Fluidcontrol

Level switch for tank installation

NT 61-Z0-Atex

Installation and Operation Instructions

Original instructions

BE100028
10/2020

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Read this instruction carefully prior to installation and/or use. Pay attention particularly to all advises and safety instructions to prevent injuries. Bühler Technologies can not be held responsible for misusing the product or unreliable function due to unauthorised modifications.

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Contents

1 Introduction

1.1 Intended Use

The level switches are used to monitor levels and temperatures inside a tank. The measuring tube is inside the tank during the process.

According to IEC/EN 60079-11, NT 61-Z0-Atex series level switches are simple electrical apparatuses without separate voltage source intended for tank top installation.

When used in explosive areas, this type may only be operated on intrinsically-safe circuits. When using intrinsically-safe connections they can be installed in Zone 1 explosive areas and the level or temperature be monitored in a Zone 0 environment. The intrinsically-safe power supply must be suitable for the zone. The limits inside these operating instructions must be observed.

Never the use level switches in highly flammable or corrosive liquids. The medium must not contain particles, particularly metallic particles, to prevent deposits on the float or between the float and switching tube.

Before installing the level switch, verify the listed technical data meet the application parameters. Also observe the applicable requirements of IEC/EN 60079-14.

Further check if all contents are complete.

Please note the specific values of the level switches when connecting and the correct version when ordering spare parts.

The level switches are marked as follows:

Ex II 1G Ex ia IIC T4 Ga

Ex II 1D Ex ia IIIC T70°C Da

Due to the limited space, the type plates do not include the explosion protection marking.

For the markings and switching values of the intrinsically safe connection of the level switch, please refer to the Technical Data.

1.2 Functionality

1.2.1 Fill level monitoring

The measuring tube is located inside the tank. The level contacts (bistable reed contacts) are located inside the measuring tube. These are activated by a magnet inside the level switch float. This can switch signals used to display the fill level.

The contacts clip onto a perforated rail spaced as specified in the purchase order and cannot be moved.

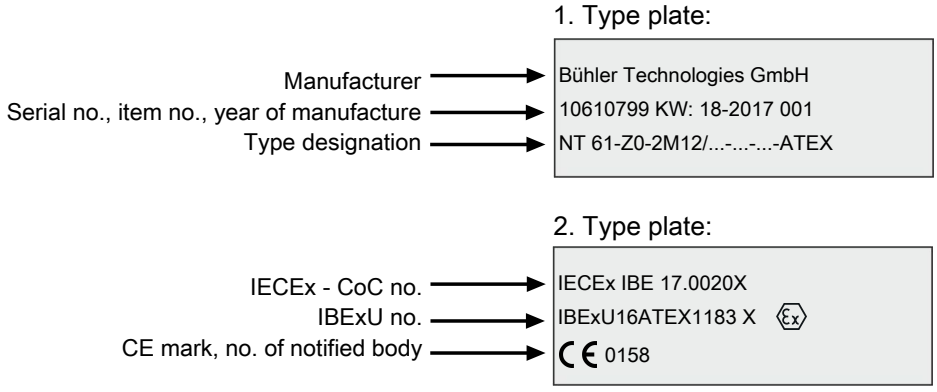
1.2.2 Temperature monitor

The temperature of a fluid is monitored via bimetal disc thermostat inside the level switch tube. When a set temperature is reached, a bimetal snap disk inside the thermostat is triggered, which opens or closes an electrical contact. A Pt100 temperature sensor can optionally be used in place of the bimetal thermostat.

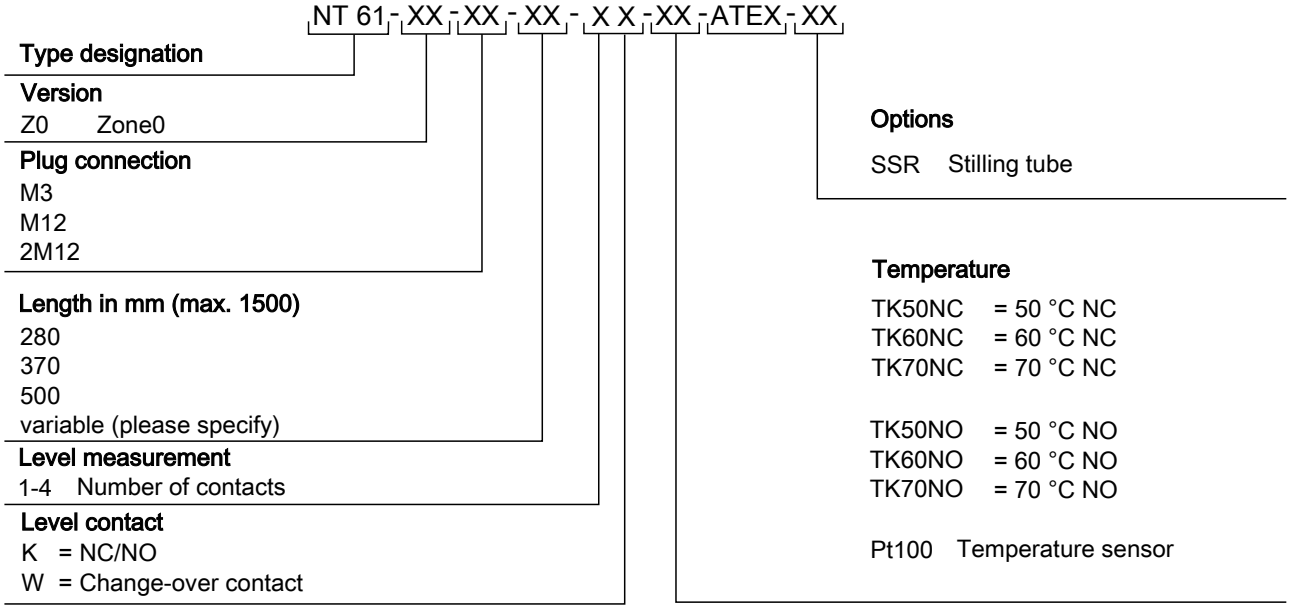
Please note the technical data in the appendix.

1.3 Type plate

Example:



1.4 Model key



1.5 Scope of Delivery

- 1 x Level switch
- 1 x Rubberised cork seal D1=90 x D2=60x4, item no.: 9009113
- 6 x Hexagon screw, item no.: 9011606
- 6 x Disc DIN125-A5.3, item no.: 9012234
- Product documentation

2 Safety instructions

2.1 Important advice

This unit may only be used if:

- The product is being used under the conditions described in the operating- and system instructions, used according to the nameplate and for applications for which it is intended. Any unauthorized modifications of the device will void the warranty provided by Bühler Technologies GmbH,
- The specifications and markings in the type plate are observed,
- The specified limits are observed,
- The equipment is operated on intrinsically-safe circuits, see chapter “Intrinsically-Safe Connection”,
- The protective element is installed outside the explosive area,
- No equipment functions exceed the limits,
- Monitoring equipment / protection devices are connected correctly,
- Service and repair work not described in these instructions are performed by Bühler Technologies GmbH,
- Genuine replacement parts are used.

