



## Variable Area Flow Meter

V31

### Supplementary Operating Instructions for Hazardous Locations



This operating manual contains important information for the operation in potentially explosive atmospheres

Please read the instructions carefully and store them in a safe place for future reference

## Contents

1.	GENERAL INSTRUCTIONS.....	3
1.1	Steps Prior to Operation.....	3
1.2	Mounting, Set-up, Start-up and Maintenance.....	3
1.3	Hazard Warnings.....	4
1.4	Intended Use of the Device.....	4
2.	IDENTIFICATION.....	5
2.1	Manufacturer.....	5
2.2	Assessment / Certification.....	5
3.	BASIC TECHNICAL PRINCIPLES OF EXPLOSION PROTECTION.....	6
4.	SAFETY INSTRUCTIONS.....	7
4.1	Atmospheric Conditions.....	7
4.2	Hot Surfaces.....	7
4.3	Electrostatic Charge.....	7
4.3.1	Electrostatic charge of non-conductive parts of the housing during cleaning.....	7
4.3.2	Process Related Charges.....	8
4.4	Mechanical Shock Resistance.....	8
4.5	Operation in Dust Potentially Hazardous Areas.....	8
4.6	System Start-up and Shut-down.....	8
4.7	Installation Conditions.....	9
4.7.1	Tool selection.....	9
4.8	Marking.....	9
4.8.1	Without electrical equipment.....	9
4.8.2	With external mounted limit switches.....	10
5.	DECLARATION OF CONFORMITY.....	11

## 1. General Instructions

### 1.1 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 Variable Area Flow Meters V31 series 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..

These supplementary Operating Instructions for Hazardous Locations apply to explosion proof non-electrical versions of the Variable Area Meters V31 series. These instructions are a supplementary operating manual for the non-explosion proof operating manual versions. 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 information in this manual contain essentially only the data relevant to explosion protection. The technical data in the mounting and operating instructions for non-explosion proof versions still apply insofar as the present instructions do not replace them or exclude their application.

### 1.2 Mounting, Set-up, Start-up and Maintenance

Installation, set up start up 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 that safety relevant in terms of explosion-protection is to be carried out by the manufacturer, an authorized Heinrichs

**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. For consequential damages due to a.m. reasons, no liability will be accepted.**

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.

### 1.3 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 advise 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.

### 1.4 Intended 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

### 2.1 Manufacturer

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: Area-Flow meter for liquid and gaseous media

Product name: V31

File name: v31-ex\_ba\_21.01\_en.doc

Version: 21.01,  
Date, October 25, 2021

### 2.2 Assessment / Certification

The Variable Area Flow Meter V31 in the non-electrical version was tested by the manufacturer under the Ex-Directive 2014/34/EU according to following standards:

DIN EN 1127-1:2019 Explosive atmosphere, basis concept and methodology

and

DIN EN ISO 80079-36:2016 Non-electrical equipment for use in hazardous areas  
Part1: Principles and requirements

The technical documentation was deposited in accordance with Article 8, paragraph 1b ii guideline for the notified Body at **DEKRA Testing and Certification GmbH** under the registration number **BVS 10 ATEX H/B 119**

### 3. Basic Technical Principles of Explosion Protection

Acc. Directive 2014/34/EU (ATEX)	<b>Example designation</b>		CE <sub>0158</sub> Ex	II	2G	Ex	h	IIC	T6	Gb	
	<b>Equipment groups</b>										
	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.									
	<b>Equipment category</b>										
	Gas	Dust	Definition								
	1G (0)	1 D (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.								
	2 G (1)	2 D (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.)										
<b>Ex = Explosion-proof equipment</b>											
<b>Examples of electrical types of protection</b>											
	General requirements		EN DIN 60079-0								
„d“	Flameproof enclosure (db, dc)		EN DIN 60079-1								
„e“	Increased safety (eb, ec)		EN DIN 60079-7								
„i“	Intrinsic safety (ia, ib, ic)		EN DIN 60079-11								
„t“	Equipment dust ignition protection by enclosure "t" (ta, tb, tc)		EN DIN 60079-31								
<b>Non-electrical types of protection</b>											
„h“	Basic Method and requirements		DIN EN ISO 80079-36								
<b>Explosion groups</b>											
Gases and vapours											
IIA	Acetone, benzene, fuel oil, ethanoic acid										
IIB	City gas, ethylene, isoprene										
IIC	Acetylene, hydrogen, carbon bisulphide										
Dust Atmospheres											
IIIA	Fibers and flyings										
IIIB	Non-conductive dusts										
IIIC	Metal dusts										
<b>Temperature classes</b>											
Maximum surface temperature		Temperature class									
450 °C	842 °F	T1									
300 °C	572 °F	T2									
200 °C	392 °F	T3									
135 °C	275 °F	T4									
100 °C	212 °F	T5									
85 °C	185 °F	T6									
<b>Equipment protection level, EPL</b>											
Gases: Ga, Gb oder Gc					Dust: Da, Db or Dc						

