

# Mechatronic

## pressure measuring instruments



 Part of your business

## Contents

<b>WIKA product lines</b>	<b>3</b>
<b>Pressure gauges with electrical output signal</b>	<b>4</b>
<b>Pressure gauges with switch contacts</b>	<b>8</b>
<b>Pressure gauges for differential pressure</b>	<b>12</b>
<b>Accessories and types of contacts</b>	<b>13</b>
<b>Mechanical pressure switches</b>	<b>14</b>
<b>Possibilities for combination with diaphragm seals</b>	<b>16</b>
<b>Special instrument designs</b>	<b>17</b>
<b>Technical information</b>	<b>18</b>
<b>WIKA worldwide</b>	<b>20</b>



**Fully automatic production of measuring instruments**



**The modern high-bay warehouse ensures efficient logistics**

# Ability to meet any challenge

## Our knowledge for your success

In the course of the last six decades the name WIKA has become a symbol for sophisticated solutions in the field of pressure and temperature measurement.

Our ever increasing ability is the basis for implementation of innovative technologies in the form of reliable products and efficient system solutions.

We owe our leading position in the world market to the consistent dedication towards premium quality, to which, today, 7,300 employees of the WIKA group of companies are committed. More than 500 experienced sales staff ensure that our customers are individually and competently advised and looked after from the outset. Anywhere and any time.

## Certified quality

The WIKA quality assurance management system has been certified in accordance with ISO 9001 since 1994. The quality and safety standards of our company meet the standard systems of several countries.

## Made by WIKA

The development and high-tech production in our owned modern production facilities Germany, Brazil, China, India, Canada, Poland, Switzerland, South Africa and U.S.A. is the best warranty for our flexibility.

Whether SMD automatic insertion machines, CNC automatic machining centres, welding robots, laser welding, sputterers, thermotransfer printing or thin film production - we exploit all possibilities to achieve above-average results. And the end result: More than 43 million quality products are delivered year in, year out, in more than 100 countries. Worldwide, approximately 350 million WIKA measuring instruments are in use.



**DKD/DAkkS accredited calibration laboratories for pressure and temperature**

# WIKA product lines

The WIKA programme covers the following product lines for various fields of application.

## Electronic pressure measurement

WIKA offers a complete range of electronic pressure measuring instruments: pressure sensors, pressure switches, pressure transmitters and process transmitters for the measurement of gauge, absolute and differential pressure. Our pressure measuring instruments are available in the measuring ranges 0 ... 0.6 mbar to 0 ... 15,000 bar. These instruments come supplied with standardised current or voltage output signals also intrinsically safe per ATEX or with flameproof enclosure, interfaces and protocols for various field buses. Whether ceramic thick film, metal thin film or piezo-resistive, WIKA is the leading manufacturer worldwide that develops and produces the full range of today's leading sensor technologies.

## Mechatronic pressure measurement

As a result of the almost unlimited options for different combinations of mechanical and electrical connections, an extraordinary range of instrument variants is possible. Various digital and analogue output signals are also available for these measuring instruments. For our measuring instruments we use latest sensors, tested in automotive applications millions of times over. They work without any kind of mechanical contact, consequently they are wear-resistant, and there's absolutely no influence on the mechanics.

## Mechanical pressure measurement

Indicating instruments for gauge, absolute and differential pressure with Bourdon tube, diaphragm or capsule pressure element have been tested millions of times over. These instruments cover scale ranges from 0 ... 0.5 mbar to 0 ... 7,000 bar and accuracies of up to 0.1 %.

## Diaphragm seals

WIKA diaphragm seals, fitted with pressure gauges, pressure transducers, pressure transmitters etc., are recognised and valued internationally for the most difficult of measuring tasks. The measuring instruments can thus be used at extreme temperatures -90 ... +400 °C and aggressive, corrosive, heterogeneous, abrasive, highly viscous or toxic media. The optimal diaphragm seal designs, materials and filling media are available for each application.

## Electrical temperature measurement

Our range of products includes thermocouples, resistance thermometers also with on-site display, temperature switches as well as analogue and digital temperature transmitters for all industrial applications, covering measuring ranges from -200 ... +1,600 °C.

## Mechatronic temperature measurement

As a result of the integration of switch contacts and output signals into our mechanical temperature measuring instruments, we can offer a wide variety of combined instruments. With switch contacts the pointer position triggers a change-over. Electrical output signals are realised via an additional, independent sensor circuit resistance thermometer or thermocouple.

