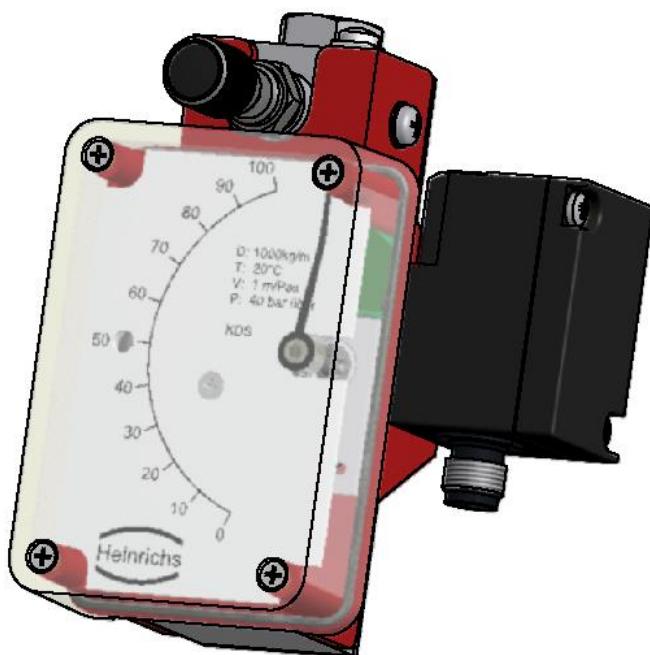




**Electronic transmitter**

**KDSE**

**EX-Supplementary Operating Manual for Hazardous areas  
Safety Instructions**



**This operating manual is a supplement to the manuals for the  
Flow-meters KDS und BGK.**

**Please read the instructions carefully and store them in a safe place.**

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## Introduction

### I. Shipping and storage; product inspection

The device is to be safeguarded against moisture, dirt, impact and damage.

#### Product inspection

Upon receipt of the product, the consignment should be checked for completeness. The data of the device have to be compared with the packing slip and the order documents

Notify us of any shipping damage immediately upon receipt of the product. Any damage claim received at a later time will not be honored.

### II. Warranty

Your flow meter was manufactured in accordance with the highest quality standards and was thoroughly tested prior to shipment. However, in the event any problem arises with your device, we will be happy to resolve the problem for you as quickly as possible under the terms of the warranty which can be found in the terms and conditions of delivery. Your warranty will only be honored if the device was installed and operated in accordance with the instructions for your device. Any mounting, commissioning and/or maintenance work is to be carried out by qualified and authorized technicians only.

### III. Validity of this operating manual



#### NOTE

The present instructions apply to explosion-proof transmitter type **KDSE as of year of construction February 2021**

These instructions are supplementary operating manual for non-explosion proof meters. If you do not have a copy of the latter instructions, please request one from Heinrichs Messtechnik GmbH or download the instructions from our website.

The instructions herein pertain primarily to explosion proof magnetic-inductive flow meters. The technical data in the mounting and operating instructions for non-explosion proof magnetic-inductive flow meters still apply insofar as the present instructions do not replace them or exclude their application.

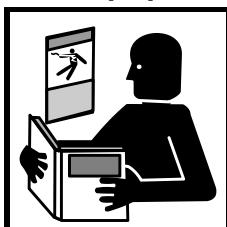
### IV. Returning the device for repairs or servicing

**Note:** According to German waste disposal legislation, it is the owner's or customer's responsibility to dispose of hazardous waste. Thus, before any devices are returned to Heinrichs Messtechnik for servicing or repairs the following measures must be performed:

- When returning the unit for an inspection, please enclose as detailed a description as possible of the fault and the specific application, as well as the chemical-physical properties of the measurement medium.
- Remove all residue of measurement medium which may be present. paying special attention to the gasket grooves and crevices. This is especially important if the medium is detrimental to health and safety, for example: corrosive, poisonous, carcinogenic or radioactive etc.

Costs, which result from insufficient cleaning, (disposal and/or personal injuries) will be invoiced to the customer.

## 1. Steps prior to operation



Prior to installation and operation, it is essential that the operator familiarizes himself with all of the instructions and information contained in the manual for non-explosion proof as well as the present instructions. If any part of either manual is missing, contact Heinrichs Messtechnik GmbH to request a new manual. These manuals can also be downloaded from our website.

### 1.1 Installation, mounting, commissioning and maintenance

Installation, mounting, commissioning and maintenance are to be performed by a technician trained to work with explosion-proof devices, or by a Heinrichs Messtechnik service technician.



