Air Sampling Smoke Detection System

Honeywell ALL-SPEC

Technical Manual

Honeywell Life Safety Systems
140 Waterside Road
Hamilton Industrial Estate
Leicester
LE5 1TN
Telephone 0116 2462000

item number: 997-674-000-1S
dated: 11/11
supersedes:

Contents

Contents

Contents

Contents

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

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 Honeywell Life Safety systems, does not assume liability.

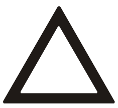
This manual refers to the air sampling smoke detection systems Honeywell ALL-SPEC1 and Honeywell ALL-SPEC2. These systems may only be used for early and very early smoke detection. As the smoke detection systems are from one series, Honeywell ALL-SPEC1 is described here. Specific technical designs of Honeywell ALL-SPEC2 are described separately.

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

The copyright in this Technical Manual remains the property of Honeywell Life Safety Systems.

The manual is designed exclusively for the assembler and his colleagues.

Reproduction of the manual, including extracts, is not allowed. Copying or distribution of the manual in any form is only allowed with permission in writing from Honeywell Life Safety Systems.

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 Features of the Honeywell ALL-SPEC air sampling smoke detection system

Honeywell ALL-SPEC is the latest generation of Honeywell air sampling smoke detection systems. Besides its use for room and equipment protection the variant can be used for monitoring climatic cabinets and climatic ducts.

Sensitivity

The device has a response sensitivity of up to 0.5 %/m, 0.1 %/m or 0.015 %/m light obscuration. According to the application further sensitivities can be set. Thanks to the innovative High-Power-Light-Source technology a wide detection range over all rated fire types is guaranteed.

If 2 detector modules are inserted in the Honeywell ALL-SPEC, the area covered is doubled.

LOGIC·SENS

In order to prevent false alarms, the intelligent signal processing called LOGIC·*SENS* distinguishes between interferences and the occurrence of real fire.

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 Honeywell air sampling smoke detection systems guarantees the detection of faults such as pipe fracture or blockage of 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 pipe design the air sampling points have defined hole diameters. For these exact air sampling points Honeywell uses **aspiration-reducing film sheets** with marking tape and clips that permit an easy mounting and avoid secondary noise. Another advantage is the quick and easy retrieval and check of the air sampling point diameters.

Point detector spacing

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

Diagnostics software

The diagnostic software permits quick and reliable fault localization for maintenance and service. The current and memorized device state can be read out to a PC via a special cable.

Choice of fan voltage

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

With Honeywell ALL-SPEC devices, the fan voltage can be set between 6.9 V and 9 V by means of the plug-in jumpers on the base board.

The voltage with Honeywell ALL-SPEC devices can be set by means of the fan control circuit boards FC-2 and FC-3.

- The voltage can be set to 6.5 V, 6.9 V and 9 V with the FC-2 fan control circuit board. The FC-2 fan control circuit board is standard in all Honeywell ALL-SPEC and -SL devices.

1.2 Areas of Application

The air sampling smoke detection system Honeywell ALL-SPEC is a smoke detection system used for the early smoke detection and very early smoke detection in rooms and equipment.

Principle

Air samples are drawn from the monitoring 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 can only be used under certain conditions.

This applies in particular to areas:

- with difficult access and in which it is difficult to install or to maintain point-type detectors.
- which are air-conditioned.
- which are higher than allowed for point-type detectors.
- in which point-type detectors are not desired for aesthetic reasons.
- in which electromagnetic fields have an impact .
- which are exposed to high or low temperature.
- with pollution of the air, where filter elements are needed.
- which are jeopardized by vandalism.

Room protection

Honeywell ALL-SPEC is suitable for the monitoring of

Rooms and other areas like:

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

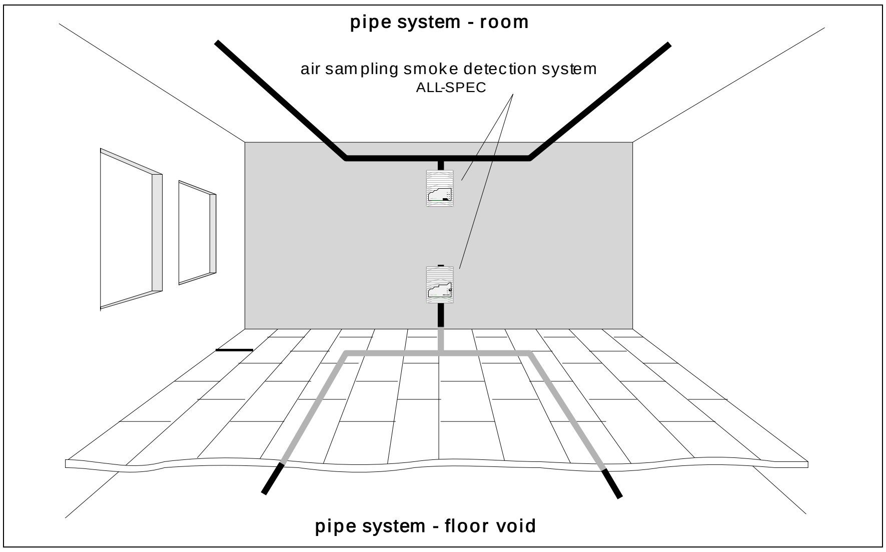


Fig. 1.1: Room monitoring with the Honeywell ALL-SPEC air sampling smoke detection system

Monitoring in areas with air conditioning

- in rooms with air conditioning for server rooms, etc.,
- in ventilation ducts,
- via floor voids, ceiling voids,
- in EDP rooms, distribution cabinets, transformer cells,
- at climatic cabinets (see Fig. 1.2) or
- at climatic ducts in the by-pass.

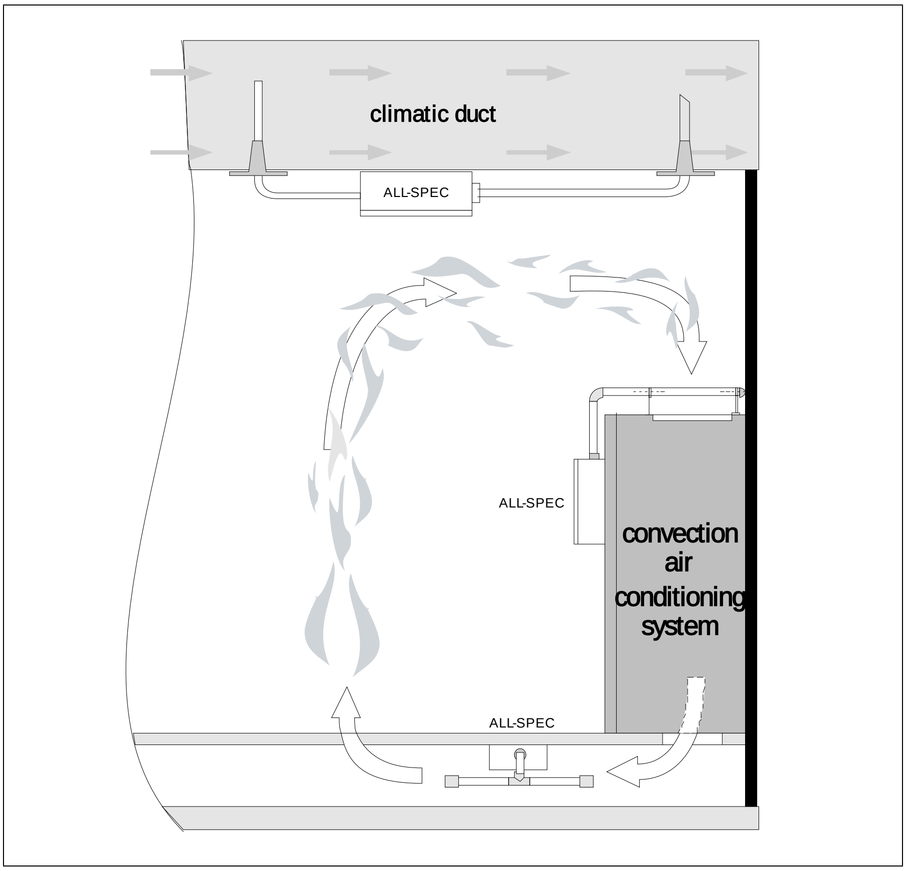


Fig. 1.2: Monitoring possibilities of a convection air conditioning system or climatic duct (scheme)

Equipment Protection

non-ventilated and ventilated installations/cabinets:

- distribution cabinets, switch cabinets
- telephone switch boards
- measuring and control units

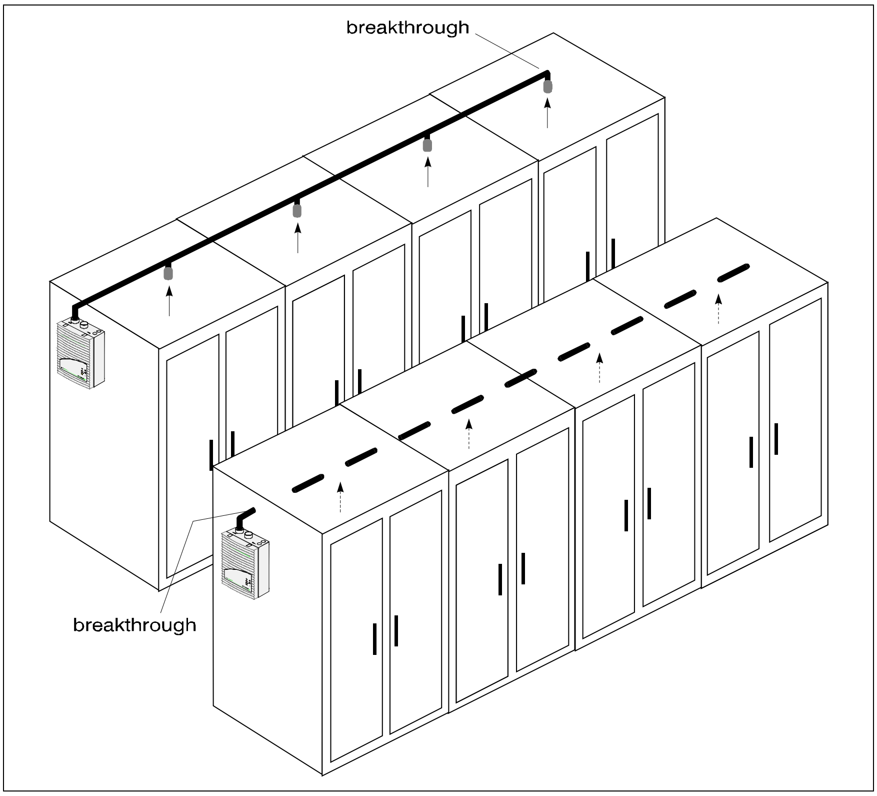


Fig. 1.3: Scheme - equipment monitoring with the air sampling smoke detection system Honeywell ALL-SPEC

The air sampling system Honeywell ALL-SPEC can also be used for earliest fire detection in rooms with special air conditioning.

Valuable goods and installations can be reliably monitored due to the system's high sensitivity. Therefore, Honeywell ALL-SPEC is especially suited for the following areas:

- where early intervention is crucial due to valuable assets
- where systems must be operational at all times
- where highly sensitive detection is required (e.g. in areas where filters keep smoke particles in the air at a minimum)
- with high air exchange rates

2 Technical Description

2.1 System Description

The air sampling smoke detection system Honeywell ALL-SPEC consists of the basic device and the pipe system.

The most important components of the basic device are the range of optical detector modules to detect the smoke particles, the aspiration unit to pass the air samples to the detector module and the air flow sensor in order to monitor the pipe system for fracture and blockage. The air flow sensor is integrated into the detector module.

Only for Honeywell ALL-SPEC2 one of the two detector modules can be equipped with or without air flow sensor and with or without LOGIC· *SENS* (refer to next page).

The pipe system consists of pipes and fittings made of ABS plastic.

For the pipe design each air sampling point in the pipe system of Honeywell ALL-SPEC represents a point type detector.

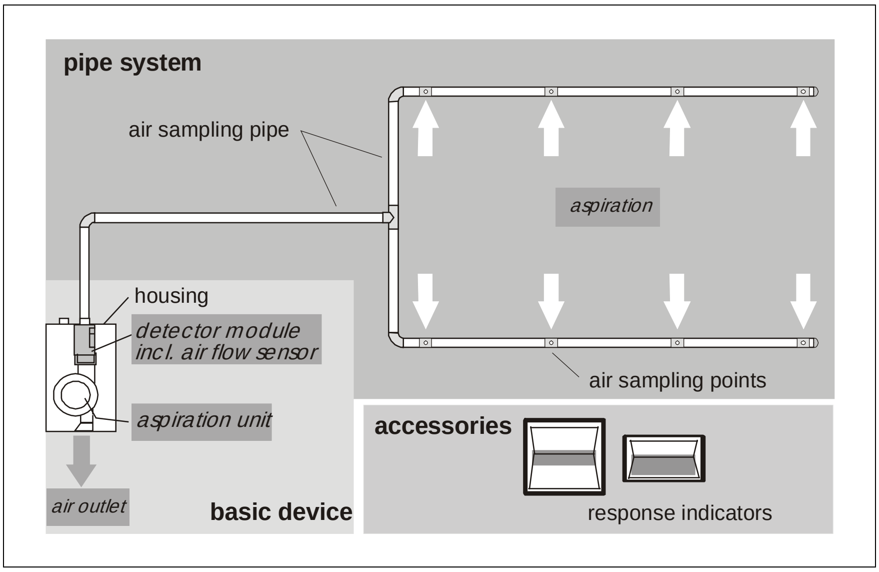


Fig.. 2.1: Air sampling system Honeywell ALL-SPEC

To guarantee a safe operation (clean room, recycling area), an extensive range of accessories are available.

2.1.1 Function

The aspiration unit in the basic device draws air samples from the area to be monitored via a pipe system with defined air sampling points. The air samples are then passed to the sensitive detector module (refer to Fig. 2.1

Detector module

Dependent on the response sensitivity of the used detector module (up to 0.5%/m, 0.1 %/m or 0.015 %/m light obscuration) Honeywell ALL-SPEC activates the alarm when the corresponding light obscuration is achieved. Four different alarm thresholds can be set. The alarm is indicated at the device via the alarm LED and can be transmitted to a connected central fire detection unit (CFDU).

Different delay periods can be set for the alarm thresholds and the fault display and fault transmission (refer to chapter 5.3).

Alarm indications are stored and have to be reset after eliminating their cause.

For Honeywell ALL-SPEC2 two detector modules allow the monitoring of two areas the same way as described above. If one area is to be monitored, a two-detector dependency and additionally through the choice of different response sensitivities an action alarm can be realized.

LOGIC·*SENS*

Honeywell ALL-SPEC incorporates an intelligent signal processing system with **LOGIC·*SENS***, which can be activated and deactivated with a switch at the detector module. This filters out interferences and contributes to a safe operation without false alarms.

Monitoring the detector module

Each detector module is checked for dirt, signal faults and removal. In the event of the detector module becoming dirty drift compensation is affected. A fault is indicated by the fault-LED at Honeywell ALL-SPEC and can be transmitted to a central fire detection unit (CFDU) via a fault contact. In order to avoid false alarms faults are processed with a delay.

Air flow monitoring

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

Dependent on the design of the pipe system (refer to chapter 4 "Pipe Design) the air flow sensor can detect at least a blockage of 50% of the air sampling points up to the complete blockage and a fracture of the pipe system causing a loss of 50 % of the air sampling points. If the fan fails, the air flow in the pipe system is interrupted causing a blockage which is also 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 detection unit (CFDU) via a fault contact. The thresholds of the monitoring window can be adapted to the ambient conditions (refer to chapter 4 "Pipe Design").

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

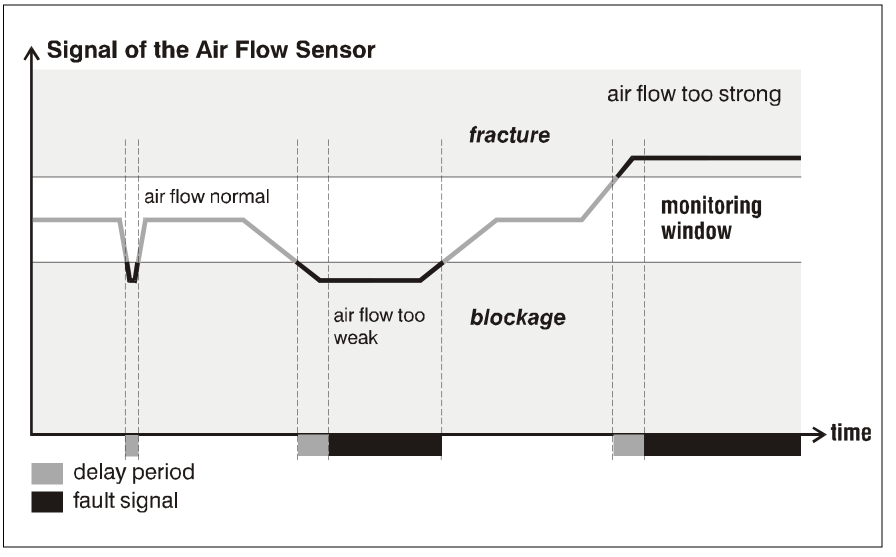


Fig. 2.2: Signal curve of the air flow sensor in case of faults

Fault display

A detector module or air flow fault causes a fault signal which is indicated at Honeywell ALL-SPEC. The fault display can be set to be latched (standard mode) or non-latched mode.

Flashing LED code for fault detection

An indication of faults and certain device states is effected through 5 different flash codes of an LED on the (electronic circuit board) of the detector module. This allows to quick identification of faults caused by a defective detector module, a blocked or fractured pipe system.

Resetting via central fire panel

A fault signal can be reset via a connection from a central fire detection unit (CFDU). If the Honeywell ALL-SPEC is connected to a central fire detection unit (CFDU) 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 Honeywell ALL-SPEC 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 5mA and 50mA. The line has to be current less during reset.

Relay output

Honeywell ALL-SPEC possesses a potential-free change-over contact for the existing alarm threshold and the collective fault. Thus, the air sampling smoke detection system can be connected to an addressable[2] loop on a central fire detection unit (CFDU).

Air flow adjustment

The air flow of Honeywell ALL-SPEC is automatically adjusted so that commissioning is much easier. The initialization is effected dependently on or independently of the air pressure.

In order to adjust the Honeywell ALL-SPEC a measurement of the air flow in the pipe network using the air flow-init process run. For each device this process is necessary one time after the installation, after each change of the pipe system and after the change of the fan voltage. Thus, the device determines and memorizes the air flow characteristic of the pipe network.

Pipe system

A pipe system up to a total length of 300 m with a maximum number of 32 air sampling points can be connected to Honeywell ALL-SPEC.

Two pipe systems can be connected to Honeywell ALL-SPEC2. The whole pipe system then measures 2 x 280 m and has a maximum of 2 x 32 aspiration points.

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

2.2 Honeywell ALL-SPEC and accessories

2.2.1 Overview

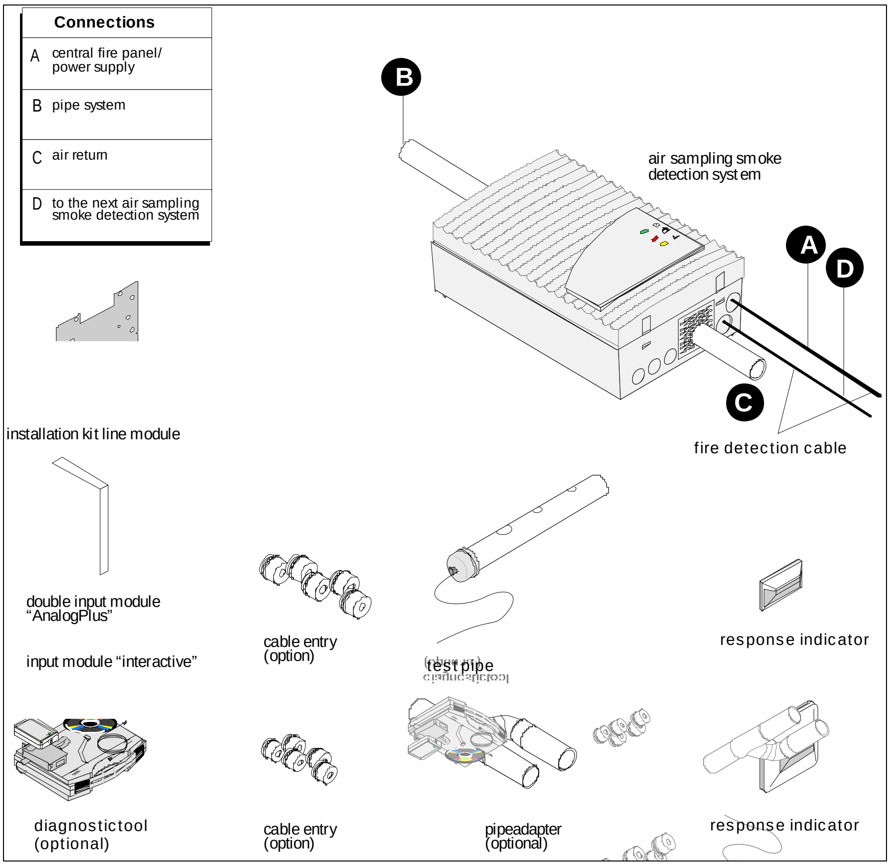


Fig. 2.3: Overview Honeywell ALL-SPEC

The components illustrated in Fig. 2.3 can be used as an option.

2.2.2 Basic device Honeywell ALL-SPEC

The basic device Honeywell ALL-SPEC consists of the following components:

- plastic housing
  - plastic connection piece
  - integrate pipe return
  - Connection for pipe with 25 mm outside diameter
- sensitive detector module with the latest technology according to optical scattered light detectors with integrated air flow monitoring
- air sampling unit with optimized air feeding
- optical displays for alarm[3], fault and ON
- interface for diagnosis

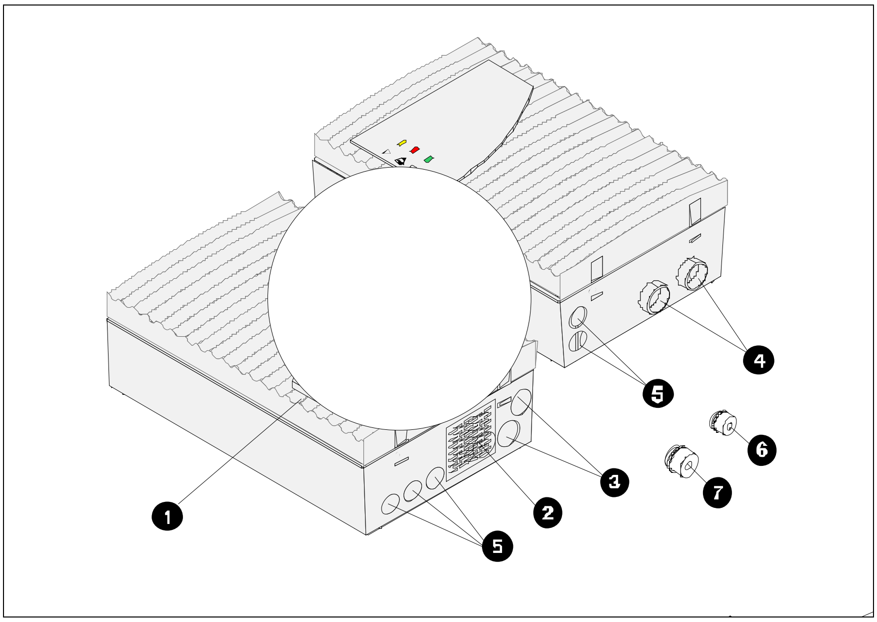


Fig. 2.4: Displays and connections of Honeywell ALL-SPEC (explanations refer to table next page)

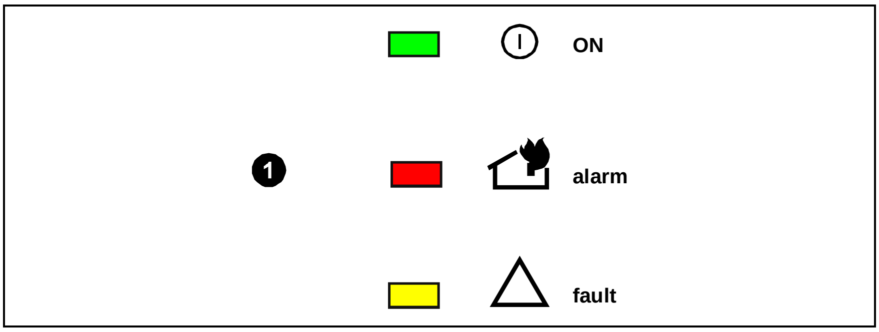


Fig. 2.5: Displays of Honeywell ALL-SPEC (explanations refer to number 1 in table next page)

[3] for Honeywell ALL-SPEC2: optical displays for alarm 1 and alarm 2

Honeywell ALL-SPEC ®

Numbers in Fig. 2.4	Function	Explanation
❶	**displays** (refer to Fig. 2.5)	
	ON (green LED)	operation display
	alarm (red LED)	alarm display
	fault (yellow LED)	fault pipe system or failure ventilator or fault detector module
❷	connection for air return pipe	to return the air
❸	cable entry of fire detection cable for connection of central fire panel (CFP) or power supply (input/output)	2 x M 25
❹	connector air sampling pipe second connector = no function[4]	for ∅ 25 mm pipe system
❺	cable entry of fire detection cable for connection of response indicator	5 x M 20
❻	plastic connection piece (small)	1 x M 20 for cable with ∅ of 8 to 12 mm
❼	plastic connection piece (large)	2 x M 25 for cable with ∅ of 9 to 14 mm (extendable to ∅ 14 to 18 mm)

4 in contrast to Honeywell ALL-SPEC*2* which offers the possibility to connect a second pipe system.

2.2.3 Diagnostics

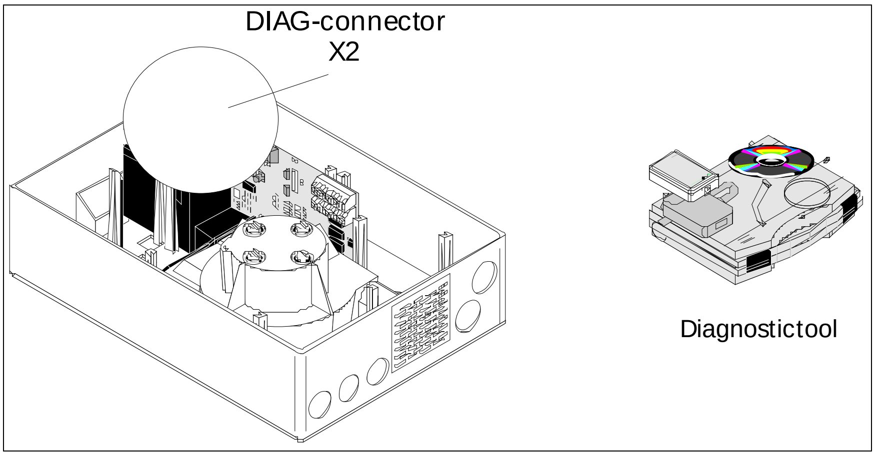


Fig. 2.6: Diagnostic software for reading out the device state

For maintenance and service the diagnostic software is able to display the memorized and current device state as well as fault signals of Honeywell ALL-SPEC on a PC or laptop. The diagnostic cable transmits the data via the X2 base board connector of Honeywell ALL-SPEC (refer to Fig. 2.6).

Diagnostic messages remain memorized for at least 3 days in the diagnostic software to allow an analysis of even short, sporadically occurring environmental influences (e.g. changed operating conditions). Resetting the diagnostic software causes the deletion of any memorized diagnostic messages.

Additionally the software allows clearing fault signals and cleaning the air flow sensor.

