



Level switch for external mounting

NS 25 AM-Atex



Installation and Operation Instructions

Original instructions





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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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Document information

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1 Introduction

1.1 Intended Use

According to EN 60079-11, the NS 25 AM-Atex series level switch is a simple electrical apparatus without separate voltage source intended for tank-top installation.

With intrinsically safe connection, the level switch may be installed in explosive areas zone 1 and zone 2 (group IIB). It is used to monitor the level inside a tank.

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

Further verify all contents are complete.

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

1.2 Product Description

According to EN 60079-11, NS 25 AM-Atex level switches are simple electrical apparatuses without separate voltage source. When used in explosive areas, they may only be operated on an intrinsically safe electric circuit (observe requirements of these instructions and EN 60079-14, as well as technical specifications). The level switches can be used to monitor the level inside a tank. In this case, the measuring tube is located outside the tank. Adjustable height level contacts (bistable reed switches) are mounted on the scale plate.

The level contacts are activated by a magnet inside the level switch float. Every level switch also has a display. The display has a scale and, like the unit, is made from stainless steel.

The level switches are mounted to the tank with screws and level switch flange.

1.3 Scope of Delivery

- Level switch
- Product documentation
- Connection/mounting accessories (optional)

1.4 Ordering Instructions

When ordering, always specify the measurement L1 and the number and type of contacts!

Model	NS 25/15 AM-Atex	NS 25/25 AM-Atex
Item no.:	2001999A	2003999A

1.5 Type plate

Example:

Manufacturer and address	→	Bühler Technologies GmbH Harkortstr. 29 D-40880 Ratingen
Model designation	→	TÖA-80-Atex-M3
Order no.+Item no.+Metre	→	1140899A KW: 37-2017 001
Controller values	→	⊕ Ui=30V, li= 50mA simple apparatus
Temperature specifications	→	T Medium < 80°C, -20°C < Ta < 100°C
Pressure specifications	→	p max. = 15 bar
Year of manufacture	→	Read manual! Year: 2017

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 EN 60079-14 and 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.
- Operation in Ex atmosphere prohibited.

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. They must be stored in a covered, dry, vibration- and dust-free location at a temperature between -20 °C to +60 °C.

4 Installation and connection

4.1 Installation

The level switch mounts to the outside of the tank with the flanges. Ensure all seals are large enough to prevent cross-section constriction in the connection fitting. All screws must be tightened to the same torque. The float is preinstalled in the level switch.

4.2 Electrical connections (intrinsically safe)

DANGER

Electrical voltage

Electrocution hazard.



- a) Disconnect the device from power supply.
- b) Make sure that the equipment cannot be reconnected to mains unintentionally.
- c) The device must be opened by trained staff only.
- d) Regard correct mains voltage.



Please refer to the compatibility charts in the appendix or the data sheet of your level switch for the pin assignment and electrical data of your level switch. It connects with plugs.

Please note, the level switch must be connected to the earthed tank via the existing external PA connection.

4.2.1 Intrinsically-safe connection

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 be 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. EN 60079-11 and EN 60079-14, when installing and operating intrinsically-safe equipment.

According to EN 60079-14, the level contacts must be operated on an **intrinsically safe electric circuit**. On a separate intrinsically safe electric circuit, the switching parameters of the level contact are **$U_i \leq 30 \text{ V}$, $I_i \leq 50 \text{ mA}$** .

When operating several level contacts on the same electric circuit, the switching values apply to the entire electric circuit. Adding the switching values based on the number of level contacts on an electric circuit is not permitted and presents an explosion hazard.

4.2.2 PA connection (potential equalisation)

CAUTION



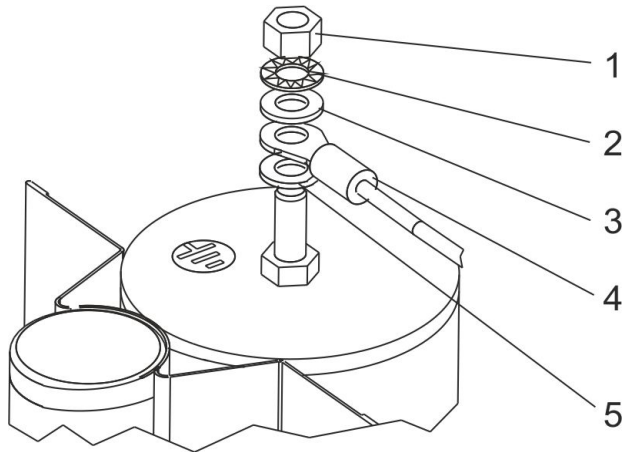
Electrostatic charge

Level switch housings must be connected to the tank via external PA connection!
 Ensure the level switch is adequately earthed (minimum conductor cross-section 4 mm²).
 Please also particularly observe the requirements of EN 60079-14.



