Refrigeration and air-conditioning technology
About us

As a family-run business acting globally, with over 7,900 highly qualified employees, the WIKA group of companies is a worldwide leader in pressure and temperature measurement. The company also sets the standard in the measurement of level and flow, and in calibration technology.

Founded in 1946, WIKA is today a strong and reliable partner for all the requirements of industrial measurement technology, thanks to a broad portfolio of high-precision instruments and comprehensive services.

WIKA ensures flexibility and the highest delivery performance. Every year, over 50 million quality products, both standard and customer-specific solutions, are delivered in batches of 1 to over 10,000 units.

With numerous wholly-owned subsidiaries and partners, WIKA competently and reliably supports its customers worldwide. Our experienced engineers and sales experts are your competent and dependable contacts locally.
Within the refrigeration cycle and its periphery there are many points where pressure and temperature are measured and monitored. This serves to control the plant in order to guarantee a secure process run.

Some of the measuring tasks are: Indication of pressure and temperature in the lines of the refrigeration cycle on one of the main aggregates, control of fan speed or expansion valve speed, respectively, filter monitoring, temperature measurement in the cooling room, level measurement of pressure vessels or valve control.

In addition to the multitude of applications also the size of the refrigeration system, the refrigerant etc. place particular demands on the instruments. Here, WIKA is the competent partner for measuring instruments for pressure, temperature and calibration in all parts of refrigeration plants.

This brochure assists you in selecting the right instruments. Apart from the described products for refrigeration and air-conditioning applications, we offer a comprehensive standard program for the measurement of pressure, temperature and level.

In co-operation with you, we will develop tailored solutions geared to the individual requirements of your process.

Talk to us.
Perfection in material and form

In view of the increasing requirements on refrigeration plants due to new refrigerants or leak-free systems the quality requirements for measuring instruments are also increasing. Thus the right choice of materials is decisive in order to get the best possible instrument.

**Case**
Choosing the right material that determines the quality of the case means taking care of parameters such as pressure, temperature and field conditions. The refrigerant used is not decisive, as the case usually is not exposed to the process medium. WIKA offers plastic, brass and stainless steel cases.

**Wetted metal parts**
The main decider in this case is whether the refrigeration plant is operated with an (H)FCKW/HFKW refrigerant or with ammonia. If it is ammonia, the pressure element must be made of stainless steel (e.g. 1.4571, 1.4404). If it is an (H)FCKW/HFKW refrigerant, a copper-zinc-alloy (brass) is sufficient. The same is true for the pressure connection, the thermowell and the stem of the thermometer.

**Thermowells**
If the temperature instrument is not put into the process directly – which is always advisable because of the protection and exchangeability of the measuring instrument – but via a thermowell, various steels are suitable for this protective case. As standard material WIKA uses stainless steel 1.4571.

**Sealings**
The process medium, which comes into direct contact with the sealing material, as well as the pressure and temperature are decisive factors for the selection of the suitable sealing material for O-rings or separating diaphragms. Especially formulated elastomer compounds are mostly used. As standard WIKA offers the materials NBR (acrylonitrile butadiene rubber), FPM (fluor propylene rubber) or EPDM (ethylene propylene diene monomer rubber), as an option FFPM (perfluor propylene rubber) or CR (chloroprene rubber) are partly possible as well.
Pressure gauges with electrical output signals

Control systems are gaining more and more importance in industrial applications. Consequently, pressure indication on the gauge itself is no longer sufficient, rather the measured value must be transferred to the control system via an electrical signal, e.g. by closing or opening of a circuit. WIKA is focusing on its mechatronic product line in order to satisfy this trend.

The switchGAUGEs are based on a high-quality WIKA mechanical pressure gauge which has, depending on the application, an integrated magnetic snap-action contact, inductive or electronic contact (PLC), reed contact, micro switch or a transistor output (NPN or PNP).

A pressure gauge with an electrical output signal from the intelligAGE series combines all the advantages of a local display, without the need for a power supply, with the requirements of an electrical signal transfer for a modern electronic measured value registration.

Refrigeration circuit
Optimum connections

The connection of pressure and temperature measuring instruments to the process can be carried out via thermowells and mounting devices. Thus the connection can be specifically adjusted to the individual process requirements.

Mounting flanges

There are three basic possibilities to mount a pressure gauge to the process – besides the connection location:

- Surface mounting flange
- Panel mounting flange
- Mounting clamp

Depending on the instrument version, these three options are available in several versions, e.g. steel, brass, chrome plated, polished, galvanised etc. Attention should be paid to the fact that not all versions can be combined with each other.