#### Warning

Any maintenance or repair which is safety relevant in terms of explosion-protection is to be carried out by the manufacturer, an authorized Heinrichs Messtechnik GmbH service center or under the supervision of an expert in explosion proof devices.

**Heinrichs Messtechnik GmbH accepts no liability for any loss or damage of any kind arising from improper operation of any product, improper handling or use of any replacement part, or from external electrical or mechanical effects, overvoltage or lightning. Any such improper operation, use or handling shall automatically invalidate the warranty for the product concerned.**

In the event of a problem please contact the service center of Heinrichs Messtechnik:



Phone: +49 221 49708-0



Fax: +49 221 49708-178

Internet: [www.heinrichs.eu](http://www.heinrichs.eu)

Email: [info@heinrichs.eu](mailto:info@heinrichs.eu)

Contact our customer service department if your device needs repair or if you need assistance in diagnosing a problem with your device.

## 1.2 Hazard warnings

The purpose of the hazard warnings listed below is to ensure that device operators and maintenance personnel are not injured and that the flow meter and any devices connected to it are not damaged.

The safety advisories and hazard warnings in the present document that aim to avoid placing operators and maintenance personnel at risk and to avoid material damage are prioritized using the terms listed below, which are defined as follows in regard to the instructions herein and the advisories pertaining to the device itself.

### Warning



means that failure to take the prescribed precautions **could result** in injury, substantial material damage or even death. Always comply to these warnings and proceed with caution.

### Caution



means that failure to take the prescribed precaution **could result** in material damage or destruction of the device. We advice always to abide to these instructions!

### Note



means that the accompanying text contains important information about the product, handling the product or about a section of the documentation that is of particular importance.

## 1.3 Proper use of the device



### Warning:

The operator is responsible for ensuring that the material used in the sensor and transmitter housing is suitable and that such material meets the requirements for the fluid being used and the ambient site conditions. The manufacturer accepts no responsibility in regard to such material and housing.



### Caution:

In order for the device to perform correctly and safely, it must be shipped, stored, set up, mounted operated and maintained properly.

## 2. Identification

Manufacturer: Heinrichs Messtechnik GmbH  
Robert-Perthel-Strasse 9  
D-50739 Cologne  
Germany

-  Phone: +49 221 49708-0  
Fax: +49 221 49708-178
-  Internet: [www.heinrichs.eu](http://www.heinrichs.eu)  
Email: [info@heinrichs.eu](mailto:info@heinrichs.eu)

Product type: Electronic transmitter for small area flow meters

Product name: KDSE

File name: kdse-ex\_ba\_21.01\_en.doc

Version: 21.01,  
Date, January 27<sup>th</sup>, 2021

### 3. General information about explosion protection

In accordance with directive 2014/34/EU (ATEX)

acc. EN / IEC 60079-0 ff

Example designation

CE 0158 Ex

II

2G

Ex

d e [ia]

IIC

T6

Gb

Equipment groups

I	Equipment group I applies to equipment intended for use in underground parts of mines as well as those parts of surface installations of such mines endangered by firedamp and/or combustible dust.
II	Equipment group II applies to equipment intended for use in other places liable to be endangered by explosive atmospheres. This group is subdivided into three categories.

Equipment category

Designation for gases	Designation for dust	Definition
1G (0)	1D (20)	Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dust mixtures are present continuously, for long periods or frequently.
2G (1)	2D (21)	Equipment in this category is intended for use in areas in which explosive atmospheres caused by gases, vapours, mists or air/dust mixtures are likely to occur.
3G (2)	3D (22)	Equipment in this category is intended for use in areas in which explosive atmospheres caused by gases, vapours, mists, or air/dust mixtures are unlikely to occur or, if they do occur, are likely to do so only infrequently and for a short period only.

(The numbers in round brackets correspond to the IEC Zones.)

Ex = Explosion-proof electrical equipment

Electrical Types of protection examples

General requirements	IEC 60079-0
„d“ Flameproof enclosure	IEC 60079-1
„e“ Increased safety	IEC 60079-7
„i“ Intrinsic safety (ia, ib)	IEC 60079-11
„n“ Non-incentive electrical equipment	IEC 60079-15
„m“ Encapsulation	IEC 60079-18

Non-electrical types of protection

“h” Basic Method and requirements	DIN EN ISO 80079-36
-----------------------------------	---------------------

Explosion group

	Examples: Gases and vapours	Minimum ignition power [ $\mu\text{J}$ ]
IIA	Acetone, benzene, fuel oil, ethanoic acid	180
IIB	City gas, ethylene, isoprene	60
IIC	Acetylene, hydrogen, carbon bisulphide	20

Temperature classes

Maximum surface temperature	Temperature class
450 °C	T1
300 °C	T2
200 °C	T3
135 °C	T4
100 °C	T5
85 °C	T6

Equipment Protection Level (EPL)	Gas	Dust
“Very high” level of protection	Ga	Da
“High” level of protection	Gb	Db
“Enhanced” level of protection	Gc	Dc

Explosion protection designations [square brackets] refer to “Related electrical equipment or circuits.”

