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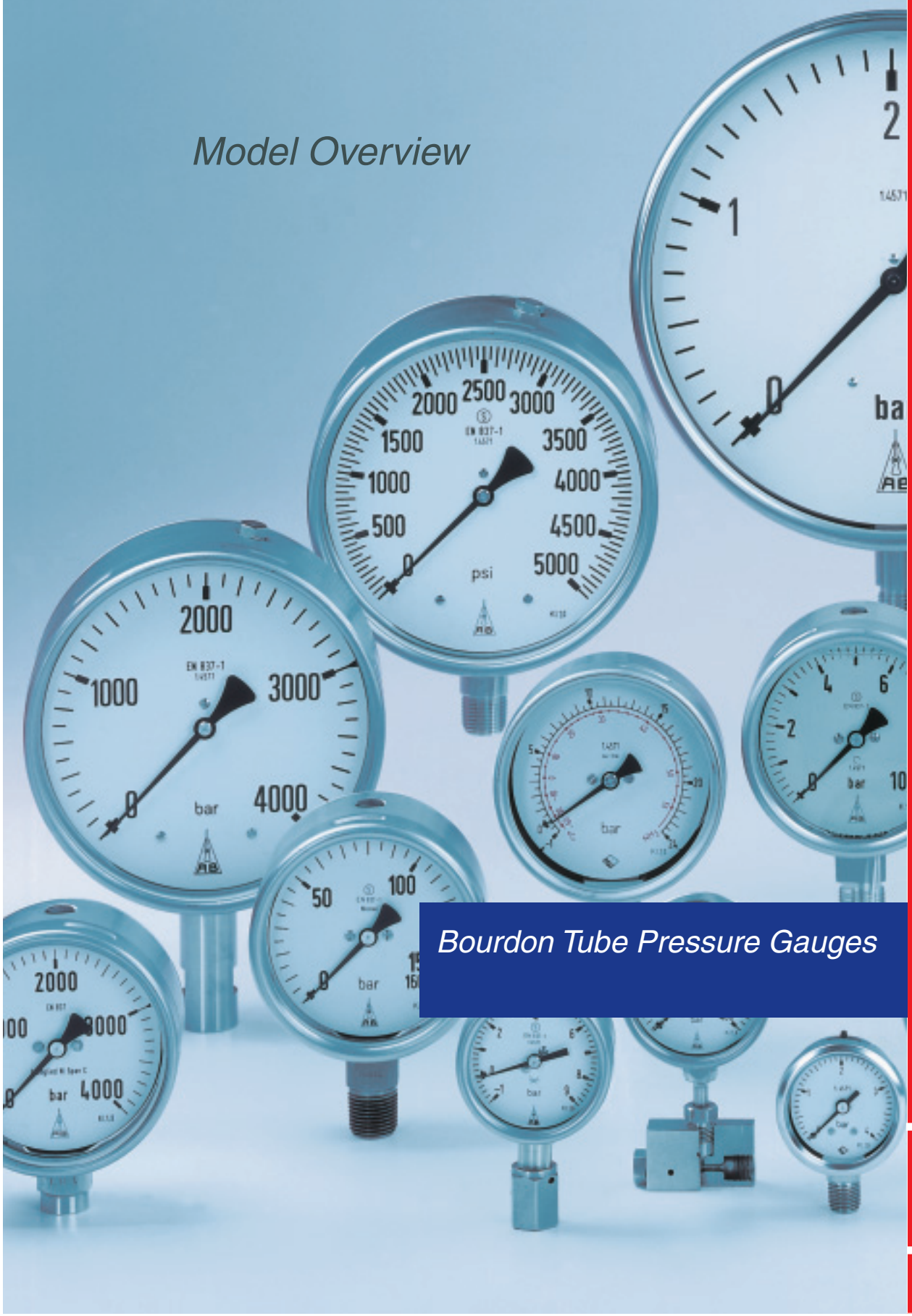
Model Overview