Thermowells

The process connection for thermometers usually is a thermowell. This has the advantage that you can remove the instrument (for replacement or test) without having to open the plant or stop the process.

When choosing a suitable thermowell, one does not only have to take account of the parameters of pressure, temperature and process medium, but also the velocity of flow, the density and the insertion length.

In refrigeration technology, fabricated stainless steel thermowells or solid-machined thermowells machined from solid body material in accordance with DIN 43772 are frequently used. Depending on the threaded connection of the thermometer, different designs with female or male threads are used.

Capillaries

An additional type of process connection is by means of capillaries. They are used for pressure gauges and thermometers alike to bridge greater distances between measuring cell and reading point or to provide better protection for the measuring instrument against strong vibrations, high temperatures etc.

As a typical application WIKA offers expansion thermometers in edgewise design for measuring the temperature of refrigerated cabinets.
### Resistance of the elastomers (selection)

<table>
<thead>
<tr>
<th>Refrigerant</th>
<th>NBR</th>
<th>FKM</th>
<th>EPDM</th>
<th>FFKM</th>
<th>CR</th>
<th>PTFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>R 11</td>
<td>++</td>
<td>+</td>
<td>–</td>
<td>+</td>
<td>–</td>
<td>++</td>
</tr>
<tr>
<td>R 12</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>R 12 B1</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>++</td>
</tr>
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<td>R 13</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>R 13 B1</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>++</td>
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<tr>
<td>R 14</td>
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<td>+</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>++</td>
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<tr>
<td>R 21</td>
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<td>–</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>R 22</td>
<td>–</td>
<td>–</td>
<td>++</td>
<td>–</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>R 31</td>
<td>–</td>
<td>–</td>
<td>++</td>
<td>–</td>
<td>++</td>
<td>++</td>
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<td>R 32</td>
<td>++</td>
<td>–</td>
<td>++</td>
<td>–</td>
<td>++</td>
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<td>+</td>
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<td>++</td>
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<td>R 114 B2</td>
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<td>–</td>
<td>+</td>
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<td>++</td>
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<tr>
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<td>–</td>
<td>+</td>
<td>–</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>R 152 a</td>
<td>+</td>
<td>–</td>
<td>++</td>
<td>–</td>
<td>++</td>
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<tr>
<td>R 290</td>
<td>+</td>
<td>+</td>
<td>k.A.</td>
<td>+</td>
<td>k.A.</td>
<td>k.A.</td>
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<tr>
<td>R 401 a</td>
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<td>k.A.</td>
<td>k.A.</td>
<td>+</td>
<td>k.A.</td>
</tr>
<tr>
<td>R 401 b</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>+</td>
<td>k.A.</td>
</tr>
<tr>
<td>R 402 a</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>+</td>
<td>k.A.</td>
</tr>
<tr>
<td>R 403 b</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>+</td>
<td>k.A.</td>
</tr>
<tr>
<td>R 404 a</td>
<td>+</td>
<td>–</td>
<td>+</td>
<td>–</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>R 407 a</td>
<td>+</td>
<td>k.A.</td>
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<td>k.A.</td>
<td>+</td>
<td>k.A.</td>
</tr>
<tr>
<td>R 407 c</td>
<td>k.A.</td>
<td>–</td>
<td>+</td>
<td>–</td>
<td>+</td>
<td>++</td>
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<tr>
<td>R 408 a</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>+</td>
<td>k.A.</td>
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<tr>
<td>R 409 a</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>+</td>
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<tr>
<td>R 410 a</td>
<td>+</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>R 413 a</td>
<td>+</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
</tr>
<tr>
<td>R 502</td>
<td>+</td>
<td>+</td>
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<td>–</td>
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<td>++</td>
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<tr>
<td>R 507</td>
<td>+</td>
<td>k.A.</td>
<td>k.A.</td>
<td>k.A.</td>
<td>+</td>
<td>k.A.</td>
</tr>
<tr>
<td>R 600 a</td>
<td>+</td>
<td>+</td>
<td>k.A.</td>
<td>k.A.</td>
<td>+</td>
<td>k.A.</td>
</tr>
<tr>
<td>R717 (liquid)</td>
<td>+</td>
<td>–</td>
<td>++</td>
<td>–</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>R717 (gaseous)</td>
<td>++</td>
<td>–</td>
<td>++</td>
<td>–</td>
<td>++</td>
<td>++</td>
</tr>
</tbody>
</table>

**Legend:**

- **++** = highly resistant
- **+** = resistant
- **–** = not resistant
- **k.A.** = not specified

