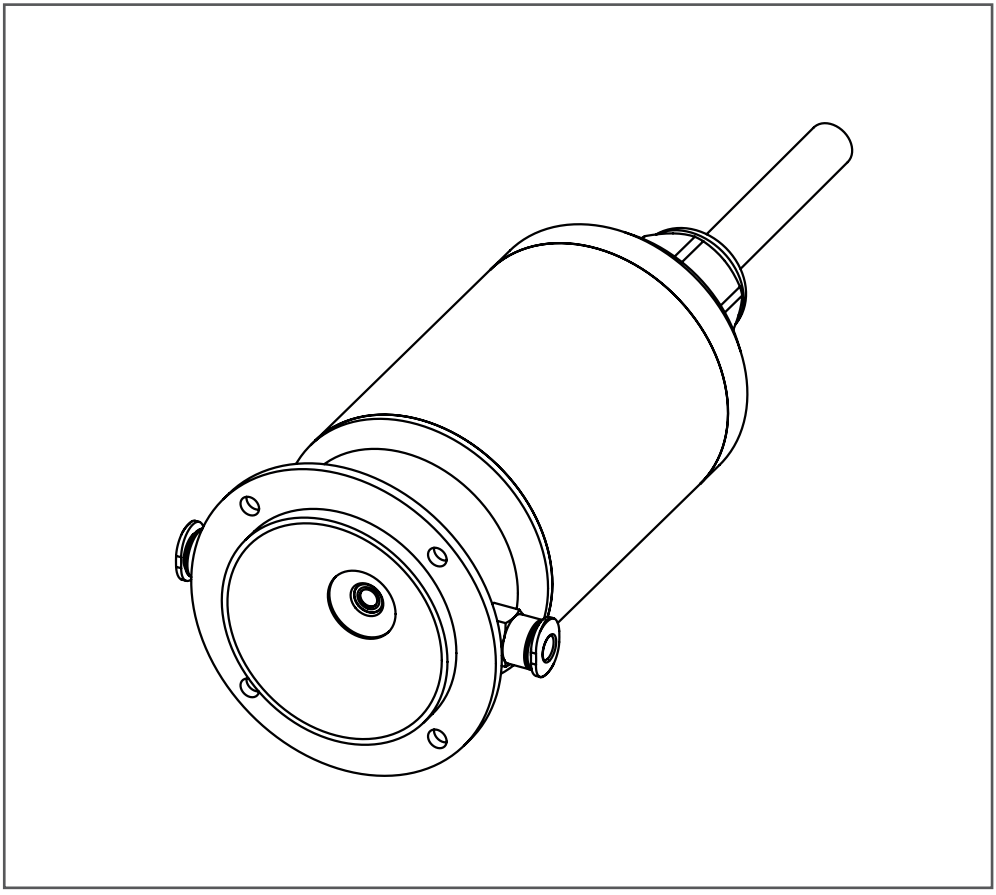

EN CE IP66/67

Operating Manual

HOTSPOT-X0
Sensor Unit

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ADICOS HOTSPOT-X0 Sensor Unit
 - Operating manual -
Article number: 410-2410-010-EN-14
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– Translation –

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Subject to technical changes!

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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 and 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.

ADICOS HOTSPOT-X0 consists of the sensor unit and the ADICOS HOTSPOT-X0 Interface-X1.

The ADICOS HOTSPOT-X0 Sensor Unit is an infrared sensor unit that, in combination with the ADICOS HOTSPOT-X0 Interface enables an optical and spatially resolved fire and heat detection in potentially explosive atmospheres of ATEX zones 0, 1, and 2.

The ADICOS HOTSPOT-X0 Interface-X1 is an interface between the ADICOS HOTSPOT-X0 Sensor Unit and the fire control panel within potentially explosive atmospheres of ATEX zones 1, and 2. Additionally it can be used as a connection and branching box (AAB) within these zones.

This manual contains information exclusively for the product component of the X0 sensor unit.

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1 About this Manual

1.1 Objective

These instructions describe the requirements on installation, wiring, commissioning, and operation of the ADICOS HOTSPOT-X0 Sensor Unit. After commissioning it is used as reference work in the case of faults.
It is exclusively addressed to knowledgeable specialist personnel (–› Chap. 2, Safety instructions).