#### **4. Applications**

The electronic module type KDSE is a transmitter with integrated magneto electric measuring element for measurement of floater's actual position or and transmission of actual pointer position into an electrical signal.

The electronic module must be assembled in an enclosure possessing a minimum degree of protection of IP20 (EPL Gb) resp. IP54 (EPL Db). This enclosure and the connector should be sufficient for the applied (EPL).

#### **5. Operational mode and system design**

The electronic transmitter type "KDSE" is used to convert the pointer position of the mechanical measuring system into a proportional 4-20mA signal.

The electronic module type KDSE is a "magneto-electrical angle sensor" used for recording the position or the angular position of a magnet in the variable area flow meters series KDS and BGK. Either the position of the float, in which there is a permanent magnet, or the angular position of a ring magnet, which is located on a magnet tracking system, is detected directly. With the latter, the angular position of the axis with the follower magnet serves as a measurement interface between the mechanical part and the electronics

The microprocessor controlled KDSE transmitter is used in flowmeters series KDS and BGK. The position of the float is transmitted to the pointer axle by means of a magnetic system. The KDSE measures the field of a magnet mounted on the pointers axle and generates an output current of 4 to 20 mA from it.

The scale is generally non-linear and is linearized in the process with a minimum of 16 interpolation points. This points and the measuring range is defined by manufacturer while calibrating the complete instrument.

The earth' magnetic field and moderate homogeneous external magnetic fields are largely compensated.

## 6. Electrical connection

The electrical connection of the intrinsically safe 2-wire 4-20mA power supply and signal circuit is via an M12 connector to pins 1 (+) and 3 (-).

This requires that the maximum electrical values ( $U_i$ ,  $I_i$ ,  $P_i$ ,  $L_i$  and  $C_i$ ) are observed as described below.

### 6.1 Electrical and thermal parameters

Voltage	$U_i$	DC	30	V
Current	$I_i$		150	mA
Effective internal inductance	$L_i$		0,24	mH
Effective internal capacitance	$C_i$		15	nF

Power  $P_i$  in acc. with the following table:

Use in	EPL Gb	EPL Db	
Ambient temperature range	-40 °C up to +70 °C	-40 °C up to +40 °C	-40 °C up to +70 °C
Power $P_i$	1 W	750 mW	650 mW

Max. surface temperature for use in EPL Db 135 °C

When used in potentially explosive dust atmospheres, the device must be cleaned regularly in order to avoid deposits exceeding 5 mm.

## 7. Special conditions for safe use

### 7.1 Environmental influences on the electronics

Environmental influences on the built-in transmitter type KDSE how the process temperature must be taken into account. See Chapter 14 of the general operating instructions for the meter type or KDS BGK.

### 7.2 Atmospheric conditions

In accordance with EN 1127, a "potentially explosive atmosphere" is defined as a mixture of air and combustible gases, vapour, mist or dust under atmospheric conditions. Such conditions are defined in EN 13463-1, para. 1, with values  $T_{atm} = -20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  and  $P_{atm} = 0.8$  to  $1.1$  bar. Outside this range, safety parameters for most ignition sources are not available.

Usually, variable-area flow meters operate under operating conditions outside the atmospheric conditions of 0.8 to 1.1 bar. Irrespective of the zone classification –safety parameters of explosion protection – are basically not applicable to the inside of the measuring tube.

Therefore operation with combustible products is only allowed if a potentially explosive air mixture is not formed inside the flow meter. Where this condition is not met, the operator will need to assess the ignition hazard in each individual case and give due consideration to existing parameters (e.g. pressure, temperature, process product, materials of construction for the measuring tube).

### 7.3 Ground connection

In variable-area flow meters, it is possible under operating conditions for charge separation to occur in the measuring tube due to the transport of non-conductive fluids and/or when the flow comes into contact with non-conductive internals (e.g. liners, floats). For this reason, variable-area flow meters must be permanently grounded by the operator by way of the process connections (flanges) in order to discharge electrostatic build-up. The operator is also responsible for extending the ground continuity of the process pipeline.

