Product Review

Mechanical
Pressure Measuring Instruments

WIKA

Part of your business

Contents

Fully automatic production of standard pressure gauges

The modern high-bay warehouse ensures efficient logistics

Ability to meet any challenge

Our knowledge for your success

In the course of the last five 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.

Our top ranking in the world market today owes itself to the consistent devotion to ensure first class quality backed by more than 4,700 employees in the WIKA group of companies. Right from the outset more than 500 experienced distribution employees alone ensure that our customers are competently advised and individually serviced throughout the world.

Certified quality

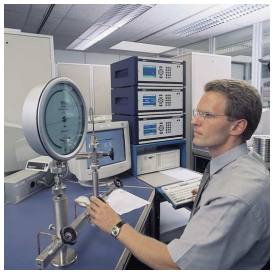
The WIKA quality assurance management system has been certified in accordance with ISO 9001:2001 since 1994. The quality and safety standards of our company meet the standard systems of several countries.

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 32 million quality products are delivered year in, year out, in more than 100 countries. This means some 350 million WIKA measuring instruments in use all over the globe.



DKD accredited calibration laboratories for pressure, temperature and mass

WIKA Product lines

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

Electronic pressure measuring instruments

WIKA offers the complete range of electronic pressure measuring instruments: We offer solutions for the measurement of gauge, absolute and differential pressure in the measuring ranges 0...0.6 mbar to 0...10,000 bar. Our pressure transmitters, transmitters with Turn down (UniTrans) and pressure switches come supplied with standard current or voltage output signals, or digital interfaces with protocols for various types of field buses. In addition WIKA is also your competent partner for pressure sensors with non-amplified output signals. Whether ceramic thick-film, metal thin-film or piezo-resistive pressure sensors, WIKA is the only manufacturer worldwide that produces the full range of essential sensor technologies possible today in-house.

Mechanical pressure measuring instruments

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, which cover pressure ranges from 0 ... 2.5 mbar to 0 ... 7,000 bar and accuracies of up to 0.1 %, can also be equipped with mechanical, electrical and electronic accessories and combined with a variety of diaphragm seal solutions.

Diaphragm seals

Our know-how on the subject of diaphragm seal systems is appreciated and recognised internationally. In combination with diaphragm seals, which are available in many different designs and special materials, pressure gauges, pressure transducers, pressure transmitters and pressure switches can be used even under extreme conditions.
Thanks to the diaphragm seals the measuring instruments are suited to extreme temperatures as well as aggressive, corrosive, heterogeneous, abrasive, highly viscous or toxic media. In addition, diaphragm seals also enable a hygienic connection of measuring instruments to the process.

Electrical temperature measuring instruments

Our range of products includes thermocouples, resistance thermometers, analogue and digital temperature transmitters, digital indicators, controllers and calibrators for temperature ranges from -200 °C to +1,800 °C.

Mechanical temperature measuring instruments

Our mechanical temperature measuring instruments work on the bimetal or gas actuation principle and cover temperature ranges from -200 °C to +700 °C.
A large variety of thermowells are available for the thermometers, so that they can even be used under extreme process conditions.
The thermowells can also be ordered in special materials, e.g. hastelloy or titanium, or with special coatings of tantalum, teflon etc.
As an engineering service we offer thermowell calculations in accordance with Dittrich/Klotter or ASME/ANSI PTC 19.3.

Testing and calibration technology

WIKA maintains DKD (German calibration service) calibration laboratories for pressure, temperature and mass as measurement variables. We not only calibrate instruments manufactured by WIKA, but also instruments from other manufacturers on customer request in pressure ranges from -1 bar to 5,000 bar with the smallest possible measurement increments and in temperature ranges from -196 °C to +1,300 °C with measurement increments up to 2 mK. Due to multilateral agreements by the European co-operation for Accreditation (EA) DKD calibration certificates are recognised in 25 European member countries.

Outside of Europe the national accreditation bodies of Australia, Brazil, China, India, Japan, Canada, New Zealand, Singapore, South Africa, Taiwan, United States of America and Vietnam are currently cosignatories of these agreements.
This confirms the increasing worldwide acceptance of the DKD calibration certificates.

For all product lines product reviews are available and may be ordered by telefax request.

Mechanical pressure gauges

Mechanical pressure gauges are produced with bourdon tube, diaphragm and bellow and spring elements and are accordingly different. The measuring elements are made of copper alloys, alloyed steels or produced in special materials for specific measuring applications.

