



## Level switch

## Nivotemp NT-EL

# Installation and Operation Instructions

Original instructions



1800-OILSOL  
1800-645765

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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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# 1 Introduction

## 1.1 Intended Use

Level switches are used to monitor the liquid level and temperature in fluid systems. Level switches 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 level switches are located inside the measuring tube. These are activated by a magnet inside the level switch float.

The contacts are soldered to the board, spaced as specified in the purchase order.

### 1.2.2 Temperature monitor

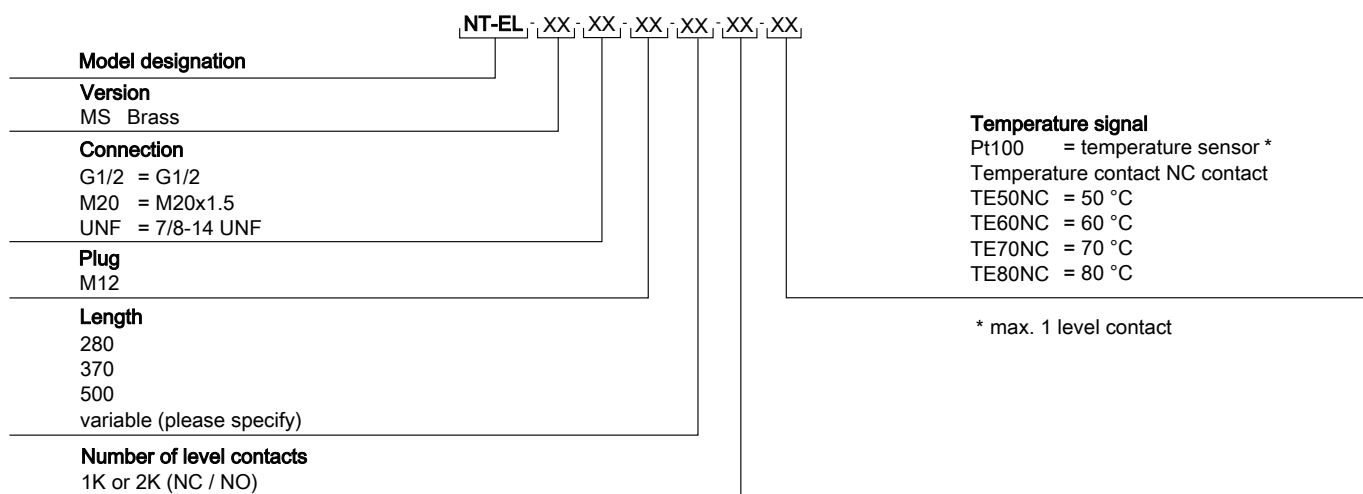
The temperature is monitored via thermal element soldered to the end of the contact board. Choose from temperature contacts with fixed increments or a resistance thermometer (Pt100).

When equipped with resistance thermometer (model key "Pt100") the temperature is output using the change in resistance (0 °C = 100 Ω) of the Pt100.

Please note the technical data in the appendix.

## 1.3 Ordering instructions NT-EL

### Model key



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## Ordering example

You require: Level switch with connector M20x1.5, length L= 370 mm,  
2 level contacts, L1 = 280 mm NC / L2 = 320 mm NO

---

Order NT-EL-MS-M20-M12/370-2K-280NC/320NO

---

## 1.4 Scope of Delivery

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



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## 2 Safety instructions

### 2.1 Important advice

Operation of the device is only valid 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.



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## 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 Assembly

#### 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 comes fully assembled and can be mounted to the tank with 30 Nm of torque. 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.

The level contacts are mounted (with the tank empty) as NO contact (NO) or NC contact (NC).

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

### 4.2 Electrical connections

The level switch is powered by 24 V (max. 30 V). The switch connects with a cable and standard M12 plug-in connectors. Please refer to the appendix for installation dimensions and plug configuration.

### 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

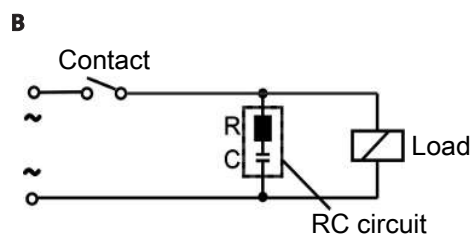
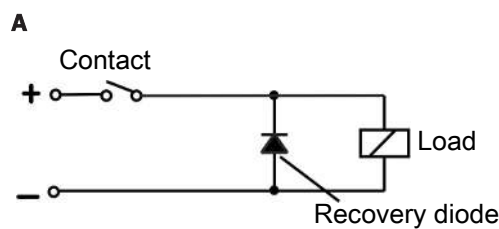
The life of reed switches can be up to  $10^9$  cycles. This is reduced by high stress and / or incorrect or the absence of protective circuits when switching inductive, capacitive or lamp loads.

**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.



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.



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## 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.



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## 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.**



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## 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.



