# 20 Series

## Piezoresistive OEM pressure transducers with optimum stability

### Features

- High long-term stability
- Robust, compact stainless-steel housing
- High proof pressure
- Optimised thermal behaviour

### Technology

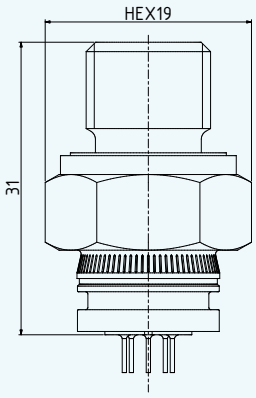
- Insulated piezoresistive pressure sensor chip, encapsulated in an oil-filled metal housing
- Fully welded design with no internal seals
- Typical range of output signal of 160 mV / mA

### Typical applications

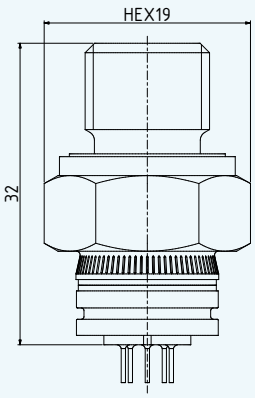
- OEM
- Industry
- Water management
- Air-conditioning technology

**Accuracy**
± 0,50 %FS
**Long-term stability**
± 0,3 %FS / year
**Pressure ranges**
0…5 bar to 0…600 bar

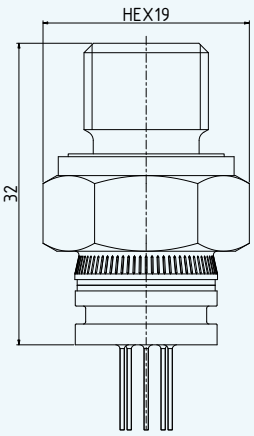
**20 Series: 0…5 to 0…50 bar**




**20 Series: 0…50 to 0…200 bar**




**20 Series: 0…200 to 0…600 bar**




**Edition 06/2025**
Subject to alterations
info@keller-pressure.com

# 20 Series – Specifications

### Standard pressure ranges

| Relative pressure PR | Absolute pressure PAA | Absolute pressure PA | Proof pressure | Sensitivity min. | Sensitivity typ. | Sensitivity max. |
|---|---|---|---|---|---|---|
| 0…5 | 0…5 | 0…5 | 15 | 24 | 32 | 40 |
| 0…10 | 0…10 | 0…10 | 30 | 12 | 16 | 20 |
| 0…30 | 0…30 | 0…30 | 90 | 4 | 5,3 | 6,7 |
| | 0…100 | 0…100 | 300 | 1,2 | 1,6 | 2 |
| | 0…200 | 0…200 | | 0,48 | 0,64 | 0,80 |
| | 0…400 | 0…400 | 600 | 0,30 | 0,40 | 0,50 |
| | 0…600 | 0…600 | 900 | 0,20 | 0,267 | 0,33 |
| bar rel. | bar abs. | bar abs. | bar | mV / (mA × bar) | | |
| Reference pressure at ambient pressure | Reference pressure at 0 bar abs. (vacuum) | Reference pressure at 1 bar abs. | Based on reference pressure | The standard pressure ranges are available from the warehouse. Additional calibrations to intermediate pressure ranges can also be made. | | |

### Performance

| | | |
|---|---|---|
| Accuracy @ RT (20 – 25 °C) | ≤ ± 0,50 %FS | Non-linearity (best fitted straight line BFSL), pressure hysteresis, non-repeatability |
| Offset @ RT (20…25 °C) | < ± 25 mV / mA | Uncompensated, the sensitivity value must be added for PA. |
| | < ± 2 mV / mA | Compensated with R3 or R4. |
| Compensated temperature range | -10…80 °C | Other temperature ranges within -20…100 °C possible as an option. |
| Long-term stability | ≤ ± 0,3 %FS | Per year under reference conditions. |
| Degree of dependency on location | ≤ 2 mbar | Calibrated in vertical installation position with pressure connection facing downwards. |
| Temperature coefficient | ≤ ± 0,025 %FS / K | Zero (TCzero) pre-compensated with R1 or R2. |
| | ≤ ± 0,06 % / K | Sensitivity (TCsens) |
| | 1800…3000 ppm / K | Total bridge resistance TC-resistance |

