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## 1. General Information

Please read this operating instruction carefully before taking the instrument into operation.

Please inspect the transport packaging and the delivered goods immediately upon their receipt to determine their integrity and completeness. In case of returns, please use the original packaging.

Our bimetal thermometers for industrial temperature measurement are manufactured according to the norm DIN EN 13190. Further information on the instruments can be found in the data sheets 8101 and 8102.

Our bimetal thermometers are suited for temperature measurement in liquids or gases.



**Applications that are not explicitly listed as according to regulations are improper to intended purpose!**

The companies ARMATURENBAU GmbH and MANOTHERM Beierfeld GmbH do not assume liability for damages that arise from misuse of the instrument resp. from disregard of the information contained in this operating instruction.

## 2. Safety Information



**Please regard the currently valid national safety regulations during installation, starting up and operation.**

The connection may only be conducted by qualified personnel. Disregard of the corresponding regulations can cause severe bodily injuries and/or damage to equipment.

**Ensure that your bimetal thermometer cannot be damaged during operation.**



- The maximum temperature of the medium must lie within the indication range of the instrument.
- Ensure that construction type and materials of the thermometer are resistant to application conditions and medium. Use thermowells!
- Thermometers without damping fluid in the case are only suited for vibration- and impact-free installations.

Conversions or other technical changes of the instrument by the customer are not permitted. Otherwise you will lose your warranty. Use thermowells for easy installation and removal.

## 3. Description, Application

**Our bimetal thermometers have stainless steel cases and stems.** A helical bimetallic element serves as measuring unit. At temperature changes, the element rolls up. This rotational movement is transferred directly via an axle or via a deflection spring to the pointer.

Thus, bimetal thermometers are free of hysteresis. They are also suited for measurement of aggressive media in chemistry or petrochemistry.

## 4. Technical Data

### Construction types



TBiSch...rm      TBiSch...      TBiGelCh... with bayonet ring  
 TBiSchG...rm      TBiSchG...      TBiGelChG... with crimped-on ring  
 Figures show bayonet ring cases

For compensation of vibrational impacts, bimetal thermometers with case filling (indicated with a **G**, e.g. TBiSchG...) of the same construction type are available.

Suitable thermowells are available for the individual stem types.

### Indication range

The measurement range of your thermometer is indicated by two triangles on the scale. Within this range, accuracy class 1 is guaranteed.

### Active Length of the Stem

The active length determines the minimum length of the stem. It depends on indication range (temperature difference) and stem diameter.

$\Delta T$ [K]	La [mm]	
	Ø 6 mm	Ø 8mm
60	70	60
80	60	40
100 and larger	40	40

Further technical data can be found in our data sheets 8101, 8102, 8111 and 8112. They are also available on our website.

## 5. Installation

### Storage and Transport

- Permissible storage temperature: -40...+70 °C (-40...+158 °F) with case filling glycerine: -20...+70 °C (-4...+158 °F)
- Bimetal thermometers have to be protected against mechanical damage during transport and storage. Store in original packaging until installation.
- The packaging can be disposed of as waste paper. For further transport or returns, the instrument must be sufficiently protected against damages.

### Installation



Installation and putting into operation may only be conducted by trained personnel, authorised by the operator.



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Before installation, check the following points:

- Are the goods undamaged and complete?
- Do goods and delivery documentation correspond?
- Do you have the suitable instrument for your application?
- Does the process temperature lie within the measuring range?
- Does the process connection meet the requirements?

Mechanical connection of thermometers is conducted according to the general technical rules for the selected connection type.

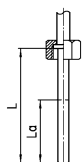
When screwing the thermometer in, do not use any force on the case. Hold turnable connection threads and union nuts against the stem.

For sealing the process resp. the thermowell installed with cylindrical fittings, gaskets made of suitable material must be used (standard: aluminium or copper gaskets).

NPT-fittings (tapered thread) provide a seal in the thread aided by suitable sealants, e.g. PTFE-tape (observe application temperature!).

Dial and numbers have to be aligned vertically. For thermometers with joint model TBIgelCh..., adjustment of the case for best readability is possible.

For precise readability, the instrument should be installed at eye level.



Install the thermometer stem so that the active part of the stem (active length see table above) is completely immersed in the medium.

Measurement errors occur, when the active part of the stem is not completely immersed in the medium.

Consider the temperature distribution of the medium at the installation point of the thermometer. Avoid measurements too close to walls of large vessels or in dead spaces of pipes, if this does not correspond to the actual measurement task.

When using thermowells, the thermal resistance between outside wall of the stem and inner wall of the thermowell can be reduced by means of a thermal contact agent.

## 6. Operation

Safe operation is ensured, when the instrument is properly installed.

To avoid reading errors, step in front of the thermometer installed at eye level and read the display frontally and do not look at it diagonally or from the side.

The reading accuracy generally corresponds to the scale graduation.

### Ambient Temperatures

The permissible ambient temperature indicates within which temperature limits the thermometer can be applied without risk of damage.

- Permissible ambient temperature: -40...+60 °C (-40...+140 °F)  
with case filling glycerine: -20...+60 °C (-4...+140 °F)
- Nominal operating range: 23 +/-2 °C

Prevent bodily injuries and damages to equipment.



- When installing and operating measurement points for hazardous, combustible, explosive or health-damaging materials, all currently valid regulations must be complied with.

- Thermometers must not be loaded beyond the full scale value or this could lead to destruction of the instrument.

### Indication adjustment

The following types have the possibility of pointer adjustment (4% of the indication range).