Bourdon Tube Pressure Gauges

Contents

Following you will find an overview of our models and data sheets that are grouped together under ***catalogue heading 1,*** *i.e. pressure gauges with bourdon tube, accuracy classes 1.0 and 1.6 acc. to EN 837-1, as well as a short description of the characteristical model features*:

- *General Features* P. 3 – 4
- *Features of Measurement* P. 5
- *Standard Pressure Ranges / Scale Division* P. 6
- *Model Overview*
  - *– Low Cost Pressure Gauges* P. 7
  - *– Standard Pressure Gauges* P. 8 – 9
  - *– Special Pressure Gauges* P. 10 – 13
  - *– Additional Accessories* P. 14 – 15

Further Catalogue Headings

No. 1 Bourdon tube pressure gauges accuracy class 1.0 to 2.5 according to EN 837-1, pressure ranges 0.6 to 4000 bar and 10 to 60,000 psi

No. 2 Test gauges with bourdon tube acc. to EN 837-1 class 0.6 and better, pressure ranges 0.6 to 1,600 bar

No. 3 Diaphragm pressure gauges with horizontal diaphragm, pressure ranges 10 mbar to 40 bar / 0.145 psi to 600 psi

No. 4 Diaphragm pressure gauges with vertical diaphragm, pressure ranges 0.6 to 40 bar / 10 to 600 psi

No. 5 Duplex gauges, Differential pressure gauges

No. 6 Capsule gauges for low pressure, 2.5 mbar to 600 mbar Liquid column manometers, 10 mbar to 100 mbar

No. 7 Chemical seals (diaphragm seals, in-line seals)

No. 8 Temperature measurement instruments (gas-actuated thermometers, bimetal thermometers)

No. 9 Electronics
- *9.1 Limit switch contact assemblies for pressure gauges and thermometers*
- *9.2 Pressure transmitters*
- *9.3 Digital displays*

No. 10 Pressure gauge test equipment (dead weight testers, comparison pumps)

No. 11 Pressure gauges accessories

Certificates

- *GOST type certification Russia*
- *GOST-R for custom purposes Russia*
- *GOST type certifictaion Ukraine*
- *GOST type certification Kazakhstan*
- *German Lloyd*
- *Russian Sea Register*

Application and Selection

Bourdon tube pressure gauges are applicable for measuring pressure (and/or vacuum) between 0-0.6 and 0-4,000 bar ***(0-10 to 0-60,000 psi)*** *of fluid or gaseous media.*

EN 837-2 has to be considered for the selection of the suitable model. In particular, the user has to ensure that the pressure medium may not corrode any of the wetted parts.

For a more detailed description of application criteria we recommend the commentary of the DIN e. V. "Überdruckmessgeräte nach DIN EN 837", published by Beuth Verlag. Furtheremore, you will find helpful instructions in our Mounting and Operating Instructions B1, available as pdf file on our web site.

Elastic element, bourdon tube type, helical (coiled)

Standard Materials
for wetted parts:

Code number – 1 = connection brass / bourdon tube bronze
for higher pressure ranges brass / 1.4571 (316 stainless steel)

– 3 = connection and bourdon tube 1.4571 (316 stainless steel)
for higher pressure Bourdon tube NiFe alloy

Furthermore available for most models :
– 6 = connection and bourdon tube monel

Please regard possible limitations on the data sheets.

Elastic element, bourdon tube type, c-form

Construction

The internals are basically constructed equally for all models.

Bourdon tube, socket with thread connection, movement, dial and pointer together constitute the complete measuring device.

The case and the ring with window just protect the pressure element against external influences.

Case Fillings

Liquid fillings in pressure gauge cases are used to protect the internals against damages caused by severe vibrations or pulsations and to exclude condensation (outdoor installation).