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## 9 Appendices

### 9.1 NT-EL Technical Data

Version	MS
Operating pressure:	max. 1 bar
Operating temperature:	-20 °C to +80 °C
Float:	SK 174
Min. fluid density:	0.80 kg/dm <sup>3</sup>
Lengths (all versions):	280, 370, 500 mm (standard) variable to max. 500 mm
Weight at L = 500 mm:	approx.180 g

#### Material

Float:	PU
Immersion tube:	Brass
G1/2 connection, M20 x 1,5,7/8-14UNF:	Aluminium

#### Level switching output K40

Number max.:	2 not adjustable
Function:	NO / NC*
Max. voltage:	30 V DC
Max. switching current:	0.5 A
Max. contact load:	5 VA
Min. contact spacing:	30 mm (in 10 mm increments)
*NO= falling NC contact / NC = falling NO contact	

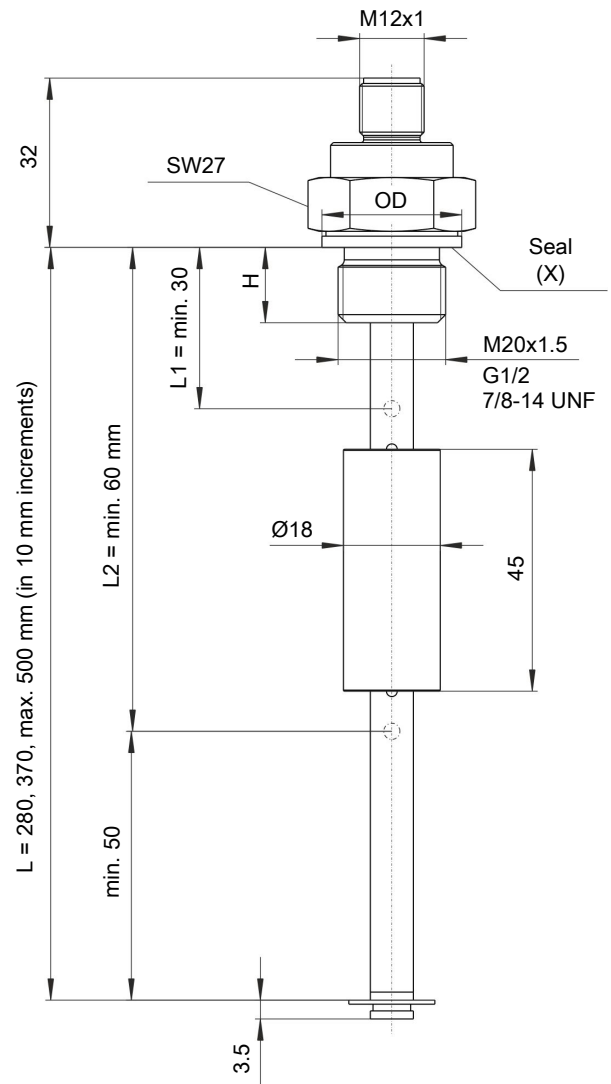
#### Optional temperature

Temperature contact:	TEL xx
Max. voltage:	30 V DC
Max. switching current:	1 A
Max. contact load:	10 VA
Function:	NC
Switching point °C:	50 / 60 / 70 / 80
Switching point tolerance:	± 5 K
Max. hysteresis:	20 K ± 5 K
Other temperatures and switching function available upon request	

#### Temperature sensor

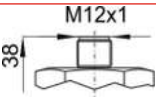
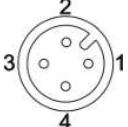
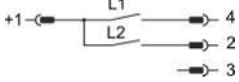
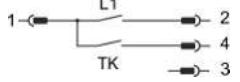
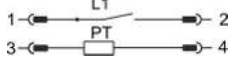
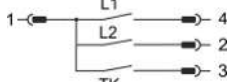
Pt100	DIN EN 60 751 (Tolerance ± 0.8 °C)
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#### Dimensions



	M20 x1.5	G1/2	7/8-14UNF
OD	26	26.6	26
H	14	14	12.7
X	Eolastic seal	Eolastic seal	O-ring

## 9.2 NT-EL default pin assignment

 <p>M12x1 38 IP rating IP67*</p>	<p>Level contact(s) only</p>	<p>Only level contact K40 and temperature contact (TK)</p>	<p>Level contact K40 and temperature sensor (PT)</p>	<p>Level contacts K40 and temperature contact (TK) with special connection</p>
				

\* with IP67 cable box attached



## 10 Attached documents

- Declaration of conformity KX100029
- RMA - Decontamination Statement



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**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**

**(Elektromagnetische Verträglichkeit / *electromagnetic compatibility*)**

in ihrer aktuellen Fassung entsprechen.

*in its actual version.*

**Produkt / products:** Niveauschalter und –geber / Level switches and gauges  
**Typ / type:** Nivotemp NT-EL

Die Betriebsmittel dienen zur Überwachung des Füllstandes und der Temperatur in Fluidsystemen.  
*The equipment is designed for monitoring level and 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**

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 27.10.2016

Stefan Eschweiler  
Geschäftsführer – *Managing Director*

Frank Pospiech  
Geschäftsführer – *Managing Director*

KX 10 0029

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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-  
heitsschädlich/  
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

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: [service@buehler-technologies.com](mailto:service@buehler-technologies.com)  
Internet: [www.buehler-technologies.com](http://www.buehler-technologies.com)

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.*



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