Data are only recommendations. These may deviate, e.g., if using flotation oils or additives. Furthermore, manufacturer-specific compositions of the individual elastomers may cause resistances to deviate in the maximum operating range. Even unknown parameters and conditions in practical use may result in deviations. We therefore accept no liability for the correctness of the recommendations in an application case.
Compressors

Due to the various structural shapes and design layouts of refrigeration plants there is also a great number of different compressors. Mainly reciprocating, screw and scroll compressors are used to suck in the refrigerant at a low pressure and compress it to a higher pressure. Other criteria for differentiation are for example the number of compressing stages, the way of cooling or the ratio compressor – engine (open, semi-hermetic, hermetic).

In order to monitor oil pressure and pressure in suction and discharge line of the compressor WIKA offers all necessary measuring instruments.

Pressure measurement
For mechanical pressure measurement the product programme ranges from the tried and tested Bourdon tube pressure gauge with plastic case over the diaphragm and capsule pressure gauges to the sturdy stainless steel or special material pressure gauge. For electronic pressure measurement WIKA offers its customers a full range of sensor technology produced in-house – whether ceramic thick film, piezo-resistive or metal thin-film.

Temperature measurement
Mechanical temperature measuring instruments are available as bimetal, expansion or gas-actuated thermometers. In electrical temperature measurement WIKA delivers resistance thermometers and thermocouples, temperature transmitters complete the programme.

R-1
Pressure transmitter with thin-film measuring cell

- Accuracy (± % of span): ≤ 2
- Measuring range:
  - 0 … 6 to 0 … 160 bar
  - -1 … +7 to -1 … +45 bar
- Special feature:
  - Special case design for the best possible condensation tightness
  - Resistant to all common refrigerants
- Data sheet: PE 81.45

AC-1
Pressure transmitter with ceramic measuring cell

- Accuracy (± % of span): ≤ 2
- Measuring range:
  - 0 … 6 to 0 … 60 bar
  - -1 … +7 to -1 … +45 bar
- Special feature:
  - Special case design for the best possible condensation tightness
  - Resistant against the major refrigerants
- Data sheet: PE 81.46
### PGS23
Bourdon tube pressure gauge with switch contacts, stainless steel version

<table>
<thead>
<tr>
<th>Nominal size:</th>
<th>100, 160 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale range:</td>
<td>0 ... 0.6 to 0 ... 1,600 bar</td>
</tr>
<tr>
<td>Accuracy class:</td>
<td>1.0</td>
</tr>
<tr>
<td>Ingress protection:</td>
<td>IP 65</td>
</tr>
<tr>
<td>Data sheet:</td>
<td>PV 22.02</td>
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</tbody>
</table>

### DPG40
DELTA-plus, differential pressure gauge with integrated working pressure indication

<table>
<thead>
<tr>
<th>Nominal size:</th>
<th>100 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale range:</td>
<td>0 ... 0.25 to 0 ... 10 bar</td>
</tr>
<tr>
<td>Accuracy class:</td>
<td>2.5</td>
</tr>
<tr>
<td>Ingress protection:</td>
<td>IP 54, IP 65 (optional)</td>
</tr>
<tr>
<td>Data sheet:</td>
<td>PM 07.20</td>
</tr>
</tbody>
</table>

### DPGS40
DELTA-comb, differential pressure gauge with integrated working pressure indication and micro switch

<table>
<thead>
<tr>
<th>Nominal size:</th>
<th>100 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale range:</td>
<td>0 ... 0.25 to 0 ... 10 bar</td>
</tr>
<tr>
<td>Accuracy class:</td>
<td>2.5 (optional 1.6)</td>
</tr>
<tr>
<td>Ingress protection:</td>
<td>IP 54 (optional IP 65)</td>
</tr>
<tr>
<td>Data sheet:</td>
<td>PV 27.20</td>
</tr>
</tbody>
</table>

### DPS40
DELTA-switch, differential pressure switch

<table>
<thead>
<tr>
<th>Nominal size:</th>
<th>100 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range:</td>
<td>0 ... 0.25 to 0 ... 10 bar</td>
</tr>
<tr>
<td>Switch point reproducibility:</td>
<td>1.6 %</td>
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<tr>
<td>Ingress protection:</td>
<td>IP 54 (optional IP 65)</td>
</tr>
<tr>
<td>Data sheet:</td>
<td>PV 27.21</td>
</tr>
</tbody>
</table>

### DPGT40
DELTA-trans, differential pressure transmitter with integrated differential pressure and working pressure indication

