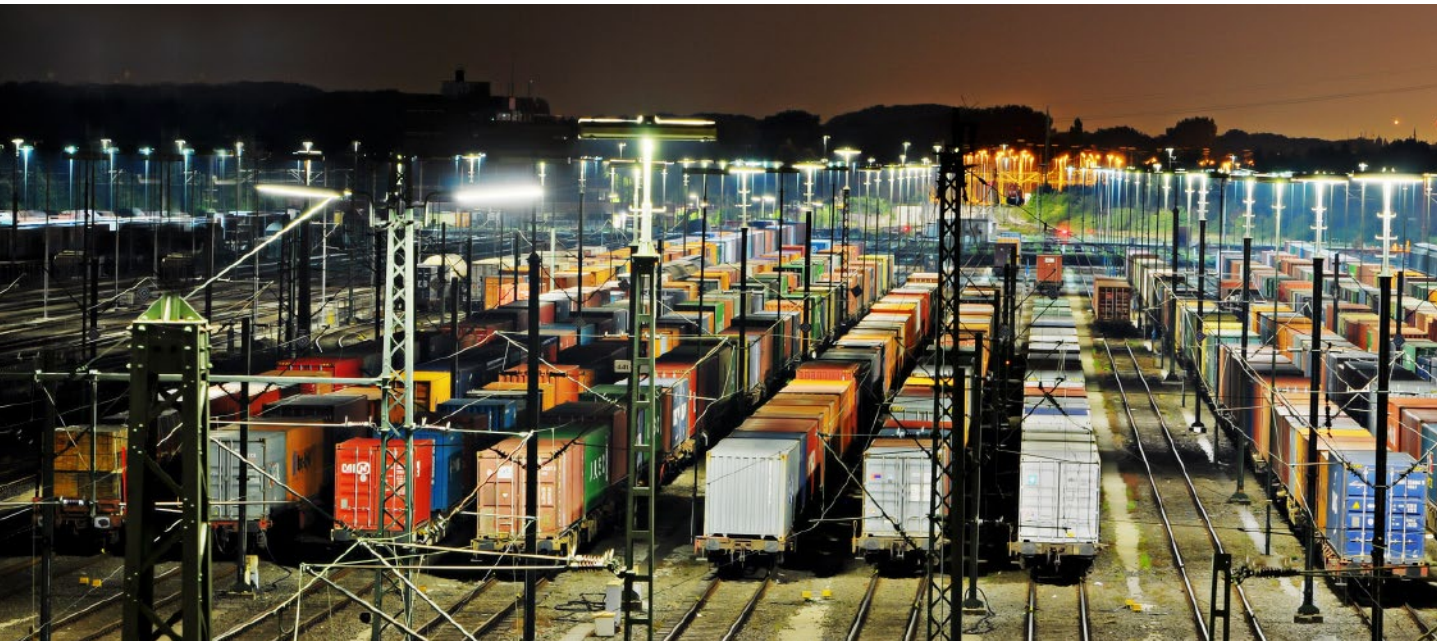


ARMANO



**You won't miss the
connection with us...**



Made in Germany

For many years, we supply pressure gauges in various versions to operators, manufacturers and suppliers of rail cars of national and international railway companies

- ◆ Undergrounds
- ◆ Tramways
- ◆ Locomotives for surface mines
- ◆ High-speed trains
- ◆ Diesel and electric locomotives
- ◆ Road/rail vehicles
- ◆ And others

The ARMANO Messtechnik GmbH represents tradition and innovation in the production and distribution of precision pressure and precision temperature measuring instruments, for whose quality we enjoy an excellent reputation worldwide for more than 100 years.

For decades, almost all pressure gauges for the former "Deutsche Reichsbahn" (East German Railways) were manufactured at our Beierfeld location.

This product portfolio is being improved and expanded continuously for the international market.

In this brochure, you will find a selection of pressure measuring instruments especially for rail cars.

Your instrument is not listed here?

Jointly, we will find a suitable solution for your application.

Do not hesitate to contact us!

