Fluidcontrol

Level switch

Nivotemp 61-0-WW

Installation and Operation Instructions

Original instructions

BE100007
05/2022

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

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
E-Mail: fluidcontrol@buehler-technologies.com

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.

Document information
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Contents

1 Introduction

1.1 Intended Use

The level switches in the Nivotemp 61-0-WW series are used to monitor fill levels in tanks. These level switches are designed to be installed on tank tops. The liquid level can be read on the scale. Up to four switching contacts or a Reed-contact also enable electronic liquid level monitoring.

Different versions also allow for use in aggressive mediums.

Please note the technical data in the appendix for the specific intended use, existing material combinations, as well as temperature limits.

WARNING

All device models are solely intended for industrial applications. They are **not safety components**. The devices must not be used if failure or malfunction thereof jeopardises the safety and health of persons.
Use in explosive areas is **prohibited**.

1.2 Functionality

1.2.1 Liquid level monitoring

The measuring tube is located inside the tank. The contacts are located inside the measuring tube. These are activated by a magnet inside the level switch float.

The level contacts are mounted to a perforated rail spaced as specified in the purchase order, but can be moved if necessary. The contact for the water alarm is fixed in the lowest position and must not be adjusted.

1.3 Ordering instructions

Base version (without level and water alarm contacts)

Item no.	Description	Plug	Total length
10 30 099	Nivotemp 61-0-WW-S6-*Level contacts/water alarm contact*	S6	L (max. 1350 mm)
10 30 799	Nivotemp 61-0-WW-2xM12-*Level contacts/water alarm contact*	2xM12	L (max. 1350 mm)
10 30 899	Nivotemp 61-0-WW-C6F-*Level contacts/water alarm contact*	C6F	L (max. 1350 mm)

Item no.	Description	Number of contacts	Type	Spacing
18 89 999	Level contact K10	See plug connection table	NC/NO	L1 (, L2, L3, L4)
18 90 999	Level contact W11	See plug connection table	Changeover contact	L1 (, L2, L3, L4)
18 50 999	Water alarm contact K6	1	NC/NO	solid
18 49 999	Water alarm contact W7	1	Changeover contact	solid

Accessories:

Item no.	Description
10 30 0991	Collecting basin (with G3/4 connection, including plug), dimensions ø70/2.6 x height = 133 mm

1.4 Scope of Delivery

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

2 Safety instructions

2.1 Important advice

Operation of the device is only permitted if:

- the product is used under the conditions described in the installation- and operation instruction, the intended application according to the type plate and the intended use. In case of unauthorized modifications done by the user Bühler Technologies GmbH can not be held responsible for any damage,
- when complying with the specifications and markings on the nameplates.
- the performance limits given in the datasheets and in the installation- and operation instruction are obeyed,
- monitoring devices and safety devices are installed properly,
- service and repair is carried out by Bühler Technologies GmbH,
- only original spare parts are used.

This manual is part of the equipment. The manufacturer keeps the right to modify specifications without advanced notice. Keep this manual for later use.

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		Wear respiratory equipment
	Warns not to inhale toxic gasses		Wear a safety mask
	Warns of corrosive liquids		Wear gloves
	High pressure warning		

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 Setup and connection

DANGER **Electric voltage**

Risk of electric shock

a) De-energise the system.

b) The equipment may only be installed, maintained and put into operation by instructed, competent personnel.

c) Always observe the applicable safety regulations for the operating site.

DANGER **Toxic, acidic gases/liquids**

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

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.