*The standard filling fluid for filled versions (models ...**G**) is glycerine, and it is a special oil when the instruments are provided with electrical accessories (models ...**Oe**).*

Temperature limitations see page 5

Process Connections

*With just a few exceptions the male **standard connections** of our bourdon tube pressure gauges are*

- *¼" BSP up to NCS 63*
- *½" BSP from NCS 80*

in accordance with EN 837-1.

But almost all models are also available with

- *¼" NPT or M 12 x 1.5 up to NCS 63*
- *½" NPT or M 20 x 1.5 from NCS 80*

without extra charges.

***Please note:** Process connection ¼" BSP, ¼" NPT and M 12 x 1,5 max. pressure range 600 bar (type –1) resp. 1000 bar (type –3).*

Numerous versions are available as custom-made products.

Dial

Dial inscriptions, pressure ranges, dial spacings as well as the dial markings for bar pressure ranges are in accordance with EN 837-1.

Standard dials show a black scale on a white background. Pressure ranges and subdivisions see table on page 6.

A factory serial number for reference is stated on the dial of gauges nom. sizes 80 (3") and above, extensively also NCS 63 (2 ½").

Pressure Ranges

***Bar** is the preferred unit of pressure according to EN 837-1.*

In this model overview (on pages 7 ff) you will find the standard pressure ranges stated in bar.
But in fact there are numerous different pressure units available, such as psi (compare page 6), kg/cm², kPa, MPa et al. Multi-scales are also possible.

For applications at refrigeration our pressure gauges can be provided with various special temperature scales for the different refrigerants.

Special Versions

Individual solutions for discerning measuring problems are a constant challenge for us, therefore we offer many other special versions.

Accuracy Classes according to EN 837-1

Accuracy class 1.6	up to NCS 63
Accuracy class 1.0	from NCS 80

The accuracy class states the tolerance in percent of the measuring span. The limit value for the hysteresis is also defined by the accuracy class.

Please regard possible limitations on our data sheets.

Load Limits acc. to EN 837-1

Nom. case sizes 100 (4"), **160** (6"), **250** (10"), **4½", and 96 x 96** (3.8" x 3.8"), **144 x 144** (5.7"x 5.7")

- at steady load: – full scale value
- at dynamic load: 90% of the full scale value
  – (>0-2,500 bar/30,000 psi max. 65%)
- overpressure: max. 130% of full scale value
  (>0-2,500 bar max. full scale value)

Nom. case sizes 40 (1½"), **50** (2"), **63** (2½"), **80** (3")

- at steady load: 75% of the full scale value
- at dynamic load: 65% of the full scale value
- overpressure: full scale value

Advice
According to EN 837-1 the normal use of all instruments is recommended, so that the maximum pressure load does not exceed 75% of the maximum scale value for steady loads or 65% of the maximum scale value for dynamic loads, to guarantee a long service life of the meatrological features.
Furthermore, it is reccommended, not to use the starting range (up to approx. 20%), because the measuring deviation is relatively enormous refering to the value.

Temperature Limitations

- **Storage temperature**: –40 °C to +70 °C (-40/+158 °F)
  With glycerine filling: –20 °C to +70 °C (- 4/+158 °F)
- **Ambient temperature:**

Dry version	– 40 °C to +60 °C (-40 /+140 °F)
Special configuration	– 60 °C to +60 °C (-76 /+140 °F)
Filled version	– 20 °C to +60 °C (- 4 /+140 °F)
Special configuration	– 40 °C to +60 °C (-40 /+140 °F)

- **Medium temperature:**

Version – 1

Dry and filled	soft soldered	+ 60 °C (+140°F) max.
	silver brazed	+100 °C (+212°F) max.
Polyamide case with liquid filling		+ 70 °C (+158°F) max.

Version – 3

Stainless steel cases	
Dry version	+200 °C (+392°F)
Filled version	+100 °C (+212°F)
Polyamide cases	
Dry version	+100 °C (+212°F)
Filled version	+ 70 °C (+158°F)

Please regard possible limitations on the data sheets. Please contact us, if you need instruments that require higher or lower temperature limitations.

