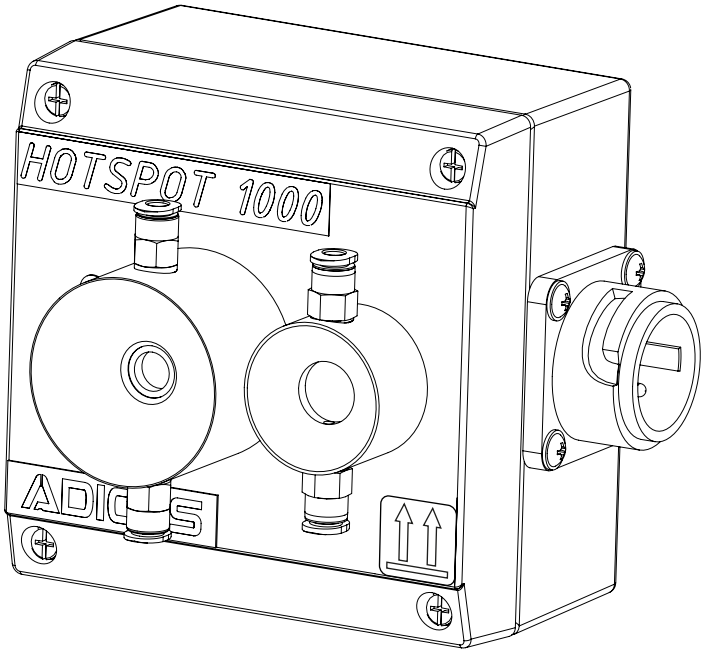

EN CE IP64

Operating Manual

IR Heat Detector

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Abstract

The Advanced Discovery System (ADICOS®) is used for early detection of fires in industrial environments. It is comprised of various, separate detector units. By parameterizing and arranging the detectors appropriately, the system fulfills a predefined detection goal.
The ADICOS system ensures reliable early detection of embers and smoldering fires even in adverse environments.

The detectors of the HOTSPOT product series are equipped with thermal imaging sensors. They use infrared measurement technology and intelligent signal analysis to detect all types of smoldering fires and open fires, even in the incipient stage. The fast response speed of 100 milliseconds enables the monitoring of conveyor belts or other conveyor systems, e.g. on moving embers.

The ADICOS HOTSPOT-1000 is an IR fire detector used for optical and spatially resolved fire and heat detection. It is well suited for these applications:

- Detection of hot surfaces
- Detection of flames
- Detection of moving hot spots (pockets of embers)
- Monitoring of machinery and parts

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1 About this Manual

1.1 Objective

This manual describes how to properly attach, wire, start up and operate the ADICOS detectors "HOTSPOT-1000." Once the device has been successfully started up, this document serves as a reference in the event of malfunctions.
It is intended to be used only by properly qualified personnel (–› Chap. 2, For your Safety).

1.2 Explanation of Symbols

This manual follows a certain structure to make it easy to work with and understand. The following designations are used throughout.

Operational objectives

Operational objectives specify the result to be achieved by following the subsequent instructions. Operational objectives are shown in **bold print**.

Instructions

Instructions are the steps to be taken in order to achieve the previously stated operational objective.
Instructions appear like this

► Indicates a single instruction

1 First of a series of instructions
2 Second of a series of instructions
3 etc.

Intermediate states

When it is possible to describe intermediate states or events resulting from the instruction steps (e.g. screens, internal function steps, etc.), they are shown like this:

▷ Intermediate state

Warnings

The following types of notes are used through this manual:

DANGER!
This combination of symbol and signal word indicates an immediately dangerous situation which could lead to death or severe injuries if it is not avoided.

WARNING!
This combination of symbol and signal word indicates a possibly dangerous situation which could lead to death or severe injuries if it is not avoided.

CAUTION!
This combination of symbol and signal word indicates a possibly dangerous situation which could lead to minor injuries if it is not avoided.

NOTICE!
This combination of symbol and signal word indicates a possibly dangerous situation which could lead to property damage if it is not avoided.

Tips and recommendations
This type of note provides information that is directly relevant for the further operation of the device.

1.3 Abbreviations

The following abbreviations are used through this manual:

Abbr.	Meaning
ADICOS	Advanced Discovery System
AAB	ADICOS junction box
M-BM	ADICOS M-BUSMASTER
NT	ADICOS power supply unit NT V40-A3
FDnet	Field Device Network (fire detection bus, SIEMENS fire detection systems)
LSN	Local Security Network (fire detection bus, BOSCH fire detection systems)
BMA	Fire detection system

1.4 Storing this Manual

Store this manual near the detectors, in a place where it can easily be accessed when needed for reference.

2 Safety Instructions

When properly installed, started up, operated and serviced, ADICOS HOTSPOT devices ensure operational safety at your facility. But it is imperative that the manual, including all safety notes, be read, understood and followed completely.

WARNING!
Personal injury and property damage!
Incorrect installation and operating errors can cause death, serious injury and damage to industrial equipment.
- **Read the entire manual and follow the instructions!**

2.1 Intended Use

The thermal imaging camera ADICOS HOTSPOT-1000 is designed in line with state-of-the-art technology and accepted safety regulations.

The ADICOS HOTSPOT-1000 may be used only in compliance with the limits stated as technical operating specifications. These can be found in Chap. 11, »Technical Data«.

Intended use also includes following the instructions in this manual and complying with all relevant local regulations.

The ADICOS HOTSPOT-1000 may not be used for any other purpose. If the device is used in any other way, or if changes are made to the product, including in the course of installation and maintenance, the warranty claim is no longer valid.

2.2 Unintended Use

The ADICOS HOTSPOT-1000 may not be installed in potentially explosive areas. There are special HOTSPOT models available for use in potentially explosive areas.

2.3 Standards and Regulations

The current safety and accident prevention regulations relevant to the specific application must be complied with when installing, starting up, servicing and inspecting the detector.

Regulation	Description
VDE 0100	Erection of power installations with rated voltages below 1000 V
VDE 0800	Telecommunications – general concepts; requirements and tests for the safety of facilities and apparatus
VDE 0833	Alarm systems for fire
VdS 3189	IR camera units for monitoring temperatures in fire prevention
VDE 0845	Protection of telecommunication systems against lightning, electrostatic discharges and overvoltages from electric power installations – provisions against overvoltages

Regulation	Description
VdS 2095	Guidelines for automatic fire detection and fire alarm systems - planning and installation
DIN 14675	Fire detection and fire alarm systems – setup and operation

2.4 Personnel Qualification

Only properly trained and qualified persons may work on ADICOS equipment. Qualified persons are those who have received relevant professional training, have the required skills and experience and who are aware of applicable regulations, enabling them to work on electrical equipment and detect potential hazards.