Pressures are only measurable in conjunction with a reference pressure. The atmospheric pressure alone serves as reference pressure. The pressure gauge shows how much the measured pressure is higher or lower in relation to the given atmospheric pressure (i.e. an overpressure measuring instrument). The pressure is shown in standard measuring ranges on the dial by the pointer. Liquid-filled pressure gauges offer optimal protection against destruction by high dynamic pressure loads or vibrations as a result of their cushioning. Switching operations can be carried out when combined with alarm contacts and electrical output signals (for example 4 ... 20 mA) can be used for industrial process automation in combination with transmitters.

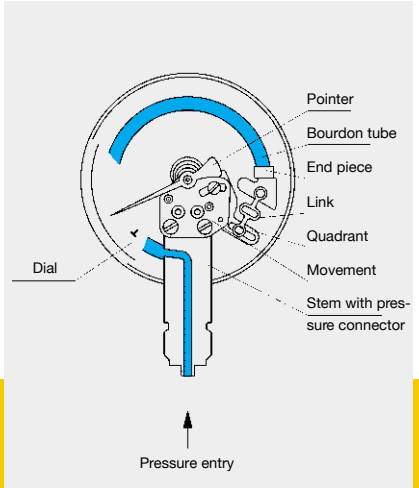
1. Pressure gauges with bourdon tube

Bourdon tubes are circular-shaped tubes with an oval cross-section. The pressure of the media acts on the inside of this tube. The end of the tube which is not fixed moves, this movement being a measurement for the pressure. This movement is indicated by a pointer.

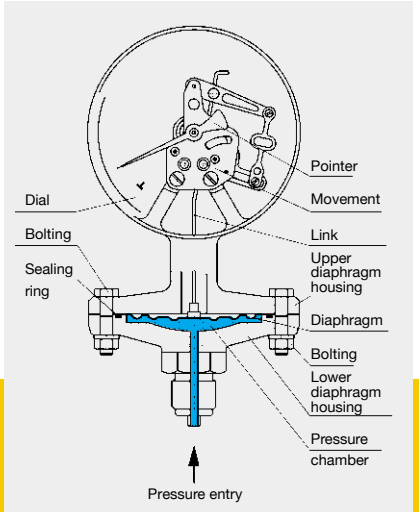
The bourdon tubes bent at an angle of approx. 250° are used for pressures up to approx. 60 bar. Used for higher pressures are bourdon tubes with a number of superimposed coils of the same diameter (i.e. helical coils) or helical-shaped coils (i.e. helical springs) at one level. Bourdon tubes can only be protected against overload to a limited extent. For particularly difficult measuring operations the pressure gauge can be provided upstream with a diaphragm seal as separation or protection system. The pressure ranges are between 0 ... 0.6 and 0 ... 7,000 bar with a reading accuracy (or class) from 0.1 to 4.0 %.

2. Pressure gauges with diaphragm elements

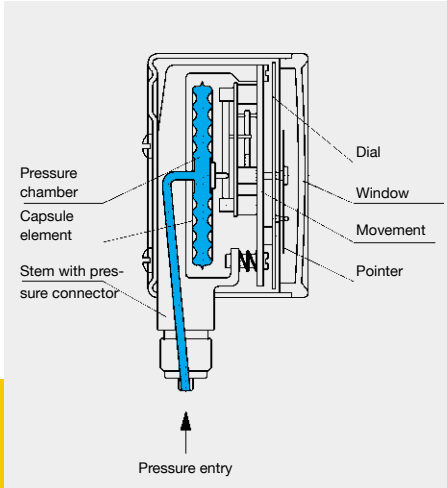
Diaphragm elements are circular-shaped, convoluted membranes. They are either clamped around the rim between two flanges or welded and subject to the pressure of the media acting on one side. The deflection caused in this way is used as a measurement for the pressure and is indicated by a pointer.
Compared with bourdon tubes these diaphragm elements have a relatively high activating force. Due to the annular clamping of the element they are insensitive to vibration. The diaphragm element can be subject to higher overload through load take-up points (by bringing the diaphragm element up against the upper flange). Moverover, the measuring instrument can also be protected against extremely corrosive media by coating with special material or covering with foil.
Wide connection ports, open connection flanges and purging plugs can be integrated for measuring highly viscous, impure or crystallizing media.
Pressure ranges are between 0 ... 16 mbar and 0 ... 40 bar in accuracy class from 0.6 to 2.5 %.