- **Reference temperature:** + 20 °C (+ 68°F)

Operating temperatures of the measuring system (elastic element and movement) different from +20 °C (+68 °F) will cause additional deviations of the pressure indication. These can be up to .4 % per each 10 °C (18 °F) in accordance with EN 837-1.

Nom. Case Sizes 80...250 (3" to 10"), **4½"**, **96**[2] (3.8"x3.8"), **144**[2] (5.7"x5.7")			
Pressure ranges in **bar** according to EN 837-1:		Pressure ranges in **psi**:	
Range	Subdivison	Range	Subdivison
-1,200-0 mbar	20 mbar		
-1 - 0	0.02	30" Hg vac.- 0	0.5" Hg vac.
-0.6 - 0	0.01		
-1 / + 0.6	0.05	30" Hg vac.- 15	1" Hg vac./ 0.5 psi
-1 / + 1.5	0.05	30" Hg vac.- 30	1" Hg vac./ 0.5 psi
-1 / + 3	0.1	30" Hg vac.- 60	2" Hg vac./ 2 psi
-1 / + 5	0.1	30" Hg vac.-100	5" Hg vac./ 2 psi
-1 / + 9	0.2	30" Hg vac.-160	5" Hg vac./ 5 psi
-1 / +15	0.5	30" Hg vac.-200	5" Hg vac./ 5 psi
		30" Hg vac.-300	10" Hg vac./ 10 psi
0.2 - 1	0.02	3 - 15	0.2
0- 0.6	0.01	0- 10	0.1
0- 1	0.02	0- 15	0.25
0- 1.6	0.05		
0- 2.5	0.05	0- 30	0.5
0- 4	0.1	0- 60	1
0- 6	0.1	0- 100	1
0- 10	0.2	0- 160	2
0- 16	0.5	0- 200	2
0- 25	0.5	0- 300	5
0- 40	1	0- 600	10
0- 60	1	0- 800	10
		0- 1,000	10
0- 100	2	0- 1,500	25
0- 160	5	0- 2,000	20
0- 250	5	0- 3,000	50
		0- 4,000	50
0- 400	10	0- 5,000	50
		0- 6,000	100
0- 600	10	0-10,000	100
0-1,000	20	0-15,000	250
0-1,600	50	0-20,000	200
0-2,500	50	0-30,000	500
0-4,000	100	0-60,000	1,000

Nominal Case Sizes 40, 50, 63[1)] (1½", 2", 2½")				
Pressure ranges in **bar** according to EN 837-1:		Pressure ranges in **psi**:		
Range	Subdivison	Range	Subdivison NCS 40, 50	Subdivison NCS 63
-1200 - 0 mbar	50 mbar			
-1 - 0	0.02	30" Hg vac.- 0	1" Hg vac.	0.5" Hg vac.
-0.6 - 0	0.02			
-1 / + 0,6	0.05	30" Hg vac.- 15	1" Hg vac. / 5 psi	1" Hg vac. / 0.5 psi
-1 / + 1,5	0.1	30" Hg vac.- 30	2" Hg vac. / 1 psi	1" Hg vac. / 0.5 psi
-1 / + 3	0.1	30" Hg vac.- 60	5" Hg vac. / 2 psi	2" Hg vac. / 2 psi
-1 / + 5	0.2	30" Hg vac.-100	5" Hg vac. / 2 psi	5" Hg vac. / 2 psi
-1 / + 9	0.2	30" Hg vac.-160	10" Hg vac. / 5 psi	5" Hg vac. / 2 psi
-1 / +15	0.5	30" Hg vac.-200	10" Hg vac. / 5 psi	5" Hg vac. / 5 psi
		30" Hg vac.-300	10" Hg vac. /10 psi	10" Hg vac./ 5 psi
0.2 - 1	0.02	3 - 15	0.5	0.2
0- 0.6	0.02	0- 10	0.2	0.1
0- 1	0.02	0- 15	0.5	0.25
0- 1.6	0.05			
0- 2.5	0.1	0- 30	1	0.5
0- 4	0.1	0- 60	2	1
0- 6	0.2	0- 100	2	1
0- 10	0.2	0- 160	5	2
0- 16	0.5	0- 200	5	2
0- 25	1	0- 300	10	5
0- 40	1	0- 600	20	10
0- 60	2	0- 800	20	10
		0- 1,000	20	10
0- 100	2	0- 1,500	50	25
0- 160	5	0- 2,000	50	20
0- 250	10	0- 3,000	100	50
		0- 4,000	100	50
0- 400	10	0- 5,000	200	100
		0- 6,000	200	100
0- 600	20	0-10,000	200	100
0-1000	20	0-15,000	—	250