WARNING!
Personal injury and property damage
Improperly performed work on and with the device can lead to malfuctions.

- **Installation, commissioning, parameterization and maintenance may be performed only by authorized and properly trained personnel.**

2.5 Modifications

WARNING!
Risk of property damage by any form of unauthorized modification
Any form of unauthorized modification or extension can lead to a failure of the detector system.

- **Never make unauthorized modifications on your own authority.**

2.6 Accessories and Spare Parts

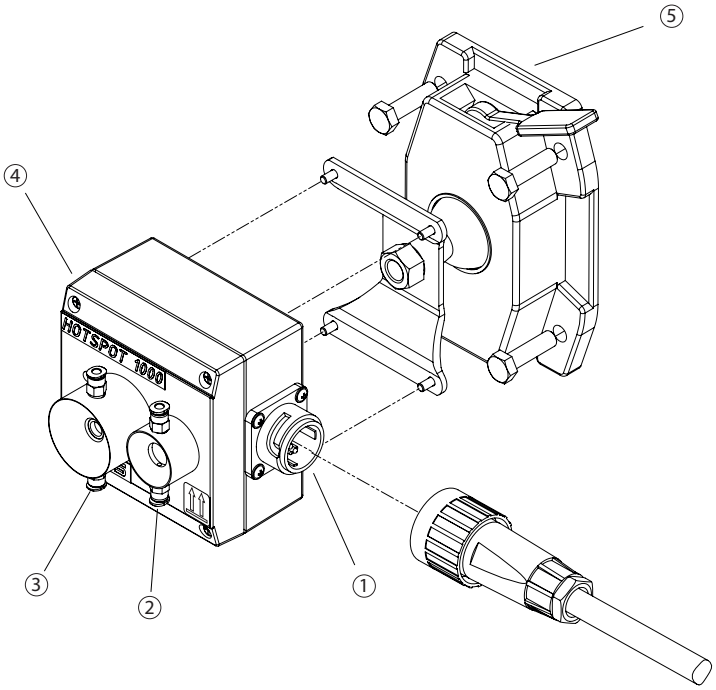
WARNING!
Property damage due to short circuit or failure of the detector system
The use of parts other than the manufacturer's original spare parts and original accessories may result in property damage due to short circuits.

- **Only use original spare parts and original accessories!**
- **Original spare parts and accessories may only be installed by trained specialist personnel.**
- **Qualified personnel are persons as described in Chap. 2.4**

3 Product Description

The ADICOS HOTSPOT-1000 is an infrared fire detector with an integrated signal evaluation. It is used for early and contact-free temperature and ember detection. Because of its durable design, the ADICOS HOTSPOT-1000 can be used in adverse industrial environments. It is excellent for monitoring bulk goods prone to spontaneous combustion as well as conveyor systems.

3.1 Overview



No.	Description
①	Pre-assembled bayonet connection
②	Camera as installation aid
③	Purge air adapter with IR sensor array
④	HOTSPOT-1000 enclosure
⑤	Adjustable mounting bracket

3.2 Sensor Specification

Type	Pixels	Capture angle	Object resolution at a distance of 5 meters
HOTSPOT-1000	32 x 31	53° x 52°	16 cm

3.3 Applications

3.3.1 Moving Objects

Because of the fast response time of 100 milliseconds, the ADICOS HOTSPOT-1000 is ideal for monitoring of moving objects, e.g. transport and conveyor belts. Therefore, an early detection of pockets of ember transported on the conveyors can be realized.
When installing the ADICOS HOTSPOT-1000, it must be ensured that the detector always has a clear, unobstructed view of the conveyor belt to be monitored. If it is not possible to scan and monitor the entire moving object with a single ADICOS HOTSPOT-1000, multiple detectors can be installed to monitor the whole object.

3.3.2 Stationary Objects

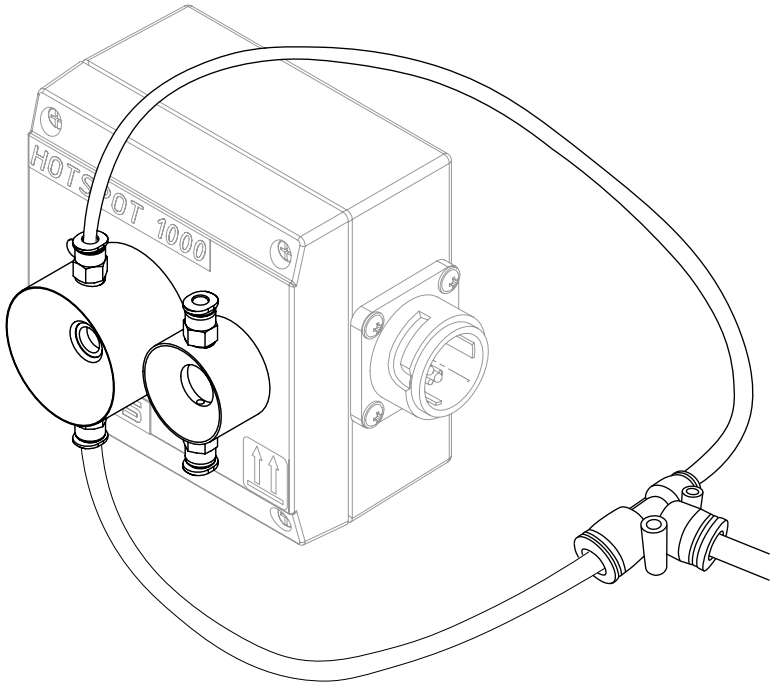
In addition to moving objects the HOTSPOT-1000 can monitor stationary objects as well, ensuring early detection of any hot spots, that may be forming. The detector can be integrated to observe drives, shaft bearings and reels in order to indicate overheating.
In addition to the ADICOS GSME the HOTSPOT-1000 can be used to monitor bulk material stored in deposits and silos to detect pockets of ember.
Multiple HOTSPOT-1000 can be operated athe same time and can be combined to one system to monitor the entire installation and area required.

3.4 Connecting Purge Air

The ADICOS HOTSPOT-1000 optics are integrated in a stainless steel tube, that prevents dust from collecting on the lens at low air flow.

For applications with strong air turbulence and higher air velocity, the ADICOS HOTSPOT-1000 has a purge air adapter. It must be ensured that purge air is applied as long as dust deposits are to be expected. Otherwise the lifetime of the detector will be reduced. Purge air can be used to extend the cleaning intervals du to contamination.

