

# Bourdon Tube Pressure Gauges

Bayonet ring case stainless steel  
With limit switch contact assembly

**RCh**  
**RChOe**

This data sheet contains information on the maximum possible number of contacts, on electrical connections, ordering information and options concerning the models RCh and RChOe with limit switch contact assemblies (with low-action, magnetic, electronic or inductive contacts), as well as dimensional drawings with the position of the electrical connections.

**Data sheet 1201** contains all details concerning the available versions of models RCh and RChG without limit switches. These details as well as the required ordering information apply also to the version with limit switches, unless otherwise stated below. Instead of glycerin, a special oil is used for liquid-filled pressure gauges with limit switches. The model code for instruments with case filling is RChOe.

**Model overview 9.1000** contains general and detailed definitions, applications and operating principles for the respective limit switch types. It also provides detailed information on the selection, switching functions and minimum spans, on operating conditions, explosion protection, options and others.



## Standard Versions

### Available Limit Switch Contact Assemblies

1. **Direct** (electromechanical)
  - 1.1 Low-action contact **S**
  - 1.2 Magnetic contact **M**
2. **Indirect** (contact-free)
  - 2.1 Electronic contact **E**
  - 2.2 Inductive contact **I**
  - 2.3 Pneumatic contact **P** upon request

### Maximum Possible Number of Contacts

	NCS 100 case filling		NCS 160 case filling	
	without	with	without	with
up to 3 x S 4 x S <sup>1)</sup>	○ upon request	– –	○ ○	– –
up to 3 x M 4 x M <sup>1)</sup>	○ upon request	○ –	○ ○	○ ○
up to 3 x E 4 x E	○ upon request	○ upon request	○ upon request	○ upon request
up to 3 x I 4 x I	○ upon request	○ upon request	○ upon request	○ upon request

○ = available

### Degree of Protection (DIN EN 60 529/IEC 529)

IP54

IP65 for model RChOe (span  $\geq 2.5$  bar)

### Blow-out Device

Model RCh blow-out plug in the back of the case, 1" ( $\varnothing 25$  mm)

Model RChOe blow-out device at the top of the case coverage

### Case Ventilation

Model RChOe via blow-out device

### Nominal Case Sizes

100, 160 mm (4, 6")

### Window

Polycarbonate

for type –1

Laminated safety glass

for types –3 and –6

### Adjusting Mechanism Limit Setting Pointer

All instruments are equipped with an adjusting lock in the window. With the removable key, the limit setting pointer can be externally set to the value of the desired switch point.

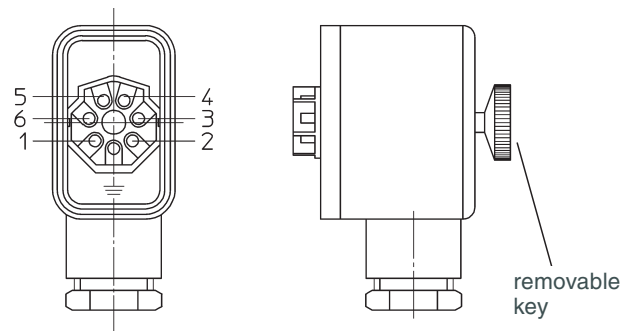
## Electrical Connection

- for limit switch (S/M): plug connector PA6, black
  - for limit switch (E): terminal box PA6, black
  - for limit switch (I): terminal box PA6, blue
- for identification of an intrinsically safe circuit, anything else as E

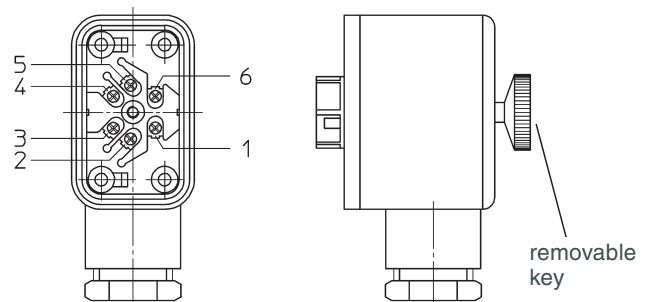
## Plug Connector and Terminal Box

6-pin + PE, screwed cable gland M20x1.5 with strain relief, IP65 according to VDE 0110 insulation group C/250, terminals numbered according to wiring diagram (on the device)

### Plug Connector



### Terminal Box



For the position of the electrical connection, please refer to the dimensional drawings, see pages 2 and 4 (cable entry).