[1)] NCS 40, 50, 63 (1½", 2", 2½"): a deviation of the values for model RE and RgG is possible

Case	**Carbon Steel Black**	**Stainless Steel**
Ring	**Snap-in window**	**Crimped-on ring** stainless steel
Model / Case Filling	**RE** / without case filling	**RgG** / with case filling
Accuracy Class / Nominal Case Size	1.6 NCS 40, 50, 63 (1½", 2", 2½") NCS 100 (4") with stationary red pointer	1.6 NCS 63 (2½")
Wetted Parts	– 1 Copper alloy	– 1 Copper alloy
Pressure Ranges	0-0,6 bar to 0-600 bar	0-1 bar to 0-600 bar
Data Sheets	**1132** NCS 40, 50 **1120** NCS 100 **1110** NCS 63	**1112**

Case	Polyamide Robust	Stainless Steel	
Ring	**Screw ring** glass-fiber reinforced polyamide 6B	**Crimped-on ring** stainless steel	**Bayonet ring** stainless steel
Model / Case Filling	**RK** / without case filling **RKG** / with case filling	**RChg** / without case filling, **RChgG** / with case filling	**RCh** / without case filling **RChG** / with case filling
Accuracy Class / Nominal Case Size	1.6 NCS 63 (2½") 1.0 NCS 100 (4")	1.6 NCS 50, 63 (2", 2½") 1.0 NCS 80, 100, 160 (3", 4", 6")	1.6 NCS 40, 63 (1½", 2½") 1.0 NCS 100, 160, 250 (4", 6", 10")
Wetted Parts	– 1 Copper alloy – 3 Stainless steel – 6 Monel	– 1 Copper alloy – 3 Stainless steel – 6 Monel	– 1 Copper alloy – 3 Stainless steel – 6 Monel
Pressure Ranges	0-0.6bar to 0-1,600 bar	0-0.6 bar to 0-1,600 bar	0-0.6 bar to 0-1,600 bar
Data Sheets	**1310** NCS 63 **1300** NCS 100	**1232** NCS 50 **1203** NCS 80 **1212** NCS 63 **1202** NCS 100	**1220** NCS 40 **1201** NCS 100,160,250 **1211** NCS 63

Safety Pressure Gauges S3 EN 837-1

Case	Polyamide Robust	Stainless Steel
Ring	**Screw ring,** glass-fiber reinforced polyamid 6B	**Bayonet ring,** stainless steel
Model / Case Filling	**RSK** / without case filling **RSKG** / with case filling	**RSCh** / without case filling **RSChG** / with case filling
Accuracy Class / Nominal Case Size	1.0 NCS 100 (4")	1.6 NCS 63 (2½") 1.0 NCS 100, 160 (4", 6")
Wetted Parts	– 1 Copper alloy – 3 Stainless steel – 6 Monel	– 1 Copper alloy – 3 Stainless steel – 6 Monel
Pressure Ranges	0- 6 bar to 0-1,600 bar	0-0.6 bar to 0-1,600 bar
Data Sheets	**1400**	**1610** NCS 63 **1600** NCS 100, 160

Advice: Please consider possible limitations for some nominal case sizes, details can be seen on the particular data sheets.