Both, the integrated IR sensor and the auiliary camera, are equipped with two 4 mm quick connectors for connection compressed air



Purge air connection
The oil-free and dust-free compressed air available on site is used. The compressed air for the sensor/camera is supplied to the purge air connection through a throttle valve. The purge air has to be adapted to the temperature of the air around the HOTSPOT-1000 to prevent condensation from forming on the lens of the IR sensor. If the auxiliary camera is only used to align the detector during the commissioning phase, it may not be necessary to use its purge air connection during operation.

Purity classes required for purge air

Dust class 2
Water content class 3 (-20 °C dewpoint)
Oil content class 2 (< 0.1 mg/m^3)

Required air flow rate

In dusty, settled air 2-3 l/min
In dusty, flowing air > 8 l/min
Testing is advisable in severely turbulent, dusty air.
The purge air supply must remain uninterrupted as long as dust residue can be expected. The air flow rate can be restricted with throttle valves; one per detector, e.g. from the Festo series GR-QS4-LF, Festo art. no. 193966.

3.5 Signal Relays

The ADICOS HOTSPOT-1000 has two signal relays to indicate the detector status: one for the “Alarm” and one for the “Failure” status. The “Alarm” relay is a make contact (NO) and the “Failure” relay is a break contact (NC). The signal lines for the relays are integrated into the ADICOS connection cable.

3.6 Detector Heater

The ADICOS HOTSPOT-1000 is equipped with an internal heater. It prevents from condensation caused by ambient conditions. The heater can be activated or deactivated with aid of the ADICOS System Software. It has a power consumption of up to 10 VA. The default condition of the heating as supplied is inactive.

The heater switches off automatically when under voltage occurs. When the under voltage has been remedied, the detector heater is not activated again until the ADICOS HOTSPOT-1000 has been reset.

The enclosure temperature is monitored to limit the heating function. If the default temperature limit of 40 °C is exceeded, the detector heater switches off automatically. The limit may need to be adjusted in the event of a high ambient temperature along with high humidity.

3.7 ADICOS M-Bus

The ADICOS M-Bus is a two-wire data line used to transmit all of the detector parameters as well as the operating and measurement data to the ADICOS M-Bus Interface (ADICOS M-BUSMASTER XF or S) used. These data can be displayed and archived using the ADICOS System Software. The parameters for all of the connected detectors can be set via the ADICOS M-Bus as well. The M-Bus lines are integrated into the ADICOS connection cable.

4 Functioning

When the ADICOS HOTSPOT-1000 is in operation, it triggers an alarm according to the set threshold combinations. With aid of the ADICOS M-Bus interface (M-BUSMASTER XF or S) the detector also transmits all sensor and operating data to the ADICOS System Software to be displayed.

If the ADICOS HOTSPOT-1000 is connected to a fire panel with aid of an internal interface module, the fire panel controls the detector’s alarm display.

4.1 Configuration and Evaluation

One of the outstanding feature of the ADICOS HOTSPOT-1000 is its capacity to early detect hot spots based on programmable parameters. The field of view of the HOTSPOT is divided into 16 segments. An individual alarm threshold can be set for each segment. Each detector has two sets of limit values. In addition to temperatures, the detectors also detect flames.

Standard configuration

In the standard configuration, the temperature threshold of the ADICOS HOTSPOT-1000 is set to 60 °C.

Individual modifications to configuration

The ADICOS System Software can be used to change the limit of the ADICOS HOTSPOT-1000 irrespective of the standard (default) configuration upon delivery.

4.2 LED Signals

The current state of the ADICOS HOTSPOT-1000 is indicated by three LEDs. The following table explains the respective illumination.

LED	State	Functioning
Green	Flashing	Initialization / not yet able to trigger an alarm
	On	Normal operation
	Off	Detector switched off, no supply voltage available, fuse or cable defective
Yellow	On	Malfunction
	Off	Normal mode
With fire panel interface:		
Red	Flashing	alarm, but without indication at the fire panel
	On	alarm, acknowledged by fire panel
	Off	Normal mode
With pre-alarm module:		
Red	Flashing	Pre-alarm
	On	Alarm
	Off	Normal operation
Without fire panel interface:		
Red	On	Alarm
	Off	Normal operation

5 Installation

WARNING!
Danger of malfunction and failure of the detector system
Incorrect installation of ADICOS detectors can lead to faults and failures of the fire detector system.
- **Installation work may only be performed by specialist personnel! (–› Chap. 2.4, Personnel qualification)**

5.1 Requirements of Mounting Location

DANGER!
Explosion danger in potentially explosive atmospheres
ADICOS HOTSPOT in their standard version may **not be installed in explosive atmospheres**!
- **Only use approved HOTSPOT variants for operation within explosive atmospheres!**

NOTICE!
Correct alignment
Arrangement and alignment of ADICOS detectors are highly important for a reliable detection. Unfavorable placement can lead to complete ineffectiveness of the detector!
- **Only experienced specialist planners may define detector position and alignment!**

5.1.1 Protective Measures

To ensure failure-free operation of the ADICOS HOTSPOT-1000, always consider the following factors when choosing a place to attach the device.

Temperature

Even under the most unfavorable conditions, the ambient temperature at the mounting location must remain within the temperature range specified for the ADICOS HOTSPOT-1000 (Refer to Chap. „11 Technical Data“).

Dirt and condensation

The ADICOS HOTSPOT-1000 is equipped with a purge air connection that prevents dusty air from polluting the optics. A detector heater is needed when there is a risk of condensation forming on the device.

WARNING!
Danger of sensitivity loss and failure of the detector system
In dust environments with simultaneous high humidity, the functionality of the detector may be impaired..
- **Ensure that purge air is applied! Purge air can be used to extend the cleaning intervals due to contamination. (–› Chap. 3.4, Connecting Purge Air)!**
- **Keep the detector heater in operation (–› Chap. 3.6, Detector Heater)!**

Moisture

When choosing a place to attach the ADICOS HOTSPOT-1000, take into consideration that it may not be exposed to moisture. Keep in mind that water could be used for cleaning purposes near the mounting location.

Vibration

The electronics contained in the ADICOS HOTSPOT-1000 can be damaged when subjected to vibration. If there are any sources of strong vibration near where the ADICOS HOTSPOT-1000 is mounted, the detector has to be positioned such that its operation is not affected.

Electromagnetic radiation

The electronics contained in the ADICOS HOTSPOT-1000 can be impaired by electromagnetic radiation. So do not place the detector near high voltage equipment. Always use shielded cable.

