

# MIP SERIES

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Issue B

## Heavy Duty, Media-Isolated Pressure Transducers 1 bar to 12 bar | 15 psi to 175 psi

### DESCRIPTION

The MIP Series offers a heavy duty, media-isolated pressure transducer in a compact, stainless steel construction for use with a wide range of media including aggressive fluids and water. The MIP Series provides a cost-competitive solution for wide-ranging potential applications in tough environments.

### VALUE TO CUSTOMERS

- Total Error Band (TEB)  $\pm 0.75$  %FSS to  $\pm 1.0$  %FSS (Full Scale Span) from  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ : Provides true measurement performance over the compensated temperature range; small error promotes system uptime and efficiency (see Figure 4).
- EMC performance: Operates reliably in the presence of electromagnetic fields, such as wireless signals, RF communication, and electrical devices.
- Hermetically welded design supports almost any media without the use of an internal seal. The sensors are designed to be used in harsh environments that see aggressive media.

### DIFFERENTIATION

- Diagnostics: Beneficial in applications where the sensor functionality and the need to know internal or external failure modes is critical.
- Great customer value: Multiple configuration possibilities provide flexibility of use in the application with no up front NRE or tooling charges.
- Durable: Provides the tough environmental capabilities needed, including long-term stability, insulation resistance and dielectric strength, external freeze-thaw resistance and EMC performance.



Certified to  
NSF/ANSI/CAN 61



### FEATURES

- Rugged, stainless steel construction
- Ratiometric output: 0.5 Vdc to 4.5 Vdc
- Operating temperature:  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$
- Total Error Band  $\pm 0.75$  %FSS to  $\pm 1.0$  %FSS ( $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ )
- An industry leader in accuracy:  $\pm 0.15$  %FSS BFSL
- Long term stability:  $\pm 0.25$  %FSS
- Radiated immunity: 100 V/m
- Drinking water approval: NSF/ANSI/CAN 61
- CE, RoHS, REACH compliant
- Mis-wiring protection
- Over voltage protection  $\pm 40$  Vdc

TABLE 1. POTENTIAL APPLICATIONS

INDUSTRY	MEDIA
Industrial: pumps compressors process	water, hydraulic fluids compressed air food, beverage, oil, gas, steam
HVAC/R	refrigerants (butane, propane, ammonia, $\text{CO}_2$ , R134A, R407C, R410A, R448A/Solstice <sup>®</sup> N40, R32 and R1234ze, R1234yf, glycol + water
Transportation	gasoline, diesel fuel, engine oil, brake fluid, coolants, CNG
Medical	$\text{O}_2$ , $\text{N}_2$ , $\text{CO}_2$ , $\text{N}_2\text{O}$ , air



### PORTFOLIO

Honeywell offers a variety of heavy duty pressure transducers for potential use in industrial and transportation applications. To view the entire product portfolio, click here.

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# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS, MIP SERIES

**TABLE 2. ELECTRICAL SPECIFICATIONS (AT 25°C [77°F] AND UNDER UNLESS OTHERWISE NOTED.)**

CHARACTERISTIC	PARAMETER
Supply voltage	5.0 ±0.25 Vdc
Nominal output transfer function (5 Vdc supply)	0.5 Vdc to 4.5 Vdc
Over/reverse voltage	±40 Vdc
Current consumption	6.5 ±1 mA
Short circuit protection	yes

**TABLE 3. PERFORMANCE SPECIFICATIONS (AT 25°C [77°F] AND UNDER UNLESS OTHERWISE NOTED.)**

CHARACTERISTIC	PARAMETER
Operating temperature range	-40°C to 125°C [-40°F to 257°F]
Total Error Band <sup>1</sup> (-40°C to 125°C [-40°F to 257°F])	±1.0 %FSS (≤10 bar) <sup>2</sup> ±0.75 %FSS (>10 bar)
Accuracy BFSL <sup>3</sup>	±0.15 %FSS typ.
Long term stability (1000 hr, 25°C [77°F])	±0.25 %FSS typ.
Typical output resolution	0.03 %FSS
Response time	1 ms (10% to 90% step change in pressure)
Startup time <sup>4</sup>	<7 ms typ.
EMC rating (CE Conformity): surge immunity (all leads) electrostatic discharge radiated immunity fast transient burst immunity to conducted disturbances radiated emissions	±1 kV line to ground per IEC 61000-4-5 ±4 kV contact, ±8 kV air per IEC 61000-4-2 10 V/m (80 MHz to 1000 MHz) per IEC 61000-4-3 ±1 kV per IEC 61000-4-4 3 V (150 kHz to 80 MHz) per IEC 61000-4-6 40 dBµV (30 MHz to 230 MHz), 47 dBµV (230 MHz to 1000 MHz) per CISPR 11
Radiated immunity	100 V/m (200 MHz to 2 GHz) per ISO 11452-2
Insulation resistance	>100 MΩ at 1 kVdc (60 s)
Dielectric strength	<1 mA at 500 Vac (60 s)
Load resistance	≥2 kΩ (pull up or pull down)
Life	>10 million full scale pressure cycles