Special

High Pressure Gauges	Process Gauges 4½"	Square Gauges

Case	***Stainless Steel***	***Polyamide Robust***	***Steel galvanised***
Ring	***Bayonet ring*** *stainless steel*	***Screw ring*** *PBTP (thermoplastic)*	***Front narrow rim*** *black*
Model / Case Filling	***RSCh*** */ without case filling,* ***RSChG*** */ with case filling*	***RPG*** */ without case filling,* ***RPGG*** */ with case filling*	***RQS*** */ without case filling*
Special Configuration	*Break-proof solid front, blow-out back, HP-Pressure bottom connection for ¼" tube, with 60° sealing cone, female thread M 16 x 1.5 or 9/16"-18 UNF* *NCS 160 inclusive gauge holder bracket, distance 60 mm*	*Break-proof solid front, blow-out back, integrated back flange for surface mounting* *US-Standard Process Gauge*	
Accuracy Class / Nominal Case Size	*1.0 NCS 100, 160 (4", 6")*	*0.5 (Grade 2A) acc. to ASME B40.1* *NCS 4½"*	*1.0 NCS 96 x 96, 144 x 144 (3.8" x 3.8", 5.7" x 5.7")*
Wetted Material	*– 3 Stainless steel*	*– 3 Stainless steel* *– 6 Monel*	*– 1 Copper alloy* *– 3 Stainless steel*
Pressure Ranges	*0-2,500 bar and 0-4,000 bar*	*0 - 0.6 bar to 0-1,600 bar*	*0-0.6 bar to 0-1,000 bar*
Data Sheets	***1600*** *2,500 bar* ***1640*** *4,000 bar*	***1401***	***1500***

Special

American Case Type	Caisson-Gauges	Can Puncturing Gauges

Case	**Stainless steel**		
Ring	**Bayonet ring,** stainless steel	**Bayonet ring,** stainless steel	**Bayonet ring,** stainless steel
Model / Case Filling	**RCha** / without case filling, **RChaG** / with case filling	**RCaiCh** / without case filling	**RCh** / without case filling
Special Configuration	Wide bayonet ring, polished	Holding chain stainless steel, adjustable pointer, 2 bottom vents	Bottom cannula connection, needle Ø 5 mm (0.2") rubber seal NBR
Accuracy Class / Nominal Case Size	1.6 NCS 63 (2½") 1.0 NCS 100, 160 (4", 6")	1.0 NCS 160 (6")	1.6 NCS 63 (2½")
Wetted Material	– 1 Copper alloy – 3 Stainless steel – 6 Monel	– 1 Copper alloy	– 1 Copper alloy
Pressure Ranges	0-0.6 bar to 0-1,600 bar	0-0.6 bar to 0-16 bar	-1-0 bar, -1-0-0.6 bar and -1-0-1.5 bar
Data Sheets	**1210** NCS 63 **1200** NCS 100, 160	**1800**	**1211, T01-000-022**

Special

Ultrapure Gas Pressure Gauges of ECD-Quality[1)]

Pressure control gauges for gas cylinders for pressure and level monitoring at gas cylinders

Case	**Stainless steel**		
Ring	**Bayonet ring,** stainless steel	**Bayonet ring,** stainless steel Ⓢ	**Snap-in window,** turnable
Model / Case Filling	**RCh** / without case filling,	**RSCh** / without case filling	**RChE** / without case filling
Special Configuration	Connection ¼" NPT or VCR-F, VCR-M or VCR-M short. For VCR-connection increased surface finish in the inlet-port, R_a 0.2 - 0.4 µm	Safety category S3 according to EN 837-1, Connection ¼" NPT or VCR-F, VCR-M or VCR-M short. For VCR-connection increased surface finish in the inlet-port, R_a 0.2 - 0.4 µm	Construction type proved according to EN 562 1 x inductive-contact I1 according to EN ICE 60947-5-6 connection ¼" NPT,
Accuracy Class / Nominal Case Size	1.6 NG 63 (2½")	1.6 NG 63 (2½")	2.5 NG 50 (2")
Wetted Material	– 3 Stainless steel	– 3 Stainless steel	– 3 Stainless steel
Pressure Ranges	0-0,6 bar to 0-250 bar	0-0,6 bar to 0-250 bar	0-18 bar, 0-80 bar and 0-250 bar
Data Sheets	**1211**	**1610**	**1231-9.2**

