

Gas-Actuated Thermometers, with Capillary Line

TFCh
TFChOe

**Bayonet ring case stainless steel
with limit switch contact assembly**

This data sheet contains information on the number of the maximum possible contacts, the electrical connections, the ordering information and the options of the models TFCh and TFChOe with limit switch contact assembly with standard/magnetic, electronic or inductive contacts, furthermore dimensional drawings with the position of the electrical connections.

Data sheet 8221 contains all details of the available versions TFCh resp. TFChG without limit switch contact assembly. These information as well as the required ordering information are also valid for the version with limit switch contact assembly, as far as not described differently.

For liquid-filled thermometers with limit switch contact assembly a special oil is used instead of silicone oil. The model code for instruments with case filling is TFChOe.

In **model overview 9.1000** definitions, applications and functions of the particular models of the limit switch contact assemblies are described generally and in detail. It also contains comprehensive information on the selection, switching functions and minimum spans, operating conditions, Ex-protection, options and others.



Standard Versions

Available limit switch contact assemblies

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

Number of the maximum possible contacts

	NCS 100 case filling		NCS 160 case filling	
	without	with	without	with
up to 3 x S	○	—	○	—
4 x S ¹⁾	upon request	—	○	—
up to 3 x M	○	○	○	○
4 x M ¹⁾	upon request	—	○	upon request
up to 3 x E	○	○	○	○
4 x E	upon request	—	upon request	upon request
up to 3 x I	○	○	○	○
4 x I	upon request	—	upon request	upon request

○ = available
¹⁾ alternatively as double change-over contact

Case Protection Type (EN 60 529 / IEC 529)
IP 65

Nominal Case Size
100, 160 (mm) (4", 6")

Window
Polycarbonate

Adjusting Mechanism Limit Setting Pointer
All instruments have an adjustable lock in the window. The limit setting pointer is set to the value at which the switching operation should happen, externally by the removable key.

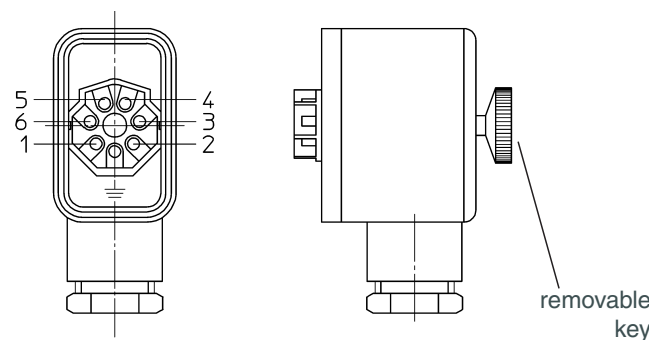
Electrical Connection

- for limit switch contact assembly (S/M): plug connector
- for limit switch contact assembly (E) : cable connection box black
- for limit switch contact assembly (I) : cable connection box blue, for identification of an intrinsically safe circuitry, otherwise as E

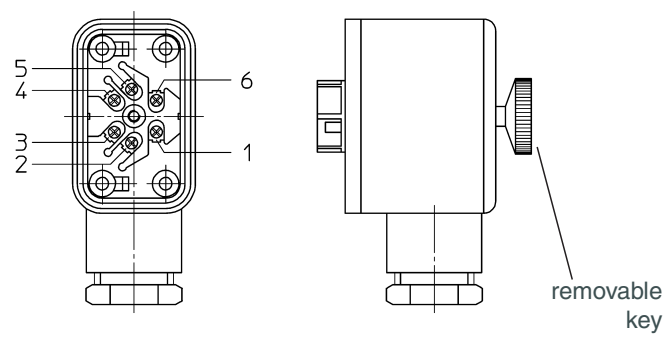
Plug Connector and Cable Connection Box

IP 65, 6-pin, with M 20 x 1.5 screwed cable gland with pull relief, terminals numbered according to wiring diagram (at the instrument), protective contact available

Plug Connector



Cable Connection Box



The position of the electrical connection can be seen on the dimensional drawings, see page 2 and page 4 (cable entry).



