

Sensor for the measurement of free water in Jet Fuel

Contact address of manufacturer: FAUDI Aviation GmbH Scharnhorststrasse 7 B D- 35260 Stadtallendorf Germany	Telefon: +49 6428 4465 - 275 Fax: +49 6428 4465 - 221 Mail: Sensor@faudi-aviation.com Web: www.faudi-aviation.com
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1 Safety instructions



This manual provides installation, operation and routine maintenance instructions for the FAUDI Aviation AFGUARD® free water sensor.

Read this manual and ensure that you fully understand its content before you attempt to install, use or maintain the AFGUARD® free water sensor.

Important safety information is highlighted in this manual as WARNINGS and CAUTIONS.

The AFGUARD® is an intrinsically safe Sensor, suitable for the needs of field and laboratory analysis of the content of free water in Jet fuel.

Work on electrical equipment is only to be carried out by trained specialists as per the regulations currently in force.

Attention must be paid to the requirements of VDE 0100 when setting high-power electrical units with nominal voltages of up to 1000V, together with the associated standards and stipulations.

Check the details on the type plate to ensure that the equipment is connected up to the correct mains voltage.

Protect against touching dangerously high electrical voltages. Before opening the equipment, it must be switched off and hold no voltages. This also applies to any external control circuits that are connected.

the equipment is only to be set within the permitted range of temperatures and pressures.



For the AFGUARD® Ex-Version the electrical standard of electrical equipment corresponds to the safety regulations concerning the:

- EN 60079-0 (Allg. Anforderungen);
- EN 60079-11 (Geräteschutz durch Eigensicherheit „i“);
- EN 60079-18 Geräteschutz durch Vergusskapselung „m“;
- EN 60079-26 (Geräteschutz der Betriebsmittel für Gruppe II Kategorie 1 G);
- EN 60079-28 (Schutz von Einrichtungen und Übertragungssystemen, die mit optischer Strahlung arbeiten)

For operation of the equipment in hazardous areas group II category 2, Explosion group “IIB”, Temperature class T4 with ambient temperature range from $-30\text{ °C} \leq T_a \leq +60\text{ °C}$.

For use in hazardous area observe the relevant national and international instructions and regulations.

Check that the location is weather-protected. It is recommended that the AFGUARD® should not be subjected to either direct rain or moisture.

Installation, maintenance, monitoring and any repairs may only be done by authorised personnel with respect to the relevant stipulations.

All changes of the standard analyser with parts which are not specified or approved by FAUDI Aviation Sensor GmbH as well as repair and service with not specified parts mean a loss of the Ex-Certificate.

In case of doubt, please turn directly to FAUDI Aviation Sensor GmbH respectively to your FAUDI Aviation Distributor or Service organisation.

The AFGUARD® is certified through **DEKRA Exam in Bochum**, authorized company for official approval of electric equipment in Germany.

Detailed information and a copy of the certificate are attached to this operating manual.

Installation and operation of the analyser has to be done corresponding to the conditions in the Ex-Certificate (see appendix). Only in this case, the reliability of operation in hazardous area can be guaranteed.

1.1 Designated use

The AFGUARD® is suitable for continuous measurement of free water in Jet Fuel.

Typical applications of the AFGUARD® are:

Measuring the content of free water at the inlet of refuelling units and filter water separators

Measuring the free water content at the outlet of FWS Filter Water Separators.

Functioning control of Monitor elements measuring the content of the free water at the inlet and outlet of monitor vessels.

Control, measurement and adjustment of additive dosage compared to the free water content in Jet Fuels.

Any other use than the one described here compromises the safety of persons and the entire measuring system and is, therefore not permitted.

The manufacturer is not liable for damage caused by improper or non-designated use.



1.2 Installation, Commissioning and Operation

Please note:

Installation, electrical connection, commissioning, operation and maintenance of the measuring system must only be carried out by trained technical personnel.

The technical personnel must be authorised for the specified activities by the system operator.

Technical personnel must have read and understood these Operating Instructions and must adhere to them.

Before commissioning the entire measuring point, check all the connections for correctness. Ensure that electrical cables and hose connections are not damaged.

Do not operate damaged products and secure them against unintentional commissioning.

Mark the damaged product as being defective.

Measuring point faults may only be rectified by authorised and specially trained personnel.

If faults cannot be rectified, the products must be taken out of service and secured against unintentional commissioning.

Repairs not described in these Operating Instructions may only be carried out at the manufacturer or by a designated service organisation.



1.3 Operational safety

The sensor has been designed and tested according to the state of the art and left the factory in perfect functioning order.

Relevant regulations and European standards have been met.

As the user, you are responsible for complying with the following safety conditions:

Installation instructions

Local prevailing standards and regulations.



1.4 Return

If the device requires repair, please send it in cleaned condition to the appropriate sales centre. Please use the original packaging.

Please enclose the completed "Declaration of Decontamination" (copy the responsible pages out of chapter 12 of the Operating Instructions) with the packaging and in addition, the shipping documents.

No repair is possible without the completed "Declaration of Decontamination"!

For optimized shipment – please contact FAUDI-Aviation Shipping department in front of shipment.

1.5 Degree of protection (IP-Code)

For safety reasons, connectors have to be protected from outside influences like dust, foreign objects, direct contact, moisture and water. This protection is provided on industrial connectors by their housings with their latching devices and sealed cable entries.

To ensure IP67 protection AFGUARD must always be connected to the dedicated cable with cable connector. Without connection IP67 can not be guaranteed!







The degree of protection “IP67” is indicated in the following way:

1st character numeral degree of protection against access to hazardous parts and against solid foreign objects

2nd character numeral degree of protection against ingress of water.

The sensor shall not be jet splashed (Kärcher) with high pressure and high temperature. This can cause harmful effects and the sensor can react with a failure signal or can be destroyed.

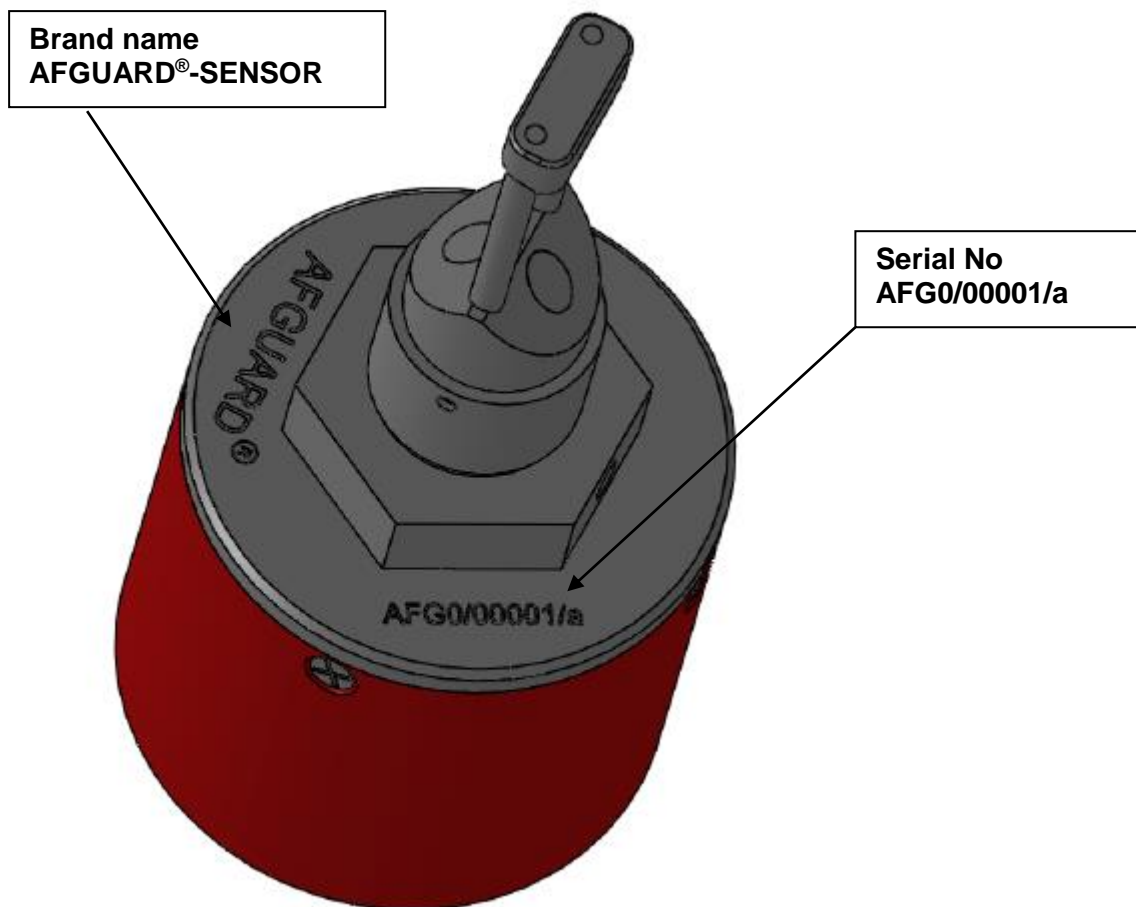
Notes on safety icons and symbols

	Warning! This symbol alerts you to hazards. They can cause serious damage to the instrument or to persons if ignored.
	Caution! This symbol alerts you to possible faults which could arise from incorrect operation. They could cause damage to the instrument if ignored.
	Note! This symbol indicates important items of information.
	Warning! This symbol alerts you to possible faults which can end in explosion. They can cause serious damage to the instrument or to persons if ignored.