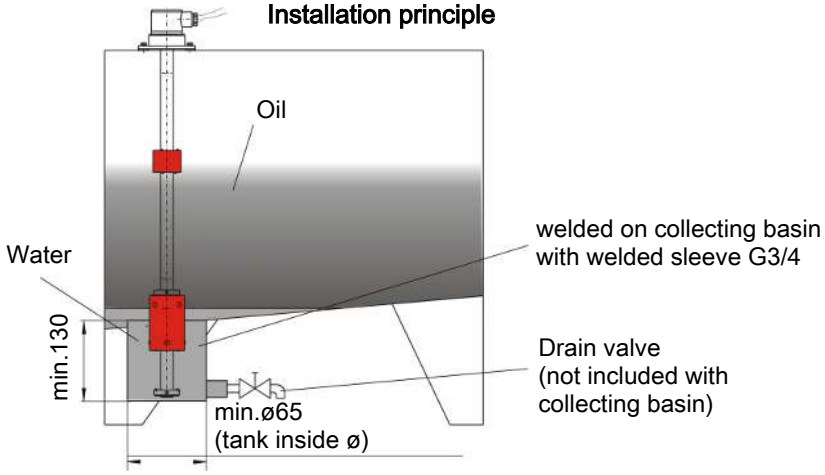
Therefore slide the float for the level switch along the level switch tube from below immediately before installation.

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

The level switches come fully assembled and can be mounted to the tank using the included screws and seals. Please be sure the floats can move freely and to have enough space between the tank wall and add-ons.

This is particularly important for the bottom water alarm float when inserted in the collecting basin (optional) (also see installation principle). In this case, be sure to tighten the screws evenly so the level switch is not tilted (resulting in the bottom float tilting in the basin and not working).

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

The device must be installed by an authorised 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.

Please refer to the compatibility charts in the appendix for the pin assignment and the electrical data. Proceed as follows: Select the plug type, contact type and number of contacts (per your order).

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. This is reduces by high stress and / or incorrect or the absence of protective circuits when switching inductive, capacitive or lamp loads.

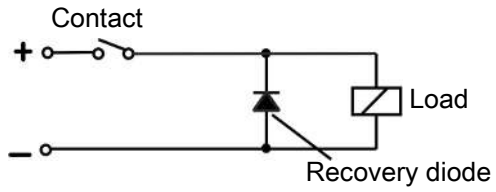
It's therefore important to ensure NEVER to exceed one or several of the maximum approved limits, even temporarily, and to install a contact protective circuit for loads which are not purely ohmic. Using test lamps when installing the devices is also prohibited, as these can temporarily allow too much current to flow, which can damage the reed contacts. In this case non-volatile testing equipment should always be used.

Contact protective circuits for reed switches

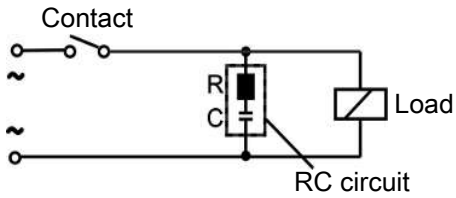
For direct current voltage a recovery diode per figure A must be connected parallel to the contact.

For alternating current voltage an RC circuit per Figure B and Table 1 must be connected parallel to the contact.

A



B



Load in VA	10		25		50	
Voltage at contact V	R/Ohm	C/µF	R/Ohm	C/µF	R/Ohm	C/µF
24	22	0.022	1	0.1	1	0.47
60	120	0.0047	22	0.022	1	0.1
110	470	0.001	120	0.0047	22	0.022
230	470	0.001	470	0.001	120	0.0047

Please note the max. voltage/load ratings of the respective level contacts!

Voltages and currents

All Bühler level contacts with reed switch can switch minimal Switching voltages of 10 µV and minimal switching currents of 1 µA.

The maximum values specified for the respective contact types apply.

Level contact with reed switches can therefore be used for SPS applications as well as for high loads (within the maximum limits) without hesitation.

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.

4.4 Adjusting the level contacts

The measurement contacts are mounted on a perforated rail inside the protective tube. These are arranged per order specifications but can be moved if necessary.

NOTICE

The water alarm contact is fixed to a specific measurement and cannot be adjusted!

Depending on the model, the perforated rail will also have electronic assemblies. These are positioned so they do not limit the setting range of the contacts. Please be sure not to damage the assemblies during installation or removal.