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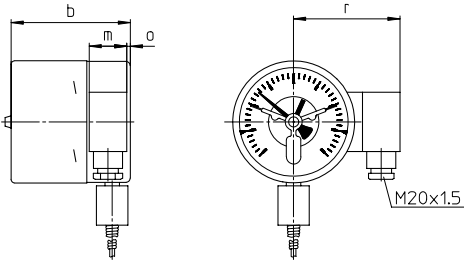
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Case Configurations, Code Letters, Dimensional Data and Weights

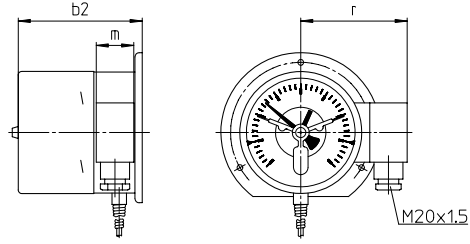
Compared to the basic models there are deviations in the front-to-back-sizes.
The remaining dimensions can be seen on data sheet 8221.

Vertical Bottom Capillary Line Position

Mouting device for gauge holder bracket¹⁾
code letters: **Mgh**

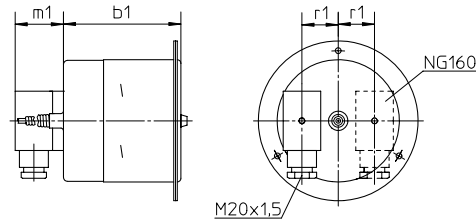


Back flange for surface mounting
code letters: **Rh**

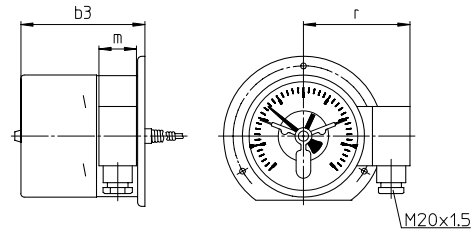


Centre Back Capillary Line Position

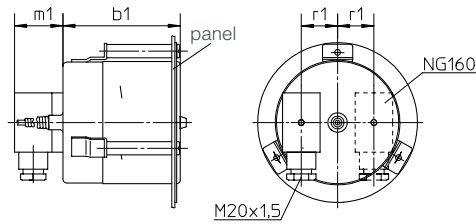
Front flange
code letters: **rmFr** - without case filling



with back flange
code letters: **rmRh**



with front flange
code letters: **rmFr** - with case filling



Dimensional Data (mm / inches) and Weights (kg / lb)

NCS/model	b / b1	b3	m	m1	o	r	r1	approx. weight ²⁾	
								TFCh	TFChOe
100 1, 2 and 3 contacts	99	103	31	42	3	94	29.5	0.95	1.50
	3.9	406	1.22	1.65	0.12	3.7	1.16	2.09	3.3
100 4 contacts	106	110	31	42	3	94	29.5	0.95	-
	4.17	4.33	1.22	1.65	0.12	3.7	1.16	2.09	
160 all limit switch contact assemblies with 1 and 2 contacts (I11, I22, see next line)	105	108	31	42	6	121	55	1.40	3.00
	4.13	4.25	1.22	1.65	0.24	4.76	2.17	3.09	6.61
160 all limit switch contact assemblies with 3 and 4 contacts and I11 and I22	115	118	31	42	6	121	55	1.45	3.10
	4.53	4.65	1.22	1.65	0.24	4.76	2.17	3.2	6.83

¹⁾ Dimensional data of the gauge holder bracket according to DIN 16 281

²⁾ The information is an example and relates to model TFCh resp. TFChOe, A3, dF 12, L=200 mm, L_F=1 m, G½, E12 resp. M1221