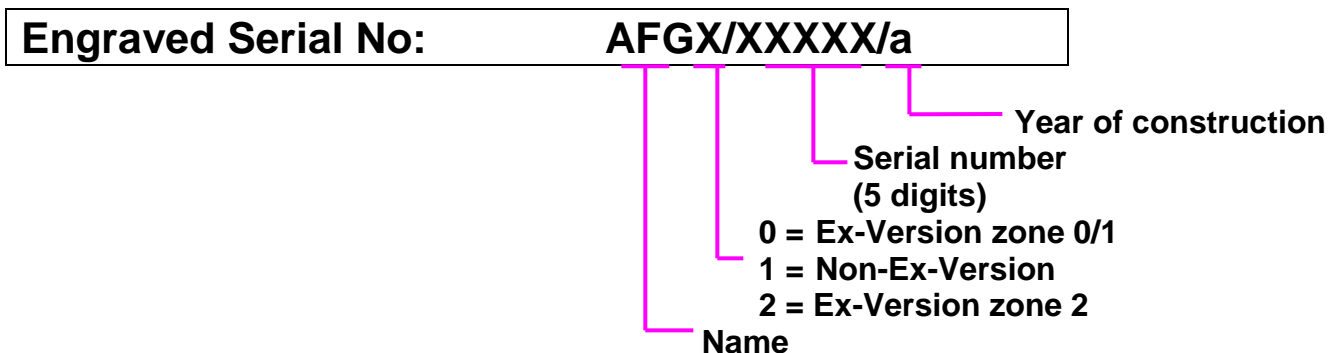
2 Identification

2.1 Product structure

The AFGUARD® is marked with the following, permanently identification marking.
 At the head of the Sensor you will find the engraved name AFGUARD® and serial no. – see attached picture.



The Series No is the distinctive feature to distinguish the AFGUARD® from each other. It is born according the following attributes



Additional to the marking of name and serial No. there is an engraved nameplate on the housing of the AFGUARD® with additional information:



Manufactured by:
 FAUDI Aviation GmbH
 Scharnhorststraße 7 B
 D 35260 Stadtallendorf
 Germany

Contact:
 Fax: +49 6428 4465-221
 Email: sensor@faudi-aviation.com
 Web: www.faudi-aviation.com

IECEx BVS 16.0059

Ex ib [ia Ga] IIB T4 Gb
 Ex ia IIB T4 Ga/Gb

Serial No: AFG0/00070/c
 BVS 09 ATEX E 012 CE - 0158

II 1/2G Ex ib [ia Ga] IIB T4 Gb
 II 1/2G Ex ia IIB T4 Ga/Gb
 Operating Temp.: -30 °C ≤ T_a ≤ +60 °C
 Supply and Signal circuit for: Ex ib IIB or Ex ia IIB
 Maxima: U_i ≤ 30 V; I_i ≤ 100 mA; P_i ≤ 750 mW
 Voltage: 15 - 30 V DC
 Signal output: 4 - 20 mA





Picture: Nameplate of a Hazardous Area approved Version of the AFGUARD® for hazardous Area Zone 0/1

The Ex-Version has a complimentary engraved Serial No on the Sensor head.

<p>AFGUARD® FAUDI  * SENSOR</p> <p>Manufactured by: FAUDI Aviation Sensor GmbH Scharnhorststraße 7 B D 35260 Stadtallendorf Germany</p> <p>Contact: Fax: +49 6428 4465-221 Email: sensor@faudi-aviation.com Web: www.faudi-aviation.com</p>	<p>Serial No: AFG1/00001/a Safe Area</p> <p>Operating Temp.: -30 °C ≤ T_a ≤ +60 °C Supply and Signal circuit: Maxima: U_i ≤ 30 V; I_i ≤ 100 mA; P_i ≤ 750 mW</p> <p>Voltage: 15 - 30 V DC Signal output: 4 - 20 mA</p> 
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Picture: Nameplate of a Non-Ex-Version of the AFGUARD®

<p>AFGUARD® FAUDI  * SENSOR</p> <p>Manufactured by: FAUDI Aviation Sensor GmbH Scharnhorststraße 7 B D 35260 Stadtallendorf Germany</p> <p>Contact: Fax: +49 6428 4465-221 Email: sensor@faudi-aviation.com Web: www.faudi-aviation.com</p>	<p>Serial No: AFG2/00001/a BVS 09 ATEX E 115 CE - 0158</p> <p>II 3 G Ex ic IIA T3</p> <p>Operating Temp.: -30 °C ≤ T_a ≤ +60 °C Supply and Signal circuit for: Ex ic IIA Maxima: U_i ≤ 30 V; I_i ≤ 100 mA; P_i ≤ 750 mW Voltage: 15 - 30 V DC Signal output: 4 - 20 mA</p> 
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Picture: Nameplate of a Hazardous area approved version of the AFGUARD® for hazardous area Zone 2

Beside Serial No and nameplate the readout of the individual configuration can be done by the product key.

Productkey		AFG	x	x	x	x	x	x	x	x	0
Name		AFG									
Version	Ex-Version 1		0								
	Non-Ex-Version		1								
	Ex-Version 2		2								
Measurement range	0 – 50 ppm								a		
	On request 0 – 100 ppm								b		
Language	German									a	
	English									b	

Variants:

Following variants are available:

Ex - Variants :

Serie, Non-Ex-Version; Ex-Version Zone 0/1 and Zone 2

Intended use :

Civil, **M**ilitary, **O**ffshore

Power supply

Direct current voltage:

DC 24 V,

Measurement ranges:

0 to 50 ppm or 0 to 100 ppm on request

Languages:

German, English...

2.2 Scope of delivery

The following items are included in the delivery:



Transport case – Hard-Top-Case with foam

AFGUARD® with protective screw pipe to protect the mirror and optical path of the sensor

Set of accessories with the following content:

- Sealing 2 mm and 1,5 mm thickness,
- Aluminium or SS thread,
- Blue cable with Sensor plug connector 10 m length,
- Operating Instruction – behind the cover - foam
- Calibration protocol

If you have any questions, please ask your local supplier or distributor.

3 Installation and dismantling

3.1 Incoming acceptance, transport, storage

You should have received a delivery like shown in the picture below.



Make sure the packaging is undamaged!

Inform the supplier about damage to the packaging.

Keep the damaged packaging until the matter has been settled.

Make sure the contents are undamaged!

Inform the supplier about damage to the delivery contents. Keep the damaged products until the matter has been settled.

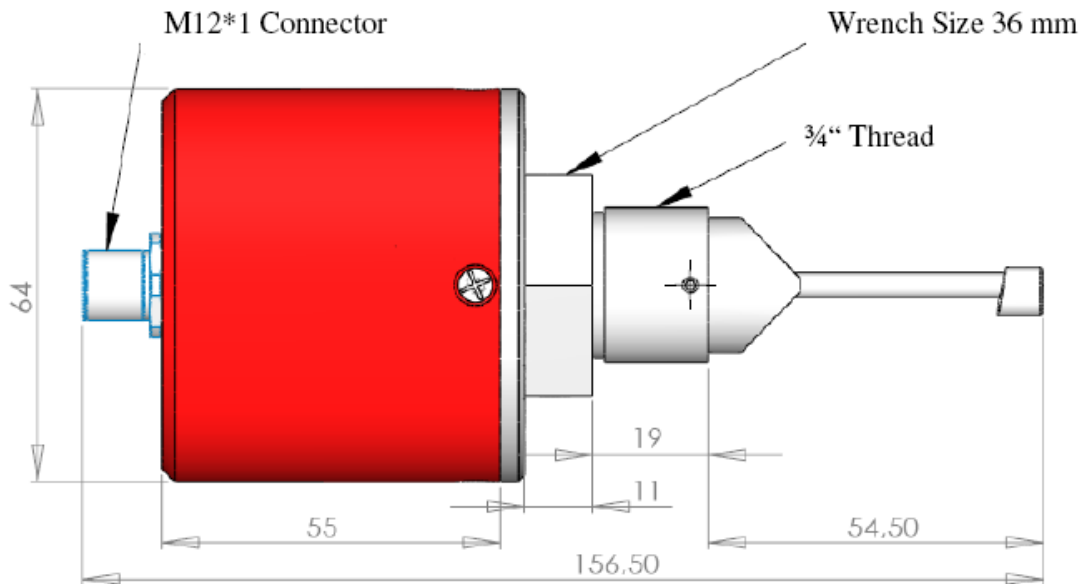
Check that the scope of delivery is complete and agrees with your order and the shipping.

The packaging material used to store or to transport the product must provide shock protection and humidity protection. The original packaging offers the best protection. Also, keep to the approved ambient conditions (see "Technical data").

If you have any questions, please contact your supplier or your sales centre responsible.

3.2 Installation conditions

3.2.1 Dimensions



3.2.2 Mounting Position

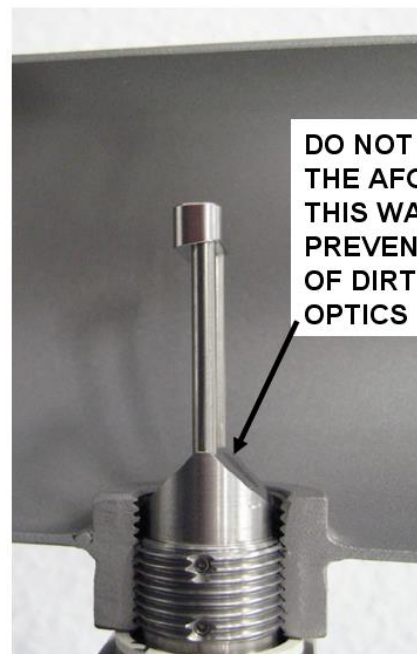


The mounting position of the AFGUARD® should be **horizontal**. Other angles of inclination are not permitted. Do not mount the AFGUARD® overhead. Make sure that there is enough space inside the pipe to prevent contact between the rear wall and the mirror during assembling – space for proper installation.



Inpipe length of the AFGUARD

Space for proper installation



↓ **Gravity** ↓

Do not touch the optics or mirror to prevent damages.

3.3 Thread for AFGUARD installation

AFGUARD uses special threads to be weld into the pipe section. Threads are available in Stainless steel and Aluminium.