Bourdon tube pressure gauges



Diaphragm pressure gauges



Capsule pressure gauges

3. Pressure gauges with capsule elements

The capsule element comprises two circular-shaped, convoluted membranes sealed tight around their circumference. The pressure acts on the inside of this capsule and the generated stroke movement is shown by a pointer as measurement of pressure.
Pressure gauges with capsule elements are more especially suitable for gaseous media and relatively low pressures. Overload protection is possible within certain limits.
The activating force is increased if a number of capsule elements are connected mechanically in series (a so-called capsule element "package").
Pressure ranges are between 0 ... 2.5 mbar and 0 ... 0.6 bar in the accuracy class 0.1 to 2.5.

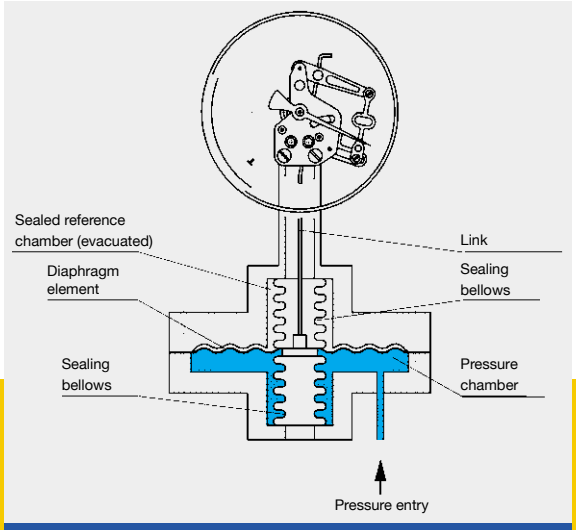
4. Absolute pressure gauges

These instruments are used where pressures are to be measured independent of the natural fluctuations in atmospheric pressure. As a general rule all the known types of element and measuring principles can be applied.
The pressure of the media to be measured is compared against a reference pressure which, at the same time, is absolute zero. For this purpose an absolute vacuum is given as reference pressure in a reference chamber on the side of the measuring element not subject to pressure. This function is achieved by sealing off the appropriate measuring chamber or surrounding case. Measuring element movement transmission and pressure indication follow in the same way as with the already described overpressure gauges.
Pressure ranges are between 0 ... 16 mbar and 0 ... 25 bar in the accuracy class 0.6 to 2.5.

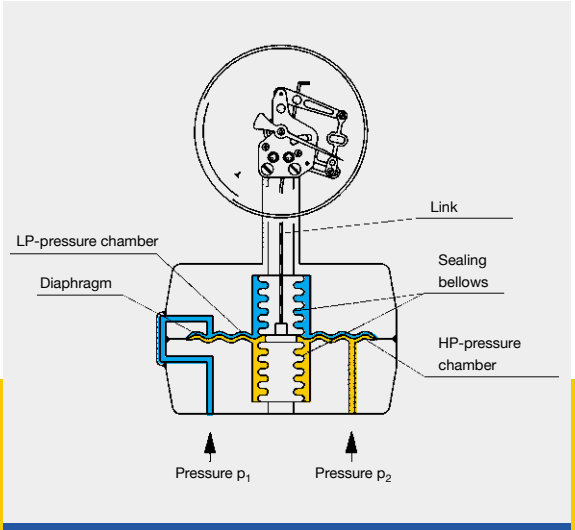
5. Differential pressure gauges

The difference between two pressures is determined directly and shown on the differential pressure gauge. Here again all of the measuring elements known from overpressure gauges and the measuring principles can be applied.
Two sealed medium chambers are separated by the measuring element or measurement elements, respectively. If both operating pressures are the same the measuring element cannot make any movement and no pressure will be indicated. A differential pressure reading is only given when one of the pressures is either higher or lower. Low differential pressures can be measured directly in the case of high static pressures. Very high overload capability is achieved with diaphragm elements.
The permissible static pressure and the overload capability on the ⊕ and ⊖ side must be observed. Transmission of the measuring element movement and pressure indication is the same as with the already described overpressure gauges in the majority of cases.
Pressure ranges are between 0 ... 2.5 mbar and 0 ... 40 bar in the accuracy class 0.6 to 2.5.