TIP

The diagnostic software allows filing any memorized and current diagnostic data and the settings of the DIL switch. Rename this file to be able to compare these data with the newly read-out values during the next check.

2.2.5 Device Support

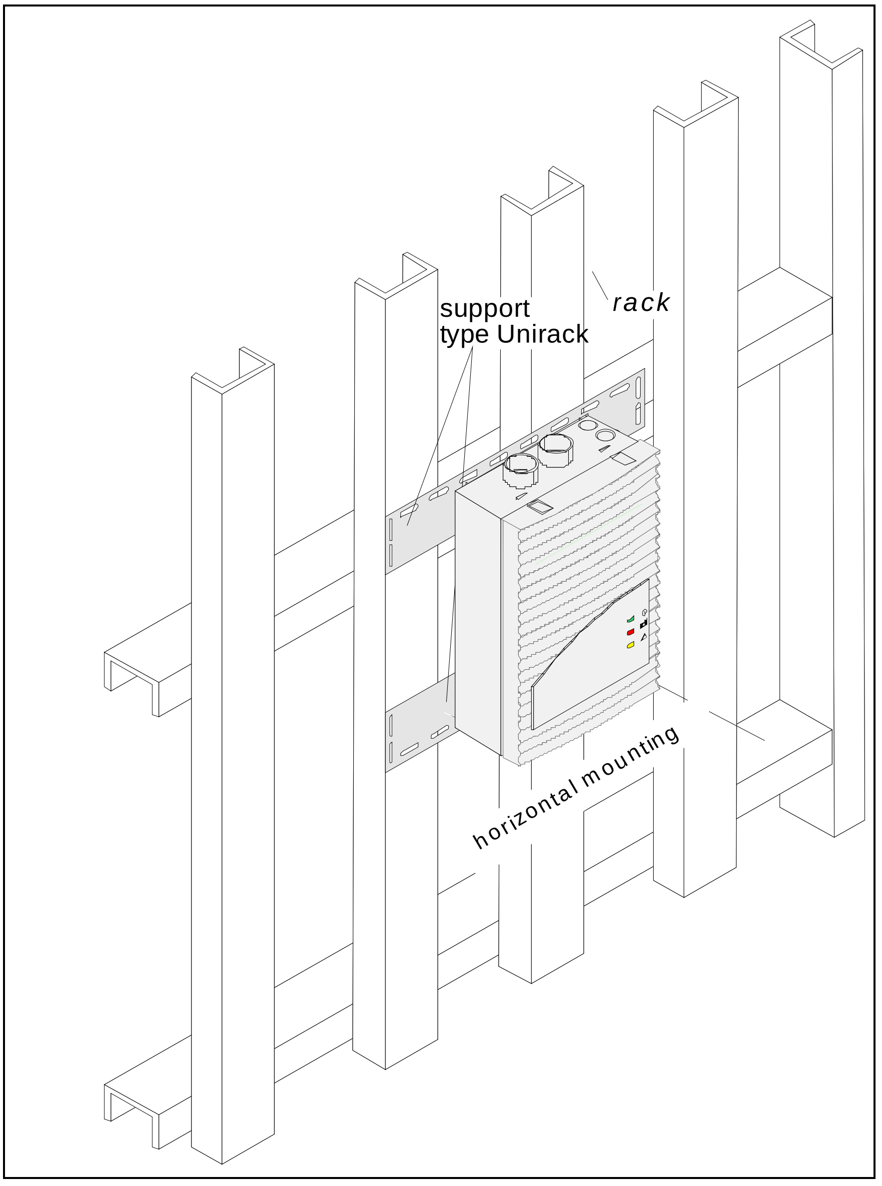


Fig. 2.7: Support for the air sampling smoke detection system Honeywell ALL-SPEC

Honeywell ALL-SPEC can be directly mounted to a wall. If required, additional supports are available.

2.3 Pipe system

2.3.1 Overview of available pipe components

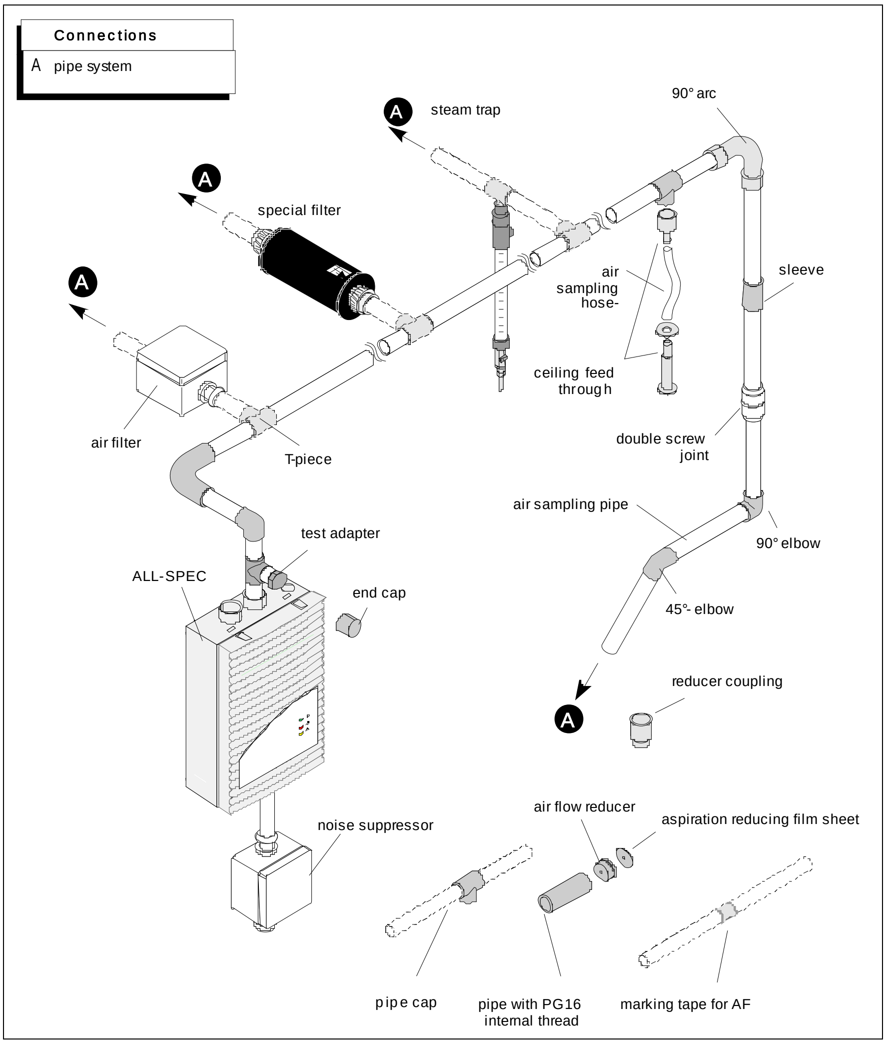


Fig. 2.9: Components for the Honeywell ALL-SPEC pipe system

The components illustrated in Fig. 2.9 are selected for each specific application and are interchangeable.

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. 2.10 and 2.11 show the components of a manual and automatic blow-through system. Depending on the frequency of blockages this can be done manually or automatically.

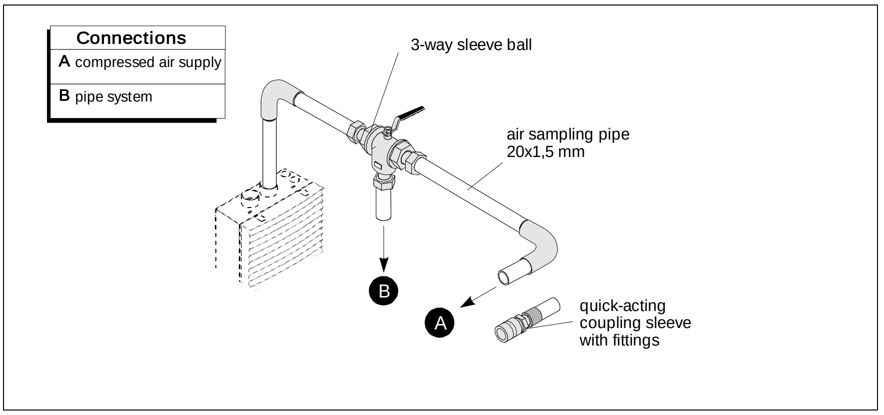


Fig. 2.10: Components for manual blow-through

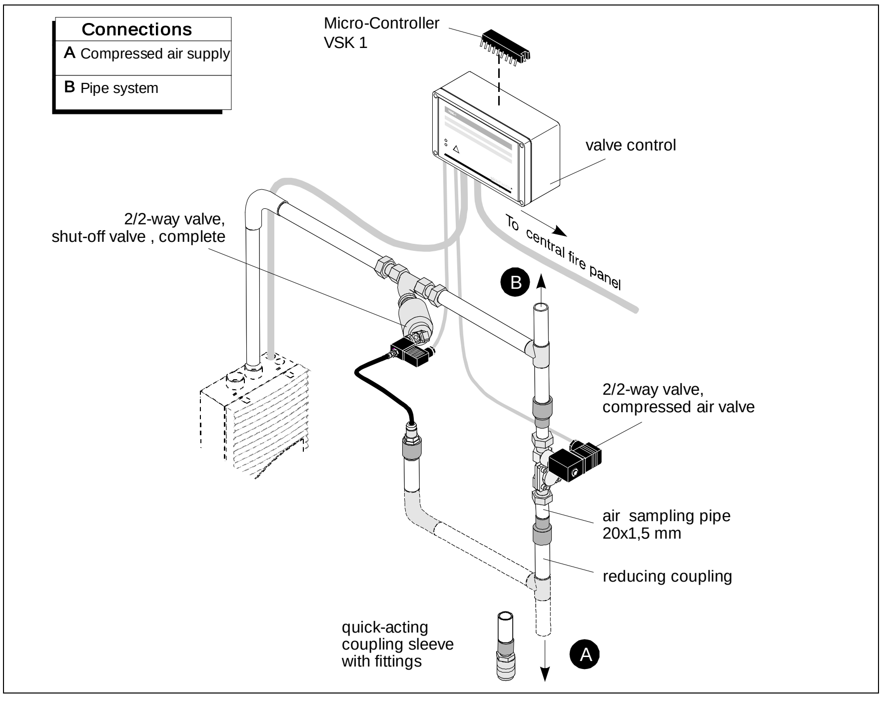


Fig. 2.11: Components for automatic blow-through

2.3.2 Air sampling points for room monitoring

2.3.2.1 Aspiration-reducing film sheets

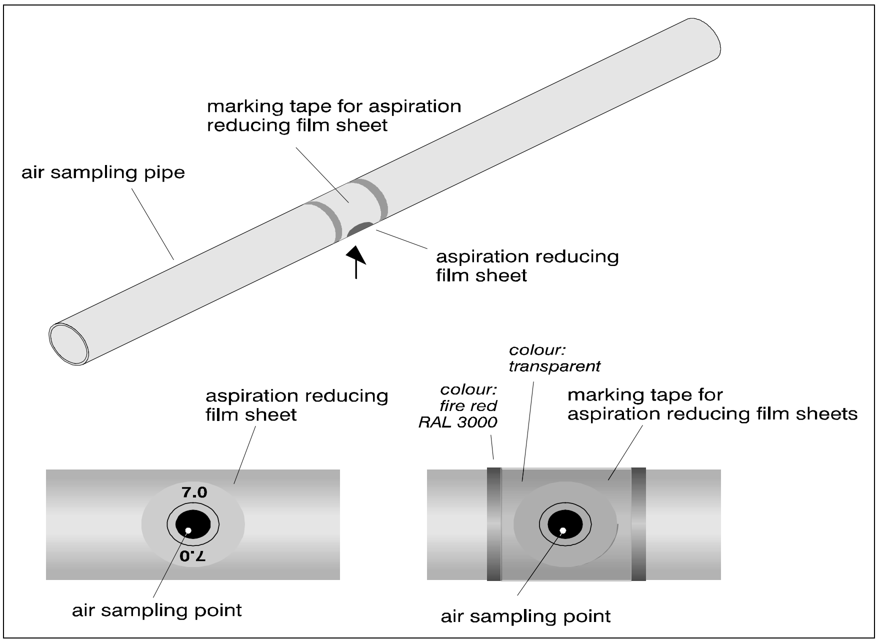


Fig. 2.12: Air sampling point with aspiration-reducing film sheet and marking tape

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, "Pipe Design").

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

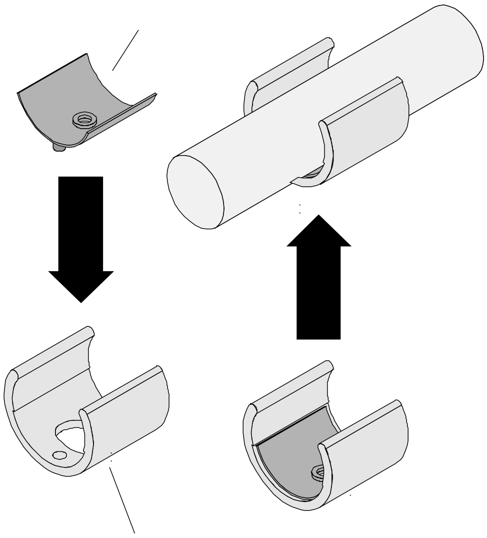


Fig. 2.13: Air flow reducer for dirty areas and deep freeze storage

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 2.14).

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

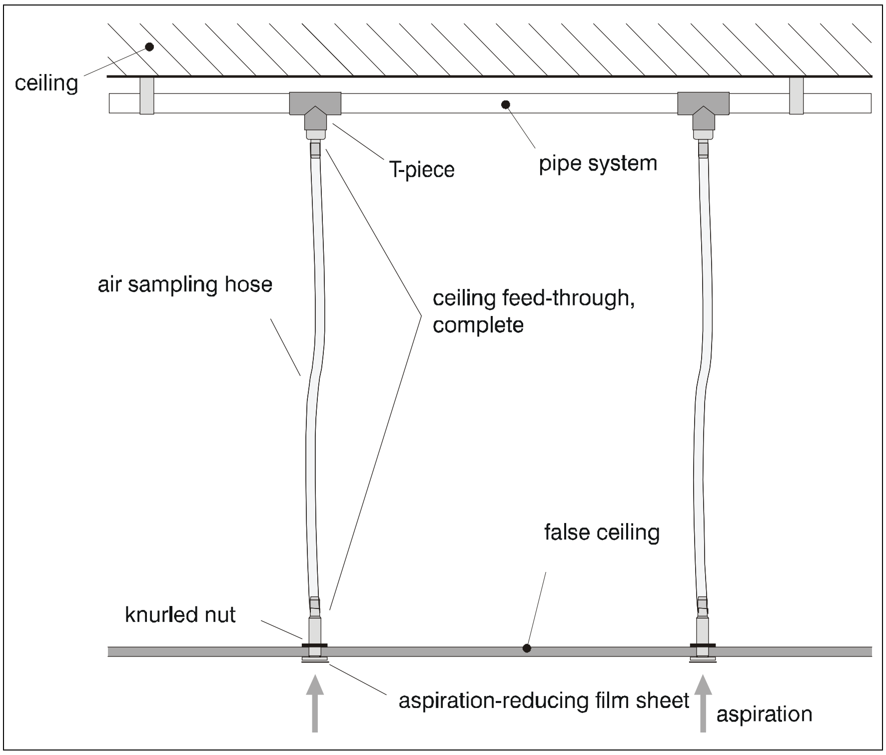


Fig. 2.14: Ceiling feed-through for ceiling voids

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 is 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).

[3] calculation is made by Honeywell

2.3.4 Air filter for dusty areas

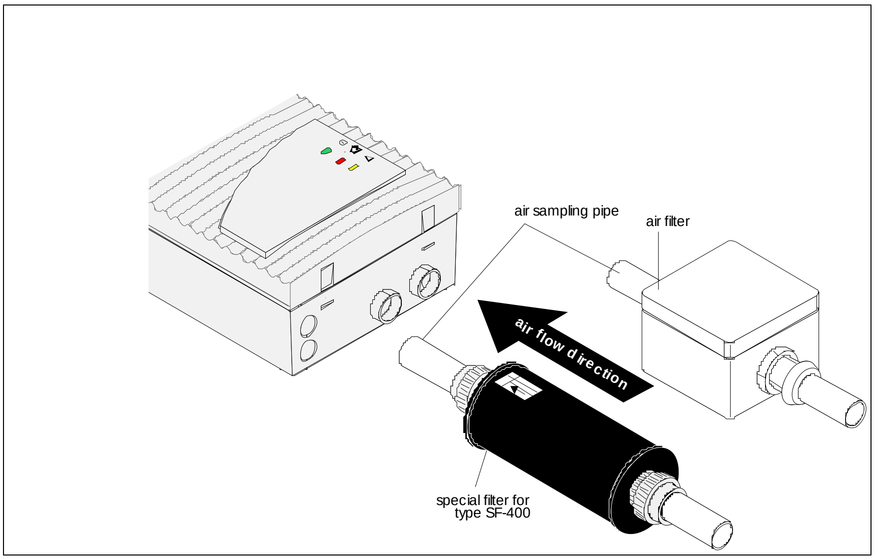


Fig. 2.15: Honeywell ALL-SPEC with air filter

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

Air Filter Type LF-AD

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 Honeywell ALL-SPEC. 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-400

In areas with a high amount of dust a special filter type SF-400 with a larger surface 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

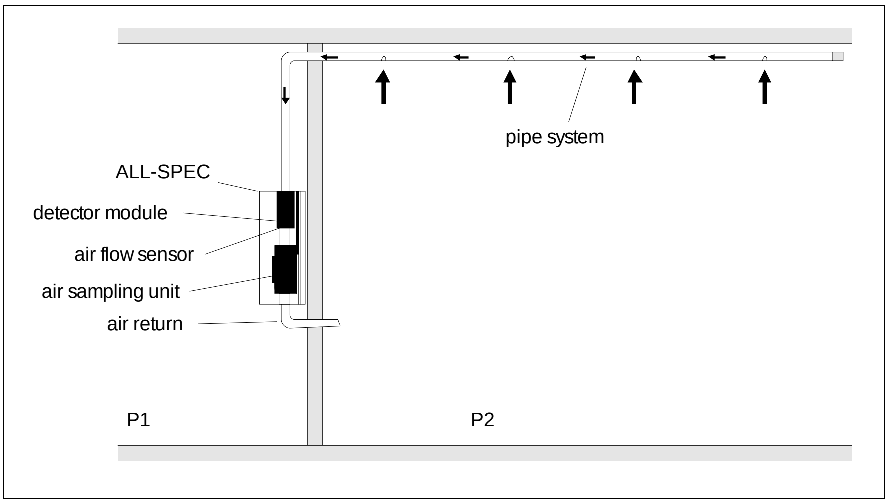


Fig.2.16: Principle of air return with Honeywell ALL-SPEC

If the air sampling smoke detection system Honeywell ALL-SPEC 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 neighbouring rooms.

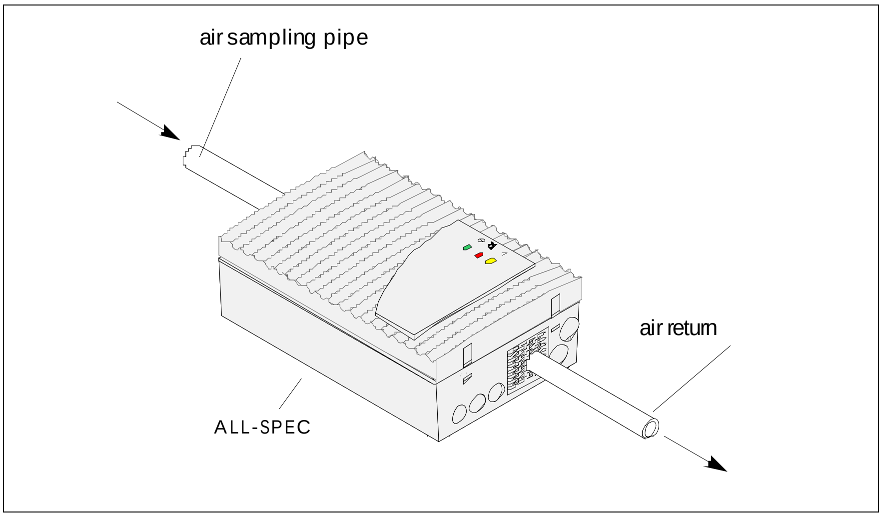


Fig. 2.17: Honeywell ALL-SPEC with air return

The return air pipe system is connected directly through the protection grid to the air outlet channel inside Honeywell ALL-SPEC (refer to Fig. 2.17). The pre-punched opening in the protection grid must be broken out to enable connection of the air return pipe.

2.3.6 Noise suppressor

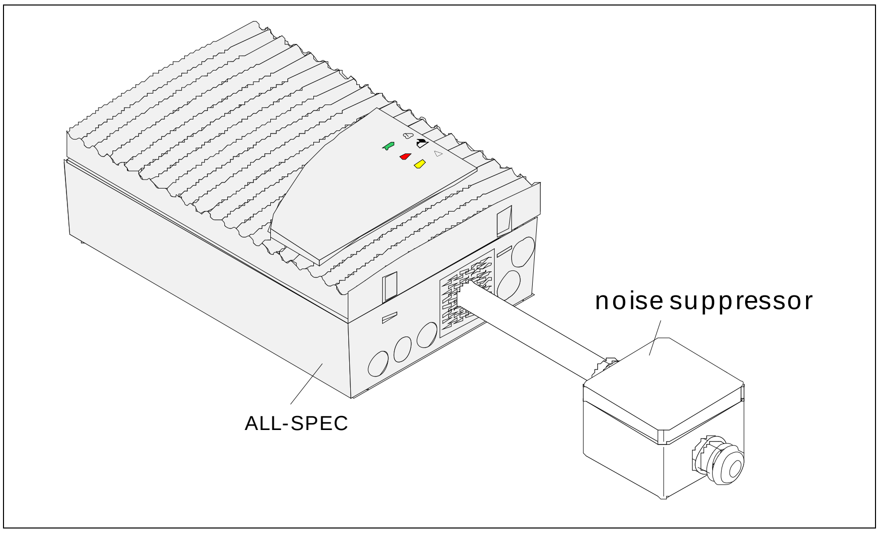


Fig. 2.18: Honeywell ALL-SPEC with noise suppressor

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 Honeywell ALL-SPEC (such as in offices or hospitals).

The noise suppressor is mounted directly to the air recirculation on the Honeywell ALL-SPEC.

2.3.7 Steam trap for humid areas

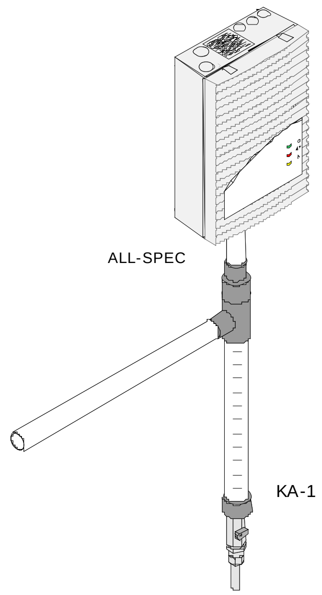


Fig. 2.19: Steam trap to eliminate water vapour from the pipe system and to collect the condensate from the pipe system

If Honeywell ALL-SPEC 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 also coarse dirt particles.

The steam trap is used in the following areas:

Application

- areas with widely varying temperatures (high humidity)
- areas with fresh air supply

3 Technical Data

INSTRUCTION

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

3.1 Honeywell ALL-SPEC

		Honeywell ALL-SPEC		Honeywell ALL-SPEC2	
Voltage	supply voltage (Ue) nominal supply voltage	14 to 30 V DC 24 V DC			
Current		U_L[1]= 6,9 V	U_L = 9 V	U_L = 6,9 V	U_L = 9 V
	starting current (at 24 V) (without reset board)	300 mA		320 mA	
	current consumption quiescent (at 24 V) (without reset board)	200 mA[2]	275 mA	220 mA	295 mA
	current consumption alarm (at 24 V) (without reset board)	max. 210 mA	max. 285 mA	max. 240 mA	max. 315 mA
	current consumption reset board	max. 20 mA			
	load on contact of the alarm and fault relays switching power	30 V, 1 A max. 24 W			
Dimensions	dimensions (h x w x d mm)	113 x 200 x 292 mm			
Weight	weight	1.35 kg			
Noise Level	L_{wa} according to EN ISO 3744, 1995 without noise suppressor	45 dB(A)			
Protection Class	protection class (DIN IEC 34 part 5)	IP 20			
Housing	material	plastic (ABS)			
	colour housing	papyrus white, RAL 9018			

[1] U_v = fan voltage
[2] The current values may vary according to the pipe system.

	Honeywell ALL-SPEC	Honeywell ALL-SPEC2

Temperature Range

Honeywell ALL-SPEC2 deep freeze version	-20° to +60°C -40° to +60°C

Humidity

Ventilator

non-condensed	10 to 95 % rf
construction type	radial
service life of the ventilator (12 V)	43.500 h at 24°C

Displays at the Device

alarm[3]	red alarm display	2 red alarm displays
fault ON	yellow collective fault green operation display	
connection for external alarm display	response indicator: type DJ 1191 / type DJ 1192	

Connections

device connector	Terminal for wire of max. 1.5 mm²	
cable	twisted in pairs, shielded or non-shielded	
cable entries	5 x M 20 2 x M 25	
tapered pipe connectors	1 x for ABS pipe ∅ 25 mm for air return ∅ 25 mm	2 x for ABS pipe ∅ 25 mm for air return ∅ 25 mm

Response sensitivity

Detector module ASD-TP-05...	up to 0.5 % light obscuration/m
Detector module ASD-TP-01...	up to 0.1 % light obscuration/m
Detector module ASD-TP-001...	up to 0.015 % light obscuration/m

[3] Honeywell ALL-SPEC*2: alarm 1 and alarm 2*

		Honeywell ALL-SPEC and -SL			Honeywell ALL-SPEC2 and -SL		
Voltage	supply voltage (Ue) nominal supply voltage	14 to 30 V DC 24 V DC					
Power	**Voltage with fan control board FC-2**	U_L[4]= 6,5 V	U_L = 6,9 V	U_L = 9 V	U_L = 6,5 V	U_L = 6,9 V	U_L = 9 V
	starting current (at 24V) (without additional module)	300 mA			330 mA		
	quiescent current consumption (at 24 V) (without additional module)	140 mA	150 mA	180 mA	170 mA	180 mA	210 mA
	current consumption alarm (at 24V) (without additional module)	max. 150 mA	max. 160 mA	max. 190 mA	max. 180 mA	max. 190 mA	max. 220 mA
	starting current (at 24V) (without additional module)	300 mA			330 mA		
	quiescent current consumption (at 24 V) (without additional module)	180 mA	200 mA	230 mA	230 mA	240 mA	270 mA
	current consumption alarm (at 24V) (without additional module)	max. 200 mA	max. 210 mA	max. 240 mA	max. 260 mA	max. 260 mA	max. 290 mA
	current consumption reset board	max. 20 mA					
	current consumption network module	max. 40 mA					
	current consumption shutdown module	max. 6 mA					
	contact load of alarm and fault relays switching power	30 V, 1 A max. 24 W					
Dimensions	dimensions (h x b x d mm)	113 x 200 x 292 mm					
Weight	weight	1.35 kg					
Noise level	L_{wa} according to EN ISO 3744, 1995 (without noise suppressor)	at 31 dB(A) according to ventilator voltage					
	L_{wa} according to EN ISO 3744, 1995 (with noise suppressor)	at 23 dB(A) according to ventilator voltage					

[4] U_V = fan voltage

		Honeywell ALL-SPEC and -SL	Honeywell ALL-SPEC2 and -SL
Protection classification	protection class (DIN IEC 34 part 5)	IP 20	
Housing	material	plastic (ABS)	
	colour housing	papyrus white, RAL 9018	
Temperature range		0° to +40°C	
Humidity	not condensed	10 to 95 % rf	
Ventilator	type	radial	
	service life of fan (12 V)	43.500 h at 24°C	
Displays on the device	alarm[5]	red alarm display	2 red alarm displays
	fault ON	yellow collective fault green operation display	
	connection for external alarm display	response indicator: type DJ 1191 / type DJ 1192	
Connections	device connector	terminals for wires of max. 1.5 mm²	
	cable	twisted in pairs, shielded or non-shielded	
	cable entries	5 x M 20 2 x M 25	
	tapered pipe connectors	1 x for ABS pipe ∅ 25 mm for air return ∅ 25 mm	2 x for ABS pipe ∅ 25 mm for air return ∅ 25 mm
Response sensitivity	Detector module ASD-TP-05...	up to 0.5 % light obscuration/m	
	Detector module ASD-TP-01...	up to 0.1 % light obscuration/m	
	Detector module ASD-TP-001...	up to 0.015 % light obscuration/m	

[5] Honeywell ALL-SPEC*2: alarm 1 and alarm 2*

3.2 Pipe system – Honeywell ALL-SPEC

Pipe system

	Pipe system	
	Honeywell ALL-SPEC and -SL	Honeywell ALL-SPEC2 and -SL
max. pipe length max. number of air sampling points	300 m 32	560 m 64
max. length of air sampling hose per ceiling feed through	1 m	
Temperature range PVC pipe ABS pipe	-0°C..+60°C -40°C..+80°C	
max. monitoring area	2880 m^2	5760 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 4.2 apply to special applications in addition to Chapter 4.3 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
Transport time reduction	Project planning with acceleration apertures	Chapter 4.2	Chapter 4.3.4
Ventilation conduits	Project planning for forced air flow	Chapter 4.2	Chapter 4.3.5

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.

