MIP SERIES

32346591
Issue B

Heavy Duty, Media-Isolated Pressure Transducers
1 bar to 60 bar | 15 psi to 870 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) ±0.75 %FSS (Full Scale Span) from -40°C to 125°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.

NSF®

Certified to NSF/ANSI/CAN 61

FEATURES

- Rugged, stainless steel construction
- Ratiometric output: 0.5 Vdc to 4.5 Vdc
- Operating temperature: -40°C to 125°C
- Total Error Band up to ±0.75 %FSS (-40°C to 125°C)
- Industry-leading accuracy: ±0.15 %FSS BFSL
- Long term stability: ±0.25 %FSS
- Radiated immunity: 100 V/m
- High burst pressure: 207 bar [3000 psi]
- Drinking water approval: NSF/ANSI/CAN 61
- CE, RoHS, REACH compliant
- Mis-wiring protection
- Over voltage protection ±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, CO_2, R134A, R407C, R410A, R448A/Solstice® N40, R32 and R1234ze, R1234yf, glycol + water
Transportation	gasoline, diesel fuel, engine oil, brake fluid, coolants, CNG
Medical	O_2, N_2, CO_2, N_2O, 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.

Honeywell

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[1] (-40°C to 125°C [-40°F to 257°F])	±1.0 %FSS (≤10 bar)[2] ±0.75 %FSS (>10 bar)
Accuracy BFSL[3]	±0.15 %FSS
Long term stability (1000 hr, 25°C [77°F])	±0.25 %FSS
Minimum output resolution	0.03 %FSS
Response time	1 ms (10% to 90% step change in pressure)
Startup time[4]	<7ms
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

[1]**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).

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

[3]**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.

[4]**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

MIP A N1 X X 010B S AA X[1]

Series

MIP	Media Isolated Pressure

Electrical Connector Type

A	Metri-Pack 150, Standard (UL V-0)	

Pressure Port Type

F1	7/16-20 UNF 1/4 inch 45° Flare Female Schrader (SAE J512)	
G1	G1/4 A-G (ISO 1179-3)	
G2	G1/4 A-L (ISO 1179-2)	
M1	M12 x 1.5 (ISO 6149-3)	
N1	1/4-18 NPT (ANSI/ASME B1.20.1)	
N2	1/8-27 NPT (ANSI/ASME B1.20.1)	

Special

X	

Output Transfer Function

AA	Ratiometric: 5.0 Vs, 10% to 90% Vs

Pressure Reference

A	Absolute
S	Sealed gage[2]

Pressure Range

bar				*psi*			
001B	1 bar	**020B**	20 bar	**015P**	15 psi	**500P**	500 psi
002B	2 bar	**025B**	25 bar	**030P**	30 psi	**600P**	600 psi
004B	4 bar	**035B**	35 bar	**050P**	50 psi	**667P**	667 psi
006B	6 bar	**040B**	40 bar	**060P**	60 psi	**700P**	700 psi
008B	8 bar	**046B**	46 bar	**100P**	100 psi	**750P**	750 psi
010B	10 bar	**050B**	50 bar	**150P**	150 psi	**800P**	800 psi
012B	12 bar	**055B**	55 bar	**200P**	200 psi	**850P**	850 psi
016B	16 bar	**060B**	60 bar	**250P**	250 psi	**870P**	870 psi
				300P	300 psi		

Special

X	

Special

X	

[1] Contact Honeywell Sales for custom configurations.
[2] Sealed gage option only available in pressure ranges at or above 8 bar | 100 psi.