<sup>1)</sup> optionally as double change-over contact

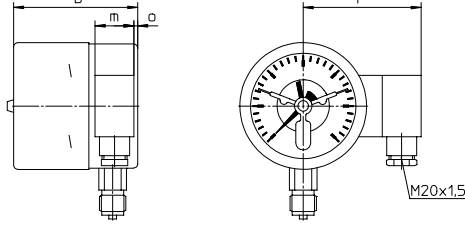
# Case Configurations, Code Letters, Dimensional Data and Weights

Compared to the basic models, there are deviations in the front-to-back sizes, see table.  
Please refer to data sheet 1201 for the other dimensional data.

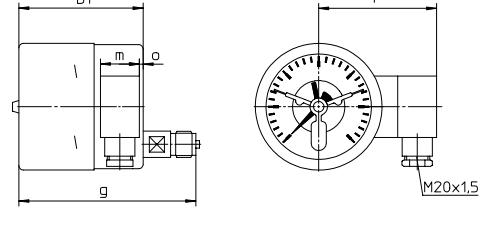
## Bottom Connection Lower Back Connection

### without mounting device

without code letters

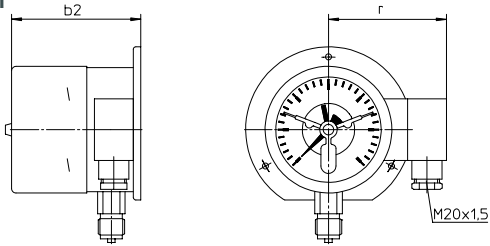


code letter: r

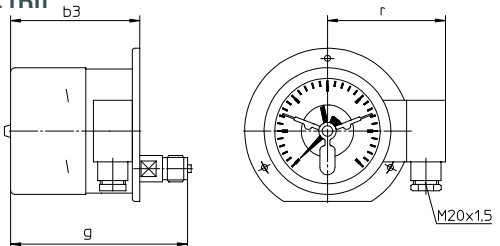


### with back flange for surface mounting

code letters: Rh

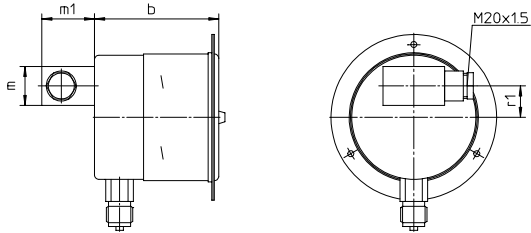


code letters: rRh

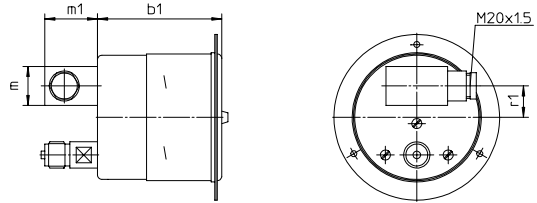


### with front flange for panel mounting

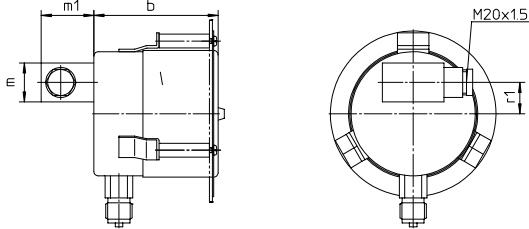
code letters: Fr  
without case filling



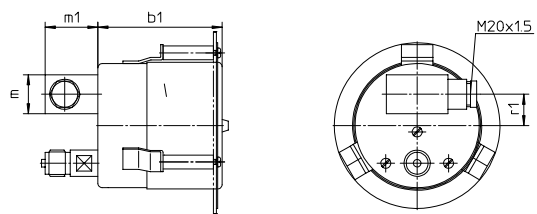
code letters: rFr  
without case filling



code letters: Fr  
with case filling



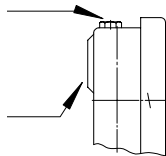
code letters: rFr  
with case filling



## Blow-out Device

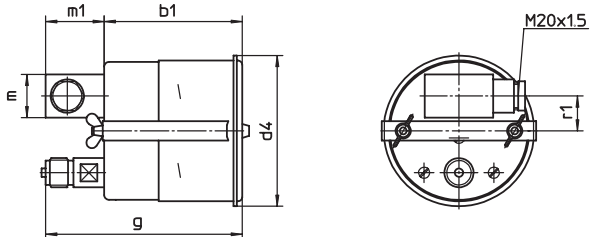
Blow-out device for model RChOe  
pressure range  $\leq 1.6$  bar blow-out device no. 5  
 $\geq 2.5$  bar blow-out device no. 3

Blow-out plug  $\varnothing 1''$  (25 mm) for models RCh when mounting plug connector, terminal box or PP/PE converter to the back of the case, for NCS 100 a blow-out plug in the back of the case is not possible.