<table>
<thead>
<tr>
<th>Nominal size:</th>
<th>100 mm</th>
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<tbody>
<tr>
<td>Scale range:</td>
<td>0 ... 0.25 to 0 ... 10 bar</td>
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<tr>
<td>Accuracy class:</td>
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<td>IP 54 (optional IP 65)</td>
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<td>Data sheet:</td>
<td>PV 17.19</td>
</tr>
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</table>

Application: Compressor

Further information at www.wika.com
### Compressors

#### 111.10
**Bourdon tube pressure gauge, plastic case, lower mount (LM)**

| Nominal size: | 40, 50, 63, 80, 100, 160 mm |
| Scale range: | 0 ... 0.6 to 0 ... 400 bar |
| (max. 40 bar with 160 mm) |
| Accuracy class: | 2.5 |
| Data sheet: | PM 01.01 |

#### 111.12
**Bourdon tube pressure gauge, plastic case, back mount (BM)**

| Nominal size: | 27, 40, 50, 63, 80, 100 mm |
| Scale range: | 0 ... 0.6 to 0 ... 400 bar |
| Accuracy class: | 2.5/4 |
| Data sheet: | PM 01.09, PM 01.17 (NS 27) |

#### 131.11
**Bourdon tube pressure gauge, stainless steel version**

| Nominal size: | 40, 50, 63 mm |
| Scale range: | 0 ... 0.6 to 0 ... 400 bar |
| Accuracy class: | 2.5 |
| Data sheet: | PM 01.05 |

#### 113.13
**Bourdon tube pressure gauge, plastic case with liquid filling**

| Nominal size: | 40, 50, 63 mm |
| Scale range: | 0 ... 1.0 to 0 ... 400 bar |
| Accuracy class: | 2.5 |
| Ingress protection: | IP 65 |
| Data sheet: | PM 01.04 |

#### PGS21
**Bourdon tube pressure gauge, stainless steel, fixed contacts**

| Nominal size: | 40, 50, 63 mm |
| Scale range: | 0 ... 2.5 to 0 ... 400 bar |
| Accuracy class: | 1.6 or 2.5 |
| Ingress protection: | IP 65 |
| Data sheet: | PV 21.02 |

#### PGS21.100/160
**Bourdon tube pressure gauge with switch contacts, industrial series**

| Nominal size: | 100, 160 mm |
| Scale range: | 0 ... 0.6 to 0 ... 600 bar |
| Accuracy class: | 1.0 |
| Ingress protection: | IP 54 |
| Data sheet: | PV 22.01 |
### Bourdon tube pressure gauge, forged brass case with liquid filling

**213.40**

- **Nominal size:** 63, 100 mm
- **Scale range:** 0...0.6 to 0...1,000 bar
- **Accuracy class:** 1.0 (NS 100), 1.6 (NS 63)
- **Ingress protection:** IP 65
- **Data sheet:** PM 02.06

### Bourdon tube pressure gauge, stainless steel case with liquid filling

**213.53**

- **Nominal size:** 50, 63, 100 mm
- **Scale range:** 0...1 to 0...400 bar (NS 50)
- **Accuracy class:** 1.0 (NS 100), 1.6 (NS 50, 63)
- **Ingress protection:** IP 65
- **Data sheet:** PM 02.12

### Bourdon tube pressure gauge, stainless steel, safety version, without/with liquid filling

**232.30, 233.30**

- **Nominal size:** 63, 100, 160 mm
- **Scale range:**
  - 0...1.0 to 0...1,000 bar (NS 63)
  - 0...0.6 to 0...1,000 bar (NS 100)
  - 0...0.6 to 0...1,600 bar (NS 160)
- **Accuracy class:** 1.0 (NS 100, 160), 1.6 (NS 63)
- **Ingress protection:** IP 65
- **Data sheet:** PM 02.04

### Bourdon tube pressure gauge, stainless steel, without/with liquid filling

**232.50, 233.50**

- **Nominal size:** 63, 100, 160 mm
- **Scale range:**
  - 0...1.0 to 0...1,000 bar (NS 63)
  - 0...0.6 to 0...1,000 bar (NS 100)
  - 0...0.6 to 0...1,600 bar (NS 160)
- **Accuracy class:** 1.0/1.6 (NS 63)
- **Ingress protection:** IP 65
- **Data sheet:** PM 02.02

### Differential pressure gauge with Bourdon tube, parallel entry

**731.18, 732.18**

- **Nominal size:** 80, 100 mm
- **Scale range:**
  - 0...2.5 to 0...60 bar
  - -1...0 to +40 bar
- **Accuracy class:** 1.6
- **Ingress protection:** IP 65
- **Data sheet:** PM 07.03