For devices with 230 V mains voltage:

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.

WARNING

Fluids or gasses discharged at high pressure harmful to the environment or health

a) Depressurise the system/component prior to installation.

b) Drain the system/component in accordance with environmental regulations. Wear suitable protective clothing.

– Disconnect the voltage supply.
– Loosen plug connections and connections!
– Unscrew the plug base.
– Carefully pull the perforated rail with contacts out the top.

NOTICE

On versions with earth wire, this is run as a loop and soldered to the protective tube from the inside in the insertion direction. To prevent breaking off the earth wire it should not be pulled all the way out.

– Mark the original contact position.
– Lock the contacts in place in the desired positions. Please note the minimum spacing!

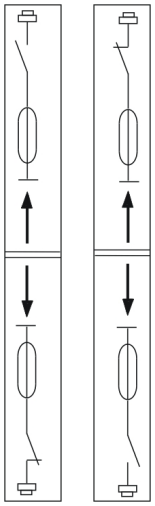
We recommend marking the original contact position for checking purposes. The contacts can then be locked into place in the desired position on the perforated rail. The contacts are installed as NO, NC or changeover based on the order. Since these are bistable contacts, the contact function of the NO or NC contact can later be changed. To do so, simply turn the contacts 180°.

The contact symbols for NO and NC are marked on the housing. Below the respective symbol you will also see an arrow. The arrow, which points up when installed, indicates the respective contact function (see drawing).

NO contact function
with rising level

i.e.

NC contact function
with falling level



NC contact function
with rising level

i.e.

NO contact function
with falling level

The contact logic assumes the level switch is installed in an empty tank, i.e. it is only in the operating position once filled.

After positioning the contacts, slide the perforated rail back into the protective tube. Please route the additional cable lengths required to move the contacts as a loop and insert along with the perforated rail.

If the loop for the earth lead was removed from the protective tube, first insert this lead again, then slide in the perforated rail.

Unscrew the plug base

NOTICE

Ensure the seals are positioned correctly. Replace defective seals immediately!

5 Operation and control

NOTICE

The device must not be operated beyond its specifications.

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.

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.