Acc. EN 60079-0 ff

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

## 4. Safety Instructions



**Warning:**

Only devices with Ex marking may be operated in hazardous areas!



### 4.1 Atmospheric Conditions

According to EN 1127-1 a hazardous area is defined as a mixture of air and flammable gases, vapors mist or dust under atmospheric conditions. These are defined according to DIN EN ISO 80079-36, para 1 with following values:  $T_{atm} = -20^{\circ}\text{C} \dots +60^{\circ}\text{C}$  and  $P_{atm} = 0.8 \dots 1.1$  bar. Outside of this range, there are no safety related parameters available for most ignition sources.

Inside the tube, Variable Area Flow Meters typically work outside of the defined atmospheric conditions of 0.8 ... 1.1 bar. Therefore, regardless of zoning, explosion protection cannot be applied due to a lack of safety related characteristics.

The operation with flammable media is therefore only permissible if no explosive atmosphere (medium / air mixture) can be formed inside the Flow Meter. If this condition is not met, the risk of ignition must be evaluated by the operator in each individual case has, taking into account the existing parameters (e.g. pressure, temperature, medium, construction materials of the tube).

### 4.2 Hot Surfaces

The unit possesses no own energy sources, which would lead to an increase in surface temperature. Thus, the maximum surface temperature is therefore dependent on the operating conditions (such as fluid temperature, heat radiation or with heating jacket version of the heating medium).

For this reason, a temperature class / surface temperature range is stated on the rating plate of the device. Further information is given in these operating instructions. The max. permissible ambient and operating temperatures corresponds to those of the standard operating instructions.

### 4.3 Electrostatic Charge

#### 4.3.1 Electrostatic charge of non-conductive parts of the housing during cleaning.



**Warning:**

The protective cover of the measuring glass is produced of non-conductive polycarbonate which when cleaned with a dry cloth could become electro statically charged due to friction and thus generate an ignitable spark.

Therefore, to prevent electrostatic charging clean only with a damp cloth.

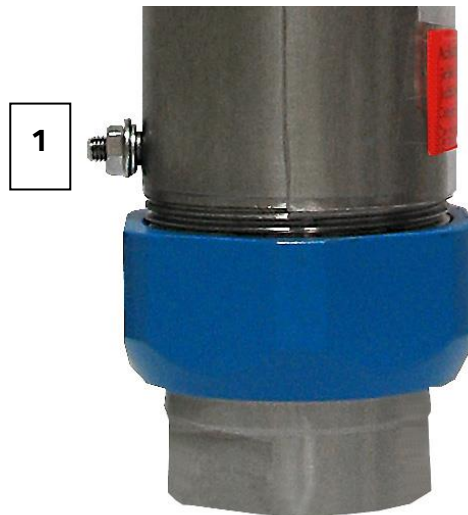
See also the warning on the instrument.

**Achtung! / Caution!**

Gefahr elektrostatischer  
Aufladung! Nicht reiben!  
Danger of electrostatic charge!  
Do not rub!

#### 4.3.2 Process Related Charges

The transport of non-conductive liquids or gases in Variable Area Flow Meters can operationally lead to a charge separation inside the measuring tube. To ensure such electrostatic build-up are discharged, Variable Area Flow Meters must therefore be permanently grounded by the operator. If grounding is not viable via the process connections (e.g. plastic process pipes) the flow meter must be connected to the grounding screw [1], which is located at the rear instrument panel, via a cable to the local equipotential bonding.