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.

Explosion protection
This information type signals measures that must be implemented for maintaining the Explosion protection.

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

1.3 Abbreviations

This manual uses the following abbreviations.

Abbr.	Meaning
ADICOS	Advanced Discovery System
X0	ATEX zone 0
X1	ATEX zone 1
LED	Light-emitting diode

1.4 Storing the Manual

Store this manual easily reachable and in direct vicinity of the detector to enable use as needed.

2 Safety Instructions

The ADICOS HOTSPOT-X0 Sensor Unit ensures operational safety assuming proper installation, commissioning, operation and maintenance. For this purpose, it is absolutely required to completely read, understand, and follow these instructions and the safety information contained.

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!**

Explosion Protection
When using ADICOS detectors in potentially explosive atmospheres, follow the specifications of the ATEX operating directive.

2.1 Intended Use

The ADICOS HOTSPOT-X0 Interface-X1 is intended for use with the ADICOS HOTSPOT-X0 Sensor Unit and is designated for the detection of fire scenarios in potentially explosive atmospheres of ATEX zones 0, 1, and 2. It may be exclusively operated within ADICOS systems. In this context, the operating parameters described in Chap. 10, »Technical Data« must be met.

Compliance with this manual as well as all applicable country-specific provisions is also part of the intended use.

2.2 Standards and Regulations

The safety and accident prevention regulations applicable for the specific application must be observed during ADICOS HOTSPOT-X0 Sensor Unit installation, commissioning, maintenance, and test.

This product also meets the following standards and directives in its current version:

Standards and Regulations	Description
EN IEC 60079-0: 2018	Explosive atmospheres - Part 0: Equipment - General requirements
EN 60079-1: 2014	Explosive atmospheres - Part 1: Equipment protection by flame proof enclosures „d“
EN 60079-11: 2014	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety ‚i‘
EN 60529	Degrees of protection provided by enclosures (IP Code)
2014/34/EU	ATEX product directive (about equipment and protective systems intended for use in potentially explosive atmospheres)
1999/92/EG	ATEX operating directive (on safety and health protection of workers potentially at risk from explosive atmospheres)

2.3 Personnel Qualification

Any work on ADICOS systems may only be performed by qualified personnel. Persons, who can perform work on electrical systems in potentially explosive atmospheres and recognize possible dangers based on their professional education, knowledge, and experience as well as knowledge of the applicable provisions, are considered qualified persons.

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

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

2.4 Handling Electrical Voltage

DANGER!
Risk of explosion by electrical voltage in potentially explosive atmospheres!
The electronics of ADICOS HOTSPOT-X0 Sensor requires an electrical voltage that can trigger an explosion in potentially explosive atmospheres.

- **Do not open enclosure!**
- **De-energize the entire detector system and secure against unintentionally reactivation for all wiring work!**

2.5 Modification

WARNING!
Property damage or detector failure by any form of unauthorized modification!
Any form of unauthorized modification or extension can lead to a failure of the detector system. The warranty claim expires.

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

2.6 Accessories and Spare Parts

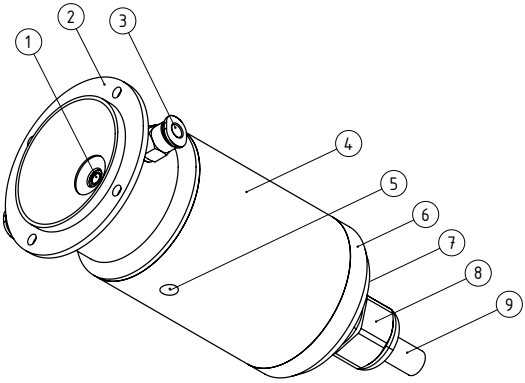
WARNING!
Property damage due to short circuit or failure of the detector system
The use of parts other than the manufacturer's original spare parts and original accessories may result in property damage due to short circuits.