# 20 Series – Specifications

## Electrical data

Half-bridge configuration

| | | |
|---|---|---|
| Constant current supply | 1 mA nominal<br>3 mA maximum | |
| Bridge resistance @ RT (20…25 °C) | 3,5 kΩ ± 20 % | |
| Electrical connection | Gold-plated pins<br>ø 0,45 mm<br>L = version-dependent | See Dimensions and options<br>Optional: AWG28 (0,09 mm2) silicone wires, L = 70 mm, other lengths on request.<br>Optional: Circuit board with JST female connector |
| Insulation | > 100 MΩ @ 500 VDC | |

## Mechanical data

Materials in contact with fluid

| | | |
|---|---|---|
| Housing and separating diaphragm | Stainless steel AISI 316L | |
| Pressure connection seal | FKM (75 Shore)<br>-20…200 °C | For medium temperatures < -20 °C FVMQ is used. |

Other materials

| | |
|---|---|
| Pressure transducer oil filling | Silicone oil |

Further details

| | | |
|---|---|---|
| Pressure connection | G1/4 male | See Dimensions and variants |
| | 1/4-18NPT male | |
| Diameter × height | Depends on pressure range | |
| Connection for capillary for reference pressure compensation | ø 1,2 mm × 3 mm | Optional: Capillary (silicone) |
| Weight | approx. 40 g | For pressure ranges ≤ 200 bar |
| | approx. 45 g | For pressure ranges > 200 bar |

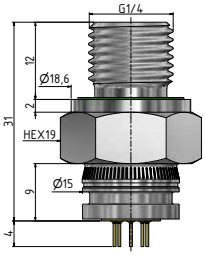
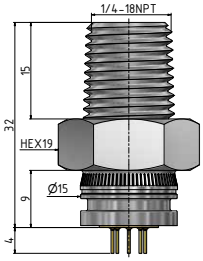
## Ambient conditions

| | | |
|---|---|---|
| Media temperature range | -20…100 °C | Operating temperature, consider o-ring.<br>Icing not permitted |
| Ambient temperature range | -20...100 °C | |
| Storage temperature range | -20…100 °C | |
| Vibration endurance | 10 g, 10…2000 Hz, ± 10 mm | IEC 60068-2-6 |
| Shock endurance | 50 g, 6 ms | IEC 60068-2-27 |
| Natural frequency (resonance) | > 20 kHz | |
| Pressure endurance @ RT (20…25 °C) | > 10 million pressure cycles | 0…100 %FS |

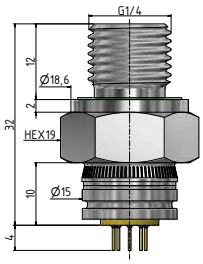
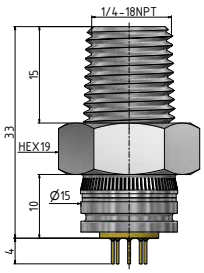
# 20 Series – dimensions and variants

