

MicroPressure Board Mount Pressure Sensors

MPR Series – Compact, High Accuracy, Compensated/Amplified

An Application Note

Background

The MPR Series is a very small piezoresistive silicon pressure sensor offering a digital output for reading pressure over the specified full scale pressure span and temperature range. It is calibrated and compensated over a specific temperature range for sensor offset, sensitivity, temperature effects, and non-linearity using an on-board Application Specific Integrated Circuit (ASIC). This product is designed to meet the requirements of higher volume medical (consumer and non-consumer) devices and commercial appliance applications.

Solutions

POTENTIAL MEDICAL APPLICATIONS (Consumer)

Non-invasive Blood Pressure Monitors

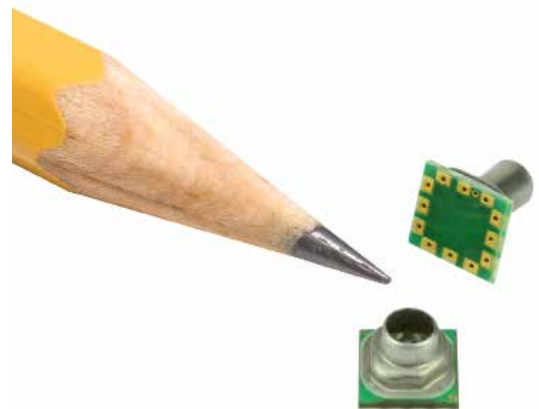
Description: Blood pressure is measured by placing an inflatable cuff on the patient that restricts blood flow. A manometer is typically then used to measure the pressure which could be replaced by a pressure sensor to automate the reading and facilitate recording the patient's blood pressure measurement remotely so that multiple patients at the same time can be monitored by the medical staff.

Function in application: May be used to measure the systolic and diastolic pressure using the air pressure from the cuff. The sensor can also be used to measure the patient's pulse.

Customer benefits: An accurate, compensated sensor is required to maintain accurate blood pressure readings. The sensor's small size helps to facilitate compact monitor design. Low power consumption enhances battery life.

Miniature Pumps (liquid and air suction in small medical/dental tools and breast pumps)

Function in application: May be used to measure partial vacuum on the suction side of miniature pumps to provide continuous suction pressure monitoring.



Customer benefits: Enables enhanced pump control, allowing detection of suction side leaks to avert pump damage. Enhanced accuracy enables more accurate pump control. Small size allows integration into small housings. These sensors are compatible with a variety of liquid media.

POTENTIAL MEDICAL APPLICATIONS

(Non-consumer)

Wound Therapy

Description: Wounds may be caused by burns, ulcers, surgery, accidents, and pressure sores (such as bedsores). Physicians use negative-pressure wound therapy (NPWT) to promote healing by creating controlled negative pressure over the wound.

Function in application: May be used to monitor the pressure applied to the wound via the suction system.

Customer benefits: Designed to provide enhanced therapeutic effect without causing the patient harm.

POTENTIAL CONSUMER APPLIANCE APPLICATIONS

Coffee Machines

Description: In recent years, many home and office coffee machines have seen improvements in reliability and coffee quality. Electric drip coffee machines have been replaced with higher end, single-serve or single-cup coffee makers.

Function in application: May be used to measure the pressure at various points in the system during the coffee brewing process, including the water level in the reservoir/holding tank, the inlet pressure on a hard-plumbed system, the output pressure from the system pump, and the heater system pressure.

Customer benefits: Designed to provide a better cup of coffee by helping to ensure that enough water is in the reservoir to make a full container of coffee so that the coffee isn't too strong. Enhanced accuracy enables a more accurately controlled process which may eliminate the need for system level hardware and software calibration. Small size enables integration into smaller/compact coffee makers. Food grade gel option is compatible with potable water. No internally trapped volume provides a flush measurement surface so that the brewer can be completely cleaned.

Washing Machines

Description: Newer, high-efficiency washing machines use much less water than older versions. Compact machines use the same washing system as a full-size machine and fit into smaller spaces.

Function in application: May be used to measure the water level. The MPR Series pressure sensor may be integrated into the liquid level measurement assembly at the end of the air tube column to measure the pressure exerted on the air column due to increase in liquid level.

Customer benefits: Continuous higher resolution water level measurement and enhanced accuracy enable more accurate liquid level measurement at lower water volumes, allowing both water and energy cost savings. These sensors are compatible with a variety of liquid media.

Dishwashers

Description: Today's more powerful and efficient dishwashers use less water than older versions.

Function in application: May be used to measure the water level. The MPR Series pressure sensor may be integrated into the liquid level measurement assembly at the bottom of the water reservoir, with an air column between the media and the sensor surface. It measures the pressure exerted on the air column due to increase in liquid level. A pressure measurement may be used to determine rate of change of the water column during drain mode; enabling the system to detect clogged drain, when no change in liquid level is detected.

Customer benefits: Continuous higher resolution water level measurement and enhanced accuracy enable a more precise liquid level measurement, allowing both water and energy cost savings. Small sensor size allows integration into existing system over-mold packages. These sensors are compatible with a variety of liquid media.

MPR Series Features

- 5 mm x 5 mm [0.20 in x 0.20 in] package footprint
- Calibrated and compensated
- 60 mbar to 2.5 bar | 6 kPa to 250 kPa | 1 psi to 30 psi
- 24-bit digital I²C or SPI-compatible output
- IoT (Internet of Things) ready interface
- Low power consumption (<10 mW typ.), energy efficient
- Stainless steel pressure port
- Compatible with a variety of liquid media
- Absolute and gage pressure types
- Total Error Band after customer auto-zero: As low as $\pm 1.5\%$ FSS
- Compensated temperature range: 0°C to 50°C [32°F to 122°F]
- REACH and RoHS compliant
- Long port version meets IPC/JEDEC J-STD-020D.1
- Sensor also available on breakout board for easy evaluation and testing

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items that Honeywell, in its sole discretion, finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

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Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this writing. However, Honeywell assumes no responsibility for its use.

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