Areas of application
- Filter technology (monitoring filter state)
- Filling level measurement (in enclosed containers)
- Flow measurement (pressure drop)



Absolute pressure gauges



Differential pressure gauges

Bourdon tube pressure gauges

Designation	Standard series	Welding gauges EN 562	Plastic case with liquid filling
Service intended	for gaseous and liquid media	for uses in welding, cutting and related processes	for adverse service conditions where pulsation or vibration exists
Model	111.10 (bottom connection) 111.12 (back connection)	111.11	113.13
Nominal size [mm]	40, 50, 63, 80, 100 (Model 111.10 also NS 160)	40, 50, 63	40, 50, 63
Scale ranges (EN 837-1/5)	0…0.6 to 0…400 bar (Model 111.10 NS 160 only to 40 bar)	0…0.6 to 0…400 bar for oxygen, acetylene and other gases	0…1.0 to 0…400 bar
Accuracy class (EN 837-1/6)	2.5	2.5	2.5
Pressure connection (threaded entry male)	111.10: NS 40 G 1/8 B NS 50, 63 G 1/4 B NS 80, 100, 160 G 1/2 B 111.12: NS 40 G 1/8 B NS 50, 63, 80, 100 G 1/4 B	Lower mount NS 40 G 1/8 B NS 50, 63 G 1/4 B with restrictor screw	Lower or back mount (NS40 only back) NS 40 G 1/8 B NS 50, 63 G 1/4 B
Wetted parts material	Cu-alloy	Cu-alloy	Cu-alloy
Case material	Black plastic (Model 111.10 NS 160 and Model 111.12 NS 100 black finish steel)	Brass lacquered steel with pressure vent in the back	Black plastic with front flange
Data sheet www.wika.de	Model 111.10: PM 01.01 Model 111.12: PM 01.09	PM 01.03	PM 01.04
Optional extras / Notes	■ Case material black finish steel ■ Special versions for Heating systems, Water-level indication, Tyre pressure, Refrigerant gauge	■ Back pressure connection ■ Pressure element for acetylene gauge: max. 70 % content of copper	■ 3-hole panel mounting flange ■ With clamp (back entry only)

Industrial series	Stainless steel case with liquid filling	Forged brass case with liquid filling	Square and edgewise panel mounting series
for gaseous and liquid media	for adverse service conditions where pulsation or vibration exists	for adverse service conditions where pulsation or vibration exists	for gaseous and liquid media, designed particularly for panel mounting
212.20	213.53	213.40	214.11
100, 160 (250, see below)	40, 50, 63, 80, 100	63, 100	48 x 24, 72 x 36 72 x 72, 96 x 96 144 x 144, 144 x 72
0…0.6 to 0…1000 bar (100) 0…0.6 to 0…1600 bar (160)	0…0.6 to 0…1000 bar 0…1.0 to 0…400 bar (NS 50)	0…0.6 to 0…1000 bar	0…0.6 to 0…40 bar 0…0.6 to 0…400 bar 0…0.6 to 0…1000 bar
1.0	1.0 1.6 (NS 50, 63) 2.5 (NS 40)	1.0 1.6 (NS 63)	1.0 1.6
Lower or back mount G ½ B	Lower or back mount NS 40 G ⅛ B NS 50, 63 G ¼ B NS 80, 100 G ½ B	Lower or back mount NS 63 G ¼ B NS 100 G ½ B	Back mount G ⅛ B G ¼ B G ½ B
Cu-alloy	Cu-alloy	Cu-alloy	Cu-alloy
Stainless steel	Stainless steel with pressure relief and bezel ring with triangular front edge	Brass forging, black	Black finish steel or galvanised steel
PM 02.01	PM 02.12	PM 02.06	PM 02.07 PM 02.08
■ 3-hole panel or surface mounting flange ■ Liquid filled 160 mm: Model 213.20 100 mm: see Mod. 213.53 ■ Alarm contacts ■ NS 250, Model 2X1.11: see data sheet PM 02.17	■ 3-hole panel or surface mounting flange ■ With clamp (back entry only)	■ 3-hole panel or surface mounting flange ■ With clamp (back entry only)	■ Stainless steel pressure system 72 x 72 and up (Model 234.11) ■ Duplex pressure system 144 x 72 mm only ■ Alarm contacts 96 x 96 mm and up