### Bourdon tube pressure gauge with electrical output signal, stainless steel case

**PGT21**

- **Nominal size:** 50, 63 mm
- **Scale range:** 0...1.6 to 0...400 bar
- **Accuracy class:** 1.6/2.5
- **Ingress protection:** IP 65
- **Data sheet:** PV 11.03

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Further information at [www.wika.com](http://www.wika.com)
Compressors

**TF44**

Strap-on temperature sensor with connecting cable

- Measuring range: -50 ... +200 °C
- Measuring element: Pt100, Pt1000, NTC, KTY
- Feature:
  - Connecting lead from PVC, silicone
  - Thermowell from aluminium
  - Mounting on pipe surfaces
- Data sheet: TE 67.14

**TR33**

Resistance thermometer in miniature design

- Sensor element: 1 x Pt100, 1 x Pt1000
- Measuring range: -50 ... +250 °C
- Output: Pt100, Pt1000, 4 ... 20 mA
- Data sheet: TE 60.33

**TR40**

Cable resistance thermometer

- Sensor element: 1 x Pt100, 2 x Pt100
- Measuring range: -200 ... +600 °C
- Pin assignment: 2-, 3- or 4-wire
- Cable: PVC, silicone, PTFE
- Data sheet: TE 60.40
TFS35
Bimetal temperature switch

Switching temperature: 40 ... 200 °C, fixed
Special feature:
- Compact design
- Automatic reset
- No capillary needed
Data sheet: TV 35.01

TF35
OEM screw-in thermometer, with plug connection

Measuring range: -50 ... +250 °C
Measuring element: Pt100, Pt1000, NTC, KTY
Special feature:
- High vibration resistance
- Compact design
- Plug connector for electrical connection
Data sheet: TE 67.10

SC15
Expansion thermometer with micro switch, indicating temperature controller

Nominal size: 60, 80, 100 mm
Scale range: -100 ... +400 °C
Wetted parts: Copper alloy
Option:
- Square case version
- Sheet steel version
- Various contact versions
Data sheet: TV 28.02

OLS-C04
Optoelectronic OEM level switch, refrigerant version with transistor output

Material: Steel, nickel-plated; glass
Process connection: G 1/2", ½" NPT
Pressure: Max. 40 bar
Temperature: -40 ... +100 °C
Data sheet: LM 31.34

Further information at www.wika.com
In order to condense the gaseous, overheated refrigerant or to evaporate the liquid refrigerant one often uses liquid-cooled aggregates. Refrigerant pressure and temperature result, for example, from the coolant temperature (in- and outlet), the surface of the aggregate and the volume of refrigerant that has to be transformed. As the surface of the aggregate is fixed, pressure and temperature are measured to monitor the performance of the aggregates.

WIKA offers all pressure and temperature measuring instruments needed for these applications. The following instruments are especially suited for applications on liquid-cooled condensers and evaporators.

You can of course use other products that have already been mentioned above for monitoring pressure and temperature in the lines of the refrigeration cycle.

### 732.51
**Differential pressure gauge with diaphragm, stainless steel, all-welded design**
- **Nominal size:** 100, 160 mm
- **Scale range:** 0 ... 15 mbar to 0 ... 25 bar
- **Accuracy class:** 1.6
- **Ingress protection:** IP 54 (with liquid filling IP 65)
- **Data sheet:** PM 07.05

### 50
**Bimetal thermometer**
- **Nominal size:** 63, 80, 100, 160 mm
- **Scale range:** -30 ... +100 °C
- **Permissible operating pressure at thermowell/stem:** Max. 6 bar
- **Wetted parts:** Copper alloy
- **Data sheet:** TM 50.03
### Bimetal Thermometer, Industrial Series Axial and Radial

- **Nominal size:** 25, 33, 40, 63, 80, 100, 160 mm
- **Scale range:** -30 ... +50 to 0 ... +500 °C
- **Wetted parts:** Stainless steel
- **Data sheet:** TM 52.01

### Bimetal Thermometer, Industrial Series, Axial and Radial, Adjustable Stem and Dial

- **Nominal size:** 63, 80, 100, 160 mm
- **Scale range:** -30 ... +50 to 0 ... +600 °C
- **Option:** Liquid damping to max. 250 °C (case and sensor)
- **Wetted parts:** Stainless steel
- **Data sheet:** TM 54.01