Regulations IEC/EN 60079-14 and IEC/EN 60079-17 must be observed when erecting electrical systems in explosive areas.

Additional national regulations pertaining to initial operation, operation, maintenance, repairs and disposal must be observed.

These operating instructions are a part of the equipment. The manufacturer reserves the right to change performance-, specification- or technical data without prior notice. Please keep these instructions for future reference.

Signal words for warnings

DANGER	Signal word for an imminent danger with high risk, resulting in severe injuries or death if not avoided.
WARNING	Signal word for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.
CAUTION	Signal word for a hazardous situation with low risk, resulting in damaged to the device or the property or minor or medium injuries if not avoided.
NOTICE	Signal word for important information to the product.

Warning signs

These instructions use the following warning signs:

	Warns of a general hazard		General information
	Warns of voltage		Unplug from mains
	Warns not to inhale toxic gasses		Wear respiratory equipment
	Warns of corrosive liquids		Wear a safety mask
	Warns of explosive areas		Wear gloves

2.2 General hazard warnings

The equipment must be installed by a professional familiar with the safety requirements and risks.

Be sure to observe the safety regulations and generally applicable rules of technology relevant for the installation site. Prevent malfunctions and avoid personal injuries and property damage.

The operator of the system must ensure:

- Safety notices and operating instructions are available and observed,
- The respective national accident prevention regulations are observed,
- The permissible data and operational conditions are maintained,
- Safety guards are used and mandatory maintenance is performed,
- Legal regulations are observed during disposal,
- compliance with national installation regulations.

Maintenance, Repair

Please note during maintenance and repairs:

- Repairs to the unit must be performed by Bühler authorised personnel.
- Only perform conversion-, maintenance or installation work described in these operating and installation instructions.
- Always use genuine spare parts.
- Do not install damaged or defective spare part. If necessary, visually inspect prior to installation to determine any obvious damage to the spare parts.

Always observe the applicable safety and operating regulations in the respective country of use when performing any type of maintenance.

The method for cleaning the devices must be adapted to the IP protection class of the devices. Do not use cleaners which could damage the device materials.

DANGER **Toxic, acidic gases/liquids**

Protect yourself from toxic, corrosive gasses/liquids when performing any type of work. Wear appropriate protective equipment.

3 Transport and storage

Only transport the product inside the original packaging or a suitable alternative.

The equipment must be protected from moisture and heat when not in use. It must be stored in a covered, dry, dust-free room at room temperature.

4 Installation and connection

4.1 Installation

Please note before installing the level switch!

After transport and delivery of the level switch, the switching status of the bistable contacts may be different than required for proper operation.

Therefore slide the float for the level switch along the level switch tube from below immediately before installation.

This ensures all built-in bistable contacts have a clearly defined switching status (NC or NO).

The level switch (transmitter) comes fully assembled and can be mounted to the tank by flange, included screws and seals. Please be sure the float can move freely and to leave enough space between the tank wall and add-ons.

After removing the float, where applicable, be sure the magnet inside the float is above the fluid level. This can easily be verified with a piece of iron to determine the magnet position inside the float.

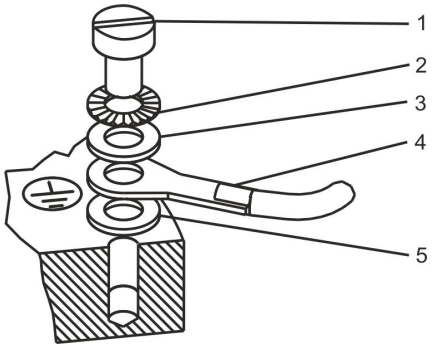
4.2 Electrical connections

4.2.1 PA connection (potential equalisation)

CAUTION	**Electrostatic charge**
	Level switch housings and stilling tubes must be connected to the tank via external PA connection! Ensure the level switch is adequately earthed (minimum conductor cross-section 4 mm²). Particularly also observe the requirements of IEC/EN 60079-14.

The level switch has an external PA connection. This is identified by the decal shown on the left. The connection uses an M5 thread. The PA cable for potential equalisation between the level switch or stilling tube (drawing B) and the tank is not included with this version and must be supplied and installed by the customer.

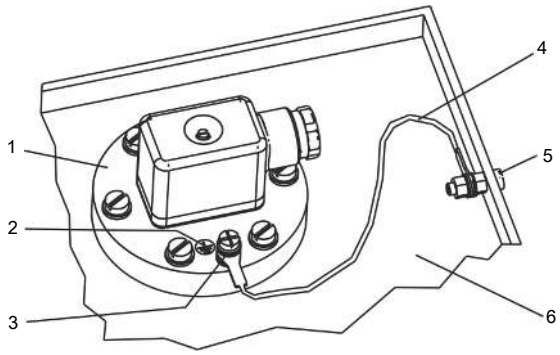
Layout of the PA connection:



1	Screw	4	PA cable (to be installed by the customer)
2	Serrated washer	5	Washer
3	Washer		

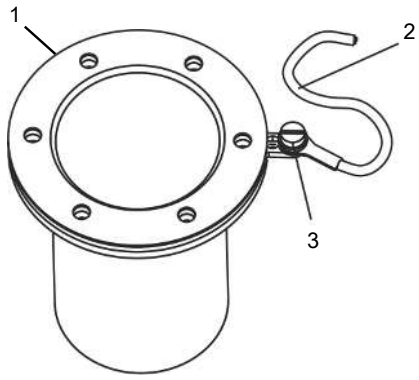
PA connection examples:

Drawing A



1	Level switch	4	PA cable
2	PA decals	5	PA connection on the tank
3	PA connection on the level switch	6	Tank

Drawing B



1	Stilling tube	3	PA connection
2	PA cable		

4.2.2 Intrinsically-safe connection

According to IEC/EN 60079-11 the components for level and temperature monitoring are simple electrical equipment and to be considered purely ohmic circuits. They may only be operated with an type-tested controller with an intrinsically-safe circuit.

CAUTION

Explosion hazard due to prohibited electrical connection data

Prohibited electrical connection data can cause an explosive gas mixture to ignite.
In areas with explosive gas atmospheres the level switch may only be operated with an intrinsically-safe power supply. The power supply must be suitable for the respective zone. The limits specified in these operating instructions must be observed and must not exceeded, even with two separate intrinsically-safe power supplies.
Ensure the limits will not be exceeded, even in the event of a fault, e.g. accidental series or parallel connection.
Please observe the relevant safety requirements, e.g. IEC/EN 60079-11 and IEC/EN 60079-14, when installing and operating intrinsically-safe equipment.