- **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. 2.3.**

The following accessories are available:

Art No.	Description
410-2401-310	HOTSPOT-X0 Sensor Unit
410-2401-410	HOTSPOT-X0-Interface X1
410-2403-301	HOTSPOT-X0 Mounting bracket with ball and axle joint
83-09-06052	Cable gland for non-reinforced and non-sealed cables
83-09-06053	Cable gland for reinforced and non-sealed cables
83-09-06050	Cable gland for non-reinforced and sealed cables
83-09-06051	Cable gland for reinforced and sealed cables

3 Structure



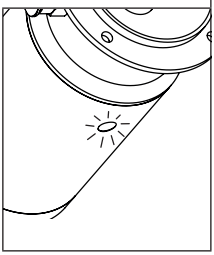
No.	Description	No.	Description
①	Infrared sensor	⑥	Enclosure cover
②	Purge air adapter with mounting flange (4 x M4 thread)	⑦	Mounting holes for mounting bracket (on the other side, not shown) (4 x M5)
③	Purge air connection for ø4 mm self-fastening compressed air hose (2 x)	⑧	Cable gland
④	Sensor enclosure (ø 47)	⑨	Intrinsically safe connection cable
⑤	Signal-LED		

3.6.1 Display Elements

Signal-LED

For indicating operating conditions, the Signal-LED is recessed in the bottom side of the sensor enclosure.

LED indicator light	Description
red	Alarm
yellow	Fault
green	Operation

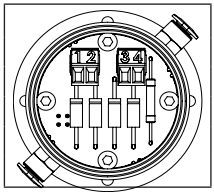


4 Connection Terminals of HOTSPOT-X0 Sensor Unit

4.1 Terminals

The terminals are located inside the enclosure of the ADICOS HOTSPOT-X0 Sensor on the connection board. They are pluggable and can be removed from the board for easy assembly of the connecting wires.

T1/T2	Communication/voltage supply
1	Communication B (intrinsically safe circuit 1)
2	Communication A (intrinsically safe circuit 1)
3	Voltage supply + (intrinsically safe circuit 2)
4	Voltage supply – (intrinsically safe circuit 2)



The sensor is supplied with a pre-assembled connection cable ex-works.

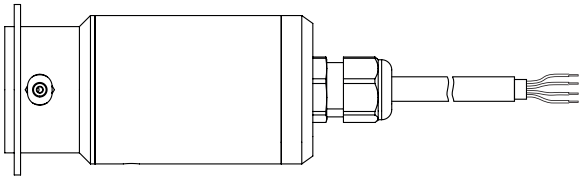
4.2 Cable Assignment

Explosion protection
The device is supplied without a permanently connected cable in accordance with IEC/EN 60079-11 and IEC/EN 60079-0. A connection cable is not part of the type examination and is therefore not certified.

- **The connection cable must be routed according to DIN EN 60079-14!**

Requirements for cables used
For the electrical connection, a manufacturer-recommended cable is supplied. The use of this cable is not mandatory; an equivalent cable may be used provided that the following requirements are met:

- **Conductor cross-section and insulation according to the “Technical Data” chapter**
- **Temperature resistance suitable for the ambient conditions**
- **Minimum insulation resistance according to IEC/EN 60079-11**
- **Mechanical durability and suitable outer sheath**
- **Appropriate characteristic impedance, twisted pairs, and shielding**



Color	Signal
green	Communication B (intrinsically safe circuit 1)
yellow	Communication A (intrinsically safe circuit 1)
brown	Voltage supply + (intrinsically safe circuit 2)
white	Voltage supply – (intrinsically safe circuit 2)

5 Installation

DANGER!
Explosion!
Installation work may only be performed, if the potentially explosive area is released for work via a risk assessment.

- **De-energize the entire detector system and secure against unintentional reactivation!**
- **Installation work may only be performed by specialist personnel! (–› Chap. 2.3, Personnel qualification)**

Explosion Protection!
Risk of explosion
In contrast to the ADICOS HOTSPOT-X0 Sensor Unit, the ADICOS HOTSPOT-X0 Interface X1 is not approved for installation within ATEX zone 0.

- **Interface-X1 may only be installed outside of ATEX zone 0.**

5.1 Mounting

WARNING!
Danger of malfunction and failure of the detector system
Incorrect installation of ADICOS detectors can lead to faults and failures of the detector system.