<sup>1</sup>**Total Error Band:** The maximum deviation from the ideal transfer function over the entire compensated temperature and pressure range. Includes all errors due to offset, full scale span, pressure non-linearity, pressure hysteresis, pressure non-repeatability, thermal effect on offset, thermal effect on span, and thermal hysteresis (see Figure 4).

<sup>2</sup>**TEB:** ±1.5 % FSS above 100°C [212°F] for pressure ratings less than 4 bar [58 psi].

<sup>3</sup>**Accuracy:** The maximum deviation in output from a Best Fit Straight Line (BFSL) fitted to the output measured over the pressure range at 25°C [77°F]. Includes all errors due to pressure non-linearity, pressure hysteresis, and pressure non-repeatability.

<sup>4</sup>**Startup time:** The time needed to receive valid output after power up.

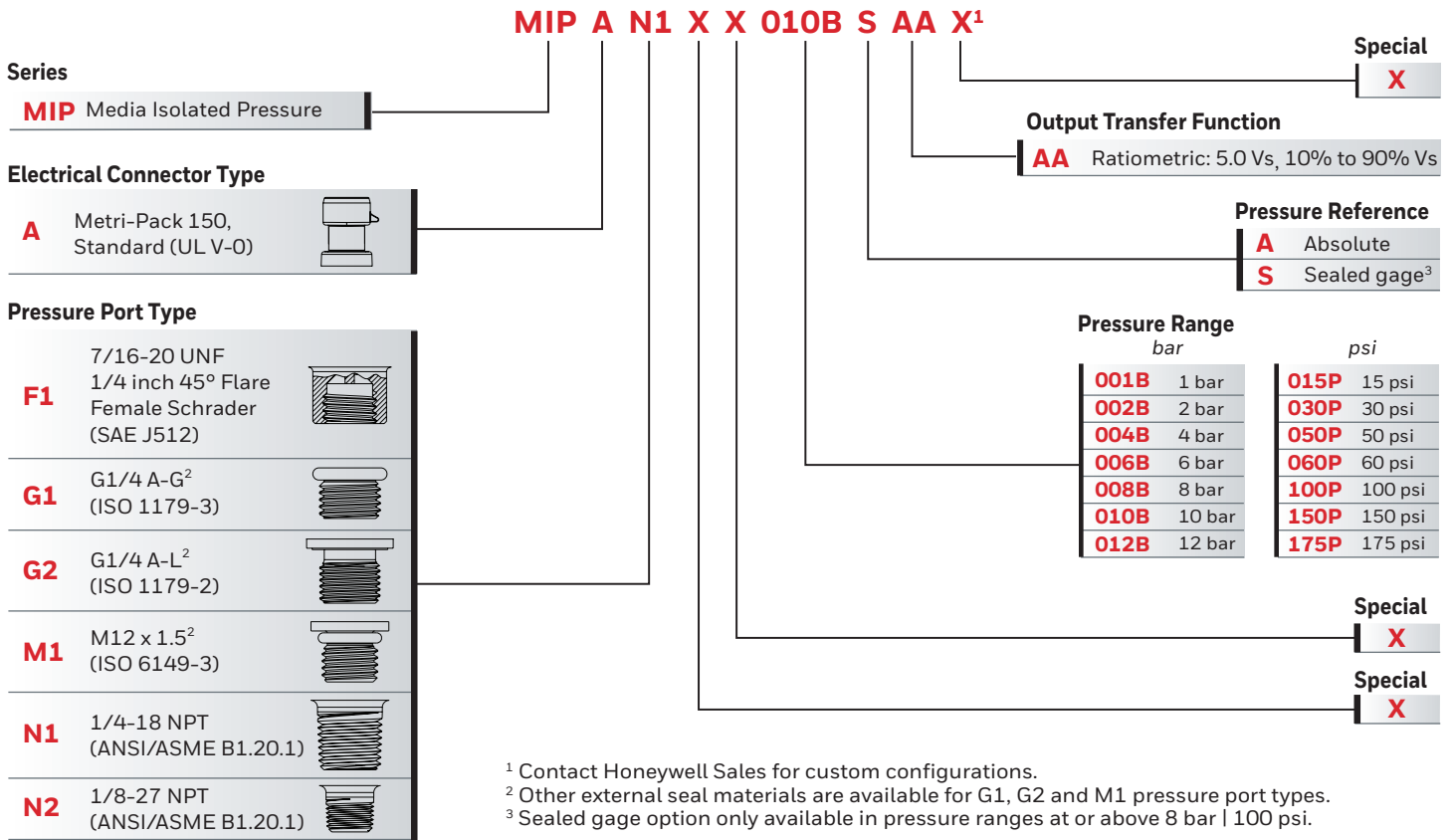
**TABLE 4. ENVIRONMENTAL AND MECHANICAL SPECIFICATIONS**

CHARACTERISTIC	PARAMETER
Shock	100 G per MIL-STD-202, Method 213, Cond. C (at 25°C [77°F])
Vibration	20 G sweep, 10 Hz to 2000 Hz (at 25°C [77°F])
Ingress protection	IP67
External freeze/thaw resistance	>6 cycles from -30°C to 50°C [-22°F to 122°F]
Wetted materials: port diaphragm external seal for ports	stainless steel 304L stainless steel 316L nitrile (-30°C to 100°C [-22°F to 212°F]) (other materials available)
Electrical connector material	PBT 30%GF (UL V-0)

# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS, MIP SERIES

**FIGURE 1. NOMENCLATURE AND ORDER GUIDE**

For example, **MIPAN1XX010BSAAX** defines an MIP Series Heavy Duty, Media Isolated Pressure Transducer, Metri-Pack 150, standard (UL V-0) electrical connector type, 1/4-18 NPT pressure port type, 10 bar pressure range, sealed gage pressure reference, ratiometric: 5 Vs, 10% to 90% Vs output transfer function



