exchange of the air flow sensor filter

1. Open TITANUS® by loosening the four screws on the housing lid. Then open the lid carefully.
2. Detach the cable of the display board from the base board (X6). Now the lid can be removed.
3. Detach both hose ends from the air flow sensor filter 3a and take it out 3b.
4. Fix again both hose ends onto the new air flow sensor filter.
5. Fix the cable of the display board onto the base board.
6. Close the housing lid and fasten the four screws tightly.

ATTENTION

Avoid mechanical load on the air flow sensor filter!.

8.4 Changing the air filter LF-AD –x

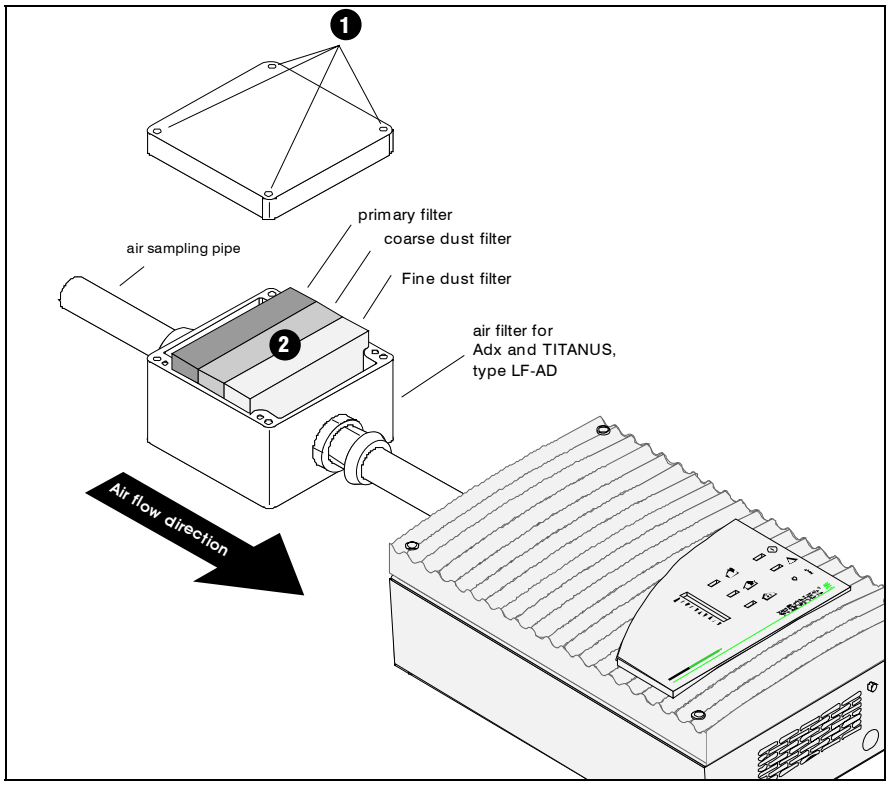

Fig. 8.3: change the filter inserts

To clean or change the filter inserts, carry out the following steps (see fig. 8.4):

1. Loosen the four screws and remove the housing lid.
2. Remove the filter inserts and check how soiled they are. The inserts can be cleaned if there is a small amount of soiling and must be replaced if soiling is heavy.
3. Carefully clean the inside of the housing from any dust. Replace the cleaned or replaced filter inserts in the correct sequence, which is shown on the instruction label of the housing floor.
4. Replace and screw down the housing lid.

TIP

In environments with a high level of fine-grade dust, three optional fine dust filters can be used in addition.

INSTRUCTION

Opening the housing lid of the air filter LF-AD-x causes an air flow fault in TITANUS®.

8.7 Changing special air filter SF-400/650

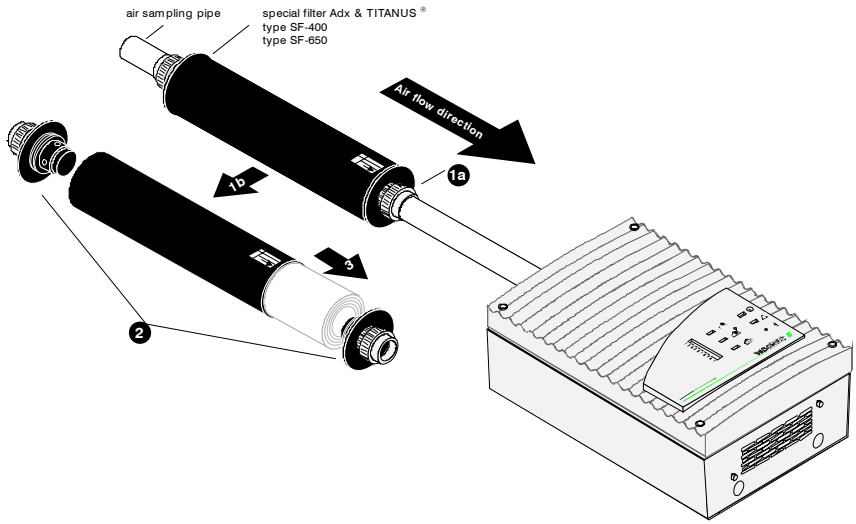

Fig. 8.4: Exchange of filter element

To change the filter insert follow these steps:

1. Loosen the two PVC reducing couplings on the special filter 1a and remove it 1b.
2. Remove the two screw-in plugs on the filter housing.
3. Remove the filter insert from the housing and replace with a new one.
4. Replace the two screw-in plugs in the filter housing.
5. Re-insert the special filter into the pipe system and fix it firmly in place with PVC reducing couplings.

INSTRUCTION

When installing the special filter it is important to note the direction of air flow!

INSTRUCTION

Opening the housing lid of the special air filter causes an air flow fault in TITANUS®.

8.8 Check of the Air Flow Sensor Adjustment

Close the housing of the air sampling smoke detection system before the air flow sensor adjustment check.

Check the air flow sensor value by means of the diagnostic device.

Independent of Air Pressure

The standard ranges of the air flow variations for the small threshold are ± 90%, for the medium threshold ± 50% and for the large threshold ± 25%. These values already contain temperature and air pressure variations if the sensor adjustment is dependent on the air pressure (for the adjustment type refer to the commissioning protocol).