## Mechanical temperature measurement

The mechanical temperature measuring instruments work on the bimetal, expansion or gas actuation principle and cover scale ranges from -200 ... +700 °C. All thermometers are suited for operation in a thermowell as required.

## Level measurement

WIKA has a comprehensive range of level measuring instruments available for temperatures up to 450 °C, specific gravity from 400 kg/m<sup>3</sup> and pressure ranges up to 420 bar. This includes standard instruments and customised products.

## Calibration technology

WIKA offers a broad product spectrum of calibration instruments for the physical measured values of pressure and temperature, and for electrical measured values. A multitude of specific patents ensure unmatched performance characteristics with many of our calibration instruments. The range of services comprises the calibration of pressure and temperature measuring instruments in our accredited DKD/DAkkS calibration laboratories and a mobile service to calibrate your instruments on site.

# Pressure gauges with electrical output signal

The multi-functional intelliGAUGEs present a cost-effective and, at the same time, reliable solution for nearly all pressure measurement applications. They combine the analogue indication of a mechanical pressure gauge, needing no external power, with the electrical output signal of a pressure transmitter. These hybrid instruments are available with all commonly used electrical signals. The sensor works in a non-contact way, without any influence on the measurement signal. Many of the instruments can be delivered in accordance with ATEX Ex II 2 G ia.

Depending on the pressure gauge, the following electrical output signals are possible:

- 0.5 ... 4.5 V ratiometric
- 4 ... 20 mA, 2-wire
- 4 ... 20 mA, 2-wire with Ex approvals
- 0 ... 20 mA, 3-wire
- 0 ... 10 V, 3-wire

For pressure gauges with nominal sizes 100 and 160 mm, the electrical output signals can also be combined with switch contacts.

## PGT01 plug

Bourdon tube, standard version



Nominal size: 40 mm  
 Scale range: 0 ... 1.6 to 0 ... 10 bar  
 Accuracy class: 2.5  
 Ingress protection: IP 40  
 Data sheet: PV 11.01

## PGT02

Bourdon tube, standard version, for panel mounting



Nominal size: 40 mm  
 Scale range: 0 ... 1.6 to 0 ... 10 bar  
 Accuracy class: 2.5  
 Ingress protection: IP 40  
 Data sheet: PV 11.02

## PGT10

Bourdon tube, plastic case



Nominal size: 40, 50 mm  
 Scale range: 0 ... 1.6 to 0 ... 400 bar  
 Accuracy class: 2.5  
 Ingress protection: IP 41  
 Data sheet: PV 11.05

## PGT11

Bourdon tube, stainless steel case



Nominal size: 40, 50, 63 mm  
 Scale range: 0 ... 1.6 to 0 ... 400 bar  
 Accuracy class: 2.5  
 Ingress protection: IP 41  
 Data sheet: PV 11.06

# intelliGAUGE®

## PGT21

Bourdon tube,  
stainless steel case



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

## PGT23.1x0

Bourdon tube,  
stainless steel version



Nominal size:	100, 160 mm
Scale range:	0 ... 0.6 to 0 ... 1,600 bar
Accuracy class:	1.0
Ingress protection:	IP 54, filled IP 65
Data sheet:	PV 12.04

## PGT23.063

Bourdon tube,  
stainless steel version



Nominal size:	63 mm
Scale range:	0 ... 1 to 0 ... 1,000 bar
Accuracy class:	1.6
Ingress protection:	IP 54, filled IP 65
Data sheet:	PV 12.03

# Pressure gauges with electrical output signal

## PGT43.1x0

Diaphragm, stainless steel version



Nominal size: 100, 160 mm  
 Scale range: 0 ... 16 mbar to 0 ... 25 bar  
 Accuracy class: 1.6  
 Ingress protection: IP 54, filled IP 65  
 Data sheet: PV 14.03

## PGT43HP.1x0

Diaphragm, stainless steel version, high overpressure safety



Nominal size: 100, 160 mm  
 Scale range: 0 ... 16 mbar to 0 ... 40 bar  
 Accuracy class: 1.6  
 Ingress protection: IP 54, filled IP 65  
 Data sheet: PV 14.07

## DPGT43.1x0

Differential pressure, stainless steel version



Nominal size: 100, 160 mm  
 Scale range: 0 ... 16 mbar to 0 ... 25 bar  
 Accuracy class: 1.6  
 Ingress protection: IP 54, filled IP 65  
 Data sheet: PV 17.05

