Honeywell

# Installation Instructions for the Basic Board Mount Pressure Sensors

*Issue 4*

***50076346***

## TBP Series, Compensated/Unamplified
## NBP Series, Uncompensated/Unamplified

60 mbar to 10 bar | 6 kPa to 1 MPa | 1 psi to 150 psi

### GENERAL INFORMATION

Honeywell's Basic Board Mount Pressure Sensors: NBP Series, Uncompensated/Unamplified, and TBP Series, Compensated/Unamplified, are piezoresistive silicon pressure sensors designed for customers who require a simple, cost-effective, mV output, unamplified, high quality, high resolution solution for medical and industrial applications.

**CAUTION**

**MEDIA INCOMPATIBILITY**

- No gel coating option: The input port is limited to non-corrosive, non-ionic media such as dry air and gases and should not be exposed to condensation. The gases are limited to media that are compatible with the following wetted materials of construction: high temperature polyamide, silicone, epoxy, alumina ceramic, silicon, gold, and glass.
- Silicon gel coating option: The gel coated sensors use the same materials in the wetted media path but are protected from condensation by a silicone-based gel coating. The gel coating option allows use in applications where condensation can occur.

**Failure to comply with these instructions may result in product damage.**

### SOLDERING

See soldering times and temperatures in Table 1.

**CAUTION**

**IMPROPER CLEANING**

- Ensure cleaning fluids, such as appropriate alcohols or fluorinated solvents, are used based on the type of contaminants to be removed.
- Do not immerse the sensor.

**Failure to comply with these instructions may result in product damage.**

**Table 1. Absolute Maximum Ratings[1]**

| Characteristic | Min. | Max. | Unit |
|---|---|---|---|
| Supply voltage (Vsupply)[2] | -12.0 | 12.0 | Vdc |
| Storage temperature | -40 [-40] | 125 [257] | °C [°F] |
| Soldering time and temperature:<br>lead solder temperature ( DIP)<br>peak reflow temperature (Lead less SMT, SMT) | 4 s max. at 250 °C [482 °F]<br>15 s max. at 250 °C [482 °F] | | |

1. Absolute maximum ratings are the extreme limits the device will withstand without damage.
2. Incorrect application of supply voltage or ground to the wrong pin may cause electrical failure.

**Table 2. Operating Specifications**

| Characteristic | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|
| Supply voltage (Vsupply):[1, 2] | | | | |
| TBP Series | 1.5 | 5.0 | 12.0 | Vdc |
| NBP Series | 1.8 | 5.0 | 12.0 | |
| Supply current (at 5.0 Vdc supply): | | | | |
| TBP Series | — | 0.6 | 1.0 | mA |
| NBP Series | — | 1.5 | 2.5 | |
| Operating temperature range[3] | -40 [-40] | — | 125 [257] | °C [°F] |
| Compensated temperature range[4] (TBP Series only) | 0 [32] | — | 85 [185] | °C [°F] |
| Input resistance (NBP Series only) | 2.4 | 3.0 | 5.5 | kOhm |

1. Ratiometricity of the sensor (the ability of the device output to scale to the supply voltage) is achieved within the specified operating voltage.
2. Incorrect application of supply voltage or ground to the wrong pin may cause electrical failure.
3. Operating temperature range: The temperature range over which the sensor will produce an output proportional to pressure.
4. Compensated temperature range: The temperature range over which the sensor will produce an output proportional to pressure within the specified performance limits.

**Table 3. Environmental Specifications**

| Characteristic | Parameter |
|---|---|
| Humidity: | |
| all external surfaces | 0 %RH to 95 %RH, non-condensing |
| internal surfaces of silicon gel coating option | 0 %RH to 100 %RH, condensing |
| internal surfaces of no coating option | 0 %RH to 95 %RH, non-condensing |
| Vibration | MIL-STD-202F, Method 214A, Condition 1E (15 g, 10 Hz to 2 kHz) |
| Shock | MIL-STD-202F, Method 213B, Condition F (100 g, 6 ms duration) |
| Life[1] | 1 million pressure cycles min. |
| ESD: | |
| TBP Series | MIL-STD 883 Method 3015.7, Class 1 |
| NBP Series | MIL-STD 883 Method 3015.7, Class 3 |
| Solder reflow | J-STD-020-D, MSL 1 (unlimited shelf life when stored at less than 30 °C and 85 %RH) |