Please refer to the chart below for the technical parameters and the approved limits (U_i, I_i, C_i, L_i, P_i) for intrinsically-safe operation:

	U_i	I_i	C_i	L_i	P_i
Level contact	30 V	50 mA	negligible	negligible	100 mW
Temperature contact	30 V	50 mA	negligible	negligible	100 mW
Pt100 Temperature Sensor	30 V	50 mA	negligible	negligible	100 mW

Remarks about the Pt100 connection

Operate the Pt100 with the respective EX approved RTD converter or a separating barrier with RTD input, suitable for EX. The Measuring current must be **≤ 1 mA** to prevent excessive self-heating, which will cause measuring errors.

5 Operation and control

DANGER

Toxic, acidic gases/liquids

Protect yourself from toxic, corrosive gasses/liquids when performing any type of work.
Wear appropriate protective equipment.

DANGER

Dangerous electrostatic charge (explosion hazard)

The equipment may only be used where normal operating conditions do not produce frequent flammable, electrostatic discharge.

Sparking

Incendive electrostatic charges may occur when cleaning plastic housing parts and decals (e.g. with a dry cloth or compressed air). The sparks this produces could ignite flammable, explosive atmospheres.

Always clean plastic housing parts and decals **with a damp cloth**!

DANGER

Impact

Strong blows to the housing can produce sparks, which can ignite an EX atmosphere.
Protect the equipment from external impact. Damaged housing parts must be replaced immediately.

CAUTION

Explosion hazard due to prohibited electrical connection data

Prohibited electrical connection data can cause an explosive gas mixture to ignite.
In areas with explosive gas atmospheres the level switch may only be operated with an intrinsically-safe power supply. The power supply must be suitable for the respective zone. The limits specified in these operating instructions must be observed and must not exceeded, even with two separate intrinsically-safe power supplies.
Ensure the limits will not be exceeded, even in the event of a fault, e.g. accidental series or parallel connection.
Please observe the relevant safety requirements, e.g. IEC/EN 60079-11 and IEC/EN 60079-14, when installing and operating intrinsically-safe equipment.

NOTICE

The device must not be operated beyond its specifications.

Before startup, check

- The electrical connections are undamaged and correctly installed.
- The level switch is connected intrinsically-safe (proof of intrinsic safety e.g. according to IEC/EN 60079-14),
- No parts have been removed from the level switches,
- Protection and monitoring devices are installed and functional (e.g. switch amplifier),
- The ambient parameters and technical specifications (e.g. U_i, I_i) are met,
- Electrical connections are securely connected and the monitoring devices are connected and set as prescribed.
- Precautions have been taken,
- The connectors are closed and the cable glands are properly sealed.
- The requirements of IEC/EN 60079-14 are met,
- The earth is proper and functional.

Level display:

Inside the float of a level switch is a magnet which is mounted in a way that exceeding the level contacts (bistable reed contacts) will trigger these magnetically. This can switch signals used to display the fill level.

Please note the technical specifications for the level switch and the connection diagrams at the end of this manual.

6 Cleaning and Maintenance

This device is maintenance-free.

The method for cleaning the devices must be adapted to the IP protection class of the devices. Do not use cleaners which could damage the device materials.

7 Service and repair

This chapter contains information on troubleshooting and correction should an error occur during operation.

Repairs to the unit must be performed by Bühler authorised personnel.

Please contact our Service Department with any questions:

Tel.: +49-(0)2102-498955 or your agent

If the equipment is not functioning properly after correcting any malfunctions and switching on the power, it must be inspected by the manufacturer. Please send the equipment inside suitable packaging to:

Bühler Technologies GmbH

- Reparatur/Service -

Harkortstraße 29

40880 Ratingen

Germany

Please also attach the completed and signed RMA decontamination statement to the packaging. We will otherwise be unable to process your repair order.

You will find the form in the appendix of these instructions, or simply request it by e-mail:

service@buehler-technologies.com.

7.1 Spare parts and accessories

Item no.	Description
9144 05 0010	Connecting cable M12x1, 4-pin, 1.5 m, angular coupling and straight plug
9144 05 0046	Connecting cable M12x1, 4-pin, 3.0 m, angular coupling and straight plug
9144 05 0047	Connecting cable M12x1, 4-pin, 5.0 m, angular coupling and strands

8 Disposal

The applicable national laws must be observed when disposing of the products. Disposal must not result in a danger to health and environment.

The crossed out wheelie bin symbol on Bühler Technologies GmbH electrical and electronic products indicates special disposal notices within the European Union (EU).

The crossed out wheelie bin symbol indicates the electric and electronic products bearing the symbol must be disposed of separate from household waste. They must be properly disposed of as waste electrical and electronic equipment.

Bühler Technologies GmbH will gladly dispose of your device bearing this mark. Please send your device to the address below for this purpose.

We are obligated by law to protect our employees from hazards posed by contaminated devices. Therefore please understand that we can only dispose of your waste equipment if the device is free from any aggressive, corrosive or other operating fluids dangerous to health or environment. **Please complete the "RMA Form and Decontamination Statement", available on our website, for every waste electrical and electronic equipment. The form must be applied to the packaging so it is visible from the outside.**

Please return waste electrical and electronic equipment to the following address:

Bühler Technologies GmbH
WEEE
Harkortstr. 29
40880 Ratingen
Germany

Please also observe data protection regulations and remember you are personally responsible for the returned waste equipment not bearing any personal data. Therefore please be sure to delete your personal data before returning your waste equipment.

9 Appendices

9.1 Technical Data

NT 61-Z0-Atex	
Operating pressure:	max. 1 bar
Operating temperature:	-20 °C to +70 °C
Ambient temperature:	-20 °C to +70 °C
Min. fluid density:	0.85 kg/dm³
Weight at L = 280 mm:	approx. 950 g
Each 100 mm add:	approx. 50 g

Material	
Float:	1.4571
Immersion tube:	1.4571
Flange (DIN 24557)	1.4571

Includes
Mounting screws (quantity 6) and rubberised cork seal.