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Industry Expertise

Applications and Application Fields of our Products at a Glance



Shipbuilding Industry



Energy



Chemistry and Petrochemistry



Water and Waste Water



Oil and Gas



Food Industry



Pharmaceutical Industry



Refrigeration Engineering



Rail Cars



Fire Extinguishing / Fire Protection



Engineering



Semiconductor Industry



Combi Gauges

One Solution for All Rail Cars

Based on the many years of experience to meet the various demands of our customers regarding pressure gauges, we developed a new type series:

The Standardised Pressure Gauge for Vehicles (according to DIN 38030:2022-10)

» with direct and indirect lighting as standard «

The standard instrument is applicable for both types of lighting as and when required. This helps you to save on storage costs!

Additionally, our combi gauges provide:

- ◆ Homogeneous appearance at the driver's cab
- ◆ Wide range of versions / options
- ◆ Minimised front-to-back sizes and reduced weights
- ◆ Reliable pressure measurement cl. 1.0 (cl. 1.6 NCS 60)
- ◆ Comfortable readability (even in the dark)
- ◆ Long durability (1,000,000 load alternations)



The Lighting

Indirect Lighting

The lighting of the pressure gauge is provided by the control panel illumination via light slits in the case, without requiring any separate power supply.



direct lighting via light bulb BA9s

Direct Lighting

The direct lighting is provided via light bulb BA9s

- ◆ 24 V, 2 W
- ◆ 12 V, 2 W
- ◆ 36 V, 2 W

A light guide ring optimally distributes the light onto pointer and dial.

A single light bulb is sufficient for the complete direct lighting of pressure gauges with nominal case size 60 – 100!

Optionally available are:

- ◆ LED lighting BA9s, 18 – 32 V, white or green
- ◆ LED lighting BA9s for operating voltages of more than 32 V up to max. 130 V upon request

The Case

Resistant & Secure

As standard, our combi gauges have a case with black anodised crimped-on ring. The homogeneous appearance of the instrument front side creates a harmonious appearance at every driver's cab, even if different nominal case sizes are applied.



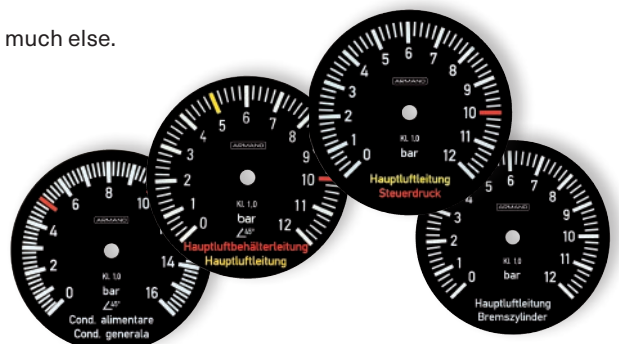
The instruments are protected against ingress of humidity in front of the panel (IP54). All our combi gauges are equipped with u-clamp(s) for panel mounting as standard. They can be mounted into panels with a thickness of 2 to 4 mm (0.08 to 0.16"). Due to the blow-out device in the back of the case, all instruments comply with safety category S1 according to DIN EN 837-1. Other safety features are the anti-reflective safety glass and the restrictor screw in each process connection.

Variety for Individual Demands

Our combi gauges combine many properties as standard, which are required for the application in various kinds of rail cars. Numerous options and alternatives are additionally available to receive exactly the instrument you need:

- ◆ Only direct or only indirect lighting, without lighting
- ◆ Other process connections, e.g. G ¼
- ◆ Additional accessory available, e.g. with cutting ring and union nut
- ◆ Luminescent scale
- ◆ Coloured design of the dial, according to your specifications
- ◆ Individual coloured dial inscriptions (suitable for the intended purpose)
- ◆ Individual design of the dial
- ◆ Coloured pointer design, e.g. blue, green
- ◆ Adjustment for special positions of installation
- ◆ Other pressure ranges, e.g. 0 – 16 bar
- ◆ Other pressure units, e.g. psi, inHg
- ◆ Earth lug (standard for lighting voltage from 48 V)

and much else.