**Notes:**

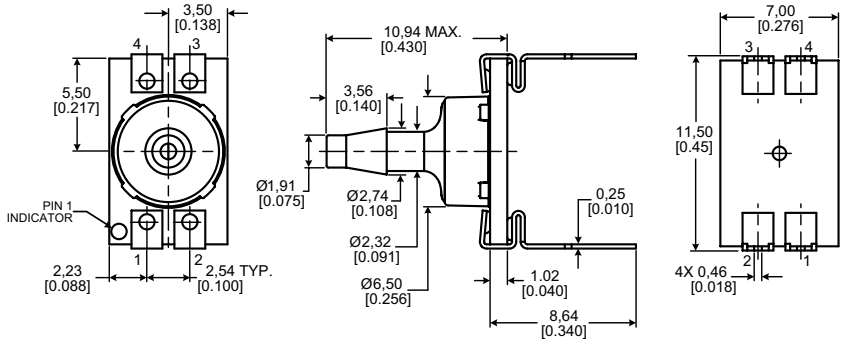
1. Life may vary depending on specific application in which the sensor is utilized.

**Table 4. Wetted Materials**

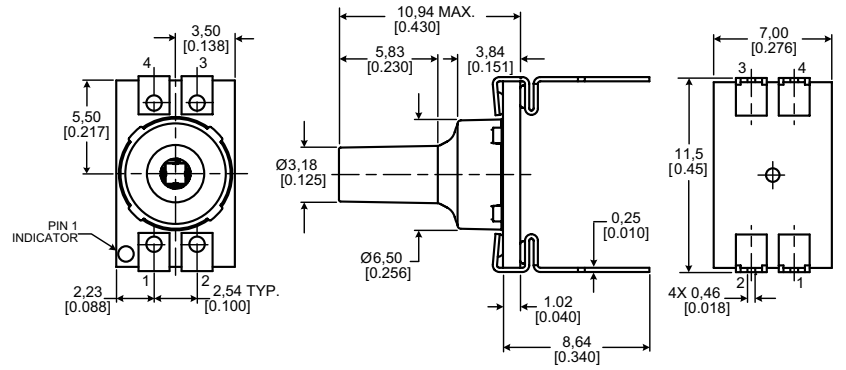
| Component | No Gel Coating Option | Silicon Gel Coating Option |
|---|---|---|
| Ports | high temperature polyamide | high temperature polyamide |
| Substrate | alumina ceramic | not exposed: protected by silicone gel |
| Adhesives | epoxy, RTV | epoxy |
| Electronic components | ceramic, silicon, gold, glass | not exposed: protected by silicone gel |