Dependent on Air Pressure

If the sensor adjustment is independent of the air pressure air pressure variations can considerably increase these values which should not lead to a fault signal.

INSTRUCTION

Consider that the measured value permanently changes due to temperature and air pressure variations.

Variations

If the measured value is not within the range of the allowed tolerances the air pressure varies and another fault is present. In this case check the pipe system for tightness and blockage of the air sampling points (refer to chapter 7.3, section "Trouble Shooting"). If this check leads to no negative results check the ventilator fan in the air sampling smoke detection system for soiling and exchange the air flow sensor filter if required (refer also to chapter 8.8 "Exchange of the Air Flow Sensor Filter"). If the faults are still present verify the air flow monitoring electronics by connecting a test pipe to the device and by re-adjusting the air flow.

ATTENTION

If the air flow monitoring system is damaged only authorized personnel is allowed to exchange it!

If the pipe network has been modified during the trouble shooting or if the air flow sensor filter has been exchanged re-adjust the air flow.

INSTRUCTION

Register the adjustment type (dependent on air pressure or not) and, if required, the values of the air pressure, the height above sea level and the set voltage at MP1 / MP2 in the commissioning protocol.

8.9 Air flow monitoring

Proceed according to chapter 7.3 "Air Flow Monitoring".

8.10 Fault signal transmission

Proceed according to chapter 7.4 "Fault Signal Transmission".

8.11 Maintenance intervals

Maintenance includes regular inspection. The air sampling smoke detection systems are checked during commissioning and then every three months (quarterly). Every fourth inspection includes additional checks which leads to the following distinction:

- quarterly check **inspection**
- annual check **maintenance + 4th annual inspection**

Type of Check	Measure	Further Information in Chapter
inspection	visual check	8.1
	detector head and alarm transmission (1 x per group)	8.2
	check of pipe system	8.3
	air flow sensor adjustment	8.4
	fault signal transmission (1 x per group)	7.4
	if necessary air filter check	
maintenance + 4th annual inspection	visual check	8.1
	detector head and alarm transmission	8.2
	check of pipe system	8.3
	air flow sensor adjustment	8.4
	fault signal transmission	7.4
	air flow monitoring	7.5
	exchange of the air flow sensor filter	8.5

INSTRUCTION

The filter of the air flow sensors is to be exchanged regularly!

Appendix

Air Pressure Adjustment Tables

Projection Tables

System Product List

Certificate of Approval of Components and Systems

EMC Declaration of Conformity

Inspection Protocol

Glossary

Conformity certification pursuant to EU

TITANUS SUPER·SENS/a, DNL-Delivery Transaction

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order no.	description	unit

Air Sampling Smoke Detection Systems

AD-05-0800	air sampl. smoke detection system rev. a	pc.
<P> <Z>	type TITANUS SUPER·SENS /a	
<2> <>		
AD-05-0810	air sampl. smoke detection system rev. a	pc.
<P> <Z>	type TITANUS SUPER·SENS R /a	
<2> <>		
AD-05-0820	air sampl. smoke detection system rev.a	pc.
<P> <Z>	type TITANUS SUPER·SENS G /a	
<2> <>		
AD-05-0830	air sampl. smoke detection system rev. a	pc.
<P> <Z>	type TITANUS SUPER·SENS RS /a	
<2> <>		
AD-10-1045	front film sheet TI.SUPER·SENS/a,Siemens	pc.
<P> <Z>	type FSBT-SUPER·SENS/a	
<2> <>		

TITANUS SUPER·SENS/a, DNL-Delivery Transaction

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order no.	description	unit

Accessories

AD-05-0270	remote display unit in wall housing	pc.
<P> <Z>	type PAG3-TITANUS	
<2> <>		
AD-05-0600	diagnostic device for AD and TITANUS	pc.
<P> <Z>	type DIAG+	
<2> <>		
AD-05-0620	diagnostic-interface	pc.
<P> <Z>	type IF-DIAG+	
<2> <>		
AD-05-0900	cable entry kit	pc.
<P> <Z>	type KES_PG11	
<2> <>		
AD-10-0225	front film sheet for PAG-TITANUS, Wagner	pc.
<P> <Z>	type FW-PAG	
<2> <>		
AD-10-0550	test pipe for air sampling systems	pc.
<P> <Z>	type DIAG-Pipe	
<0> <>		

TITANUS SUPER·SENS/a, DNL-Delivery Transaction

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order no.	description	unit

Spare Parts

01-45-5295	housing for TITANUS SUPER·SENS/a	pc.
<P> <Z>	type KG-TSS/a	
<0> <>		
01-45-5297	cap nuts	
<P> <Z>	type CN-TSS/a	
<0> <>		
02-70-0640	radial ventilator f. TITANUS SUPERSENS/a	pc.
<P> <Z>	type RG125-19/12N-TSS/a	
<0> <>		
09-20-5980	display board TITANUS 3000/SUPER·SENS	pc.
<P> <Z>	type E598 (with bargraph display)	
<2> <>		
09-20-5985	exchange set	pc.
<P> <Z>	type DB-IR-1 (pu=1 pc.)	
<3> <>		
09-20-5995	switch power supply for remote display	pc.
<P> <Z>	type E599.2	
<2> <>		
09-20-6030	base board TITANUS SUPER·SENS	pc.
<P> <Z>	type E603	
<2> <>		
09-20-6045	base board TITANUS SUPER·SENS	pc.
<P> < >	type E603-G	
<2> <>		
10-60-0695	operat.device reset and discon. button	pc.
<P> <Z>	type RTT-1, 19"	
<2> <>		
AD-05-0265	housing for remote display TITANUS	pc.
<P> <Z>	type GPA-3000/SUPERSENS	
<0> <>		
AD-05-0630	board for reset and disconnecting button	pc.
<P> <Z>	type RTT-1	
<2> <>		