## DPGT43HP.1x0

Differential pressure, stainless steel version, high overpressure safety



Nominal size: 100, 160 mm  
 Scale range: 0 ... 60 mbar to 0 ... 40 bar  
 Accuracy class: 1.6  
 Ingress protection: IP 54, filled IP 65  
 Data sheet: PV 17.13

## PGT63HP.1x0

Capsule, stainless steel version



Nominal size: 100, 160 mm  
 Scale range: 2.5 ... 100 mbar  
 Accuracy class: 1.6  
 Ingress protection: IP 54  
 Data sheet: PV 16.06

# intelliGAUGE®

## APGT43.1x0

Absolute pressure, stainless steel version



Nominal size:	100, 160 mm
Scale range:	0 ... 25 mbar to 0 ... 25 bar abs
Accuracy class:	2.5
Ingress protection:	IP 54, filled IP 65
Data sheet:	PV 15.02

## 732.15.1x0

Cryo gauge, stainless steel version



Nominal size:	100, 160 mm
Scale range:	0 ... 80 to 0 ... 2,300 mbar
Accuracy class:	1.6
Ingress protection:	IP 65
Data sheet:	PM 07.30

## 712.15.1x0

Cryo gauge, Cu-alloy



Nominal size:	100, 160 mm
Scale range:	0 ... 80 to 0 ... 2,300 mbar
Accuracy class:	1.6
Ingress protection:	IP 65
Data sheet:	PM 07.30

# Pressure gauges with switch contacts

Control systems are gaining more and more importance in industrial applications. Consequently, mere 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 new mechatronic product line in order to satisfy this trend.

The switchGAUGEs are based on a high-quality mechanical WIKA pressure gauge.

Depending on the model the following contacts are built-in:

- Magnetic snap-action contact 821
- Inductive contact 831
- Electronic contact 830e
- Reed contact 851
- Micro switch model 850
- Transistor output NPN or PNP

All instruments with inductive contacts are certified in accordance with ATEX Ex II 2 GD c TX.

## PGS06

Bourdon tube, plastic case



Nominal size:	40, 50 mm
Scale range:	0 ... 1.6 to 0 ... 400 bar
Accuracy class:	2.5
Ingress protection:	IP 41
Data sheet:	PV 21.05

## PGS07

Bourdon tube, stainless steel case



Nominal size:	40, 50, 63 mm
Scale range:	0 ... 1.6 to 0 ... 400 bar
Accuracy class:	2.5
Ingress protection:	IP 41
Data sheet:	PV 21.06

## PGS10

Bourdon tube, plastic case, standard version



Nominal size:	50 mm
Scale range:	0 ... 0.6 to 0 ... 400 bar
Accuracy class:	2.5
Ingress protection:	IP 41
Data sheet:	PV 20.01

## PGS11

Bourdon tube, standard version, stainless steel case



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 41
Data sheet:	PV 21.01



# switchGAUGE

## PGS21

Bourdon tube, stainless steel case,  
fixed contacts



Nominal size: 40, 50, 63 mm  
Scale range: -1 ... 0 to 0 ... 400 bar  
Accuracy class: 1.6 or 2.5  
Ingress protection: IP 65  
Data sheet: PV 21.02

## PGS25

Bourdon tube,  
stainless steel case



Nominal size: 50, 63 mm  
Scale range: 0 ... 1.6 to 0 ... 400 bar  
Accuracy class: 2.5  
Ingress protection: IP 65  
Data sheet: PV 21.04

## PGS21.1x0

Bourdon tube,  
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

# Pressure gauges with switch contacts

## PGS23.1x0

Bourdon tube, stainless steel version



Nominal size: 100, 160 mm  
 Scale range: 0 ... 0.6 to 0 ... 1,600 bar  
 Accuracy class: 1.0  
 Ingress protection: IP 65  
 Data sheet: PV 22.02

## PGS23.063

Bourdon tube, stainless steel, safety version



Nominal size: 63 mm  
 Scale range: 0 ... 4 to 0 ... 400 bar  
 Accuracy class: 1.6  
 Ingress protection: IP 54  
 Data sheet: PV 22.03

## PGS43.1x0

Diaphragm, stainless steel version



Nominal size: 100, 160 mm  
 Scale range: 0 ... 16 mbar to 0 ... 25 bar  
 Accuracy class: 1.6  
 Ingress protection: IP 54  
 Data sheet: PV 24.03