Bourdon tube pressure gauges

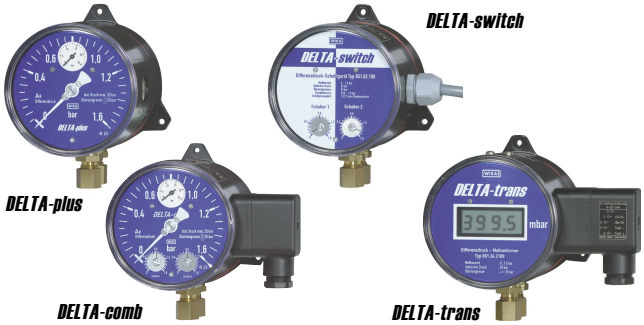
Designation	Stainless steel series	Stainless steel series	Safety pattern gauge solid front Ⓢ
Service intended	for gaseous and liquid, also corrosive media, also in a corrosive environment	for gaseous and liquid, also corrosive media, also in a corrosive environment	for particular safety with gaseous media
Model	131.11	232.50 233.50 (liquid filling)	232.30 233.30 (liquid filling)
Nominal size [mm]	40, 50, 63	63, 100, 160	63, 100, 160
Scale ranges (EN 837-1/5)	0…1.6 to 0…600 bar (40) 0…1.0 to 0…600 bar (50) 0…1.0 to 0…600 bar (63)	0…1.0 to 0…1000 bar (63) 0…0.6 to 0…1000 bar (100) 0…0.6 to 0…1600 bar (160)	0…1.0 to 0…1000 bar (63) 0…0.6 to 0…1000 bar (100) 0…0.6 to 0…1600 bar (160)
Accuracy class (EN 837-1/6)	2.5	1.0 1.6 (NS 63)	1.0 1.6 (NS 63)
Pressure connection (threaded entry male)	Lower or back mount G ¼ B	Lower or back mount NS 63 G ¼ B NS 100, 160 G ½ B	Lower or back mount (NS 160 only low) NS 63 G ¼ B NS 100, 160 G ½ B
Wetted parts material	Stainless steel	Stainless steel	Stainless steel
Case material	Stainless steel	Stainless steel	Stainless steel with solid baffle wall and blow-out back
Data sheet www.wika.de	PM 01.05	PM 02.02	PM 02.04
Optional extras / Notes	■ 3-hole panel or surface mounting flange ■ Special versions (63 mm only) Ammonia gauges with temperature scale	■ 3-hole panel or surface mounting flange, for assembling afterwards ■ Special version Ammonia gauge ■ Alarm contacts ■ Version per ATEX	■ 3-hole panel or surface mounting flange ■ Monel pressure system (Model 26X.30, not 63 mm) ■ Alarm contacts ■ Transmitter (Mod. 89X.34, see data sheet AE 08.02) ■ Version per ATEX

Test gauge class 0.6	Precision test gauge class 0.25 or 0.1	Test gauge solid front, class 0.6 Ⓢ	Field service test gauge solid front, class 0.6 Ⓢ
for gaseous and liquid media, particularly for testing and calibration	for gaseous and liquid media, particularly for testing and calibration	for gaseous and liquid media, particularly for testing and calibration	for gaseous and liquid media, particularly for mobile testing and calibration
312.20 610.20	341.11 342.11 612.11	332.30 333.30 (liquid filling)	332.11
160	250	160	160
Model 312.20: 0…0.6 bar to 0…1600 bar Model 610.20: 0…10 mbar to 0…600 mbar	Model 34X.11: 0…1.0 bar to 0…1600 bar Model 612.11: 0…6 mbar to 0…400 mbar	0…0.6 to 0…1600 bar	0…0.6 to 0…600 bar
0.6 ± 0.5 % per BS and ANSI	0.25 (Model 341.11 and 612.11) 0.1 (Model 342.11 and 612.11)	0.6 ± 0.5 % per BS and ANSI	0.6 ± 0.5 % per BS and ANSI
Lower or back mount G ½ B	Lower mount G ½ B	Lower mount G ½ B	With pressure gauge valve and LH / RH union M 20 x 1.5
Cu-alloy	Model 34X.11: Stainless steel, NiFe-alloy Model 612.11: Cu-alloy	Stainless steel	Stainless steel
Stainless steel	Black finish steel (aluminium)	Stainless steel with solid baffle wall and blow-out back	Stainless steel with solid baffle wall and blow-out back
Model 312.20: PM 03.01 Model 610.20: PM 06.09	Model 34X.11: PM 03.03 Model 612.11: PM 06.04	PM 03.05	PM 03.04
■ 3-hole panel or surface mounting flange ■ Liquid filling (Model 333.30, see data sheet PM 03.05) ■ Alarm contacts ■ Model 610.20 measuring system overpressure and vacuum safety	■ Transport case ■ Point-to-point calibration certificate (both standard supply with Model 342.11)	■ 3-hole panel or surface mounting flange ■ Alarm contacts	■ Supplied with field service case and fitting ■ Staple lock to fit round test flange ■ Version for oxygen service