TITANUS SUPER·SENS/a, DNL-Delivery Transaction

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order no.	description	unit
AD-10-0275	front plate for PAW-TITANUS, Wagner	pc.
<P> <Z>	type FPW3-PA	
<2> <>		
AD-10-0410	air filter, for air flow sensor	pc.
<P> <Z>	type LF-AWM3100V	
<2> <>		
AD-10-0435	sealing kit for detector head	
<P> <Z>	type SL-DK (VE=10 sets)	
<0> <>		
AD-10-4110	detector head TITANUS SUPERSENS/a	pc.
<P> <Z>	type TSS/a-DK 0.02	
<2> <>		
AD-10-4120	detector head TITANUS SUPERSENS/a clean	pc.
<P> <Z>	type TSS/a-DKR 0.01	
<2> <>		
AD-10-4130	detector head TITANUS SUPERSENS/a galvan	pc.
<P> <Z>	type TSS/a-DKG 0.02	
<2> <>		
AD-10-4140	detector head TITANUS SUPERSENS/a RS	pc.
<P> <Z>	type TSS/a-DKRS 0.006	
<2> <>		
AD-10-4660	connecting cable	pc.
<P> <Z>	type CC-NU	
<2> <>		

Air Pressure Adjustment Chart TITANUS *SUPER · SENS* ®

Adjustment TITANUS *SUPER · SENS* Equipment Monitoring

(opening in percent: 15% up to 24%)

height above sea level	Air Pressure [hPa] at a Height of														
0	973	978	983	988	993	998	1003	1008	1013	1018	1023	1028	1033	1038	1043
50	967	972	977	982	987	992	997	1002	1007	1012	1017	1022	1027	1032	1037
100	961	966	971	976	981	986	991	996	1001	1006	1011	1016	1021	1026	1031
150	954	959	964	969	974	979	984	989	994	999	1004	1009	1014	1019	1024
200	948	953	958	963	968	973	978	983	988	993	998	1003	1008	1013	1018
250	942	947	952	957	962	967	972	977	982	987	992	997	1002	1007	1012
300	936	941	946	951	956	961	966	971	976	981	986	991	996	1001	1006
350	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
400	924	929	934	939	944	949	954	959	964	969	974	979	984	989	994
450	918	923	928	933	938	943	948	953	958	963	968	973	978	983	988
500	912	917	922	927	932	937	942	947	952	957	962	967	972	977	982
550	906	911	916	921	926	931	936	941	946	951	956	961	966	971	976
600	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970
650	894	899	904	909	914	919	924	929	934	939	944	949	954	959	964
700	888	893	898	903	908	913	918	923	928	933	938	943	948	953	958
750	882	887	892	897	902	907	912	917	922	927	932	937	942	947	952
800	877	882	887	892	897	902	907	912	917	922	927	932	937	942	947
850	871	876	881	886	891	896	901	906	911	916	921	926	931	936	941
900	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935
950	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930
1000	854	859	864	869	874	879	884	889	894	899	904	909	914	919	924
1050	848	853	858	863	868	873	878	883	888	893	898	903	908	913	918
1100	843	848	853	858	863	868	873	878	883	888	893	898	903	908	913
1150	837	842	847	852	857	862	867	872	877	882	887	892	897	902	907
1200	832	837	842	847	852	857	862	867	872	877	882	887	892	897	902
1250	827	832	837	842	847	852	857	862	867	872	877	882	887	892	897
1300	821	826	831	836	841	846	851	856	861	866	871	876	881	886	891
1350	816	821	826	831	836	841	846	851	856	861	866	871	876	881	886
1400	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880
1450	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875
1500	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870
1550	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865
1600	789	794	799	804	809	814	819	824	829	834	839	844	849	854	859
1650	784	789	794	799	804	809	814	819	824	829	834	839	844	849	854
1700	779	784	789	794	799	804	809	814	819	824	829	834	839	844	849
1750	774	779	784	789	794	799	804	809	814	819	824	829	834	839	844
1800	769	774	779	784	789	794	799	804	809	814	819	824	829	834	839
1850	764	769	774	779	784	789	794	799	804	809	814	819	824	829	834
1900	759	764	769	774	779	784	789	794	799	804	809	814	819	824	829
1950	754	759	764	769	774	779	784	789	794	799	804	809	814	819	824
2000	749	754	759	764	769	774	779	784	789	794	799	804	809	814	819
2050	744	749	754	759	764	769	774	779	784	789	794	799	804	809	814
2100	739	744	749	754	759	764	769	774	779	784	789	794	799	804	809
2150	734	739	744	749	754	759	764	769	774	779	784	789	794	799	804
2200	729	734	739	744	749	754	759	764	769	774	779	784	789	794	799
2250	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795
2300	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790
2350	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785
2400	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780
Titanus SS [V]	**1,09**	**1,27**	**1,44**	**1,62**	**1,80**	**1,97**	**2,15**	**2,32**	**2,50**	**2,68**	**2,85**	**3,03**	**3,20**	**3,38**	**3,56**

Air Pressure Adjustment Chart TITANUS *SUPER · SENS* ®

Adjustment TITANUS *SUPER · SENS* Room Monitoring (I-Shape Pipe System)

(opening in percent: 19%)

