# Gas pressure thermometer
# with long-distance line - Type TFB…, TFC… -


- **ROUND HOUSING NG 100 AND 160 MM FOR CHEMICAL USE**
- **WITHOUT OR WITH GLYCERINE FILLING**
- **INSTALLATION OF ELECTRICAL CONTACT DEVICES**

## DESCRIPTION

**Series: TFB, TFC**
Gas pressure thermometer with nitrogen filling (inert gas filling, physiologically harmless)

**Series: TFBG, TFCG**
As above, but filled with glycerine

## TECHNICAL DATA - STANDARD VERSION

| | |
|---|---|
| Nominal size | 100 and 160 mm |
| Accuracy (EN 13190) | Class 1 |
| Reference temperature | + 23°C |
| Display ranges (EN 13190) | According to table below for temperature differences from 80 K to 500 K |
| Resistance to environmental temperature | -20 to +60°C (also storage/transport) |
| Max. permitted static operating pressure | 25 bar at the sensor |
| Protection type (EN 60529 / IEC 529) | IP 55 without filled housing<br>IP 65 with filled housing |
| Housing / bayonet ring | CrNi steel 1.4301<br>TFB/TFC - without filled housing<br>TFBG/TFCG - with filled housing |
| Viewing pane | Instrument glass |

| | |
|---|---|
| Connection | At the bottom, optional: At the back, off-centre (r..), for connection type see sensor types |
| Sensor | CrNi steel 1,4571 |
| Long-distance line (long-distance line length over 20 m on request) | TFB – steel ∅ 3 mm<br>TFC – CrNi steel ∅ 2 mm |
| Measuring system | With nitrogen (inert gas, physiologically harmless) |
| Indicators | Brass / nickel silver |
| Readjustment | ± 6% with correction screw from the outside |
| Dial | White aluminium, black scale |
| Indicators | Black aluminium |

## SPECIAL VERSIONS, etc.

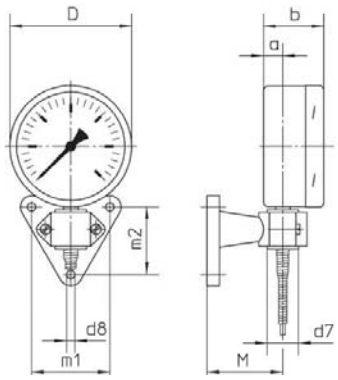
- Other connection threads on request
- Sensor with protective pipe
- Additional electrical devices

| Display range (°C) | Measuring range (°C) | Scale division value (°C) | Temperature difference △T (K) |
|---|---|---|---|
| -50 / 50 | -40 / 40 | 1 | 100 |
| -30 / 50 | -20 / 40 | 1 | 80 |
| -30 / 120 | -10 / 100 | 2 | 150 |
| -30 / 170 | -10 / 150 | 5 | 200 |
| -20 / 60 | -10 / 50 | 1 | 80 |
| -20 / 80 | -10 / 70 | 1 | 100 |
| 0 / 80 | 10 / 70 | 1 | 80 |
| 0 / 100 | 10 / 90 | 1 | 100 |
| 0 / 120 | 20 / 100 | 2 | 120 |
| 0 / 150 | 20 / 130 | 2 | 150 |
| 0 / 160 | 20 / 140 | 2 | 160 |
| 0 / 200 | 20 / 180 | 5 | 200 |
| 0 / 300 | 30 / 270 | 5 | 300 |
| 0 / 350 | 50 / 300 | 5 | 350 |
| 0 / 400 | 50 / 350 | 10 | 400 |
| 0 / 500 | 50 / 450 | 10 | 500 |
| 0 / 600 | 100 / 500 | 10 | 600 |
| 50 / 300 | 80 / 270 | 5 | 250 |
| 50 / 400 | 100 / 350 | 5 | 350 |
| 100 / 500 | 150 / 450 | 10 | 400 |
| 100 / 600 | 150 / 550 | 10 | 500 |