Designation	Industrial series	Process industry series	Stainless steel series for gases and liquids
Service intended	for gaseous and liquid media	for gaseous and liquid, also corrosive media, also in a corrosive environment	Measurement of absolute pressure excluding the effect of barometric pressure variation
Model	422.12 423.12 (liquid filling)	432.50 433.50 (liquid filling)	532.5X 533.5X (liquid filling)
Nominal size [mm]	100, 160	100, 160	100, 160
Scale ranges (EN 837-3/5)	0…16 mbar to 0…40 bar	0…16 mbar to 0…40 bar	0…25 mbar to 0…25 bar absolute pressure, high overpressure safe
Accuracy class (EN 837-3/6)	1.6	1.6	0.6 (Model 532.51, NS 160) 1.0 (Model 532.52) 1.6 (Model 532.53) 2.5 (Model 532.54)
Pressure connection (threaded entry male)	Lower mount G ½ B	Lower mount G ½ B	Lower mount G ½ B
Overpressure safety	5 (3) x scale range 40 bar maximum depending on range	5 x scale range (optional: 10 x scale range) 40 bar maximum	minimum 1 bar absolute pressure (atmospheric pressure) 10 x scale range, 25 bar absolute pressure max.
Wetted parts material	Carbon steel, stainless steel, NBR (nitrile rubber)	Stainless steel, NiCrCo-alloy (Duratherm), FPM (Viton)	Stainless steel, NiCrCo-alloy (Duratherm)
Case material	Grey iron casting	Stainless steel	Stainless steel
Data sheet www.wika.de	PM 04.02	PM 04.03	PM 05.02
Optional extras / Notes	■ Stainless steel pressure system (Model 432.12) ■ Flange pressure connection ■ All wetted parts lined or coated with special materials ■ Alarm contacts, transmitter	■ Solid front (Model 43X.30) ■ Flange pressure connection ■ All wetted parts lined or coated with special materials ■ High overpressure safety up to 400 bar ■ Alarm contacts, transmitter ■ Version per ATEX	■ Safety pattern case (53X.3X) ■ Retard scale (Model 532.23 only) ■ Flange pressure connection ■ Alarm contacts, transmitter ■ Special material Monel (Model 56X.XX) ■ Version per ATEX

Standard and industrial series	Plastic series swikap	Square and edgewise panel mounting series	Stainless steel series
for gaseous and dry media	for gaseous and dry media; medical and vacuum technology, environmental and heating engineering etc.	for gaseous media, particularly for panel mounting industrial	for gaseous and dry, also corrosive media, also in a corrosive environment
611.10 (standard series) 612.20 (industrial series)	611.13	614.11	632.50
50, 63 (Model 611.10) 100, 160 (Model 612.20)	50, 63	72 x 72, 96 x 96 144 x 144 144 x 72	63, 100, 160
0…60 to 0…600 mbar (50) 0…25 to 0…600 mbar (63) 0…10 to 0…600 mbar (100) 0… 6 to 0…600 mbar (160)	0…40 to 0…1000 mbar	0…25 to 0…600 mbar 0…10 to 0…600 mbar 0… 6 to 0…600 mbar 0… 2.5 to 0…400 mbar	0…40 to 0…600 mbar (63) 0…25 to 0…600 mbar (100) 0… 2.5 to 0…600 mbar (160)
1.6	2.5	1.6	1.6
Lower or back mount NG 50 G ¼ B (back) NG 63 G ¼ B NG 100, 160 G ½ B	Lower or back mount G ¼ B	Back mount NG 72 x 72, 96 x 96: G ¼ B NG 144 x 144, 144 x 72: G ½ B	Lower or back mount NS 63 G ¼ B NS 100, 160 G ½ B
Cu-alloy, NBR (nitrile rubber)	Copper beryllium alloy, NBR (nitrile rubber)	Cu-alloy, NBR (nitrile rubber)	Stainless steel
Stainless steel, black finish steel (Model 611.10, NS 50 and NS 63 only)	Black plastic	Galvanised or black finish steel	Stainless steel
PM 06.01 PM 06.02	PM 06.12	PM 06.05	PM 06.03
■ 3-hole panel or surface mounting flange ■ Stainless steel pressure system (Model 631.10, NS 63 only) ■ Pressure system over-pressure or vacuum safety	■ Zero adjustment, through window ■ Black finish steel case (Model 611.23)	■ Stainless steel pressure system (Model 634.11) ■ Pressure system over-pressure or vacuum safety ■ Special versions with 2 alarm contacts maximum (144 x 72)	■ 3-hole panel or surface mounting flange ■ Pressure system over-pressure or vacuum safety ■ High overpressure safety Model 632.51 see data sheet PM 06.06 ■ Version per ATEX