The Selection Criteria

Single Pressure Gauges with Bourdon Tube

Bourdon tube pressure gauges with one measuring unit are applied for instance for separate compressed air measurement on a brake cylinder or the timing reservoir of a compressed air brake system.

A detailed description can be found in our data sheet 1901.



Duplex Pressure Gauges with Bourdon Tube

Duplex pressure gauges with Bourdon tube are used for simultaneous reading of two pressures, e.g. on the brake cylinders of two bogies or on the main air reservoir pipe and the main brake pipe of a compressed air brake system.

The pressure gauges are equipped with two independently operating Bourdon tube measuring units. A movement with separate pointer shafts transfers the Bourdon tube motions caused by pressure to the respective pointer. The pressure connections are marked with a colour dot, matching the colour of the corresponding pointer.

A detailed description can be found in our data sheet 5901.



Technical Data

According to DIN 38030:2022-10

Standard Pressure Ranges in bar

Single Pressure Gauge with Bourdon Tube	Duplex Pressure Gauge with Bourdon Tube	Smallest Subdivision of Scale	
		NCS 60 (2.36")	NCS 80 (3"), 100 (4")
0 – 6	0 – 6	0.2	0.2
0 – 10	0 – 10	0.2	0.2
0 – 12	0 – 12	0.2	0.2

Pressure Limitation

- ◆ At steady load: 0 – 100 %
- ◆ At dynamic load: 0 – 90 % of full scale value

The instruments are designed for at least 1,000,000 load alternations at a dynamic load between 30 % and 95 % of the full scale value.

Temperature Resistance

- ◆ Storage temperature: –40 °C to +70 °C (–40 °F to +158 °F)
- ◆ Ambient temperature: –40 °C to +60 °C (–40 °F to +140 °F)
- ◆ Medium temperature: max. +60 °C (+140 °F)

Further Details

Accuracy class / Nominal case size	1.6 NCS 60 mm (2.36") 1.0 NCS 80, 100 mm (3, 4")
Degree of protection	DIN EN 60529 / IEC 60529 IP54 in front of the panel
Wetted parts	connections: brass Bourdon tubes: bronze, soft soldered, c-form
Window	made of non-splintering material (reflex-reduced laminated safety glass)
Standard position of installation	70° – 90° (position of calibration 80°)
Dial	black with white scale, with zero stop pin
Safety category	according to DIN EN 837-1 S1 (pressure gauge with blow-out device)
Restrictor screw	in each inlet port

Combi Gauges

Models R... and DR... According to DIN 38030:2022-10

Our company is certified according to the highest quality standards and our product portfolio meets the highest quality demands. We do not only manufacture according to product-specific instrument standards, we also offer versions with special approvals for application areas with specific requirements. Our combi gauges are manufactured according to DIN 38030:2022-10.



Bourdon Tube Pressure Gauge for One Pressure Pipe – With One Measuring Unit

Model	Rg 60 – 1Fz rmBFr	RChg 80 – 1Fz rmBFr	RChg 100 – 1Fz rmBFr
Nominal case size	60 mm (2.36")	80 mm (3")	100 mm (4")
Accuracy class	1.6	1.0	1.0
Case	galvanised steel, with crimped-on ring made of aluminum, black anodised	stainless steel 304 (1.4301), with crimped-on ring made of aluminum, black anodised	
Blow-out device	blow-out plug in the back of the case		
Lighting	direct: 1 light bulb BA9s and indirect: via light slits in the case		
Case configuration	position of the connection: centre back connection (rm), mounting device: u-clamp for panel mounting (BFr)		
Pressure ranges	0 – 6 bar, 0 – 10 bar, 0 – 12 bar		
Process connection	M 12x1.5 with chuck cone for cutting ring L6 according to DIN EN ISO 8434-1	M 16x1.5 with chuck cone for cutting ring L10 according to DIN EN ISO 8434-1	
	with restrictor screw in the pressure inlet port, orifice Ø 0.8 mm (0.03")		
Window	reflex-reduced laminated safety glass		
Pointer	aluminum, colour yellow (RAL 1016)		
Data sheet	1901	1901	1901



