

1. General Information

Please read this operating instruction carefully before taking the gas-actuated thermometer 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. You have purchased an instrument that was manufactured in a high quality standard in our company, which is certified according to DIN ISO 9001. Should a reason for complaint however arise, please return the instrument with a precise description of faults to our factory. If you have any questions or difficulties, please contact us as manufacturer or the distributor of your thermometer. Please support us in improving this operating instruction. We will gladly accept your advice.

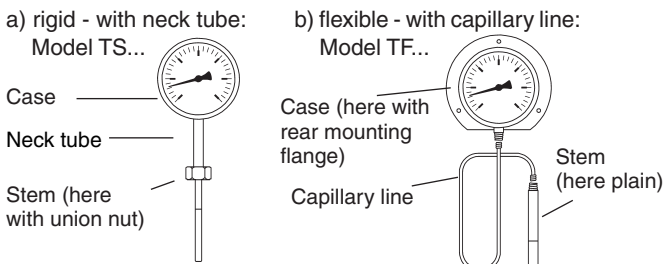
Do not manipulate the instrument. Otherwise you will lose your warranty!

2. Instrument Description

Gas-actuated dial thermometers according to EN 13 190 convert a change in temperature at the stem into a pressure change, which is transferred via a measuring spring and movement to the actual value pointer.

In instruments with limit switches the pointer moves, depending on the model, 1 to 4 contact arms via a mechanism. Contact is made resp. broken, when the actual value pointer has reached the adjustable switching temperature.

Connection between stem and case:



Information on technical data and construction types can be found in our data sheets, which are also available on the internet under www.armaturenbau.com resp. www.manotherm.com.

Storing and Transport

- Permissible storage temperature: -40...+70 °C (-40...+158 °F) with case filling: -20...+70 °C (-4...+158 °F)
- Gas-actuated dial thermometers have to be protected against mechanical damages 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.

Please note the information provided on the thermometer.

3. Safety Information

Ensure that the gas-actuated dial 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 regarding application conditions and medium.
 - Note the protection type!
 - Use thermowells!
 - Note the maximum permissible operating pressure!
- Thermometers without damping fluid in the case are only suited for vibration- and impact-free installations.

4. Installation

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

Mechanical Connection

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!).

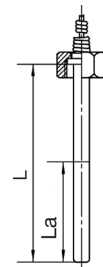
Position of Installation of the Case

- Dial and numbers have to be aligned vertically
- Other installation positions upon agreement: with indication of corresponding symbol of position on the dial!

Installation of Thermometers with Capillary Line

- Ensure that no tensile stresses act on the capillary line, especially on connection points to the case resp. the stem.
- Protect the capillary line against possible damage.
- The minimum bending radius may not exceed 30 mm.
- Vibrations and impacts have to be absorbed through corresponding installation of the line, e.g. via freely oscillating loops between two mounting points resp. mounting point and stem.
- Any crimping or interruption of the capillary line will cause destruction of the thermometer.
- The capillary line must be installed with sufficient clearance to sources of heat or cold in order to avoid temperature influences.

Installation of the Stem



Install the stem so that the minimum immersion depth ETmin (active part of the stem), indicated in the data sheets, 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, for example, measurement 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.

Electrical Connection



The electrical connection (only for instruments with additional electrical accessory) may only be conducted by qualified personnel.

- Regard the local regulations (Germany: VDE)
- Comply with the maximum switching capacity!



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The connection of limit switches has to be conducted according to the wiring diagram on the case. Depending on the model, the maximum switching capacity is indicated on the nameplate of the limit switch or on the wiring diagram.

The connection takes place depending on the model via:

- o a plug connector preassembled at the factory
- o a junction box
- o a connection cable fed out of the instrument

5. Operation

Safe operation is ensured, when the instrument is properly installed. For precise readability, the instrument should be installed at eye level.

The indications given in the respective data sheets apply.

Ambient Temperatures

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

Within the nominal operating range the error class of the indication is maintained. Beyond the nominal operating range additional temperature errors occur.

- Permissible storage temperature: -40...+60 °C (-40...+140 °F)
with case filling: -20...+60 °C (-4...+140 °F)
- Nominal operating range: +23 °C ± 2 °C (+73.4 ± 6.4 °F)

Prevent bodily injuries and damage to equipment.



- **When installing and operating measurement points for hazardous, combustible, explosive or health-damaging materials, all currently valid regulations must be complied with.**
- **At damage of the stem near the vessel, the pressurised nitrogen helium mixture can suddenly be released. Resulting dangers to personnel or material assets must be prevented by introducing appropriate measures.**

Indication Adjustment

It is possible to adjust the pointer in your gas-actuated dial thermometer. After removal of the screw resp. the filling plug, positioned laterally at the top of the case, a retaining screw at the movement becomes accessible, which can be regulated with a screwdriver.

You have the possibility to adjust indication errors that were caused, for example, by constantly deviating ambient temperatures. Only conduct indication adjustments, if you can check the indication with a reference measurement at the lower, upper and medium range value. Calibrated glass thermometers or portable, calibrated digital thermometers can be used, for example, as reference measurement devices.

Comparison of measured values must be effected through measurement

- at identical ambient conditions
- at the same measuring point
- with identical immersion length
- within a period of time where there are no changes in temperature at the measuring point.

6. Maintenance and Repair

Gas-actuated thermometers are maintenance-free. They do not contain any elements that can be replaced or repaired by the user. Repairs can only be made in our factory. In order to ensure accuracy of measurement, we recommend checking the indication on a regular basis. Please refer to section 5. for the necessary comparative measurement steps.

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, facilities and the environment. Therefore, precautionary measures must be taken.

Do not manipulate the instrument. Otherwise you will lose your warranty!

Repairs may only be conducted by the manufacturer!

7. Putting Out of Operation

For putting the instrument out of operation remove it completely from the area of application. Please note the indications provided in section 6.

8. Installation in Potentially Explosive Areas

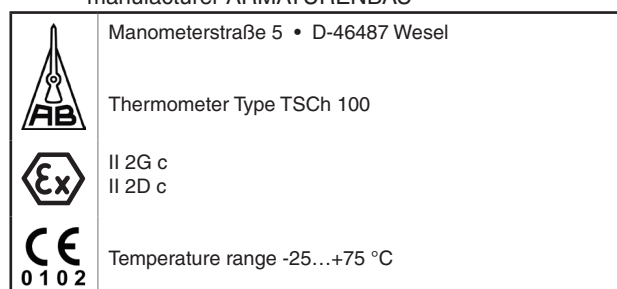
8.1 General Information

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

8.2 Marking for the Potentially Explosive Area

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

Example: Thermometer Type TSCh100,
manufacturer ARMATURENBAU



(binding content, partition-free)

Please contact the manufacturer in case of uncertainties.

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)