- 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.

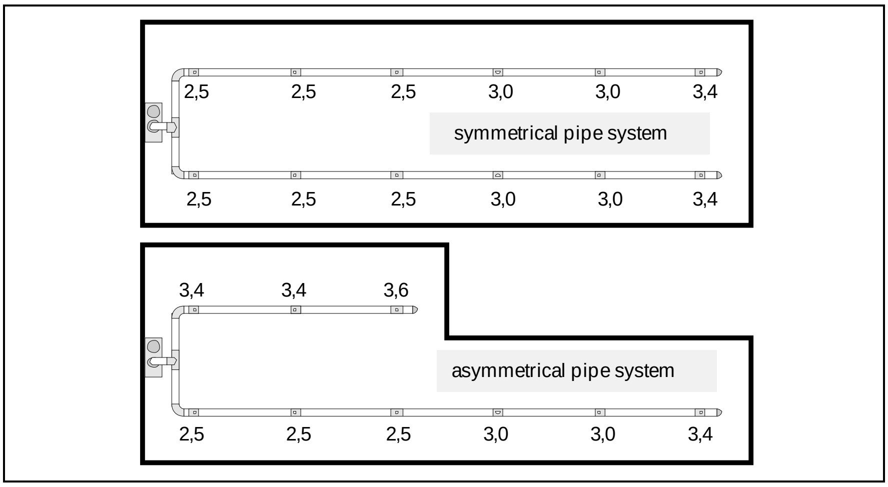


Fig. 4.1: Example of a symmetrical and an asymmetrical U-pipe system

Longer pipe lengths

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

5 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 Honeywell ALL-SPEC.
M-pipe	An air sampling smoke detection pipe system which branches into 3 air sampling branches after the connection to the Honeywell ALL-SPEC.
Double U-pipe	An air sampling smoke detection pipe system which branches into 4 air sampling branches after the connection to the Honeywell ALL-SPEC.
Quadruple U-pipe	An air sampling smoke detection pipe system which branches into 8 air sampling branches after the connection to the Honeywell ALL-SPEC

Pipe connections

The ALL-SPEC has 2 pipe connections. One pipe system may be connected to each of these pipe connections, as long as two detector modules are being used.

If only one detector module is being used, it will only be possible to connect one sampling pipe.

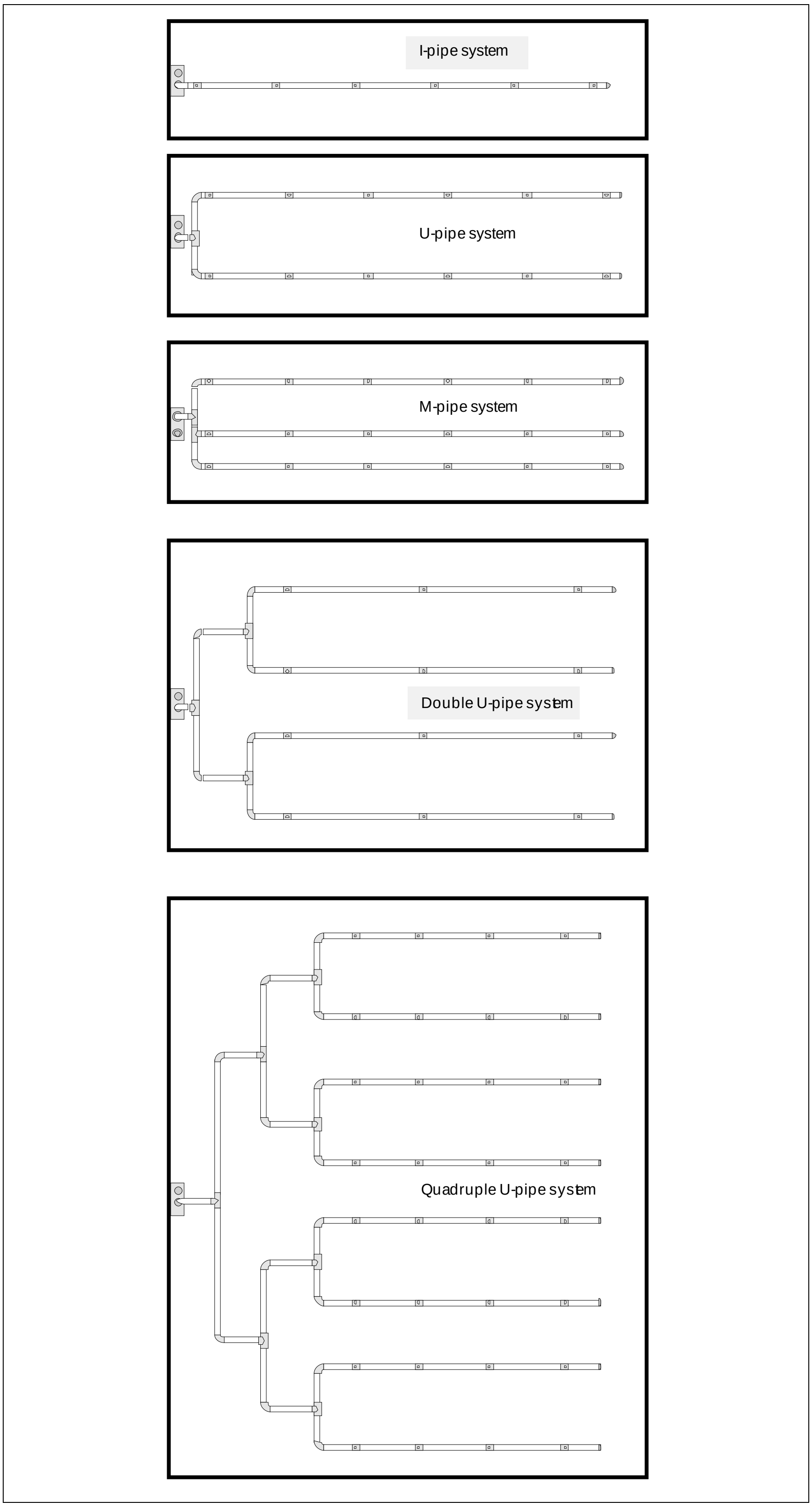


Fig. 4.2: Pipe designs

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	1.5m
Bend	0.3m

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, Honeywell 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

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

Dual detector dependency

One intake line is to be allocated per detector module. The two detector modules of a device must be evaluated independently of one another. Only one extinguishing area may be monitored per air sampling smoke detection system.

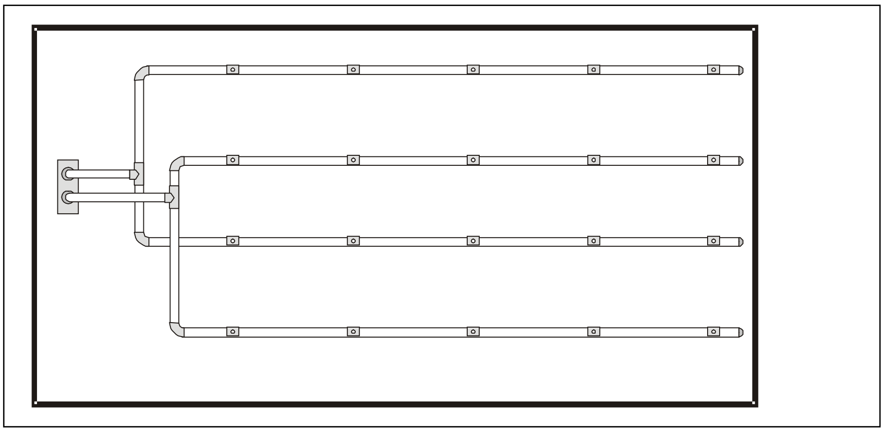


Fig. 4.3: Pipe design for dual detector dependency

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 II. But level I 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.

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.

Dynamic air flow sensor system

The device's air flow monitoring enables the system to detect both pipe breakages outside the device and sudden obstruction in individual aspiration apertures (e.g. in the event of sabotage to the pipe system). As the dynamic air flow sensors are only active if level I has been selected for the air flow monitoring, the aspects described under "Level I limitation" should be taken into account here.

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 Honeywell ALL-SPEC 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 Honeywell ALL-SPEC:

Activation sensitivity (fire alarm) **Honeywell ALL-SPEC**		
Detector module Type ASD-TP-05-L	**Detector module Type ASD-TP-01-L**	**Detector module Type ASD-TP-001-L**
	0.8 % light obscuration/m	0.12 % light obscuration/m
	0.4 % light obscuration/m (Standard)	0.06 % light obscuration/m (Standard)
1 % light obscuration/m	0.2 % light obscuration/m	0.03 % light obscuration/m
0.5 % light obscuration/m (Standard)	0.1 % light obscuration/m	0.015% 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 Honeywell ALL-SPEC **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 300 m (2 x 280 m with 2 pipe systems connected)
- 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 **32** 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

If components which have not been approved by Honeywell 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 filters
- Steam trap
- Detonation protection

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
SF-400	Fine filter for separating particles > approx. 1 µm	As above. Additionally: Fine dust in high concentrations

Steam trap

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

Sound suppressor

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

Stop valve

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

Detonation protection

Type	Application
EG IIA	Detonation protection for explosion group II A areas
EG IIB3	Detonation protection for explosion group II B 3 areas
EG IIC	Detonation protection for explosion group II C areas

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 SF-400 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.	**<u>Selection</u>** Selection of the corresponding project planning table based on the air filter to be used (see Chap. 4.2.2) **<u>Result</u>** The project planning table has been determined
2.	**<u>Selection</u>** Selection of the number of aspiration apertures in the project planning table **<u>Result</u>** The achievable sensitivity class for the selected number of apertures has been determined
3.	**<u>Selection</u>** Determinations on the sensitivity necessary to achieve the sensitivity class **<u>Result</u>** Determination of the detector module and sensitivity setting
4.	**<u>Selection</u>** Selection of other pipe components (e.g. steam trap and detonation protection see Chap. 4.2.2 described components) **<u>Result</u>** The project planning table has been determined
5.	**<u>Selection</u>** Pipe length selection **<u>Result</u>** Determination of the pipe shape and necessary fan voltage.

1 Projection without filter

M = Modul S = Sensitivity (% Lt/m) HA = Fire alarm VA = Action alarm

M	S		1	2	3	4	5	6	7	8	9	10	11	...	32
0,015	0,015	HA	A	A	A	A	A	A	A	A	A	A	A		A
	0,03	HA	A	A	A	A	A	A	A	A	A	A	A		A
	0,06	HA	A	A	A	A	A	A	A	A	A	A	A		B
	0,12	HA	A	A	A	A	A	A	B	B	B	B	B		C
0,1	0,1	HA	A	A	A	A	A	A	A	A	A	B	B		B
	0,2	HA	A	A	A	A	B	B	B	B	B	B	B		C
	0,4	HA	A	A	B	B	B	B	C	C	C	C	C		
	0,8	HA	A	B	B	C	C	C							
0,5	0,5	HA	A	A	A	B	B	B	B	C	C	C	C		
	1	HA	A	B	B	C	C	C	C						

without pipe accessories

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	9	10	11	...	32	permitted total pipe length [m]
I	6,5	77	77	77	77	77	77	77	77						
	6,9	77	77	77	77	77	77	77	77	76					
	≥9	100	100	100	100	100	100	100	100	100	100	100			
U	6,5	120	120	120	120	120	120	120	120	120	120	120			
	6,9	120	120	120	120	120	120	120	120	120	120	120			
	≥9	150	150	150	150	150	150	150	150	150	150	150			
M	6,5	170	170	170	170	170	170	170	170	170	170	170			
	6,9	170	170	170	170	170	170	170	170	170	170	170			
	≥9	180	180	180	180	180	180	180	180	180	180	180			
Double U	6,5	180	180	180	180	180	180	180	180	180	180	180			
	6,9	180	180	180	180	180	180	180	180	180	180	180			
	≥9	200	200	200	200	200	200	200	200	200	200	200			
Quad-U (1 DM)	6,5														
	6,9														
	≥9	300	300	300	300	300	300	300	300	300	300	300		300	
Quad-U (2 DM)	6,5														
	6,9														
	12	280	280	280	280	280	280	280	280	280	280	280		280	

with detector box and/or VSK

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	9	10	11	...	32	permitted total pipe length [m]
I	6,5	70	70	70	70	70	70	70							
	6,9	70	70	70	70	70	70	70	70						
	≥9	100	100	100	100	100	100	100	100	100	100				
U	6,5	120	120	120	120	120	120	120	120	120	120	120			
	6,9	120	120	120	120	120	120	120	120	120	120	120			
	≥9	140	140	140	140	140	140	140	140	140	140	140			
M	6,5	150	150	150	150	150	150	150	150	150	150	150			
	6,9	150	150	150	150	150	150	150	150	150	150	150			
	≥9	180	180	180	180	180	180	180	180	180	180	180			
Double U	6,5	140	140	140	140	140	140	140	140	140	140	140			
	6,9	150	150	150	150	150	150	150	150	150	150	150			
	≥9	180	180	180	180	180	180	180	180	180	180	180			

with steam trap

Pipe shape	U_{Fan}[V]	1	2	3	4	5	6	7	8	9	10	11	...	32	permitted total pipe length [m]
I	6,5	60	60	60	60	60	60								
	6,9	60	60	60	60	60	60	60							
	≥9	80	80	80	80	80	80	80	80	80	80				
U	6,5	100	100	100	100	100	100	100	100	100	100				
	6,9	110	110	110	110	110	110	110	110	110	110	110			
	≥9	110	110	110	110	110	110	110	110	110	110	110			
M	6,5	100	100	100	100	100	100	100	100	100	100	100			
	6,9	110	110	110	110	110	110	110	110	110	110	110			
	≥9	160	160	160	160	160	160	160	160	160	160	160			
Double U	6,5	140	140	140	140	140	140	140	140	140	140	140			
	6,9	140	140	140	140	140	140	140	140	140	140	140			
	≥9	160	160	160	160	160	160	160	160	160	160	160			

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

- Module 0.015 % LT/m – with a sensitivity of min. 0.12 % LT/m
- Module 0.1 % LT/m – with a sensitivity of min. 0.2 % LT/m

Possible system parameters:

- I-pipe system
  - ≥ 9 V fan voltage, max. 80 m overall pipe length
- U-pipe system
  - 6.5 V fan voltage, max. 100 m overall pipe length
  - 6.9 V fan voltage, max. 110 m overall pipe length
  - ≥ 9 V fan voltage, max. 110 m overall pipe length
- M-pipe system
  - 6.5 V fan voltage, max. 100 m overall pipe length
  - 6.9 V fan voltage, max. 110 m overall pipe length
  - ≥ 9 V fan voltage, max. 160 m overall pipe length
- Double U-pipe system,
  - 6.5 V fan voltage, max. 140 m overall pipe length
  - 6.9 V fan voltage, max. 140 m overall pipe length
  - ≥ 9 V fan voltage, max. 160 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

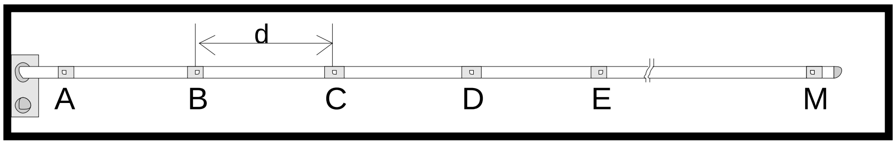


Fig. 4.4: I-pipe system

Aspiration apertures

Number of apertures	1	2	3	4	5	6	7	8	9	10	11	12	13
Sampling aperture ∅ in mm [1)]													
A	7.0	6.0	5.2	4.6	4.2	3.8	3.6	3.4	3.0	3.0	2.5	2.5	2.5
B	—	6.8	5.2	4.6	4.2	3.8	3.6	3.4	3.0	3.0	2.5	2.5	2.5
C	—	—	5.6	4.6	4.4	4.0	3.8	3.4	3.2	3.0	3.0	3.0	2.5
D	—	—	—	5.0	4.4	4.0	3.8	3.4	3.4	3.0	3.0	3.0	2.5
E	—	—	—	—	4.4	4.2	3.8	3.6	3.6	3.4	3.0	3.0	3.0
F	—	—	—	—	—	4.2	3.8	3.8	3.6	3.4	3.4	3.0	3.0
G	—	—	—	—	—	—	4.0	3.8	3.6	3.6	3.4	3.2	3.0
H	—	—	—	—	—	—	—	4.0	3.8	3.6	3.4	3.2	3.0
I	—	—	—	—	—	—	—	—	3.8	3.6	3.6	3.2	3.2
J	—	—	—	—	—	—	—	—	—	3.8	3.8	3.2	3.2
K	—	—	—	—	—	—	—	—	—	—	3.8	3.8	3.4
L	—	—	—	—	—	—	—	—	—	—	—	4.0	3.8
M	—	—	—	—	—	—	—	—	—	—	—	—	4.0

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

U-pipe

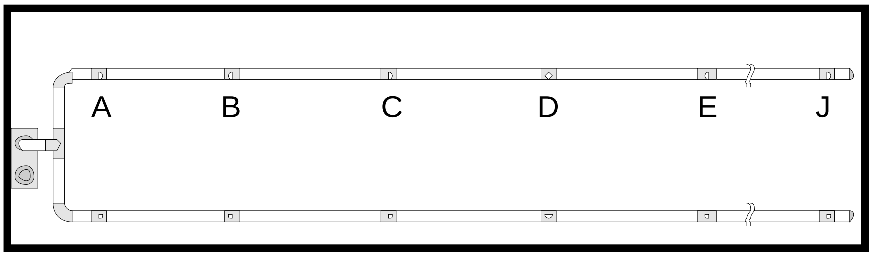


Fig. 4.5: U-pipe system

Aspiration apertures

Number of apertures	2	4	6	8	10	12	14	16	18	20
Sampling aperture ∅ in mm[2])										
A	5.2	3.6	3.4	3.0	2.5	2.5	2.0	2.0	2.0	2.0
B	—	4.4	3.4	3.0	3.0	2.5	2.0	2.0	2.0	2.0
C	—	—	3.6	3.2	3.0	2.5	2.5	2.0	2.0	2.0
D	—	—	—	3.4	3.2	3.0	2.5	2.5	2.0	2.0
E	—	—	—	—	3.2	3.0	3.0	2.5	2.5	2.0
F	—	—	—	—	—	3.4	3.2	3.0	2.5	2.5
G	—	—	—	—	—	—	3.6	3.4	3.0	2.5
H	—	—	—	—	—	—	—	3.6	3.4	2.5
I	—	—	—	—	—	—	—	—	3.6	3.6
J	—	—	—	—	—	—	—	—	—	3.8

M-pipe

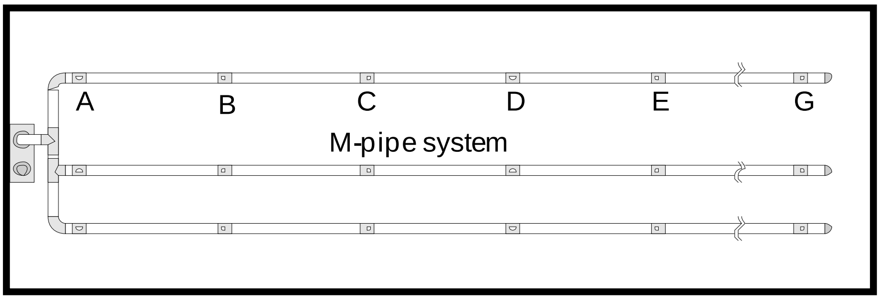


Fig. 4.6: M –pipe system

Aspiration apertures

Number of apertures	3	6	9	12	15	18	21
Sampling aperture ∅ in mm[2])							
A	4.4	3.4	3.0	2.5	2.5	2.0	2.0
B	—	3.6	3.0	2.5	2.5	2.5	2.0
C	—	—	3.2	3.2	2.5	2.5	2.0
D	—	—	—	3.2	3.0	2.5	2.5
E	—	—	—	—	3.2	3.0	2.5
F	—	—	—	—	—	3.2	3.2
G	—	—	—	—	—	—	3.4

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

Double U-pipe

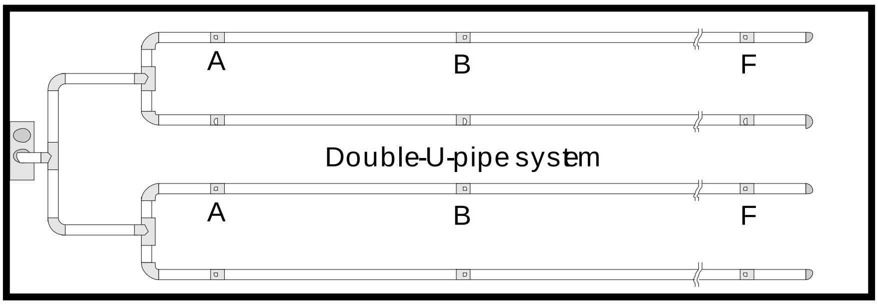


Fig. 4.7: Double U-pipe system

Aspiration apertures

Number of apertures	**4**	**8**	**12**	**16**	**20**	**24**
Sampling aperture ∅ in mm[3])						
A	4.0	3.0	2.5	2.0	2.0	2.0
B	—	3.4	3.0	2.5	2.0	2.0
C	—	—	3.0	3.0	2.5	2.0
D	—	—	—	3.2	2.5	2.5
E	—	—	—	—	3.6	2.5
F	—	—	—	—	—	3.6

Quadruple U-pipe

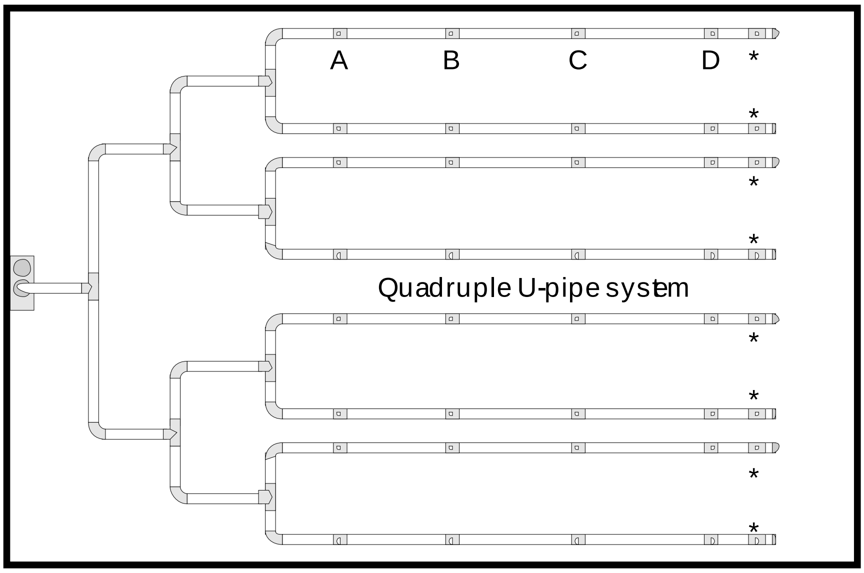


Fig. 4.8: Quadruple U-pipe

Aspiration apertures

Number of apertures	**8**	**16**	**24**	**32**
Sampling aperture ∅ in mm[3])				
A	3.2	2.5	2.0	2.0
B	—	3.0	2.5	2.0
C	—	—	3.0	2.0
D	—	—	—	2.5
Acceleration aperture		2.5 *	3.0 *	3.0 *

* The distance of the acceleration aperture to the last sampling aperture is entirely elective.

[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

1 pipe system

Honeywell ALL-SPEC

2 pipe systems

Honeywell ALL-SPEC*2*

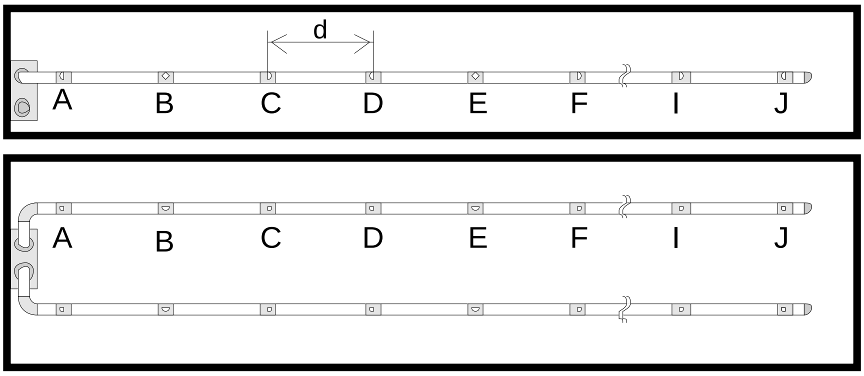


Fig. 4.9: I-shape pipe system for area protection

Limit values

Min. distance from All-SPEC to 1st sampling aperture	4 m
Max. distance from ALL-SPEC to 1st sampling aperture	20 m
Max. Distance from 1st sampling aperture to last sampling aperture with low fan voltage 6.5 V – 6.9 V with high fan voltage 9 V – 12 V	40 m 60 m
Max. Overall pipe length per pipe system with low fan voltage 6.5 V – 6.9 V with high fan voltage 9 V – 12 V	60 m 80 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	6.0	5.0	4.2	3.8	3.2	3.0	2.5	2.5	2.0
B	6.8	5.2	4.4	3.8	3.2	3.0	2.5	2.5	2.0
C	—	5.2	4.6	4.0	3.6	3.0	3.0	2.5	2.5
D	—	—	4.6	4.0	3.6	3.4	3.0	3.0	2.5
E	—	—	—	4.4	4.0	3.4	3.4	3.0	3.0
F	—	—	—	—	4.0	3.8	3.4	3.4	3.0
G	—	—	—	—	—	3.8	3.8	3.4	3.4
H	—	—	—	—	—	—	3.8	3.8	3.4
I	—	—	—	—	—	—	—	3.8	3.6
J	—	—	—	—	—	—	—	—	3.6

I-pipe system triggering thresholds

Triggering threshold

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

Example **if the blockage of 3 aspiration apertures of a total of 7 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 or II 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] O not purposeful

4.3.1.2 U-shape pipe system

1 pipe system
Honeywell ALL-SPEC

2 pipe systems
Honeywell ALL-SPEC*2*

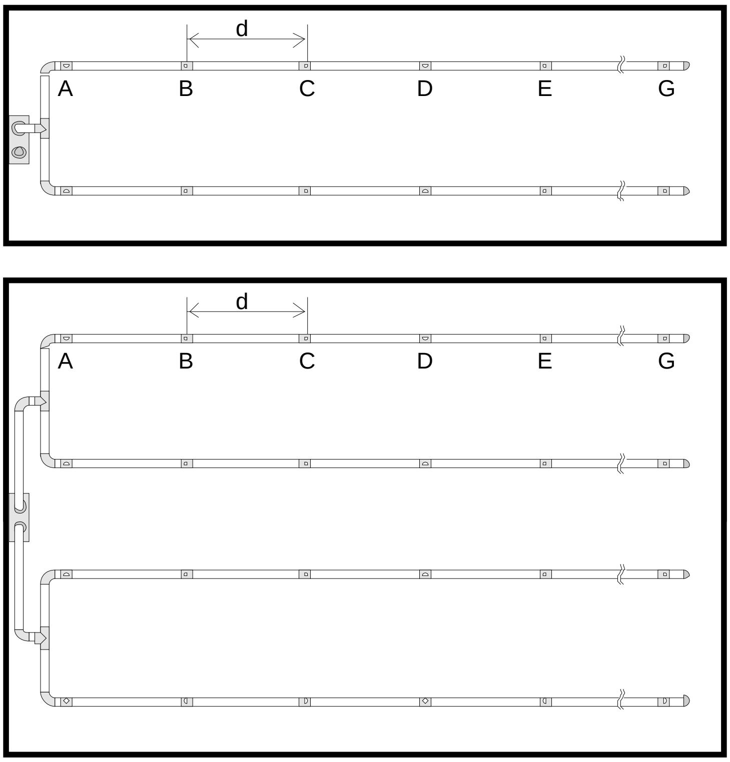


Fig. 4.10: U-shape pipe system for area protection

Limit values

Min. distance from ALL-SPEC to T-piece	4 m
Max. distance from ALL-SPEC to T-piece	20 m
Max. Branch length with low fan voltage 6.5 V – 6.9 V with high fan voltage 9 V – 12 V	40 m 50 m
Max. Overall pipe length per pipe system with low fan voltage 6.5 V – 6.9 V with high fan voltage 9 V – 12 V	100 m 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	14 pcs.