[1)] ECD-quality: absolutely free of halogenated hydrocarbons, proper for Electron Capture Detector

Special

Combi Gauges for Rail Cars

SF6-Gas Density Monitors

Case	**Steel galvanized resp. 1.4301 (304 stainless steel)**	**Stainless steel**
Ring	**Crimped-on ring,** aluminum black anodised	**Crimped-on ring,** stainless steel
Model / Case Filling	**Rg 60-1** Fz rmBFr / without case filling **RChg 80-1** Fz rmBFr / without case filling **RChg 100-1** Fz rmBFr / without case filling	**RChg** / without case filling **RChgOe** / oil filled case **RChgN** / nitrogen filled case
Special Configuration	Combi-Gauges according to DIN 38030:2009 The instruments are provided with u-clamps for panel mounting and as combination instruments with direct and indirect lighting. **Duplex Pressure Gauges with two measuring units can be found on data sheet 5901 and AwB 33**	Gas density monitors for SF6-gas are pressure gauges with electrical additional accessory, to give alarm if leakage occurs. The instruments are configured for the respective case of operation for adjustment pressure, set points and ambient temperature.
Accuracy Class / Nominal Case Size	1.6 NCS 60 1.0 NCS 80 and 100	1.0 for 20 °C (68 °F) NCS 100 (4") 2.5 for -20 °C to +60 °C (-4° to 140 °F)
Wetted Material	– 1 Copper alloy	– 3 Stainless steel
Pressure Ranges	0-6 bar, 0-10 bar and 0-12 bar	e.g. -0.1 / +0.9 MPa
Data Sheets	**1901 and AwB 33 with many examples "Bahn-Manometer Spezial"**	**1902**

Chemical Seals

This combination chemical seal / pressure gauge solves measuring problems, that are not possible for a pressure gauge without chemical seal, like

- *the medium should not get into the measuring unit*
- *the wetted parts have to be made of other materials than brass/bronze or stainless steel, e.g. hastelloy alloy, monel, tantalum, nickel or titanium*
- *processes and instructions make high demands on the hygiene*
- *pressure gauges are not suitable for the temperature at the point of the medium*

Basically, chemical seals consist of a body with process connection and a diaphragm as separating element, that avoids that the medium gets into the measuring unit.

The space between diaphragm and the end of the bourdon tube is evacuated, completely filled with a suitable liquid and closed hermetically.