Ensure to only use FAUDI-Aviation treads as they do have special design. Standard threads do not work with AFGUARD.

Welding instruction is part of each thread delivery.

3.3.1 Installation place

Select the installation location so that there is easy access for later check and service work. Make sure that the AFGUARD® and related assemblies are secured safely and vibration-free.

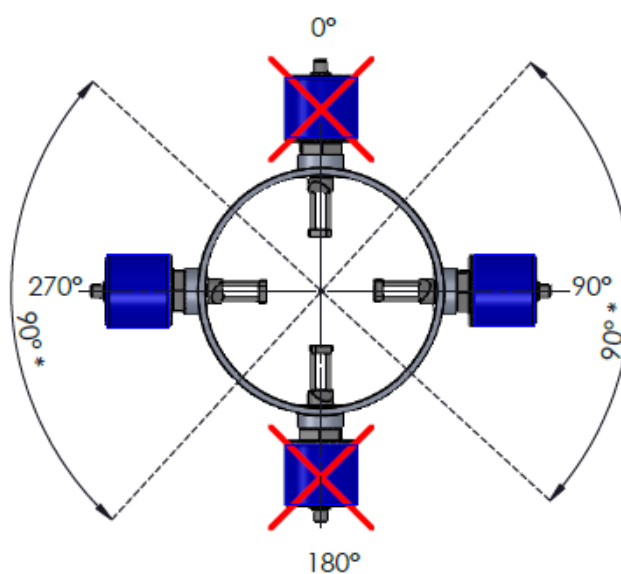
3.3.2 Procedure for proper AFGUARD® installation

Step 1:

Select the best place for installation in the effluent pipe section.



Have a look on the assembly area:



* Montagebereich
ASSEMBLY AREA

Step 2:

Drain the pipe section.

Step 3:

Disconnect the pipe section from the vessel and clean the pipe section from flammable fluids.

Step 4:

Drill the hole for the AFGUARD® socket.

Drilling tools:

HSS cylindrical saw 45mm for a hand drilling

machine AFGUARD® socket stainless steel

FAUDI article number: 600355

HSS cylindrical saw 54mm for a hand drilling

machine AFGUARD® socket aluminium

FAUDI article number: 600356



Please have a look on the welding instruction.

<p>Allgemein- toleranzen für Schweißen konstruktion Lagern und Befestigen Angaben DIN EN ISO 15613</p> <p>Schutzvermerk nach DIN ISO 10214</p> <p>Allgemein- toleranzen für Anbauten Zulässige Abweichungen DIN 2865-1</p> <p>Oberflächen DIN ISO 1302 Klasse 2</p> <p>Allgemein- toleranzen nach DIN ISO 2768 mS</p>	<p>341000</p> <p>FASN-01-001.2 - 1.4541 FASN-01-001.5 - 316L</p>	<p>341010</p> <p>FASN-01-001.3 - ALMg4.5Mn</p>																								
	<p style="text-align: center;">* Montagebereich ASSEMBLY AREA</p>																									
	<p>Anweisung:</p> <p>Nach dem Einschweißen der Muffe das Gewinde mit einem G3/4"-Gewindebohrer nachschneiden.</p>																									
	<p>INSTRUCTION:</p> <p>AFTER WELDING . RECUT THE THREAD WITH A G3/4"-TAP.</p>																									
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Step 5:

Weld the special AFGUARD® socket into the pipe section.



Step 6:

After welding, it is recommended to thread the socket with a G3/4"-thread cutter.



Step 7:

Proceed a pressure test to ensure the required PN rating of the pipe section.

Step 8:

Reassemble the pipe section (ensure to use good working seals).

Step 9:

Install the AFGUARD® in the socket with one of the provided special KLINGERSIL-sealings. Start with the 2 mm one and check the AFGUARD orientation in the pipe section. If not adequate – replace it by the 1.5mm one.

Use the special AFGUARD® torque spanner to achieve the recommended torque of 50Nm.



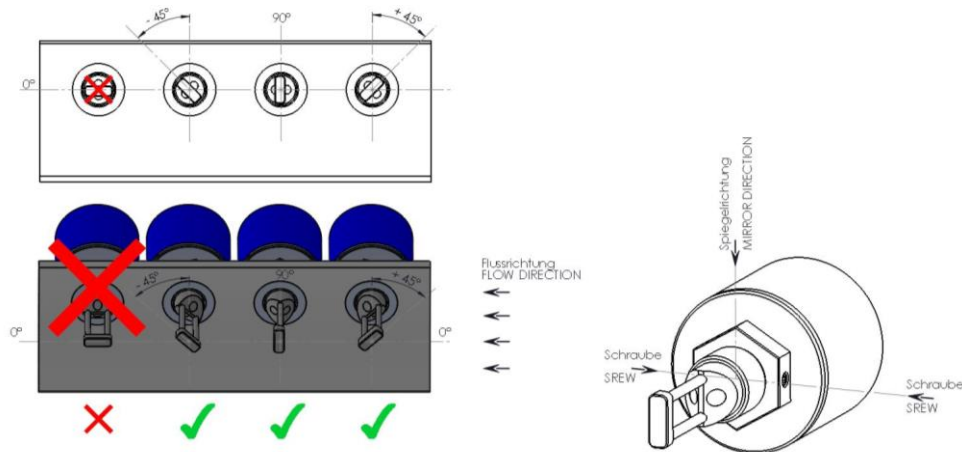
Step 10: AFGUARD spanner FAUDI article no 600513

Connect the AFGUARD® to the control system of the truck / tank farm by the use of the blue two wire cable.

For hazardous area use please ensure to only use an AFGUARD® together with a suitable barrier with power supply.

3.3.3 AFGUARD orientation in the pipe section

AFGUARD is capable in seeing different droplet size distributions. Especially for bigger droplets AFGUARD orientation in the pipe section would be of importance. Therefor we recommend installing the AFGUARD according the following picture



Orientation of AFGUARD could be achieved by the use of one of the supplied sealings. Start with the 2 mm one to get an idea about the orientation of AFGUARD (by the use of AFGUARD spanner) If insufficient change to the 1.5 mm sealing.

3.3.4 Measuring system

- A complete measuring system comprises at least:
 - AFGUARD®
 - Sealing
 - Two wire cable connection with plug connector. It is only recommended to use the cable delivered together with the AFGUARD®.
- Isolating converter with transmitter supply.



3.3.4.1 Isolating converter with transmitter supply for signal output 4 to 20 mA (inherent safe)

Manufacturer	Type	Rating. EGB for Explosion group „IIB“				
		Uo	Io	Po	Co	Lo
Endress + Hauser	RMA42	27,3 V	96,5 mA	659 mW	352 nF	100 mH
	RN221N (PTB 00 ATEX 2018)	27,3 V	87,6 mA	597 mW	683 nF	18,9 mH
Phoenix Contact	MACX MCR-EX-SL-RPSS-I	25,2 V	93 mA	587 mW	820 nF	4 mH

FAUDI Aviation highly recommends the use of isolating converters with transmitter supply. Especially for use in hazardous area the use of inherent safe isolating converters is a must. Protection class can be „ia“ or „ib“.



3.3.4.2 Proof of intrinsic safety for the interconnection of simple electrical circuitry Ex i

As the user of the AFGUARD free water sensor in combination with an isolating converter with transmitter supply (sometimes together with other equipment like displays) it is evident to make sure that your combination fits together. This should be done in front of installation. If you are not sure on how to proceed – please call FAUDI Aviation Sensor GmbH.

Example: Combination of AFGUARD (Ex ia IIB) together with RN 221N (E+H)

Intrinsic safe AFGUARD		Proof of intrinsic safety	Isolating converter with power supply		Remarks
AFGUARD Zone 0/1 Ex ia IIB			RN221N (E+H) Ex ia IIB		
	Data			Data	
U_i	30 V	\geq	U_o	27,3 V	comply
I_i	100 mA	\geq	I_o	87,6 mA	comply
P_i	750 mW	\geq	P_o	597 mW	comply
L_i+L_c		\leq	L_o	18,9 mH	L_i negligible
C_i+C_c		\leq	C_o	683 nF	C_i negligible

cable data according EN 60079-14, 12.2.2.2				
L_c	1 μ H/m	results in	18900 m	length of cable
C_c	200 pF/m	results in	3415 m	length of cable

Use the result with shorter cable length

max. cable length 3415 m acc. EN 60079-14

The calculation delivers the maximum length of cable (please use specific cable data) to be used for the specified combination of AFUGARD, optional Display and isolating converter with power supply.

3.3.5 Installing a measuring point

The AFGUARD® is an optical working measuring device that is designed for use in field applications under rough conditions. Regarding these circumstances some minimum directives have to be considered:

The optical path of the AFGUARD® (Glass rod, Mirror) is specially adjusted to the application. Avoid direct contact with hard or sharp edges. Don't touch with unprotected hand.

During installation of the AFGUARD® be careful applying force.

The recommended fastening force is 50 Nm – recommended to use AFGUARD spanner.

Handle the connection cable with care. Do not lay the cable under stress. Try to avoid sharp angles.

Protect the cable against "getting caught".

Please take care of possible electrostatic charges on the outer surface of the cable. It is only allowed to clean the cable using wet cloth.





FAUDI Aviation highly recommends the use of isolating converters with transmitter supply. Especially for use in hazardous area the use of inherent safe isolating converters is a must. Protection classes „ia“ or „ib“ are allowed.

3.4 Installation examples



Try to touch the AFGUARD® only by the use of the housing to take it out of the box.
 Remove the protection device of the optics
 Put the sealing over the thread in front of the Sensor. Do not use other sealing than recommended by FAUDI Aviation Sensor GmbH.
 Screw the sensor into the fitting.
 Pull it hand tight and apply the recommended torque setting of approx. 50 Nm.
 Check the sealing
 Adjust the cable. Take care not to stress the cable.