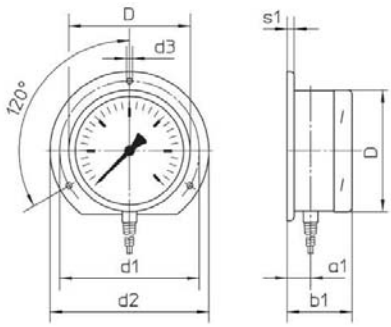
[1] Display range not possible for all sensor diameters, see table for minimum sensor length
[2] Not with limit transducer
[3] Long-distance line > 5 m on request

## Housing designs, reference letters, dimensions and mass

Connection at the bottom, for attachment with measuring device holder,
Reference letters: **Mgh**

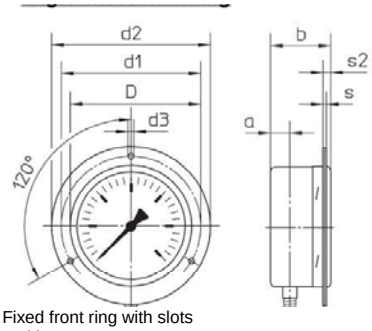



Connection at the bottom, rim at the back
Reference letters: **Rh**



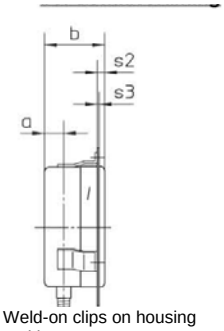

Connection at the bottom, front ring
Reference letters: **Fr**

**Unfilled version**




Fixed front ring with slots and loose cover

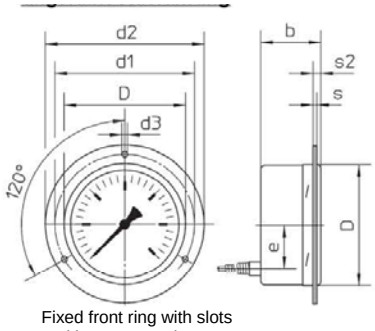
**For filled housing**




Weld-on clips on housing and loose cover

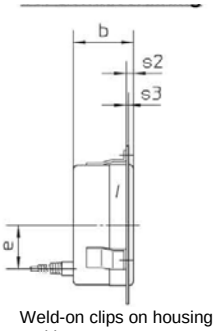
Connection at the back, off-centre, front ring
Reference letters: **rFr**

**Unfilled version**




Fixed front ring with slots and loose cover ring

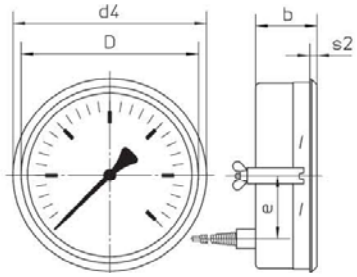
**For filled housing**




Weld-on clips on housing and loose cover

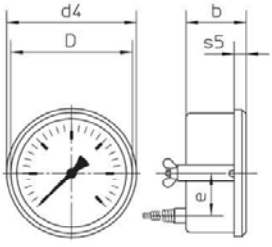
**Only TFCh 160** (without filled housing)
Connection at the back, off-centre, front ring with bracket[3)],
Reference letters: **rBFr**

Kennbuchstaben: **rBFr**




**NG 100 as type TFChg / TFChgG 100**)
Connection at the back, off-centre, front ring with bracket, flanged ring,
Identification letter for housing design **rBFr**

Kennbuchstaben für Gehäusebauform: **rBFr**




**Dimensions (mm) and weight (kg)**

**Maße (mm) und Masse (kg)**

| NG | a | a1 | b | b1 | D | d1 | d2 | d3 | d4 | e | s | s1 | s2 | s3 | s5 | Masse (ca.) TFCh | Masse (ca.) TFChG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 16 | 19,5 | 50 | 54 | 101 | 116 | 132 | 4,8 | 106 | 36 | 2 | 6 | | 1 | 10 | 0,50 | 0,80 |
| | | | | | | | | | | | | | | | — | 1,00 | 1,90 |