height above sea level	Air Pressure [hPa] at a Height of														
0	973	978	983	988	993	998	1003	1008	1013	1018	1023	1028	1033	1038	1043
50	967	972	977	982	987	992	997	1002	1007	1012	1017	1022	1027	1032	1037
100	961	966	971	976	981	986	991	996	1001	1006	1011	1016	1021	1026	1031
150	954	959	964	969	974	979	984	989	994	999	1004	1009	1014	1019	1024
200	948	953	958	963	968	973	978	983	988	993	998	1003	1008	1013	1018
250	942	947	952	957	962	967	972	977	982	987	992	997	1002	1007	1012
300	936	941	946	951	956	961	966	971	976	981	986	991	996	1001	1006
350	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
400	924	929	934	939	944	949	954	959	964	969	974	979	984	989	994
450	918	923	928	933	938	943	948	953	958	963	968	973	978	983	988
500	912	917	922	927	932	937	942	947	952	957	962	967	972	977	982
550	906	911	916	921	926	931	936	941	946	951	956	961	966	971	976
600	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970
650	894	899	904	909	914	919	924	929	934	939	944	949	954	959	964
700	888	893	898	903	908	913	918	923	928	933	938	943	948	953	958
750	882	887	892	897	902	907	912	917	922	927	932	937	942	947	952
800	877	882	887	892	897	902	907	912	917	922	927	932	937	942	947
850	871	876	881	886	891	896	901	906	911	916	921	926	931	936	941
900	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935
950	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930
1000	854	859	864	869	874	879	884	889	894	899	904	909	914	919	924
1050	848	853	858	863	868	873	878	883	888	893	898	903	908	913	918
1100	843	848	853	858	863	868	873	878	883	888	893	898	903	908	913
1150	837	842	847	852	857	862	867	872	877	882	887	892	897	902	907
1200	832	837	842	847	852	857	862	867	872	877	882	887	892	897	902
1250	827	832	837	842	847	852	857	862	867	872	877	882	887	892	897
1300	821	826	831	836	841	846	851	856	861	866	871	876	881	886	891
1350	816	821	826	831	836	841	846	851	856	861	866	871	876	881	886
1400	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880
1450	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875
1500	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870
1550	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865
1600	789	794	799	804	809	814	819	824	829	834	839	844	849	854	859
1650	784	789	794	799	804	809	814	819	824	829	834	839	844	849	854
1700	779	784	789	794	799	804	809	814	819	824	829	834	839	844	849
1750	774	779	784	789	794	799	804	809	814	819	824	829	834	839	844
1800	769	774	779	784	789	794	799	804	809	814	819	824	829	834	839
1850	764	769	774	779	784	789	794	799	804	809	814	819	824	829	834
1900	759	764	769	774	779	784	789	794	799	804	809	814	819	824	829
1950	754	759	764	769	774	779	784	789	794	799	804	809	814	819	824
2000	749	754	759	764	769	774	779	784	789	794	799	804	809	814	819
2050	744	749	754	759	764	769	774	779	784	789	794	799	804	809	814
2100	739	744	749	754	759	764	769	774	779	784	789	794	799	804	809
2150	734	739	744	749	754	759	764	769	774	779	784	789	794	799	804
2200	729	734	739	744	749	754	759	764	769	774	779	784	789	794	799
2250	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795
2300	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790
2350	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785
2400	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780
Titanus SS [V]	**1,24**	**1,39**	**1,55**	**1,71**	**1,87**	**2,03**	**2,18**	**2,34**	**2,50**	**2,66**	**2,82**	**2,97**	**3,13**	**3,29**	**3,45**

Air Pressure Adjustment Chart TITANUS *SUPER · SENS* ®

Adjustment TITANUS *SUPER · SENS* Room Monitoring (U-Shape and H-Shape Pipe System)

(medium opening in percent: 22%)

height above sea level	Air Pressure [hPa] at a Height of														
0	973	978	983	988	993	998	1003	1008	1013	1018	1023	1028	1033	1038	1043
50	967	972	977	982	987	992	997	1002	1007	1012	1017	1022	1027	1032	1037
100	961	966	971	976	981	986	991	996	1001	1006	1011	1016	1021	1026	1031
150	954	959	964	969	974	979	984	989	994	999	1004	1009	1014	1019	1024
200	948	953	958	963	968	973	978	983	988	993	998	1003	1008	1013	1018
250	942	947	952	957	962	967	972	977	982	987	992	997	1002	1007	1012
300	936	941	946	951	956	961	966	971	976	981	986	991	996	1001	1006
350	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
400	924	929	934	939	944	949	954	959	964	969	974	979	984	989	994
450	918	923	928	933	938	943	948	953	958	963	968	973	978	983	988
500	912	917	922	927	932	937	942	947	952	957	962	967	972	977	982
550	906	911	916	921	926	931	936	941	946	951	956	961	966	971	976
600	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970
650	894	899	904	909	914	919	924	929	934	939	944	949	954	959	964
700	888	893	898	903	908	913	918	923	928	933	938	943	948	953	958
750	882	887	892	897	902	907	912	917	922	927	932	937	942	947	952
800	877	882	887	892	897	902	907	912	917	922	927	932	937	942	947
850	871	876	881	886	891	896	901	906	911	916	921	926	931	936	941
900	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935
950	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930
1000	854	859	864	869	874	879	884	889	894	899	904	909	914	919	924
1050	848	853	858	863	868	873	878	883	888	893	898	903	908	913	918
1100	843	848	853	858	863	868	873	878	883	888	893	898	903	908	913
1150	837	842	847	852	857	862	867	872	877	882	887	892	897	902	907
1200	832	837	842	847	852	857	862	867	872	877	882	887	892	897	902
1250	827	832	837	842	847	852	857	862	867	872	877	882	887	892	897
1300	821	826	831	836	841	846	851	856	861	866	871	876	881	886	891
1350	816	821	826	831	836	841	846	851	856	861	866	871	876	881	886
1400	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880
1450	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875
1500	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870
1550	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865
1600	789	794	799	804	809	814	819	824	829	834	839	844	849	854	859
1650	784	789	794	799	804	809	814	819	824	829	834	839	844	849	854
1700	779	784	789	794	799	804	809	814	819	824	829	834	839	844	849
1750	774	779	784	789	794	799	804	809	814	819	824	829	834	839	844
1800	769	774	779	784	789	794	799	804	809	814	819	824	829	834	839
1850	764	769	774	779	784	789	794	799	804	809	814	819	824	829	834
1900	759	764	769	774	779	784	789	794	799	804	809	814	819	824	829
1950	754	759	764	769	774	779	784	789	794	799	804	809	814	819	824
2000	749	754	759	764	769	774	779	784	789	794	799	804	809	814	819
2050	744	749	754	759	764	769	774	779	784	789	794	799	804	809	814
2100	739	744	749	754	759	764	769	774	779	784	789	794	799	804	809
2150	734	739	744	749	754	759	764	769	774	779	784	789	794	799	804
2200	729	734	739	744	749	754	759	764	769	774	779	784	789	794	799
2250	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795
2300	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790
2350	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785
2400	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780
Titanus SS [V]	**1,16**	**1,32**	**1,49**	**1,66**	**1,83**	**2,00**	**2,16**	**2,33**	**2,50**	**2,67**	**2,84**	**3,00**	**3,17**	**3,34**	**3,51**