### Available pressure connection

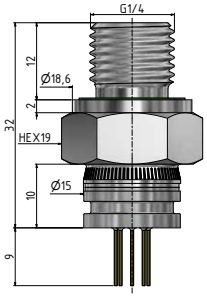
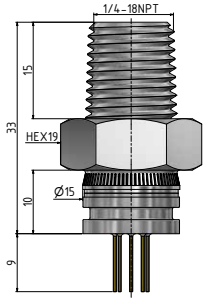
For pressure ranges ≤ 50 bar

| G1/4 | 1/4-18NPT |
|---|---|
|  |  |
| DIN EN ISO 1179-2 | ASME/ANSI B 120.1 |

For pressure ranges > 50 bar to ≤ 200 bar

| G1/4 | 1/4-18NPT |
|---|---|
|  |  |
| DIN EN ISO 1179-2 | ASME/ANSI B 120.1 |

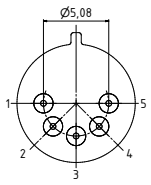
For pressure ranges > 200 bar

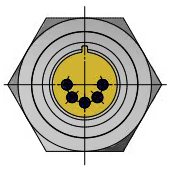
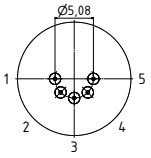
| G1/4 | 1/4-18NPT |
|---|---|
|  |  |
| DIN EN ISO 1179-2 | ASME/ANSI B 120.1 |

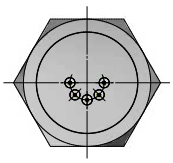
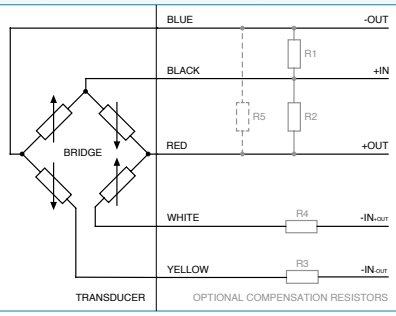
Other pressure connections available on request.

# 20 Series – dimensions and variants

## Electrical connection

<table>
<tr><td colspan="2">Glass feedthrough connection</td><td colspan="4">Half-open measurement bridge pin assignment</td></tr>
<tr><td colspan="2" rowspan="2"> 

 </td><td>PIN</td><td>Label</td><td>Designation</td><td>Wire colour</td></tr>
<tr><td>1</td><td>+OUT</td><td>Positive Output</td><td>red</td></tr>
<tr><td colspan="2" rowspan="5"></td><td>2</td><td>+IN</td><td>Positive Supply</td><td>black</td></tr>
<tr><td>3</td><td>-OUT</td><td>Negative Output</td><td>blue</td></tr>
<tr><td>4</td><td>-IN$_{-OUT}$</td><td>Negative Supply (half bridge -OUT)</td><td>yellow</td></tr>
<tr><td>5</td><td>-IN$_{+OUT}$</td><td>Negative Supply (half bridge +OUT)</td><td>white</td></tr>
<tr><td colspan="2">For pressure ranges ≤ 200 bar</td><td colspan="4">Electrical diagram with compensation resistors</td></tr>
<tr><td colspan="2" rowspan="2"> 

 </td><td colspan="4" rowspan="3"> 
</td></tr>
<tr><td colspan="2">For pressure ranges > 200 bar</td></tr>
</table>

The alignment of the PIN arrangement to the hexagon can vary.

## Customised configurations on request

- Calibration to other pressure ranges
- Calibration to other temperature ranges
- Calibration with mathematical modeling
- O-Rings made of other materials
- Other oil filling types for pressure transducers
- Modifications to customer-specific applications

## Examples of similar products

- 20Y Series: Pressure transducer 20 with analog compensation electronics
- 20C Series: Pressure transducer 20 with chip-in-oil technology and analog ratiometric output signal
- 20D Series: Pressure transducer 20 with chip-in-oil technology and I²C interface
- 20S Series: High-stability pressure transducer with pressure ranges of 0…0,3 bar to 0…1000 bar

# 20 Series – Analysis and characteristic curves

## Standard analysis

| Calibration sheet: Example type PA-10L | Key |
|---|---|

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**PA-10L / 10 bar / 10-1005-118** (1) **Sn I107547** (2)