Accessory housing design MgH; **measuring device holder**

Zubehör Gehäusebauform Mgh: **Messgerätehalter**

Nosing M (order number *)

| Material | d7 | d8 | m1 | m2 | Ausladung M (Bestellnummer * ) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Black aluminium | 26 | 7 | 65 | 56 | 60 | Z-06 70 01 | 100 | Z-06 70 02 | 160 | Z-06 70 03 |
| CrNi steel / CrNi-Stahl | | | | | | 06 30 01 | | Z-06 30 02 | | 06 30 03 |



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# Gas pressure thermometer
# with long-distance line - Type TFB…, TFC… -

## Housing dimensions and electrical connection for additional facilities

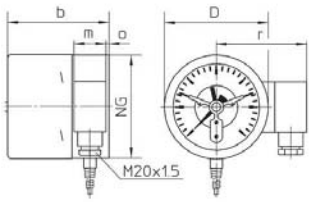
Only the installation heights differ when installing electromechanical and inductive limit transducers, resistive long-distance sensors or rotation angle transducers, see table and figure below.

Inspection glass made of acryl; laminated glass panel on request and at a surcharge

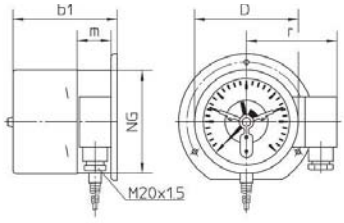
TFBOe, TFCOe
As basic type TFB/TFCG, but in liquid-filled devices with additional, electrical facilities, a special oil is used instead of silicone oil, therefore the code "Oe".

**Electrical connection**
Type TFB is normally delivered with a cable duct and 1 m connection cable for installation of creep and magnetic snap contacts. The electrical connection is established with plug-in connectors when long-distance resistive transducers and rotation angle transducers are installed.
Types TFC, TFBOe and TFCOe have a plug-in connection as a standard feature.
The electrical connection of inductive limit transducers is always based on a cable connection socket.
The exact position of the cable duct or the plug-in connection/cable connection socket is provided in the dimensional drawings below. Different connections are only possible on request and at a surcharge.

Connections at the bottom for measuring device holder (Mgh).
**Plug-in connection** or **cable connection socket**

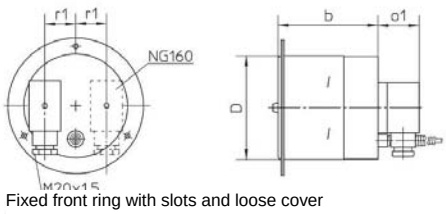



Connections at the bottom, rim at the back (Rh).
Reference letters: **Rh**



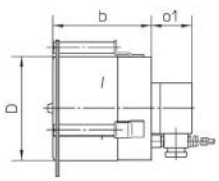

Connection at the back with front ring (rFr)
**Plug-in connection** or **cable connection socket**

**Unfilled version**




Fixed front ring with slots and loose cover

**For filled housing**




Weld-on clips on housing and loose front ring

**Dimensions (mm) and weight (kg)**

**Maße (mm) und Masse (kg)**

| NG | b | b1 | D | m | o | o1 | r | r1 | Weight (approx.)[3] Masse (ca.)[3] TFCh | TFChOe |
|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 98,5 [1] | 101 [1] | 101 | 31 | 3 | 40 | 88 | 30 | 0,70 | 1,50 |
| 160 | 105 [2] | 109 [2] | 161 | | 6 | | 119 | 55 | 1,30 | 2,70 |

### Installation and operating instructions for thermometers

- Do **NOT** use the housing for screwing in the sensor.
- The sensor of the thermometer may not be bent during installation.
- The display range may not be exceeded.
- Indicator thermometers without filling (glycerine...) must be installed without vibration.
- The bayonet ring on bayonet housings can be removed by turning and the device can be adjusted at the indicator
- The housing must be protected against heat radiation.
- The sensor must be completely immersed in the medium to be measured, e.g. too long welded sockets lead to measurement errors.
- If possible, a heat conducting paste should be used with protective sleeves to ensure optimal heat conduction.

We will gladly help you with special requests.