Options	
Stilling tube (SSR)	1.4571/NBR

The equipment comply with: IEC 60079-0 (Ed.6.0); IEC 60079-11 (Ed.6.0); EN 60079-0:2012+A11:2013; EN 60079-11:2012

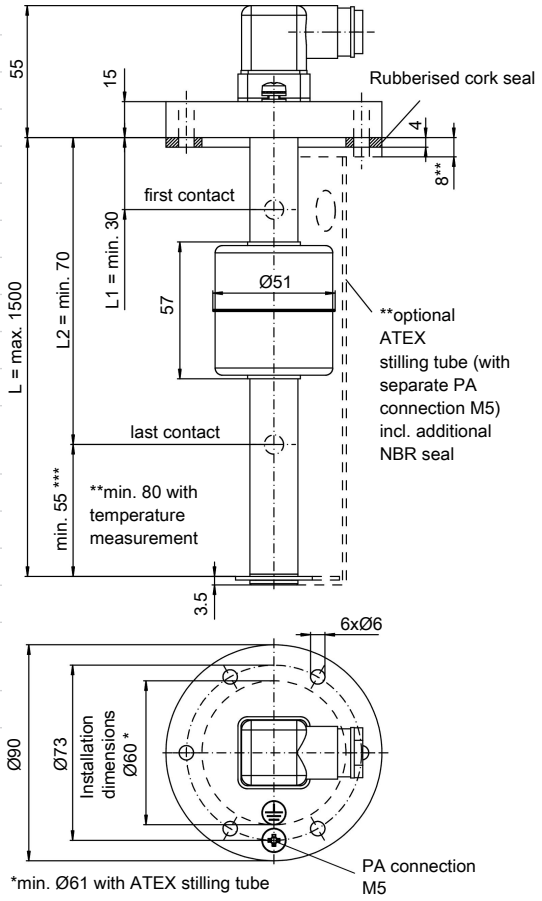
ATEX/IECEx marking

Ex II 1G Ex ia IIC T4 Ga

Ex II 1D Ex ia IIIC T70°C Da

The level switches may only be operated on intrinsically-safe circuits!

Dimensions



Level switching outputs

Level contact	K10	W11
Function	NC/NO*	Change-over contact
U_i	30 V	
I_i	50 mA	
L_i; C_i	Negligible	
P_i	100 mW	

*NC = rising NC contact/falling NO contact, NO = rising NO contact/falling NC contact

Optional temperature switching outputs

Temperature contact	TKÖ	TKS
Function	NC**	NO**
U_i	30 V	
I_i	50 mA	
L_i; C_i	Negligible	
P_i	100 mW	

**NC = NC contact, NO = NO contact

Temperature signal

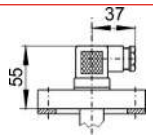
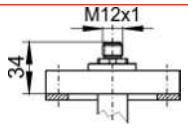
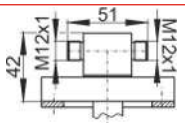
Pt100 Resistance Thermometer	
Temperature sensor	Pt100 Class B, DIN EN 60 751
Tolerance:	±0.8 °K
P_i	100 mW
U_i	30 V
I_i	50 mA
I_{Mess} (measuring current)	≤1 mA
L_i; C_i	Negligible

Pt100 measuring resistance base values

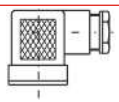
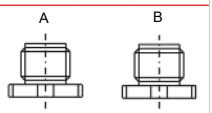
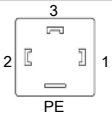
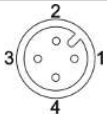
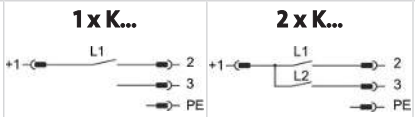
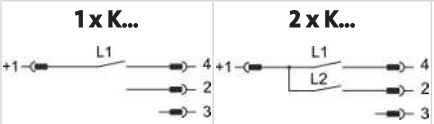
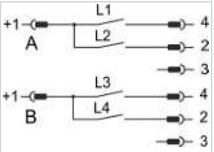
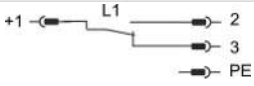
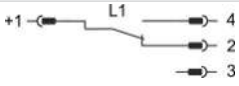
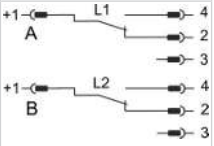
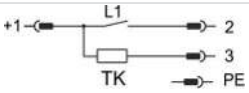
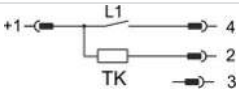
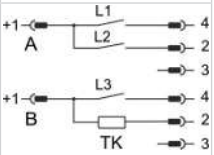
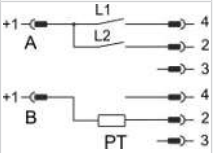
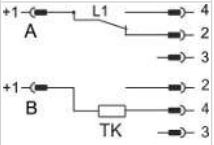
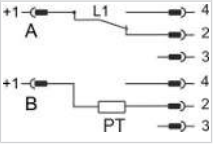
°C	0	10	20	30	40	50	60	70	80	90	100
Ohm	100.00	103.90	107.79	111.67	115.54	119.40	123.24	127.07	130.89	134.70	138.50

9.2 Standard pin assignment

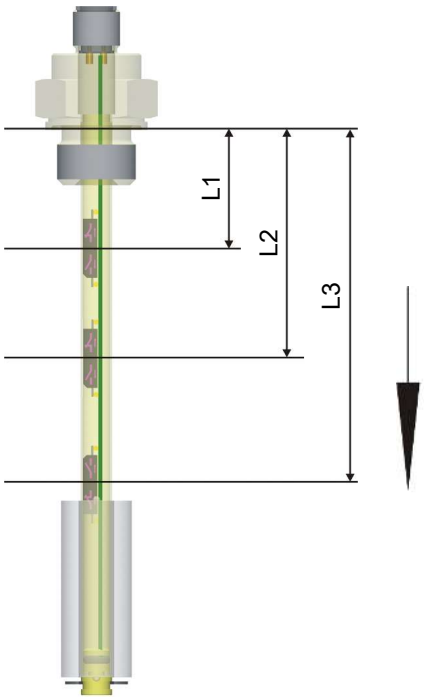
Plug connection

	M3	M12	2 x M12
Dimensions			
Number of pins	3-pin + PE	4-pin	4-pin / 4-pin
DIN EN	175301-803	61076-2-101	61076-2-101
Degree of protection	IP65	IP67**	IP67**
Cable fitting	PG 11		

** with respective plug top

	M3	M12 (base)	2 x M12 (base)
			
Connection schematic			
Only level contact(s) type K10 (NC/NO)			
Only level contact(s) type W11 (changeover contact)			
Level contact(s) type K10 plus temperature contact TK			
Level contact(s) type K10 plus Pt100 temperature sensor			
Level contact(s) type W11 plus temperature contact TK			
Level contact(s) type W11 plus Pt100 temperature sensor			

9.3 Definitions



The contact positions are measured top to bottom:

L1 = Contact no. 1
L2 = Contact no. 2
L3 = Contact no. 3
, etc.