**Figure 2. DIP Package Dimensional Drawings (For reference only: mm [in].)**

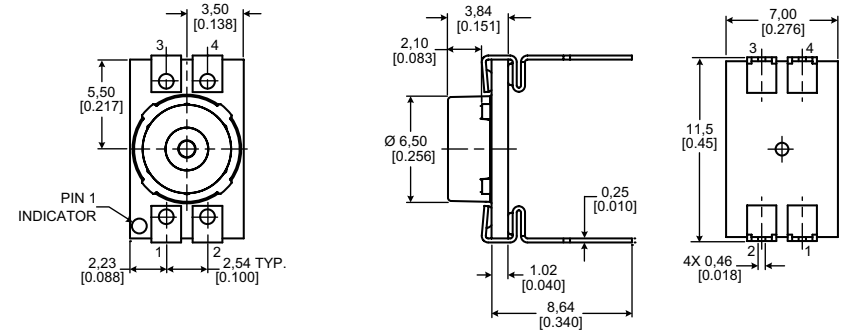
**AN: Single axial barbed port**




**LN: Single axial barbless port**




**PN: Low-profile port**




**Recommended PCB Pad Layout**

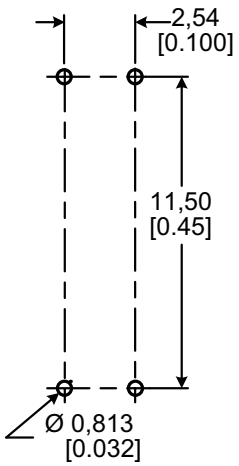
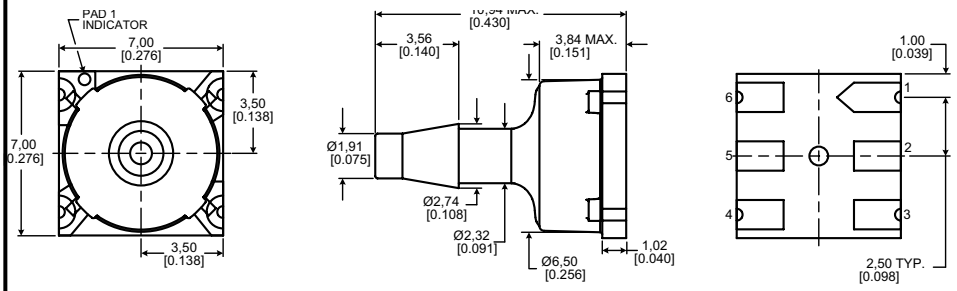



**Table 8. Pinout for DIP Packages**

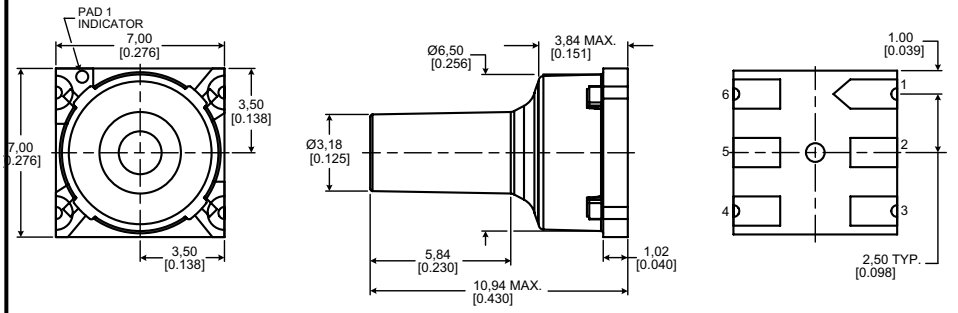
| Pin 4 | Pin 3 |
|---|---|
| Vout+ | GND |
| **Pin 1** | **Pin 2** |
| Vsupply | Vout- |