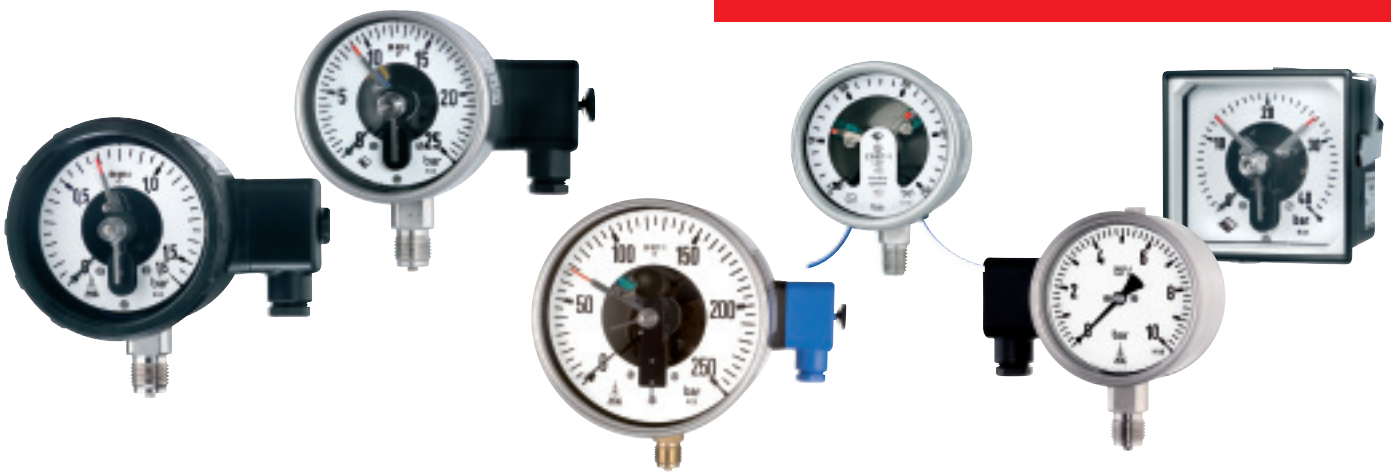
The mounting resp. welding of the chemical seal happens directly or with cooling element resp. capillary line between chemical seal and pressure gauge.

Detailed information can be found on product overview 7000 and on the data sheets of catalogue-heading 7.

Our latest development DW-Line

DW-Line *(Double Weld)*

Case:	***Stainless Steel***
Ring:	***Bayonet ring,*** *stainless steel*
Model / Case Filling:	***RCh... -3vDW*** */ without case filling* ***RChG...-3vDW*** */ with case filling*
Special Configuration:	*Pressure gauges (case / connection pieces welded) with chemical seal MDM 7...v (welded), to avoid leakage, easy external cleaning*
Accuracy Class / Nominal Case Size:	*1.6 NCS 63 (2 ½")* *1.0 NCS 100 (4 ")*
Wetted Material:	*– 3 Stainless steel*
Pressure Ranges:	*0-0.6 bar to 0-250 bar (0-10 to 0-3,000 psi)*
Data sheets:	***1201.7*** *NCS 100 (4")* ***1211.7*** *NCS 63 (2 ½")* ***Chemical seals see catalogue-heading 7***



Available electrical accessories

	Model	Data sheets with details of the electrical additional accessory
Reed switch (only NCS 63)	R 201	1219.4 1619.4
Standard- or magnetic contact	S resp. M	9000 9100
inductive limit switch contact assembly	I	9000 9200
electronic. limit switch contact assembly	E	9000 9201
pneumatic limit switch contact assembly	P	9000 9300
Pressure transmitter	DMU	9631

Available Bourdon Tube Pressure Gauges with electrical accessories

Model / Case Filling	Nominal Case Size	Data Sheets	Electrical accessory / Model
RK /without case filling RKOe/with case filling	100	1390	S*/M, I, E, and P*
RCh /without case filling RChOe/with case filling	100, 160	1291	S*/M, I, E, and P*
RSCh /without case filling	63	1619.1 1619.2 1619.4	M I, E R
RSCh /without case filling RSChOe/with case filling	100, 160	1690	S*/M, I, E, and P*
RSCh /without case filling RSChOe/with case filling	100, 160	9631	DMU
RCha / without case filling	63	1219.4	R
RQS	96x96, 144x144	1590	S/M, I, E, and P

* only for unfilled instruments

Accessory

Impulse-controlled multifunctional relay	DS 9521
Power supply module	
Multifunctional relay	
Output unit	

Company:	**Limit Africa pty(ltd)**
Physical Address:	**cnr Berguis & Erasmus STR, Secunda, 2302**
Postal Address:	**P.O.Box 15011, Secunda, 2302**
Tel Number:	**(017) 634 4852**
Registration Number:	**2005/000670/07**
VAT Number:	**4750220784**