Aspiration apertures

Number of apertures per pipe system	2	4	6	8	10	12	14
Sampling aperture ∅ in mm[7])							
A	5.2	3.6	3.4	3.2	2.5	2.5	2.0
B	—	4.0	3.4	3.2	3.0	2.5	2.0
C	—	—	3.6	3.4	3.0	2.5	2.5
D	—	—	—	3.4	3.2	3.0	2.5
E	—	—	—	—	3.2	3.0	3.0
F	—	—	—	—	—	3.2	3.0
G	—	—	—	—	—	—	3.2

U-pipe system triggering thresholds

per pipe system

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

Example

If the blockage of 3 aspiration apertures of a total of 10 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 or II should be set in any case for project planning in conformity with EN 54-20.

[7] Press cut diameter in aspiration-reducing film sheet
[8] — not possible
[9] ○ not purposeful

4.3.1.3 M-pipe system

1 pipe system
Honeywell ALL-SPEC

2 pipe systems
Honeywell All-Spec2

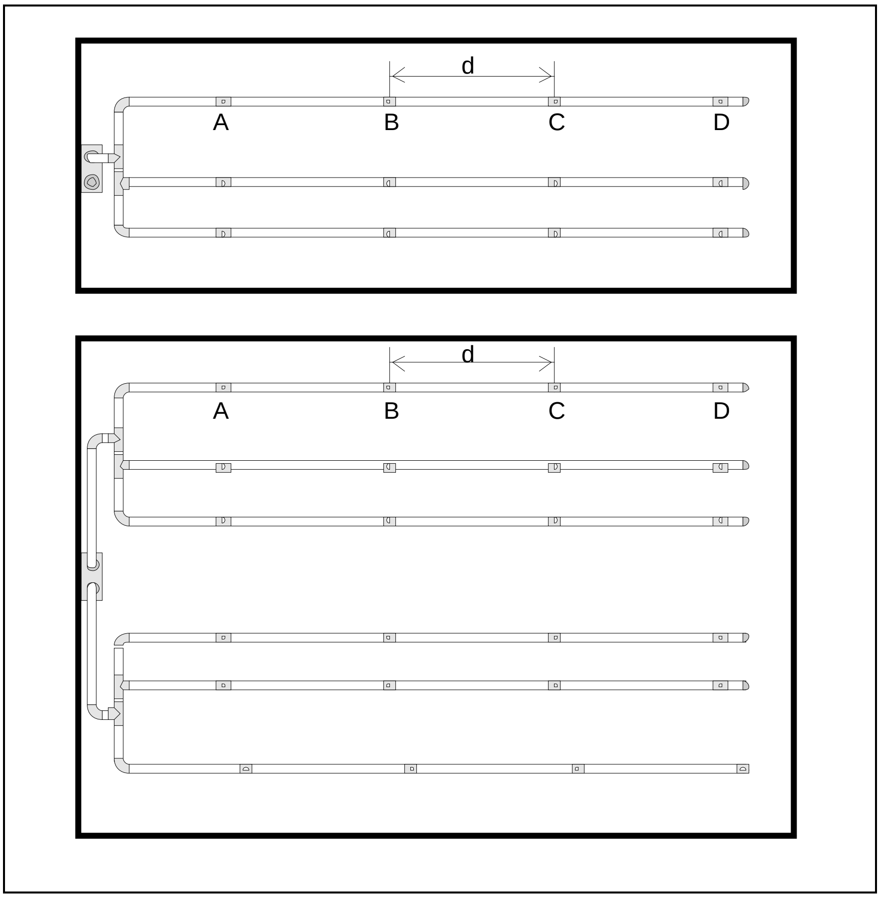


Fig. 4.11: M-shape pipe system for area protection

Limit values

Min. distance from ALL-SPEC to T-piece	4 m
Max. distance from ALL-SPEC to T-piece	20 m
Max. Branch length with low fan voltage 6.5 V – 6.9 V with high fan voltage 9 V – 12 V	 30 m 40 m
Max. Overall pipe length per pipe system with low fan voltage 6.5 V – 6.9 V with high fan voltage 9 V – 12 V	 110 m 140 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	4.4	3.4	3.0	2.5
B	—	3.6	3.0	2.5
C	—	—	3.2	3.2
D	—	—	—	3.2

M-pipe system triggering thresholds

per pipe system

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

Example **If the 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 I.**

INSTRUCTION

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

10 Press cut diameter in aspiration-reducing film sheet
11 — not possible
12 ○ not purposeful

4.3.1.4 Double U-pipe system

1 pipe system
Honeywell ALL-SPEC

2 pipe systems
Honeywell ALL-SPEC*2*

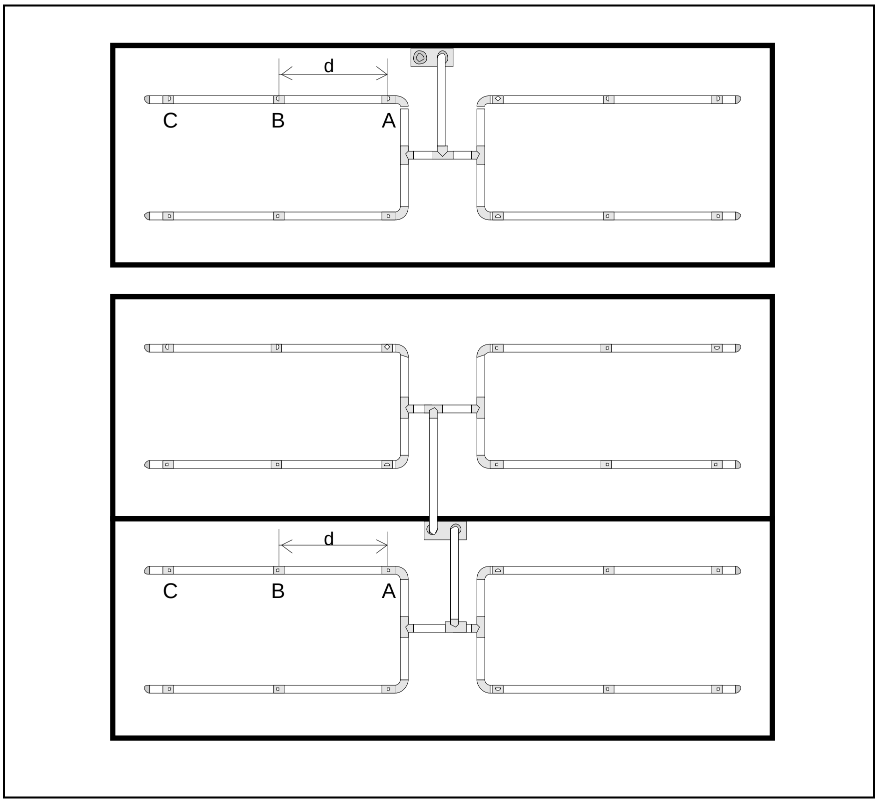


Fig. 4.12: Double U pipe system for area protection

Limit values

Min. distance from ALL-SPEC to last T-piece	4 m
Max. distance from ALL-SPEC to last T-piece	20 m
Max. branch length with low fan voltage 6.5 V – 6.9 V with high fan voltage 9 V – 12 V	 20 m 30 m
Max. Overall pipe length per pipe system with low fan voltage 6.5 V – 6.9 V with high fan voltage 9 V – 12 V	 100 m 140 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 aspiration apertures per pipe system	4	8	12
Sampling aperture ∅ in mm[13])			
A	4.0	3.0	2.5
B	—	3.4	3.0
C	—	—	3.0

Double U-pipe system triggering thresholds

per pipe system

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

Example If the blockage of **4** aspiration apertures of a total of **12** 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** or **II** should be set in any case for project planning in conformity with EN 54-20.

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

1 pipe system

Honeywell ALL-SPEC

2 pipe systems

Honeywell ALL-SPEC*2*

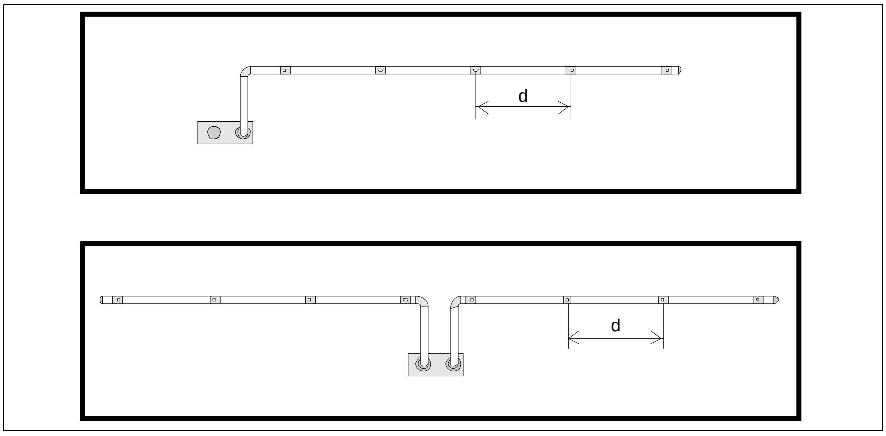


Fig. 4.13: I-pipe system, such as for equipment protection

Limit values

Min. distance from ALL-SPEC to 1st sampling aperture	2 m
Max. distance from ALL-SPEC to 1st sampling aperture	20 m
Max. distance from the 1st sampling aperture to the last sampling aperture	20 m
Max. overall pipe length Ø 25 mm	40 m
Max. number of aspiration apertures (n) per pipe system	18 pcs.
Minimum distance between aspiration apertures (d)	0.1 m
Maximum distance between aspiration apertures (d)	4 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	3.4	3.2	3.0	3.0

Aspiration apertures

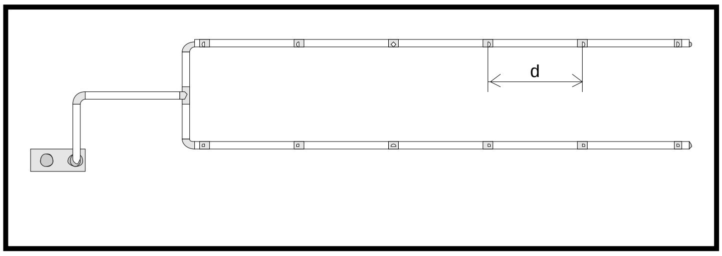
Number of apertures	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
∅ of all aspiration apertures in mm)	3.0	3.0	2.5	2.5	2.5	2.5	2.5	2.5

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

4.3.2.2 U-pipe system

1 pipe system

Honeywell ALL-SPEC



2 pipe systems

Honeywell ALL-SPEC*2*

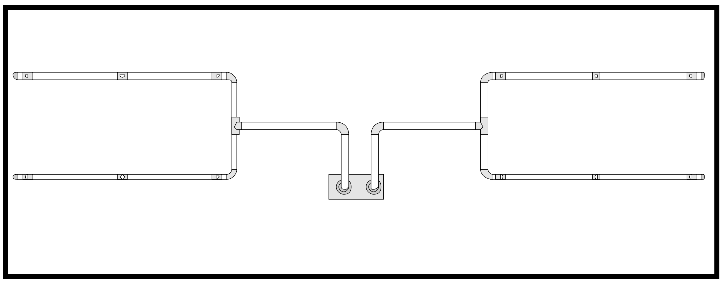


Fig. 4.14: U-pipe system, e.g. for equipment protection

Limit values

Min. distance from ALL-SPEC to T-piece	2 m
Max. distance from ALL-SPEC to T-piece	20 m
Max. branch length	20 m
Max. overall pipe length Ø 25 mm	60 m
Max. number of aspiration apertures (n) per pipe system	18 pcs.
Minimum distance between aspiration apertures (d)	0.1 m
Maximum gap between aspiration apertures (d)	4 m

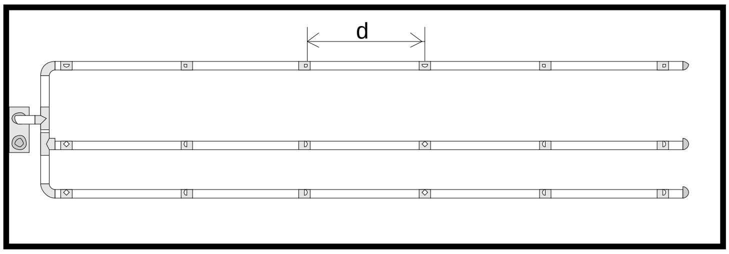
Aspiration apertures

Number of apertures	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**
∅ of all aspiration apertures in mm[17])	6.0	4.4	3.6	3.2	3.0	3.0	2.5	2.5	2.5

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

4.3.2.3 M-pipe system

1 pipe system
Honeywell ALL-SPEC



2 pipe systems
Honeywell ALL-SPEC2

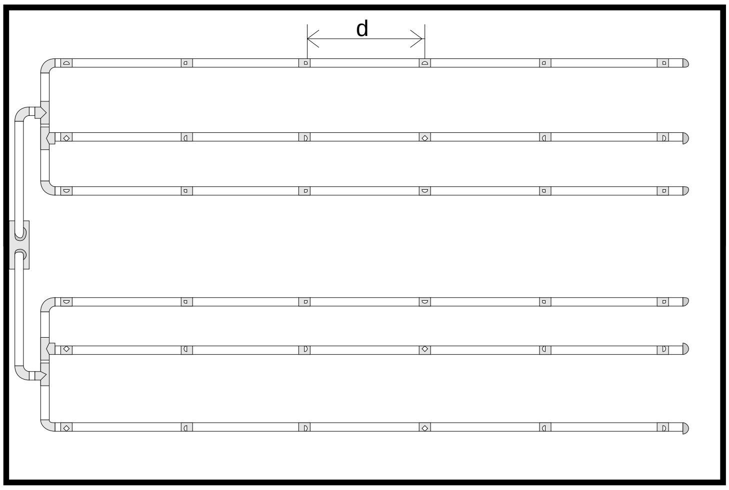


Fig. 4.15: M-pipe system for area protection

Limit values

Min. distance from ALL-SPEC to last T-piece	2 m
Max. distance from ALL-SPEC to T-piece	20 m
Max. branch length	20 m
Max. overall pipe length per pipe system	80 m
Max. number of aspiration apertures (n) per pipe system	18 pcs.
Min. distance between 2 aspiration apertures (d)	0.1 m
Max. distance between 2 aspiration apertures (d)	4 m

Aspiration apertures

Number of apertures	**3**	**6**	**9**	**12**	**15**	**18**
∅ of all aspiration apertures in mm[18])	5.0	3.6	3.0	3.0	2.5	2.5

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

4.3.2.4 Double U-pipe system

1 pipe system
Honeywell ALL-SPEC

2 pipe systems
Honeywell ALL-SPEC*2*

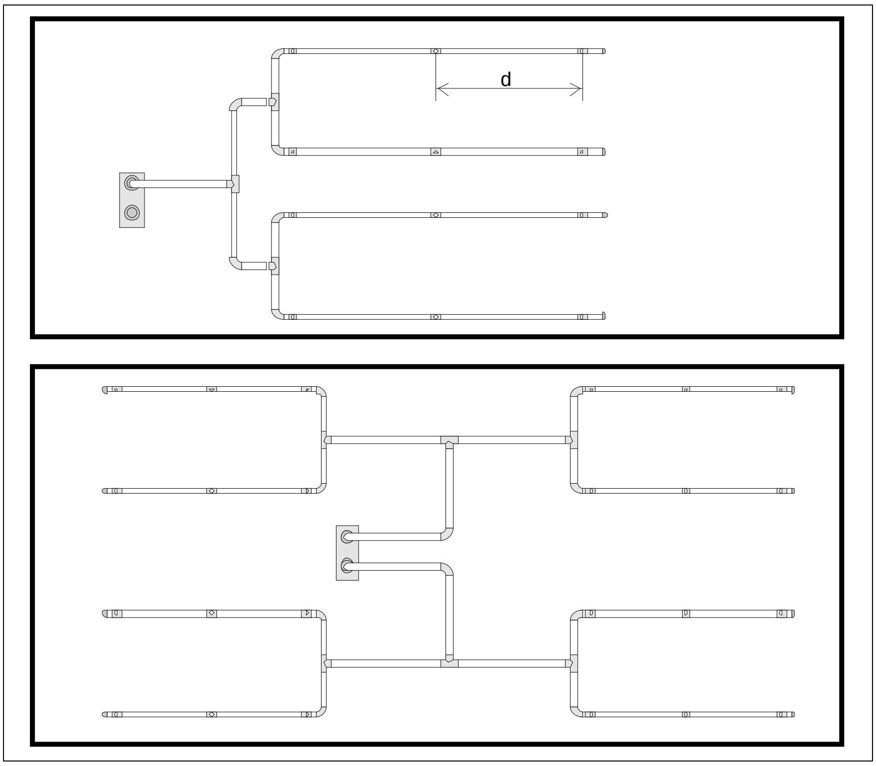


Fig. 4.16: Double U-pipe system, e.g. for equipment protection

Limit values

Min. distance from ALL-SPEC to last T-piece	2 m
Max. distance from ALL-SPEC to last T-piece	20 m
Max. branch length	20 m
Max. overall pipe length Ø 25 mm	100 m
Max. number of aspiration apertures (n) per pipe system	20 pcs.
Minimum distance between aspiration apertures (d)	0.1 m
Maximum gap between aspiration apertures (d)	4 m

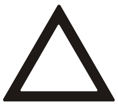
Aspiration apertures

Number of apertures per pipe system	**4**	**8**	**12**	**16**	**20**
∅ of all aspiration apertures in mm [19])	4.0	3.4	3.0	2.5	2.0

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 32mm **or** 40mm.



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

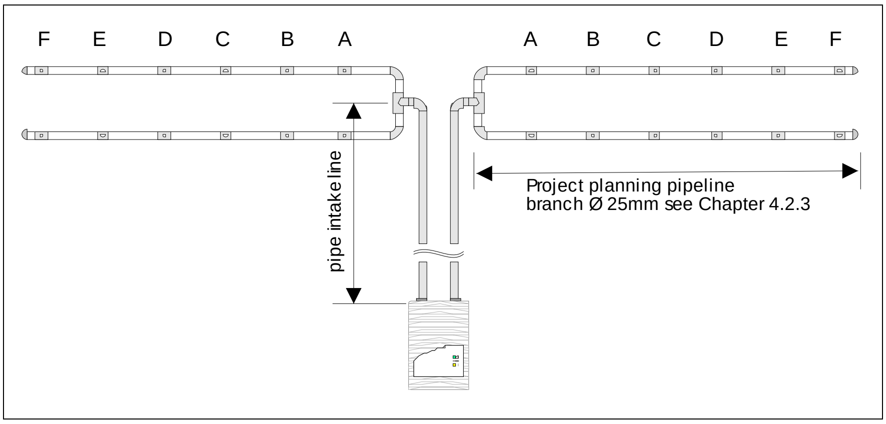


Fig. 4.17: Example of a pipe system for project planning with long pipe intake lines

A basis pipe from which spur-shaped sampling pipes extend can be installed for the project planning of high-bay storage shelves.

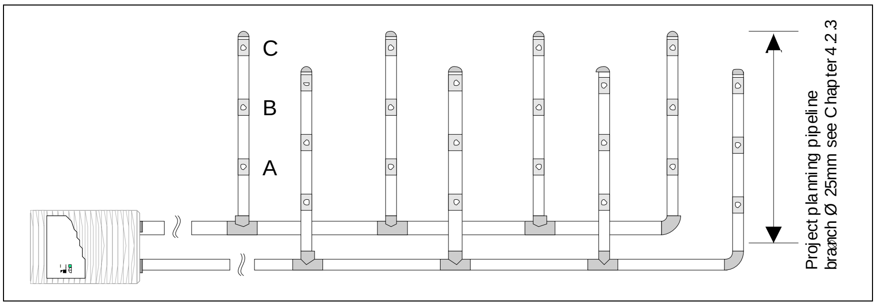


Fig. 4.18: Example of special project planning for high-bay storage shelves

4.3.4 Project planning with acceleration apertures

Acceleration aperture

It may be necessary to increase the system's transport time in order to meet individual requirements. For this purpose, acceleration apertures can be planned at the end of the pipe branch, which will increase the transport rate.

The dimensioning of a acceleration aperture with a simple or double diameter of the final sampling aperture of a pipe branch may be necessary depending on the transport time requirements. Exclusively tools approved by Honeywell are to be used for transport time calculations.

The acceleration apertures can also cause a reduction in the sensitivity of the sampling aperture due to additional air supply. This reduction is to be compensated for electively as follows:

	Solution approach	**Primarily to be applied for**
1	Increase in sensitivity of the detector module	Already installed systems
2	Reduction of the number of aspiration apertures	Systems in planning

1st option:

Increase in sensitivity

The reduction in sensitivity at the sampling aperture can be compensated for by using a more sensitive detection setting.

In doing so, one should distinguish whether the cross-section of the acceleration aperture is smaller than or identical to:

- the cross section of the final sampling aperture of a branch (Table A1)
- the double cross section of the final sampling aperture of a branch (Table A2)

	Aspiration apertures																				
Pipe shape	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**18**	**20**	**21**	**24**	**32**
I	0.50	0.66	0.75	0.80	0.83	0.85	0.87	0.88	0.90	0.90	0.91	0.92	0.92								
U		0.50		0.66		0.75		0.80		0.83		0.85		0.87		0.88	0.90	0.90			
M			0.50			0.66			0.75			0.80			0.83		0.85		0.87		
Double U				0.50				0.66				0.75				0.80		0.83		0.85	
Quadruple U								0.50								0.66				0.75	0.80

Table A1: Factors in increasing the sensitivity (one acceleration aperture corresponds to one sampling aperture here)

	Aspiration apertures																				
Pipe shape	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**18**	**20**	**21**	**24**	**32**
I	0.33	0.50	0.60	0.66	0.71	0.75	0.77	0.80	0.81	0.83	0.84	0.85	0.86								
U		0.33		0.50		0.60		0.66		0.71		0.75		0.77		0.80	0.81	0.83			
M			0.33			0.50			0.60			0.66			0.71		0.75		0.77		
Double U				0.33				0.50				0.60				0.66		0.71		0.75	
Quadruple U								0.33								0.50				0.60	0.66

Table A2: Factors in increasing the sensitivity (one acceleration aperture corresponds to two aspiration apertures)

Example: A double U-pipe system with 24 aspiration apertures is planned in order to meet requirements for class B. According to EN 54-20, 24 apertures at a sensitivity of 0.1 % LT/m are approved to meet requirements for class B. An acceleration aperture in the same size as the final sampling aperture should be used to increase the transport time.

In accordance with Table A1, the necessary sensitivity of the detector module amounts to 0.1 % LT/m * 0.85 = 0.085 % LT/m in this case.

2nd option:

Reduction of the number of aspiration apertures

The reduction in sensitivity at the sampling aperture can be compensated for by reducing the number of aspiration apertures.

In doing so, one should distinguish whether the cross-section of the acceleration aperture is smaller than or identical to:

- the cross section of the final sampling aperture of a branch (Table B1)
- the double cross section of the final sampling aperture of a branch (Table B2)

	Aspiration apertures																				
Pipe shape	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**18**	**20**	**21**	**24**	**32**
I		1	2	3	4	5	6	7	8	9	10	11	12								
U				2		4		6		8		10		12		14	16	18			
M						3			6			9			12		15		18		
Double U								4				8				12		16		20	
Quadruple U																8				16	24

Table B1: Reduction in the number of aspiration apertures (one acceleration aperture corresponds to one sampling aperture here)

	Aspiration apertures																				
Pipe shape	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**18**	**20**	**21**	**24**	**32**
I		1	1	2	3	4	5	6	7	8	9	10	11								
U				2		2		4		6		8		10		12	14	16			
M						3			3			6			9		12		15		
Double U								4				4				8		12		16	
Quadruple U																8				8	16

Table B2: Reduction in the number of aspiration apertures (one acceleration aperture corresponds to two aspiration apertures)

Example:

A double U-pipe system with 24 aspiration apertures is planned in order to meet requirements for class B. According to EN 54-20, 24 apertures at a sensitivity of 0.1 % LT/m are approved to meet requirements for class B. An acceleration aperture double the size of the final sampling aperture should be used to increase the transport time.

In accordance with Table B2, 16 aspiration apertures are permissible at a sensitivity of 0.1% LT/m in this case.

INSTRUCTION

> The influence of the pipe accessory to be used on the maximum permissible project planning is to be taken into consideration in accordance with Chapter 4.2.

4.3.5 Project planning for forced air flow

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:

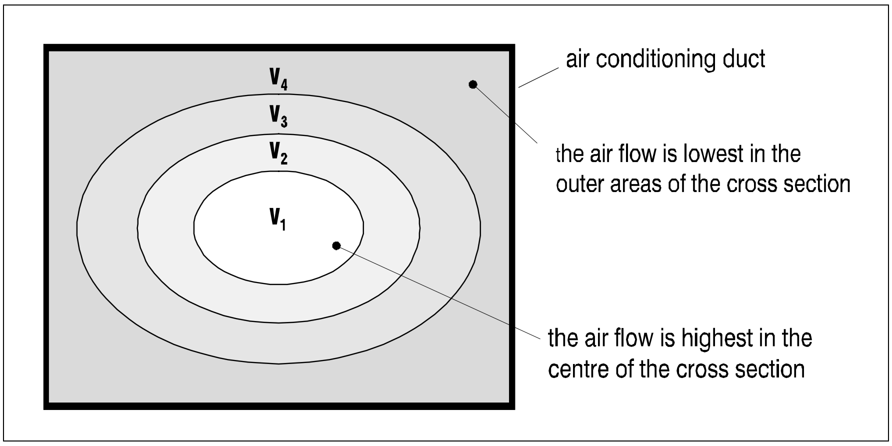


Fig. 4.19: Rate distribution in an air conditioning duct with $v_1 > v_2 > v_3 > v_4$

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. 4.19/20).