Note: The number of contacts may be limited depending on the level switch model (see model key in the type plate and technical data).

Abbreviation	Explanation
NO	rising NO contact/falling NC contact
NC	rising NC contact/falling NO contact
TK	Temperature contact
PT	Pt100 Temperature Sensor
SSR	Stilling tube
L1, L2, L3, L4	Level contact
T1, T2, T3, T4	Temperature output / contact

Information about temperature contacts:

Depending on the version ordered, the temperature contacts (TK) may be a temperature contact as NO contact (TKS), temperature contact as NC contact (TKÖ) or a Pt100 temperature sensor.

10 Attached documents

- EU-Type Examination Certificate IBExU16ATEX1183X
- Declaration of Conformity KX100032
- RMA - Decontamination Statement

IBExU Institut für Sicherheitstechnik GmbH
An-Institut der TU Bergakademie Freiberg

[1] EU-TYPE EXAMINATION CERTIFICATE - Translation

[2] Equipment or protective systems
intended for use in potentially explosive atmospheres, Directive 2014/34/EU

[3] EU-type examination certificate number **IBExU16ATEX1183 X** | Issue 1

[4] Product: **Level-switches**
Types: **NT 61-Z0-ATEX** and
NS 10/G2-2K-VA-ATEX-M12/xxx-SK221 / NS 10/G2-XK-VA-ATEX-M12/YYYY-VZZ

[5] Manufacturer: Bühler Technologies GmbH

[6] Address: Harkortstr. 29
40880 Ratingen
GERMANY

[7] This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

[8] IBExU Institut für Sicherheitstechnik GmbH, Notified Body number 0637 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential test report IB-17-3-0202.

[9] Compliance with the essential health and safety requirements has been assured by compliance with:
EN 60079-0:2012+A11:2013 EN 60079-11:2012
except in respect of those requirements listed at item [18] of the schedule.

[10] If the sign "X" is placed after the certificate number, it indicates that the product is subject to the specific conditions of use specified in the schedule to this certificate.

[11] This EU-type examination certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

[12] The marking of the product shall include the following:

NS 10/G2-2K-VA-ATEX-M12/xxx-SK221
NS 10/G2-XK-VA-ATEX-M12/YYYY-VZZ
Ⓔx II 1G Ex ia IIC T4 Ga
Ⓔx II 1D Ex ia IIIC T100 °C Da
$-20\ °C \leq T_a \leq +100\ °C$

NT 61-Z0-ATEX

Ⓔx II 1G Ex ia IIC T4 Ga
Ⓔx II 1D Ex ia IIIC T70 °C Da
$-20\ °C \leq T_a \leq +70\ °C$

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

Tel: + 49 (0) 37 31 / 38 05 0
Fax: + 49 (0) 37 31 / 38 05 10

By order

(Dipl.-Ing. [FH] Henker)

Zertifizierungsstelle Explosionsschutz IBExU Institut für Sicherheitstechnik GmbH * Kenn-Nr. 0637 *
- Seal -
(Notified Body number 0637)

Certificates without signature and seal are not valid. Certificates may only be duplicated completely and unchanged. In case of dispute, the German text shall prevail.

Freiberg, 2018-01-19

[13] **Schedule**

[14] **Certificate number IBExU16ATEX1183 X** | Issue 1

[15] **Description of product**

The level-switches are used as remote tank level indicator. A stainless steel pipe is containing reed-switches. The pipe is surrounded by a floater who is equipped with a permanent magnet. That magnet acts to reed-switches that allow a control of tank level.
Additionally the level-switches may contain temperature-switches or PT100 resistance thermometer for temperature measurement.

Technical data

Ambient-temperature / operating pressure:		
NS 10/G2-2K-VA-ATEX-M12/xxx-SK221* and NS 10/G2-XK-VA-ATEX-M12/YYYY-VZZ	-20 °C to +100 °C	/ 10 bar
NT 61-Z0-ATEX	-20 °C to +70 °C	/ 1 bar

*xxx: indicates length of the immersion pipe in mm
*XK: indicates the number of temperature-switches (1K .. 2K)
*YYYY: length of immersion pipe in mm
*VZZ: indicates the variant-number (V1…V99)

Parameters of intrinsic safety:

Level-switch:

Ui	30 V
Ii	50 mA
Pi	100 mW
Ci, Li	negligible

Temperature switch:

Ui	30 V
Ii	50 mA
Pi	100 mW
Ci, Li	negligible

Resistance thermometer PT100:

Ui	30 V
Ii	50 mA
Pi	100 mW
Ci, Li	negligible

Alternative marking for resistance-thermometer PT100

Ui	9 V
Ii	22 mA
Li	negligible
Ci	negligible

Changes compared to the previous approval IBExU16ATEX1183 X (NS-10 only):

- The type designation or type key has been changed and additional placeholders have been added: the length identifier was changed from three digits to four digits and new three-digit variant designation was implemented.
- One or two contacts can be used both as normally closed and normally open contacts in any combination.
- The protective earth conductor (PE) can be connected either via the plug connector or via the screws to the earthed metal container.
- The seal to the container may be provided by the user.

[16] **Test report**
The test results are recorded in the confidential test report IB-17-3-0202 of 2018-01-19.

The test documents are part of the test report and they are listed there.

Summary of the test results
The level switches NT 61-Z0-ATEX and NS 10/G2-2K-VA-ATEX-M12/xxx-SK221 resp. NS 10/G2-XK-VA-ATEX-M12/YYYY-VZZ fulfil the requirements of explosion protection for electrical equipment of the Equipment Group II Category 1G and 1D in protection-type "ia" intrinsically save devices for explosion group IIC temperature class T4 and explosion group IIIC with surface-temperature 70 °C and 100 °C.

[17] **Specific conditions of use**
- The ambient temperature range is fixed from -20 °C to +70 °C (NT-61) or +100 °C (NS-10).
- See "Installation and Operating Instructions" for intrinsic safe values.

[18] **Essential health and safety requirements**
In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item [9], the following are considered relevant to this product, and conformity is demonstrated in the test report: None

[19] **Drawings and Documents**
The documents are listed in the test report.

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

By order

(Dipl.-Ing. [FH] Henker)

Freiberg, 2018-01-19

[1] EU-TYPE EXAMINATION CERTIFICATE - Translation

[2] Equipment or protective systems
intended for use in potentially explosive atmospheres, Directive 2014/34/EU

[3] EU-type examination certificate number **IBExU16ATEX1183 X** | Issue 0

[4] Product: **Level-switches**
Types: **NT 61-Z0-ATEX** and **NS 10/G2-2K-VA-ATEX-M12/xxx-SK221**

[5] Manufacturer: Bühler Technologies GmbH

[6] Address: Harkortstr. 29
40880 Ratingen
GERMANY

[7] This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

[8] IBExU Institut für Sicherheitstechnik GmbH, Notified Body number 0637 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential test report IB-16-3-170 of 2017-07-14.