### Bimetal Thermometer, Axial and Radial, Adjustable Stem and Dial

- **Nominal size:** 63, 100, 160 mm
- **Scale range:** -70 ... +70 to 0 ... +600 °C
- **Wetted parts:** Stainless steel
- **Option:** Liquid damping to max. 250 °C (case and sensor)
- **Data sheet:** TM 55.01

### Bimetal Thermometer with Switch Contacts, Stainless Steel

- **Nominal size:** 100, 160 mm
- **Scale range:** 70 ... +30 to 0 ... 600 °C
- **Wetted parts:** Stainless steel
- **Option:** Liquid damping to max. 250 °C (case and sensor)
- **Data sheet:** TV 25.01

### intelliTHERM® Gas-Actuated Thermometer

- **Nominal size:** 100, 160 mm
- **Scale range:** -200 ... +100 to 0 ... 700 °C
- **Wetted parts:** Stainless steel
- **Option:** Capillary, Liquid damping (case)
- **Data sheet:** TV 17.10

Further information at www.wika.com
Further applications

Air channel/air-conditioning system

**48**

**Bimetal thermometer**
- **Nominal size:** 63, 80, 100, 160 mm
- **Scale range:** -30 ... +120 °C
- **Wetted parts:** Copper alloy
- **Data sheet:** TM 48.01

**TR10-J**
- **Threaded resistance thermometer, with perforated thermowell**
- **Sensor element:** 1 x Pt100, 2 x Pt100
- **Measuring range:** -200 ... +600 °C
- **Pin assignment:** 2-, 3- or 4-wire
- **Process connection:** Mounting thread
- **Data sheet:** TE 60.10

**TR60**
- **Indoor and outdoor resistance thermometer**
- **Sensor element:** Pt100
- **Measuring range:** -40 ... +80 °C
- **Pin assignment:** 2-, 3- or 4-wire
- **Process connection:** Wall mounting
- **Data sheet:** TE 60.60

**Precision/test instruments**

**TF40**
- **Duct temperature sensor**
- **Measuring range:** -50 ... +200 °C
- **Measuring element:** Pt100, Pt1000, NTC
- **Feature:**
  - Smallest case design, UV-resistant
  - Protected against dust and water jets, IP 65
  - Plastic mounting flange
- **Data sheet:** TE 67.16

**TF41**
- **Ambient temperature sensor**
- **Measuring range:** 40 ... +100 °C
- **Measuring element:** Pt100, Pt1000, NTC
- **Special feature:**
  - Smallest case design, UV-resistant
  - Protected against dust and water jets, IP 65
  - Clip-on sun protector
- **Data sheet:** TE 67.17

**312.20**
- **Bourdon tube pressure gauge, test gauge series**
- **Nominal size:** 160 mm
- **Scale range:** 0 ... 0.6 to 0 ... 600 bar
- **Accuracy class:** 0.6
- **Ingress protection:** IP 54
- **Data sheet:** PM 03.01
Cold stores

**TF58, TF59**
Expansion thermometer, standard version

- **Nominal size:** 59 x 25 mm, 62 x 11 mm
- **Scale range:** -50 ... +250 °C
- **Wetted parts:** Copper alloy
- **Option:**
  - Vertical arrangement
  - Special scales
  - Other case materials
- **Data sheet:** TM 80.02

**TF-LCD**
Longlife digital thermometer

- **Measuring range:** -40 ... +120 °C
- **Special feature:**
  - Resistant to steam diffusion
  - Extremely long service life
- **Power supply:** Battery or solar powered
- **Data sheet:** TE 85.01

**TF45**
OEM insertion thermometer with connecting cable

- **Measuring range:** -50 ... +250 °C
- **Special feature:**
  - Connecting lead from PVC, silicone, PTFE
  - With single or dual measuring element
  - Thermowells from stainless steel
- **Power supply:** Battery or solar powered
- **Data sheet:** TE 67.15

**70**
Expansion thermometer, stainless steel version

- **Nominal size:** 63, 100, 160 mm
- **Scale range:** -60 ... +400 °C
- **Wetted parts:** Stainless steel
- **Option:**
  - Liquid damping (case)
  - With micro switch
  - Indication accuracy class 1
- **Data sheet:** TM 81.01

**TGT70**
intelliTHERM® expansion thermometer

- **Nominal size:** 63, 100 mm
- **Scale range:** -40 ... +250 °C
- **Wetted parts:** Stainless steel
- **Output signal:** 4...20 mA, 0.5...4.5V
- **Option:**
  - Capillary
  - Other connection designs
- **Data sheet:** TV 18.01

Further information at www.wika.com
Wika has developed ventilation and air-conditioning measuring instruments based on the «Value Innovations» philosophy. The measuring instruments are primarily intended for installation in air-conditioning units (monoblocks). The pressure measuring instruments can be used, for example, for filter monitoring in accordance with the V/AC (ventilation and air-conditioning) directive.