Connect the cable to the responding connecting terminals using one of the recommended isolating converters with transmitter supply.
 Finally connect the plug with the responding plug socket at the rear end of the AFGUARD®

3.4.1 Measuring at the inlet and / or outlet of Filter Vessels

Filters are intended to be used as last filtering step in front of into plane filling. Its main task is to filter out the residual parts of solids and the amount of free water in Jet fuel.
 The water removing performance of the filters is measured based on the level of free water detected by AFGUARD® sensors, placed at the vessel inlet and outlet. Free water will be detected and, with these tools in place, the filters can be under constant surveillance to insure their proper function. Maximum safety and constant surveillance of the system is guaranteed even if filter elements indicate insufficient water removing capacity, especially since the AFGUARD® will distinguish between water slug and Jet Fuel.

3.5 Check of correct assembly

Check the mounting position.
 Check the recommended torque setting of 50 Nm by the use of the AFGUARD spanner.
 Check against any leakages. Check the right positioning of the AFGUARD
 Check the signal cable. Try to fix it in the way to prevent water going straight to the plug.
 The direction of the cable should be downwards of horizontal.
 Avoid any stress for the cable.



3.6 Dismantling

The dismantling of the Sensor is going in reverse direction than the installation of the AFGUARD®.
 Make sure that the power is off and the pipe work is free of pressure and empty (medium free).
 Remove the sensor plug connection.
 Screw the Sensor out.
 Remove the sealing,
 Screw in a blind plug instead of the Sensor (don't forget the sealing)
 Clean the Sensor and check it carefully.



To send the Sensor back for service purposes please fill out the attached declaration of decontamination (chapter 12).
 Use the original transport box for storage or transport.



4 Cabling



WARNING!

The electrical connection must only be carried out by authorised technical personnel. Technical personnel must have read and understood the instructions in this manual and must adhere to them.

Ensure that there is no voltage at the power cable before beginning the connection work.

It is only permitted to use the cable specified from FAUDI Aviation Sensor GmbH.

For direct connection between the AFGUARD and the recommended isolated converter with transmitter supply FAUDI Aviation Sensor delivers 10 m of two wired cable with isolated plug adapter M12*1. The cable can be shortened by authorized technical personnel.

The following connection is recommended:



Colour of cable	Function
blue	Signal output
brown	Power supply

It is only allowed to clean the cable using a wetted cloth to prevent electrostatic charges.



4.1 Direct connection to isolated converter with power supply



The AFGUARD® must be connected via specified sensor cable with plug adaptor with the terminal clamps of an inherent safety isolated converter with power supply.

The marking "II 1/2G Ex ib [ia] IIB T4" applies to the transmitter in case of being supplied by means of an IS 2-wire supply- and signal circuit providing level of protection 'Ex ib IIB'.

The marking "II 1/2G Ex ia IIB T4" applies to the transmitter in case of being supplied by means of an IS 2-wire supply- and signal circuit providing level of protection 'Ex ia IIB'

The power circuit parameters should comply with:

Supply and signal circuit intended for connection to an intrinsically safe 4 to 20 mA current loop

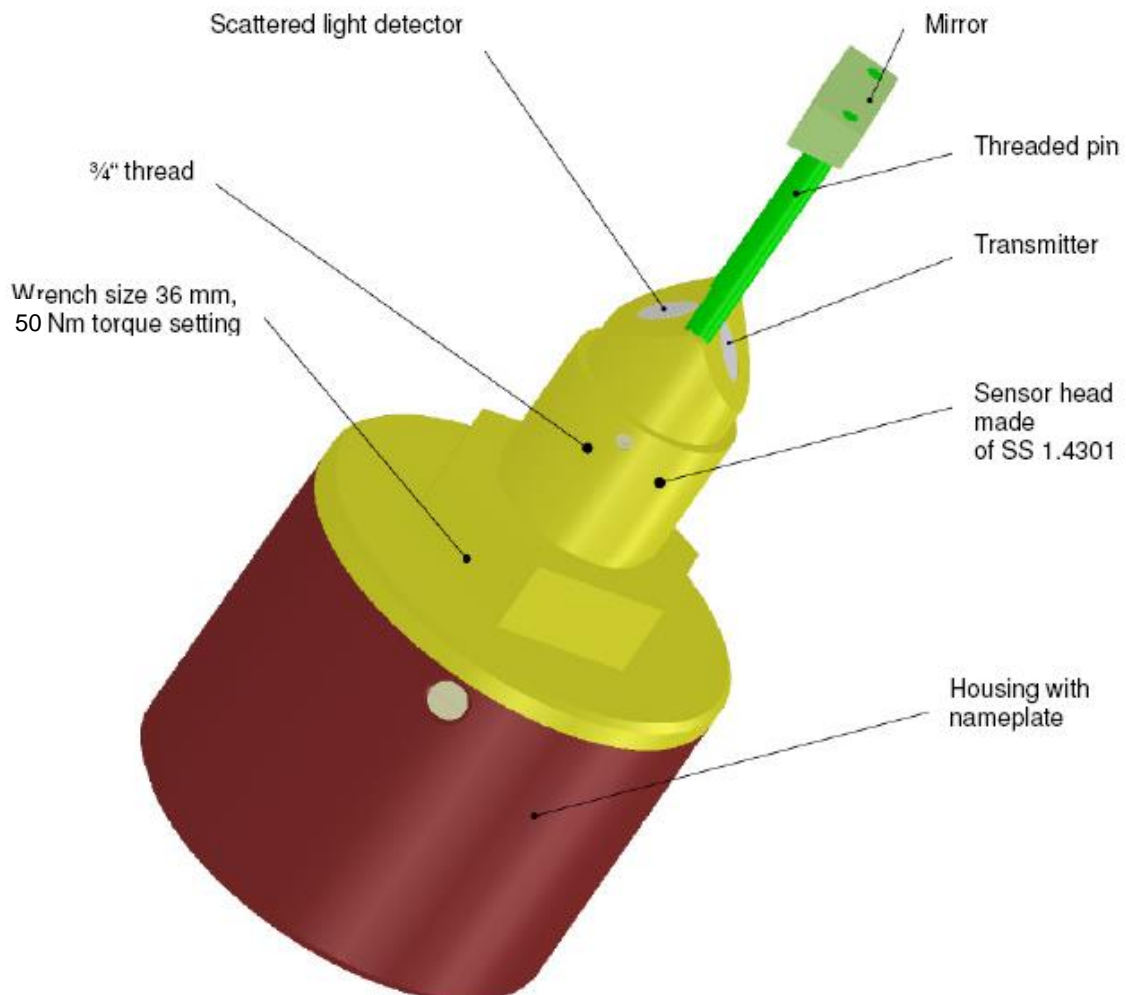
Voltage	U_i	DC	30	V
Current	I_i		100	mA
Power	P_i		750	mW

Effective internal capacitance	C_i	negligible
Effective internal inductance	L_i	negligible

Make sure to follow the manufacturer's instructions of the operating manual that will be provided with your isolating converter with power supply. For hazardous area approved AFGUARD® make sure to use correct intrinsically safe power supply.

5 Operation

5.1 Assembly instructions of the AFGUARD®

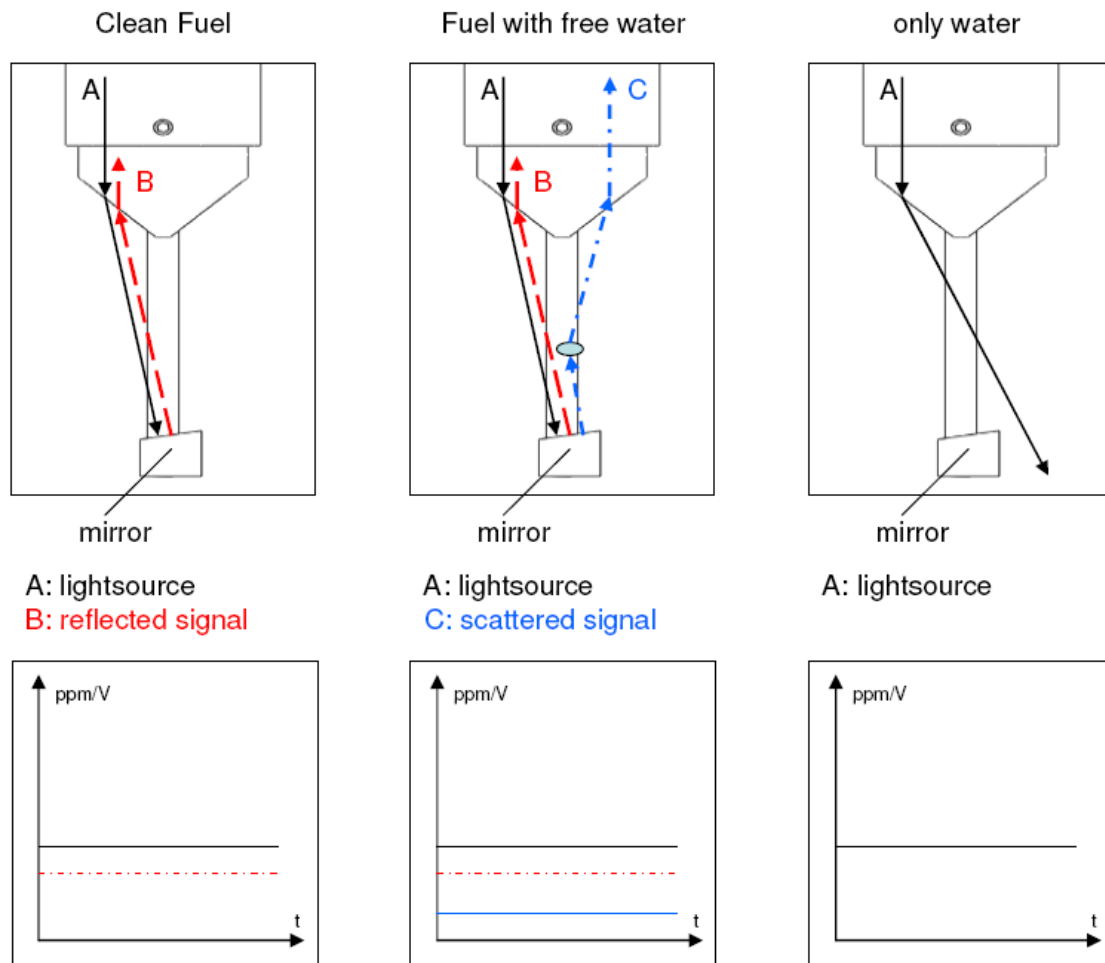


The AFGUARD® consists of the following functional units:

Sensor head with optics and mirror fixed via threaded pins.