Bourdon Tube Pressure Gauge for Two Pressure Pipes – With Two Measuring Units

Model	DRg 60 – 1 Fz rmBFr	DRChg 80 – 1 Fz rmBFr	DRChg 100 – 1 Fz rmBFr
Nominal case size	60 mm (2.36")	80 mm (3")	100 mm (4")
Accuracy class	1.6	1.0	1.0
Case	galvanised steel, with crimped-on ring made of aluminum, black anodised	stainless steel 304 (1.4301), with crimped-on ring made of aluminum, black anodised	
Blow-out device	blow-out plug in the back of the case		
Lighting	direct: 1 light bulb BA9s and indirect: via light slits in the case		
Case configuration	position of the connection: centre back connection (rm), mounting device: u-clamp for panel mounting (BFr)		
Pressure ranges	0 – 6 bar, 0 – 10 bar, 0 – 12 bar		
Process connection	2 x M 12x1.5 with chuck cone for cutting ring L6 according to DIN EN ISO 8434-1	2 x M 16x1.5 with chuck cone for cutting ring L10 according to DIN EN ISO 8434-1	
	including restrictor screw in each pressure inlet port, orifice Ø 0.8 mm (0.03") each process connection is marked with a colour dot, matching the colour of the corresponding pointer		
Window	reflex-reduced laminated safety glass		
Pointer	aluminum, 1 pointer yellow (RAL 1016), 1 pointer luminous bright red (RAL 3026)		
Data sheet	5901	5901	5901

Rail Car Pressure Gauges – Special

A good standard helps to simplify many aspects and to make them more straightforward – and to reduce costs. However, individuality and customisation is essential to meet the variety of requirements and demands.

Do you need a special pressure gauge for rail cars? We manufacture your pressure measuring instrument as required. On the following pages, you will find several examples for versions we manufacture according to customer specifications in addition to our combi gauges. If you need a special pressure gauge version, do not hesitate to contact us!



Special Size 130

Model	Single Pressure Gauge with Bourdon Tube R 130 – 1 rBFr	Duplex Pressure Gauge with Bourdon Tube DR 130 – 1 rBFr
Nominal case size	130 mm (5.12")	130 mm (5.12")
Accuracy class	1.0	1.0
Case	with bezel ring black	
Blow-out device	blow-out plug in the back of the case	
Lighting	direct: 1 light bulb BA9s, indirect: via light slits in the case	direct: 2 light bulbs BA9s, indirect: via light slits in the case
Case configuration	mounting device: with brackets (for panel mounting)	
Pressure ranges	0 – 6 bar, 0 – 10 bar, 0 – 12 bar, 0 – 16 bar	
Process connection	1 x L10 (M 16x1.5 with chuck cone)	2 x L10 (M 16x1.5 with chuck cone)
Window	reflex-reduced laminated safety glass	
Pointer	aluminum, colour yellow (RAL 1016)	aluminum, 1 pointer yellow (RAL 1016), 1 pointer luminous bright red (RAL 3026)
Options	upon request	



Nominal Size 125

Model	Single Pressure Gauge with Bourdon Tube RChg 125 – 1 Fz rBFr	Duplex Pressure Gauge with Bourdon Tube DRChg 125 – 1 Fz rBFr
Nominal case size	125 mm (5")	125 mm (5")
Accuracy class	1.0	1.0
Case	stainless steel 304 (1.4301), crimped-on ring 1.4301 black enamelled	
Blow-out device	blow-out plug in the back of the case	
Lighting	direct: 2 light bulbs BA9s, indirect: via light slits in the case	
Case configuration	mounting device: single-piece bracket (for panel mounting)	mounting device: with brackets (for panel mounting)
Pressure ranges	0 – 6 bar, 0 – 10 bar, 0 – 12 bar, 0 – 16 bar	0 – 10 bar
Process connection	1 x L10 (M 16x1.5 with chuck cone)	2 x L10 (M 16x1.5 with chuck cone)
Window	reflex-reduced laminated safety glass	
Pointer	aluminum, colour yellow (RAL 1016)	aluminum, 1 pointer yellow (RAL 1016), 1 pointer luminous bright red (RAL 3026)
Options	upon request	
Data sheet	1901.1	5901.1