The level switch has a separate PA connection. This is identified by the decal shown on the right. A PA cable is connected with an M5 thread. The PA cable for potential equalisation between the level switch and the tank is not included and must be supplied and installed by the customer.

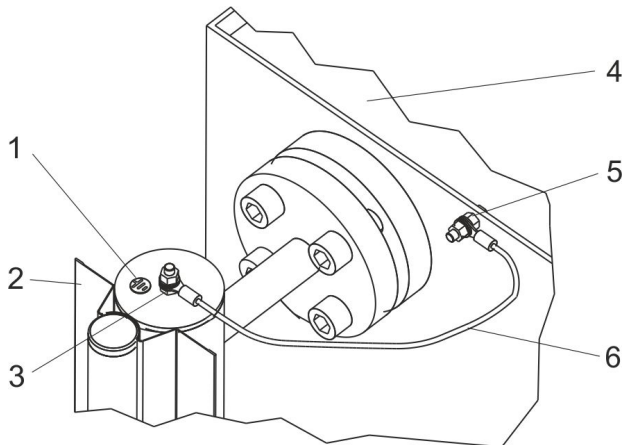
Layout of the PA connection:



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

PA connection example:

Drawing A



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

4.3 Information on the correct operation of reed contacts in Bühler level switches

Based on their construction, reed contacts are very long lasting and reliable components. Yet the following should be considered when using them:

Life of reed switches

The life of reed switches can be up to 10^9 cycles. It is reduced by excess loads.

It's therefore important to ensure NEVER to exceed one or several of the maximum approved limits, even temporarily. Since it is a component on an intrinsically safe electric circuit, this is not permissible for explosion protection reasons and more. Using test lamps when installing the devices is also prohibited, as these can temporarily allow too much current to flow, which can damage the reed contacts. In this case non-volatile testing equipment should always be used.

Voltages and currents

All Bühler level contacts with reed switch can switch minimal Switching voltages of 10 μ V and minimal switching currents of 1 μ A.

On a separate intrinsically safe electric circuit, the switching parameters of the level contact are $U_i \leq 30$ V, $I_i \leq 50$ mA.

Contact material

All reed switches in Bühler level contacts use rhodium as the contact material for the actual contact areas.

Magnetic fields

Avoid external magnetic fields, including from electric motors. These can interfere with the function of the reed switches.

Mechanical loads

Do not expose the level switch to strong blows or bending.

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 be 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. EN 60079-11 and 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 temperature switch/sensor is connected intrinsically-safe (proof of intrinsic safety e.g. according to EN 60079-14),
- No parts have been removed from the temperature switch/sensor,
- 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 EN 60079-14 are met,
- The earth is proper and functional.

Inside the float of the 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 electric signals used to display the liquid level.

The level contacts (type MKS) are mounted directly to the scale plate with variable height adjustment. They can monitor minute level changes by mounting a solenoid switch on the left and right on the scale plate.

The level contacts are available as change-over (MKS-1/W), NO/NC (MKS-1/K) or with one NO/NC contact each (MKS-2/K).

Please note the technical specifications for the level switches and the connection diagrams at the end of this manual. Also be sure to observe the warnings in these instructions.

6 Cleaning and Maintenance

During maintenance, remember:

- The equipment must be maintained by a professional familiar with the safety requirements and risks.
- Only perform maintenance work described in these operating and installation instructions.
- When performing maintenance of any type, observe the respective safety and operation regulations.
- 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.
- Only perform maintenance and cleaning when there is no explosive atmosphere or outside the explosive area.

Inadequate filtration may cause sludge deposit in the system. In this case the level switch must be inspected. Proceed as follows:

- Shut down and depressurise the system/component.
- Drain the liquid according to environmental regulations.
- On level switches with shut-off, close the shut-off. In this case you will not need to drain all of the liquid.
- Open the bleed valve on the level switch and open the lower flange or hexagon cap. Collect the liquid (place a drain tray under it!).
- Clean the float and the float chamber.
- Reinstall the float the in the correct direction (check with a piece of iron: magnet above the liquid level) and close the level switch with the flange or the caps.
- Open the check valves and start the level switch.
- Dispose of the collected liquid according to local regulations.