- **Installation work may only be performed by specialist personnel! (→ Chap. 2.3, Personnel Qualification)**

5.2 Selecting the Mounting Location

5.2.1 Mounting Location of HOTSPOT-X0 Sensor Unit

WARNING!
Correct allignment
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!**

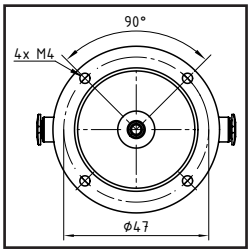
NOTICE!
Danger of sensitivity loss and failure of the detector system
In dust environments with simultaneous high humidity, the functionality of the detector may be impaired.

- **Ensure that purge air is applied! This allows you to extend the cleaning-related maintenance intervals!**
- **In case of high dust exposure in combination with high air humidity, contact the manufacturer for consultation!**

5.3 Mounting of HOTSPOT-X0 Sensor Unit

The ADICOS HOTSPOT-X0 sensor unit is designed for two types of assembly: Flange mounting as well as wall/ceiling mounting with quick mounting base.
Flange mounting is particularly suited for detection within not pressure-tight enclosures. Wall/ceiling mounting is particularly suited for standalone applications.

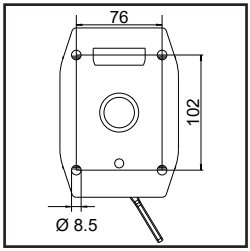
5.3.1 Flange mounting



1 Cut circular cutout into enclosure using a Ø40 mm hole saw
2 Using a Ø4 mm drill, drill four holes along a Ø47 mm circular path at a distance of 90° each
3 Firmly bolt the HOTSPOT-X0 sensor unit to the enclosure using suitable M4 screwsWall/Ceiling Mounting

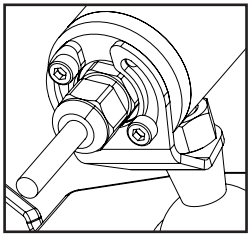
5.3.2 Wall mounting

Mounting mounting base



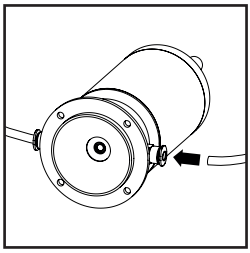
1 Drill holes for dowels into the wall and/or ceiling at the mounting location at a distance of 76 mm x 102 mm
2 Press in dowels
3 Firmly bolt the mounting base to the wall and/or ceiling using 4 suitable screws and washers

Mounting HOTSPOT-X0 mounting bracket



► Using the enclosed M5 cylinder-head screws, bolt the HOTSPOT-X0 mounting bracket through the radial elongated holes to the HOTSPOT-X0 sensor unit at minimum two points

5.3.3 Connecting Purge Air



► Insert Ø4 mm compressed air hose into the purge air connections (2 x).

Purge air specification, see chap. 10, »Technical Data«

6 Wiring

WARNING!
Explosion!
Installation work may only be performed, if the potentially explosive area is released for work via a risk assessment.
- **De-energize the entire detector system and secure against unintentionally reactivation for all wiring work!**
- **Wiring may only be performed by specialist personnel! (–› Chap. 2.3)**

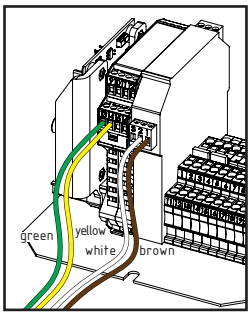
WARNING!
Risk of explosion
The connection cable must be routed per DIN EN 60079-14!
- **Consider minimum bending radius!**

WARNING!
Risk of explosion
The ADICOS HOTSPOT-X0 Sensor Unit is subject to the protection principle and/or the ignition protection type **equipment protection by intrinsic safety "i"**.
- **Explosion protection barriers must be used!**
- **Only wire to the ADICOS HOTSPOT-X0 Interface X1!**

Color Coding
The color coding corresponds to our recommended cable.