Ordering Information, Limit Setting Pointer

Basic Model: Gas-actuated thermometers with limit switch contact assembly		TFCh, TFChOe
Ordering information		
	When installing limit switch contact assemblies, the ordering code of the basic model is extended by	
code letters	S standard contact	
	M magnetic contact	e.g. M
	E electronic contact	
	I inductive contact	
code number	1 making contact	
for switching function	2 breaking contact	e.g. 2
(clockwise direction of action, that means for pressure gauges at rising pressure)	3 single change-over contact as standard or magnetic contact	
	11 1. and 2. making contact	
	12 1. making contact / 2. breaking contact	
	21 1. breaking contact / 2. making contact	
	22 1. and 2. breaking contact	
	33 double change-over contact as standard or magnetic contact	
Details	For an optimal function of the instruments with limit switch contact assemblies you have to add the following to the ordering code: - switching temperature(s) - switching range(s) that are beyond the adjustment ranges that are defined by us - if an anticlockwise switching direction is requested Information on limit switch contact assemblies with 3 or 4 contacts see above	
Options	for all limit switch contact assembly models adjustable lock with non-removable key limit switch contact assembly with pneumatic contact or with micro switch upon request switching distance fixing (2 contacts and above) upon request S/M contacts separated circuitries wire break control (parallelly switched 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 interval switching reactionless for NCS 160 with 2 contacts, interval relay required options of electrical connections 4 other position of the electrical connection upon request	(order at the moment still as clear text)

Example:

TFChOe 100 Rh, 0 - 200 °C, A3, dF 12, L=150 mm, L_{FL}=1 m, G¹/₂, E1

Information on limit switch contact assemblies with 3 and 4 contacts

Compared to thermometers with 2 contacts the limit setting pointers of thermometers with 3 or 4 contacts are not adjustable one above the other in every case.

Behaviour of the limit setting pointers to each other

Model Limit switch contact assembly	3 limit setting pointers		4 limit setting pointers	
	NCS 100	NCS 160	NCS 100	NCS 160
S, M	adjustment one above the other		only 3 adjustable one above the other in each case	
E, I	only 2 adjustable one above the other in each case		only the two pointers in the middle adjustable one above the other	only 3 adjustable one above the other in each case

Switching functions

The limit setting pointers, that are not adjustable one above the other for limit switch contact assemblies with 3 and 4 contacts are separated by a point when indicating the switching function.

Example: M 222.1 4-fold; 3rd and 4th limit setting pointer not adjustable one above the other

E 1.22.1 4-fold; only the two pointers in the middle are adjustable one above the other

Minimum distance of the not adjustable (one above the other) pointers in angular degrees

Model Limit switch contact assembly	NCS 100	NCS 160
S, M	15	10
E, I	35	28

Options

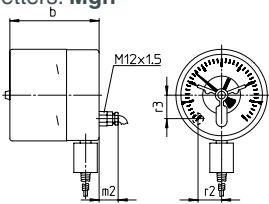
Electrical Connection

Cable entry

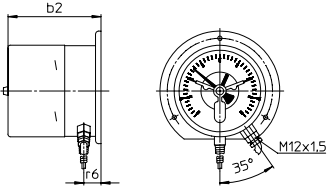
- for instruments without case filling
 - IP 65
 - cable entry M 12 x 1.5 with pull relief and 1 m connection cable
 - available for max. 4 x S / M
- more than 1 m connection cable upon request

Bottom Capillary Line Position

Mounting device for gauge holder bracket ¹⁾
code letters: **Mgh**

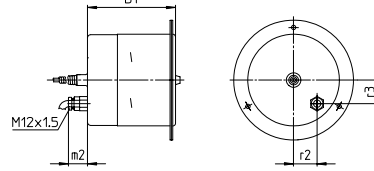


Back flange for surface mounting
code letters: **Rh**

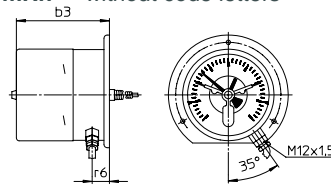


Centre Back Capillary Line Position

Front flange
code letters: **rmFr** - without case filling



Back flange for surface mounting
code letters: **rmRh** - without code letters



Dimensional Data (mm / inches) and Weights (kg / lb)