[9] Compliance with the essential health and safety requirements has been assured by compliance with:
EN 60079-0:2012+A11:2013 EN 60079-11:2012
except in respect of those requirements listed at item [18] of the schedule.

[10] If the sign "X" is placed after the certificate number, it indicates that the product is subject to the specific conditions of use specified in the schedule to this certificate.

[11] This EU-type examination certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

[12] The marking of the product shall include the following:

NS 10/G2-2K-VA-ATEX-M12/xxx-SK221
Ⓔx II 1G Ex ia IIC T4 Ga
Ⓔx II 1D Ex ia IIIC T100 °C Da
$-20\ °C \leq T_a \leq +100\ °C$

NT 61-Z0-ATEX
Ⓔx II 1G Ex ia IIC T4 Ga
Ⓔx II 1D Ex ia IIIC T70 °C Da
$-20\ °C \leq T_a \leq +70\ °C$

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

By order
A. Henker
(Dipl.-Ing. [FH] Henker)

Zertifizierungsstelle Explosionsschutz IBExU Institut für Sicherheitstechnik GmbH Kenn-Nr. 0637
- Seal -
(Notified Body number 0637)

Tel: + 49 (0) 37 31 / 38 05 0
Fax: + 49 (0) 37 31 / 38 05 10

Freiberg, 2017-07-14

[13] **Schedule**

[14] **Certificate number IBExU16ATEX1183 X** | Issue 0

[15] **Description of product**
The level-switches are used as remote tank level indicator. A stainless steel pipe is containing reed-switches. The pipe is surrounded by a floater who is equipped with a permanent magnet. That magnet acts to reed-switches that allow a control of tank level.
Additionally the level-switches may contain temperature-switches or PT100 resistance thermometer for temperature measurement.

Specifications

Ambient-temperature / operating pressure:

NS 10/G2-2K-VA-ATEX-M12/xxx-SK221*	-20 °C to +100 °C	/ 10 bar
NT 61-Z0-ATEX	-20 °C to +100 °C	/ 1 bar

*The 'xxx' notes the length of the pipe in mm.

Level-switch:

Ui	30 V
Ii	50 mA
Pi	100 mW
Ci, Li	negligible

Temperature switch:

Ui	30 V
Ii	50 mA
Pi	100 mW
Ci, Li	negligible

Resistance thermometer PT100:

Ui	30 V
Ii	50 mA
Pi	100 mW
Ci, Li	negligible

Alternative marking for resistance-thermometer PT100

Ui	9 V
Ii	22 mA
Li	negligible
Ci	negligible

[16] **Test report**
The test results are recorded in the confidential test report IB-16-3-170 of 2017-07-14.

The test documents are part of the test report and they are listed there.

Summary of the test results
The level switches Nivotemp NT 61-Z0-ATEX and NS 10/G2-2K-VA-ATEX-M12/xxx-SK221 fulfil the requirements of explosion protection for electrical equipment of the Equipment Group II Category 1G and 1D in protection-type "ia" intrinsically save devices for explosion group IIC temperature class T4 and explosion group IIIC with surface-temperature 70 °C and 100 °C.

[17] **Specific conditions of use**
See "Installation and Operating Instructions" for intrinsic safe values.

[18] **Essential health and safety requirements**
In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item [9], the following are considered relevant to this product, and conformity is demonstrated in the test report: None

[19] **Drawings and Documents**
The documents are listed in the test report.

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

By order

(Dipl.-Ing. [FH] Henker)

Freiberg, 2017-07-14

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: **IECEx IBE 17.0020X**

Certificate history:

Status: **Current**

Issue No: 0

Date of Issue: 2017-08-24

Applicant: **Buehler Technologies GmbH**
Harkortstrasse 29
40880 Ratingen
Germany

Equipment: **Level-switches type NS 10/G2-2K-VA-ATEX-M12/xxx-SK221 and NT 61-Z0-ATEX**

Optional accessory:

Type of Protection: **Intrinsic safety**

Marking: Ex ia IIC T4 Ga

Ex ia IIIC 100°C Da [NS 10/G2-2K-VA-ATEX-M12/xxx-SK221]

Ex ia IIIC 70°C Da [NT 61-Z0-ATEX]

Approved for issue on behalf of the IECEx Certification Body: **Dipl.-Ing. Alexander Henker**

Position: **Deputy Head of Certification Body**

Signature:
(for printed version)

Date:
(for printed version)

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting www.iecex.com or use of this QR Code.

Certificate issued by:

IBExU Institut für Sicherheitstechnik GmbH
Certification Body
Fuchsmühlenweg 7
09599 Freiberg
Germany

IECEx Certificate of Conformity

Certificate No.: **IECEx IBE 17.0020X** Page 2 of 3

Date of issue: 2017-08-24 Issue No: 0

Manufacturer: **Buehler Technologies GmbH**
Harkortstrasse 29
40880 Ratingen
Germany

Manufacturing locations:

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements.This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

STANDARDS :
The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0:2011 Explosive atmospheres - Part 0: General requirements
Edition:6.0

IEC 60079-11:2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition:6.0

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Report:

DE/IBE/ExTR16.0040/00

Quality Assessment Report:

DE/BVS/QAR16.0002/01

IECEx Certificate of Conformity

EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

The Level-switches are used as remote tank level indicator. It works with a stainless steel pipe containing reed-switches. The pipe is surrounded by a floater who is equipped with a permanent magnet. That magnet acts to reed-switches that allow a control of tank level.

Parameters of intrinsic safety:

Level-switch	
Ui	30 V
Ii	50 mA
Pi	100 mW
Li	negligible
Ci	negligible

Temperature-switch	
Ui	30 V
Ii	50 mA
Pi	100 mW
Li	negligible
Ci	negligible

Resistance-thermometer PT100	
Ui	30 V
Ii	50 mA
Pi	100 mW
Li	negligible
Ci	negligible

Alternative marking for resistance-thermometer PT100	
Ui	9 V
Ii	22 mA
Li	negligible
Ci	negligible

SPECIFIC CONDITIONS OF USE: YES as shown below:
See “Installation and Operating Instructions” for intrinsic safe values and complete Ex-marking.