Further application areas are, amongst others, clean rooms, dust removal technology, extraction systems, emulsion mist separators and gas scrubbers.

Your benefits
- Easy to install and remove without tools
- Up to 50 % time saving during installation compared with conventional models
- Advanced design, optimised packaging for the target market
- Extended guarantee

Application examples air2guide
The range includes differential pressure measurement (mechanical and electronic), inclined tube manometers and differential pressure switches for filter monitoring, and also differential pressure transmitters, mainly used for the monitoring of ventilators and blowers. Duct/immersion temperature sensors and duct humidity and temperature sensors for measuring temperature and relative humidity in heating, ventilation and air-conditioning systems are used. The range is completed by measuring instruments for monitoring CO₂ content and VOCs (volatile organic compounds).

The brochure “Measuring instruments for air-handling technology” shows you the entire air2guide product family and their high technical specifications.

www.air2guide.com
Calibration services

Our calibration laboratory has been accredited for pressure since 1982 and for temperature since 1992 in accordance with DIN EN ISO/IEC 17025. Since 2014, our calibration laboratory has also been accredited for the electrical measurement parameters DC current, DC voltage and DC resistance.

**From -1 ... +8,000 bar**

![Image of pressure measurement equipment]

**D-K-15105-01-00**

We calibrate your pressure measuring instruments quickly and precisely:

- in the range (+ +8,000) bar
- using high-precision reference standards (pressure balances) and working standards (precise electrical pressure measuring instruments)
- with an accuracy from (0.003 ... 0.01) % of reading depending on the pressure range
- in accordance with the directives DIN EN 837, DAkkS-DKD-R 6-, EURAMET cg-3 or EURAMET cg-17

**From -196 ... +1,200 °C**

![Image of temperature measurement equipment]

**D-K-15105-01-00**

We calibrate your temperature measuring instruments quickly and precisely:

- in the range (-196 ... +1,200) °C
- in calibration baths, tube furnaces or at fixed points using appropriate reference thermometers
- with an accuracy of 2 mK ... 1.5 K depending on temperature and the procedure
- in accordance with the appropriate DKD/DAkkS and EURAMET directives

Our calibration laboratory has been accredited for pressure since 1982 and for temperature since 1992 in accordance with DIN EN ISO/IEC 17025. Since 2014, our calibration laboratory has also been accredited for the electrical measurement parameters DC current, DC voltage and DC resistance.
CT Service Hotline
You will receive information about calibrations in the WIKA laboratory and on-site calibrations from our CT Service Team.
Tel. 09372 132-5049 - CTserviceteam@wika.com

Online services
If you would like to send your measuring instrument for calibration to the WIKA laboratory, please use our product return form at www.wika.com – Service – Product return

DC current, DC voltage and DC resistance

We calibrate your electrical measuring instruments quickly and precisely:
- DC current in the range 0 ... 100 mA
- DC voltage in the range 0 ... 100 V
- DC resistance in the range 0 Ω to 10 kΩ
- in accordance with the directives: VDI/VDE/DGG/DKD 2622

On-site calibration

In order to have the least possible impact on the production process, we offer you a time-saving, on-site DAkkS calibration throughout Germany (measurement parameter pressure).

We calibrate your pressure and temperature measuring instruments quickly and precisely:
- in our calibration van or on your workbench
- with a DAkkS accreditation for pressure
  - in the range from (-1 ... +8,000) bar
  - with accuracies between 0.025 % and 0.1 % of full scale of the standard used
- 3.1 inspection certificates for the measurement parameter temperature from (-55 ... +1,100) °C
### Conversion factors for pressure