## CAUTION PRODUCT DAMAGE DUE TO MISUSE

- Ensure torque specifications are determined for the specific application. Values provided are for reference only. (Mating materials and thread sealants can result in significantly different torque values from one application to the next.)
- Use appropriate tools (such as an open ended wrench or deep well socket) to install transducers.
- Ensure that the proper mating electrical connector with a seal is used to connect the transducer. Improper or damaged seals can compromise ingress protection, leading to short circuits.
- Ensure that filters are used upstream of the transducers to keep media flow free of large particulates and condensed moisture. MIP Series transducers are dead-end devices. Particulate accumulation may clog the port or damage the diaphragm.
- Ensure that the transducer is mounted in a vertical position with the process connection (pressure port) downward to avoid particulate deposits.
- Ensure that the media does not create a residue when dried. Build-up of residue inside the transducer may affect transducer output.
- Ensure that the transducer housing is properly grounded.

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

# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS, MIP SERIES

**TABLE 5. PRESSURE RATINGS**

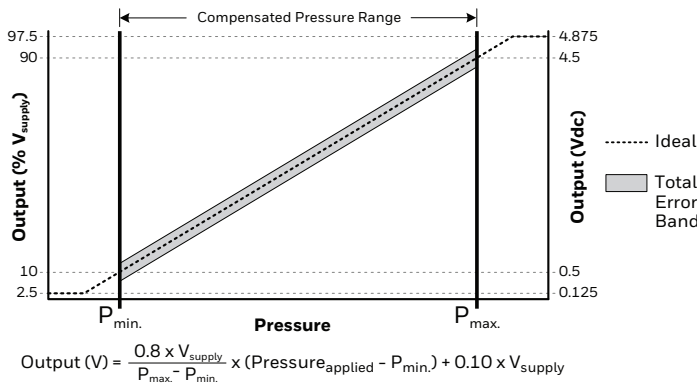
BAR			PSI		
OPERATING PRESSURE	OVER-PRESSURE <sup>1</sup>	BURST PRESSURE <sup>2</sup>	OPERATING PRESSURE	OVER-PRESSURE <sup>1</sup>	BURST PRESSURE <sup>2</sup>
1 to 3	6	69	15 to 43.5	87	1000
>3 to 12	24		>43.5 to 174	348	

<sup>1</sup>**Overpressure:** The maximum pressure which may safely be applied to the product for it to remain in specification once pressure is returned to the operating pressure range. Exposure to higher pressures may cause permanent damage to the product.

<sup>2</sup>**Burst Pressure:** The maximum pressure which may be applied without causing escape of pressure media. The product should not be expected to function after exposure to the burst pressure.