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx IBE 17.0020X	Issue No: 1	Certificate history:
Status:	**Current**		Issue No. 1 (2018-01-25)
		Page 1 of 5	Issue No. 0 (2017-08-24)
Date of Issue:	**2018-01-25**		

Applicant: **Bühler Technologies GmbH**
Harkortstrasse 29
40880 Ratingen
Germany

Equipment: **Level-switches type NS 10/G2-2K-VA-ATEX-M12/xxx-SK221, NS 10/G2-XK-VA-ATEX-M12/YYYY-VZZ and NT 61-Z0-ATEX**

Optional accessory:

Type of Protection: **Intrinsic safety**

Marking:

Ex ia IIC T4 Ga

Ex ia IIIC 100°C Da [NS 10/G2-2K-VA-ATEX-M12/xxx-SK221]

new variants: [NS 10/G2-XK-VA-ATEX-M12/YYYY-VZZ]

Ex ia IIIC 70°C Da [NT 61-Z0-ATEX]

Approved for issue on behalf of the IECEx Certification Body: Dipl.-Ing. Alexander Henker

Position: Deputy Head of Certification Body

Signature:
(for printed version)

Date: 2018-01-25

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

IBExU Institut für Sicherheitstechnik GmbH
Certification Body
Fuchsmühlenweg 7
09599 Freiberg
Germany

IECEx Certificate of Conformity

Certificate No:	IECEx IBE 17.0020X	Issue No: 1
Date of Issue:	**2018-01-25**	Page 2 of 5
Manufacturer:	**Bühler Technologies GmbH** Harkortstrasse 29 40880 Ratingen **Germany**	

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-11 : 2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

DE/IBE/ExTR16.0040/00 DE/IBE/ExTR16.0040/01

Quality Assessment Report:

DE/BVS/QAR16.0002/01

IECEx Certificate of Conformity

Certificate No: IECEx IBE 17.0020X Issue No: 1

Date of Issue: **2018-01-25**

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The Level-switches are used as remote tank level indicator. It works with a stainless steel pipe containing reed-switches. The pipe is surrounded by a floater who is equipped with a permanent magnet. That magnet acts to reed-switches that allow a control of tank level.

Parameters of intrinsic safety:

Level-switch	
Ui	30 V
Ii	50 mA
Pi	100 mW
Li	negligible
Ci	negligible
Temperature-switch	
Ui	30 V
Ii	50 mA
Pi	100 mW
Li	negligible
Ci	negligible
Resistance-thermometer PT100	
Ui	30 V
Ii	50 mA
Pi	100 mW
Li	negligible
Ci	negligible

IECEx Certificate of Conformity

Certificate No: IECEx IBE 17.0020X Issue No: 1

Date of Issue: **2018-01-25**

Alternative marking for resistance-thermometer PT100	
Ui	9 V
Ii	22 mA
Li	negligible
Ci	negligible

SPECIFIC CONDITIONS OF USE: YES as shown below:

See "Installation and Operating Instructions" for intrinsic safe values and complete Ex-marking.

IECEx Certificate of Conformity

Certificate No: IECEx IBE 17.0020X Issue No: 1

Date of Issue: **2018-01-25** Page 5 of 5

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

NS-10 only:

- The type designation or type key has been changed and additional placeholders have been added: the length identifier was changed from three digits to four digits and new three-digit variant designation was implemented.
- One or two contacts can be used both as normally closed and normally open contacts in any combination.
- The protective earth conductor (PE) can be connected either via the plug connector or via the screws to the earthed metal container.
- The seal to the container may be provided by the user.

Example:

NS 10/G2-XK-VA-ATEX-M12/YYYY-VZZ

*xxx: indicates length of the immersion pipe in mm

*XK: indicates the number of temperature-switches (1K .. 2K)

*YYYY: length of immersion pipe in mm

*VZZ: indicates the variant-number (V1…V99)

EU-Konformitätserklärung
EU-declaration of conformity

Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte „Geräte" im Sinne der Richtlinie

Herewith declares Bühler Technologies GmbH that the following products are "equipment" according to Directive

2014/34/EU
(ATEX)

In ihrer aktuellen Fassung sind.

in its actual version.

Produkt / product: Niveauschalter für Tankeinbau / *Level switches for tank installation*
Typ / type: NT 61-Z0-Atex

Die Produkte werden entsprechend der derzeitig gültigen Atex-Richtlinie innerhalb der internen Fertigungskontrolle folgendermaßen gekennzeichnet:
The products are marked according to the currently valid Atex directive during internal control of production:

Ex II 1G Ex ia IIC T4 Ga
Ex II 1D Ex ia IIIC T70°C Da

Zum Beurteilen der Konformität des Produkts wurden für die Baumusterprüfbescheinigung zum Zeitpunkt der Ausstellung folgende harmonisierte Normen herangezogen:
To assess the conformity of the product, the following harmonised standards were consulted for the examination certificate at the time of its issuance:

EN 60079-0:2012+A11:2013 **EN 60079-11:2012**

Der Hersteller hat die Anforderungen von EN IEC 60079-0:2019 geprüft und bestätigt, dass das Produkt auch dem neuen harmonisierten Ausgabestand entspricht.
The manufacturer has checked the requirements of EN IEC 60079-0:2019 and confirms that the product also complies with the new harmonised version.

Baumusterprüfbescheinigungs-Nr. | ***Type-examination certificate no.:*** IBExU16ATEX1183 X
Eingeschaltete notifizierte Stelle | ***Engaged notified Body:*** IBExU, Fuchsmühlenweg 7
09599 Freiberg, Germany

Kennummer | ***Identification Number:*** 0637

Eingeschaltete benannte Stelle für das Qualitätssicherungssystem | ***Engaged notified body for the quality assurance system*** DEKRA Testing and Certification GmbH
Dinnendahlstraße 9
44809 Bochum, Germany

Kennummer | ***Identification Number:*** 0158

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.
This declaration of conformity is issued under the sole responsibility of the manufacturer.

Dokumentationsverantwortlicher für diese Konformitätserklärung ist Herr Stefan Eschweiler mit Anschrift am Firmensitz.
The person authorised to compile the technical file is Mr. Stefan Eschweiler located at the company's address.

Ratingen, den 20.04.2023

Stefan Eschweiler
Geschäftsführer – *Managing Director*

Frank Pospiech
Geschäftsführer – *Managing Director*

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen,
Tel. +49 (0) 21 02 / 49 89-0, Fax. +49 (0) 21 02 / 49 89-20
Internet: www.buehler-technologies.com

RMA-Formular und Erklärung über Dekontaminierung
RMA-Form and explanation for decontamination

RMA-Nr./ RMA-No.

Die RMA-Nr. bekommen Sie von Ihrem Ansprechpartner im Vertrieb oder Service. Bei Rücksendung eines Altgeräts zur Entsorgung tragen Sie bitte in das Feld der RMA-Nr. "WEEE" ein./ You may obtain the RMA number from your sales or service representative. When returning an old appliance for disposal, please enter "WEEE" in the RMA number box.