(1) connection screw for grounding

#### 4.4 Mechanical Shock Resistance

The instruments have been type tested for impact strength in accordance with DIN EN ISO 80079-36. The devices were equipped with a polycarbonate protective cover for the glass measuring cone. The requirements with impact energy of 7 Joule to metal parts and at 4 joules translucent parts were met.

Nevertheless, we recommend that you install the Variable Area Flow Meter with its glass measuring tube so that it is protected from mechanical damage.

#### 4.5 Operation in Dust Potentially Hazardous Areas

With regard to surface temperatures and dust deposits, the requirements for establishment according to DIN EN 60079-14 "Electrical installations design, selection and erection" must be met.

When used in potentially explosive dust environments, regular cleaning is required to avoid dust deposits from exceeding a thickness of 5mm.

#### 4.6 System Start-up and Shut-down

In the case of gases, slowly increase the operating pressure. The operating pressure must be varied by means of an adjusting valve so not to expose the float to hammering, otherwise damage to the measuring unit or ignition sparks may occur.

A maximum medium speed of 15 m/s must not be exceeded.

For devices with flange connections, the union nut must be tightened firmly **before** the flange connection is established.



## 4.7 Installation Conditions

For the Ex- version of the V31, the same installation conditions are valid as described in the operating instruction of the standard instrument.

**It must be insured by the operator that the maximum ambient- and fluid temperatures of the instrument does not exceed the prevailing temperature class of the hazardous area.**

The maximum permissible process temperature is indicated on the meters marking plate.

In addition the operator is to consider the dangers presented by hot surfaces in accordance with the requirements of EN 1127-1:2019 (Explosion protection–Principles and Methods) paragraph 5.1 and 6.4.2.



### Warning:

Compensation and stray currents can flow across the body of the flow meter.

To reduce the risk of igniting an explosive atmosphere, the operator must ensure that measures are taking to eliminate the risk of compensation and stray currents, e.g. by earthing the piping system.

### 4.7.1 Tool selection

When installing the flowmeter in an ATEX Zone 1 or Zone 2 area and the presence of an explosive atmosphere cannot be excluded, only tools capable of producing single sparks, such as screwdrivers or spanners shall be used.

If the presence of Gas group IIC substances (Hydrogen, Acetylene, Carbon Disulphide), or the danger of explosion through Hydrogen Sulphide, Ethylene Oxide or Carbon Monoxide cannot be excluded, the use of tools of any kind capable of producing sparks is forbidden for the installation in Zone 1 environments.



### Warning:

Tools which generate spark showers, such as grinding or separating tools, should not be used for installation and maintenance work in Zone 1 or Zone 2 where a dangerous explosive atmosphere cannot be excluded.

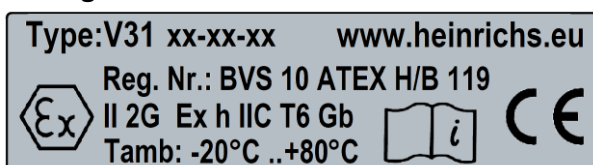
Before performing installation or maintenance work in a Zone 21 or 22 dust environment using grinding or separating tools, the workplace is to be shielded from the rest of the Zone and it is to be ensured that all dust deposits within that area have been removed.

## 4.8 Marking

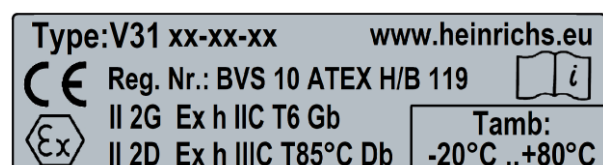
### 4.8.1 Without electrical equipment

In the basic version the flow meter is a *non- electrical equipment* under intended operation without own sources of ignition and complies with the requirements of DIN EN ISO 80079-36 and can be used in hazardous areas requiring instruments of category 2.