5.1.2 Requirements of Proper Detection

To ensure reliable and correct operation of the ADICOS HOTSPOT-1000 as well as proper detection, always consider the following factors when choosing a place to attach the device.

Visibility

The ADICOS HOTSPOT-1000 must always have a clear, unobstructed view of the installation to be monitored. If the object to be monitored is obscured or is not within the visibility range of the ADICOS HOTSPOT-1000, the device will not be able to detect any heat sources and trigger an alarm.

Distance and detection area

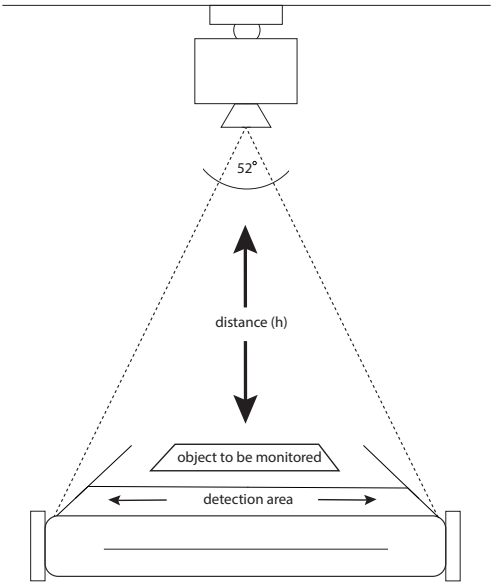
The detection area is determined by the distance between the detector and the object to be monitored. So the distance or the installation location should be selected such that the object to be monitored can be covered completely by the detector's field of view. This ensures maximum sensitivity.

Rule of thumb: Detection area when positioned vertically: tan(26.5) x 2 x height

Example:

An 80 cm wide conveyor belt is to be monitored to detect any moving hot spots. So the HOTSPOT detector should be installed about 80 to 100 mm above the conveyor belt.

Distance [m]	Object resolution [cm]	Width of detection area [m]
1	3	1
3	10	3
5	16	5
10	32	10
15	48	15



As the distance increases, so do the size of the total detection area and the area detected by a single sensor pixel. So the object resolution of the IR detectors is a factor of the distance.

Disturbing Influences

Certain disturbing influences can have a negative impact on the operation of the ADICOS HOTSPOT-1000, leading to a false alarm:

- Direct sunlight and reflections due to reflective surfaces
- Hot bodies (e.g. vehicle engines and exhaust systems)
- Welding

5.2 Mounting

1. Select a suitable mounting location.
2. Install the ADICOS AAB junction box near the ADICOS HOTSPOT-1000.
3. If applicable, use a 4 mm hose to connect the ADICOS HOTSPOT-1000 to a purge air supply. This prevents residue from forming on the ADICOS HOTSPOT-1000 optics.
4. Connect the components to one another (Refer to chapter 5.3).
5. Connect the components to the supply voltage.

5.2.1 Installation Requirements

The most important requirement for properly detecting a heat source is that the detector must have a clear, unobstructed view of the equipment parts and/or objects to be monitored within the detection area. When choosing the mounting position, it is also necessary to take into account possible deception sizes.

NOTICE!
Spurious alarms!
Note the influence of spurious parameters, e.g. solar radiation.

- **When selecting the mounting position, avoid direct or indirect sunlight!**

Before mounting the device, determine the detection area of a single detector, or adjust it as a factor of the installation location. When doing this, take into consideration the mounting angle of the detector as well as the angle of detection.

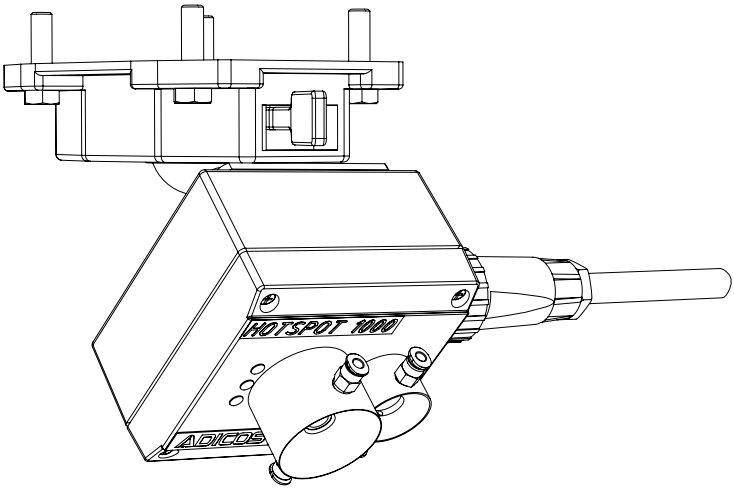
5.2.2 Mounting the ADICOS HOTSPOT-1000

Attaching to a mounting plate

The aluminum enclosure of the ADICOS HOTSPOT-1000 has four mounting bores with a thread cut of M5 in the lower part. These mounting bores/threads can be used to mount the detector directly or to attach it to a mounting plate. A standard mounting plate is available as an accessory.
The person installing the device must verify that the mounting plate is positioned such that the object to be monitored is within the detection area of the ADICOS HOTSPOT-1000.

Attaching to a mounting bracket

The ADICOS HOTSPOT-1000 is also available with a ball joint. The ball joint is connected to the detector with a angle bracket to the enclosure. There is a lever that can be released to adjust the detector to the proper angle, allowing it the best view of the detection area. The ball joint gives the ADICOS HOTSPOT-1000 a tilting range of +/- 50° from the vertical position towards the narrower side and +/- 30° from the vertical position towards the wider side.

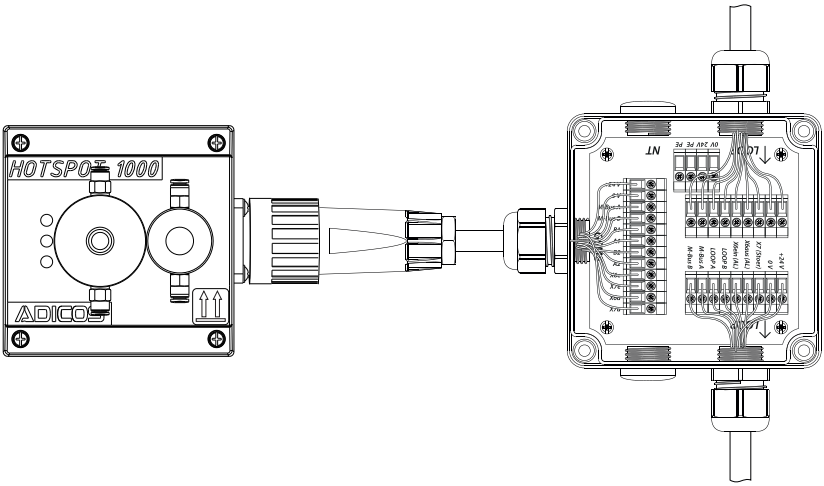


5.3 Wiring

NOTICE!
Faults and failures of the detector system by improper wiring!
Incorrect wiring of ADICOS detectors can lead to faults and failures of the detector system.