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| (3) Temp [°C] | (4) Zero [mV] | (5) +510 [mV] | (6) Comp [mV] | (7) dZero [mV] |
|---|---|---|---|---|
| -9.5 | 18.5 | 13.3 | -0.6 | 0.2 |
| 0.1 | 18.7 | 13.3 | -0.6 | 0.2 |
| 25.0 | 19.1 | 13.1 | -0.8 | 0.0 |
| 50.2 | 19.8 | 13.0 | -0.9 | -0.1 |
| 79.9 | 20.8 | 12.9 | -1.1 | -0.2 |

---------- L1

COMP R1 510 kOhm (8) R3 56.0 Ohm (8)
RB 3482 Ohm (9)
ZERO -0.8 mV (10) P_atm 964 bar
**SENS 16.41 mV/bar** (11)

| LIN (12) [bar] | (13) [mV] | (14) Lnorm [%Fs] | (15) Lbfsl [%Fs] |
|---|---|---|---|
| 0.000 | 0.0 | 0.00 | -0.01 |
| 2.500 | 41.1 | 0.02 | 0.01 |
| 5.000 | 82.1 | 0.00 | 0.00 |
| 7.500 | 123.1 | -0.02 | -0.01 |
| 10.000 | 164.1 | -0.01 | -0.01 |

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Long Term Stability Ok (16)
Lot 72114-2 (17)
Test 500 Volt Ok (18)
**Supply 1.000 mA** (19)
01.09.17 (20) ---------- GOL3.A03D1K (20)

Key

1. Type (PA-10L) and measuring range (10 bar) of pressure sensor
2. Serial number of pressure sensor
3. Actual test temperatures
4. Uncompensated zero offset
5. Zero offset values with calculated compensation resistor R1 (+) or R2 (-)
6. Zero offset values with calculated compensation resistors R1 or R2 and R3 or R4
7. Temperature zero error with calculated compensation resistors
8. Calculated compensation resistor R1 or R2 (TCzero) and R3 or R4 (offset)
9. RB: Bridge resistance at room temperature
10. Calculated offset with compensation resistors R1 or R2 and R3 or R4
11. Sensitivity of pressure sensor at room temperature 25° C
12. Pressure test points
13. Signal change at pressure test points at room temperature 25° C
14. Non-linearity (best straight line through zero)
15. Non-linearity (best straight line)
16. Result of the long-term stability test
17. Sensor traceability information
18. Insulation test
19. Excitation (constant current)
20. Date of test -------- Test equipment

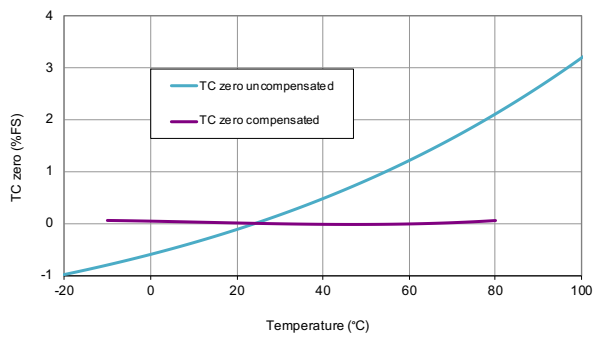
Notes

- The indicated specifications apply only for constant current supply of 1 mA. The sensor must not be supplied with more than 3 mA. The output voltage is proportional to the supply current. If the supply deviates from the calibration, this will cause signal shifts.
- The compensation resistors described in this data sheet are not part of the pressure transducer and are not included in the scope of delivery.
- It is recommended to use compensation resistors with temperature coefficients of < 50 ppm/°C for large temperature ranges. Sensor and resistors can be exposed to different temperatures.
- In addition, a maximum TC-sensitivity can be guaranteed on request or the value for the compensation resistor (R5) can be indicated. See “Electrical diagram of compensation resistors” on page 5.

## Characteristic lines

Examples of typical characteristic lines of the temperature coefficients, normalised at 25 °C, uncompensated and compensated.

Temperature coefficient zero (TCzero)




Temperature coefficient sensitivity (TCsens)