NCS/model	b / b1	b2 / b3	m2	r2	r3	r6	approx. weight ²⁾ TFCh
100 1, 2 and 3 contacts	99 / 3.9	103 / 4.06	21 / 0.83	26 / 1.02	26 / 1.42	21 / 0.83	0.95 / 2.09
100 4 contacts	106 / 4.17	110 / 4.33	21 / 0.83	26 / 1.02	26 / 1.42	21 / 0.83	0.95 / 2.09
160 all limit switch contact assemb. with 1 and 2 contacts	105 / 4.13	108 / 4.25	21 / 0.83	36 / 1.42	50 / 1.97	18 / 0.71	1.40 / 3.09
160 all limit switch contact assemb. with 3 and 4 contacts	115 / 4.53	118 / 4.65	21 / 0.83	36 / 1.42	50 / 1.97	18 / 0.71	1.45 / 3.2

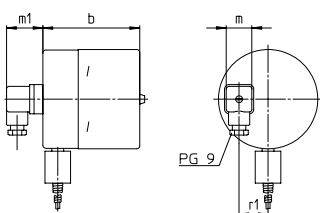
Plug connector DIN EN 17 5301-803

- IP 65, 3-pin and protective contact
- available for max. 2x S / M or 1x E / I
- resp. 2x E / I at option PNP-switching outputs as 2-wire connection

Plug connector DIN EN 17 53 01-803 construction type A - for instruments without case filling

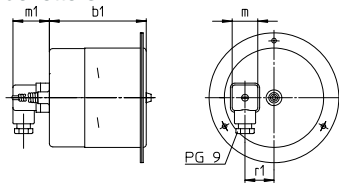
Bottom Capillary Line Position

Mounting device for gauge holder bracket ¹⁾
without code letters



Centre Back Capillary Line Position

Front flange
code letters: **rm**



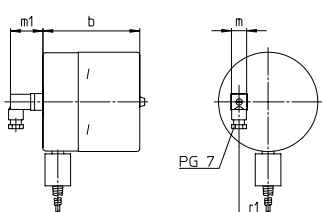
Dim. Data (mm / inches) and Weights (kg / lb)

NCS	b / b1	m	m1	r1	approx. weight ²⁾ TFCh
100	99	26	37	29.50	0.95
4"	3.9	1.02	1.46	1.16	2.09
160	105	26	37	55	1.40
6"	4.13	1.02	1.46	2.17	3.09

Plug connector DIN EN 17 53 01-803 construction type C - for instruments with and without case filling

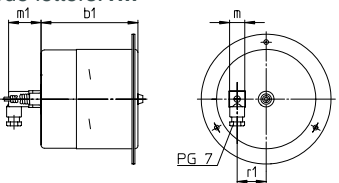
Bottom Capillary Line Position

Mounting device for gauge holder bracket ¹⁾
without code letters



Centre Back Capillary Line Position

Front flange
code letters: **rm**



Dim. Data (mm / inches) and Weights (kg / lb)

NCS	b / b1	m	m1	r1	approx. weight ²⁾ TFCh	TFChG
100	99	15.5	33	29.50	0.95	1.50
4"	3.9	0.61	1.30	1.16	2.09	3.3
160	105	15.5	33	55	1.40	3.00
6"	4.13	0.61	1.30	2.17	3.09	6.61

Circular plug connector M 12 x 1.5

- with 2 m die casted cable upon request

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

angular cable box



straight cable box upon request



¹⁾ Dimensions of the gauge holder bracket according to DIN 16 281

²⁾ The information is an example and relates on the model TFCh resp. TFChOe, A3, dF 12, L=200 mm, L₁=1 m, G1/2, E12 resp. M1221