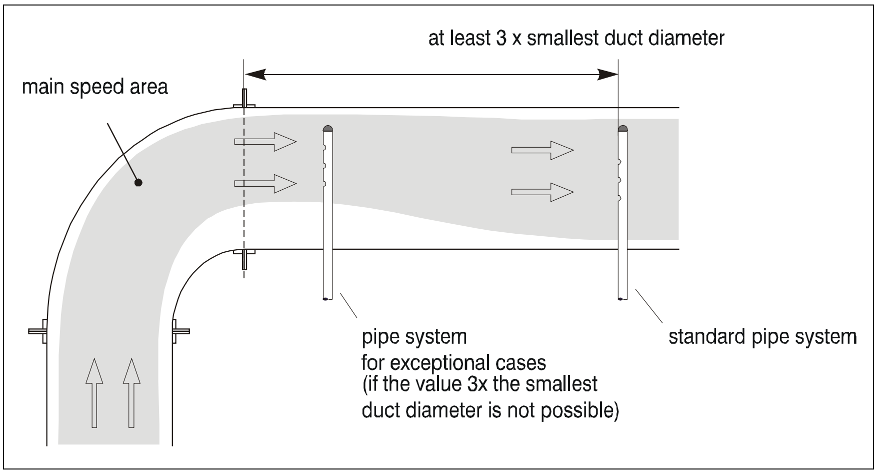


*Fig. 4.20: Change in direction of a duct **without** baffles*

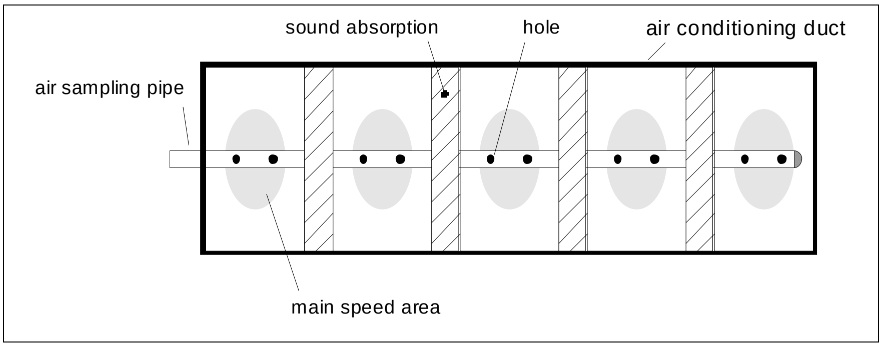


Fig. 4.21: Sound suppressors in a duct

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 Honeywell ALL-SPEC 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.

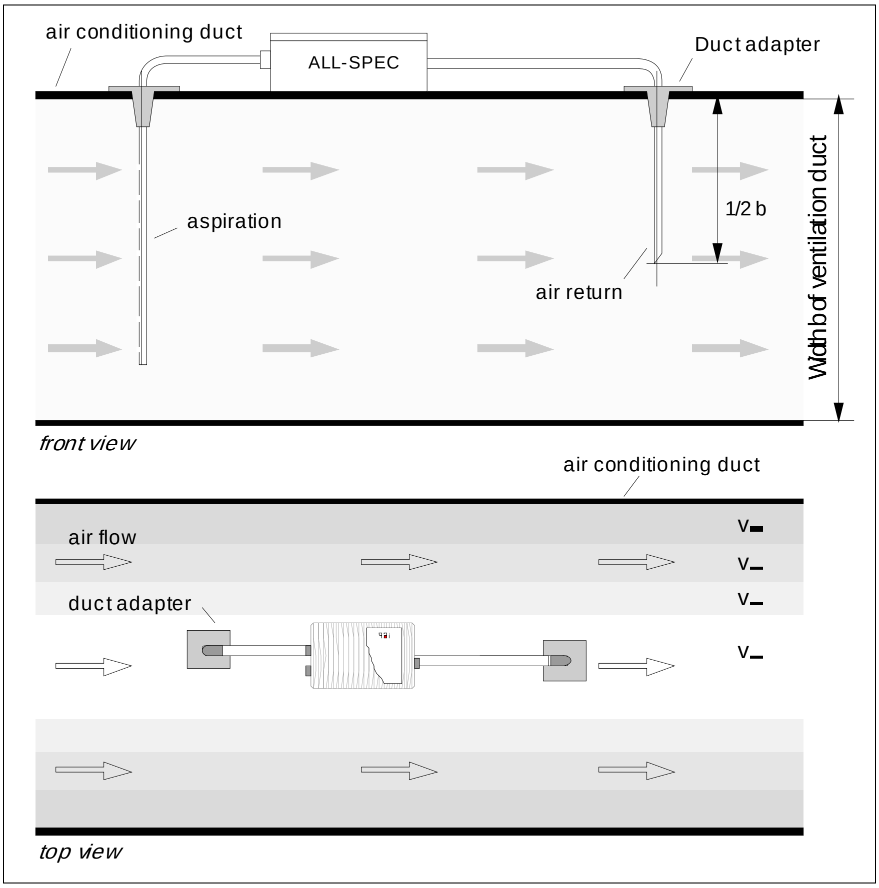


Fig. 4.22: Air recirculation

Air recirculation

The air recirculation 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. 4.22).

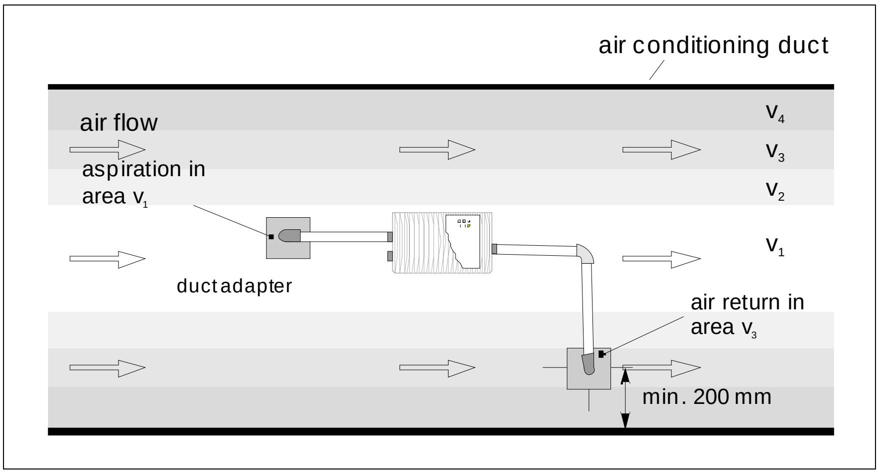


Fig. 4.23: Offset air recirculation reengagement

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 airs 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.

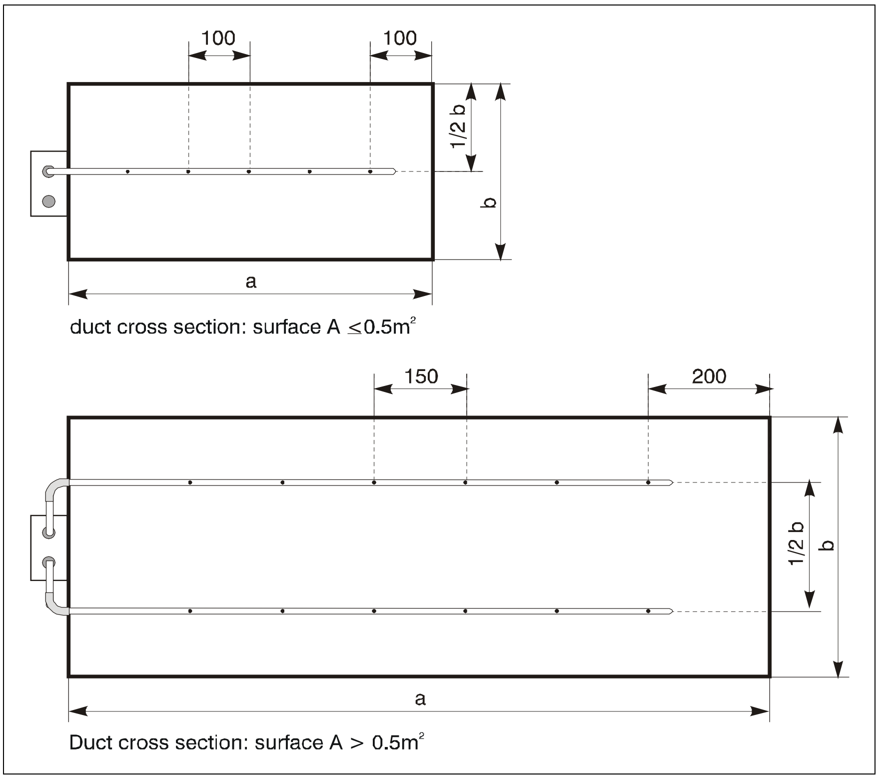


Fig. 4.24: Ducts with small and large duct cross-section

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 formulas 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

$$I_{total,room} = I_{alarm} \cdot n_{max\,area} + I_{quiescent} \cdot (n - n_{max\,area}) \le I_{powersupply\,max}$$

Equipment Protection

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

The power for charging the batteries is calculated as follows:

Charging Current

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

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

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]*

NOTICE

> The calculated total current (I_{ges}) with the highest value is used for the configuration of the power supply units!

The power consumption of Honeywell ALL-SPEC is listed in chapter 3, "Technical Data".

20 {0><}0{>80% load in 24 hours<0}

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 section 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:

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

$K_{nominal}$	*= 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 Honeywell ALL-SPEC

5.1 General

The regulations, guidelines and instructions given in chapter 4.1 apply.

The following is to be considered when mounting the air sampling smoke detection system Honeywell ALL-SPEC.

1. Any changes in the design of installations are to be avoided. If changes are inevitable the operator, manufacturer and/or supplier are to be informed (written approval).
2. Any changes in the supplying network (230 V/400 V supply) and external supply systems are to be carried out by the system owner. This includes e.g.:
   - the primary connection of the supply units
   - any connection to external systems (e.g. central units)
   - the design of possibly required lightning protection and over voltage protection systems which are in accordance with the standard

5.2 Opening the Honeywell ALL-SPEC

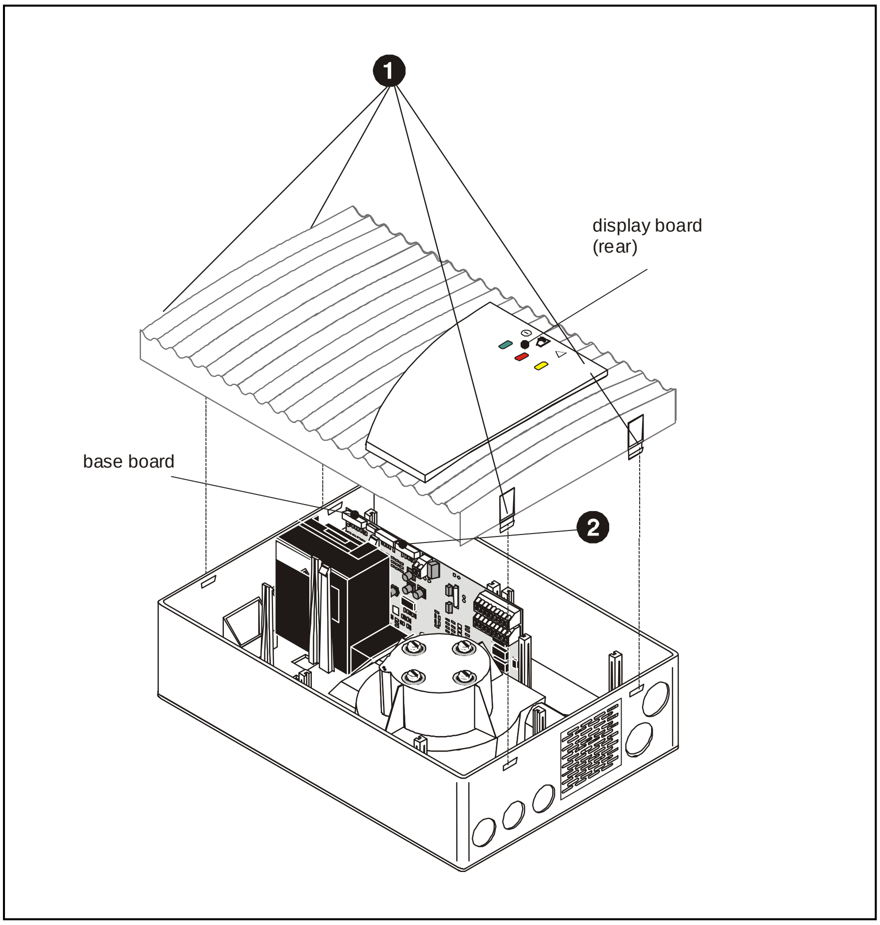


Fig. 5.1: Opening the Honeywell ALL-SPEC air sampling system

ATTENTION

> The components on the base and circuit board must be protected from damage with an anti-static set.

To open Honeywell ALL-SPEC follow the steps below (see fig. 5.1):

❶ Using a screwdriver carefully unlock the snap-in closures of the housing by simultaneously pressing in both clips located on one side of the housing lid. Lift the lid carefully.

❷ Pull the display board cable off the base board. Remove the lid.

5.3 Settings

5.3.1 Detector module

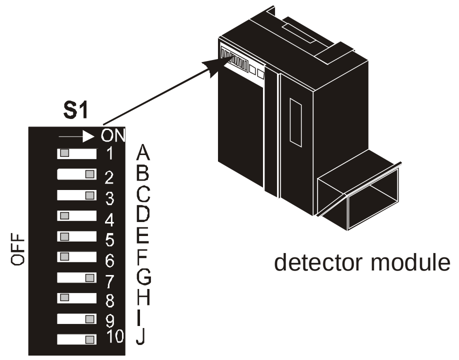


Fig. 5.2: Standard settings on the detector module of Honeywell ALL-SPEC

5.3.1.1 Setting of the response sensitivity

The sensitivity of the detector module is set via the switch S1 (1, 2) on the detector module (refer to Fig. 5.2) of Honeywell ALL-SPEC.
The following table shows the response sensitivity (alarm) of Honeywell ALL-SPEC.

detector module ASD-TP-05	**detector module ASD-TP-01**	**detector module ASD-TP-001**	**switch S1 contact 1**	**switch S1 contact 2**
	0.8 %/m	0.12 %/m	on	on
	0.4 %/m (standard)	0.06 %/m (standard)	off	on
1 %/m	0.2 %/m	0.03 %/m	on	off
0.5 %/m (standard)	0.1 %/m	0.015 %/m	off	off

5.3.1.2 Delay period of the alarm activation

The delay period for the alarm thresholds can be set via the switch S1 (3, 4). As a standard the delay period for the alarm is set to 10 sec. If the smoke level increases during operation so that the alarm threshold 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 S1 Contact 3	Switch S1 Contact 4
0 seconds	off	off
10 seconds (standard)	on	off
30 seconds	off	on
60 seconds	on	on

TIP

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

5.3.1.3 Activating threshold of the air flow monitoring

Set the activating threshold of the air flow fault via the switch S1 (5, 6) on the detector module (refer to Fig. 5.2) of Honeywell ALL-SPEC

Level	Activating Threshold	Switch S1 Contact 5	Switch S1 Contact 6
I	small	on	off
II	medium (standard)	off	on
III	large	off	off
IV	very large	on	on

Choose the activating threshold according to chapter 4, "Pipe Design".

5.3.1.4 Delay period of the air flow fault

Set the delay period for the transmission of a fault signal via the switch S1 (7, 8) on the detector module (refer to Fig. 5.2) of Honeywell ALL-SPEC

Setting of the Delay Period	**Switch S1 Contact 7**	**Switch S1 Contact 8**
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.

5.3.1.5 Fault display

The display for collective faults (air flow and detector module fault) can either be set latched (standard) or non-latched. The setting is made via the switch S1 contact 9 (refer to Fig. 5.2) of the detector modules of Honeywell ALL-SPEC

Fault Signal	**Switch S1 Contact 9**
latched (standard)	on
non-latched	off

5.3.1.6 LOGIC·*SENS*

The sophisticated signal processing **LOGIC·*SENS*** is activated or deactivated via the switch S1 contact 10. When the signal processing is switched on the air sampling smoke detection system recognizes faults and can thus avoid a false alarm.

LOGIC·*SENS*	**Switch S1 Contact 10**
on (standard)	on
off	off

5.3.1.7 Jumper setting for the fault contact

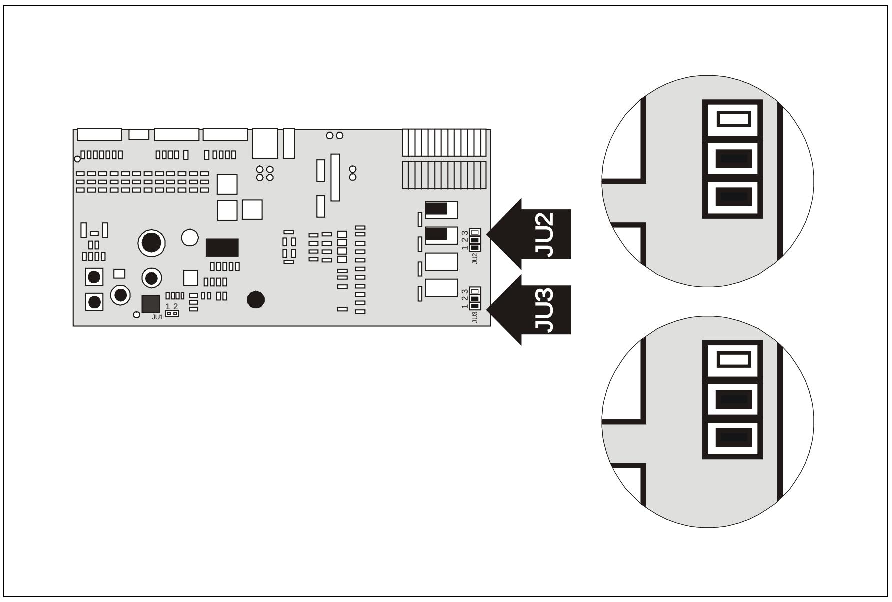


Fig. 5.3: Jumper settings on the collective fault contact

Set the fault contact type using the jumper JU2 and JU3.

The following table shows the positioning of the jumpers. The symbols used mean:

X = pin pair bridged O = pin pair open

The standard setting has a grey background.

Contact art	**Jumper JU2 pin pair 1+2**	**Jumper JU2, pin pair 2+3**	**Jumper JU3, pin pair 1+2**	**Jumper JU3, pin pair 2+3**
break contact (Standard)	X	O	X	O
make contact	O	X	O	X

5.3.1.8 Setting the Fan Voltage

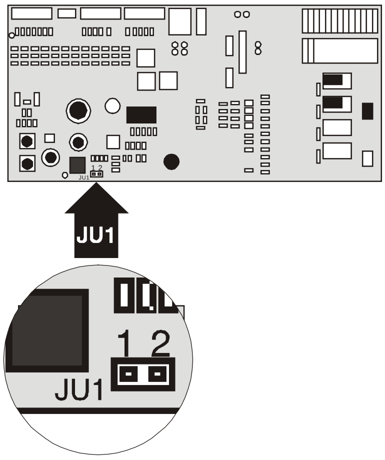


Fig. 5.4: Switching of the fan voltage on the base board

The standard setting of the fan voltage is 6.9 V. In critical areas the fan voltage can be switched from 6.9 V to 9 V by removing the jumper JU1 in order to increase the transport speed in the pipe system and thus to guarantee a quicker detection in case of greater pipe lengths.

ATTENTION

Re-initialise the air flow if you change the fan voltage. Close or open the jumper JU1 only when the device is switched off.

5.3.1.9 Connecting the Fan

The electrical connection of the fan is made via terminal block X5 (FAN) on the base board of Honeywell ALL-SPEC.

- connect the red connecting lead of the fan with terminal block X5 / clip 1 (+)
- connect the black connecting lead of the fan with terminal block X7 / clip 2 (-)

INSTRUCTION

When Honeywell ALL-SPEC is delivered, the fan is already connected.

5.3.1.10 Setting the fan voltage of the Honeywell ALL-SPEC and -SL

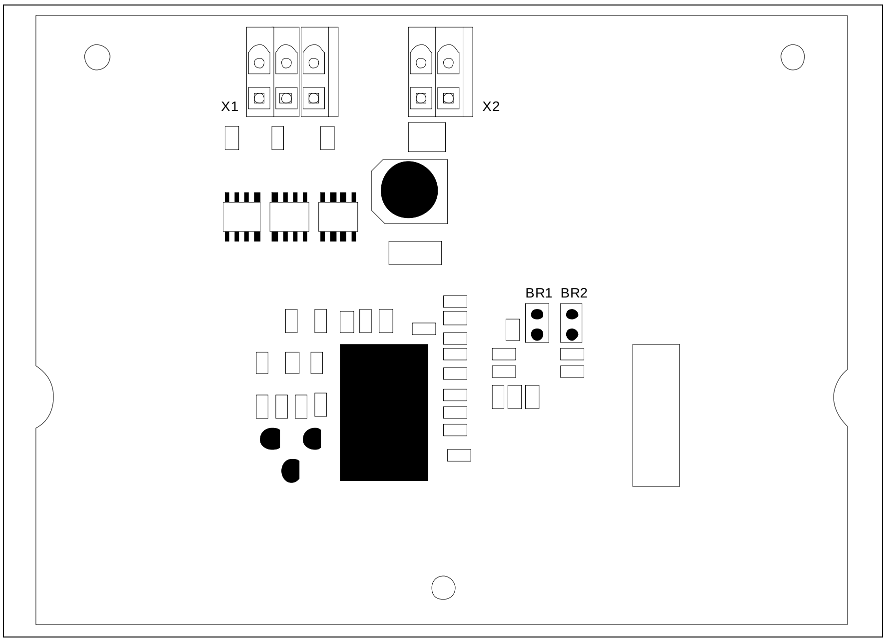


Fig. 5.5: Switching the fan voltage on the fan connection terminal board on the FC-2 or FC-3 fan control circuit board

The default setting for the fan voltage is 6.9 V. The fan voltage can be adjusted according to project planning by plugging or removing the BR 1 and/or BR 2 bridges.

The symbols used mean:

X = pin pair bridge O = pin pair open

The standard settings have a grey background.

Setting of fan voltage FC-2	**Bridge Pin-No. BR1, 1+2**	**Bridge Pin-No. BR2, 1+2**
6,5 V	O	X
6,9 V (standard)	X	O
9 V	O	O

Setting of fan voltage FC-3	**Bridge Pin-No. BR1, 1+2**	**Bridge Pin-No BR2, 1+2**
10 V	O	X
11 V (standard)	X	O
12 V	O	O

ATTENTION

The JU 1 link on the base board must always be removed.

ATTENTION

Conduct the air flow initialisation again if you change the fan voltage. Only close or open the BR 1 and BR 2 links when the device is turned off.

5.3.1.11 Connecting the fan on Honeywell ALL-SPEC and -SL

The electrical connection of the fan control circuit board is made via terminal block X5 (FAN) on the base board (see fig. 5.3) of Honeywell ALL-SPEC

The electrical connection of the fan is made via terminal block X1 (FAN) on the fan control circuit board (see fig. 5.4).

- Connect terminal 1 of terminal board X5 on the base board to terminal 2 (+) of terminal X2 on the fan control circuit board.
- Connect terminal 2 of terminal board X5 on the base board to terminal 1 (-) of terminal board X2 on the fan control circuit board.
- Connect the fan's brown connection line to terminal board X1 / terminal 1 of the fan control circuit board.
- Connect the fan's yellow connection line to terminal board X1 / terminal 2 of the fan control circuit board.
- Connect the fan's purple connection line to terminal board X1 / terminal 3 of the fan control circuit board.

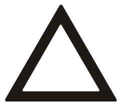
INSTRUCTION

> When Honeywell ALL-SPEC is delivered, the fan is connected at the factory.

5.5 Mounting Location

5.5.1 Fitting of the Honeywell ALL-SPEC air sampling system

Mount the air sampling system in such a way that the displays are clearly visible. Screw the air sampling smoke detection system either directly to the wall with its bottom casing or mount it by means of a special support (refer to 2.2.5 "Device Support").



INSTRUCTION

Note that the mounting location is not within the opening range of doors.

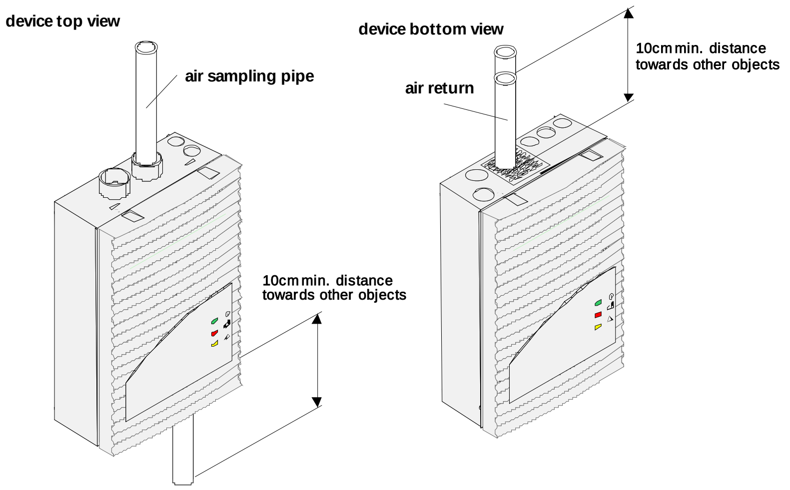


Fig. 5.7: Installation of Honeywell ALL-SPEC

Make sure the air outlet of the air sampling system is not blocked. The distance between the air outlet of Honeywell ALL-SPEC and adjacent objects (e.g. wall) is to be **at least 10 cm**.

The air sampling smoke detection system Honeywell ALL-SPEC can be mounted with the air sampling pipe connectors pointing upwards or downwards. If necessary, turn the lid by 180°.

Aspiration downwards

If Honeywell ALL-SPEC is mounted with the air sampling pipe connectors pointing downwards make sure no impurities or dripping water enter the air outlet which then points upwards. In this case, use a short pipe curving downwards.

