



## Level- and temperature sensor

### Nivotemp NT M-L

# Installation and Operation Instructions

Original instructions





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](http://www.buehler-technologies.com)  
E-Mail: [fluidcontrol@buehler-technologies.com](mailto: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.

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Document information

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# 1 Introduction

## 1.1 Intended Use

Level sensors are used to monitor the liquid level and temperature in fluid systems. Level sensors must not be used 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. If necessary, filter the medium.

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 reed-contact is located inside the measuring tube.

Simply put, the reed-contact works the same as a regular resistance potentiometer. The reed-contact consists of a number of reed switches along with resistors connected in series. The total length of the chain varies by the path being monitored.

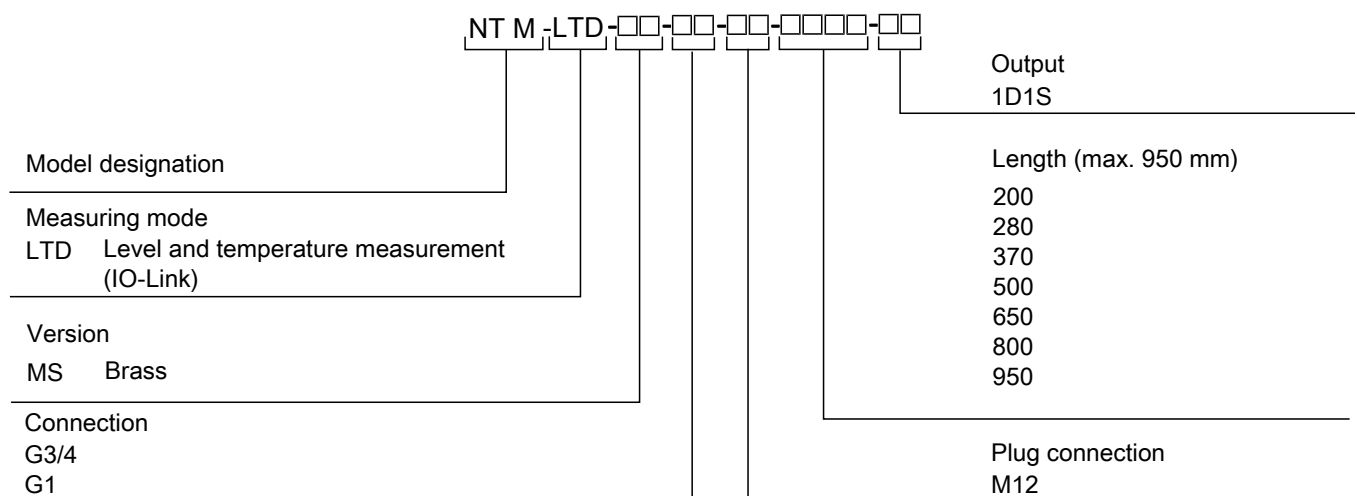
If a magnet inside a float trips the reed switch, a resistance signal proportional to the position of the float will be output. When the float changes positions, resistances are more or less activated and the resistance signal altered based on the position of the float. The resistance signal is analysed by the built-in electronics and output via the IO-Link interface.

### 1.2.2 Temperature monitor

The temperature is monitored by a temperature sensor (Pt100) located at the bottom end of the Reed-contact. The temperature signal is analysed by the built-in electronics and output via the IO-Link interface.

Please note the technical data in the appendix.

## 1.3 Model key



## 1.4 Scope of Delivery

- Level sensor
- 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

<b>DANGER</b>	Signal word for an imminent danger with high risk, resulting in severe injuries or death if not avoided.
<b>WARNING</b>	Signal word for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.
<b>CAUTION</b>	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.
<b>NOTICE</b>	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 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 Setup and connection

**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

The level switch comes fully assembled and can be mounted to the tank using the screw-in thread. 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

Electricity is supplied via plug connectors. Please refer to the appendix for installation dimensions, nominal voltage and plug configuration.

The switching outputs are PNP transistors.

The level- and temperature sensor is powered with 18 - 30 V direct voltage. The sensor connects with a cable and standard M12 plug-in connectors.



## 5 Operation and control

### NOTICE



The device must not be operated beyond its specifications.

### Version with IO-Link interface

This unit is equipped with an IO-Link interface, which require an IO-Link master.

The IO-Link interface allows direct access to process and diagnostics data, and allows configuring the unit during operation.

The IODDs required to configure the unit is available at <https://ioddfinder.io-link.com/>.

If the IO-Link interface is not being used (no master or only used to parametrise), the level- and temperature sensor functions as a regular level- and temperature sensor with 2 switching outputs. The default parameters and switching function of the switching outputs, however, can be parametrised via IO-Link master.