Projection without filter

Sensitivity (% obs/m)		Number of apertures																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24
0,025	(HA)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
0,05	(HA)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
0,1	(HA)	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B
0,2	(HA)	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B

without pipe accessories

Pipe shape	U_{Fan} [V]	Number of apertures																					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	permitted total pipe length [m]
I	12	70	70	70	70	70	70	70	70	70													
	15	100	100	100	100	100	100	100	100	100	100	100	100										
U	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150				
M	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180					
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
Double U	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180				
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

with detector box

Pipe shape	U_{Fan} [V]	Number of apertures																					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	permitted total pipe length [m]
I	12	70	70	70	70	70	70	70															
	15	100	100	100	100	100	100	100	100	100													
U	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150					
M	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180					
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
Double U	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180				
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

with detector box and *OXY·SENS* or with steam trap

Pipe shape	U_{Fan} [V]	Number of apertures																					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	permitted total pipe length [m]
I	12	60	60	60	60	60	60																
	15	70	70	70	70	70	70	70															
U	12	90	90	90	90	90	90	90	90	90	90												
	15	130	130	130	130	130	130	130	130	130	130	130	130	130	130								
M	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170					
Double U	12	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140						
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

Projection with air filter LF-AD

Sensitivity (% obs/m)		Number of apertures																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24
0,025	(HA)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
0,05	(HA)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B
0,1	(HA)	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B
0,2	(HA)	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B				

without additional pipe accessories

Pipe shape	U_{Fan} [V]	Number of apertures																					permitted total pipe length [m]
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	
I	12	70	70	70	70	70	70	70	70														
	15	100	100	100	100	100	100	100	100	100	100												
U	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150				
M	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180					
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
Double U	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180				
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

with detector box

Pipe shape	U_{Fan} [V]	Number of apertures																					zulässige GesamtPipe länge [m]
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	
I	12	70	70	70	70	70	70	70															
	15	100	100	100	100	100	100	100	100	100													
U	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150					
M	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180					
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
Double U	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180				
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

with detector box and *OXY·SENS* or with steam trap

Pipe shape	U_{Fan} [V]	Number of apertures																					permitted total pipe length [m]
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	
I	12	60	60	60	60	60	60																
	15	70	70	70	70	70	70	70															
U	12	90	90	90	90	90	90	90	90	90	90												
	15	130	130	130	130	130	130	130	130	130	130	130	130	130	130								
M	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170					
Double U	12	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140						
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

Projection with air filter LF-AD -1

Sensitivity (% obs/m)		Number of apertures																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24
0,025	(HA)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
0,05	(HA)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B
0,1	(HA)	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B
0,2	(HA)	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B				

without additional pipe accessories

Pipe shape	U_{Fan} [V]	Number of apertures																					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	permitted total pipe length [m]
I	12	70	70	70	70	70	70	70	70														
	15	100	100	100	100	100	100	100	100	100	100												
U	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150				
M	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180					
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
Double U	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180				
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

with detector box

Pipe shape	U_{Fan} [V]	Number of apertures																					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	zulässige GesamtPipe länge [m]
I	12	70	70	70	70	70	70	70															
	15	100	100	100	100	100	100	100	100	100													
U	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150					
M	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180					
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
Double U	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180				
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

with detector box and *OXY·SENS* or with steam trap

Pipe shape	U_{Fan} [V]	Number of apertures																					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	permitted total pipe length [m]
I	12	60	60	60	60	60	60																
	15	70	70	70	70	70	70	70															
U	12	90	90	90	90	90	90	90	90	90	90												
	15	130	130	130	130	130	130	130	130	130	130	130	130	130	130								
M	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170					
Double U	12	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140						
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

Projection with air filter LF-AD -2

Sensitivity (% obs/m)		Number of apertures																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24
0,025	(HA)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
0,05	(HA)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B
0,1	(HA)	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B
0,2	(HA)	A	A	A	B	B	B	B	B	B	B	B	B	B	B							

without additional pipe accessories

Pipe shape	U_{Fan} [V]	Number of apertures																					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	permitted total pipe length [m]
I	12	70	70	70	70	70	70	70	70														
	15	100	100	100	100	100	100	100	100	100	100												
U	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150				
M	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180					
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
Double U	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180				
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

with detector box

Pipe shape	U_{Fan} [V]	Number of apertures																					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	zulässige GesamtPipe länge [m]
I	12	70	70	70	70	70	70	70															
	15	100	100	100	100	100	100	100	100	100													
U	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150					
M	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180					
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
Double U	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180				
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

with detector box and *OXY·SENS* or with steam trap

Pipe shape	U_{Fan} [V]	Number of apertures																					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	permitted total pipe length [m]
I	12	60	60	60	60	60	60																
	15	70	70	70	70	70	70	70															
U	12	90	90	90	90	90	90	90	90	90	90												
	15	130	130	130	130	130	130	130	130	130	130	130	130	130	130								
M	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170					
Double U	12	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140						
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

Projection with air filter SF X00

Sensitivity (% obs/m)		Number of apertures																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24
0,025	(HA)	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B
0,05	(HA)	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B				
0,1	(HA)	A	A	B	B	B	B	B	B	B												
0,2	(HA)	A	B	B	B																	

without additional pipe accessories

Pipe shape	U_{Fan} [V]	Number of apertures																					permitted total pipe length [m]
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	
I	12	70	70	70	70	70	70	70															
	15	100	100	100	100	100	100	100	100	100													
U	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150					
M	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180					
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
Double U	12	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180				
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

with detector box and *OXY·SENS* or with steam trap

Pipe shape	U_{Fan} [V]	Number of apertures																					permitted total pipe length [m]
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20	21	22	24	
I	12	60	60	60	60	60	60																
	15	70	70	70	70	70	70	70															
U	12	90	90	90	90	90	90	90	90	90	90												
	15	130	130	130	130	130	130	130	130	130	130	130	130	130	130								
M	12	120	120	120	120	120	120	120	120	120	120	120	120										
	15	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170					
Double U	12	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140						
	15	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	

Certificate

of

Approval

of

Components and Systems

Holder of the Approval:

WAGNER Group GmbH
Schleswigstraße 1 - 5
DE-30853 Langenhagen

Approval No.:	*No. of pages:*	*Valid from:*	*Valid to:*
G 201035	10	16.06.2009	17.04.2011

Subject matter of the Approval:

Aspirating Smoke Detectors
Type TITANUS *SUPER·SENS*® /G / x / R / RS / a

Use:

in Automatic Fire Detection Systems

Basis for approval:

DIN EN 54-20 (09/06) - Aspirating Smoke Detectors
VdS 2504 (12/96) - Smoke Detectors, Sect. 5.6
VdS 2344 (12/05) - Procedure Guidelines

This approval
is valid only for the specified component/system as submitted for the test

- together with the parts listed in enclosure 1
- documented in the technical papers acc. to enclosure 2 (n/a for systems)
- for application in the specified fire protection and security installations. Use of the subject matter of the approval, is subject to the hints/comments of enclosure 3.