## with u-clamp for panel mounting

code letters: rBFr  
without case filling



## Dimensional Data (mm/inch) and Weights (kg/lb)

NCS/type	b/b1	b2/b3	d4	g	m	m1	o	r	r1	approx. weight <sup>1)</sup>	
										RCh	RChOe
100 type - 1	99 3.9	103 4.06	108 4.25	141 5.55	31 1.22	42 1.65	3 0.12	94 3.7	25 0.98	1.65	2.54
100 types - 3 and - 6	103 4.06	107 4.21	108 4.25	145 5.71	31 1.22	42 1.65	3 0.12	94 3.7	25 0.98	1.65	2.54
160 all limit switches with 1 and 2 contacts (I11 and I22, see next row)	105 4.13	108 4.25	167 6.57	146.5 5.77	31 1.22	42 1.65	6 0.24	121 4.76	28 1.1	1.50 3.31	2.90 6.39
160 all limit switches with 3 and 4 contacts and I11 and I22	115 4.53	118 4.65	167 6.57	156.5 6.16	31 1.22	42 1.65	6 0.24	121 4.76	28 1.1	1.50 3.31	2.90 6.39

<sup>1)</sup> the data are based on the version with bottom connection and limit switches with 2 contacts

## Ordering Information, Limit Setting Pointer

<b>Basic Model:</b>	<b>Bourdon Tube Pressure Gauge with Limit Switch Contact Assembly</b>	<b>RCh, RChOe</b>
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	When installing limit switches, the order text of the basic device is supplemented by		
	code letters	S	low-action contact
		M	magnetic contact
		E	electronic contact
		I	inductive contact
	code number	1	making contact
	for the switching	2	breaking contact
	function (clock-	3	single change-over contact as low-action or magnetic contact
	wise direction of	11	1 <sup>st</sup> and 2 <sup>nd</sup> making contact
action at rising	12	1 <sup>st</sup> making contact / 2 <sup>nd</sup> breaking contact	
pressure)	21	1 <sup>st</sup> breaking contact / 2 <sup>nd</sup> making contact	
	22	1 <sup>st</sup> and 2 <sup>nd</sup> breaking contact	
	33	double change-over contact as low-action or magnetic contact	

<b>Please note</b>	For an optimal function of the devices with limit switch, please specify in your order text: <ul style="list-style-type: none"> <li>• correct specification of the switching function</li> <li>• switching pressures</li> <li>• switching ranges, which are beyond the adjustment ranges defined by us</li> <li>• if you require a counterclockwise switching direction</li> </ul> Information on limit switch contact assemblies with 3 or 4 contacts see below
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<b>Options</b>	for all limit	adjusting lock with non-removable key
	switch types	limit switch with pneumatic contact or with micro switch upon request
		switching distance fixing (2 contacts or more) upon request
	S/M contacts	separated circuits
		wire break control (parallel resistor for each contact)
		contact pins made of special materials upon request
	E contacts	PNP switching output as 2-wire connection
	I contacts	safety version SN or S1N (NCS 160 only)
		reactionless interval switching for NCS 160 with 2 contacts, interval relay required
		options for electrical connection see page 4
	other position of the electrical connection upon request	

**Example:** RChOe 100, rFr, 0 – 16 bar, G ½ B, M12

### Information on Limit Switches with 3 and 4 Contacts

In contrast to pressure gauges with 2 contacts, pressure gauges with 3 or 4 contacts do not always allow the limit setting pointers to be adjusted one above the other.

<b>Behaviour of the limit setting pointers to each other</b>				
Type limit switch	3 limit setting pointers		4 limit setting pointers	
	NCS 100	NCS 160	NCS 100	NCS 160
S, M	adjustable one above the other		only 3 pointers adjustable one above the other	
E, I	only 2 pointers adjustable one above the other		only the two middle pointers adjustable one above the other	only 3 pointers adjustable one above the other

### Switching functions

Those limit setting pointers with 3 and 4 contacts, which are not adjustable one above the other, are separated by a point when indicating the switching function.