6.1 Wiring of ADICOS HOTSPOT-X0 Sensor Unit

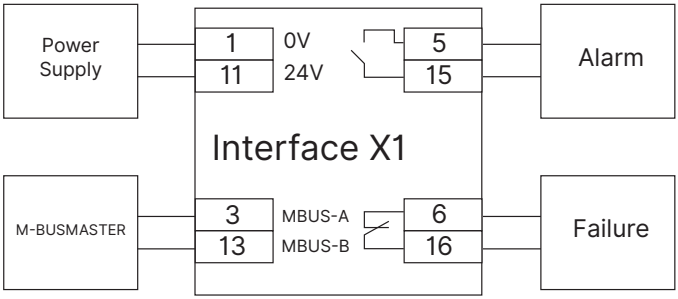
1 Remove enclosure lid by rotating counter clockwise
2 Open cable gland
3 Insert sensor connection cable through cable gland
4 Connect green wire (communication B) to terminal 14 of Explosion protection barrier 1 (intrinsically safe circuit 1)
5 Connect yellow wire (communication A) to terminal 13 of Explosion protection barrier 1 (intrinsically safe circuit 1)
6 Connect brown wire (power supply +) to terminal 1 of Explosion protection barrier 2 (intrinsically safe circuit 2)
7 Connect white wire (power supply –) to terminal 2 of Explosion protection barrier 2 (intrinsically safe circuit 2)
8 Connect shield of sensor connection cable to terminal 3 of Explosion protection barrier 2 (intrinsically safe circuit 2)
9 Close cable gland
10 Mount enclosure lid by rotating clockwise and pulling tight



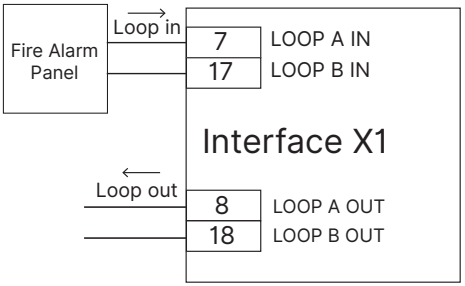
6.2 Wiring of the Fire Detection System

Depending on the system configuration connect the fire detection system to terminals 1 ... 20 of the system connection terminal (–› Chap. 3.2.3).
Also consult ADICOS manual No. 430-2410-001 (ADICOS AAB Operating manual).

Power Supply / Alarm and Failure

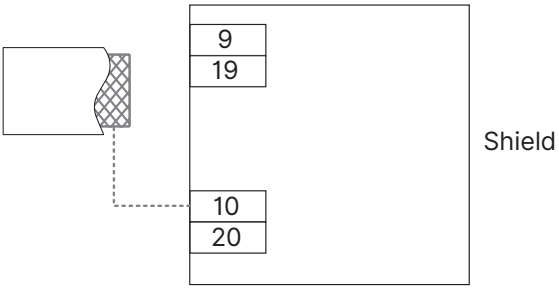


Firedetector LOOP with...



Connection with interface module Siemens / BOSCH

Primary cable shield



Shield

7 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 false alarms and device failure
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.

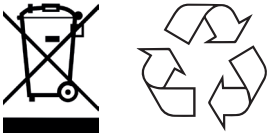
- **Before startup, check that all of the detector enclosure covers are completely closed, ohterwise the ADICOS system will not work properly.**

WARNING!
Risk of explosion
The ADICOS HOTSPOT-X0 sensor unit is subject to the protection principle and/or the ignition protection type **equipment protection by intrinsic safety "i"**.

- **Explosion protection barriers must be used!**
- **Only wire to the ADICOS HOTSPOT-X0 Interface X1!**

8 Disposal

Return device to the manufacturer after the end of the useful life. The manufacturer ensures environmental-friendly disposal of all components.