The validity of the approval can be extended upon application. Application for extension shall be submitted six months before expiry of the current approval at the latest.

This certificate may only be reproduced in its present form without any modification including all enclosures. All changes of the underlying conditions of this approval shall be reported at once to the VdS Certification Body enclosing the required documentation.

Any advertising with this VdS approved component/system shall reflect the correct contents of the certificate and shall not violate the trade practice rules.

Köln (Cologne), 16.06.2009

Schüngel
Managing Director

ppa. Stahl
Head of the VdS Certification Body

Deutscher Akkreditierungs Rat
DAR
DAT-ZE 005/92

VdS Schadenverhütung GmbH
Zertifizierungsstelle
Amsterdamer Str. 174
D-50735 Köln

A company of the German Insurance Association (GDV) (German federation of insurance companies)

Accredited by the "Deutsche Akkreditierungsstelle Technik (DATech)" as a certification body for the areas of fire protection and security

VdS Schadenverhütung GmbH • Amsterdamer Straße 172-174 • D-50735 Köln

Notifizierte Zertifizierungsstelle für Bauprodukte • Kenn-Nummer 0786
Notified Certification Body for Construction Products • Registration No. 0786

EG-Konformitätszertifikat
EC-Certificate of Conformity

0786 – CPD - 20781

Gemäß der Richtlinie 89/106/EWG des Rates der Europäischen Gemeinschaften vom 21. Dezember 1988 zur Angleichung der Rechts– und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte (Bauproduktenrichtlinie – CPD), geändert durch die Richtlinie 93/68/EWG des Rates der Europäischen Gemeinschaften vom 22. Juli 1993, wird hiermit bestätigt, dass das Bauprodukt

In compliance with the Directive 89/106/EEC of the Council of European Communities of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to the construction products (Construction Products Directive - CPD), amended by the Directive 93/68/EEC of the Council of European Communities of 22 July 1993, it has been stated that the construction product

Ansaugrauchmelder
Serie TITANUS SUPER SENS

Aspirating Smoke Detectors
Series TITANUS SUPER SENS

(Produktmerkmale siehe Anlage 1)

(Product parameters see appendix 1)

in Verkehr gebracht durch

placed on the market by

WAGNER Group GmbH
Schleswigstraße 1 - 5
DE 30853 Langenhagen

und erzeugt im Herstellwerk

and produced in the factory

WAGNER Group GmbH
Schleswigstraße 1 - 5
DE 30853 Langenhagen

durch den Hersteller einer werkseigenen Produktionskontrolle sowie zusätzlichen Prüfungen von im Werk entnommenen Proben nach festgelegtem Prüfplan unterzogen wird und dass die notifizierte Stelle VdS Schadenverhütung GmbH eine Erstprüfung der relevanten Eigenschaften des Produkts, eine Erstinspektion des Werkes und der werkseigenen Produktionskontrolle durchgeführt hat und eine laufende Überwachung, Beurteilung und Anerkennung der werkseigenen Produktionskontrolle durchführt.

Dieses Zertifikat bescheinigt, dass alle Vorschriften über die Bescheinigung der Konformität und die Leistungseigenschaften, beschrieben im Anhang ZA der Norm(en)

is submitted by the manufacturer to a factory production control and to the further testing of samples taken at the factory in accordance with a prescribed test plan and that the notified body VdS Schadenverhütung GmbH has performed the initial type-testing for the relevant characteristics of the product, the initial inspection of the factory and of the factory production control and performs the continuous surveillance, assessment and approval of the factory production control.

This certificate attests that all provisions concerning the attestation of conformity and the performances described in the Annex ZA of the standard

EN 54-20: 2006

angewendet wurden und dass das Produkt alle darin vorgeschriebenen Anforderungen erfüllt.

Dieses Zertifikat wurde erstmals am 17.06.2009 ausgestellt und gilt solange, wie die Festlegungen in der angeführten harmonisierten technischen Spezifikation oder die Herstellbedingungen im Werk oder die werkseigene Produktionskontrolle selbst nicht wesentlich verändert werden.

were applied and that the product fulfils all the prescribed requirements.

This certificate was first issued on 17.06.2009 and remains valid as long as the conditions laid down in the harmonised technical specification in reference or the manufacturing conditions in the factory or the FPC itself are not modified significantly.

Köln, 17.06.2009

(ppa. Stahl)

Leiter der Zertifizierungsstelle
Head of Certification Body

WAGNER®

EG-KONFORMITÄTSERKLÄRUNG
EC-DECLARATION OF CONFORMITY

über die Einhaltung der EMV-Schutzanforderungen
regarding the EMC protection requirements

Wir
We

WAGNER Alarm- und Sicherungssysteme GmbH
Schleswigstraße 5
D-30853 Langenhagen

erklären in alleiniger Verantwortung, dass das Produkt
hereby declare that the product

TITANUS *SUPER·SENS*® /a

auf das sich diese Erklärung bezieht, mit den folgenden Normen oder normativen Dokumenten übereinstimmt.
meets the following standards or technical specifications.

EN 50130-4 : 1995;
EN 55011 : 1991 Grenzwertklasse B;

Gemäß den Bestimmungen der Richtlinie 89/336/EWG des Rates zur Angleichung der Rechtsvorschriften der Mitgliederstaaten über die elektromagnetische Verträglichkeit.