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 the transducer is installed with the port facing downwards. Any particulates in the system are less likely to enter and settle within the transducer if it is in this position.
- Ensure that the media does not create a residue when dried. Build-up of residue inside the transducer may affect transducer output

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

TABLE 5. PRESSURE RATINGS

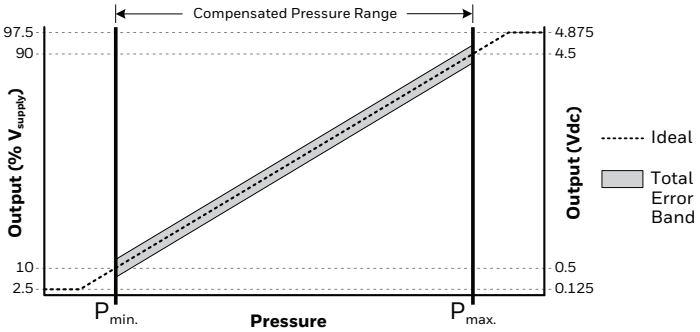
BAR			PSI		
OPERATING PRESSURE	OVER-PRESSURE[1]	BURST PRESSURE[2]	OPERATING PRESSURE	OVER-PRESSURE[1]	BURST PRESSURE[2]
1 to 3	6	207	15 to 43.5	87	3000
>3 to 12	24		>43.5 to 174	348	
>12 to 60	120		>174 to 870	1740	

[1]**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.

[2]**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. ANALOG 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.



$$\text{Output (V)} = \frac{0.8 \times V_{supply}}{P_{max.} - P_{min.}} \times (\text{Pressure}_{applied} - P_{min.}) + 0.10 \times V_{supply}$$

FIGURE 3. ABSOLUTE VS SEALED GAGE

Example shown is for 100 psi.

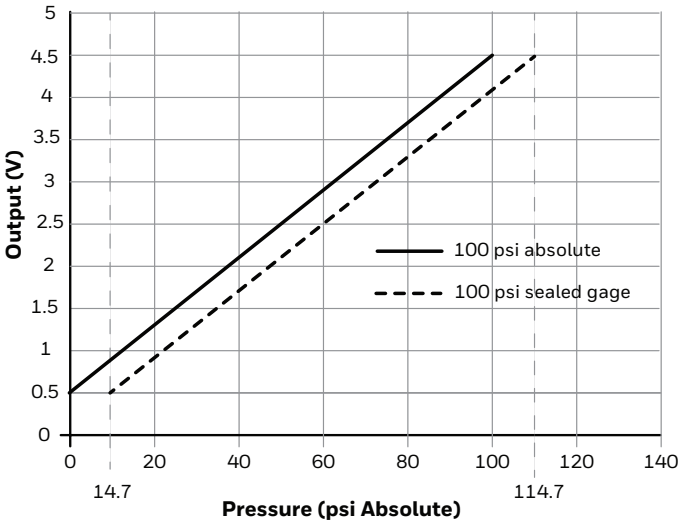


FIGURE 4. TEB COMPONENTS FOR THE MIP SERIES

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.

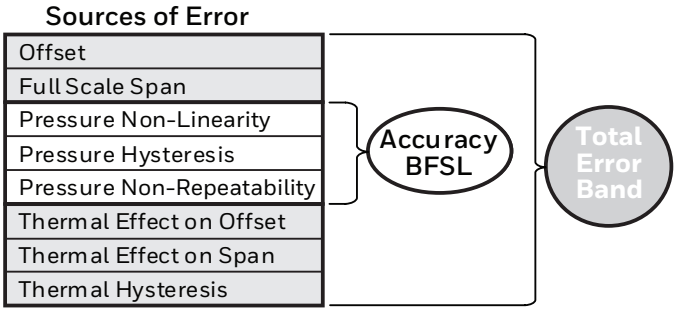
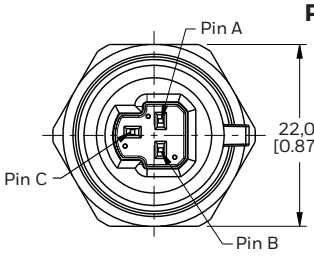


TABLE 6. OUTPUT DIAGNOSTICS CODES

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	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)