Types TBI Sch.../TBI gel Ch... (bayonet ring)

- Loosen bayonet ring by turning to the left and open case
- Carefully turn the pointer on the indicator bushing with a screwdriver until it reaches the reference value
- Close case and tighten bayonet ring by turning to the right

Types TBI Schg.../TBI gel Chg... (crimped-on ring)

There is an adjusting screw on the back side.

With a no. 6 hexagon Allen key turn the dial carefully until the pointer reaches the reference value.

Only conduct indication adjustments if you can check the indication with a reference measurement. Calibrated glass thermometers or portable, calibrated digital thermometers can be used as reference measurement devices.

## 7. Installation in Potentially Explosive Areas

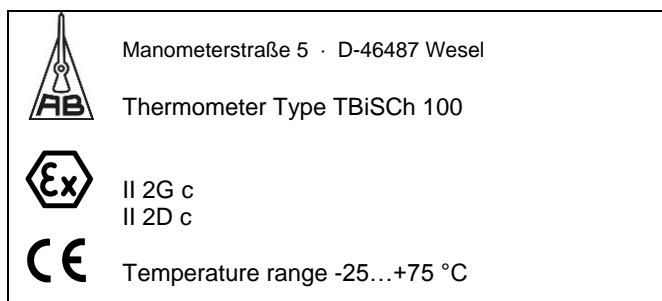
### 7.1 General Information

Thermometers are mechanical temperature measuring instruments and do not show any ignition sources when operated as intended. Versions made of stainless steel and with a laminated safety glass window are suitable for applications in areas of category 2 and 3 according to the ATEX-Directive 94/9/EC.

### 7.2 Marking for the Potentially Explosive Area

Thermometers **without** limit switch contacts for application in potentially explosive areas, are marked as follows:

Example: Thermometer Type TBI Sch 100,  
Manufacturer ARMATURENBAU



(content binding, partition-free)



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## 7.3 Installation in Zone 0



The instrument has to be separated from zone 0. Therefore, the installation of a bimetal thermometer has to be performed – according to EN 50284 – with a thermowell of a wall thickness of 1 mm minimum.

## 8. Maintenance, Repairs

The instruments are maintenance-free. They do not contain any elements that can be replaced or repaired by the user.

In order to ensure accuracy of measurement, we recommend checking the instrument on a regular basis. After approximately a year of operation, adjustment of the indication may be necessary, due to aging.

Repairs may only be conducted by the manufacturer. For possibly necessary repair or maintenance work, please contact your supplier or our factory. When returning the instrument to our factory, please ensure that it is well packed, see above.



Media residues in demounted instruments can endanger people, the environment and facilities. Therefore, precautionary measures have to be taken.

## 9. Decommissioning

For decommissioning, please remove the instrument completely from the area of application.

## 10. Disposal



Please help us protect our environment and dispose of or recycle the used materials according to the respective and valid regulations.

Please contact the manufacturer in case of uncertainties.

Technical changes excepted.



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# EU-Konformitätserklärung

## EC Declaration of Conformity

nach DIN EN ISO / IEC 17 050-1

according to DIN EN ISO / IEC 17 050-1



Für die nachfolgend bezeichneten Erzeugnisse

We hereby declare for the following named goods

### Manometer

Typen RCh..., RSCh..., RChg..., RQ..., RF...,  
Pm..., PCh..., PSCh..., PsP..., D(i)RCh..., DiRZCh...,  
DiKPCh..., KPB..., KPCh...

### Pressure Gauges

Models RCh..., RSCh..., RChg..., RQ..., RF...,  
Pm..., PCh..., PSCh..., PsP..., D(i)RCh..., DiRZCh...,  
DiKPCh..., KPB..., KPCh...

### Thermometer

Typen TBi..., TSChg..., TGeChg..., TFChg..., TA...,  
TSCh..., TGeCh..., TF..., TRCh...

### Thermometers

Models TBi..., TSChg..., TGeChg..., TFChg..., TA...,  
TSCh..., TGeCh..., TF..., TRCh...

### ohne Grenzsinalgeber

### without Limit Switch Contact

wird hiermit erklärt, dass sie den wesentlichen Schutzanforderungen entsprechen, die in der nachfolgend bezeichneten Richtlinie festgelegt sind:

that they meet the essential protective requirements which are fixed in the following directive:

RICHTLINIE 2014/34/EU DES EUROPÄISCHEN PARLAMENTES UND DES RATES vom 26. Februar 2014 für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen – kurz:

DIRECTIVE 2014/34/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL from 26. February 2014 on equipment and protective systems intended for use in potentially explosive atmospheres – short:

### ATEX-Richtlinie

### ATEX-Directive

Zur Beurteilung der Erzeugnisse hinsichtlich der Richtlinie wurden folgende Normen herangezogen:

The following standards have been used to assess the goods regarding the directive:

DIN EN 13463-1:2009-07

DIN EN 1127:2011-10

DIN EN 13463-5:2011-10

### Kennzeichnung:



Temperaturbereich: -25 °C\* ... +75 °C

\* optional bis -60 °C,  
je nach Gerätetyp und Anforderung

### Marking:



Range of temperature: -25 °C\* ... +75 °C

\* optionally up to -60 °C,  
depending on models and requirements

Diese Erklärung wird verantwortlich für die Hersteller:

This declaration is responsibly for the manufacturers:

**ARMATURENBAU GmbH**  
**MANOTHERM Beierfeld GmbH**

abgegeben durch / by

**Bernd Vetter**

Geschäftsführer / Managing Director

WESEL

(Ort / Location)

2017-02-03

(Datum / Date)

(rechtsgültige Unterschrift / Legal signature)