**For more information please visit:** [www.io-link.com](http://www.io-link.com)



## **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

#### 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**

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 NT M-L

#### Basic unit

Version	MS
Operating pressure:	max. 1 bar
Medium temperature:	-20 °C to +80 °C
Ambient temperature:	-20 °C to +70 °C
Float:	SK 161
Min. fluid density:	0.8 kg/dm <sup>3</sup>
Lengths (all versions):	200, 280, 370, 500, 650, 800 and 950 mm

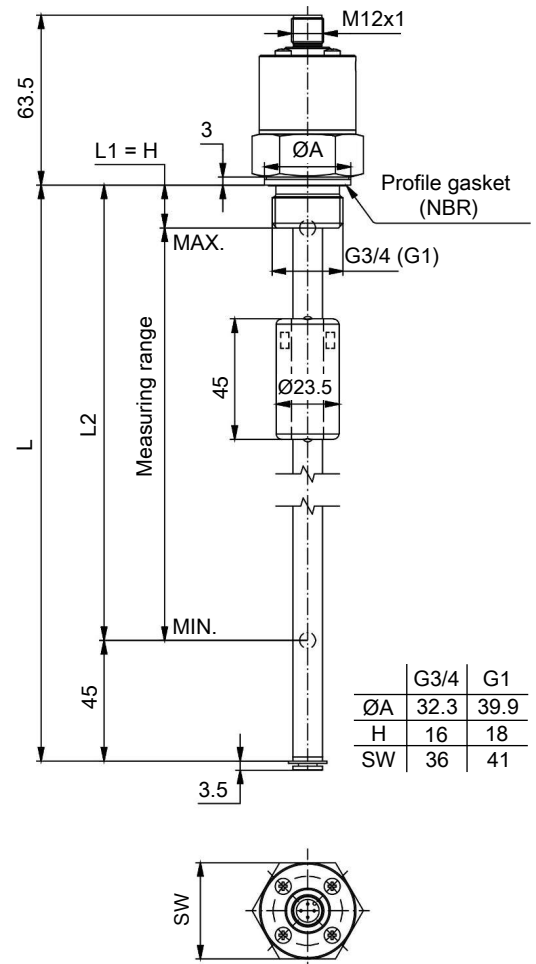
#### Material/Version

Float:	NBR
Immersion tube:	Brass
Flange G3/4:	Brass
Flange G1:	Brass
Seals:	NBR/FKM
Weight at L=500 mm:	G3/4 = approx. 300 g, G1 = approx. 390 g

Input values	Level	Temperature
Measuring principle:	Reed-contact	Pt100 Cl. B, DIN EN 60751
Resolution:	10 mm	
Tolerance:		± 0.8 °C
Operating voltage:	18 - 30 VDC	
Analysis display electronics accuracy:	± 1 % from end value	± 1 % from end value
Measuring range	0 to 100 %	-20 °C to +120 °C

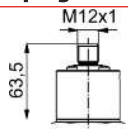
IO-Link	Revision 1.1
Baud rate:	COM3 (230.4 k)
SIO Mode:	Yes
min. time period:	10 ms

#### Dimensions

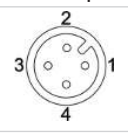


## 9.2 Standard Pin Assignment NT M-L

### Connector

	<b>M12 plug A coded</b>
Dimensions	
Number of pins	4-pin
DIN EN	61076-2-101
IP rating	IP67*

\*with IP67 cable box attached

<b>Version</b>	<b>LTD-1D1S</b>
Plug	M12 4-pin
Connection schematic	
<b>Pin</b>	
1	+24VDC
2	S2 (PNP max. 200 mA)
3	GND
4	C/Q (IO-Link)

## **10 Attached documents**

- Declaration of conformity: KX100033
- 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*

**2014/30/EU (EMV/EMC)**

in ihrer aktuellen Fassung entsprechen.

*in its actual version.*

Folgende Richtlinie wurde berücksichtigt:

*The following directive was regarded:*

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

**Produkt / products:** Niveau- und Temperatursensoren / *Level and temperature sensors*  
**Typ / type:** NT 63-LTD, NT M-LTD

Die Betriebsmittel dienen zur Überwachung des Füllstandes und der Temperatur in Fluidsystemen.  
*The equipment is intended for monitoring the liquid level and the temperature in 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 61326-1:2013**

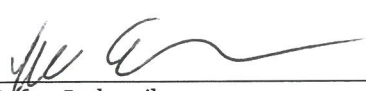
Zusätzlich wurden berücksichtigt:  
*In addition, the following standards have been used:*

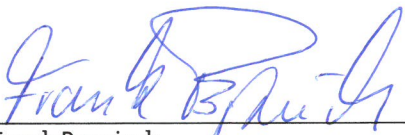
**EN 61010-1:2010**

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 21.01.2019

  
Stefan Eschweiler  
Geschäftsführer – *Managing Director*

  
Frank Pospiech  
Geschäftsführer – *Managing Director*



# 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.*