Mounting Material

ALL-SPEC	cylinder or flat head screws – diameter of thread: max. 6 mm – diameter of head: 10 mm

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

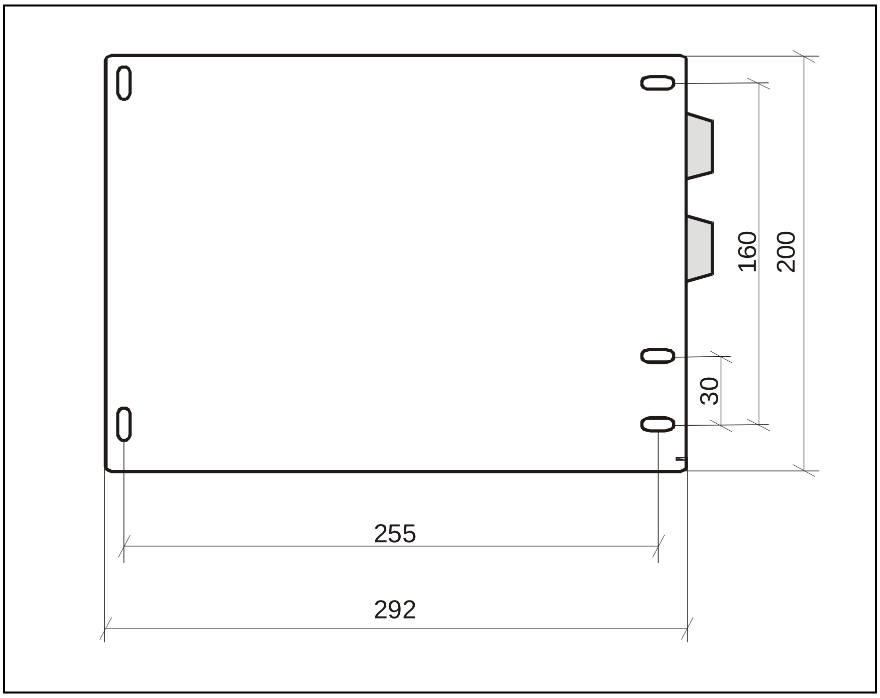


*Fig. 5.8: ALL-SPEC hole-spacing **without** support*

5.5.2 Connection of the air sampling pipe

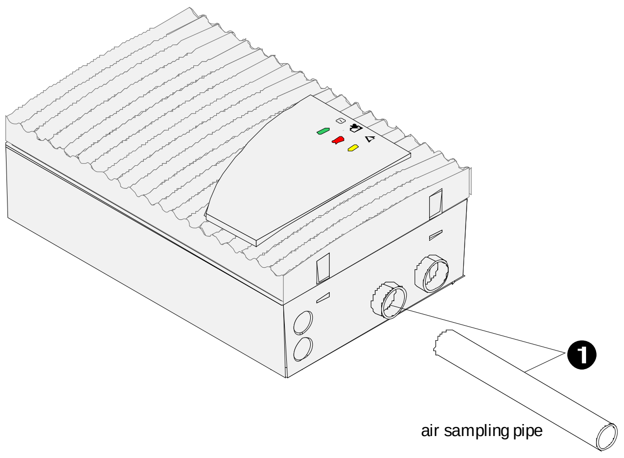


Fig. 5.9: Connection of the air sampling pipe to the Honeywell ALL-SPEC air sampling smoke detection system.

Connection of air sampling pipe ❶ Connect the air sampling pipe to Honeywell ALL-SPEC ensuring that the pipe is fitted to the correct connector.
(refer to Fig. 5.10).

INSTRUCTION

> Do not use any adhesive to connect the air sampling pipe with the pipe connector.
> Wide variations in temperature require the air return to be firmly fixed just before the device so that the pipe is not pulled out of the pipe connection due to changes in length that occur (refer to chapter 6.1).

5.6 Electrical connection

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

1. Break through the required cable entries e.g. by means of a screw-driver.
2. Attach the plastic connection pieces M 20 or M 25 to the cable entries.
3. Pass the cables through the corresponding cable entries.

INSTRUCTION

One plastic connection piece M 20 and 2x M 25 are supplied with the device.

The electrical connection is effected via the terminal blocks X6 and X7 on the base board of the Honeywell ALL-SPEC. Pay attention to the allowed wire cross sections of the corresponding screw joint and to the allowed wire cross sections of the terminals for max 1.5mm^2 cores.

ATTENTION

Power down the equipment before making any connections

INSTRUCTION

In order to maximise the fault safety, use shielded cables for the external wiring of the device(s).

5.6.1 Connection to central fire panel, with reset button

The relay contacts on the base board can be used to e.g. connect Honeywell ALL-SPEC to a central fire panel, to trigger signalling devices, security management systems etc. It is also possible to connect a response indicator.

INSTRUCTION

> The reset input must not be permanently connected to +24V. Otherwise all signals – even an alarm – are automatically reset after the cause of the signal has been eliminated. In this case the alarm is non-latched.

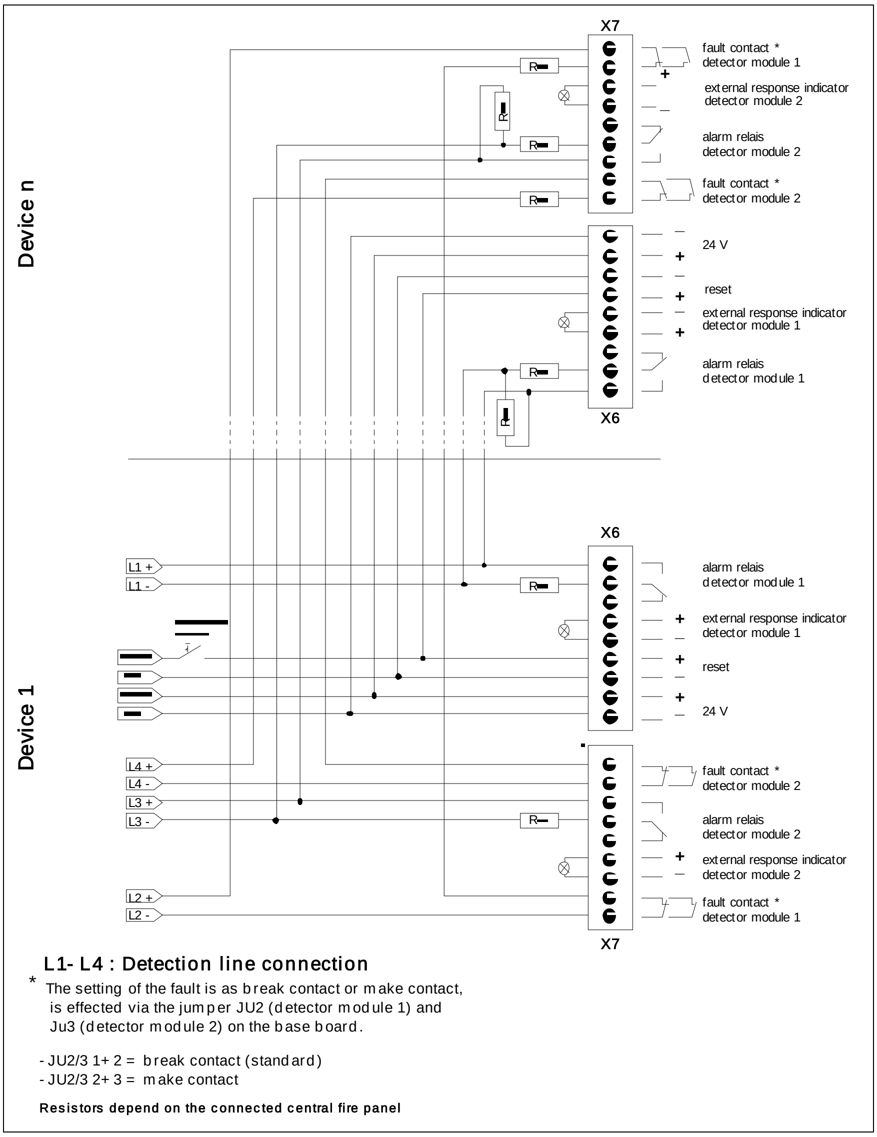


Fig. 5.10: Example of the connection of Honeywell ALL-SPEC with central fire panel and reset button

5.6.2 Connection of several Honeywell ALL-SPEC without central fire panel, with reset button

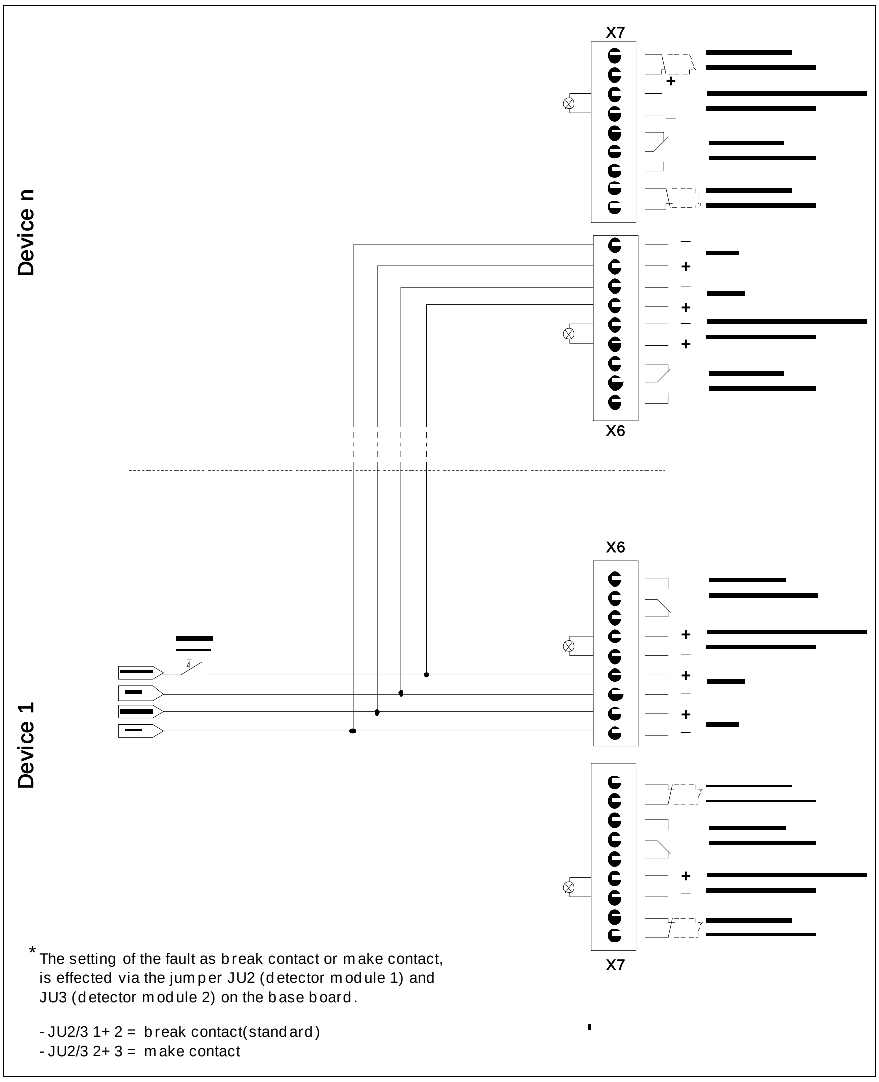


Fig. 5.11: Example of the connection of several Honeywell ALL-SPEC without central fire panel, with reset button

5.6.3 Connection to central fire panel, with reset board

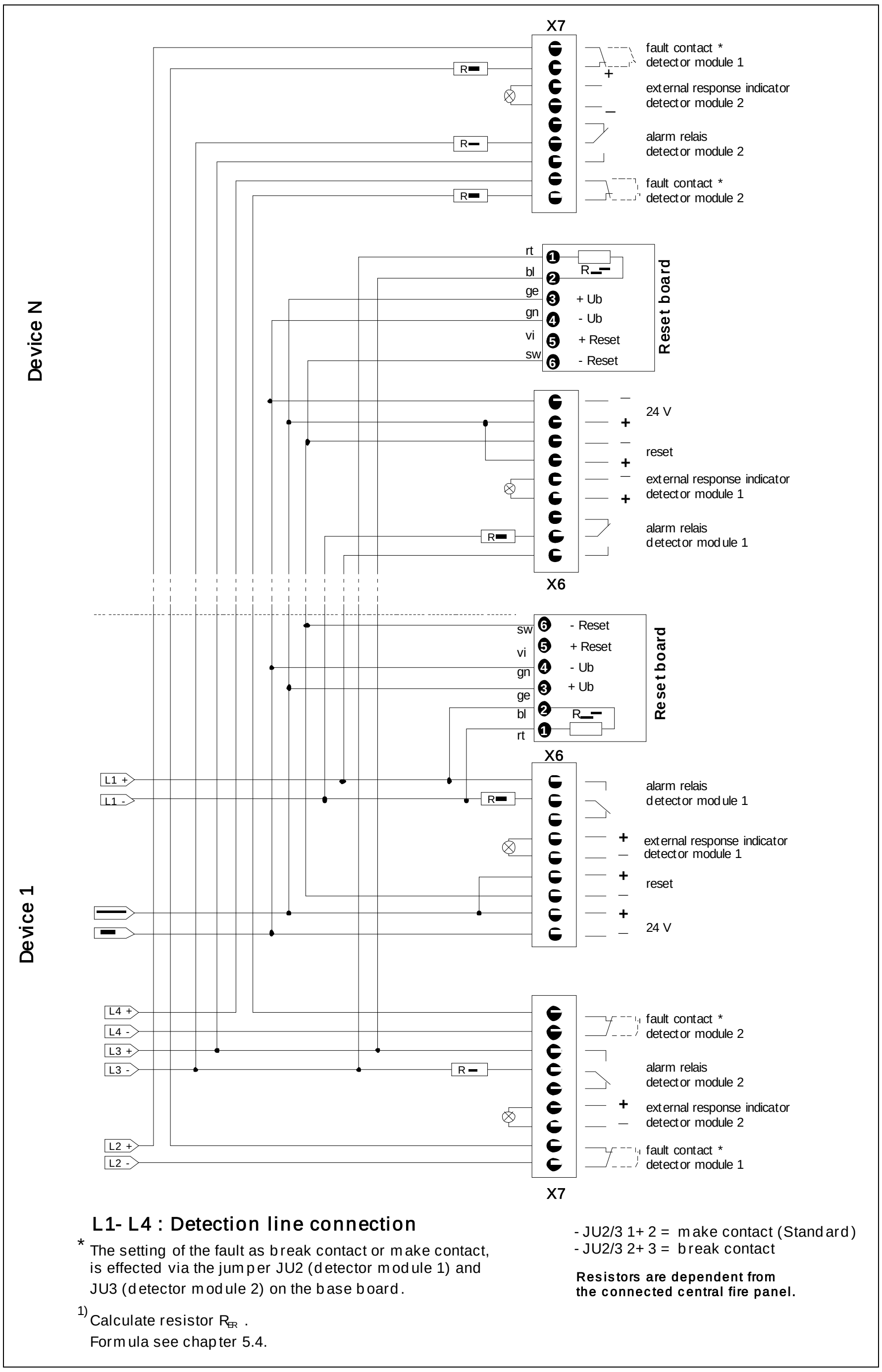


Fig. 5.12: Example of the connection of Honeywell ALL-SPEC with central fire panel and reset board

ATTENTION

The fault display is to be set to "non-latched" (refer to section 5.3.1.5).

5.9 Installation of the second detector module

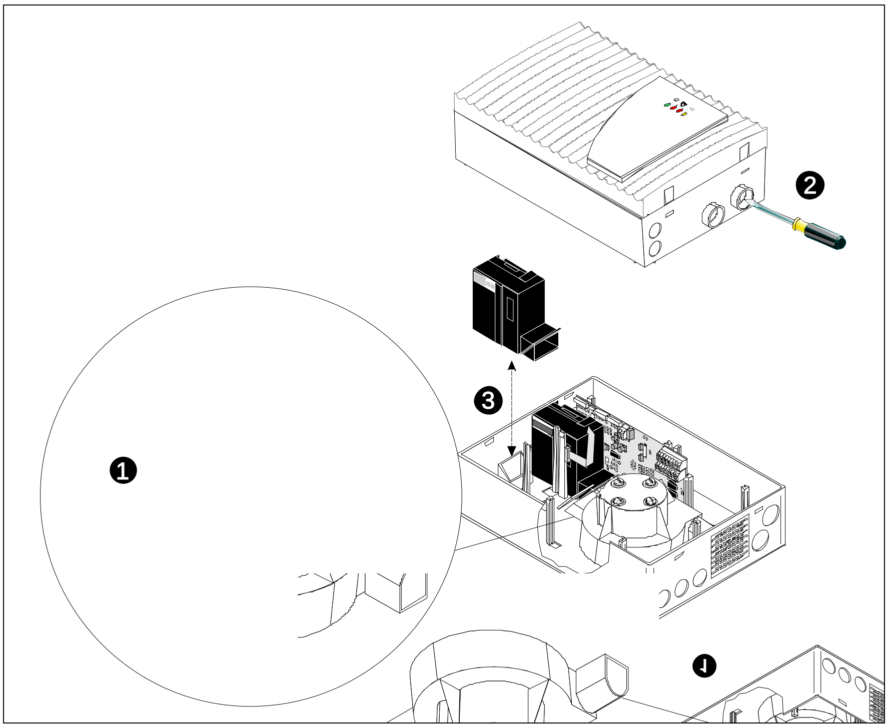


Fig. 5.13: Installation of the second detector module

❶ Only carry out the following work if the device is disconnected fro the 24v supply

❷ With a slot screwdriver, carefully undo the snap-in closures of the housing by simultaneously pressing in the clips located on one side. Then carefully lift the housing lid. Pull the cable from the display board and remove the lid.

❸ Carefully remove the cover from the second air sampling pipe (plastic self-adhesive cover). If necessary use a screwdriver to assist.

❹ Carefully break the closure connecting the second pipe system and the housing (correct breaking point marked by "II"), again using a screwdriver if required.

❺ Spread both support clamps and place the new detector module between them. Both clamps must fit tightly against the module and snap in audibly. Press both support clamps together.

❻ Pull the jumper JU4 across to the base 1de1 board (see fig. 5.22).

❼ Connect the detector module to the base board via the ribbon cable. Connection: X3 HEAD 2 (see fig. 5.22)

INSTRUCTION

Ensure that the position of the marker is correct before plugging the flat cable into the base board.

8. Connect the display board with the base board. Connection: X4 DISPLAY
9. Before initialisation, operating power must be restored. Press the Flow-Init button at the detector module in order to initialise the pipe system.
10. Close the housing lid.

INSTRUCTION

When extending to Honeywell ALL-SPEC 2 the front panel must be replaced.

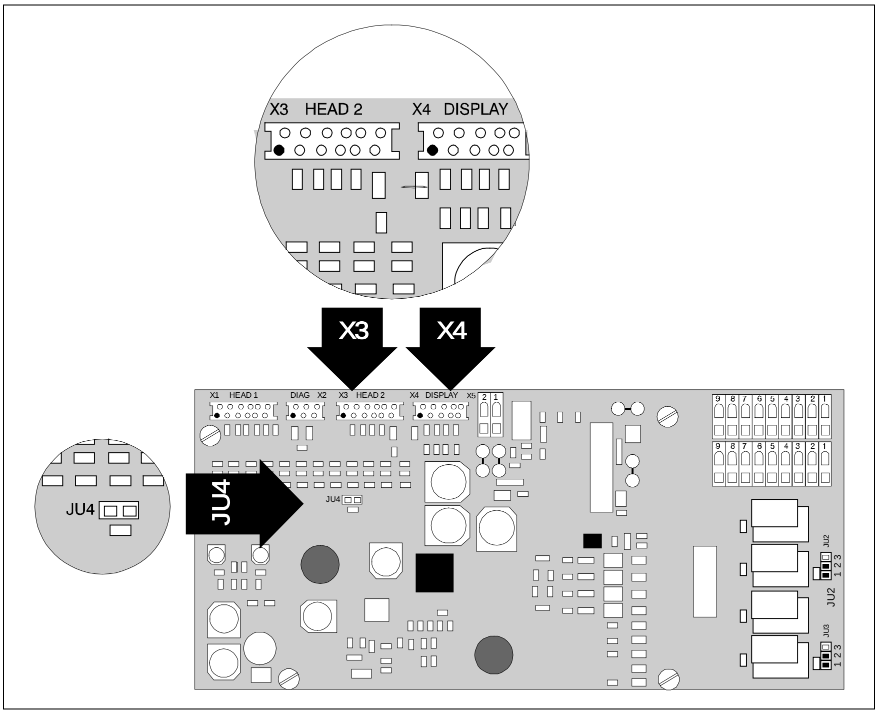


Fig. 5.14: Connections for base board X3, X4 and JU4

5.11 Data Log

The device can be tested with the diagnostic software DIAG 3. Besides the current air flow sensor data, different status values can be read out, - which help the service technician to easily recognise modified operating conditions. Air flow and smoke level values can be read out on site with a laptop. After the software has been started up, the data is read out on the PC via a USB-Port. For details refer to the diagnostic software documentation. See also chapter 7.5.2 “Operational Check”, using diagnostic software.

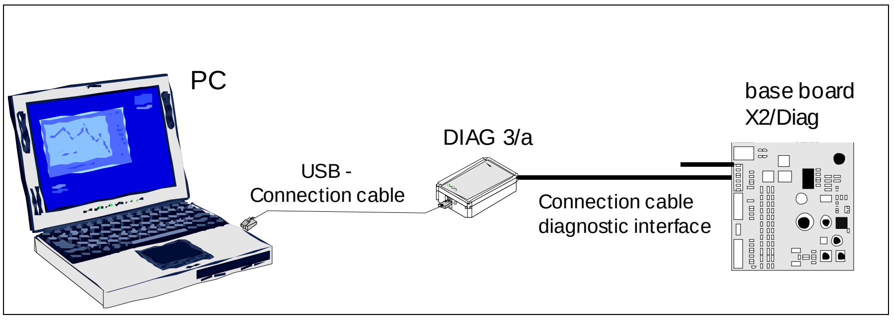


Fig. 5.15: Connection of a PC via the connection diagnostic interface connection cable

TIP

> For later checks of the device settings, save and archive the data after commissioning.

6 Installation 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

Bends should be used instead of elbows. If the number of changes of direction is too high an air flow fault can occur at Honeywell ALL-SPEC and the detection time can be changed.

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

[1] An bend equals a straight piece of pipe of 0.3 m
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 caps.

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 pipes are caused by variations in temperature. An increase in temperature results in a lengthening of the pipe and a decrease in temperature in a shortening of the pipe. This is especially important if the mounting temperature of the pipe system differs considerably in comparison to its operating temperature.

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

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

ΔL = linear expansion in (mm)
L = length of the pipe to be calculated in (m)
ΔT = maximum temperature difference in (°C)
δ = coefficient of the change in length in mm/m°C
δ_{PVC} = 0,08 mm/m°C
δ_{ABS} = 0.101 mm/m°C

A variation in temperature of 10°C of the ABS pipe with a length of 10 m results in a change in length of 10.1 mm.

Pipe Clips For the installation of the pipe system (ø 25 mm) the plastic pipe clips are used as a standard. (refer to Fig. 6.1).

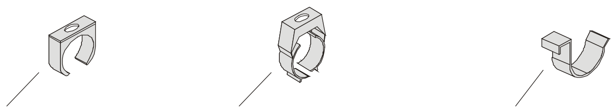


Fig. 6.1: Pipe clip types

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 Air sampling points

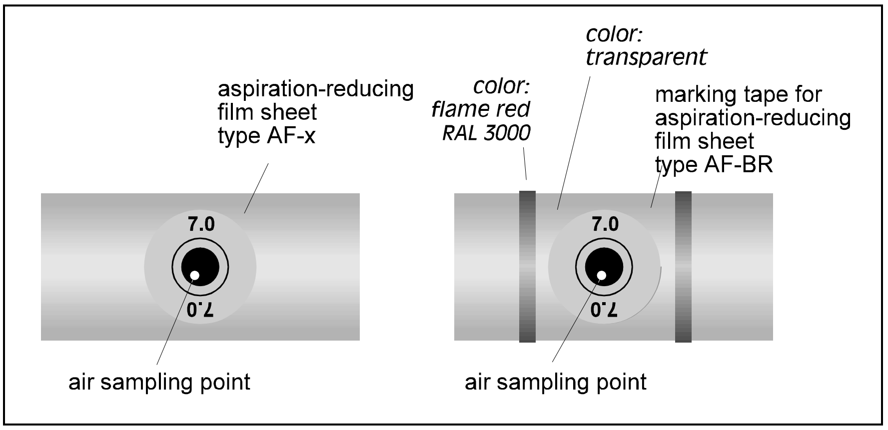


Fig. 6.2: Example of an air sampling hole with an aspiration-reducing film sheet

Air Sampling Points

The layout of the air sampling points (air sampling hole) is to be designed according to the requirements of the project and the guidelines of the pipe design.

Air Sampling Holes

1. Place a 10 mm-air sampling hole in a right angle towards the pipe.
2. Clean and trim the holes carefully.
3. Clean the area of the hole (throughout the whole pipe) from dirt and grease.Select the size of the aspiration-reducing film sheet according to the recommendations of the **pipe design**.
4. Place the aspiration-reducing film sheet on the hole (refer to Fig. 6.3
5. Prevent the film sheet from falling off by sticking marking tape on the film sheet (refer to Fig. 6.3).

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 adhesive in order to keep it free from dust and grease.

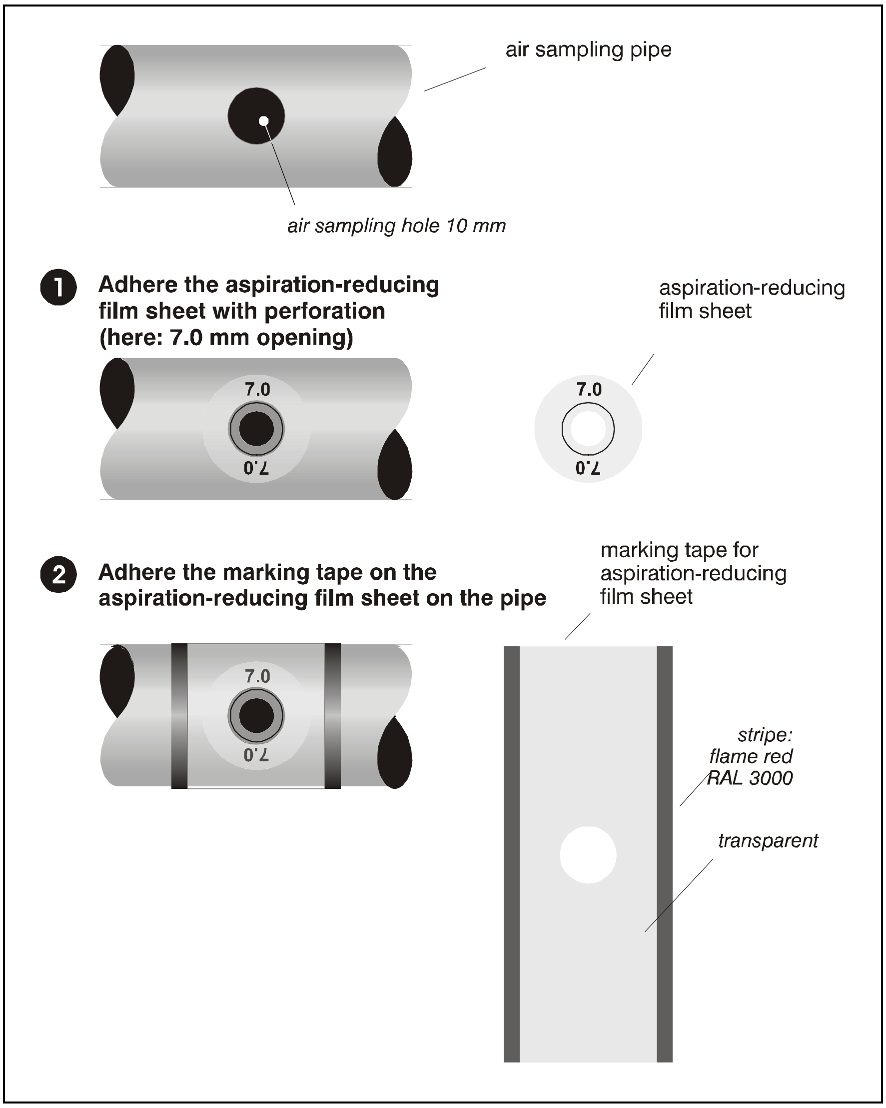


Fig. 6.3: Attaching the aspiration-reducing film sheet

6.3 Ceiling lead through

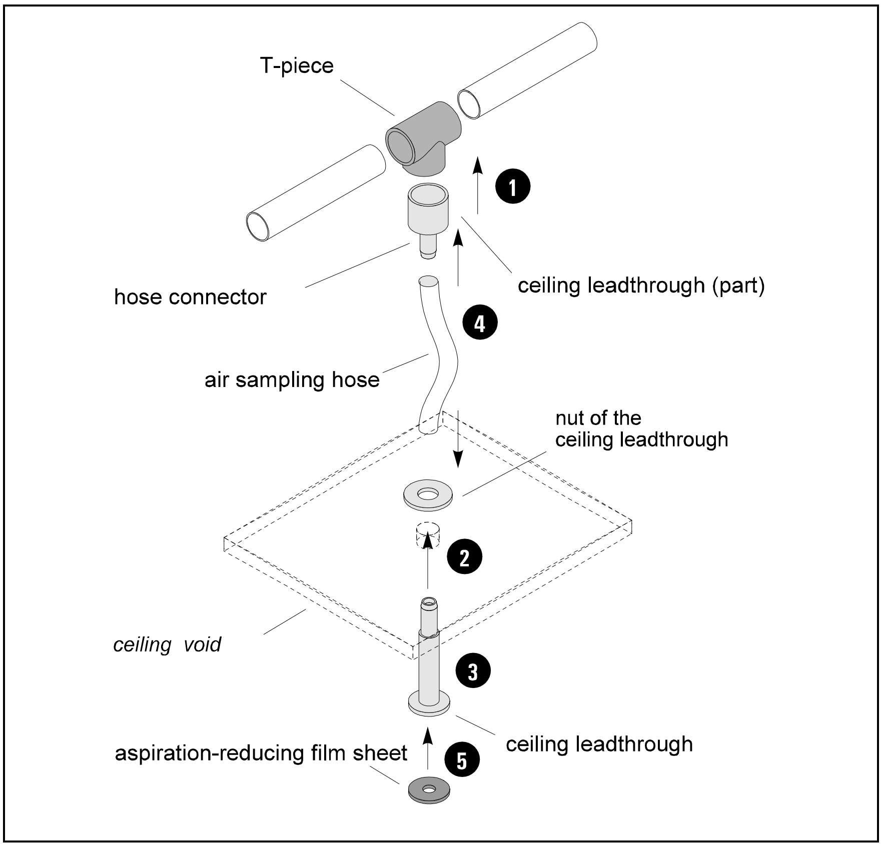


Fig. 6.4: Mounting of the ceiling lead through

The following steps are necessary for the mounting of the ceiling lead through:

❶ **Before** gluing remove dirt and grease from the pipe using an appropriate cleaning agent.