#### SI units – Engineering units (based on the metre)

<table>
<thead>
<tr>
<th>SI units</th>
<th>Engineering units</th>
</tr>
</thead>
<tbody>
<tr>
<td>bar</td>
<td>mbar</td>
</tr>
<tr>
<td>1 bar</td>
<td>10³</td>
</tr>
<tr>
<td>1 mbar</td>
<td>10⁻³</td>
</tr>
<tr>
<td>1 µbar</td>
<td>10⁻⁶</td>
</tr>
<tr>
<td>1 Pa</td>
<td>10⁻⁵</td>
</tr>
<tr>
<td>1 kPa</td>
<td>10⁻³</td>
</tr>
<tr>
<td>1 MPa</td>
<td>10</td>
</tr>
<tr>
<td>1 mmHg</td>
<td>1.33322</td>
</tr>
<tr>
<td>1 mmWS</td>
<td>98.0665</td>
</tr>
<tr>
<td>1 mWS</td>
<td>98.0665</td>
</tr>
<tr>
<td>1 kp/mm²</td>
<td>98.0665</td>
</tr>
<tr>
<td>1 kp/cm²</td>
<td>0.980665</td>
</tr>
<tr>
<td>1 atm</td>
<td>1.01325</td>
</tr>
</tbody>
</table>

#### Corresponding pressure

- **1 Pa = 1 N/m²**
- **1 hPa = 1 mbar**
- **1 mmHg = 1 Torr**
- **1 kp/cm² = 1 atm (atü)**

#### Comments:

The table refers to DIN 1301 Part 1 (2002) and Part 3 (1979). According to the Regulation Implementing the Law on units of measurement (unit regulation - EinhV) of 13 December 1985, only the following units for pressure are allowed:
- **pascal (Pa)** - bar (bar)
- **millimetres of mercury (mmHg)**, however, only for blood pressure and the pressure of other body fluids in medicine.

The definitions and conversion factors in accordance with DIN 1301 apply for these units according to EinhV. In part 1 of this standard it is specified:
- **pascal as a derived SI unit with a specific name and with a specific unit symbol**
- **bar as a generally applicable unit outside SI**
- **millimetre of mercury as a unit outside SI with a limited scope of application.**

Part 3 of this standard defines, amongst other things, conversion factors for the following units:
- **conventional millimetre of mercury (mmHg)**
- **conventional metre of water (mWS)**
- **Torr (Torr)**
- **technical atmosphere (at)**
- **standard atmosphere (atm).**

#### Pictures:

- Cover: ©Cmon - Fotolia.com
- Page 10: Kaeser Kompressoren GmbH
- Page 16: Bitzer Kühlmaschinenbau GmbH
- Page 17: ©iStockphoto.com
### Conversion factors for temperature

#### Temperature scales

<table>
<thead>
<tr>
<th>Water</th>
<th>°C</th>
<th>°Réaumur</th>
<th>°F</th>
<th>K</th>
<th>°Rankine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling point</td>
<td>100</td>
<td>80</td>
<td>212</td>
<td>373.15</td>
<td>671.67</td>
</tr>
<tr>
<td>(at 1 atm = 101,325 Pa)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freezing point</td>
<td>0</td>
<td>0</td>
<td>32</td>
<td>273.15</td>
<td>491.67</td>
</tr>
<tr>
<td>(at 1 atm = 101,325 Pa)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interval freezing point</td>
<td>100</td>
<td>80</td>
<td>180</td>
<td>100</td>
<td>180</td>
</tr>
<tr>
<td>boiling point of water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(at 1 atm = 101,325 Pa)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triple point</td>
<td>0.01</td>
<td>0.008</td>
<td>32.02</td>
<td>273.16</td>
<td>491.69</td>
</tr>
<tr>
<td>(equilibrium solid-liquid-gaseous)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*C: degree Celsius, °F: degree Fahrenheit, K: Kelvin

#### Conversion formulae:

- a °C = (4/5)a °Réaumur = [32 + (9/5)a] °F
- b °Réaumur = (5/4)b °C = [32 + (9/4)b] °F
- t °C = (t + 273.15) K
- T_r,K = (T_r - 273.15) °C = [1.80 °C - 273.15] + 32] °F = 1.80 T_r °Rankine

#### Conversion table

<table>
<thead>
<tr>
<th>°C</th>
<th>-20</th>
<th>0</th>
<th>20</th>
<th>37.8</th>
<th>60</th>
<th>80</th>
<th>100</th>
<th>121.1</th>
<th>140</th>
<th>160</th>
</tr>
</thead>
<tbody>
<tr>
<td>°F</td>
<td>-4</td>
<td>32</td>
<td>68</td>
<td>100</td>
<td>140</td>
<td>176</td>
<td>212</td>
<td>256</td>
<td>284</td>
<td>320</td>
</tr>
<tr>
<td>K</td>
<td>253.2</td>
<td>273.2</td>
<td>293.2</td>
<td>310.9</td>
<td>333.2</td>
<td>353.2</td>
<td>373.2</td>
<td>394.3</td>
<td>413.2</td>
<td>433.2</td>
</tr>
</tbody>
</table>