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May, 2017

PHPS-5600 Pressure Transducer

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General description

The PHPS 5600 is pressure transducer in a miniature metal housing for industrial applications. Input pressure is sensed with silicon piezoresistive bridge. Measured pressure is transformed into standard output voltage range from 0.5 to 4.5 V or other. A switching output is integrated in transducer, which can be externally adjusted with potentiometer and switching level seen with LED indicator. Temperature compensation and calibration is performed by programmable digital signal conditioner. Wide supply range 7 to 40 V, standard 0,5 to 4,5 V voltage output, digital output and switching output provides users maximum freedom for any type of application with dry air or non-corrosive gases and liquids.

Small size and robust M8 threaded housing is very convenient for applications with limited space. Total length is less than 40 mm with standard M8 electrical connector.

The whole group consists of pressure ranges from 20 mbar to 7 bar. Gage pressure configuration available for this group.

Features

- Wide supply voltage range 7 to 40 V
- Wide compensated range (0 to 70°C)
- **Total accuracy down to 0,5%FS** over 0 to 70°C, all effects included (maximum)
- Digital I2C output up to 15 bits (pressure + temperature)
- Overcurrent and overvoltage protection
- Overload and short circuit protection
- Integrated EMC protection
- High performance OEM applications
- Standard M8 output connector
- Gage pressure configuration

Applications

- Industrial process control
- Pressure transducer
- Air flow monitoring
- Process control
- Leak detection
- Pneumatic controls



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Types overview

$$T_{AMB} = 25^{\circ}\text{C}$$

$$V_{CC} = 12\text{V}$$

Low pressure range

| Pressure range | 20 mbar (0,15psi) | 50 mbar (0,3psi) | 100 mbar (0,8psi) | 350 mbar (5psi) |
|------------------------------|--|-----------------------------|-----------------------------|-----------------------------|
| ID group | PHPS 5600-020M | PHPS 5600-050M | PHPS 5600-100M | PHPS 5600-350M |
| Pressure types | gage/ bidirectional gage | gage/ bidirectional gage | gage/ bidirectional gage | gage/ bidirectional gage |
| V _{out} | 0,5 to 4,5 V | 0,5 to 4,5 V | 0,5 to 4,5 V | 0,5 to 4,5 V |
| Temperature ranges | Operating: -25 to 85°C Compensated: 0 to 70°C Storage : -40 to 125°C | | | |
| Over pressure ¹⁾ | 200 mbar | 500 mbar | 1 bar | 1 bar |
| Burst pressure ²⁾ | 300 mbar | 750 mbar | 1,5 mbar | 1,7 bar |

High pressure range

| Pressure range | 1 bar (15psi) | 2 bar (30psi) | 4 bar (60psi) | 7 bar (100psi) | -1 to 0 bar |
|------------------------------|--|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| ID group | PHPS 5600-001B | PHPS 5600-002B | PHPS 5600-004B | PHPS 5600-007B | PHPS 5600-000B |
| Pressure types | gage/ bidirectional gage | gage/ bidirectional gage | gage/ bidirectional gage | gage/ bidirectional gage | gage/ bidirectional gage |
| V _{out} | 0,5 to 4,5 V | 0,5 to 4,5 V | 0,5 to 4,5 V | 0,5 to 4,5 V | 0,5 to 4,5 V |
| Temperature ranges | Operating: -25 to 85°C Compensated: 0 to 70°C Storage : -40 to 125°C | | | | |
| Over pressure ¹⁾ | 3 bar | 6 bar | 8 bar | 14 bar | 3 bar |
| Burst pressure ²⁾ | 5 bar | 10 bar | 12 bar | 21 bar | 5 bar |

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Performance characteristics

 $T_{AMB} = 25^{\circ}\text{C}$ $V_{CC} = 12$

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|--|-----------|-------------------------------|-------|------|--------|
| Power supply | | | | | |
| Supply voltage | V_{CC} | 7 | 12 | 40 | V |
| Current consumption | I_{CC} | | 4 | 6,5 | mA |
| Digital output (pressure), 15 bits ³⁾ | | | | | |
| Offset voltage ⁴⁾ | V_O | | 3277 | | counts |
| Full scale output (FSO) ⁵⁾ | V_{FS} | | 29491 | | counts |
| Full scale span (FSS) ⁶⁾ | V_{FSO} | | 26214 | | counts |
| Offset voltage (bidirectional devices) | V_O | | 16384 | | counts |
| Digital output (temperature), 15 bits ⁷⁾ | | | | | |
| Temperature output @ 0°C | T_o | | 8192 | | counts |
| Temperature output @ 70°C | T_s | | 24576 | | counts |
| Accuracy (pressure) @ 25°C ⁸⁾ | | | | | |
| Low pressure (20 to 100 mbar FS devices) | E_a | | 0,3 | ±0,5 | %FSO |
| Standard pressure | E_a | | 0,1 | ±0,3 | %FSO |
| Total accuracy (pressure) @ 0 to 70°C ⁹⁾ | | | | | |
| Low pressure (20 to 100 mbar FS devices) | E_{ta} | | 0,5 | ±1 | %FSO |
| Standard pressure (all other devices) | E_{ta} | | 0,3 | ±0,5 | %FSO |
| Resolution | | | | | |
| A/D converter | D_i | | | 15 | bit |
| D/A converter | D_o | | 11 | | bit |
| Response time | E_{rt} | | 1,5 | | ms |
| Repeatability ¹⁰⁾ | E_r | | ±0,05 | | % FSO |
| Nonlinearity & pressure hysteresis (BFSL) ¹¹⁾ | E_l | | ±0,1 | ±0,3 | % FSO |
| Load resistance | R_L | 2 | | ∞ | k |
| Media compatibility | | See spec. note ¹²⁾ | | | |
| Weight | W | | 9 | | g |