**Figure 3. Leadless SMT Package Dimensional Drawings (For reference only: mm [in])**

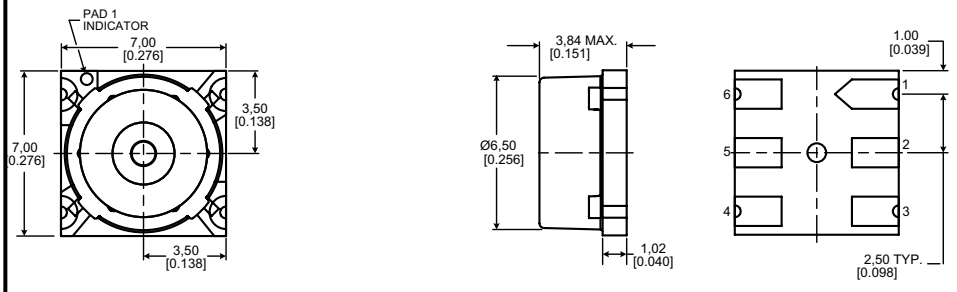
**AN: Single axial barbed port**




**LN: Single axial barbless port**




**PN: Low-profile port**




**Recommended PCB Pad Layout**

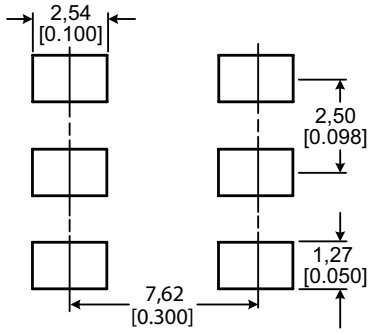
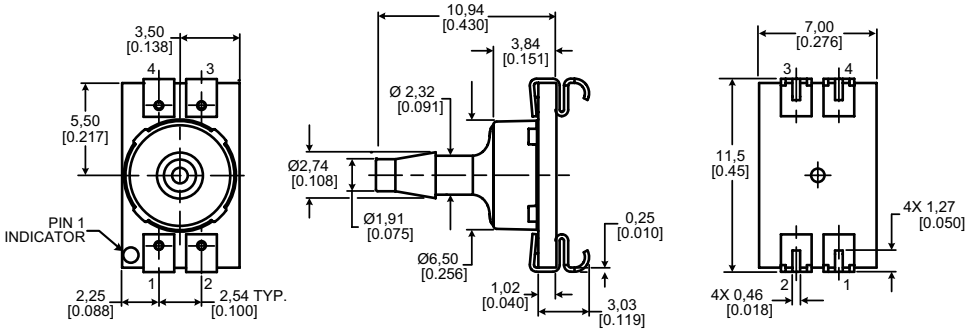



**Table 9. Pinout for Leadless SMT Pressure Packages**

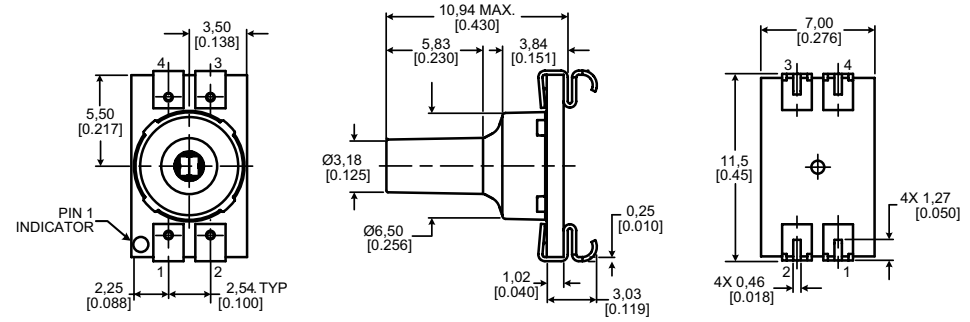
| **Pad 1** | **Pad 6** |
|---|---|
| Vsupply | Vout+ |
| **Pad 2** | **Pad 5** |
| NC | NC |
| **Pad 3** | **Pad 4** |
| Vout- | GND |

**Figure 4. SMT Package Dimensional Drawings (For reference only: mm [in])**

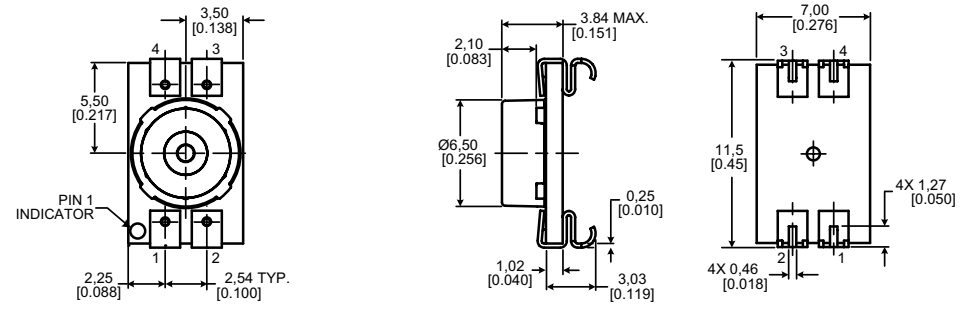
**AN: Single axial barbed port**




**LN: Single axial barbless port**




**PN: Low-profile port**




**Recommended PCB Pad Layout**

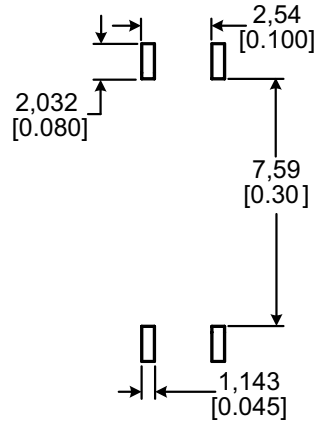



**Table 10. Pinout for SMT Packages**

| Pin 4 | Pin 3 |
|---|---|
| Vout+ | GND |
| **Pin 1** | **Pin 2** |
| Vsupply | Vout- |

**Figure 4. TBP and NBP Series Nomenclature and Order Guide**

For example, **TBPDANN150PGUCV** defines a TBP Series Basic Board Mount Pressure Sensor, DIP package, AN pressure port, with no gel coating in media path,150 psi gage pressure range, unamplified, compensated, constant supply voltage.