Housing with electronic and connection adapter for plug connector with three wired cables.

5.2 Mode of Operation



The AFguard® is an insitu Sensor to detect the content of free water phases in Jet Fuel. The principle of measuring can be described as refraction index bases IR scattered light effect.

Operation:

Clean Fuel: Pulsed IR light – (Transmitter A) leaves the optics under defined refraction index, passing through the Jet Fuel till the mirror is reached, being reflected and going back to the optics where the signal intensity is being measured. The difference between transmitted and received light intensity will be handled for:

Internal adjustment for example if there is some debris on the optics or the mirror caused by dirt in the Jet Fuel.

Self Check of electronics

As long as there is no drop of free water in the measuring zone, there will be no scattered light.

Fuel with free water: Free water in Jet Fuel as fine dispersed second phase will be detected as scattered light by receiver C. During the whole process the self checking functionality of the electronics is ongoing.

Only water (water slug): If there is a water slug phase the refraction index will change. This results in another angle of light beam leaving the optics (A). Under this principle it is easy to differentiate between Jet Fuel and water. Additional hereto AVGAS and Gas phases could be determined.

Optional measuring of gas phases:

The AFGUARD® is able to detect gas phases.

Optional differentiation between Jet Fuel and AVGAS

The AFGUARD® is able to determine between Jet Fuel and AVGAS.

5.3 Signal output

The signal output of the AFGUARD® is 4 to 20 mA as world wide standard. Additional hereto the AFGUARD® gives out a lower and upper signal:

Signal output:	< 3.8 mA:	Self Check (Electronics)
Signal output:	4 to 20 mA:	Measuring range 0 to 50 ppm or 0 to 100 ppm
Signal output:	> 20.2 mA:	Water slug, Gas phases, AVGAS

5.4 Calibration

The AFGUARD® is leaving the factory calibrated to Jet A1. FAUDI recommends checking / calbrating the AFGUARD® on a yearly basis.

The sensor electronics consists of up to 8 calibration curves which can be used for onsite calibration or special requirements.

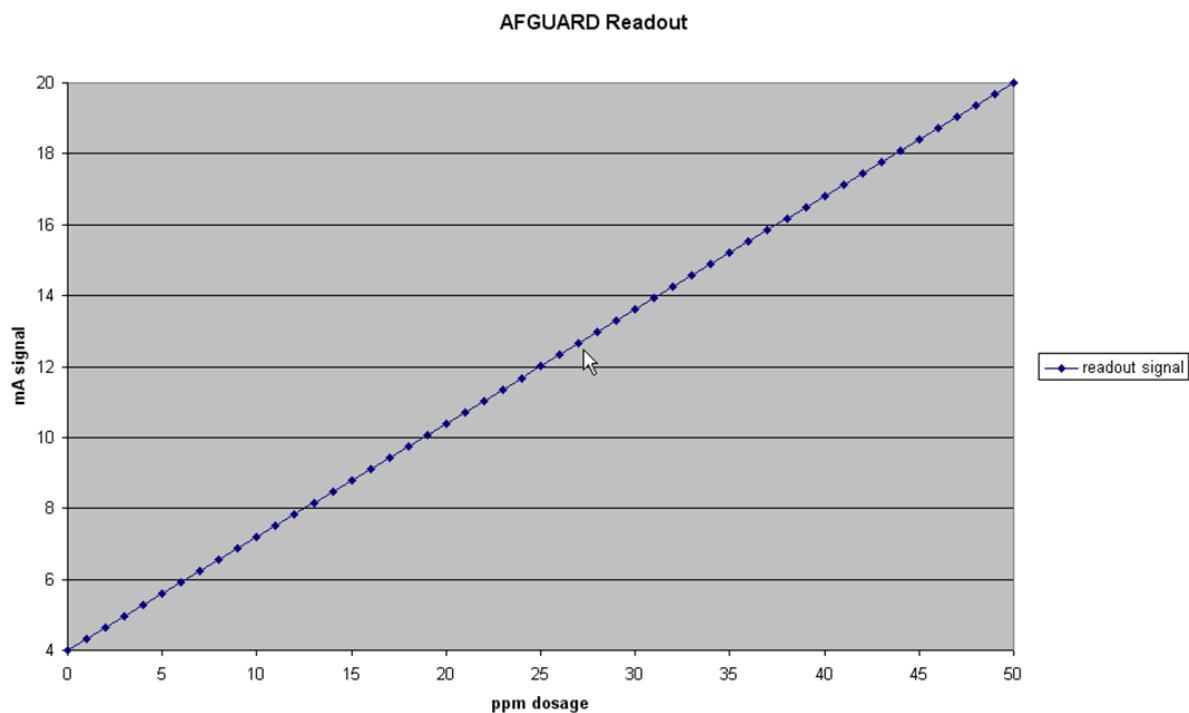
Without special requirements according to designated use of the AFGUARD free water sensor, the AFGUARD leaves the factory calibrated for 0 to 50 ppm Jet A1.

Other calibration curves could be adjusted in front of use.

To optimize the accuracy of measurement FAUDI is going to develop a check tool set for onsite calibration checks.

If you have questions please contact FAUDI Aviation Sensor GmbH or your local Distributor or service organisation.

Signal output:



AFGUARD® readout curve depending on calibration status.

6 Commissioning

Before first commissioning, check if:

- the sensor is correctly installed
- the electrical connection is correct and has carried out by trained specialists as per the regulations currently in force.

6.1 Check of Installation and function

Warning!

Before applying pressure to the system, make sure the connections are correctly fitted. Check the cabling and electrical installation.

Do not paint or paste up the housing of the sensor with something. Especially when using the Hazardous Area approved AFGUARD®.

Make sure that the AFGUARD® is connected to an isolating converter with transmitter supply.



Picture for Installation and functioning check

The following procedure is recommended to check the functionality of the AFGUARD® if there is no respond during installation and start up.

Keep a digital current meter ready for use.

1. Connect the AFGUARD with supply voltage in the range between 16 VDC and 30VDC

brown = +Ub

blue = -Ub

2. Connect the digital current meter at the 4 to 20 mA outlet (blue cable) against -Ub.

3. Check the output signal (electrical current):

No signal: Cable / Connector damaged – check against cable break

< 3,8 mA: Self check / Sensor damaged

Between 4..20 mA: AFGUARD® submerged in Jet Fuel

> 20,2 mA: AFGUARD® in Air or submerged in Water

7 Loop check

FAUDI developed a special device to check the loop behind the AFGUARD to ensure that critical signals from the AFGUARD will be handled as required.


Test protocol AFGUARD® loop test

Requirements: system must be powered on,
loop tester installed instead of AFGUARD®

Pre-Test:

Disconnected cable – result should be “broken wire alarm”

Test 0:

Function test for 4 mA base signal of AFGUARD® sensor
 No further interaction (do not press any function button)
 Output 4 mA or 0 ppm

Test 1: Fail safe test – fast blinking

Function test for NAMUR 1 indicating failed sensor
 press F1:
 Output: Immediate reply – blue lamp fast blinking
 (press F1 again to go back to 4 mA signal)

Test 2: Warning level – slow blinking

15 ppm < water level < 30 ppm
 Press F2 -> after 10 seconds LED constantly on + blue lamp slowly blinking

Test 3: Alarm level – fast blinking

Function test for alarm level / water level > 30 ppm
 Press F3 for alarm level
 Output: -> after 10 seconds LED constantly on + blue lamp fast blinking

Test 4: water slug indication – fast blinking

Function test for water slug indication / water level >> 500 ppm
 Press F4 for water slug
 Output: LED blinking -> after 5 seconds LED constantly on + blue lamp fast blinking

Authorisation:

Name	Function
Date	Signature

Loop test protocol using the AFGUARD loop tester – FAUDI part no: 600514

8 Maintenance

8.1 Cleaning of the AFGUARD®

The AFGUARD® has been developed to measure the content of free water in Jet Fuel. With regard to the recommended limits (JIG, API 1598 etc.) of free water and particulate matters of:

Free water:	< 15 ppm
Particles:	< 0.26 mg/l

Malfunctioning caused by coatings or debris of particles is unlikely. Effects of small amounts of debris could be self-adjusted by the self-adjusting intelligence of the AFGUARD®.

The sensor intelligence will detect and compensate minor deviations.

Should severe measuring deviations occur during operation, we recommend dismounting and cleaning of the optical path: Surfaces of glass elements of the sender and receiver, as well as the mirror. Please use only soft, fuzz-free cloths, to avoid any damages to the optical path, such as scratches or brush marks. Especially when using the AFGUARD together with self-cleaning, hydrophobic coating – avoid contact of optical elements like glass rods or mirror.

We offer a special cleaning kit for our AFGUARD. Please contact our Sales Department.

9 Accessories

9.1 Connection accessories

The AFGUARD® delivery standard includes a 10 m long signal connection cable with a welded sensor plug for connection to the inlet- resp. supply circuit of an ex-proof transmitter supply.

Optional accessories:

Ex-proof dedicated transmitter supply.

Ex-proof dedicated buffer amplifier with display and optional relay outlets.

Display for the insitu display of measuring readings.

Data log for reading and recording measurement readings. The following types are available:


To make installation as easy as possible, FAUDI defined so called bundles that could be used for easy installation.