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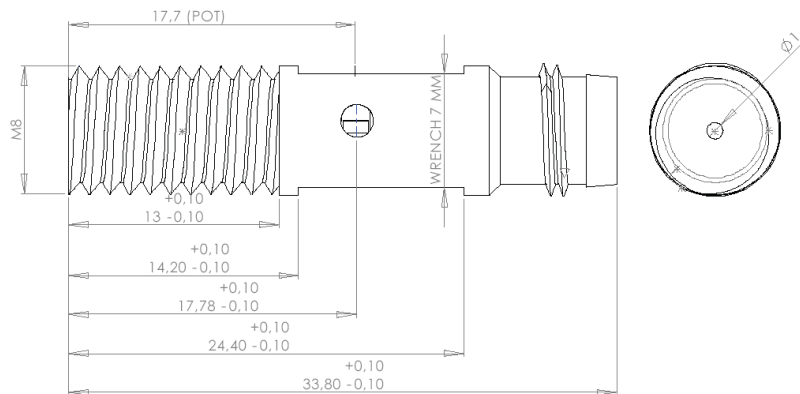
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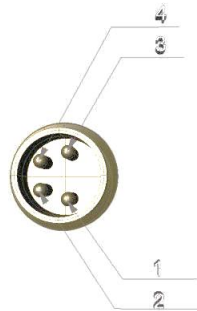
Specification notes

- 1) Over pressure is the maximum pressure which may be applied without causing damage to the sensing element.
- 2) Burst pressure is the maximum pressure which may be applied without causing leakage damage to the sensing element.
- 3) Digital signal is non-ratiometric to the power supply V_{cc} .
- 4) Offset voltage is the voltage output at zero pressure.
- 5) Full scale output is the voltage output at full pressure range.
- 6) Full scale span is the algebraic difference between the output at full scale pressure range and offset.
- 7) Digital output signal (temperature) is not ratiometric to power supply V_{cc} . Temperature data are read directly on the sensing element.
- 8) Accuracy includes all effects (offset, span, nonlinearity, pressure hysteresis and repeatability) at room temperature and represents maximum deviation of transducer signal from ideal characteristic.
- 9) Total accuracy includes all effects (offset, span, nonlinearity, pressure hysteresis and repeatability) included with all temperature effects of offset and span. It describes overall error and represents maximum deviation of transducer signal from ideal characteristic in compensated temperature range from 0 to 70°C.
- 10) Repeatability is defined as typical deviation of the output signal after 10 pressure cycles.
- 11) Nonlinearity is defined as the BFSL (best fit straight line) across entire pressure range.
- 12) Media compatibility: clean, dry and noncorrosive gases and liquids to silicon, RTV, ceramics Al_2O_3 , epoxy, nickel.

Outline dimensions



Pinout



DIGITAL I2C VERSION:

| | |
|---|-----|
| 1 | SDA |
| 2 | GND |
| 3 | Vcc |
| 4 | SCL |

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Ordering guide

| Transducer type | Pressure range | Pressure type | Direction |
|-----------------|----------------|---------------|-----------|
| PHPS 5600 | 020M | G | 0 |
| | 050M | | B |
| | 100M | | |
| | 350M | | |
| | 001B | | |
| | 002B | | |
| | 004B | | |
| | 007B | | |
| | 000B | | |

| Pressure range | |
|----------------|-------------|
| 020M | 20 mbar |
| 050M | 50 mbar |
| 100M | 100 mbar |
| 350M | 350 mbar |
| 001B | 1 bar |
| 002B | 2 bar |
| 004B | 4 bar |
| 007B | 7 bar |
| 000B | -1 to 0 bar |

| Pressure type | |
|---------------|------|
| G | Gage |

| Pressure direction | |
|--------------------|---|
| 0 | 0 to press. range |
| B | -press range to +press. range (bidirectional) |

Other configurations possible on special request.

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