## 432.x6.1x0 with 8xx

Diaphragm, stainless steel version, high overpressure safety



Nominal size: 100, 160 mm  
 Scale range: 0 ... 16 mbar to 0 ... 40 bar  
 Accuracy class: 1.6  
 Ingress protection: IP 54  
 Data sheet: PV 24.07

# switchGAUGE

## 532.53 with 8xx

Absolute pressure,  
stainless steel version



Nominal size: 100, 160 mm  
Scale range: 0 ... 25 mbar to 0 ... 25 bar abs  
Accuracy class: 1.0  
Ingress protection: IP 54  
Data sheet: PV 25.02

## 632.51 with 8xx

Capsule,  
stainless steel version



Nominal size: 100, 160 mm  
Scale range: 0 ... 2.5 to 0 ... 100 mbar  
Accuracy class: 1.6  
Ingress protection: IP 54  
Data sheet: PV 26.06

# Differential pressure gauges with switch contacts

## DPGS43.1x0

Stainless steel version



Nominal size:	100, 160 mm
Scale range:	0 ... 16 mbar to 0 ... 25 bar
Accuracy class:	1.6
Ingress protection:	IP 54, filled IP 65
Data sheet:	PV 27.05

## DPGS43HP.1x0

Stainless steel version, high  
overpressure safety



Nominal size:	100, 160 mm
Scale range:	0 ... 60 mbar to 0 ... 40 bar
Accuracy class:	1.6
Ingress protection:	IP 54, filled IP 65
Data sheet:	PV 27.13

## 702.02.100

DELTA-comb,  
working pressure indication



Nominal size:	100 mm
Scale range:	0 ... 250 mbar to 0 ... 25 bar
Accuracy class:	1.6
Ingress protection:	IP 65
Data sheet:	PV 27.16

## 851.02.100

DELTA-switch,  
differential pressure switch



Nominal size:	100 mm
Scale range:	0 ... 0.25 to 0 ... 25 bar
Accuracy class:	1.6 % of full scale value
Switch point repeatability:	1.6 % of full scale value
Ingress protection:	IP 65
Data sheet:	PV 27.17

# Accessories and types of contacts

## 821

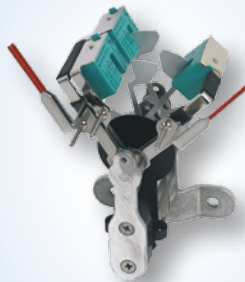
### Magnetic snap-action contact



- No control unit and no extra power supply required
- Direct switching up to 250 V, 1 A
- Up to 4 switch contacts per measuring instrument

## 831

### Inductive contact



- Long service life due to non-contact sensor
- Additional control unit model 904.xx required
- With corresponding control unit suitable for use in zone 1/21 (2 GD) hazardous areas
- Insensitive to corrosion
- Up to 3 switch contacts per measuring instrument

## 830 E

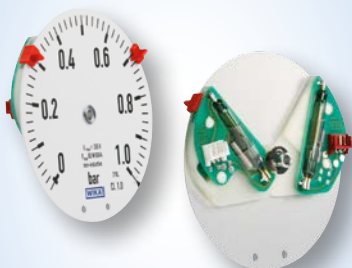
### Electronic contact



- For direct triggering of a programmable logic controller (PLC)
- Long service life due to non-contact sensor
- Insensitive to corrosion
- Up to 3 switch contacts per measuring instrument

## 851

### Reed contact



- No control unit and no extra power supply required
- Direct switching up to 250 V, 1 A
- Also suitable for direct triggering of a programmable logic controller (PLC)
- Free from wear as without contact
- Up to two change-over contacts per measuring instrument

## 905.1x

### Contact protection relay for contacts model 821



- Application: For optimal contact protection and highest switching reliability
- Data sheet: AC 08.01

## 904.xx

### Control units for inductive contacts model 831



- Application: For operating gauges with inductive switch contacts
- Data sheet: AC 08.01

# Mechanical pressure switches

These high-quality pressure switches have been developed especially for safety-critical applications. In order to ensure as flexible operation as possible, the pressure switches are equipped with micro switches, which make it possible to switch an electrical load of up to 15 A/AC 220 V directly. For smaller contact ratings, such as for PLC applications, Argon gas-filled micro switches with gold-plated contacts can be selected as an option. All wetted materials are from stainless steel as a standard. The pressure switches are SIL 2 approved in accordance with IEC 61508 for use in safety applications (SIS).

Each switch family is available in IP 65, Ex-ia or Ex-d versions. The cases of the Ex-d certified switches are from copper-free aluminium with a yellow epoxy resin coating, the standard versions are from stainless steel. The switches are resistant to extreme environmental conditions and are suitable for use in hazardous areas.