Every bundle has it's own advantages. Please ask your local distributor for details.

Example of JIG bulletin 110 AFGUARD bundle

Intended to be used as an alternative to CWD testing

Precondition: Trigger signal (flow trigger) of the truck has to be made available

<p>AFGUARD®</p> <p>Order reference: 120500 Description: SET-AFG-A-2450EXI (incl. 2 sockets SS and AL plus sealing and cable)</p> <p>Linked with: Barrier 1 channel (600517)</p> <p>Electronic sensor for the detection of free water in Jet fuel. The AFGUARD® sensor is qualified for use as an alternative to Chemical Water Detectors (CWD)</p> <ul style="list-style-type: none"> • Qualified and tested according to specification EI 1598, 2nd Edition • Accepted by Joint Inspection Group (JIG) • Recommended by IATA Fuel Quality Pool (IFQP) 	
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CCS (Contamination Control System)

Order reference: 740000

Description: CCS Silver

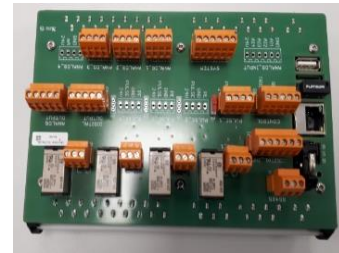
Or

Order reference 730000

Description: CCS Gold

Gold and silver are linked with: AFGUARD® (120500), Barrier 1 channel (600517), blue LED warning light (600361), SLUGGUARD® (600306), external key switch (600087)

The CCS is developed to process, in combination with the AFGUARD, the actual free water contamination in fuel. Relais outputs to switch alarms and warnings according the latest specifications. Logged data can be stored on memory stick or send out to connected SCADA system.



Barrier 1 channel

Order reference: 600517

Description: Barrier, 1-Channel, EX I, Zone 2

Linked with: AFGUARD® (120500)

Quantity: 1

PHOENIX barrier - Ex i with power supply and input signal conditioner:

- Transmits supplied or active 0/4 - 20mA signals from the hazardous area to a load (active or passive) in the safe area
- Electrical isolation
- SIL 2 according to IEC 61508
- With screw connection



Blue LED warning light

Order reference: 600361



Description: Blue LED warning light 24 V DC IP66

Linked with: Contamination Control System Silver (740000)

Light indicator according JIG bulletin 110 to indicate warning and or alarm situation in case of critical levels of free water.



<p>SLUGGUARD® with LED (optional)</p> <p>Order reference: 600306 Description: BG SLUGGUARD® with LED (including barrier and cable)</p> <p>Linked with: SLUGGUARD® ball valve (600511)</p> <p>Sensor according to EI 1592 to differentiate between jet fuel and water. To be installed in water sumps, drain pipes and or drain ports to detect and indicate the actual water situation.</p>	
<p>Ball valve (optional)</p> <p>Order reference: 600511 Description: Ball Valve for Water Sensor EST G1" 2.0</p> <p>Linked with: Set SLUGGUARD® (600306)</p> <p>Ball valve for SLUGGUARD® sensor to isolate the sensor for testing and maintenance purpose.</p>	
<p>AFGUARD® loop tester</p> <p>Order reference: 600514 Description: AFGUARD® Loop Tester</p> <p>Linked with: AFGUARD® (120500)</p> <p>Loop tester to periodically test the loop of the AFGUARD installation according to JIG requirement.</p>	
<p>AFGUARD® torque spanner</p> <p>Order reference: 600513 Description: AFGUARD® Torque Spanner</p> <p>To install the AFGUARD sensor with the right torque setting of 50 Nm.</p>	

<p>CCS silver box (optional)</p> <p>Order reference: upon request Description: Prewired Installationsbox</p> <p><i>Or</i></p> <p>CCS gold box (optional)</p> <p>Order reference: upon request Description: Prewired Installationsbox</p> <p>Gold and silver boxes are linked with: Barriers, DC/DC Converter</p>	<p>CCS silver box image:</p> 
<p>External key switch</p> <p>Order reference: 600087 Description: External key switch</p> <p>External key switch to reset the warning and alarm levels of the Contamination Control System, non Ex variant, IP66.</p>	

Combined with the bundles you will get a very easy to understand recommendation for onsite installation.

Please ask for details according the mentioned electronic accessories.

9.2 Installation accessories

Optional torque wrench with spanner insert SW36

Optional 3/4" sleeve for welding into pipe lines (aluminium/stainless steel)

Spare gaskets for 3/4" sleeve connection.

10 Trouble-shooting

10.1 Trouble-shooting instructions

See chapter 11 issues and solutions

10.2 Sensor checks

Caution!

Only authorised and trained personnel may test the AFGUARD®!



10.3 Spare parts

Sealing

Cable with Sensor plug

Hard case for storage and transport

10.4 Return

If the device requires repair, please send it cleaned to the sales centre responsible. Please use the original packaging, if possible.

Please enclose the completed "Declaration of Decontamination" (copy the page of chapter 12 of these Operating Instructions) with the packaging and the transportation documents.

No repair without completed "Declaration of Decontamination"!



10.5 Disposal

The device contains electronic components and must therefore be disposed of in accordance with regulations on the disposal of electronic waste.

Please observe local regulations.

11 Technical Data

11.1 Input

Measured value	Free water [ppm] Water slug; Gas phases, AVGAS
Measuring range	0 ... 50 ppm (accuracy depending on calibration) 0 ... 100 ppm (accuracy depending on calibration) 100% Water (Water slug)

11.2 Ambient conditions

Storage temperature	- 40 °C ... + 75 °C
Operating temperature	- 30 °C ... + 60 °C
Rel. humidity	10 % ... 90 %
Ingress protection acc. EN 60529	IP 67

11.3 Performance and parameter


Supply and signal circuit intended for connection to an intrinsically safe 4 to 20 mA current loop:		
Voltage	U_i	DC 30 V
Current	I_i	100 mA
Power	P_i	750 mW
Optical radiation (Power output)		
Wave length		$840 \text{ nm} \leq f \leq 1050 \text{ nm}$
Optical power		$\leq 12 \text{ mW}$
Irradiation intensity		$\leq 1,025 \text{ mW/mm}^2$
Light pulse-Energy		$\leq 53 \text{ } \mu\text{J}$
Ambient conditions and Explosion group and Temperature class		
Ambient temperature		$-30 \text{ }^\circ\text{C} \leq T_a \leq 60 \text{ }^\circ\text{C}$
Explosion group		IIB
Temperature class		T4

11.4 Process conditions

Operating pressure	Max. 10 / 16 bar, no vacuum
Process Temperature	- 30 °C ... + 60 °C
Process medium	Kerosene, Jetfuel, AVGAS

11.5 Layout

Design, Dimensions	See chapter 3.2.1	
weight	Sensor hazardous approved:	ca. 1 kg
Materials (in contact with medium)	Sensor head:	SS 1.4301
	Glass rod:	optical Glass
	Sealing:	Klingersiel FKM intern
Process connections:	Thread:	G3/4"
	Length of thread:	25 mm
	Wrench size:	AF 36 mm

Version 2.3		Operating instructions AFGUARD® Zone 0/1 type	
Page: 36	of: 47		

	Torque setting:	< 70 Nm (50 Nm recommended)
Cable connection	Sensor plug	
Length of cable	Delivered length: specification:	10 m manufacturer Binder
Temperature compensation	internal	

12 EC-Type Examination Certificate (Original)



(1) **EG-Baumusterprüfbescheinigung**

(2) **- Richtlinie 94/9/EG -
Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung
in explosionsgefährdeten Bereichen**

(3) **BVS 09 ATEX E 012**

(4) **Gerät:** AFGUARD® Typ: AFG0/xxxxx/x

(5) **Hersteller:** FAUDI Aviation Sensor GmbH

(6) **Anschrift:** 35260 Stadtallendorf

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Zertifizierungsstelle der DEKRA EXAM GmbH, benannte Stelle Nr. 0158 gemäß Artikel 9 der Richtlinie 94/9/EG des Europäischen Parlaments und des Rates vom 23. März 1994, bescheinigt, dass das Gerät die grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie erfüllt.
Die Ergebnisse der Prüfung sind in dem Prüfprotokoll BVS PP 09.2120 EG niedergelegt.


(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit:

EN 60079-0:2006	Allgemeine Anforderungen
EN 60079-11:2007	Eigensicherheit 'i'
EN 60079-26:2004	Gerätegruppe II Kategorie 1G

(10) Falls das Zeichen „X“ hinter der Bescheinigungsnummer steht, wird in der Anlage zu dieser Bescheinigung auf besondere Bedingungen für die sichere Anwendung des Gerätes hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf die Konzeption und die Baumusterprüfung des beschriebenen Gerätes in Übereinstimmung mit der Richtlinie 94/9/EG. Für Herstellung und Inverkehrbringen des Gerätes sind weitere Anforderungen der Richtlinie zu erfüllen, die nicht durch diese Bescheinigung abgedeckt sind.

(12) Die Kennzeichnung des Gerätes muss die folgenden Angaben enthalten:

 **II 1/2G Ex ib [ia] IIB T4
II 1/2G Ex ia IIB T4**

DEKRA EXAM GmbH
Bochum, den 04. August 2009


Zertifizierungsstelle


Fachbereich



(13)

Anlage zur

(14)

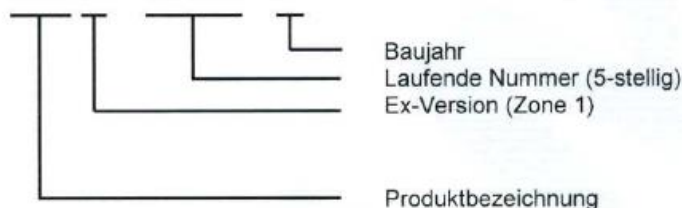
EG-Baumusterprüfbescheinigung

BVS 09 ATEX E 012

(15) 15.1 Gegenstand und Typ

AFGUARD® Typ: AFG0/xxxxx/x

Eingelasserte Seriennummer:
AFG 0 / XXXXX / X



15.2 Beschreibung

Der AFGUARD® Typ: AFG0/xxxxx/x dient zur Messung der Partikel-Verunreinigung in Kraftstoffleitungen.