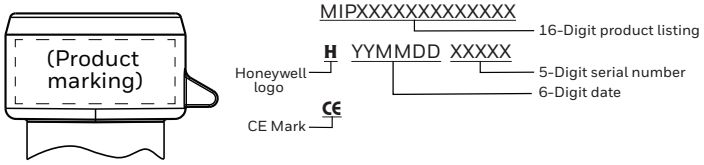
FIGURE 5. MOUNTING DIMENSIONS (FOR REFERENCE ONLY. MM/[IN])

Pinout

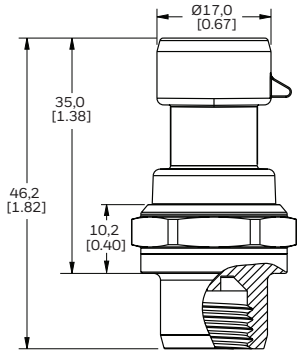


Ratiometric Voltage Output
Pin A = Ground
Pin B = V+
Pin C = Vout

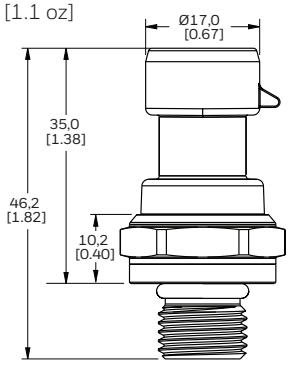
Product Marking



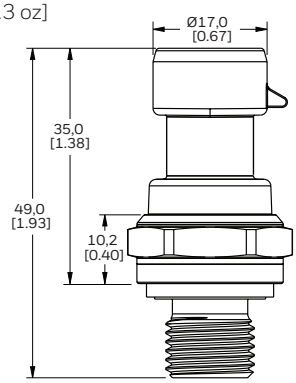
F1: 7/16-20 UNF 1/4 inch 45° Flare Female Schrader (SAE J512)
Seal: 45° cone
Mating geometry: SAE J512
Installation torque: 17 N m [12 ft-lb]
Weight: 36 g [1.3 oz]



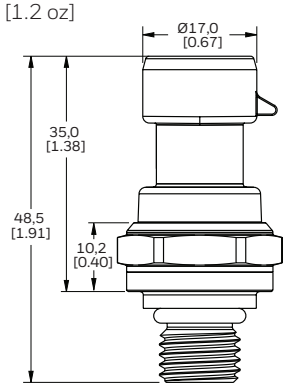
G1: G1/4 A-G (ISO 1179-3)
Seal: O-ring (included) and retaining ring ISO 1179-3-G1/4 (not included)
Mating geometry: ISO 1179-1
Installation torque: 20 N m [14.7 ft-lb]
Weight: 33 g [1.1 oz]



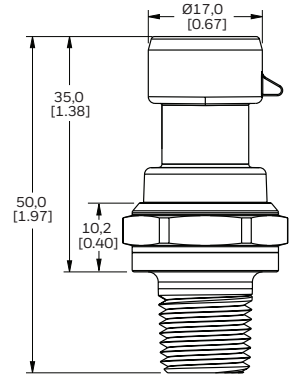
G2: G1/4 A-L (ISO 1179-2)
Seal: ISO 9974-2/DIN 3869 profile ring (included)
Mating geometry: ISO 1179-1
Installation torque: 20 N m [15 ft-lb]
Weight: 36 g [1.3 oz]



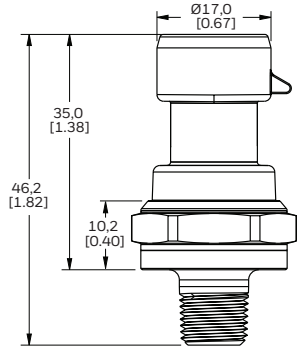
M1: M12 x 1.5 (ISO 6149-3)
Seal: O-ring (included)
Mating geometry: ISO 6149-1
Installation torque: 20 N m [15 ft-lb]
Weight: 34 g [1.2 oz]



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 at sensing.honeywell.com:

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

FOR MORE INFORMATION

Honeywell Sensing and Internet of Things services its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or the nearest Authorized Distributor, visit sensing.honeywell.com or call:

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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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