- Air channel thermometers must be inserted into the channel to at least a depth of 100 mm.
- Contact or mobile thermometers may not be completely heated up. This leads to measuring errors.
- The long-distance line of thermometers may under no circumstances be bent.
  The long-distance line made of steel must also be protected against rust.
- At high environmental temperatures, the insulation of the long-distance line prevents a distortion of the measuring results.
- Filled thermometers require that the attached bleeding screw is mounted before initial operation.
- Filled thermometers can be exposed to moderate oscillations and vibrations. Too strong vibrations (e.g. shakers, vibration machines, etc.) will destroy the device.



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# Gas pressure thermometer
# with long-distance line - Type TFB…, TFC… -

## Sensor types and connection design types for long-distance line

**Sensor material**: CrNi steel 1.4571 (incl. screw connection elements)[1)]

**Sensor type A 1**
Smooth sensors (without thread), sensor length = **L** = freely selectable, but ≥ minimum length (see below)
Basis for clamping ring connections sensor A 5

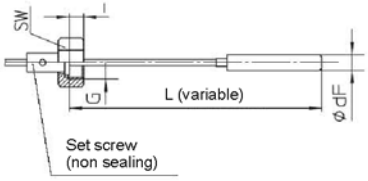
**Dimensions (mm)**

| ø $d_F$ [3)] | 6[2)], 8, 10, 12 |
|---|---|


**Sensor type A 2**
Sensor smooth, with loose union nut on the long-distance line that can be adjusted according to the immersion depth desired; for installation into protective pipe (see Data Sheet 8312) or for vertical installation in unpressurised measuring material (capillary pipe does not seal at the duct); connection M 20 x 1.5 or G 1/2, sensor length = **L** (≥ minimum length of the sensor A1 plus capillary pipe to the limit stop for the union nut) = freely selectable, but > minimum length (see below)

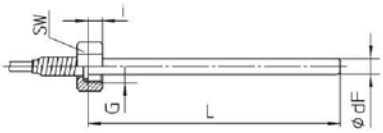
SE = Width Across Flat

| ø $d_F$ [3)] | G | SW | i |
|---|---|---|---|
| 6[2)], 8, 10, 12 | M20x1,5 | 27 | 10 |
| | G ½ | 27 | 10 |



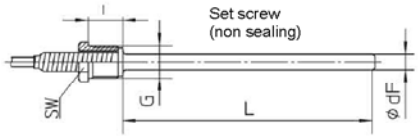

**Sensor type A 3**
Sensor with loose union nut, connection M 20 x 1.5 or G1/2, sensor length = **L** (immersion depth to the limit stop for the union nut) = freely selectable, but ≥ minimum length (see below)
Basis for sensor A 6

| ø $d_F$ [3)] | G | SW | i |
|---|---|---|---|
| 6[2)], 8, 10, 12 | M20x1,5 | 27 | 10 |
| | G ½ | 27 | 10 |




**Sensor type A 4**
Sensor with rotatable connection pin, connection M 20 x 1.5 or G1/2 B, sensor length = **L** (immersion dept to limit stop for connection pin) = freely selectable,
but ≥ minimum length (see below)

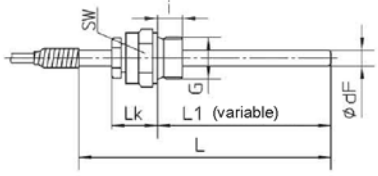
| ø $d_F$ [3)] | G | SW | i |
|---|---|---|---|
| 6[2)], 8, 10, 12 | M20x1,5 | 22 | 20 |
| | G ½ B | 22 | 20 |




**Sensor type A 5**
Sensor A1 with clamping/cutting ring connection, can be shifted on the sensor (please note: L1 must at least be ≥ minimum length of Sensor A1!), connection G1/4B or G1/2B, sensor length = **L** = freely selectable,
but ≥ minimum length (see below)

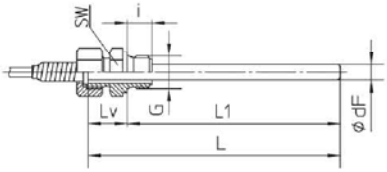
adjustable

| ø $d_F$ [3)] | G | SW | i | $L_K$ |
|---|---|---|---|---|
| 6[2)], 8, 10, 12 | G ½ B | 27 | 14 | ca. 37 |