❷ Glue the hose connector to the corresponding T-piece of the air sampling pipe by means of ABS adhesive.

❸ Drill a hole of ∅13 mm for each ceiling lead through in the ceiling void.

❹ In order to mount the ceiling lead through remove the nut, pass the hose nozzle from below through the drill hole, replace the nut above the ceiling void and fix it.

❺ Cut the air sampling hose so that it has the necessary length. Attach the hose on the hose nozzle of the ceiling lead through and on the hose connector of the pipe-T-piece. If necessary, soften the ends of the hoses with a hot air ventilator.

❻ Stick the correct aspiration-reducing film sheet onto the ceiling lead through (according to the pipe design guidelines).

The aspiration-reducing film sheets are available in two colours. According to the ceiling colour the aspiration-reducing film sheets of the type AFW-x (pure white, RAL 9010) or type AF-x (papyrus white, RAL 9018) can be used. If required specially colour film sheets are available.

INSTRUCTION

The perforation of the aspiration-reducing film sheet is to be placed exactly on the opening of the ceiling lead through. The diameter of the aspiration-reducing film sheet must not be changed.
Avoid touching the adherent in order to keep it free from dust and fat.

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.

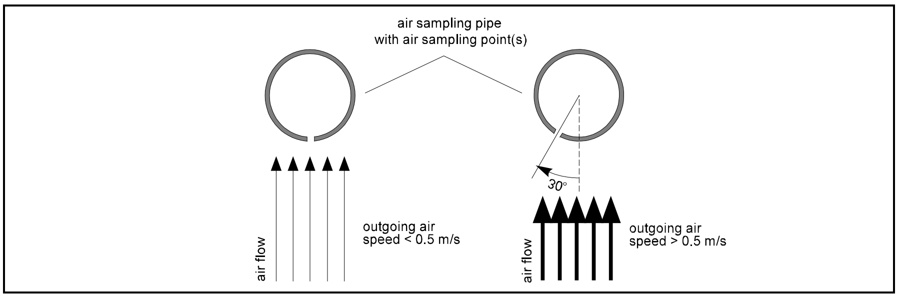


Fig. 6.5: Positioning of air sampling point, depending on air speed

6.4.2 Detection in bypass systems

INSTRUCTION

In case of detection with air flows ≥ 2 m/s the outgoing air of the Honeywell ALL-SPEC is additionally to be returned to the air flow area. The end of the air return pipe is to be cut in an elbow of 45° (refer to Fig. 6.6)

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

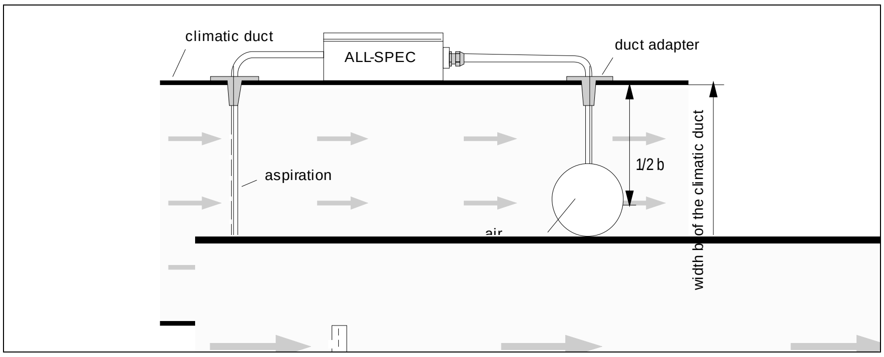


Fig. 6.6: Positioning of air return, example of a climatic duct (bypass)

For the pipe design of Honeywell ALL-SPEC in these areas refer to chapter 4.7 "Pipe Design for Forced Air Flow".

6.5 Filter

6.5.1 Installation of the air Filter type LF-AD-x

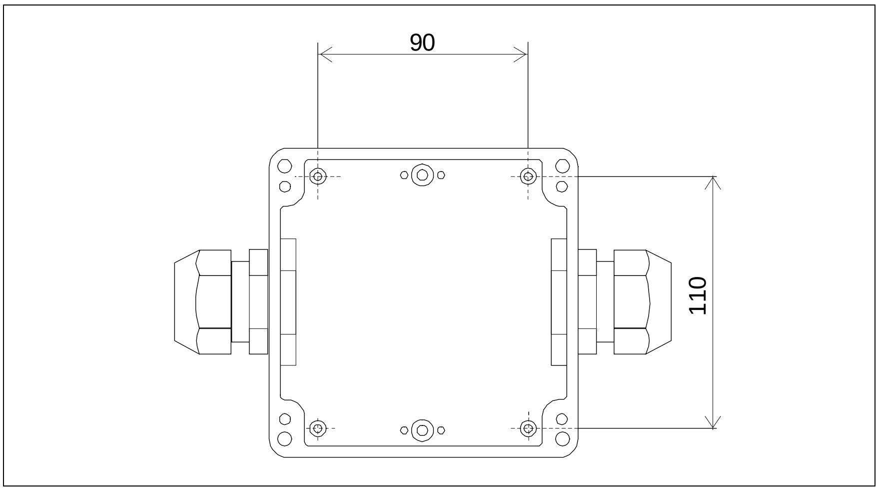


Fig. 6.7: Distances of the drill holes in the bottom of the air filter housing

Air filter LF-AD-x

1. To fit the filter into the pipe systems use the two PG29-screw joints of the filter.
2. Mount these screw joints like e.g. at the pipe adapter.
3. When mounting the filter pay attention to the direction of the air flow indicated on the type plate in the housing bottom.
4. Screw the bottom side of the air filter housing directly to a wall.

Mounting 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

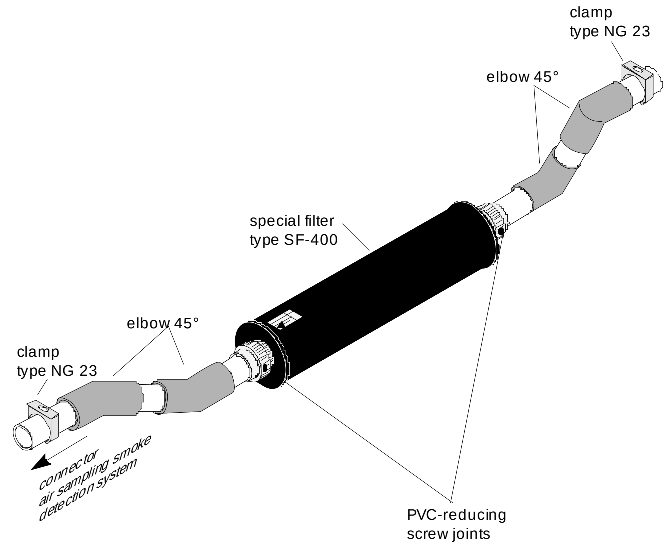


Fig. 6.8: Mounting of the special filter into the pipe system

Special Filter SF-x

1. In order to install or de-install the special filter use the two PVC reducing couplings at both filter ends.
2. Glue the reducing couplings into the pipe system.
3. When mounting the special filter pay attention to the air flow direction which is indicated on the type plate of the filter housing (refer to Fig. 6.10).
4. Mount the special filter by means of a 45°-elbow and via the installed pipe system through clamps.

Mounting Material

special filter	pipe fittings made of PVC or ABS – 45°-elbows

6.6 Air return

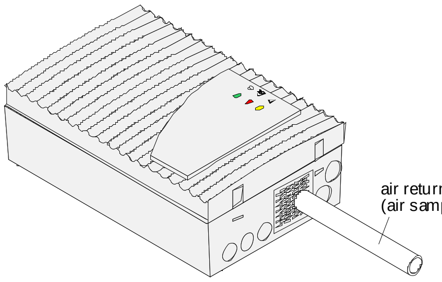


Fig. 6.9: Mounting of the air return

❶ Remove the pre-punched pipe lead-through in the protection grid of the air outlet opening (e.g. by means of a small side cutter).

❷ Pass the air return through the opened pipe lead-through in the protection grid and fix it through the air outlet opening of Honeywell ALL-SPEC. As the air return pipe fits exactly into the air exit opening, a tight fit is ensured.

INSTRUCTION

Wide variations in temperature require the air return to be firmly fixed in place just in front of the device so that the pipe is not pulled out of the pipe connection due to any changes in length that may occur (refer to chapter 6.1).

6.7 Noise suppressor

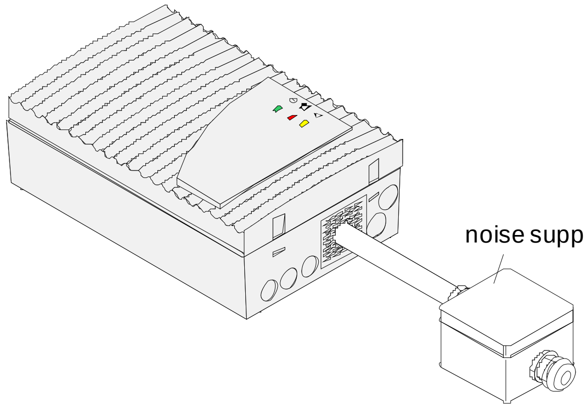


Fig. 6.10: Mounting of noise suppressor

❶ Remove the pre-punched pipe lead-through in the protection grid of the air outlet (e.g. with a small side cutter).

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 Honeywell ALL-SPEC. 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.

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

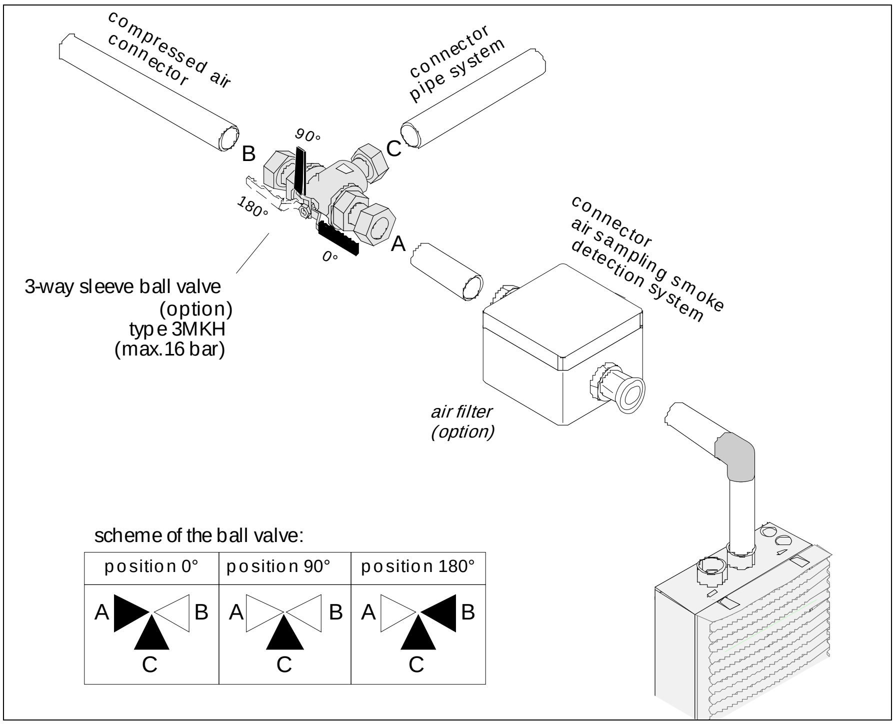


Fig. 6. 11: Installation of 3-way ball valve

The ball valve is required for blowing-through with compressed air[2] (preferably).

The ball valve switches between fire detection (position 0°) and blowing-through (position 180°). Connect the ball valve to the pipe system by means of the screw joints.

Connections During installation pay attention to the correct connectors (refer to scheme in Fig. 6.11):

- Connect the pipe system to connector C.
- Mount ALL-SPEC to the connector A or B and the compressed air supply to the remaining connector.

2 Depending on the temperature use either compressed, non purified and humid ambient air or purified and dehumidified air. If the air sampling system and the pipe system are located in areas below the freezing point purified and dehumidified compressed air should be used.

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

1. Connect the compressed air supply (compressor or mobile blow-through device), which is necessary for the blow-through of the pipe system, to the 3-way socket ball valve via the quick-acting coupling sleeve of the blown-through pipe system.
2. Separate the pipe system to be blown-through via the 3-way socket ball valve from the relevant device by re-setting the ball valve from 0º-operating position to 180º (see fig. 6.11).
3. Manually blow the pipe system through for 10 seconds.
4. Set the ball valve to 90º. In this position the device is neither connected to the pipe system nor the pressed or compressed air supply. Wait about 20 seconds so that 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 pipe system with the device within the next 10 seconds by again positioning the ball valve to 0º.

INSTRUCTION

One 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 mentioned process must be repeated **at the earliest after 120 seconds**.

6.9 Steam trap

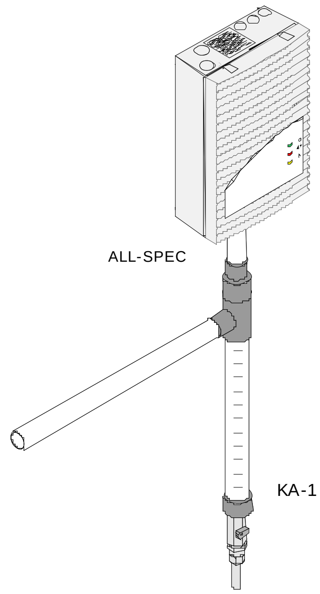


Fig. 6.12: Mounting of the steam trap to the pipe system

The steam trap is installed at the deepest point of the pipe system in front of the air filter and Honeywell ALL-SPEC. It is fixed to the pipe system by means of the PG-screw joints.

INSTRUCTION

> Two 45°-elbows are necessary on each connection side for the installation of the steam trap in the pipe system.

Connection

When mounting the steam trap pay attention to the air flow direction (refer to the arrow on the steam trap housing).

1. Prepare the pipe system with two 45°-elbows on each side for the connection to the steam trap and connect it to the PG-screw joints.
2. Fix the steam trap additionally through two screws and the support.

6.10 Test adapter

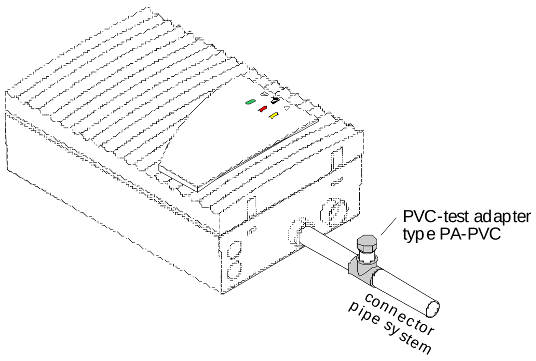


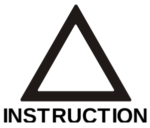
Fig. 6.13: Mounting of the test adapter at the pipe system

The test adapter is glued into the pipe system near the air sampling smoke detection system. For standard operation the test adapter has always to be closed. It is only opened for maintenance and service purposes to pass test gas or smoke into the system.

ATTENTION

> After testing the detector module in the air sampling smoke detection system and transmitting the alarm close the test adapter; if not, an air flow fault occurs!

7 Commissioning



> During commissioning, the inspection report must be filled out (see appendix). This will be needed for later evaluation of data such as air flow value, type of adjustment (see chapter 7.1), commissioning temperature, air pressure and height above sea level.

Check of Settings

Before commissioning check the settings of Honeywell ALL-SPEC (chapter 5.3 "Settings"). Then, connect the device to the power supply.

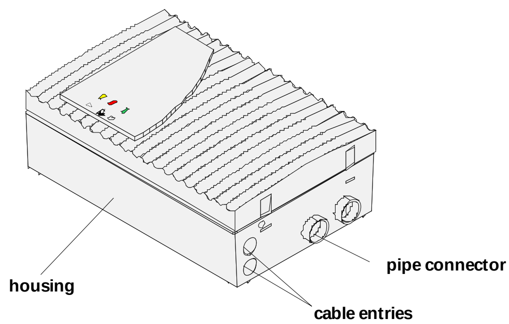


Fig. 7.1: Check for tightness

For the commissioning of Honeywell ALL-SPEC install the complete pipe system and connect it.

7.1 Air flow sensor adjustment

INSTRUCTION

> In order to adjust Honeywell ALL-SPEC correctly for the connected pipe system, the device must have been operating for at least 30 minutes.

Adjustment types

- The air flow sensor adjustment can be independent of the current air pressure (refer to chapter 7.1.1 "Adjustment Independent of the Air Pressure"). For restrictions on this kind of adjustment refer to chapter 4.3 “Air Flow Monitoring”.
- The adjustment can be made in dependence on the current air pressure (refer to chapter 7.1.2 "Adjustment Dependent on the Air Pressure”). Refer to the air pressure adjustment charts in the appendix.

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 independent of the air pressure

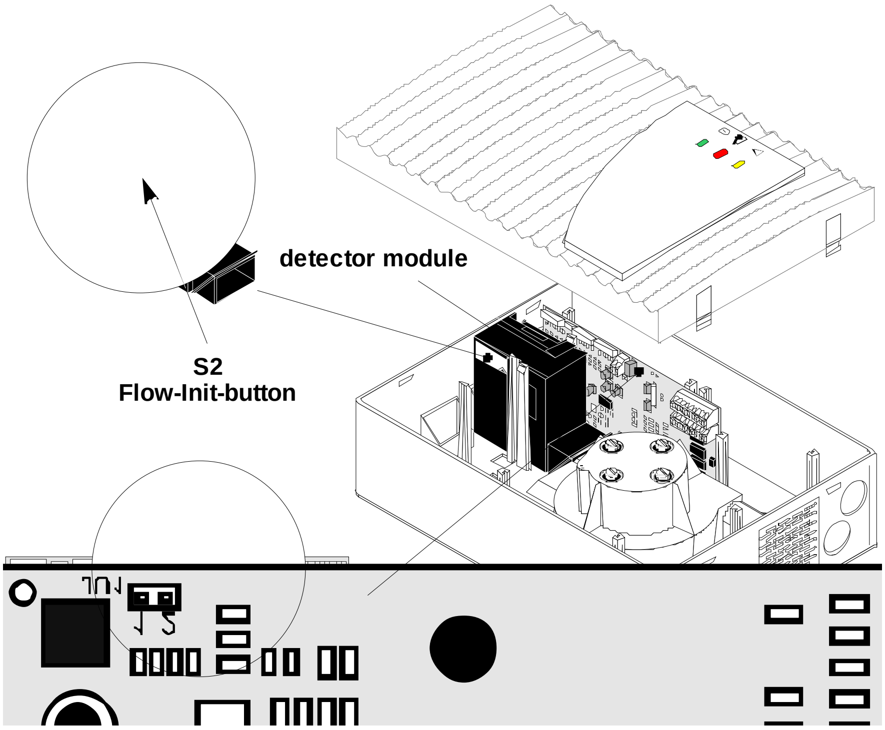


Fig. 7.2: Adjustment independent of the air pressure of the air flow sensor of Honeywell ALL-SPEC

1. Make sure the device has been in operation for at least 30 minutes.
2. Check the voltage at the measuring points MP1 (+) and MP4 (-). Pay attention to the polarity. Choose the "V-DC" range of the measuring device. The standard voltage at the measuring points is 1.2 V.
3. If this is not the case, set the trimming potentiometer R53 to this value by means of a small screwdriver.
4. Press the Flow-Init-button S2 on the detector module of Honeywell ALL-SPEC (refer to Fig. 7.2).
5. After pressing button S2, close the housing of Honeywell ALL-SPEC.

The learning phase of Honeywell ALL-SPEC is about 5 seconds. During this phase the alarm detection is fully functional, the operating-LED flashes and changes 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.

7.1.2 Adjustment dependent on the air pressure

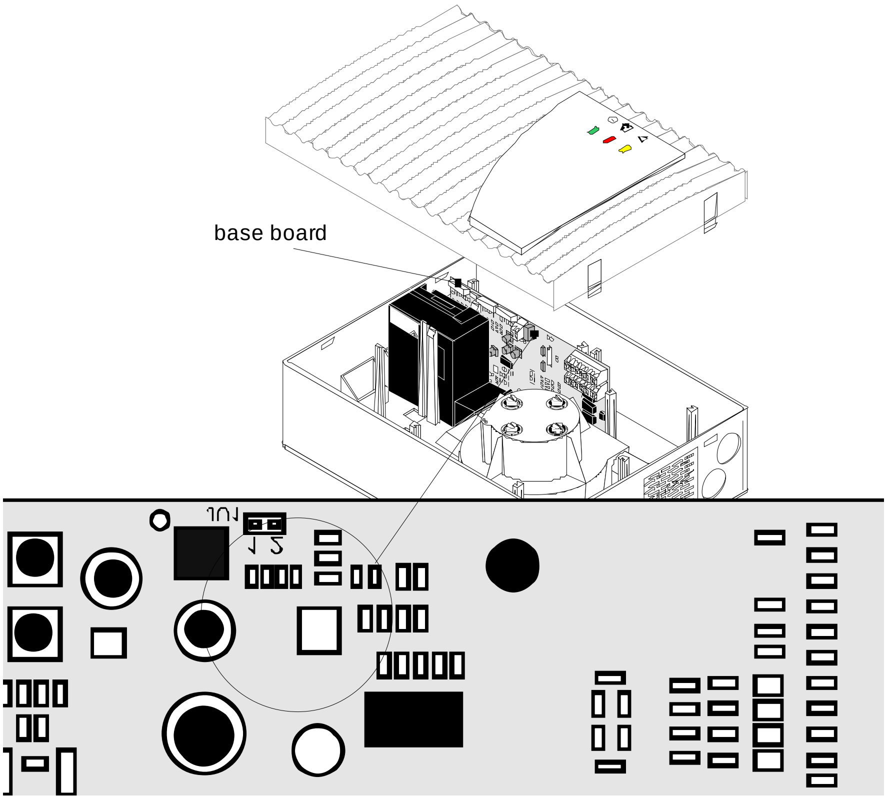


Fig. 7.3: Adjustment dependent on the air pressure of the air flow sensor of Honeywell ALL-SPEC

For the adjustment dependent on the air pressure of the air flow sensor a barometer and a multi-meter are necessary. Follow the steps below:

1. Make sure the device has been in operation for at least 30 minutes.
2. 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.
3. Measure the air pressure by means of the pocket barometer and the ambient temperature by means of a temperature measuring instrument. Register both values in the commissioning protocol.
4. Determine the adjustment value for the air flow sensor according to the air pressure adjustment chart (refer to appendix) and register the value in the commissioning protocol. Pay attention that the adjustment chart corresponds to the design of the pipe system.

5. Connect the multi-meter to the measuring points MP1 (+), MP4 (-) (refer to Fig. 7.3). Pay attention to the polarity. Choose the "V-DC" range of the measuring device. The standard voltage at the measuring points is 1.2 V.

INSTRUCTION

> The standard voltage of 1.2V, set to the measuring point, corresponds to the average yearly air pressure for the relevant elevation (m above sea level).

6. With a small screwdriver set the trimming potentiometer R53 to the value established in the air pressure adjustment chart.

7.2 Detector module and alarm transmission

Trigger the alarm of the detector module 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 the pipe system of Honeywell ALL-SPEC
2. Follow the steps in the table.

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

INSTRUCTION

If the **LOGIC·*SENS*** switch S1-10 is set to "ON" (refer to chapter 5.3 "Settings"), it should be set to "OFF" for the alarm triggering test through test aerosol in order to accelerate the alarm processing.

INSTRUCTION

Record all checked data in the inspection report.

7.3 Check air flow monitoring

Pipe Fracture Verify the detection of a pipe fracture :

1. Loosen the connection between the pipe and Honeywell ALL-SPEC or open the test adapter.
2. Verify whether the fault display of the air sampling smoke detection system is lit.
3. Check optionally the data of the air flow sensor using the diagnostic software DIAG 3 and a PC or laptop.
4. Register the result in the commissioning protocol.

Blockage Verify the detection of a blockage:

1. Close the necessary number of air sampling points by means of adhesive tape according to the chosen configuration of the air flow monitoring.
2. Check whether the fault display of the air sampling smoke detection system is lit.
3. Check optionally the data of the air flow sensor using the diagnostic software DIAG 3 and a PC or laptop.
4. Register the result in the commissioning protocol.

INSTRUCTION

A pipe fracture or blockage is indicated by a flash code via the LED of the detector module.

- fracture: 3x flashing
- blockage: 2x flashing

The corresponding flash code is repeated every two seconds.

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

Check whether ...

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 Honeywell ALL-SPEC or the air flow sensor is checked by means of the test pipe or through the diagnostic software (refer to chapter 7.5 "Operational Check Honeywell ALL-SPEC")

7.4 Check fault signal transmission

INSTRUCTION

> The following steps can only be completed after the air flow adjustment has been completed according to chapter 7.1 "Adjustment Air Flow Sensor".

1. Check the fault signal transmission.

Check the air flow monitoring (according to the following section) and verify whether the fault is still indicated at Honeywell ALL-SPEC and, if necessary, at the central fire panel.

7.5 Operational check of Honeywell ALL-SPEC

If it is not possible to adjust Honeywell ALL-SPEC check the functionality by means of the test pipe and a digital manometer or the diagnostic software. For this check Honeywell ALL-SPEC must have been in operation for at least 30 minutes.