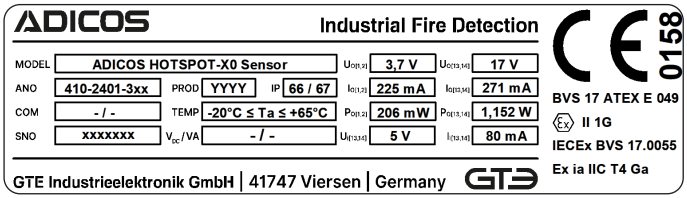


9 Technical Data

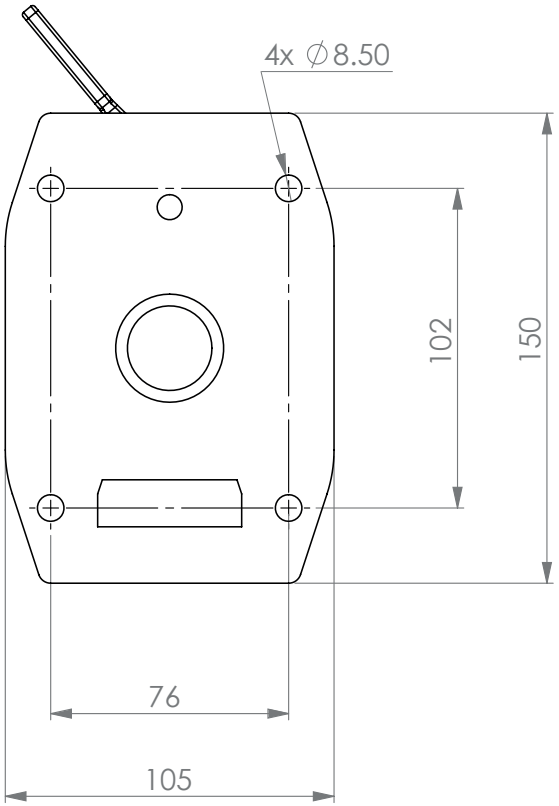
General information		
Model: Article number:		HOTSPOT-X0 Sensor Unit 410-2401-310
Enclosure dimensions:	mm	54 x 98 (Ø Diameter x Length)
Full dimensions:	mm	123 x 54 x 65 (Length L x Ø Diameter x Width W) (Length: connection cable incl., Width: diameter purge air adapter incl.)
Weight:	kg	0,6 (without connection cable)
Degree of protection:	IP	IP66/67
Enclosure:		Stainless steel
Information regarding explosion protection		
Explosion protection:		II 1G Ex ia IIC T4 Ga
Temperature class:		T4
Device group:		II, category 1G
Type approval:		Certificate per 2014/34/EU
Electrical Data		
$U_{i[1,2]}$	V	3,7
$I_{i[1,2]}$	mA	225
$P_{i[1,2]}$	mW	206
$C_{i[1,2]}$	µF	negligible
$L_{i[1,2]}$	mH	negligible
$L_{i\,[1,2]}$ / $R_{i\,[1,2]}$	s	0
$U_{o[1,2]}$	V	5
$I_{o[1,2]}$	mA	80
$P_{O[1,2]}$	mW	70
$C_{o[1,2]}$	µF	80
$L_{o[1,2]}$	µH	200
$U_{i[3,4]}$	V	17
$I_{i[3,4]}$	mA	271
$P_{i[3,4]}$	W	1.152
$L_{i[3,4]}$	µH	negligible
$L_{i[3,4]}$		3
$L_{i[3,4]}$ / $R_{i[3,4]}$	ns	97

Thermal, phyical data		
Ambient temperature:	°C	–20 ... +65
Relative humidity:	%	≤ 95 (non-condensing)
Purge air		
Purity classes:		Dust ≥ 2, Water content ≥ 3 Oil content ≥ 2 (< 0.1 mg/m³) Use non-ionized sealing air!
Air flow:	l/min	2 ... 8
Sensor data		
Sensor resolution:	pixel	32 x 31
Optical angle:	°	52 x 52
Reaktion time:	s	< 1
Temporal resolution:	s	0.1 or 1 (depends on configuration)
Other		
Bending radius, connection cable	mm	> 38

9.1 ID plate



TYPE	Device Model					Electrical data		CE marking
ANR	Article number	Prod.	Production year	IP	Degree of Protection	$U_{I[1,2]}$ $I_{I[1,2]}$	$U_{I[3,4]}$ $I_{I[3,4]}$	
COM	Communication number (variable)	TEMP	Ambient temperature			$P_{I[1,2]}$ $U_{O[1,2]}$	$P_{I[3,4]}$ $U_{O[3,4]}$	Information on explosion protection
SNR	Serial number (variable)	V_{DC}/VA	Supply voltage / Power consumption					

10 Appendix

10.1 ADICOS Mounting Bracket