- **Wiring may only be performed by specialist personnel!** (↪ Chap. 2.4, Personnel qualification)
- **De-energize the entire detector system for any wiring!**
- **Use ADICOS connection cables only for connecting detectors as well as ADICOS junction boxes!**

5.3.1 Cable Assignment



Color	Signal	Potential-free contact
Red	Operating voltage DC 21.6 ... 40 V, non-polarized	
Black		
Yellow	Relay output X6 e	Alarm (NO)[1]
White	Relay output X6 a	Alarm (NO)[1]
Brown	Relay output X7 a	Failure (NC)
Green	Relay output X7 e	Failure (NC)
Pink	Fire panel interface B – in	Auxiliary assembly (optional, added at factory)
Blue	Fire panel interface A – in	
Violet	Fire panel interface B – out	
Gray	Fire panel interface A – out	
Blue/red	M-Bus Max, 40 V, non-polarized	
Gray/pink		

[1] With series resistor, standard 680 Ω

Optional fire panel interfaces

Color	Signal	Siemens FDnet	BOSCH LSNi
Pink	Fire panel interface B – in	FDnet-A (–)	LSN b1 in
Blue	Fire panel interface A – in	FDnet (+)	LSN a in
Violet	Fire panel interface B – out	FDnet-B (–)	LSN b2 out
Gray	Fire panel interface A – out	FDnet (+)	LSN a out

Optional analog signal

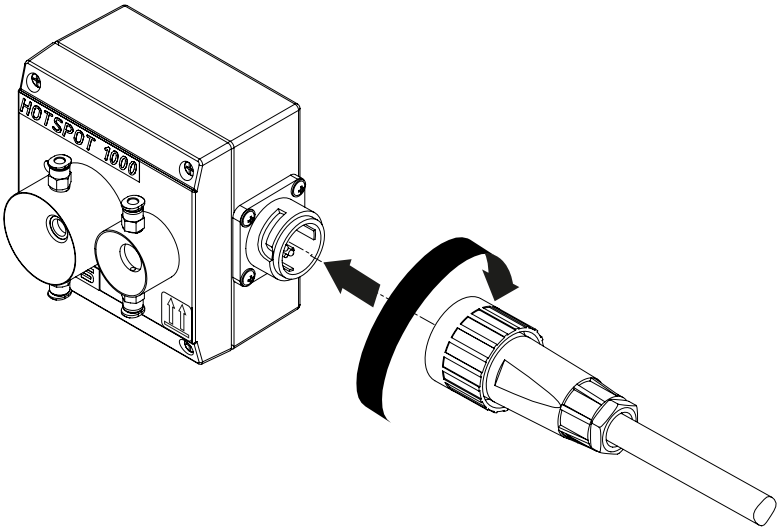
Color	Signal	Analog signal
Pink	Analog signal – protected against polarity reversal	4 ... 20 mA
Blue	Analog signal – protected against polarity reversal	4 ... 20 mA

Optional pre-alarm relay

Color	Pre-alarm module
Pink	NC (break contact)
Blue	-
Violet	M (center tap)
Gray	NO (make contact)

The pre-alarm relay is linked to set 2 of the trigger limits. The pre-alarm functionality is ensured as long as the limits programmed in set 2 are less sensitive than the limits in set 1.

5.3.2 Attaching ADICOS Connection Cable to ADICOS HOTSPOT-1000



1 Press the bayonet lock on the ADICOS connection cable against the detector connection.

2 Carefully turn the entire bayonet lock to find the proper position for the twist protection.

3 Firmly turn the bayonet ring on the connector to secure the cable.

5.3.3 Attaching ADICOS Connection Cable to ADICOS-AAB

Wiring ADICOS-AAB

1. Open the cover on the ADICOS-ABB enclosure
2. Open the lower cable gland on the ADICOS-ABB
3. Thread the ADICOS connection cable through the lower cable gland into the ADICOS-ABB
4. Connect the cable cores to the ADICOS-ABB connecting terminals as shown in the wiring diagram
5. Close the cable gland on the ADICOS-ABB
6. Close the cover on the ADICOS-ABB enclosure

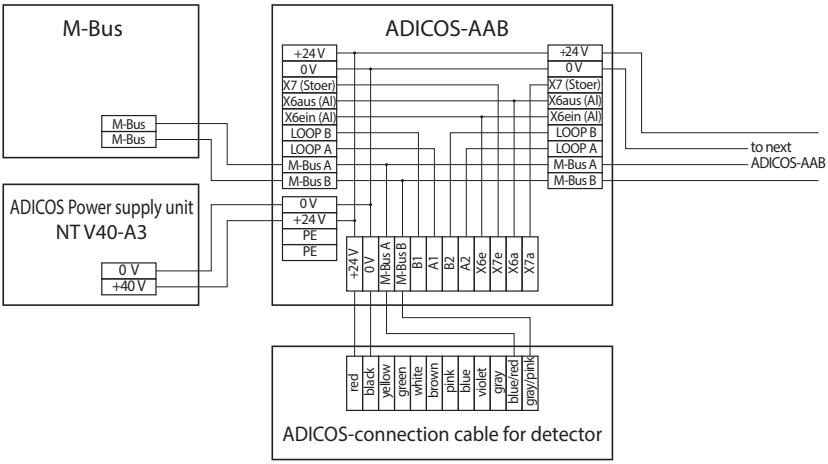
i Further information on the installation of the ADICOS junction box can be found in the ADICOS manual no. 430-2410-001.

5.3.4 Wiring Variations

The actual wiring of the detector to the ADICOS junction box can vary depending on the system configuration. The following wiring diagrams show the basic wiring and the further configurations that must be additionally wired.