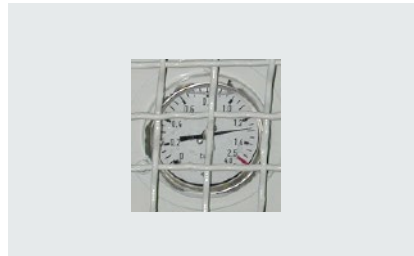
Rail Car Pressure Gauges – Special



For Electro-magnetic Rail Brakes

Bourdon Tube Pressure Gauge RChgG 63 – 3 rFr

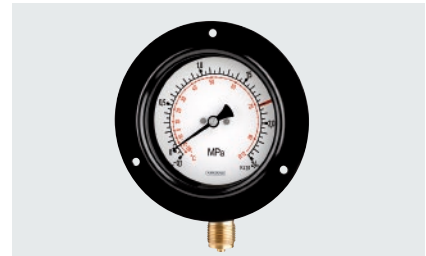
Nominal case size	63 mm (2½")
Accuracy class	1.6
Case	and crimped-on ring stainless steel
Dial	aluminum white
Scale	black
Mounting	with front flange for panel mounting
Pressure ranges	0 – 16 bar and others
Process connection	G ¼ B lower back connection, stainless steel
Specialties	tightness tested with helium leak detection
Data sheet	1212



For Rail Tank Cars

Bourdon Tube Pressure Gauge RChgG 63 – 1 rmFr

Nominal case size	63 mm (2½")
Accuracy class	1.6
Case	and crimped-on ring stainless steel
Dial	aluminum white
Scale	for test pressure 1 bar for transport 0.5 bar for unloading 2.5 bar
Mounting	with front flange for panel mounting
Pressure ranges	0 – 4 bar
Process connection	G ¼ B
Specialties	special scale for different pressure ratios
Application report	AppBe_SF_032



For Air-conditioning Systems

Bourdon Tube Pressure Gauge (Various Cases)

Nominal case size	63, 80, 100, 160 mm (2½, 3, 4, 6")
Accuracy class	1.6 (NCS 63) 1.0 (NCS 80, 100, 160)
Case	steel black enameled
Dial	aluminum white
Scale	black for pressure, coloured for refrigerant
Mounting	with front flange or bracket for panel mounting
Pressure ranges	-1 / +15 bar, -1 / +24 bar, -1 / +30 bar, and others
Process connection	brass or stainless steel, G ½ B or others, also ¾" - 20 UNF acc. to DIN 3866
Specialties	combined pressure and temperature scale for refrigerants
T-sheet	T01-000-015

Repairable Version

- ◆ Measuring unit with removable back of the case (without damaging the crimped-on ring)
- ◆ Readjustment after reaching the maximum number of load alternations possible
- ◆ Complete replacement of the measuring unit possible
- ◆ External dimensions similar to standard versions (see data sheets)
- ◆ Available for nominal case sizes 80 and 100



Restoration of Old Instruments And Manufacturing of New Instruments in Historical Design

The restoration of your old pressure gauges and thermometers lets them shine bright and new.
Is the instrument worth restoring?
We are glad to help with your decision.

Possible restoration procedure:

- ◆ Dismounting of the individual components
- ◆ Reworking of damage
- ◆ Cleaning and polishing
- ◆ Readjustment – if possible and requested
- ◆ Reworking or printing of new individual scales
- ◆ Mounting of the individual components
- ◆ Check of the functionality

Besides restoring old instruments, we also manufacture new instruments in historical design.

To preserve the charm of an old steam engine, the instruments should have the suitable design.

Options:

- ◆ Brass case
- ◆ Special pointer versions
- ◆ Special dials

Do not hesitate to contact our experienced sales team.
There are almost no limits to what we can do!





ARMANO

ARMANO Messtechnik GmbH

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