The switches can also be supplied for special use in NACE, off-shore, tropical or ammonia applications. For all pressure switches we offer the presetting of the switch points free of charge.

## PXS, PXA

### Mini pressure switch, stainless steel version



Measuring range:	1 ... 2.5 to 50 ... 400 bar
Ingress protection:	IP 66
Ignition protection type:	Ex-ia or Ex-d
Contact rating:	5 A, AC 220 V
Data sheet:	PV 34.36, PV 34.38 (Ex)

## PCS, PCA

### Compact pressure switch



Measuring range:	-1 ... -0.2 to 20 ... 100 bar
Ignition protection type:	Ex-ia or Ex-d
Switch:	1 x SPDT or DPDT
Contact rating:	15 A, AC 220 V
Data sheet:	PV 33.30, PV 33.31 (Ex)

## PCS-HP, PCA-HP

### Compact pressure switch, for high pressure ranges



Measuring range:	8 ... 40 to 100 ... 600 bar
Ignition protection type:	Ex-ia or Ex-d
Switch:	1 x SPDT or DPDT
Contact rating:	15 A, AC 220 V
Data sheet:	PV 33.32, PV 33.33 (Ex)

## BWX, BAX

### Bourdon tube



Measuring range:	-1 ... 1.5 to 0 ... 600 bar
Ignition protection type:	Ex-ia or Ex-d
Switch:	1 or 2 x SPDT
Contact rating:	15 A, AC 220 V
Data sheet:	PV 32.20, PV 32.22

## MW1, MA1

### Diaphragm



Measuring range:	-0.2 ... 0 mbar to 0 ... 40 bar
Ignition protection type:	Ex-ia or Ex-d
Switch:	1 or 2 x SPDT
Contact rating:	15 A, AC 220 V
Data sheet:	PV 31.10, PV 31.11 (Ex)

## MWB, MAB

### Diaphragm, for low pressure ranges



Measuring range:	-100...0 mbar to 0 ... 100 mbar
Ignition protection type:	Ex-ia or Ex-d
Switch:	1 or 2 x SPDT
Contact rating:	15 A, AC 220 V
Data sheet:	PV 31.12, PV 31.13 (Ex)

## MWH, MAH

Diaphragm piston system,  
for high pressure ranges



Measuring range: 4 ... 40 to 30 ... 600 bar  
Ignition protection  
type: Ex-ia or Ex-d  
Switch: 1 or 2 x SPDT  
Contact rating: 15 A, AC 220 V  
Data sheet: PV 31.14, PV 31.15 (Ex)

## DW, DA

Differential pressure switch



Measuring range: 0 ... 160 mbar to 0 ... 40 bar  
Ignition protection  
type: Ex-ia or Ex-d  
Static pressure: 40, 100 or 160 bar  
Switch: 1 or 2 x SPDT  
Data sheet: PV 35.42, PV 35.43 (Ex)

## DW10, DA10

Differential pressure switch,  
for low pressure ranges



Measuring range: 0 ... 16 to 0 ... 60 mbar  
Ignition protection  
type: Ex-ia or Ex-d  
Static pressure: 10 bar  
Switch: 1 or 2 x SPDT  
Data sheet: PV 35.44, PV 35.45 (Ex)

## DC, DE

Differential pressure switch,  
compact version



Measuring range: 0 ... 160 mbar to 0 ... 40 bar  
Ignition protection  
type: Ex-ia or Ex-d  
Static pressure: 40, 100 or 160 bar  
Switch: 1 x SPDT or DPDT  
Data sheet: PV 35.40, PV 35.41 (Ex)

## APW, APA

Absolute pressure switch



Measuring range: 0 ... 160 mbar to 0 ... 1 bar  
Ignition protection  
type: Ex-ia or Ex-d  
Overpressure  
safety: 11 bar abs.  
Switch: 1 or 2 x SPDT  
Data sheet: SP 08.50, SP 08.51 (Ex)