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 Accessories

Flange seal	25/15	25/25
Model	Ø 45/ Ø 22x2	Ø 68/ Ø 27x2
Item no.	2251000	2252000
Set of retaining screws with nuts	25/15	25/25
Model	8x) DIN931-M12x80	8x) DIN931-M12x80
Item no.	2272999	2272999
Switch amplifier	25/15	25/25
Type, item no.	see data sheet no. 180003	see data sheet no. 180003

8 Disposal

Dispose of parts so as not to endanger the health or environment. Follow the laws in the country of use for disposing of electronic components and devices during disposal.

9 Appendices

9.1 Technical Data

Technical Data

Max. operating pressure	25 bar
Ambient temperature:	-20 °C to +100 °C
spec. fluid weight for float SK 661	$\geq 0.85 \text{ kg/dm}^3$

Material

Float SK661	1.4571
Riser	1.4571
Flanges	S355 galvanised
Sight glass	PC

Dimensions (in mm)

NS...AM-Atex	25/15	25/25
Connecting flange (DIN 2656)	DN 15	DN 25
$\varnothing D$	95	115
$\varnothing k$	65	85
$\varnothing d$	14	14
b	16	18
$\varnothing A$	45	68
h	12	14
L max.	3000	3000
S for float, type: SK 661	205	205
Weight at L1=500 mm	9.5 kg	10.5 kg

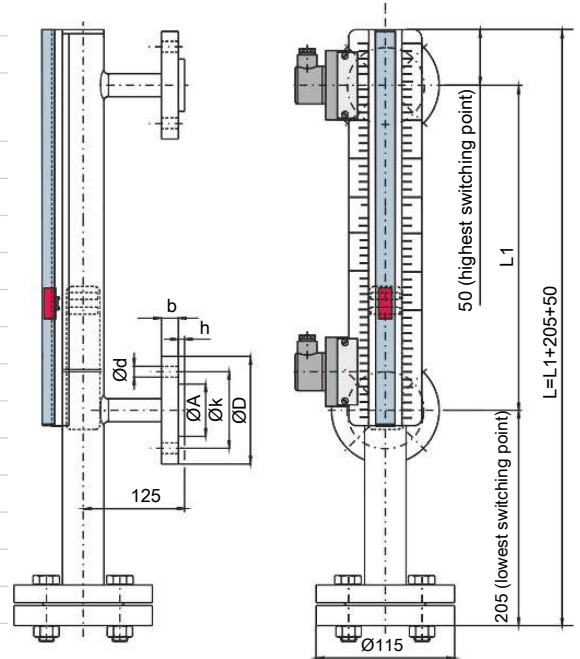
MKS contacts

P_i	100 mW
U_i	30 V
I_i	50 mA
$L_i; C_i$	Negligible

The device is suitable for use in ATEX category II 2 G Ex ib IIB T4 Gb.

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

Dimensions

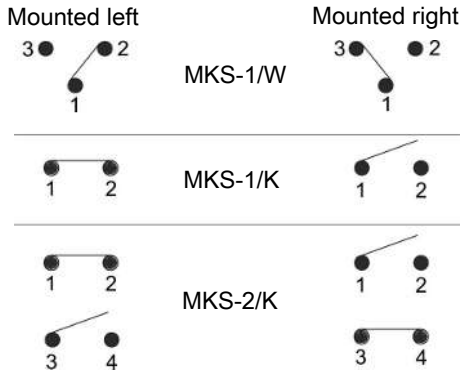


9.2 Contacts

Model	MKS-1/K	MKS-2/K	MKS-1/W
Contact type (bi-stable)	NC contact/NO contact	NC contact/NO contact	NO contact
Connector	3-pin + PE DIN 43650 (M3)	6-pin + PE DIN 43651 (S6)	3-pin + PE DIN 43650 (M3)
IP rating	IP65	IP65	IP65
Item no.	2888999A	2891999A	2889999A

For applications in high shock and vibration environments we recommend using the contacts MKS-1/K and MKS-2K.

Contact position (tank empty)



10 Attached documents

- Manufacturer declaration: HX200001
- RMA - Decontamination Statement

Herstellereklärung Manufacturer Declaration



der Firma Bühler Technologies GmbH nach
EN 60079-11 Abschn. 5.7 „Einfache elektrische
Betriebsmittel“.

by Bühler Technologies GmbH pursuant to
EN 60079-11 Section 5.7 "Simple apparatus".