### Marking:



Marking plate for Gas atmospheres



Marking plate for gas and dust atmospheres

#### 4.8.2 With external mounted limit switches

The Variable Area Flow Meter can be equipped with external limit switches. These limit switches must possess either:

- a Type examination certificate according to EN 60079 ff or,
- they must meet the requirements of „simple apparatus“ according to EN 60079-11 / section 5.7

The Ex marking is printed on the name plate of each switch.

---



**Caution:**

Magnetic-field sensors supplied by Heinrichs Messtechnik possess no type examination certificate. It is therefore essential that the electrical parameters for the supply to the switch are defined and documented by the operator according to DIN EN 60079-11:2012, section 5.7 “simple apparatus” before installation and operation in an Ex-Zone.

---



**Caution:**

The influence of the fluid temperature on the installed switch must be considered.

---

## 5. DECLARATION OF CONFORMITY

### CE Konformitätserklärung Declaration of Conformity



Nº. 21-4164-01

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

Produktbeschreibung:  
*Product description:* **Schwebekörper-Durchflussmessgerät vom Typ V31**  
**Variable Area Flow-meter Model V31**

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)**  
*(Nur für elektrische Sensoren)*  
*(For electrical switches only)*

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*

**2014/68/EU (PED)**

EU-Richtlinie zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Druckgeräten auf dem Markt  
*EU-Directive on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment*

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

Köln, den 30.08.2021



Joseph Burke  
(Explosionsschutzbeauftragter /  
Explosion Protection Representative)



Michael Manderfeld  
(Druckgerätebeauftragter /  
PED Representative)



Guido Thometzki  
(Geschäftsführung / Managing Director)

**Kontakt:**  
**Contact:**

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

**CE** Anhang N zur Konformitätserklärung  
**Annex N of the Declaration of Conformity**



Nº. 21-4164-01

Produktbeschreibung: **Schwebekörper-Durchflussmessgerät vom Typ V31**  
 Product description: **Variable Area Flowmeter Model V31**

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 Directive	Norm –Ref. Nr. Standard / Ref. Nº.	Ausgabe Edition	Norm Beschreibung Standard Description		Anbau elektrische Sensor
	<b>DIN EN -</b>			V31	
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	1127-1	2019	Grundlagen und Methodik	X	
	80079-36	2016	General requirements non electrical devices	X	
2014/68/EU	AD 2000-Merkblätter		Module H	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  
 ID-Nr. / ID-Nº.: L 2014/68/EU: 0036

**CE** Anhang X zur Konformitätserklärung  
**Annex X of the Declaration of Conformity**



Nº. 21-4164-01

Produktbeschreibung: **Schwebekörper-Durchflussmessgerät vom Typ V31**  
 Product description: **Variable Area Flowmeter Model V31**

Gerät Zulassungen / Device certification

Baumusterprüfbescheinigung Type examination certificate	Nachtrag Supplement	Kennzeichnung Marking		
			V31	
BVS 10 ATEX H/B 119	1	II 2G II 2D	X	
Tech. File Ref.	1	HM-V31-ATEX-21-01X	X	

X: Zutreffende Norm / Applicable Standard

Konformitätserklärungen für die als Option verwendeten Schalter werden vom 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 Baumusterprüfbescheinigungen genannten Normen ersetzt haben. Der Hersteller erklärt, dass alle in dieser Konformitätserklärung erwähnt Produkte auch die Anforderungen der neuen Ausgaben einhalten, da die veränderten Anforderungen der neuen Ausgaben 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 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.*

**Heinrichs Messtechnik GmbH**

Robert-Perthel-Straße 9  
 50739 Köln  
 Telefon 0221/49708-0  
 Telefax 0221/49708-178  
<http://www.heinrichs.eu>  
[info@heinrichs.eu](mailto:info@heinrichs.eu)

**Bankverbindung**

Dresdner Bank Köln  
 BLZ 370 800 40  
 Konto-Nr. 0955 051300  
 IBAN :  
 DE58 3708 0040 0955 0513 00  
 SWIFT-BIC: DRES DE FF 370

**Erfüllungsort und Gerichtsstand:**

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

**Geschäftsführer**

Dipl. Ing. (FH)  
 Guido Thometzki