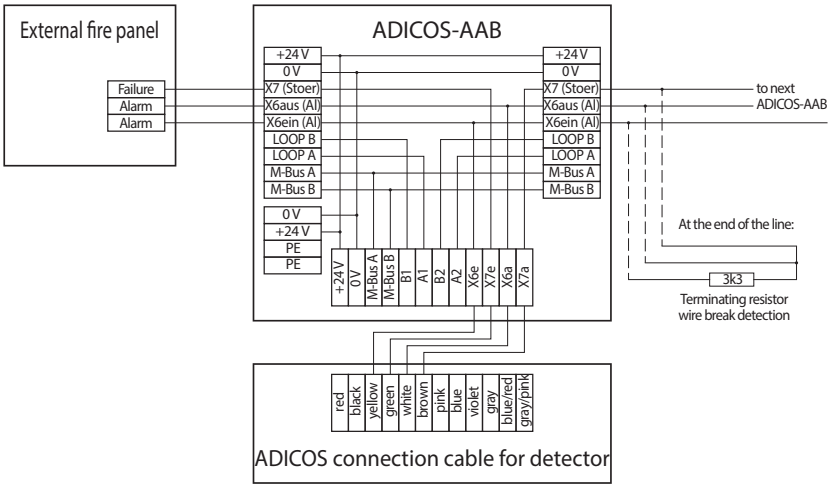
5.3.4.1 Basic wiring

ADICOS M-Bus and external Power Supply

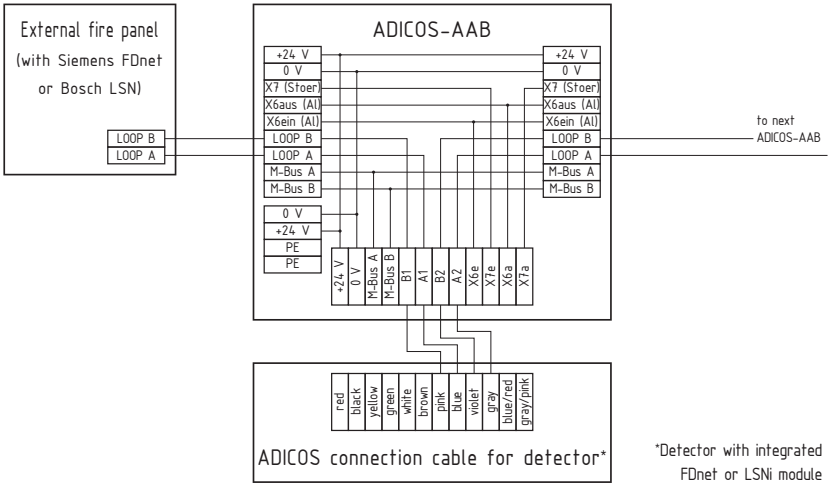


5.3.4.2 Additional wiring

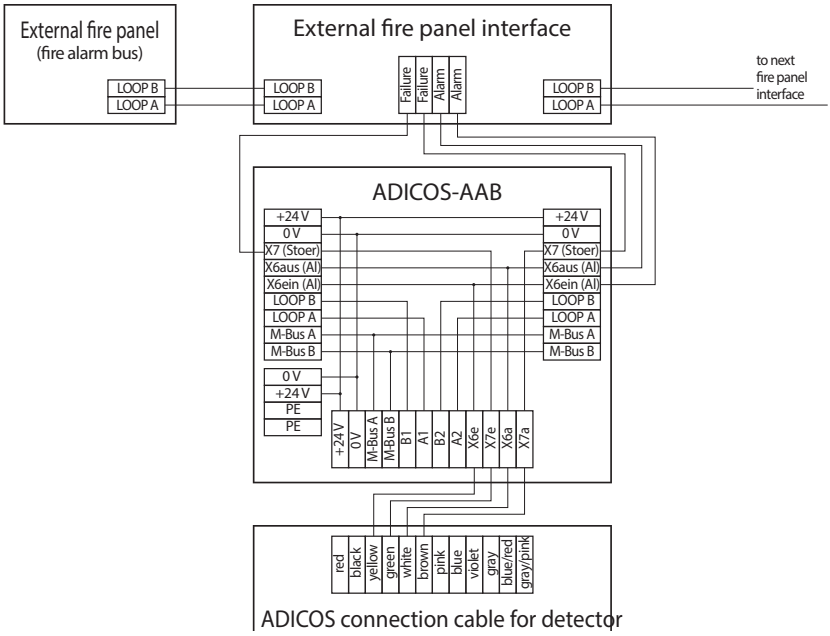
Limit value detection lines "Failure" and "Alarm"



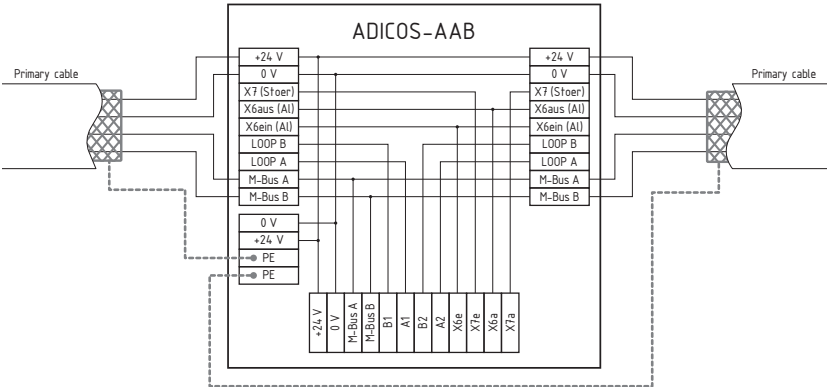
Fire detector LOOP with FDnet /LSNi (internal fire panel interface)



Other fire detector LOOP bus systems (external fire panel interface)



Primary cable shield

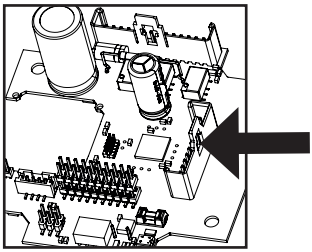


5.4 Replacing the Configuration Module

NOTICE!
Property damage due to electrical voltage
Electrical voltages can cause damage to property.
- **De-energize the detector for any wiring and secure against unintentional reactivation!**
- **Apply ESD measures when working on the detector electronics!**
- **Do not touch electronic components!**

The electronics of the ADICOS HOTSPOT detectors have a slot for coupling modules. With the corresponding order configuration, the detector electronics are equipped with the required module ex works. In special cases, however, it may be necessary to replace coupling modules on site. In addition to the electrical installation, it should be noted that a configuration change of the detector using the ADICOS System Software is usually also required in order to be able to use module functionalities.