Designation	Parallel entry with bourdon tube	Magnetic piston and compression spring (with sealing membrane)	Stainless steel series accepts alarm contacts or transmitters
Service intended	for gaseous and liquid media	for gaseous and liquid media	for gaseous media with low pressures, also in a corrosive environment
Model	711.12	700.01 (for gaseous media) 700.02 (for liquid media)	736.51
Nominal size [mm]	100, 160	80	100, 160
Scale ranges (EN 837)	0…0.6 to 0…1000 bar	Model 700.01: 0…400 mbar to 0…10 bar Model 700.02: 0…160 mbar to 0…2.5 bar	0…2.5 to 0…160 mbar
Accuracy class (EN 837)	1.6	Model 700.01 ± 3 %, Model 700.02 ± 5 %, full scale ascending differential pressure	1.6
Pressure connection	Lower mount 2 x G ½ B male parallel	Entry on the right and left, in-line 2 x G ¼ female	Lower mount 2 x G ½ B male
Static pressure rating (working pressure)	Same as scale range	100, 250 or 400 bar Model 700.02: 100 bar	200 mbar
Overpressure safety	1.3 x full scale value	Either side to static pressure 100, 250 or 400 bar Model 700.02: 50 bar	⊕ -side 200 mbar
Wetted parts material	Cu-alloy, stainless steel	Compression spring: stain. steel magnetic piston: stainless steel and barium-ferrit, Mod. 700.02: sealing membrane NBR	Stainless steel, aluminium, glass, polyurethan, PTFE (Teflon), NBR (nitrile rubber)
Case material	Black finish steel	Black aluminium-zinc, die-casting	Stainless steel, pressure retaining
Data sheet www.wika.de	PM 07.02	PM 07.14	PM 07.08
Optional extras / Notes	■ Stainless steel pressure system (Model 731.12) ■ Liquid filling 100 mm only (Model 7X3.12) ■ Alarm contacts, transmitters ■ Special version with Vee-connector (Model 711.11)	■ Outher threaded pressure connection ■ Fine strainer in ⊕ connection (Model 700.01) ■ Maximum drag pointer ■ Sealing membrane FPM/ Viton (Model 700.02) may be retrofitted locally: ■ Panel mounting flange (700.01) ■ Reed contacts	■ 3-hole panel or surface mounting flange ■ Pressure equalising valves ■ Alarm contacts, transmitters (Note: pressure medium must be suitable for copper and plastic)



Process industry series all welded construction	Multi purpose overpressure safe up to 40, 100, 250 or 400 bar	The family of differential pressure instruments overpressure safe up to 25 bar
for gaseous and liquid, also corrosive media, also in a corrosive environment	for gaseous and liquid media	for filter plants, pumps and piping, In the field of heating, ventilation and climate control engineering, facility management and water treatment
732.51 733.51 (liquid filling)	732.14 (stainless steel) 762.14 (Monel) 7X3.14 (liquid filling)	***DELTA-plus*** 702.01 (indicator) ***DELTA-comb*** 702.02 (indicator and switch) ***DELTA-switch*** 851.02 (switch) ***DELTA-trans*** 891.34.2189 (indicator and transmitter)
100, 160	100, 160	100
0…16 mbar to 0…25 bar	0…60 mbar to 0…40 bar Overpressure safety 400 bar: 0...0.4 bar to 0...40 bar	Differential measuring ranges from 0…160 mbar to 0…25 bar
1.6	1.6	Differential pressure gauge: 2.5
Lower mount 2 x G ¼ female	Lower mount 2 x G ½ female	Lower mount, in-line 2 x G ¼ female
≤ 250 mbar: 2.5 resp. 6 bar > 250 mbar: 25 bar	40, 100, 250 or 400 bar	25 bar
Either side, mbar ranges: 2.5 bar bar ranges: 10 x scale range resp. static pressure max.	Either side to static pressure 40, 100, 250 or 400 bar	Either side to static pressure 25 bar
Stainless steel, NiCrCo-alloy (Duratherm)	Stainless steel, NiCrCo-alloy (Duratherm), FPM/FKM (Model 732.14) Monel, FPM/FKM (762.14)	GD-AlSi 12 (Cu) 3.2982, stainless steel 1.4310 resp. 1.4305, 1.4571, FPM/FKM, Cu-alloy
Stainless steel	Stainless steel	GD-AlSi 12 (Cu) 3.2982, black painted
PM 07.05	PM 07.13	PM 07.15, PM 07.16, PM 07.17, PM 07.18, PM 07.19
■ Safety pattern (Model 73X.31) ■ Other connection position ■ Male pressure connection ■ Higher overpressure safety and static pressure rating ■ Pressure equalising valves ■ Alarm contacts, transmitters ■ Version per ATEX	■ Pressure connection DIN EN 61 518 ■ Special materials resp. diaph. cushion with special liquids ■ Overpressure safety 400 bar, scale ranges ≤ 250 mbar ■ Pressure equalising valves ■ Alarm contacts, transmitters ■ Version per ATEX	■ Pressure media chamber GD-AlSi 12 (Cu) HART-COAT surface protection or stainless steel ■ Accuracy class 1.6 for differential pressure gauge ■ Integrated pressure equalizing valve ■ 4-way valve manifold ■ Component-approval as flow protection, - monitors for DELTA-comb ■ GL-approval for DELTA-comb and DELTA-trans