## APW10, APA10

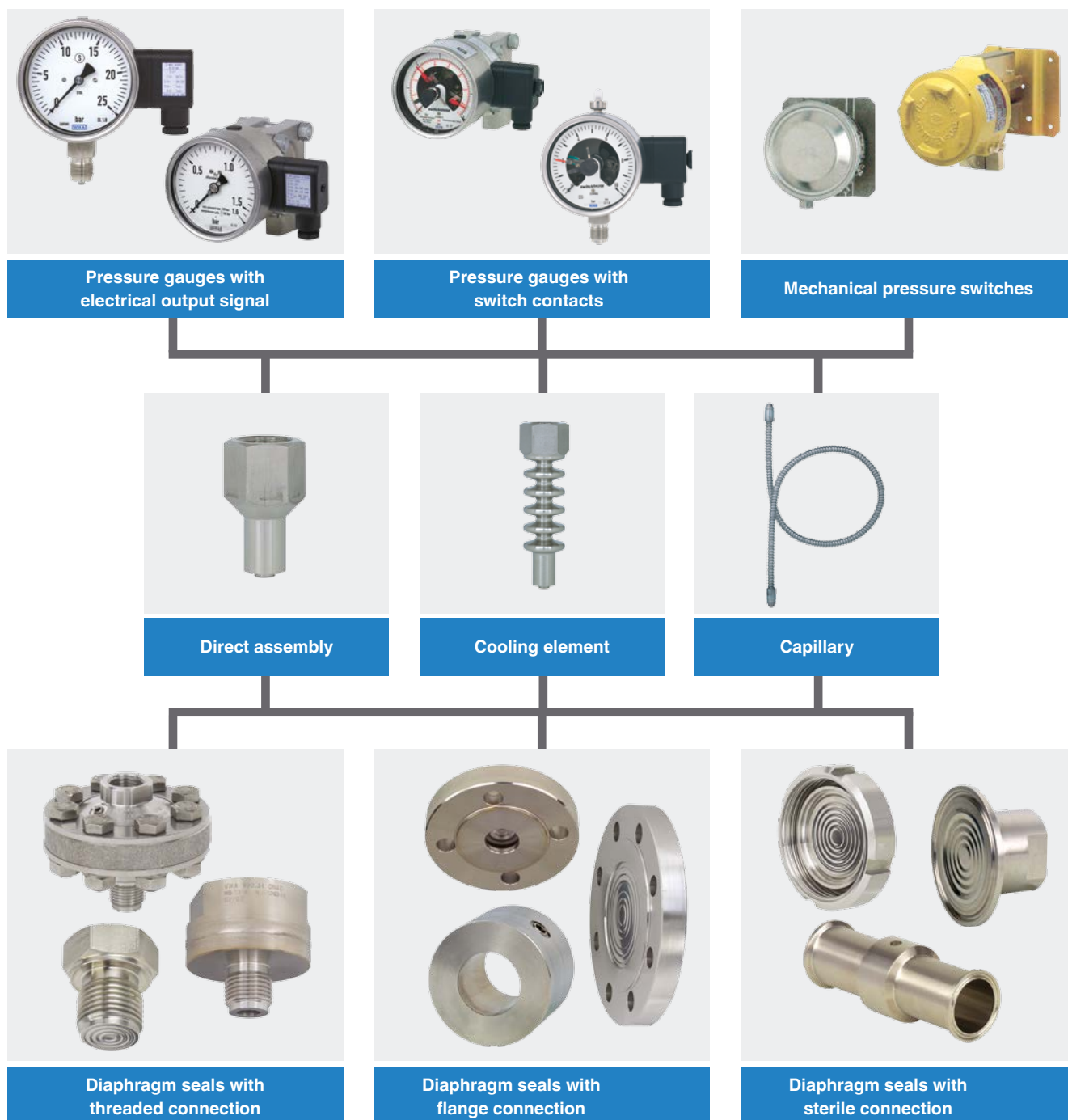
Absolute pressure switch,  
for low pressure ranges



Measuring range: 0 ... 25 to 0 ... 60 mbar  
Ignition protection  
type: Ex-ia or Ex-d  
Overpressure  
safety: 2 bar abs.  
Switch: 1 or 2 x SPDT  
Data sheet: SP 08.52, SP 08.53 (Ex)

# Possibilities for combination and assembly

Assembly of the diaphragm seal and measuring instrument may be made via a rigid direct connection or a flexible capillary. The “rigid” assembly is made by a direct threaded connection or welding the measuring instruments to the diaphragm seal or via an adapter. For high temperatures a cooling element can be fitted between seal and instrument.



The configuration of the combination of pressure measuring instruments and diaphragm seals depends, among other things, on the application conditions in which the assembly must work. Please do not hesitate to ask us for advice regarding the selection of suitable diaphragm seals and the best configuration for your specific application.