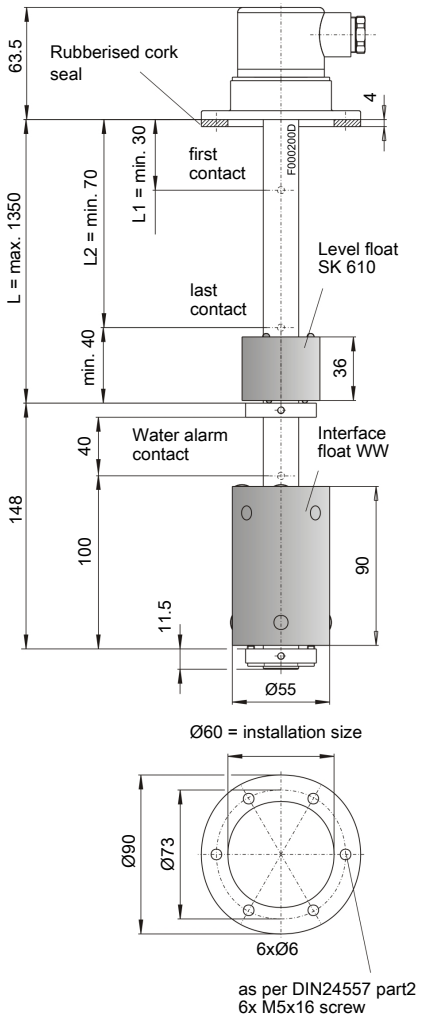
9 Appendices

9.1 Technical Data

Base unit				
Operating pressure	max. 1 bar			
Operating temperature	max. 80 °C			
Fluid density	min. 0.8 kg/dm³			
Oil density	max. 0.86 kg/dm³			
Material/Version				
Float SK 610 (level)	Hard PU			
Float WW (water alarm)	PPH			
Switching tube	MS			
Flange	PA 6			
Weight at L=500 mm	750 g			
Includes: Mounting screws (quantity 6) and rubberised cork seal.				
Level contacts	**K10**	**W11**	**-**	**-**
Water alarm contacts	**-**	**-**	**K6**	**W7**
Function	NC/NO*	Changeover contact	NC/NO*	Changeover contact
Voltage max.	230 V AC/DC	48 V AC/DC	230 V AC/DC	230 V AC/DC
Max. switching current	0.5 A	0.5 A	1 A	1 A
Contact load max.	10 VA	20 VA	50 VA	40 VA
Min. contact spacing	40 mm	40 mm	fixed	fixed

*NC= NC contact/NO = NO contact
All data with empty tank

Dimensions (mm)



9.2 Selecting the pin assignment

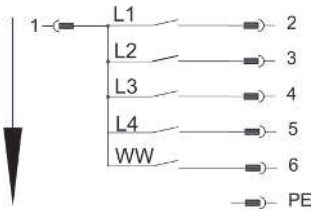
Read the contacts top to bottom with respect to the length, see example:

L1 = level contact no. 1

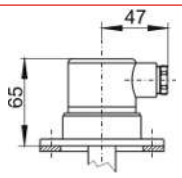
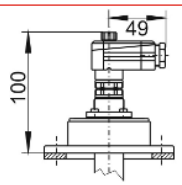
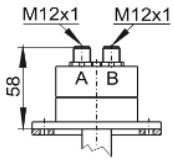
L2 = level contact no. 2

etc.

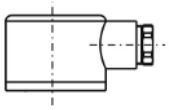
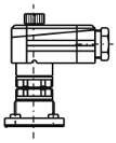
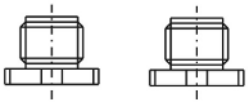
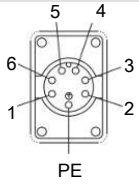
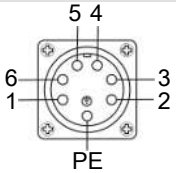
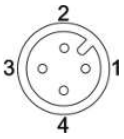
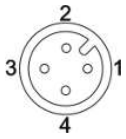
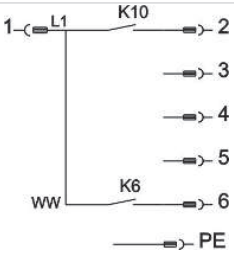
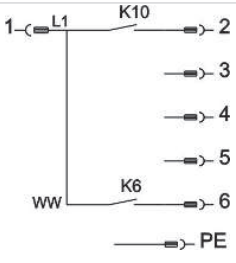
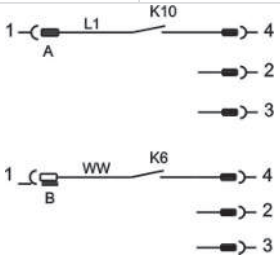
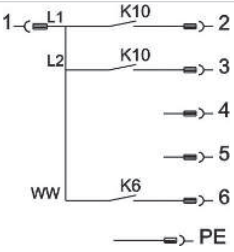
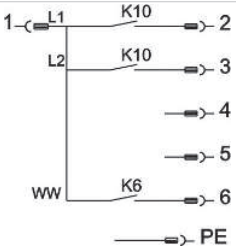
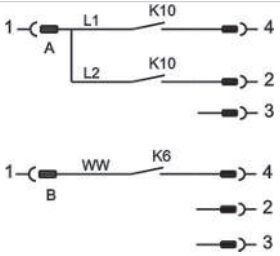
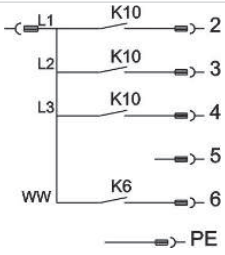
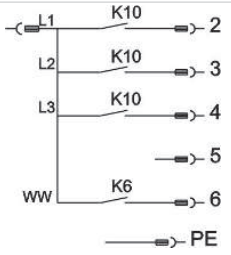
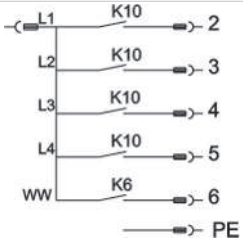
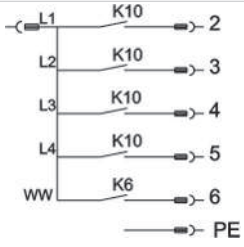
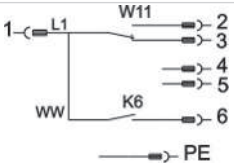
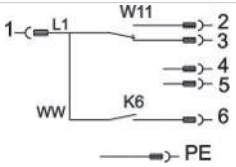
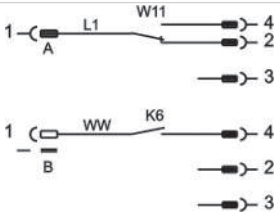
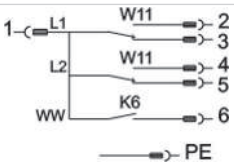
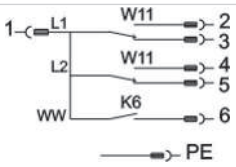
WW = water alarm