Designation	Pressure gauge cocks and valves
Model	910.10 / 910.11
Service intended	Pressure gauge isolation
Data sheet	AC 09.01

Designation	Surface mounting bracket
Model	910.16
Service intended	For mounting pressure gauges
Data sheet	AM 09.07

Designation	Pressure gauge syphons
Model	910.15
Service intended	For protection against excessive pulsation and heat
Data sheet	AM 09.06

Designation	Adaptors and sealing washers
Model	910.14 / 910.17
Service intended	To adapt, mount and seal pressure gauges
Data sheet	AM 09.05 and AC 09.08

Designation	Snubbers and overpressure protectors
Model	910.12 / 910.13
Service intended	For protect gauges against the effects of pressure pulses and pressure peaks
Data sheet	AM 09.03 and AC 09.04

Designation	Electric alarm contacts magnetic snap-action contact
Model	821
Service intended	For making or breaking the current circuit dependent on pointer position
Data sheet	AC 08.01

Designation	Electric alarm contacts inductive alarm sensors
Model	831
Service intended	High contact safety and long service life by means of non-contact sensor

Designation	Electronic contact
Model	830 E
Service intended	Inductive contacts in special design with integrated amplifier for direct switching of a PLC, for example
Data sheet	AC 08.01

Designation	Control relays to combine with contacts
Model	905.12...14
Service intended	For optimal contact protection and highest switching safety

Designation	Control units for inductive sensors
Model	904.15...30
Service intended	For operating pressure gauges with inductive alarm sensors
Data sheet	AC 08.01

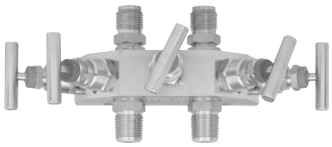
Designation	Transmitter combined with pressure gauges
Model	891.34, 892.34 (Ex-Version)
Service intended	For industrial process automation, electric signal output and local readout
Data sheet	AE 08.02

Designation	Pressure gauges for ultra high purity
Model	Bourdon tube pressure gauges 230.25, 232.35
Data sheet	APM 230.25 (Model 230.25), PM 02.11 (Model 232.35)
Brief description	These pressure gauges meet the demanding needs of ultra high purity applications. Fields of application are especially the semiconductor and electronic industry, medical engineering, gene technology, biotechnology and pharmaceutical.

Designation	Gas density monitors with local readout and alarm contacts
Model	233.52.100, 212.22.100
Service intended	Model 233.52.100 for outdoor installation Model 212.22.100 for indoor installation
Data sheet	PM 02.32 (Model 233.52.100), PM 02.31 (Model 212.22.100)
Brief description	These temperature compensated instruments guarantee the correct function of SF6-Gas isolated switchgears. They combine indication and switching in one gauge only.

Designation	Compact differential pressure gauge with combined working pressure gauge and integrated pressure equalizing valve
Model	732.51.160.2170
Service intended	For filling level measurement, for example, in liquid gas tank plants (cyrogenic technology)
Data sheet	SP 03.01
Brief description	Differential and working pressures are combined central in one instrument. This reduces the number of sealing points and measuring points.

Designation	Pressure equalizing valve for differential pressure gauges
Model	910.25
Service intended	For gaseous and liquid media, different versions and nominal pressures
Data sheet	AC 09.11
Brief description	Three standard versions: one-way, three-way, four-way and five-way valve and in the pressure ratings PN 40, 100 or 400 bar.



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