Produkt / products: Niveauschalter für Außenmontage/ Level switch for external mounting
Typ / type: NS25/15 AM-Atex, NS 25/25 AM-Atex

Zusätzliche Angaben/additional details:

Die Erklärung gilt für alle Exemplare, die nach den beim Hersteller hinterlegten Fertigungsunterlagen – die Bestandteil dieser Erklärung sind - hergestellt wurden.

Bei den Niveauschaltern NS25/15 AM-Atex und NS 25/25 AM-Atex handelt es sich nach EN 60079-11 um einfache elektrische Betriebsmittel ohne eigene Zündquelle, welche für die Tank-Außenmontage bestimmt sind. Gemäß den Anforderungen dieser Norm wird dieses Betriebsmittel keiner Typprüfung und keiner Kennzeichnung nach Richtlinie **2014/34/EU (Atex)** unterworfen.

Bei eigensicherem Anschluss können sie im explosionsgefährdeten Bereich der Zonen 1 (Gruppe IIB) installiert werden. Eine vergleichbare ATEX-Kennzeichnung lautet: II 2G Ex ib IIB T4 Gb.

Die Betriebsmittel dürfen nur durch Fachpersonal installiert werden; die einschlägigen Sicherheitsvorschriften

(z.B. EN 60079-14) sind zwingend zu beachten.

This declaration is valid for all devices manufactured according to the design and manufacturing specifications of the manufacturer. These specifications are part of this declaration.

*Level switches NS25/15 AM-Atex and NS 25/25 AM-Atex are simple apparatuses according to EN 60079-11 made for mounting outside a reservoir. In accordance with the requirements of this standard, this equipment is not subject to type approval or marking pursuant to directive **2014/34/EU (Atex)**.*

In case of intrinsically safe connection they can be used in Zone 1 (group IIB) of Ex-areas. A comparable ATEX marking is: II 2G ex ib IIB T4 Gb.

The equipment has to be installed by trained personnel. All safety regulations have to be fulfilled (e.g. EN 60079-14).

Beschaltungswerte der einfachen elektrischen Betriebsmittel/Parameters of the simple apparatuses:

$U_i \leq 30 \text{ V}$
 $I_i \leq 50 \text{ mA}$
 C_i, L_i vernachlässigbar/negligible

Zur Beurteilung der Konformität gemäß Atex-Richtlinie wurden folgende harmonisierte Normen herangezogen:

For the assessment of conformity according to the Atex directive the following standards have been used:

EN 60079-11:2012

EN 60079-0:2012 + A11:2013


EN ISO 80079-36:2016

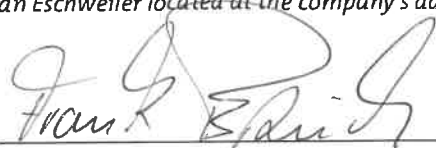
Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.
This declaration of conformity is issued under the sole responsibility of the manufacturer.

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 14.10.2020


Stefan Eschweiler
Geschäftsführer – Managing Director


Frank Pospiech
Geschäftsführer – Managing Director

HX 20 0001

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RMA-Formular und Erklärung über Dekontaminierung

RMA-Form and explanation for decontamination



RMA-Nr./ RMA-No.

Die RMA-Nummer bekommen Sie von Ihrem Ansprechpartner im Vertrieb oder Service./ You may obtain the RMA number from your sales or service representative.

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

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

Grund der Rücksendung/ Reason for return

- Kalibrierung/ Calibration Modifikation/ Modification
 Reklamation/ Claim Reparatur/ Repair
 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



gesundheitsge-
fährdend/
harmful to
health



gesund-
heitschädlich/
health hazard



umweltge-
fährdend/
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 commission an external service provider to clean the goods and invoice it to your account.

Firmenstempel/ Company Sign

Datum/ Date

rechtsverbindliche Unterschrift/ Legally binding signature



Die Analyse defekter Baugruppen ist ein wesentlicher Bestandteil der Qualitätssicherung der Firma Bühler Technologies.

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.

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.

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.

Analysing defective assemblies is an essential part of quality assurance at Bühler Technologies.

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.

Electronic assemblies may be sensitive to static electricity. Be sure to handle these assemblies in an ESD-safe manner. Where possible, the assemblies 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.

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.