If grounding cannot be made via the process connections (plastic process connections or undefined connections), the flow meter must be connected to the local ground potential via the flanges. This connection only ensures electrostatic grounding of the device and does not meet the requirements for equipotential bonding.

### 7.4 Electrostatic charge of non-conductive parts

In hazardous areas of protection class IIC pay attention to the risk of the electrostatic charge in a danger threatening amount during cleaning work on the synthetic material housing and plastics. For cleaning purposes, use only a damp cloth.

Devices where explosive electrostatic charges can be expected are marked with an adhesive label:

WARNUNG- / WARNING-  
Gefahr elektrostatischer  
Aufladung! Nicht reiben!  
Danger of electrostatic charge!  
Do not rub!

### 7.5 Mechanical strength

The flow meters have undergone an impact test to DNI EN ISO 80079-36 for a low level of mechanical hazard. Additional protective measures are required if higher mechanical hazard levels are expected.

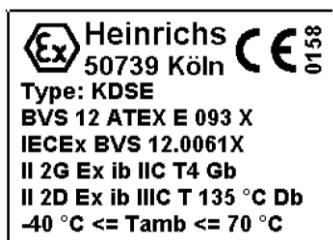
## 8. Marking



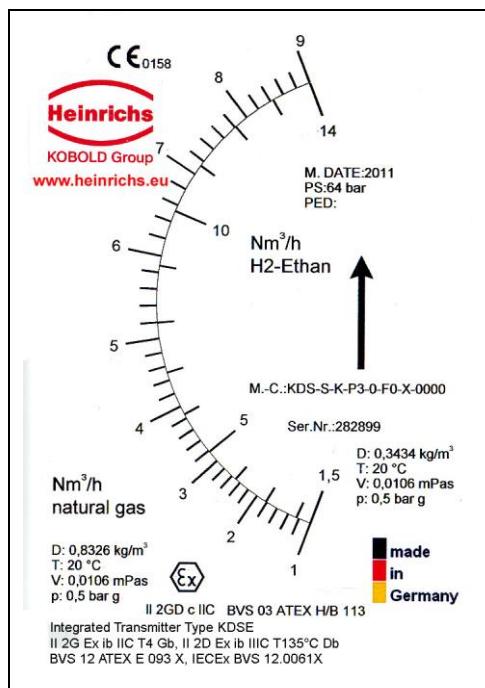
### Warning:

Only devices with ex marking may be operated within the explosive atmospheres range.

The electronic module is marked as follows:



When the module is assembled in a variable area flow meter is additional a mark on the scale of the device.



## 9. Declaration of Conformity



### EU-Konformitätserklärung EU-Declaration of Conformity

Nº. 20-4156-01



Hersteller:  
*Manufacturer:* Heinrichs Messtechnik GmbH  
Robert-Perthel-Strasse 9  
50739 Köln

Produktbeschreibung:  
*Product description:* Schwebekörper-Durchflussmessgerät vom Typ KDS und  
BGK mit KDSE  
*Variable Area Flowmeter Model KDS and BGK with KDSE*

Hiermit erklären wir, in alleinige Verantwortung, dass das oben genannte Messsystem den Anforderungen der folgenden EU-Richtlinien, einschließlich allen bis heute veröffentlichten Änderungen bzw. Nachträgen entspricht:

*We declare herewith, in sole responsibility, that the product described above is conform with the provisions of the following EU-directives, including all published changes and amendments as of today:*

2014/30/EU (EMC) EU-Richtlinie über die Elektromagnetische Verträglichkeit  
*EU-Directive relating to electromagnetic compatibility*

2014/34/EU (ATEX) EU-Richtlinie über Geräte zur Bestimmungsgemäße Verwendung in explosionsgefährdeten Bereichen.  
*EU-Directive relating to electrical equipment intended for use in potentially explosive atmospheres*

2014/35/EU (LVD) EU-Richtlinie über die Bereitstellung elektrischer Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen auf dem Markt  
*EU-Directive relating to the making available on the market of electrical equipment designed for use within certain voltage limits*

Anhang N und X sind ein integraler Bestandteil dieser Erklärung  
*Annex N and X are an integral part of this declaration*

Köln, den 01.04.2020



Joseph Burke  
(Explosionsschutzbeauftragter /  
Explosion Protection Representative)



Guido Thometzki  
(Geschäftsführung / Managing Director)