# The right solution

## Your design

We deliver our measuring instruments just as you require. Cases and dials, scales, cables, sealings and much more can be manufactured with your logo or to the design you wish. We can also provide you with complete technical documentation in your design, with your model designation and corresponding packaging.



## Indicating – transmitting – switching

In some cases, not only analogue output signals, such as 4 ... 20 mA, are necessary for a PLC, but also additional signals which can switch a load directly. For these applications, IntelliGAUGes (pressure gauges with an integrated transmitter) are available, into which additional switch contacts for the direct switching of higher loads can also be integrated.

## Special applications

### Example medical engineering

Pressure monitoring in medical engineering covers a multitude of applications; ranging from treating patients with anaesthetic gases or special gas mixtures, to gaseous disinfectants for sterility and hygiene, to the provision of specific pressure conditions for surgery. Here, special instrument designs are used, which are suitable for operation with oxygen.



## An innovative partner for OEM applications

With our high-tech production lines and technical experts, WIKA is perfectly equipped for the requirements of the OEM market.

While our standard product range includes products that can be used in numerous ways, individual consulting and customised solutions complete our broad range of services and products.



# Transmitters

## Hall sensor

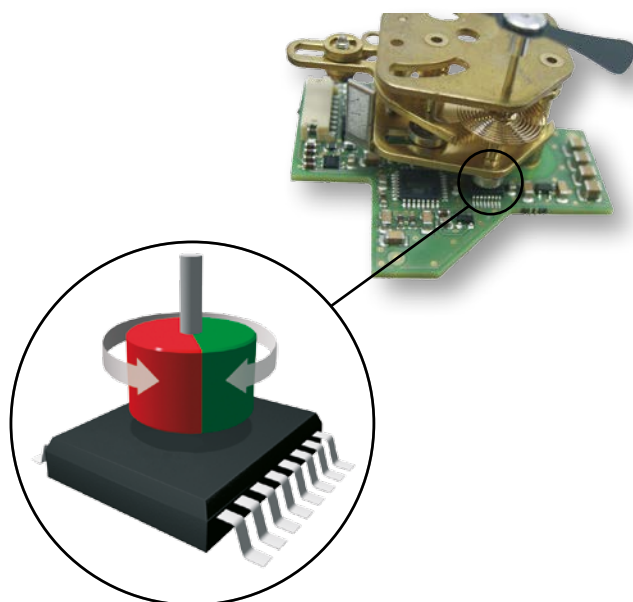
Bourdon tube pressure elements are widely used as measuring elements within pressure measurement technology due to their robustness and simple handling. Under the influence of pressure, these pressure elements deform within their elastic limits.

This motion is converted, via a mechanical movement (toothed gear), into a rotational motion. A magnet on the pointer shaft rotates proportionally to the instrument pointer as a direct linear function of the process pressure. The electronics positioned opposite the magnet register the rotary motion of the magnet.

A magnetic-field-dependent sensor picks up this change on the electronic side, contact-free, wear-free and without reaction on the pressure element.

The sensor signal, proportional to the deflection, is converted to an electrical output signal via an amplifier. The span of the electrical output signal corresponds to the measuring span on the dial. With the appropriate transistor switches, switching outputs are also available.

A pressure gauge with an electrical output signal from the intelliGAUGE 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 model measured value registration.



Transmitter

# Switch contacts

**Built into mechanical pressure and temperature gauges - they make or break an electrical control circuit dependent upon the position of the instrument's pointer. They can be used for various monitoring functions, such as, for example, to start, stop or switch processes or even just as a "simple" alarm when a measured value either falls below, or exceeds a preset value. Magnetic snap-action contacts, inductive contacts and electronic contacts, mounted behind the instrument dial, can be set to any point across the entire scale range via the set pointer. The instrument pointer (actual value pointer) moves freely across the entire scale range, independent of the setting. The contacts can be adjusted using a removable adjustment key in the window or via a spindle in the front of the instrument. For transistor outputs the switch values can be programmed to meet your requirements.**

## Magnetic snap-action contact model 821

This universal contact can be used in a whole range of operating conditions. The set pointer has an adjustable permanent magnet attached, giving a snap-action characteristic to the contacts. This strengthens the contact force. This snap-action behaviour provides further protection of the contacts against harmful arcing effects. The signal is made either before or after mating, dependent upon the movement of the instrument pointer.