Replacing the configuration module



1. Using the SL/PH2 screwdriver, loosen the enclosure screws in the detector cover
   The screws remain in the cover.
2. Carefully remove the enclosure cover with the detector electronics
   The plug connector for detector connection remains connected.
3. Carefully pull off the old configuration module
4. Insert the new configuration module in the correct orientation into the configuration module slot on the detector board
5. Close the detector enclosure, required torque 1.5 Nm

6 Commissioning

DANGER!
Property damage due to electrical voltage!
ADICOS systems work with electrical current, which can cause equipment damage and fire if not installed properly.
- **Before switching on the system, verify that all detectors are properly mounted and wired.**
- **Startup may be performed only by properly trained personnel.**

WARNING!
Risk of faults and failures of the detector system
The degree of protection of ADICOS detectors specified in the technical data is only guaranteed when the enclosure cover is completely closed. Otherwise a false alarm can be triggered or the detector can fail.
- **Before startup, check that all of the detector enclosure covers are completely closed, ohterwiese the ADICOS system will not work properly.**

The ADICOS detectors do not have to be started individually. When the ADICOS power supply unit is switched on, all of the detectors start automatically.

NOTICE!
The ADICOS detector indicates a malfunction until the startup process is completed.

► Supply voltage to the device to start up the ADICOS HOTSPOT-1000.

► Start up the ADICOS system as described in the manual for the M-BUSMASTER interface unit used.

▷ Startup begins automatically and takes about ten seconds.

▷ The green signal LED “Operation” flashes.

▷ The detector electronics are initialized.

▷ Once startup is completed, the green signal LED “Operation” remains illuminated.

7 Operation

During operation, the ADICOS HOTSPOT-1000 monitors the area within its field of view and triggers an alarm when the limits are exceeded. The scan interval is 100 milliseconds.

7.1 Software Access

When an ADICOS M-BUSMASTER is used, detailed information on the detector can be accessed via the M-Bus. To be able to gain the detector information, you will need a PC with installed ADICOS System Software and that is connected to the ADICOS M-Bus interface.

The communication number (COM or K.N.) shown on the ID plate and on the front of the detector is used to access detailed information on the detector in the software. Parameterization of the ADICOS HOTSPOT-1000 is also done in the software. However, only properly trained personnel may perform this task. And in the software you can also look at the current thermal image of the detector, enabling potential sources of ignition to be revealed.

7.2 Alarm

If the temperature limits sets in the ADICOS HOTSPOT-1000 are exceeded, the ADICOS HOTSPOT-1000 triggers an alarm. The internal alarm relay is engaged and the red LED lights up. The status is also transmitted via the M-Bus.

If an alarm delay has been set, the alarm is not triggered until the alarm conditions have been met for longer than the set duration.

7.2.1 Fire Detection System Operation

If the ADICOS HOTSPOT-1000 is connected to a fire panel, the alarm is transmitted to the fire panel via the fire detection system module. The fire detection system triggers the ADICOS HOTSPOT-1000 alarm. The alarm relay is triggered and the red signal LED lights up. In case fire panel does not recognize to the alarm condition and does not respond the red LED flashes.

7.2.2 Resetting Alarm

The ADICOS HOTSPOT-1000 remains in a state of alarm until the temperatures fall below the set limits again. Scans occur at 100 millisecond intervals to determine whether the temperatures have fallen below the limits. When the temperatures have fallen below the alarm limits and the alarm conditions are no longer met, the alarm state is automatically canceled and the alarm relay stops operation. If an alarm duration time has been set, the signal LED “Alarm” is not reset until after a respective delay.

If the alarm LED is controlled by a fire detection system, the alarm state can be reset with the alarm reset contact on the fire detection system.

7.2.3 Alarm Duration

The alarm duration is a parameter that can optionally be set via the ADICOS System Software. The purpose of the alarm duration is to ensure that, once the alarm conditions are no longer met, the signal LED “Alarm” is not reset unit after a respective delay.

7.2.4 Alarm Delay

The alarm delay is a parameter that can optionally be set via the ADICOS System Software. The purpose of the alarm delay is to prevent the alarm from being triggered until the alarm conditions have been met for a previously defined minimum time (in minutes).

NOTICE!
Faulty parametrizing!
Incorrect parameterization of the alarm delay function can lead to ineffectiveness of the detector!

- **The detector parameters may only be changed by experienced specialist personnel!**
- **In case of doubt, contact the manufacturer!**

7.2.5 Pre-alarm

If the ADICOS HOTSPOT-1000 is equipped with a pre-alarm module and properly configured, set 2 of the saved limit combinations automatically acts as the trigger criterion for the pre-alarm. If the limits specified in set 2 are exceeded, the pre-alarm module relay switches and the red signal LED “Alarm” flashes.

8 Maintenance

The following maintenance measures should be performed at least at the intervals stated here. Visual inspection of the optics to check for dirt or condensation should occur as needed or as a factor of the ambient conditions.

Measure	Daily	Every 3 months	Every year
Check for fault indications via the fire panel or the software	•		
Visual inspection for condensation on the detector enclosure		•	
Visual inspection for damage to detector, mounting device and connection cable		•	
Visual inspection for dirt on the optics		•	
Functional testing of signal relays “Alarm” and “Failure”			•
Functional testing with ADICOS HOTSPOT test device			•

8.1 Dirt and Condensation

To prevent the detector from getting dirty, it should be mounted such that the optics face down whenever possible. Therefore only a minimum of dust and dirt can settle on the lense. If the detector is mounted such that the optics have a vertical view or almost vertical view downward, regular manual cleaning is sufficient.
When the detector is used in areas where there is frequent dust turbulence, it is highly recommended to use purge air (Refer to Chap. „3.4 Connecting Purge Air“). In case of a combination of dust and moisture, purge air is essential.

A liquid film on the detector can prevent a heat source from being recognized. So it is important to prevent condensation from forming on the optics. The detector may not be used in areas where grease or oil and especially splashes may occur. Panes of glass or plastic cannot be used to protect the optics. The most common glass and plastic panes are completely impermeable in the relevant wave length range of 8 to 12 µm. In the event that condensation forms on the optics, switch on the detector heater.

Cleaning

The ADICOS HOTSPOT-1000 may be cleaned with water and dishwashing liquid. Acids and bases may not be used; do not apply water pressure to clean. Always use a damp, soft cloth, never rough materials or sponges. The ADICOS HOTSPOT-1000 will not function correctly if it is not cleaned properly.

8.2 Checking Signal Relay Functioning

The signal relays “Alarm” and “Failure” should be checked every year to verify that they function properly. They can be switched for testing purposes via the ADICOS System Software.