Zu diesem Rücksendeschein gehört eine Dekontaminierungserklärung. Die gesetzlichen Vorschriften schreiben vor, dass Sie uns diese Dekontaminierungserklärung ausgefüllt und unterschrieben zurücksenden müssen. Bitte füllen Sie auch diese im Sinne der Gesundheit unserer Mitarbeiter vollständig aus./ This return form includes a decontamination statement. The law requires you to submit this completed and signed decontamination statement to us. Please complete the entire form, also in the interest of our employee health.

Firma/ Company

Firma/ Company	
Straße/ Street	
PLZ, Ort/ Zip, City	
Land/ Country	

Ansprechpartner/ Person in charge

Name/ Name	
Abt./ Dept.	
Tel./ Phone	
E-Mail	

Gerät/ Device	
Anzahl/ Quantity	
Auftragsnr./ Order No.	

Serien-Nr./ Serial No.	
Artikel-Nr./ Item No.	

Grund der Rücksendung/ Reason for return

- ☐ Kalibrierung/ Calibration
- ☐ Modifikation/ Modification
- ☐ Reklamation/ Claim
- ☐ Reparatur/ Repair
- ☐ Elektroaltgerät/ Waste Electrical & Electronic Equipment (WEEE)
- ☐ andere/ other

bitte spezifizieren/ please specify

Ist das Gerät möglicherweise kontaminiert?/ Could the equipment be contaminated?

☐ Nein, da das Gerät nicht mit gesundheitsgefährdenden Stoffen betrieben wurde./ No, because the device was not operated with hazardous substances.

☐ Nein, da das Gerät ordnungsgemäß gereinigt und dekontaminiert wurde./ No, because the device has been properly cleaned and decontaminated.

☐ Ja, kontaminiert mit:/ Yes, contaminated with:

☐ explosiv/ explosive	☐ entzündlich/ flammable	☐ brandfördernd/ oxidizing	☐ komprimierte Gase/ compressed gases	☐ ätzend/ caustic	☐ giftig, Lebensgefahr/ poisonous, risk of death	☐ gesundheitsgefährdend/ harmful to health	☐ gesundheitsschädlich/ health hazard	☐ umweltgefährdend/ environmental hazard

Bitte Sicherheitsdatenblatt beilegen!/ Please enclose safety data sheet!

Das Gerät wurde gespült mit:/ The equipment was purged with:

Diese Erklärung wurde korrekt und vollständig ausgefüllt und von einer dazu befugten Person unterschrieben. Der Versand der (dekontaminierten) Geräte und Komponenten erfolgt gemäß den gesetzlichen Bestimmungen.

This declaration has been filled out correctly and completely, and signed by an authorized person. The dispatch of the (decontaminated) devices and components takes place according to the legal regulations.

Falls die Ware nicht gereinigt, also kontaminiert bei uns eintrifft, muss die Firma Bühler sich vorbehalten, diese durch einen externen Dienstleister reinigen zu lassen und Ihnen dies in Rechnung zu stellen.

Should the goods not arrive clean, but contaminated, Bühler reserves the right, to comission an external service provider to clean the goods and invoice it to your account.

Firmenstempel/ Company Sign

Datum/ Date

rechtsverbindliche Unterschrift/ Legally binding signature

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen
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Vermeiden von Veränderung und Beschädigung der einzusendenden Baugruppe

Die Analyse defekter Baugruppen ist ein wesentlicher Bestandteil der Qualitätssicherung der Firma Bühler Technologies GmbH. Um eine aussagekräftige Analyse zu gewährleisten muss die Ware möglichst unverändert untersucht werden. Es dürfen keine Veränderungen oder weitere Beschädigungen auftreten, die Ursachen verdecken oder eine Analyse unmöglich machen.

Umgang mit elektrostatisch sensiblen Baugruppen

Bei elektronischen Baugruppen kann es sich um elektrostatisch sensible Baugruppen handeln. Es ist darauf zu achten, diese Baugruppen ESD-gerecht zu behandeln. Nach Möglichkeit sollten die Baugruppen an einem ESD-gerechten Arbeitsplatz getauscht werden. Ist dies nicht möglich sollten ESD-gerechte Maßnahmen beim Austausch getroffen werden. Der Transport darf nur in ESD-gerechten Behältnissen durchgeführt werden. Die Verpackung der Baugruppen muss ESD-konform sein. Verwenden Sie nach Möglichkeit die Verpackung des Ersatzteils oder wählen Sie selber eine ESD-gerechte Verpackung.

Einbau von Ersatzteilen

Beachten Sie beim Einbau des Ersatzteils die gleichen Vorgaben wie oben beschrieben. Achten Sie auf die ordnungsgemäße Montage des Bauteils und aller Komponenten. Versetzen Sie vor der Inbetriebnahme die Verkabelung wieder in den ursprünglichen Zustand. Fragen Sie im Zweifel beim Hersteller nach weiteren Informationen.

Einsenden von Elektroaltgeräten zur Entsorgung

Wollen Sie ein von Bühler Technologies GmbH stammendes Elektroprodukt zur fachgerechten Entsorgung einsenden, dann tragen Sie bitte in das Feld der RMA-Nr. „WEEE“ ein. Legen Sie dem Altgerät die vollständig ausgefüllte Dekontaminierungserklärung für den Transport von außen sichtbar bei. Weitere Informationen zur Entsorgung von Elektroaltgeräten finden Sie auf der Webseite unseres Unternehmens.

Avoiding alterations and damage to the components to be returned

Analysing defective assemblies is an essential part of quality assurance at Bühler Technologies GmbH. To ensure conclusive analysis the goods must be inspected unaltered, if possible. Modifications or other damages which may hide the cause or render it impossible to analyse are prohibited.

Handling electrostatically conductive components

Electronic assemblies may be sensitive to static electricity. Be sure to handle these assemblies in an ESD-safe manner. Where possible, the assembles should be replaced in an ESD-safe location. If unable to do so, take ESD-safe precautions when replacing these. Must be transported in ESD-safe containers. The packaging of the assemblies must be ESD-safe. If possible, use the packaging of the spare part or use ESD-safe packaging.

Fitting of spare parts

Observe the above specifications when installing the spare part. Ensure the part and all components are properly installed. Return the cables to the original state before putting into service. When in doubt, contact the manufacturer for additional information.

Returning old electrical appliances for disposal

If you wish to return an electrical product from Bühler Technologies GmbH for proper disposal, please enter "WEEE" in the RMA number box. Please attach the fully completed decontamination declaration form for transport to the old appliance so that it is visible from the outside. You can find more information on the disposal of old electrical appliances on our company’s website.

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