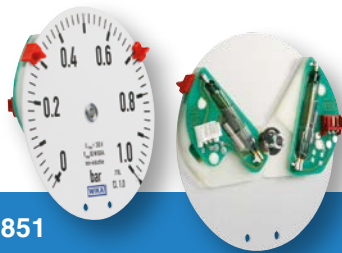


## Magnetic snap-action contact model 821

Proper operation will ensure many years of problem-free operation for the magnetic snap-action contacts. For low switching voltages, to maintain reliability, the current to be switched should not be less than 20 mA. For extremely high as well as for lower loads, and also for liquid-filled gauges, we recommend the use of contact protection relays.

### Reed contact model 851

This universal contact can be used in all operating conditions. It can switch loads up to 230 V/1 A directly, as well as giving a secure contact with extremely low currents. It can also be used as a direct input to PLC's. Its design and its very low mass make it particularly vibration resistant. The contact is switched by a magnet fixed to the instrument pointer. The switching is therefore made without contact and is thus free from wear. The setting and the visualisation of the switch points is achieved via the red marks situated on the dial. The reed switch is always a change-over contact and can be used as either a normally-closed, a normally-open or a change-over contact. A maximum of 2 change-over contacts are possible per instrument.

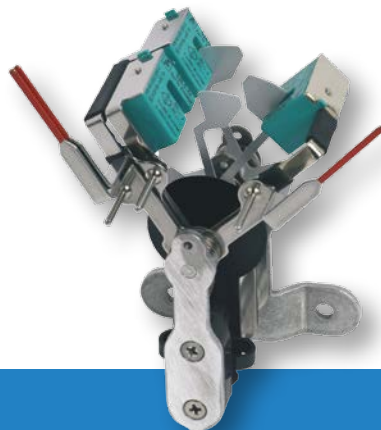


Reed contact model 851

### Inductive contact model 831

In hazardous areas, only measuring instruments with inductive contacts for zone 1 and 2 hazardous areas may be used. Outside of Ex areas, these contacts are primarily used where particularly safe switching at higher switching rates is important. Typical application areas are those in chemical, petrochemical and nuclear plants.

The inductive contact works in a non-contact way. Essentially it consists of the control head (initiator), attached to the set pointer, with its fully-potted electronics and the mechanical assembly with the moving flag. The flag is moved by the instrument pointer. The control head is supplied with a DC voltage. When the flag enters the slot in the control head this then increases its internal resistance. The subsequent change in the current acts as the input signal for switching amplifiers of the control unit. The non-contact "contact system" produces no wear within the electrical system, and so leads to a longer service life.



Inductive contact model 831

### Electronic contact model 830 E

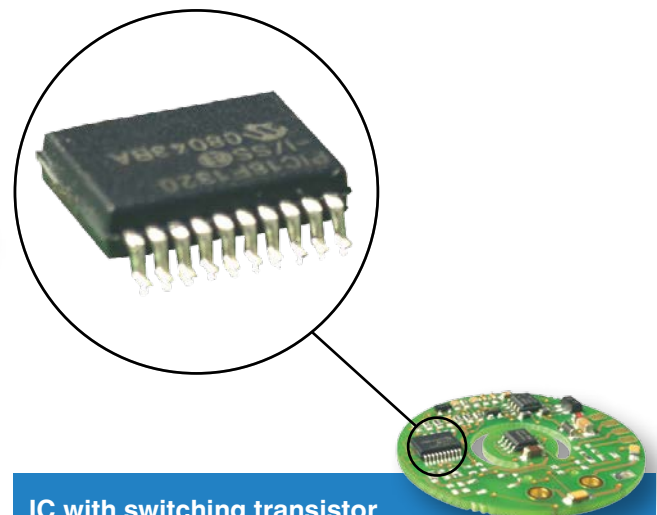
This contact can switch small loads, such as those usual in programmable logic controllers (PLC), directly. The "inductive contact with integrated amplifier" is factory-fitted to the measuring instrument. The usual advantages of inductive contacts, such as fail-safe contact operation, no wear due to proximity contact operation as well as virtually no effect on the measuring system, also apply here. No additional control unit is required.



Electronic contact model 830 E

### Transistor output NPN or PNP

Transistors are electronic semiconductor elements, which are used to switch on, switch off or amplify electrical signals, without any moving, mechanical components. In principle, it is an electrical resistance, controlled through either a current or a voltage. Either an NPN or a PNP bipolar transistor is used. In both designs a basic current  $I_B$  controls a stronger current  $I_C$  in load circuit (collector circuit). The transistors switch a maximum  $I_C$  of 100 mA without any wear. They switch without any contact so that oxidation or mechanical wear cannot occur. Thus reliable switching is ensured in the long term.



IC with switching transistor

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