7.5.1 Preparations for operational check

1. Remove the pipe system from Honeywell ALL-SPEC.

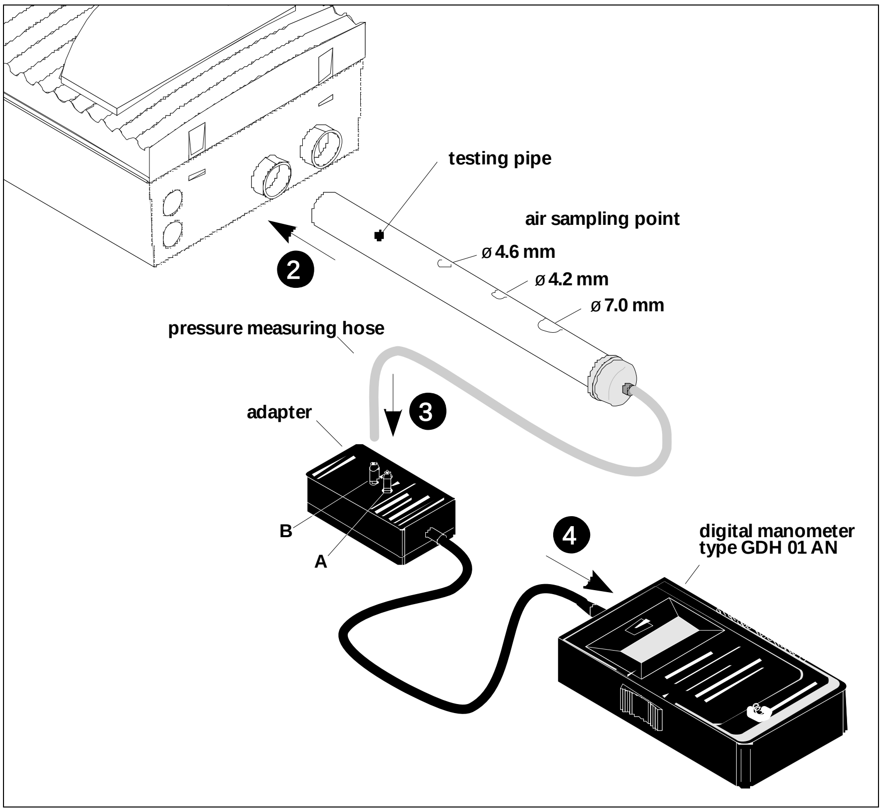


Fig. 7.4: Operational check of Honeywell ALL-SPEC

2. Connect the testing pipe.
3. Fasten the pressure measuring hose to adapter connection B.
4. Connect the 4-pole plug of the adapter to the digital manometer and switch it on.

INSTRUCTION

Preparations for the operational check of Honeywell ALL-SPEC2 must be carried out with steps 1 – 4 for both pipe systems.

7.5.2 Operational check

The operational check can be completed with or without a digital manometer. In the following the complete check is described. If during the operational check of Honeywell ALL-SPEC the values vary from those given in the following the device or its air flow sensor is damaged.

1. Make sure the device has been operating for at least 30 minutes.
2. Close all air sampling points of the test pipe by means of adhesive tape. After a short initiation period the depression generated in the device is to be approx. 250 up to 310 Pa for a set ventilator voltage of 6.9 V and 460 up to 530 Pa for 9 V.
3. Free the air sampling point at the test pipe again. After about 120 secs press the Init-button S2 on the detector module. The LED in operation flashes and the fault LED must go out (see INSTRUCTION).
4. Close the air sampling points of the test pipe with adhesive tape. After several seconds of **“blockage”,** the flash code of the LED on the detector module must flash.
5. Re-open all air sampling points of the test pipe. After a few seconds the flash code of the LED must go out.
6. Remove the test pipe. The LED flash code on the detector module must signal **“fracture”** for several seconds.
7. Re-connect the test pipe to the device. After a few seconds the LED flash code must go out.

INSTRUCTION

A pipe fracture or blockage is indicated by a flash code via the LED of the detector module:

- fracture: 3x flashing
- blockage: 2x flashing

The corresponding flash code is repeated every two seconds.

INSTRUCTION

The operational check for Honeywell ALL-SPEC2 must be carried out with steps 1 – 7 for both pipe systems.

If no fault on the air sampling smoke detection system occurred during the operational check, the pipe system must be checked.

Connection check

Check that:

1. the pipe system is firmly connected to the pipe connection of Honeywell ALL-SPEC all pipe fittings are taped and the pipe system is air tight. For this purpose, first seal all air sampling points (eg with insulating tape).Then measure the air flow at the opening for the air return or with a test adapter (see chapter 2.3), which must be installed to the air sampling pipe directly in front of the device.

2. the correct aspiration-reducing film sheets were taped over the air sampling points.

INSTRUCTION

> After adjusting the air flow sensors (chapter 7.1 “Air Flow Sensor Adjustment”), no further alterations on the pipe system must be made.
>
> If later alterations become necessary, the air flow sensor must again be adjusted.

For the operational check the diagnostic software DIAG 3 can be used as an option. The following steps are to be considered:

1. Install the diagnostic software on a laptop or PC2[1]. Windows 95, 98, ME, 2000, NT and XP are suitable.
2. With the enclosed diagnostic cable Honeywell ALL-SPEC is connected to the PC via “Diag.” on the base board.
3. Start the diagnostic software.
4. The current data of Honeywell ALL-SPEC is visualized on the screen of the PC.

INSTRUCTION

> For a correct colour interpretation, the monitor and graphic card must be able to depict more than 256 colours.

After completion of the operations check, commissioning of the device with the pipe system must be repeated from chapter 7.1 "Adjustment of Air Flow Sensor”.

INSTRUCTION

> After commissioning is completed, the setting values must be recorded and saved. A print-out of the setting values must be filed in the project folder for future reference.

[1] PC with serial interface

8 Maintenance

8.1 Visual Check

Check the pipe system is easily accessible, undamaged and mounted tightly,

- 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 (refer also to flash code table).

8.2 Flash Code Table

The detector modules are equipped with an LED which indicates different faults and device conditions in a flash code:

Flash Codes	
Number	**Meaning**
-/- (permanently lit)	hardware defect in the detector module
2 x flashing	air flow too small (blockage)
3 x flashing	air flow too large (fracture)
4 x flashing	stabilizing phase after turning on, etc. fan is turned off, etc. air flow sensor is being cleaned

8.3 Checking detector module and alarm transmission

Proceed according to chapter 7.2 "Detector Module and Alarm Transmission". In addition, check the detector module through visual check for external dirt and damage and, if necessary, exchange it.

INSTRUCTION

> A hardware defect of the detector module is displayed through the permanently lit detector module LED.

8.4 Checking the pipe system

In areas were dust particles or icing up are possible, check the pipe system and air sampling points for blockage. If necessary, free the openings with a blast of compressed air. For this purpose use a portable compressed air bottle (blow-through device) or use the manual blow-through installation on site.

ATTENTION

> Before blow-through, detach the pipe system from Honeywell ALL-SPEC in order to avoid damage to the air flow sensor.

8.5 Exchange of detector module

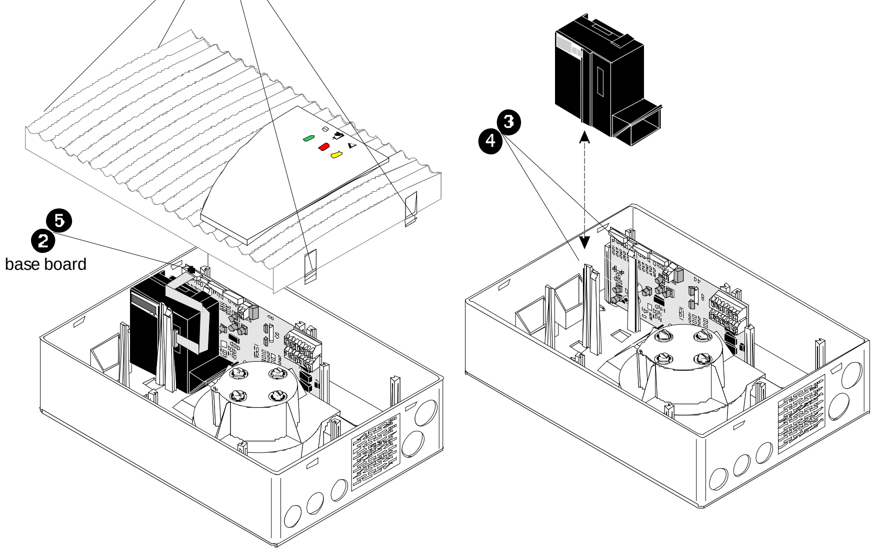
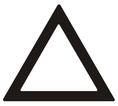


Fig. 8.1: Exchange of the detector module

1. Carry out the following steps **only** if the device is powered down.
2. Carefully unlock the snap-in closures of the housing using a screwdriver by simultaneously pressing in both clips located at one side of the housing lid. Then, lift the lid carefully. Pull the display board cable off and remove the lid.
3. Pull the connection cable of the detector module off the base board.
4. Carefully spread a bit both support clamps of the detector module and remove the detector module.
5. Spread both support clamps again, and place the new detector module in between them so that it audibly snaps in. Afterwards press both support clamps together
6. Reconnect the detector module via the ribbon cable to the base board. Connection: X1 (HEAD 1)
7. Connect the display board to the base board X4 (DISPLAY).
8. Before initialisation, operating power must be re-established.
   Press the Flow-Init button S2 at the detector module in order to initialize the pipe system.
9. Close the housing lid.



INSTRUCTION

A calibration of the detector module is not required.

8.6 Changing the air filter LF-AD -x

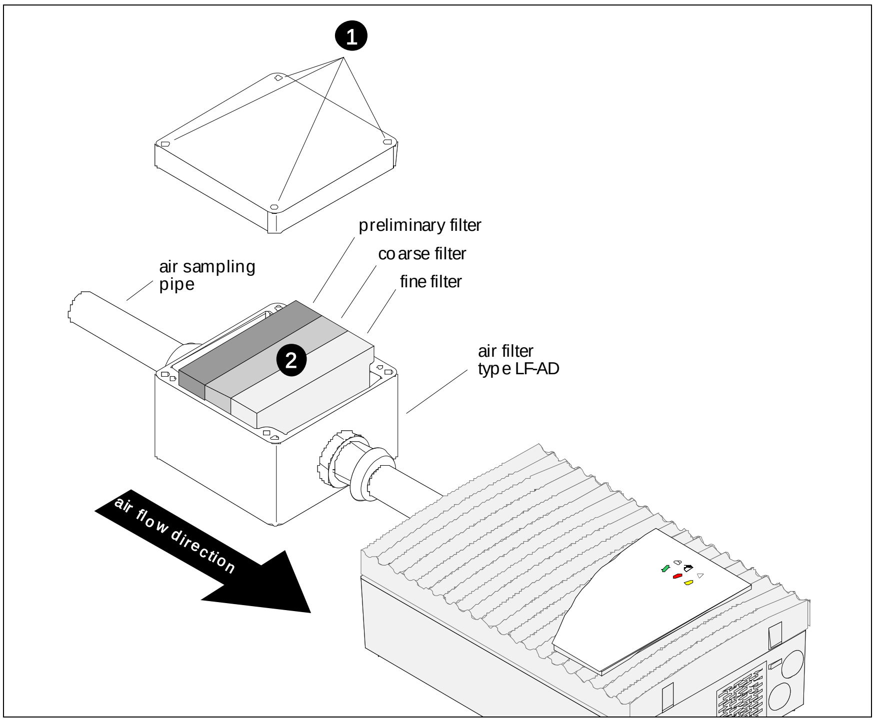


Fig. 8.2: change the filter inserts

To change the filter inserts, carry out the following steps (see fig. 8.2):

❶ Loosen the four screws and remove the housing lid.

❷ 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

❸ Carefully clean the inside of the housing from dust deposits. Now replace the cleaned or new filter inserts in the correct sequence. This can be seen on the sign on the housing floor.

❹ Replace the housing lid and screw it shut.

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 causes an air flow fault in Honeywell ALL-SPEC.

8.7 Changing special air filter SF-400

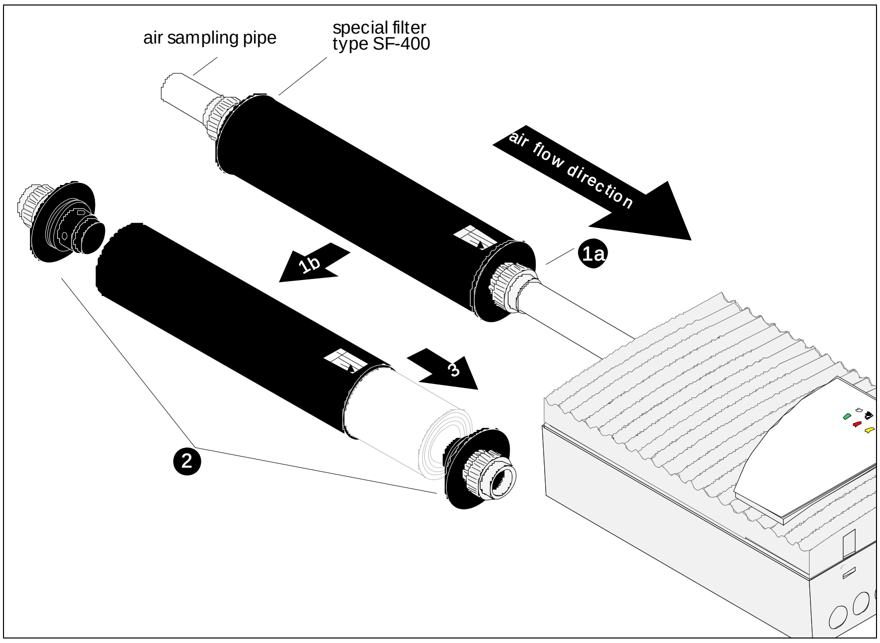


Fig. 8.3: Exchange of filter element

Follow these steps to change the filter elements: (see Fig 8.3):

❶ Loosen the PVC screw joints on the special filter 1a and remove it 1b.

❷ Remove the two screw-in plugs on the filter housing.

❸ Remove the filter element. Place a new filter element in the housing.

❹ Screw both screw-in plugs into the housing.

❺ Re-insert the special filer back into the pipe system and fix it firmly in place with PVC screw joints.

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 Honeywell ALL-SPEC.

8.8 Check of the air flow sensor adjustment

Check the air flow adjustment using the diagnostic software.

During initialization of the connected pipe system the device stores first via the integrated air flow sensor technology the measured current value of the air flow as rated value. This rated value serves as reference value for further evaluation of a possible air flow fault. According to the selected air flow threshold (refer to chapter 4.3 section Adaptation of the Air Flow Sensitivity) the current air flow value is allowed to vary more or less from the rated value during operation without triggering an air flow fault. Only if the selected air flow threshold has been exceeded, the air flow fault is also indicated by the device and can therefore be transmitted.

Checking of actual Value

In the diagnostic software the tolerance range of the selected air flow threshold is displayed together with the current and rated value. The limits (maximum/minimum) always correspond to a variation of ±100% from the set rated value. Check the variation of the current value from the rated value. If a variation of > ±70 % exists, as a preventive measure you should check the pipe system (refer to section "Clearance Air Flow Fault", next page).

INSTRUCTION

The reason for a variation of the current air flow value from the rated value stored during initialization of the pipe system can either be a fault of the pipe system (fracture or blockage) or air pressure or temperature variations of the environment.

Dependent on air pressure

To guarantee a faultless long-term operation of the device the air flow sensor adjustment should be dependent on the air pressure. Only this type of adjustment allows small air pressure variations to be within the monitoring window and thus within the permissible tolerance range.

ATTENTION

At a low or medium air flow threshold an air flow-dependent adjustment **must** be made.

Independent of air pressure

If the sensor adjustment has been effected independently of the air pressure, air pressure variations can lead to undesired air flow faults. This type of air flow sensor adjustment is only allowed if it is guaranteed that there are no variations of the air pressure in the near environment.

ATTENTION

If it is not guaranteed that no variations of the air pressure occur in the near environment, it is absolutely necessary to adjust the air flow sensor in dependence on the air pressure.

Clearance air flow fault

If the air flow sensor adjustment has been effected in dependence on the air pressure and the measured value is not within the tolerance range of the selected air flow threshold (air flow fault is indicated at the device), another fault other than those caused by air pressure or temperature variations is present.

1. In this case check the pipe system for tightness and blockage (refer to chapter 7.3, section "Trouble Shooting").

INSTRUCTION

> If the pipe network has been modified during the trouble shooting, the original configuration of the pipe network is to be restored after the completed trouble-shooting and the air flow is to re-adjust.

2. If this check leads to no negative results, check the air flow monitoring by connecting the test pipe and carrying out the operational check described in chapter 7.5.2.

ATTENTION

> If the air flow monitoring is damaged only authorized personnel is allowed to exchange the detector module!

If the test results do not vary from the given values, it is obvious that the air flow monitoring has no defect.

3. Carry out a new adjustment for the connected pipe system.

INSTRUCTION

> Register the adjustment type (dependent on the air pressure or not) and, if required, the values of the air pressure, the height above sea level and the set voltage at MP1 / MP4 in the commissioning protocol.

4. Keep an eye on the current air flow value during maintenance or check it during the next inspection at the latest.

TIP

> The diagnostic software allows filing any memorized and current diagnostic data and the settings of the DIL switch. Rename this file to be able to compare these data with the newly read-out values during the next check.
> For more information about the diagnosis software DIAG 3 refer to separated documentation.

5. If there is a similar variation from the rated value like before, interfering environmental influences are the cause for this variation. If these negative influences on the air flow monitoring cannot be stopped, the next less sensitive threshold is to be set.

8.9 Check air flow monitoring

A pipe fracture or pipe blockage shows for each detector module via a flash code LED on the base board. Proceed according to chapter 7.3 "Air Flow Monitoring".

8.10 Check fault signal transmission

A fault is shown on Honeywell ALL-SPEC and if necessary on the central fire panel.

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 lead 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
	check detector module and alarm transmission	8.3
	check pipe system	8.4
	check air flow sensor adjustment	8.8
	check fault signal transmission	7.4
maintenance + 4th annual inspection	visual check	8.1
	check detector module and alarm transmission	8.3
	check pipe system	8.4
	check air flow sensor adjustment	8.8
	check fault signal transmission	7.4
	check air flow monitoring	7.3

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

Air Pressure Correction Table

for Adjustment of Honeywell All Spec and Honeywell All Spec 2

Equipment Protection

Height [m above sea level]	Air Pressure [hPa] at a Height of														
0	973	978	983	988	993	998	1003	1008	1013	1018	1023	1028	1033	1038	1043
50	967	972	977	982	987	992	997	1002	1007	1012	1017	1022	1027	1032	1037
100	961	966	971	976	981	986	991	996	1001	1006	1011	1016	1021	1026	1031
150	954	959	964	969	974	979	984	989	994	999	1004	1009	1014	1019	1024
200	948	953	958	963	968	973	978	983	988	993	998	1003	1008	1013	1018
250	942	947	952	957	962	967	972	977	982	987	992	997	1002	1007	1012
300	936	941	946	951	956	961	966	971	976	981	986	991	996	1001	1006
350	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000
400	924	929	934	939	944	949	954	959	964	969	974	979	984	989	994
450	918	923	928	933	938	943	948	953	958	963	968	973	978	983	988
500	912	917	922	927	932	937	942	947	952	957	962	967	972	977	982
550	906	911	916	921	926	931	936	941	946	951	956	961	966	971	976
600	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970
650	894	899	904	909	914	919	924	929	934	939	944	949	954	959	964
700	888	893	898	903	908	913	918	923	928	933	938	943	948	953	958
750	882	887	892	897	902	907	912	917	922	927	932	937	942	947	952
800	877	882	887	892	897	902	907	912	917	922	927	932	937	942	947
850	871	876	881	886	891	896	901	906	911	916	921	926	931	936	941
900	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935
950	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930
1000	854	859	864	869	874	879	884	889	894	899	904	909	914	919	924
1050	848	853	858	863	868	873	878	883	888	893	898	903	908	913	918
1100	843	848	853	858	863	868	873	878	883	888	893	898	903	908	913
1150	837	842	847	852	857	862	867	872	877	882	887	892	897	902	907
1200	832	837	842	847	852	857	862	867	872	877	882	887	892	897	902
1250	827	832	837	842	847	852	857	862	867	872	877	882	887	892	897
1300	821	826	831	836	841	846	851	856	861	866	871	876	881	886	891
1350	816	821	826	831	836	841	846	851	856	861	866	871	876	881	886
1400	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880
1450	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875
1500	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870
1550	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865
1600	789	794	799	804	809	814	819	824	829	834	839	844	849	854	859
1650	784	789	794	799	804	809	814	819	824	829	834	839	844	849	854
1700	779	784	789	794	799	804	809	814	819	824	829	834	839	844	849
1750	774	779	784	789	794	799	804	809	814	819	824	829	834	839	844
1800	769	774	779	784	789	794	799	804	809	814	819	824	829	834	839
1850	764	769	774	779	784	789	794	799	804	809	814	819	824	829	834
1900	759	764	769	774	779	784	789	794	799	804	809	814	819	824	829
1950	754	759	764	769	774	779	784	789	794	799	804	809	814	819	824
2000	749	754	759	764	769	774	779	784	789	794	799	804	809	814	819
2050	744	749	754	759	764	769	774	779	784	789	794	799	804	809	814
2100	739	744	749	754	759	764	769	774	779	784	789	794	799	804	809
2150	734	739	744	749	754	759	764	769	774	779	784	789	794	799	804
2200	729	734	739	744	749	754	759	764	769	774	779	784	789	794	799
2250	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795
2300	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790
2350	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785
2400	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780
Titanus PS/PS 2 [V]	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**	**1.10**	**1.20**	**1.30**	**1.40**	**1.50**	**1.60**	**1.70**	**1.80**	**1.90**

Release: As: 23/05/2012

Air Pressure Correction Table

for Adjustment of Honeywell All Spec and Honeywell All-Spec2

Room Protection (I-shaped pipe system)

Height [m above sea level]	Air Pressure [hPa] at a height of														
0	973	978	983	988	993	998	1003		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 PS/PS 2 [V]	**0.58**	**0.67**	**0.76**	**0.85**	**0.94**	**1.03**	**1.12**	**1.21**	**1.30**	**1.39**	**1.48**	**1.57**	**1.66**	**1.75**	**1.84**

Air Pressure Correction Table
for Adjustment of Honeywell All Spec and Honeywell All-Spec2

Room Protection (U-shaped, double U-shaped and H-shaped pipe system)

Height [m above sea level]	Air Pressur [hPa] at a Heigt 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 PS/PS 2 [V]	**0.54**	**0.63**	**0.73**	**0.82**	**0.92**	**1.01**	**1.11**	**1.20**	**1.30**	**1.40**	**1.49**	**1.59**	**1.68**	**1.78**	**1.87**

Commissioning Protocol for Air Sampling System Type Honeywell All Spec and Honeywell All-Spec2

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	[sec]						
fault delay	[min]						
activating threshold	(small/medium/ large/very large)						
fault latched	(yes/no)						
LOGIC · SENS	(yes/no)						
adjustment dependent on the air pressure	(yes/no)						
adjustment independent of the air pressure	(yes/no)						
height	[m above sea level]						
air pressure	[hPa]						
temperature	[°C]						
Fault Blockage							
LED flashes	(✓/ –)						
relay drops out after delay time	(✓/ –)						
signal transmission to central fire panel	(✓/ –)						
cause of the fault eliminated, LED off	(✓/ –)						
relay picks up when thresh. is not reached	(✓/ –)						
cause of fault eliminated, LED memorized	(✓/ –)						
relay stays dropped out	(✓/ –)						
Fault Fracture							
LED flashes	(✓/ –)						
relay drops out after delay time	(✓/ –)						
signal transmission to central fire panel	(✓/ –)						
cause of the fault eliminated, LED off	(✓/ –)						
relay picks up when thresh. is not reached	(✓/ –)						
cause of fault eliminated, LED memorized	(✓/ –)						
relay stays dropped out	(✓/ –)						
Alarm							
LED flashes	(✓/ –)						
relay drops out after delay time	(✓/ –)						
signal transmission to central fire panel	(✓/ –)						
LED memorized	(✓/ –)						
relay memorized	(✓/ –)						

issuer: ……………………………. **signature: ………………………………….**

key:	✓ O.K. – not O.K.

Glossary

Technical Term	Definition
A	
aerosol also: *smoke aerosol*	An aerosol is a floating particle in the microscopic or submicroscopic particle size range. They consist of unburned parts of the fire load, intermediate products of the oxidation and finely divided carbon (soot).
air flow sensor	Sensor for monitoring the total air flow in the pipe system, i.e. checking the pipe system for blockage and fracture; according to the requirements of the air flow monitoring →single-hole monitoring and the detection of a fracture at the end of the pipe system can be realized.
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, detector head or detector module).
alarm	a) Acoustic and/or optical signal activated through smoke detectors to indicate a fire. b) Freely adjustable alarm threshold. The activation of the alarm definitely means the detection of a fire. The fire department is informed.
alarm 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 a reaction to an existing danger.
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 and air sampling smoke detection systems.
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.
CMOS	**C**omplementary **M**etal **O**xide **S**emiconductor, complementary MOS technology
collective alarm	A non-differentiated, i.e. non-localizable alarm, which is indicated at a superior system.
collective detection system	Conventional detection line technology for which all detectors connected to the same detection line have the same collective address (common indication and operation without identification of the individual detector).

C	
collective fault	A non-differentiated, i.e. non-localizable →fault signal which is indicated at a superior system.
D	
detection line	Monitored transmission line (primary line) through which the smoke detectors are connected to the central fire panel.
detection reliability	The detection reliability is the measure 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 module	modular scattered light smoke detector optimized for use in air sampling smoke detection systems and equipped with a special air feed, a Flow-Init button for initialization of the integrated air flow sensor, a diagnostic LED with flash code for indicating faults and a DIL-switch
detector module sensitivity *also: sensitivity*	The detector module sensitivity has a sensitivity adjustable between the levels 1 to 4 and makes up the generic term for response sensitivity.
DIL switch	**d**ual **i**n **l**ine; e.g. to set the response sensitivity, the air flow sensor, the delay period for alarm and fault, to set the fault display to latched or non-latched and to activate or deactivate *LOGIC · SENS*.
Drift	Method of compensating detector soiling which could cause the quiescent signal to be changed by moving the zero point.
E	
electromagnetic compatibility (EMC)	The electromagnetic compatibility is the ability of an electrical system to operate correctly in its electromagnetic environment and to have no un-allowed 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.
F	
fault signal	Signal indicating a deviation from the desired value in the smoke detection installation.
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.

H	
head control	The head control is an electronic board in the detector module and contains the control electronics for the detector module. 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 adjustable; they can be programmed through 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 can impair the proper functioning of a smoke detection installation.
L	
line module	By means of line modules (AnalogPLUS® or interactive) TITANUS *PRO · SENS*® can be connected to the *AlgoRex*®-smoke detection system.
LOGIC · SENS	Through the LOGIC·*SENS* switch the intelligent signal processing can be activated. It allows an analysis of the measured smoke level by comparing the smoke data with known parameters thus enabling to detect interferences and avoiding false alarms.
loop line	Detection line which forms a loop from the central fire panel via the smoke detectors and back to the central fire panel to increase the operation reliability.
M	
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.
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.
P	
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	
response sensitivity	The response sensitivity describes the sensitivity at which an alarm is activated (detector module sensitivity).
S	
scattered light smoke detectors	Scattered light smoke detectors are optical smoke detectors. They use the phenomenon of light scatter through smoke particles which causes the signal to change at the light diode.
secondary line	Non-monitored transmission lines
sensitivity ⇧ detector module sensitivity	
single-hole monitoring	Detection of changes (e.g. blockages) of the diameter of each single air sampling point.
smoke detection system	Smoke detection systems are risk management systems which serve persons to make a direct emergency call in case of a fire and/or detect and indicate a fire in an early stage.
smoke detector	Smoke detectors react to the combustible particles and/or aerosols (floating particles) in the air.
T	
temperature compensation	The air flow in the pipe system is not falsified by temperature variations.
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.