In accordance with the Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Langenhagen, den 15.01.2001

Leiter Entwicklung
i.A. [signature]

WAGNER Alarm- und Sicherungssysteme GmbH, Schleswigstraße 5, D-30853 Langenhagen

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Sitz der Gesellschaft: 29308 Winsen
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USt.-Ident-Nr. DE 115119330

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Hallbaum-Bank Hannover
Konto 10154243, BLZ 25060180

Postbank Hannover
Konto 123626-308, BLZ 25010030
Kreissparkasse Hannover
Konto 2048957, BLZ 25050299

68-20-1221

Commissioning Protocol for Air Sampling System Type TITANUS *SUPER · SENS*® Rev.: …

device number							
serial number							
		measuring and adjustment values	measuring and adjustment values	measuring and adjustment values	measuring and adjustment values	measuring and adjustment values	measuring and adjustment values
Commissioning							
visual check	(✓/ –)						
depression	[Pa]						
sensitivity	[%/m]						
alarm delay	[s]						
fault delay	[min]						
activating threshold	(small/medium/						
	large/very large)						
memory							
adjustment dependent on the air pressure	(yes/no)						
adjustment independent of the air pressure	(yes/no)						
air flow value	[V]}						
height	[m ü. NN.]						
air pressure	[hPa]						
temperature	[°C]						
Fault Blockage							
LED flashes	(✓/ –)						
relay deactivated after delay period	(✓/ –)						
signal transmission to CFDU	(✓/ –)						
cause of the fault eliminated, LED off	(✓/ –)						
cause of the fault eliminated, LED memorized	(✓/ –)						
relay activated when threshold is not reached	(✓/ –)						
relay activated after a min. delay period of 100 s	(✓/ –)						
Fault Fracture							
LED flashes	(✓/ –)						
relay deactivated after delay period	(✓/ –)						
signal transmission to CFDU	(✓/ –)						
cause of the fault eliminated, LED off	(✓/ –)						
cause of the fault eliminated, LED memorized	(✓/ –)						
relay activated when threshold is not reached	(✓/ –)						
relay activated after a min. delay period of 100 s	(✓/ –)						
Alert Alarm							
LED flashes	(✓/ –)						
relay activated after delay period	(✓/ –)						
signal transmission to CFDU	(✓/ –)						
cause of the fault eliminated, LED off	(✓/ –)						
cause of the fault eliminated, LED memorized	(✓/ –)						
relay deactivated when threshold is not reached	(✓/ –)						
relay memorized	(✓/ –)						
Action Alarm							
LED flashes	(✓/ –)						
relay activated after delay period	(✓/ –)						
signal transmission to CFDU	(✓/ –)						
LED memorized	(✓/ –)						
relay memorized	(✓/ –)						
Fire Alarm							
LED flashes	(✓/ –)						
relay activated after delay period	(✓/ –)						
signal transmission to CFDU	(✓/ –)						
LED memorized	(✓/ –)						
relay memorized	(✓/ –)						

issuer: …… **signature: ……**

key:	✓ O.K.
	– not O.K.

Glossary

Technical Term	*Definition*
	A
action alarm	At this alarm level first measures are taken as e.g. the cutoff of a device (→fire alarm, →alert alarm).
aerosol *also: smoke aerosol*	An aerosol is a floating particle in the microscopic or submicroscopic particle size range. They consist of unburned parts of the fire load, intermediate products of the oxidation and finely divided carbon (soot).
air sampling smoke detection system	Active system of which the underpressure to take air samples is produced by a ventilator fan belonging to the system. The air samples are then passed to a detection unit (smoke detector or detector head).
alarm	Acoustic and/or optical signal activated through →smoke detectors to indicate a fire.
alarm current	An increased current in the →alarm state (→quiescent current).
alarm state	The state of a fire detection installation or a part of it as reaction on an exisiting danger.
alert alarm	Defined or, depending on the device, variable alarm threshold according to the smoke level. The alert alarm informs about a deviation from the nomal state and allows to take further measures (→fire alarm, →action alarm).
automatic smoke detector	Automatic detectors are detectors which detect and analyze physical parameters which serve to create danger warning signals. Automatic smoke detectors are e.g. point-type detectors, →multi-point detectors, →linear detectors, →flame detectors and →air sampling smoke detection systems.
	C
CMOS	**C**omplementary **M**etal **O**xide **S**emiconductor, complementary MOS-technoloy
collective alarm	A non-differentiated, i.g. non-localizable →alarm, which is indicated at a superior system.
collective detection system	Conventional detection line technology; the detectors connected to the same detection line form a collective address (common display and operation without identification of the single detectors)

C	
central fire panel	Central part of a fire detection installation which supplies the detectors with power, receives signals to display them optically and acoustically and, if required, transmits them and which checks the installation for faults.
collective detector	Smoke detectors with conventional limiting value-detector technology. They are suitable for areas with low risks of fire and unproblematic ambient conditions.
collective fault	A non-differentiated, i.g. non-localizable →fault signal which is indicated at a superior system.
control in case of a fire	Equipment or fire prevention installation automatically or manually triggered by the →central fire panel to reduce the danger to human life and minimize damage caused by fire.
D	
detection line	Monitored transmission line (→primary line) through which the smoke detectors are connected with the →central fire panel.
display sensitivity	The display sensitivity describes the sensitivity level at which the air sampling system starts detecting smoke particles (level 1). It is displayed by means of a bargraph. (→response sensitivity →detector head sensitivity)
detection reliability	The detection reliability is the quantity of reliability with which phenomena are detected and indicated for whose perception a detection system is used.
detector group	Collection of smoke detectors in a →detection line, for which an own display in the →central fire panel is installed.
detector head sensitivity	The detector head sensitivity is a sensitivity adjustable between level 1 and 4 and is the general term of →response sensitivity and →display sensitivity.
differential heat detector	The increase in heat per unit of time is evaluated for the alarm activation.
DIL-switch	**d**ual **i**n **l**ine; e.g. to set the air flow sensor technology, the response sensitivity, the delay period for →alarm and fault and to set the alarm to “latched“ or “non-latched“.