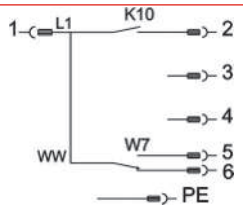
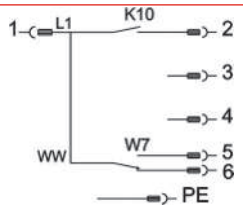
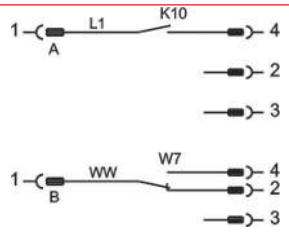
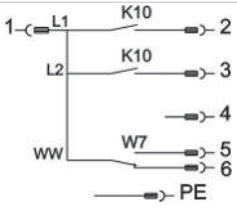
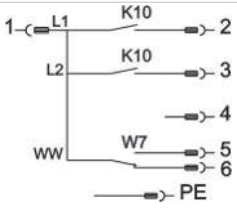
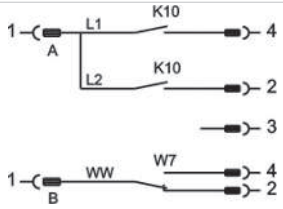
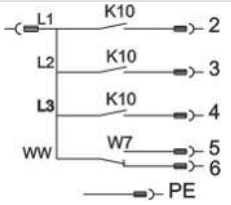
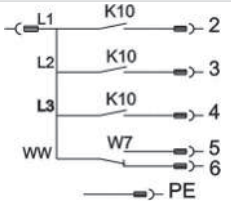
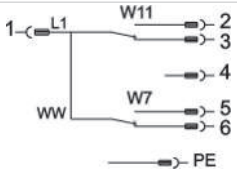
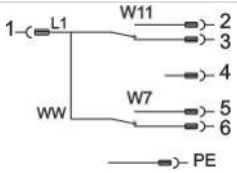
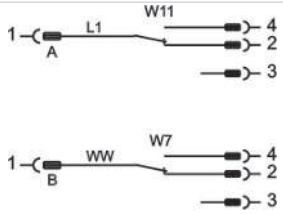