**FIGURE 2. RATIOMETRIC OUTPUT TRANSFER FUNCTION**

The transfer function shown here is applicable to a ratiometric output ranging between 10%  $V_{supply}$  at null pressure to 90%  $V_{supply}$  at full scale pressure.



**FIGURE 4. TEB COMPONENTS FOR THE MIP SERIES**

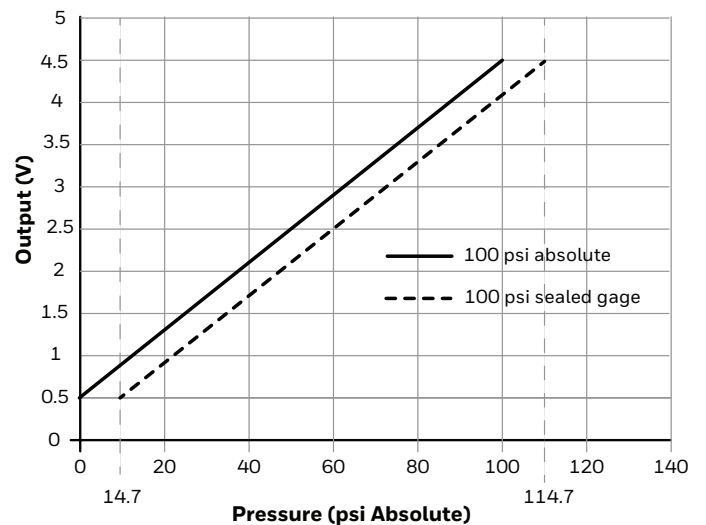
Total Error Band (TEB) is a single specification that includes the major sources of sensor error. TEB should not be confused with accuracy, which is actually a component of TEB. TEB is the maximum error that the sensor could experience.

Honeywell uses the TEB specification in its datasheet because it is the most comprehensive measurement of a sensor's true accuracy. Honeywell also provides the accuracy specification in order to provide a common comparison with competitors' literature that does not use the TEB specification.

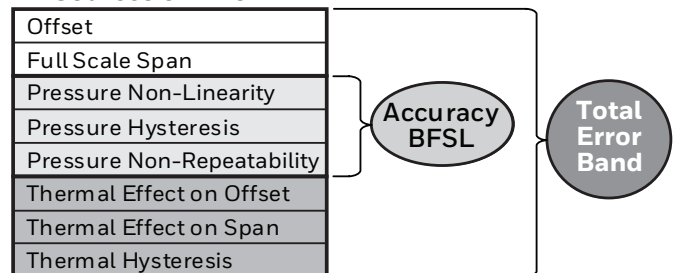
Many competitors do not use TEB—they simply specify the accuracy of their device. Their accuracy specification, however, may exclude certain parameters. On their datasheet, the errors are listed individually. When combined, the total error (or what would be TEB) could be significant.

**FIGURE 3. ABSOLUTE VS SEALED GAGE**

Example shown is for 100 psi.



**Sources of Error**

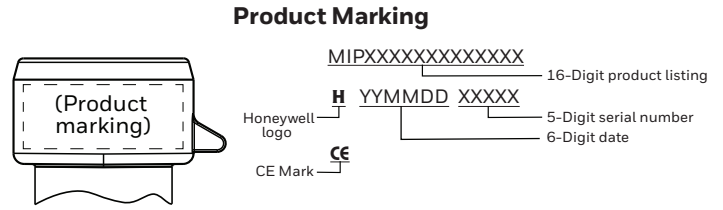
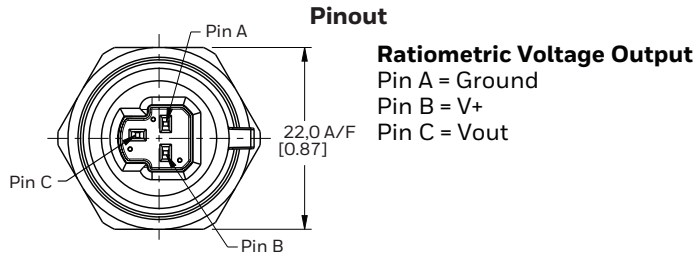


**TABLE 6. OUTPUT DIAGNOSTIC CODES**

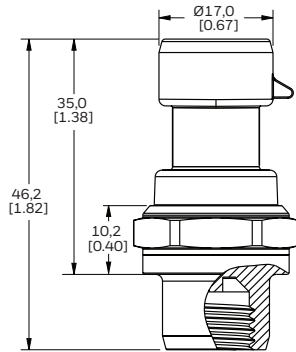
FAULT CONDITION	ANALOG DIAGNOSTIC RAIL
Sensor internal failures	97.5% of $V_{supply}$ (See Figure 2.)
Over pressure	97.5% of $V_{supply}$ (See Figure 2.)
Under pressure (for sealed gage only)	2.5% of $V_{supply}$ (See Figure 2.)
Power or ground loss	high (external pull-up resistor)
Power or ground loss	low (external pull-down resistor)