Example: M 222.1      4-fold; 3<sup>rd</sup> and 4<sup>th</sup> limit setting pointer not adjustable one above the other  
E 1.22.1      4-fold; only the two middle pointers adjustable one above the other

### Minimum distance of the limit setting pointers, which are not adjustable one above the other (in degree)

Type limit switch	NCS 100	NCS 160
S, M	15	10
E, I	35	28

# Options

## Electrical Connection

### Cable entry

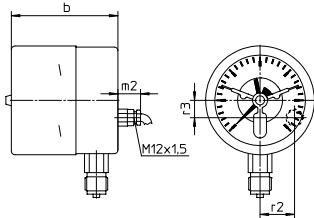
- For instruments without case filling
- IP65
- Cable entry M12x1.5 with strain relief and 1 m connection cable (connection cable longer than 1 m upon request)
- Available for types S/M

### Bottom Connection

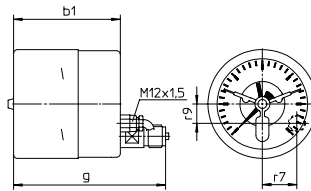
### Lower Back Connection

#### without mounting device

without code letters

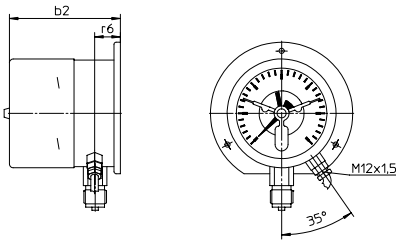


code letters: r

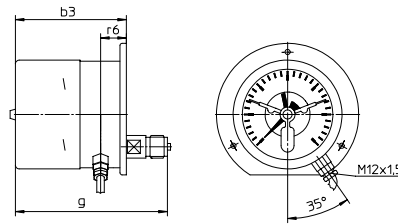


#### with back flange for surface mounting

code letters: Rh

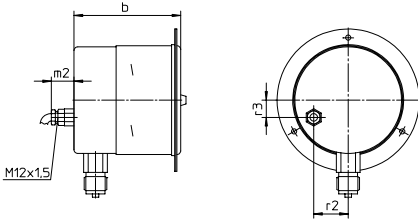


code letters: rRh

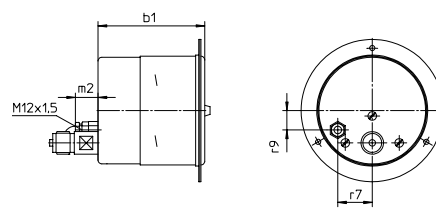


#### with front flange for panel mounting

code letters: Fr

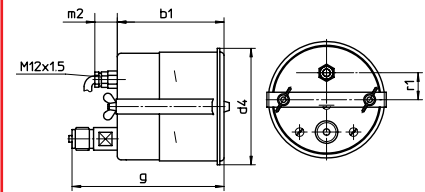


code letters: rFr



#### with u-clamp for panel mounting

code letters: rBFr



## Dimensional Data (mm/inch) and Weights (kg/lb)

NCS/type	b/b1	b2/b3	d4	g	m2	r1	r2	r3	r6	r7	r9	approx. weight <sup>1)</sup> RCh
100 type – 1 (standard)	99 3.9	103 4.06	108 4.25	141 5.55	21 0.83	25 0.98	32 1.26	16 0.63	24 0.94	32 1.26	18 0.71	0.75 1.65
100 types – 3 and – 6	103 4.06	107 4.21	108 4.25	145 5.71	21 0.83	25 0.98	32 1.26	16 0.63	24 0.94	32 1.26	18 0.71	0.75 1.65
160 all limit switches with 1 and 2 contacts (I11 and I22, see next row)	105 4.13	108 4.25	167 6.57	146.5 5.77	21 0.83	28 1.1	38 1.5	53 2.09	18 0.71	36 1.42	52 2.05	1.50 3.31
160 all limit switches with 3 and 4 contacts and I11 and I22	115 4.53	118 4.65	167 6.57	156.5 6.16	21 0.83	28 1.1	38 1.5	53 2.09	18 0.71	36 1.42	52 2.05	1.50 3.31

## Plug connector DIN EN 17 5301-803

- IP65, 3-pin + PE and protective contact
- Available for max. 2 x S/M or 1 x E/I or 2 x E for option PNP switching output as 2-wire connection

The plug connectors DIN EN 17 5301-803 have the same position of connection as the plug connectors and terminal boxes, see page 2.

### Construction type A



for instruments without case filling

### Construction type C



for instruments without and with case filling

## Circular plug connector

- For instruments without and with case filling
- IP67, 4-pin
- Available for max. 2 x E/I
- With 2 m die cast cable upon request

The circular plug connectors have roughly the same position of connection as the cable entries, see above.

### Angular cable box



### Straight cable box upon request



<sup>1)</sup> the data are based on the version with bottom connection and limit switches with 2 contacts