9.3 Standard pin assignment

Connector	S6	C6F circular connector	2xM12 plug A coded
Dimensions			
Number of poles	6-pin + PE	6-pin + PE	4 pin/4 pin
DIN EN	175201-804	175301-804	61076-2-101
Voltage max.	230 V AC/DC*	230 V AC/DC*	24 V DC
IP rating	IP65	IP65	IP67**
Cable fitting	M20x1.5	PG 11	PG7**
Max. Number of contacts	4xK10 + 1xK6 2xW11 + 1xK6 3xK10 + 1xW7 1xW11 + 1xW7	4xK10 + 1xK6 2xW11 + 1xK6 3xK10 + 1xW7 1xW11 + 1xW7	2xK10 + 1xK6 1xW11 + 1xK6 2xK10 + 1xW7 1xW11 + 1xW7

*max. 48 V AC/V DC for change-over contact. **with IP 67 cable box attached. Other connectors available upon request.

Connector	S6	C6F	2 x M12 (base)
Plug			
Connection schematic			Plug A  Plug B 
1x K10 level contact and 1x K6 water alarm contact			
2x K10 level contacts and 1x K6 water alarm contact			
3x K10 level contacts and 1x K6 water alarm contact			
4x K10 level contacts and 1x K6 water alarm contact			
1x W11 level contact and 1x K6 water alarm contact			
2x W11 level contacts and 1x K6 water alarm contact			

Connector	S6	C6F	2 x M12 (base)
1x K10 level contact and 1x W7 water alarm contact			
2x K10 level contacts and 1x W7 water alarm contact			
3x K10 level contacts and 1x W7 water alarm contact			
1x W11 level contact and 1x W7 water alarm contact			

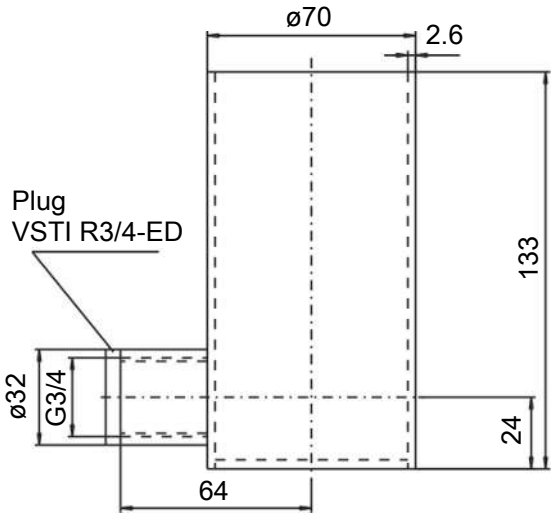
K10 contacts (NC/NO*) and W11 (change-over) are the level contacts.

K6 (NC/NO*) and W7 (change-over) are the water alarm contacts.

*NC=NC contact, NO=NO contact.

9.4 Collecting basin dimensions (optional)

Collecting basin made from St52-3 (with G3/4 connection, includes plug), item no. 10300991



10 Attached documents

- Declaration of Conformity KX100023
- RMA - Decontamination Statement

EU-Konformitätserklärung
EU-declaration of conformity

Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte den wesentlichen Anforderungen der Richtlinie

Herewith declares Bühler Technologies GmbH that the following products correspond to the essential requirements of Directive

2014/35/EU
(Niederspannungsrichtlinie / *low voltage directive*)

in ihrer aktuellen Fassung entsprechen.

in its actual version.

Folgende Richtlinie wurde berücksichtigt:

The following directive was regarded:

2014/30/EU (EMV/EMC)

Produkt / products: Niveauschalter und -geber / *Level switches and gauges*
Typ / type: Nivotemp 61, 61-WW, M
Nivovent 71

Die Betriebsmittel dienen zur Überwachung des Füllstandes und der Temperatur in Tanks für Fluidsysteme.
The equipment is intended for monitoring the liquid level and the temperature in tanks for fluid systems.

Das oben beschriebene Produkt der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:
The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

EN 61010-1:2010 **EN 61326-1:2013**

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 authorized to compile the technical file is Mr. Stefan Eschweiler located at the company's address.

Ratingen, den 20.04.2016

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-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

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
- ☐ 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

Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen
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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 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.

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.

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