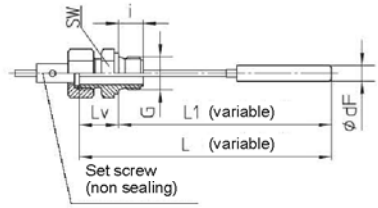

**Sensor type A 6**
Sensor A 3 with screw connection, connection M 20 x 1.5 or G1/2B, M 24x1,5, M 27x2 or G3/4B, sensor length = **L1** (immersion depth up to sealing surface of the screw connection) = freely selectable,
but ≥ minimum length (see below)

| ø $d_F$ [3)] | G | SW | i | $L_V$ |
|---|---|---|---|---|
| 6[2)], 8 | M20x1,5 | 27 | 14 | 25 |
| 10 | G ½ B | 27 | 14 | 25 |
| 6[2)], 8, 10, 12 | M24x1,5 | 27 | 16 | 27 |
| | M27x2 | 32 | 16 | 27 |
| | G ¾ B | 32 | 16 | 27 |




**Sensor type A 7**
Sensor A 2 with long-distance line and screw connection adjustable according to the penetration depth desired, vertical installation, only for unpressurised measuring material (capillary pipe does not seal at duct), connection M 20 x 1.5 or G1/2B, M 24x1,5, M 27x2 or G3/4B, sensor length = **L1** (≥ minimum length of Sensor A1 plus capillary pipe up to the sealing surface of the screw connection) = freely selectable, but ≥ minimum length (see below)

| ø $d_F$ [3)] | G | SW | i | $L_V$ |
|---|---|---|---|---|
| 6[2)], 8 | M20x1,5 | 27 | 14 | 25 |
| 10 | G ½ B | 27 | 14 | 25 |
| 6[2)], 8, 10, 12 | M24x1,5 | 27 | 16 | 27 |
| | M27x2 | 32 | 16 | 27 |
| | G ¾ B | 32 | 16 | 27 |




### Minimum immersion depth and minimum sensor length

| Sensor types (order length) | | Minimum immersion depth ET min (mm) [4)] | | | | Minimum sensor length L and L1 (mm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | all | | | | A1, A4 (L) | | | | A2, A3, (L) / A6, A7 (L1) | | | | A5 (L) | | | |
| Sensor Ø [2)3)] (mm) | | 12 | 10 | 8 | 6[2)] | 12 | 10 | 8 | 6[2)] | 12 | 10 | 8 | 6[2)] | 12 | 10 | 8 | 6[2)] |
| Long-distance line ≤ 5 m | AZ [6)] </= 500 °C | 35 | 45 | 75 | 120 | 40 | 50 | 80 | 125 | 50 | 60 | 90 | 135 | 75 | 85 | 115 | 160 |
| | AZ [6)] > 500 °C | 75 | 105 | 165 | 285 | 80 | 110 | 170 | 290 | 90 | 120 | 180 | 300 | 115 | 145 | 205 | 325 |
| Long-distance line > 5 m ≤ 15 m | AZ [6)] </= 500 °C | 53 | 80 | 115 | 190 | 58 | 85 | 120 | 195 | 68 | 95 | 130 | 205 | 93 | 120 | 155 | 230 |
| | AZ [6)] > 500 °C | 150 | 200 | 320 | 570 | 155 | 205 | 325 | 575 | 165 | 215 | 335 | 585 | 190 | 240 | 360 | 610 |

1) for A5: Clamping ring connection optionally and on request made of steel
2) Sensor Ø 6 mm, price and delivery time on request
3) other sensor Ø on request

Our equipment is currently being developed, therefore we reserve the right to make amendments.

4) The minimum immersion depth is determined by the active length of the sensor (container). It is the minimum depth that the sensor must be immersed in the measuring substance to obtain a correct temperature reading.
5) The minimum sensor length is the smallest possible length of the temperature sensor as a function of the minimum immersion depth and the sensor type.
6) AZ = Display range



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