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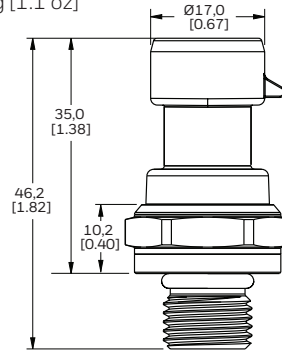
FIGURE 5. MOUNTING DIMENSIONS (FOR REFERENCE ONLY. MM/[IN])



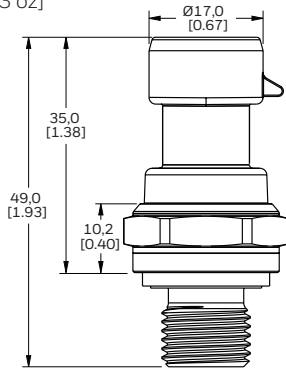
**F1: 7/16-20 UNF 1/4 inch 45° Flare Female Schrader (SAE J512)**  
 Seal: 45° cone  
 Mating geometry: SAE J512  
 Installation torque: 17 N m [12 ft-lb]  
 Weight: 36 g [1.3 oz]



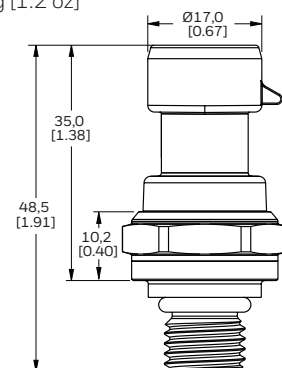
**G1: G1/4 A-G (ISO 1179-3)**  
 Seal: O-ring (included) and retaining ring ISO 1179-3-G1/4 (not included)  
 Mating geometry: ISO 1179-1  
 Installation torque: 20 N m [14.7 ft-lb]  
 Weight: 33 g [1.1 oz]



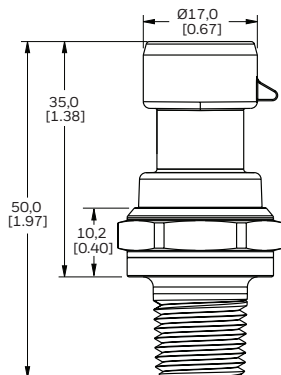
**G2: G1/4 A-L (ISO 1179-2)**  
 Seal: ISO 9974-2/DIN 3869 profile ring (included)  
 Mating geometry: ISO 1179-1  
 Installation torque: 20 N m [15 ft-lb]  
 Weight: 36 g [1.3 oz]



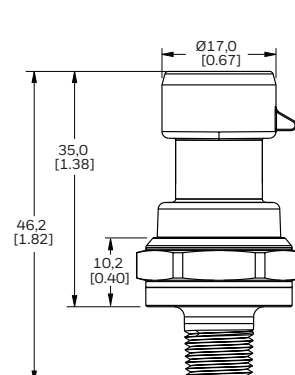
**M1: M12 x 1.5 (ISO 6149-3)**  
 Seal: O-ring (included)  
 Mating geometry: ISO 6149-1  
 Installation torque: 20 N m [15 ft-lb]  
 Weight: 34 g [1.2 oz]



**N1: 1/4-18 NPT**  
 Seal: Pipe thread  
 Mating geometry: ANSI B1.20.1  
 Installation torque: Two to three turns from finger tight  
 Weight: 38 g [1.3 oz]



**N2: 1/8-27 NPT**  
 Seal: Pipe thread  
 Mating geometry: ANSI B1.20.1  
 Installation torque: Two to three turns from finger tight  
 Weight: 30 g [1.0 oz]



## ADDITIONAL MATERIALS

The following associated literature is available on our [website](#):

- Product range guide
- Application-specific and technical information
- CAD Models

## FOR MORE INFORMATION

Honeywell Advanced Sensing Technologies services its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or the nearest Authorized Distributor, visit our [website](#) or call:

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## 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 acknowledgment 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.**

While Honeywell may provide application assistance personally, through our literature and the Honeywell web site, it is buyer's sole responsibility to determine the suitability of the product in the application.

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.

## 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.**

## Honeywell Advanced Sensing Technologies

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