Der Messumformer des Typs: AFGUARD® besteht aus einem Elektronik-Gehäuse aus Leichtmetall, Edelstahl oder leitfähigem Kunststoff (Oberflächenwiderstand $\leq 10^9 \Omega$) und einem integrierten optischen Sensor.

Das Elektronik-Gehäuse enthält teilweise in Vergussmasse eingebettete Leiterplatten mit elektronischen Bauteilen.

Der eigensichere Speise- und Signalstromkreis ist auf einen Steckverbinder aufgelegt.

Das Befestigungselement des integrierten optischen Sensorkopfes besteht, unabhängig vom Material des Elektronikgehäuses, aus Edelstahl und ist für den Einbau in die Trennwand zwischen Bereichen mit 1G bzw. 2G Anforderungen bestimmt.

Die Kennzeichnung 'II 1/2G Ex ib [ia] IIB T4' gilt bei Betrieb des AFGUARD® mit einem eigensicheren Zweidraht-Speise- und Signalstromkreis mit Schutzniveau 'Ex ib IIB'.

Die Kennzeichnung 'II 1/2G Ex ia IIB T4' gilt bei Betrieb des AFGUARD® mit einem eigensicheren Zweidraht-Speise- und Signalstromkreis mit Schutzniveau 'Ex ia IIB'.



15.3 Kenngrößen

15.3.1 Speise- und Signalstromkreis
zum Anschluss an eine eigensichere 4 bis 20 mA Stromschleife

Spannung	U_i	DC	30	V
Stromstärke	I_i		100	mA
Leistung	P_i		750	mW
innere wirksame Kapazität	C_i		vernachlässigbar	
innere wirksame Induktivität	L_i		vernachlässigbar	

15.3.2 Optische Strahlung

Wellenlänge	$840 \text{ nm} \leq f \leq 920 \text{ nm}$
Optische Dauerleistung	$\leq 12 \text{ mW}$
Bestrahlungsstärke	$\leq 1,025 \text{ mW/mm}^2$
Lichtimpuls-Energie	$\leq 53 \text{ } \mu\text{J}$
Lichtimpuls-Dauer	$\leq 10 \text{ } \mu\text{s}$
Impulsabstand	$\leq 1 \text{ ms}$

15.3.3 Umgebungstemperaturbereich :

$$-30 \text{ }^\circ\text{C} \leq T_a \leq 60 \text{ }^\circ\text{C}$$

(16) Prüfprotokoll

BVS PP 09.2120 EG, Stand 04.08.2009

(17) Besondere Bedingungen für die sichere Anwendung

Entfällt


12.1 EC-Type Examination Certificate (Translation)



Translation

(1) EC-Type Examination Certificate

- (2) **- Directive 94/9/EC -**
Equipment and protective systems intended for use in potentially explosive atmospheres
- (3) **BVS 09 ATEX E 012**
- (4) **Equipment:** AFGUARD® type: AFG0/xxxxx/x
- (5) **Manufacturer:** FAUDI Aviation Sensor GmbH
- (6) **Address:** 35260 Stadtallendorf, Germany
- (7) The design and construction of this equipment and any acceptable variation thereto are specified in the appendix to this type examination certificate.
- (8) The certification body of DEKRA EXAM GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in the test and assessment report BVS PP 09.2120 EG.
- (9) The Essential Health and Safety Requirements are assured by compliance with:
EN 60079-0:2006 General requirements
EN 60079-11:2007 Intrinsic safety 'i'
EN 60079-26:2004 Equipment Group II Category 1G
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the appendix to this certificate.
- (11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC.
Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate
- (12) The marking of the equipment shall include the following:

 **II 1/2G Ex ib [ia] IIB T4**
II 1/2G Ex ia IIB T4

DEKRA EXAM GmbH
Bochum, dated 04. August 2009

Signed: Dr. Eickhoff
Certification body

Signed: Leindecker
Special services unit



(13) Appendix to

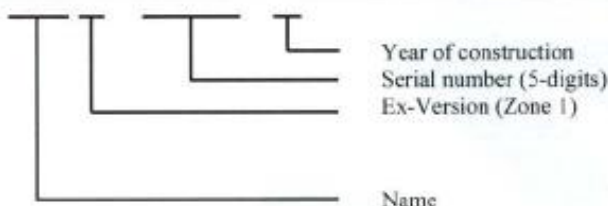
(14) **EC-Type Examination Certificate**

BVS 09 ATEX E 012

(15) 15.1 Subject and type

AFGUARD® type: AFG0/xxxxx/x

Engraved Serial No:
AFG 0 / XXXXX / X



15.2 Description

The AFGUARD® type AFG0/xxxxx/x is used for particle contamination measuring purposes in fuel pipes.

The transmitter of the type AFGUARD® comes with an electronics housing made of light alloy, stainless steel or conductive synthetic material (surface resistance $\leq 10^9 \Omega$) and an integrated optical sensor.

The electronics enclosure contains PCB, partly embedded in casting compound.

The IS supply- and signal circuit is fitted with a connector.

The mounting assembly of the integrated optical sensor head is made of stainless steel independently of the material of the electronics enclosure and is designated for mounting in the boundary wall between areas requiring 1G or 2G apparatus.

The marking II 1/2G Ex ib [ia] IIB T4' applies to the transmitter of the type: AFGUARD® in case of being supplied by means of an IS 2-wire supply- and signal circuit providing level of protection 'Ex ib IIB'.

The marking II 1/2G Ex ia IIB T4' applies to the transmitter of the type: AFGUARD® in case of being supplied by means of an IS 2-wire supply- and signal circuit providing level of protection 'Ex ia IIB'.



15.3 Parameters

15.3.1 Supply and signal circuit
intended for connection to an intrinsically safe 4 to 20 mA current loop

Voltage	U_i	DC	30	V
Current	I_i		100	mA
Power	P_i		750	mW
Effective internal capacitance	C_i		negligible	
Effective internal inductance	L_i		negligible	

15.3.2 Optical radiation

Wave length	$840 \text{ nm} \leq \lambda \leq 920 \text{ nm}$
Permanent optical power	$\leq 12 \text{ mW}$
Radiation power	$\leq 1.025 \text{ mW/mm}^2$
Light pulse energy	$\leq 53 \text{ } \mu\text{J}$
Light pulse duration	$\leq 10 \text{ } \mu\text{s}$
Pulse rate	$\leq 1 \text{ ms}$

15.3.3 Ambient temperature range:

$$-30 \text{ }^\circ\text{C} \leq T_a \leq 60 \text{ }^\circ\text{C}$$

(16) Test and assessment report

BVS PP 09.2120 EG as of 04.08.2009

(17) Special conditions for safe use

None

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 04. August 2009
BVS-Scha / Her A 2080628

DEKRA EXAM GmbH




Certification body



Special services unit

12.2 PESO Certificate for India



Government of India
 Ministry of Commerce & Industry
 Petroleum & Explosives Safety Organisation (PESO)
 5th Floor, A-Block, CDS, CGPHE, Seminary Hills,
 Nagpur-440002

E-mail : exploatives@explosives.gov.in
 Phone/Fax No : 0712-2510248, Fax-2510577

Approval No : A/P/HQ/MH/104/6169 (P416317) Dated : 05/04/2019

To,

M/s. FAUDI Aviation GmbH,
 formerly FAUDI Aviation Sensor GmbH Scharnhorststrasse 7 B, ,Stadtallendorf
 35260
 GERMANY

Sub : Approval of Intrinsically Safe Type Transmitter, under Petroleum Rules 2002- Regarding.

Sir(s),

Please refer to your letter No. NIL dated 26/02/2019 on the subject.

The following Ex electrical equipment(s) manufactured by you according to IEC 60079-0 : 2011, IEC 60079-11 : 2011, IEC 60079-26 : 2014, standards and covered under DEKRA EXAM GmbH Test reports mentioned below is/are approved for use in Zone 1 of Gas IIB hazardous areas coming under the the Petroleum Rules, 2002 administered by this Organization.

Sr. No	Description	Safety Protection	Equipment Reference Number	Test Agency			Drawing no
				Name	Certificate No.	Certificate Date	
1	AFGUARD transmitter type AFG0/xxxx/x	Ex Ia/Ib IIB T4 Ga/Gb or Ex Ia IIB T4 Ga/Gb	P416317/H	DEKRA EXAM GmbH	IECEx BVS 16.0059 Issue No. 0	14/02/2017	Assembly, AFG_Z/11000/a Sheet 1-2

This Approval is granted subject to observance of the following conditions:-


- 1)The design and construction of the equipment shall be strictly in accordance with description, condition and drawings as mentioned in the DEKRA EXAM GmbH Test Reports referred to above.
- 2)The equipment shall be used only with approved type of accessories and associated apparatus.
- 3)Each equipment shall be marked either by raised lettering cast integrally or by plate attached permanently to the main structure to indicate conspicuously-
 - (a) Name of the manufacturer
 - (b) Name and number by which the equipment is identified.
 - (c) Number & date of the test report of the DEKRA EXAM GmbH applicable to the equipment.
 - (d) Equipment reference number of this letter by which use of apparatus is approved.
 - (e) Protection level.
- 4) A certificate to the effect that the equipment has been manufactured strictly in accordance with the drawing referred to in the DEKRA EXAM GmbH Test report and is identical with the one tested and certified at DEKRA EXAM GmbH shall be furnished with each equipment.
- 5) The customer shall be supplied with a copy of this letter, an extract of the conditions and maintenance schedules, if any, recommended by DEKRA EXAM GmbH in their test reports and copy of instructions booklet detailing operation & maintenance of the equipment so as to maintain its Flame Proof characteristics.
- 6) The After sales service and maintenance of subject equipment shall be looked after by your representative M/s. Petromar Engineered Solutions Private Limited, 204, 206, Dheeraj Heritage, S.V. Road, Santacruz West, Mumbai - 400 054 (Maharashtra)

Conditions of the Approval:-
 The approval for above equipment is subject to validity of IECEx Quality Assessment Report No. DE/BVS/QAR12.0003.