NOTICE!
Functional testing of the signal relays triggers an alarm or failure state on the connected fire panel.
- **Switch the fire panel to walk test mode before testing functioning!**

8.3 Function Test

NOTICE!
It is essential to use the test device ADICOS HTL-2 to verify that the detector is working properly. Please follow the instructions in the GTE manual no. 410-2410-008.
- **Test proper alarm triggering at least once a year!**

8.4 Replacing Detectors

Replace the ADICOS HOTSPOT-1000 no later than eight years after initial start-up!

8.4.1 General Notes

The ADICOS HOTSPOT-1000 has to be replaced with a similar detector or newer product version after eight years of operation.

8.4.2 Replacing the ADICOS HOTSPOT-1000

An old ADICOS HOTSPOT-1000 has to be replaced when
- The serviceable life of the detector has been exhausted
- It is foreseeable that functioning will decline prematurely
- A change in the operating conditions requires a different type of detector

When the ADICOS HOTSPOT-1000 is replaced, the parameter set from the previous device can be imported if the following conditions are met:
- The detector is mounted in the same position.
- There is a data backup of the parameterization available.
- The detector is not being replaced because the buiding is to be used for a different purpose.

To replace the detector, switch off the system and detach the old detector. Install the new detector as described in this manual.

9 Failure

Failure of the ADICOS HOTSPOT-1000 is indicated by the yellow signal LED lighting up as well as by the “Failure” signal relay deenergizing.

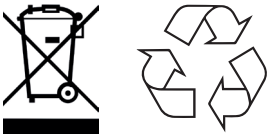
The ADICOS HOTSPOT-1000 recognizes the following states and causes of failure:

Failure	Description	Measure
Undervoltage / current failure	Operating voltage falls below 20 V (even only briefly).	Check supply voltage and wiring; use a more powerful or additional power supply; self-resetting
Checksum ROM/EEPROM	The checksum is not correct after restart or reset.	Update of the checksum with aid of the ADICOS System Software
Lifetime warning	The service life of the detector is exhausted (service life > 8 years).	Runtime-related detector replacement
Test failure	The ADICOS service software was used to trigger a test failure for test purposes.	Cancel test failure with ADICOS System Software
Sensor fault	The IR sensor is defective	Replace detector
Undertemperature	Failure is triggered below the default temperature limit (inside temperature: -15 °C)	Use the detector heater or insulate the device sufficiently

Use the ADICOS System Software to precisely analyze the failure states!

10 Disposal

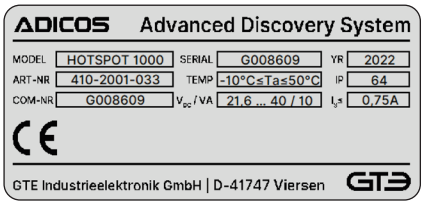
Return the device to the manufacturer when it reaches the end of its serviceable life. The manufacturer will ensure that the components are disposed of properly, in an environmentally friendly manner.



11 Technical Data

General		
Model:		HOTSPOT-1000
Item No.:		410-2001-033
Enclosure dimensions:	mm	120 x 100 x 90 (Length x Width x Depth) (Length: bayonet connector included)
Weight:	kg	0.9
Degree of protection:		IP 64
Enclosure:		Aluminum die-casting, coated
Electrical properties		
Voltage range:	V	DC 21.6 ... 40 (A fault indication is triggered when voltage falls below 20 V)
Max. Power consumption: (excl./incl. heating):	VA	2/10 (Power consumption is briefly higher upon startup)
M-Bus-Voltage (Signal):	V/mA	max. 40 V non-polarized / max. 30 mA
Service bus		M-Bus: 4800 baud
Startup time (ready for operation)		after about 10 s
Thermal, physical data		
Ambient Temperature:	°C	–10 ... + 50
Relative humidity	%	≤ 95 relative humidity (non-condensing)
Sensor data		
Resolution:	Pixel	32 x 31
Capture angle:	°	53 x 52
Reaction time:	s	< 1
Temporal resolution:	s	0.1 or 1 (depending on configuration)
Mounting and connections		
Mounting:		Overhead / diagonally / on the ball joint
Electrical connection:		ADICOS connection cable (12-lead) with bayonet lock
Purge air adapter:		4 mm quick connector for hose connection
Bending radius connection cable	mm	> 91,5

11.1 ID Plate



Model:	Device model	SERIAL:	Serial number (variable)	YR:	Year of production (variable)
ART-Nr:	Article number (variable)	TEMP:	Ambient temperature	IP:	Degree of protection
COM-Nr:	Communication number (variable)	V_{DC}/VA:	Voltage range / maximum power consumption (heating incl.)	I_0:	Internal fusing (Short-circuit current)
	CE marking				

11.2 Measuring Range

The standard temperature detection range is 0 to 200 °C. The temperature ranges can be adjusted with aid of the ADICOS System Software.

11.3 Accuracy of Standard Version ADICOS HOTSPOT-1000

In regard to the precision of the temperature detection capacity of the ADICOS HOTSPOT-1000, the following requirements can be stated:

- The emission coefficient of the monitored surfaces must be taken into consideration.
- The ambient temperature is near the device temperature.
- The size of the detected object is the same as the sensing range of one pixel.

Statistical accuracy of temperature detection at device temperatures between 10 °C and 30 °C (room temperature)

Temperature differential [°C] between object and device (dT)	Absolute Accuracy	Relative Accuracy [°C] (pixel-pixel)
0 ... 10	< 10 % or < 2 °C	< 2
10 ... 40	< 10 % or < 4 °C	< 3
40 ... 80	< 15 % or < 5 °C	< 4
80 ... 180	< 20 % or < 10 °C	< 5
180 ... 500	< 20 % or < 30 °C	< 10

Statistical accuracy of temperature detection at device temperatures below 10 °C or above 30 °C

Temperature differential [°C] between object and device (dT)	Absolute Accuracy	Relative Accuracy [°C] (pixel-pixel)
0 ... 10	< 15 % or < 4 °C	< 2
10 ... 40	< 15 % or < 5 °C	< 3
40 ... 80	< 20 % or < 8 °C	< 4
80 ... 180	< 20 % or < 10 °C	< 5
180 ... 500	< 20 % or < 30 °C	< 10

Deviation

Averaging method (depending on detector configuration)	Deviation
Average of ten measurements	Typically 1 °C
Maximum value of ten measurements	Typically 3 °C
With the model 0 ... 500 °C	Typically 10 °C

11.4 Purge Air Requirements

Air quality grade required for purge air	
Dust	Class 2
Water content	Class 3 (-20 °C dewpoint)
Oil content	Class 2 (< 0.1 mg/m^3)

Required air flow rate	
In dusty, settled air	> 2 l/min
In dusty, flowing air	> 8 l/min

Testing is advisable in severely turbulent air.