E	
electromagnetic compatibility (EMC)	The electromagnetic compatibility is the ability of an electrical or electronical system to operate correctly in its electromagnetic environment and to have no unallowed impact 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
extinction smoke detector	Extinction smoke detectors react to products of combustion which cause the subdueing and scattering of light.
F	
fault signal	Signal indicating a deviation from the desired value in the →smoke detection installation.
fire alarm	Defined or, depending on the device, variable alarm threshold according to the smoke level. Fire alarm means the detection of a fire, the fire department is informed (→alert alarm, →action alarm).
fire load	The fire load corresponds to the quantity of heat of all combustible materials of a fire section referred to its area.
fire section	Isolated section in a building which avoids or slows down the spreading of a fire to a neighboring section through special constructions.
fire-resistant collar	Constructions that avoid a flame/smoke spread in cable ducts as well as in chases and break-throughs for wiring through walls and ceilings.
flame detector	The flame detector transfers the electromagnetic radiation produced by the flames into an electrical signal which is analyzed for the alarm activation.
H	
head control	The head control is an electronic board in the detector head and contains the control electronics for the detector head. It provides the smoke signal for further processing.
I	
interactive detector	Detector series with highest detection reliability of the evaluation and decision logics with interactive signal processing based on programmable algorithms. The detectors are parameterizable; they can be programmed through a software in an optimum way for the conditions of the mounting location.
interference	Interferences in smoke detection installations are the totality of external parameters which have an impact on the intended function of a smoke detection installation.

I	
ionization chamber smoke detector	The ionization chamber smoke detector uses the effect that air ions tend to add to smoke particles. The air in the potential field of a measuring chamber is made electronically conductive through a weak source of rays (ionized). The produced ions are moved by the potential field towards the oppositely charged electrode.
L	
linear detector	Detectors which react to the modification of fire phenomena at a linear sensor or ray.
line module	By means of line modules (AnalogPLUS® or interactive) TITANUS *SUPER·SENS*® can be connected to the *AlgoRex*®-smoke detection system.
load on contact	The load on contact describes the maximum power with which a relay contact can be operated.
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 the operation reliability.
LowSens-switch	Through the LowSens-switch the second detector sensitivity can be set. If the input is fed with 24 V the sensitivity is changed through the switch, i.g. the basic sensitivity of the detector is set to the next less sensitive level.
M	
maximum heat detector	A determined maximum temperature is evaluated for the alarm activation.
monitoring area	Area which is monitored by an automatic smoke detector.
monitoring window	The normal air flow is within an adjustment range between a defined upper and lower value. This range is the monitoring window.
multi-point detector	Multi-point detectors react to the modification of a parameter measured at several fixed points in the area.
N	
nominal gap width	Maximum allowed gap in the housing of the detonation prevention device without an ignition spark being flashed over from the device to the potentially explosive area.
non-automatic smoke detector	Non-automatic detectors are detectors which are indirectly or directly activated by a person.

P	
parameterization	Through the paremeterization the character of the algorithm and therefore its effect are determined. Through the choice of the appropriate algorithm (parameterization) the detector is specifically adapted to the fire phenomena and ambient conditions to be expected. This application-specific parameterization permits a significantly increased alarm reliability.
primary line	Primary lines are transmission lines permanently and automatically checked for short circuit and interruption. They serve for the transmission of signals of important functions of →smoke detection installations.
Q	
quiescent current	Current on the →detection line in its normal operational state, →alarm current
R	
repeater	A repeater can bridge a distance of up to 2000 m between the →air sampling smoke detection system and the remote display unit. It is installed after a max. distance of 1000 m and amplifies the signal to be transmitted.
response sensitivity	The response sensitivity is the sensitivity at which a fire alarm is activated (lighting of all LEDs) (→display sensitivity, →detector head sensitivity).
S	
scattered light smoke detector	Scattered light smoke detectors react to products of combustion which scatter the light.
secondary line	Non-monitored transmission lines.
sensitivity	The set sensitivity of an air sampling system determines at which light obscuration per meter an alert, action or fire alarm is activated. Each device has four adjustable sensitivity levels. (→detector head sensitivity, →display sensitivity, →response sensitivity)
single-hole monitoring	Detection of changes (e.g. blockages) of the diameter of each single air sampling point.
smoke aerosol ⇧aerosol	
smoke detection installation	Smoke detection installations are danger detection systems which serve persons to directly call for help in case of a fire and/or to detect and indicate the fire early.

S	
smoke detector	Smoke detectors react to the combustible particles and/or →aerosols (floating particles) in the air. One distinguishes → ionization chamber smoke detectors and optical smoke detectors (→extinction smoke detectors and →scattered light smoke detectors).
smoldering fire	Smoldering fires develop from a seat of fire; later on they become open fires after a considerable smoke development.
T	
temperature compensation	The air flow in the pipe is not falsified by temperature variations.
two-detector dependency	System to verify alarm states. The fire alarm is activated after two detectors of a →detector group have been actuated. When the first detector has been actuated an internal alarm or a control function can be activated.
two-group dependency	System to verify alarm states. The fire alarm is activated after one detector each of two related →detector groups has been actuated. When the first detector has been actuated an internal alarm or a control function can be activated.
V	
value concentration	The value concentration is an important factor for the evaluation of the risk of fire. It is determined by the values to be protected. It is also to be considered if the values exposed to the risk of fire are recoverable which will be nearly impossible for cultural assets.
W	
watchdog	Monitoring circuit which is activated when the microprocessor fails.

Conformity certification pursuant to EU Construction Products Directive 89/106/EEC

- The conformity of the „**air sampling smoke detector for fire detection and fire alarm systems in buildings**“ according to DIN EN 54-20 has been established by a test at the VdS laboratory.
- The EC certificate of conformity has been issued by notified product certification body (ID no. 0786, VdS).
- The CE designation according to DIN EN 54-20 has been carried out.

CE

0786

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09
Nr. 0786 – CPD – 20781

EN 54-20: 2006
Air sampling smoke detector for fire detection
and fire alarm systems in buildings

0,025 % light obscuration/m
Class: A, B and C

Technical data: see chapter 3 of technical manual.

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