**TBP D AN N 150PG U C V**

**Series**

| | |
|---|---|
| **TBP** | |
| **NBP** | |

**Package**

| | |
|---|---|
| **D** | DIP (Dual Inline Pin) |
| **L** | Leadless SMT (Surface Mount Technology) |
| **M** | SMT (Surface Mount Technology) |

**Pressure Port**

| | DIP | Leadless SMT | SMT |
|---|---|---|---|
| **AN** | Single axial barbed port  | Single axial barbed port  | Single axial barbed port  |
| **LN** | Single axial barbless port  | Single axial barbless port  | Single axial barbless port  |
| **PN** | Low-profile port  | Low-profile port  | Low-profile port  |

**Gel Coating Option**

| | |
|---|---|
| **N** | No gel coating in media path |
| **S** | Silicone gel coating in media path |

**Supply Voltage**

| | |
|---|---|
| **V** | Constant |

**Compensation**

| | |
|---|---|
| **C** | Compensated |
| **U** | Uncompensated |

**Output**

| | |
|---|---|
| **U** | Unamplified |

**Pressure Range**

| 60 mbar to 10 bar *Gage* | | 6 kPa to 1 MPa *Gage* | | 1 psi to 150 psi *Gage* | |
|---|---|---|---|---|---|
| **060MG** | 0 mbar to 60 mbar | **006KG** | 0 kPa to 6 kPa | **001PG** | 0 psi to 1 psi |
| **100MG** | 0 mbar to 100 mbar | **010KG** | 0 kPa to 10 kPa | **005PG** | 0 psi to 5 psi |
| **160MG** | 0 mbar to 160 mbar | **016KG** | 0 kPa to 16 kPa | **015PG** | 0 psi to 15 psi |
| **250MG** | 0 mbar to 250 mbar | **025KG** | 0 kPa to 25 kPa | **030PG** | 0 psi to 30 psi |
| **400MG** | 0 bar to 400 mbar | **040KG** | 0 kPa to 40 kPa | **060PG** | 0 psi to 60 psi |
| **600MG** | 0 bar to 600 mbar | **060KG** | 0 kPa to 60 kPa | **100PG** | 0 psi to 100 psi |
| **001BG** | 0 bar to 1 bar | **100KG** | 0 kPa to 100 kPa | **150PG** | 0 psi to 150 psi |
| **1.6BG** | 0 bar to 1.6 bar | **160KG** | 0 kPa to 160 kPa | | |
| **2.5BG** | 0 bar to 2.5 bar | **250KG** | 0 kPa to 250 kPa | | |
| **004BG** | 0 bar to 4 bar | **400KG** | 0 kPa to 400 kPa | | |
| **006BG** | 0 bar to 6 bar | **600KG** | 0 kPa to 600 kPa | | |
| **010BG** | 0 bar to 10 bar | **001GG** | 0 kPa to 1 MPa | | |

# TBP Series, Compensated/Unamplified
# NBP Series, Uncompensated/Unamplified

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## ⚠ WARNING

**PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

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E-mail: info.sc@honeywell.com
Internet: sensing.honeywell.com
Phone and Fax:

| | |
|---|---|
| Asia Pacific | +65 6355-2828 |
| | +65 6445-3033 Fax |
| Europe | +44 (0) 1698 481481 |
| | +44 (0) 1698 481676 Fax |
| Latin America | +1-305-805-8188 |
| | +1-305-883-8257 Fax |
| USA/Canada | +1-800-537-6945 |
| | +1-815-235-6847 |
| | +1-815-235-6545 Fax |

**Sensing and Control**
Honeywell
1985 Douglas Drive North
Golden Valley, MN 55422
**honeywell.com**

Honeywell

50076346-4-EN
February 2014