This approval also covers the permissible variations as approved under the DEKRA EXAM GmbH test reports referred above. This approval is liable to be cancelled if any of the conditions of the approval is violated or not complied with. The approval may also be amended or withdrawn at any time, if considered necessary in the interest of safety.

The field performance report from actual users/your customers of the subject equipment may please be collected and furnished to this office for verification and record on annual basis.
 The Approval is Valid upto 31/12/2023

Yours faithfully,


 (Ninad Dattaram Gawade)
 Dy. Controller of Explosives
 For Chief Controller of Explosives
 Nagpur

Copy to :-
 1. Jt. Chief Controller of Explosives, West Circle, MUMBAI
 2. M/s. Petromar Engineered Solutions Private Limited, 204, 206, Dheeraj Heritage, S.V. Road, Santacruz West, Mumbai - 400 054 (Maharashtra)


 for Chief Controller of Explosives
 Nagpur

(For more information regarding status, fees and other details please visit our website <http://peso.gov.in>)

Note:- Please submit the revalidation application one month before the date of Expiry of approval otherwise approval will be treated as cancelled and a fresh application for approval will be considered for the approval.

<http://10.0.1.28/pesoFPE/licence/CustomizeLetterPrint.aspx> 4/5/2019

12.3 EG-Konformitätserklärung – EC Declaration of conformity



EG – KONFORMITÄTSERKLÄRUNG

EC-Declaration of conformity

im Sinne der RICHTLINIE 94/9/EG (ATEX 95)

according to the guideline 94/9/EC

Wir erklären in alleiniger Verantwortung, dass das Produkt von
we hereby declare in our sole responsibility, that the product of

Hersteller: FAUDI Aviation Sensor GmbH

producer:

Adresse: D-35260 Stadtallendorf; Scharnhorststraße 7 B

address:

Betriebsmittel-Kennzeichnung: AFGUARD® Streulichtsensor
operating supplies identification: free water sensor

Typ: AFGUARD®

type:

Geräte-Nr.:
unit N°:

AFG0/XXXXX/a

den Anforderungen entspricht, die in der Richtlinie 94/9/EG (ATEX 95) des Europäischen Parlaments und des Rates vom 23. März 1994 zur Angleichung der Rechtsvorschriften der Mitgliedsstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen sowie in der vom 10.10.1996 korrigierten Fassung festgelegt sind.

Gerätegruppe:
equipment group:

II

Geräteklasse:
equipment category:

1/2

explosionsfähige Atmosphäre (Gas-Explosionsschutz):
potentially explosive atmosphere class (gas-explosions proof):

G

Zündschutzart:
explosion proof:

Ex ib [ia] bzw.
Ex ia

Explosionsgruppe:
explosion group:

IIB

Temperaturklasse:
temperature class:

T4

Umgebungstemperaturbereich:
ambient temperature range:

-30 °C ≤ T_a ≤ +60 °C

Höchstwerte zu Versorgungs- und Signalstromkreis:
maximum values to supply- and signal electrical circuit:

U_i ≤ DC 30 V
I_i ≤ 100 mA
P_i ≤ 750 mW

EG-Baumusterprüfbescheinigung:
EC-certificate of conformity:

BVS 09 ATEX 012

angewandte harmonisierte Normen und technische Spezifikationen:
applied harmonized norms and technical specifications:

EN 60079-0 (Allgemeine Bestimmungen; Gas-Ex-Schutz)
EN 60079-11 (Geräteschutz durch Eigensicherheit „r“)
EN 60079-18 (Geräteschutz durch Vergusskapselung „m“)
EN 60079-26 (Geräteschutz der Betriebsmittel für Gruppe II Kategorie 1 G)
EN 60079-28 (Schutz von Einrichtungen und Übertragungssystemen, die mit optischer Strahlung arbeiten)

weitere angewandte EG-Richtlinien:
further applied EC guidelines:

EG-Niederspannungsrichtlinie: RL 72/23/EWG (EN 61010-1) und RL 93/68/EWG
EG-EMV-Richtlinie: RL 89/336 EWG (EN 61326)

Dokumente:
documents:

Betriebsanleitung mit EG-Baumusterprüfbescheinigung und EG-Konformitätserklärung;
operating manual with EC-certificate of conformity and EC-Declaration of conformity:

FAUDI Aviation Sensor GmbH
Scharnhorststraße 7 B
35260 Stadtallendorf
Telefon (06428) 4465-275
Telefax (06428) 4465-221
D-35260 Stadtallendorf, den xx.05.2009


Geschäftsführer ggf. Vertreter

Hausanschrift / Address
FAUDI Aviation Sensor GmbH
Scharnhorststraße 7 B
D-35260 Stadtallendorf

Handelsregister / Registered
Marburg HRB 5480
USt-ID-Nr.: DE 232448004

Geschäftsführer / Managing Director
Marcus Wildschütz

Bankverbindung / Bank account
Spa-Kasse Neuss
Konto 93336504, BLZ 305 500 00
IBAN: DE85 3065 0000 0093 3365 84
Swift: WELAED33

Phone: +49 6428 4465 - 275
Fax: +49 6428 4465 - 231
E-Mail: contact@faudi-aviation.com
Web: www.faudi-aviation.com

13 Issues and solutions

Question	Solution
Is the connector to be inserted compliant with explosion proof specifications?	Connectors for use with 'Intrinsically safe' („ia/ib“) initiator types do not necessarily have to be ex-certified, because the energy of the ex-i circuit is limited to a point avoiding any ignitive sparks. (Limitation of short circuit current and open-circuit voltage)
No blue ex- i proof cable to be used with ex-proof intrinsically safe electric circuit?	For ignition protection type, Intrinsically safe' („ia/ib“) a cable, marked blue, is generally required. Since the entire market does not offer plastic coated cables with a surface resistance of $< 10^9 \Omega$, the cable is to be wiped only with a damp cloth considering possible electrostatic charge.
Sensor cable for special use/requirements?	For connector M 12X1 a cable socket with a connection via user specific cable, 4 mm ² to 8 mm ² cross section, can be used.
Is the AFGUARD® sensitive to extraneous light?	Yes, the sensor optic should not be exposed to light (>10 Lux). Therefore, installation into a sight glass is not possible.
How does the sensor detect the difference between water and jet fuel?	The principle of the AFGUARD® is based on an optical process, relying on the refraction index of the medium to be examined. The refraction index of Jet Fuel and water strongly diverge from each other. Water results in an optical bypass of the mirror.
Can AFGUARD® differentiate between clean water and jet fuel?	Yes
What is the output signal?	The output signal of the AFGUARD® is a so-called standard signal of 4 bis 20 mA. As an example, for a measuring range of 0 to 50 ppm this means having output current of 4 mA = 0 ppm and 20 mA = 50 ppm. The signal measuring span of 16 mA is distributed linearly to the measuring range.
How can I assure that the AFGUARD® is properly installed/positioned?	The marking in vicinity of the screw nut SW36 should be located across to the foot. (BASE)

Can the non explosion-proof AFGUARD® also be used in areas susceptible to explosions (Ex zones)?	This is the operator's decision. We, FAUDI Aviation Sensor GmbH, will only recommend the use of hazardous area approved equipment for use in hazardous zones.
Which explosive areas (ex-zones) do I have, and where are they?	The operator is responsible for allocating zones, as well as for deciding which sensor technology to be used (plant safety regulations). We, FAUDI Aviation Sensor GmbH, can only offer assistance in the decision process.
Which documents do I need for obtaining operation approval?	-.-
Who may install the AFGUARD®?	This is the operator's decision (plant safety regulations). We recommend installation only by authorized personnel with the certification regarding explosion proof installations.
How often does the AFGUARD® require calibration?	Our recommendation is: Once per year. The operator may, based on experience with the sensor, shorten the intervals.
Is FAUDI Aviation able to deliver electronic accessories like intrinsically safe barriers, hazardous area approved displays or data loggers?	Yes – FAUDI Aviation developed so called electronic bundles to make life and operation easier. Delivery conditions and pricing for electronic devices could be asked via your local sales contact.
Do you have the possibility to address alarms?	The AFGUARD itself only gives out a linear signal readout that represents the amount of free water with regard to the calibration of the sensor. This readout signal could be used together with additional electronic devices to address alarms like optical or acoustical signals or relays to stop the process.
Where do I need to place the intrinsically safe barrier?	Intrinsically safe barriers should be installed in safe area. Please refer to the manuals provided with each electronic device.
Is the AFGUARD able to see particulate matter?	Yes – but the AFGUARD is not calibrated to give out correct values related to particulate matter. It is more or less a volume based signal that should be multiplied with the density of particulate matter to have an idea about the mass.

14 Declaration of decontamination

Dear customer

Because of legal determinations and for the safety of our employees and operating equipment, we need this "Declaration of decontamination" with your signature before your order can be handled. Please, include the completely filled in declaration with the device and the shipping documents in any case. Add also safety sheets and / or specific handling instructions if necessary.

Shipping address:
 FAUDI Aviation GmbH
 Scharnhorststraße 7 B
 D - 35260 Stadtallendorf

 Germany

Type of device / Sensor:

Serial No.:

Medium / concentration:
 chemical notation:
 Description:

Reason for Return::

Company data:

Company:

Contact Person:

Street:

address:

Tel:

Fax:

E-Mail:

Your order no:

Place, Date, Signature: _____