**Kontakt:** Tel: +49 (221) 49708-0  
**Contact:** Email: [info@heinrichs.eu](mailto:info@heinrichs.eu)  
Web: [www.heinrichs.eu](http://www.heinrichs.eu)


**Anhang N zur EU-Konformitätserklärung**  
*Annex N of the EU-Declaration of Conformity*
**Nº. 20-4156-01**


Produktbeschreibung: **Schwebekörper-Durchflussmessgerät vom Typ KDS und BGK mit KDSE**  
*Product description:* **Variable Area Flowmeter Model KDS and BGK with KDSE**

Durch diese Erklärung wird die Konformität mit den auf Seite 1 genannten Richtlinien sowie die Einhaltung der folgenden Normen bestätigt (gegebenenfalls abhängig von Gerätevariante):  
*Conformity to the Directives referred to on Page 1 of this Declaration is assured through the application of the following standards (possibly dependent on version of device):*

Richtlinie <i>Directive</i>	Norm –Ref. Nr. <i>Standard / Ref. N°.</i>	Ausgabe <i>Edition</i>	Norm Beschreibung <i>Standard Description</i>	KDS(E)	KDS	BGK
	<i>DIN EN -</i>					
2014/30/EU	61000-6-2	2011-06	Immunity Industrial environment	X		
	61000-6-3	2012-11	Emission residential environment	X		
	55011	2011-04	Radio frequency disturbance	X		
	61326-1	2011-07	EMC requirements	X		
2014/34/EU	60079-0	2012+A11	General requirements	X		
	60079-11	2012	Intrinsic Safety „i“	X		
	80079-36	2016	General requirements non electrical devices		X	X
	80079-37	2016	Protection by constructional safety „c“		X	X
	2014/35/EU	61010-1	2011-07	Safety requirements	X	

X: Zutreffende Norm / Applicable Standard

Name und Anschrift der Notifizierte Stelle / Name and Address of the Notified Body

TÜV-SÜD Industrie Service GmbH  
TÜV SÜD Gruppe  
Westendstraße 199  
D-80686 München

DEKRA Testing and Certification GmbH  
Carl-Beyling-Haus  
Dinnendahlstraße 9  
D-44809 Bochum  
ID-Nr. / ID-N°.: RL 2014/34/EU: 0158




**Anhang X zur EU-Konformitätserklärung  
Annex X of the EU-Declaration of Conformity**



Nº. 20-4156-01

Produktbeschreibung:  
*Product description:*

Schwebekörper-Durchflussmessgerät vom Typ KDS und  
BGK mit KDSE  
*Variable Area Flowmeter Model KDS and BGK with KDSE*

Gerät Zulassungen / Device certification

EG-Baumusterprüfbescheinigung <i>EC-type examination certificate</i>	Nachtrag <i>Supplement</i>	Kennzeichnung <i>Marking</i>	KDS(E)	KDS	BGK
BVS 12 ATEX E 093 X	0	II 2G	X		
	0	II 2D	X		
BVS 03 ATEX H/B 113	1	II 2G II 2D		X	X
Tech. File Ref.	-	03-01 X		X	X

X: Zutreffende Norm / Applicable Standard

Konformitätserklärungen für die als Option verwendeten Schalter werden von der Hersteller auf deren Homepage bereitgestellt.

*For proximity switches offered as an option in conjunction with the above-mentioned products, the Declarations of Conformity are provided by the switch manufacturer on their homepage.*

Die oben genannten Produkte entsprechen der Richtlinie 2014/34/EU. Neue Editionen können bereits eine oder mehrere der in den jeweiligen EG-Baumusterprüfbescheinigungen genannten Normen ersetzt haben. Der Hersteller erklärt, dass alle Produkte erwähnt in dieser Konformitätserklärung auch der Anforderungen der neuen Editionen einhalten, weil die veränderten Anforderungen der neuen Editionen entweder keinen Einfluss auf das Produkt haben, oder das Produkt die Anforderungen erfüllt.

*The above-mentioned products comply with the Directive 2014/34/EU. New editions may have already replaced one or more of the Standards stated in the respective EC-Type-examination certificates. The manufacturer declares that all products mentioned in this Declaration of Conformity also comply with the requirements of the new editions since either the changed requirements of the new editions do not affect the product, or the product also fulfills the requirements.*

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**Erfüllungsort und  
Gerichtsstand:**  
Köln  
Amtsgericht Köln HRA 37040  
Ust.IDNr.: DE813416533  
Steuer-Nr.: 217/5743/0386

**Geschäftsführer**  
Dipl. Ing. (FH)  
Guido Thometzki