

# MIP SERIES

32354483  
Issue E

## Heavy-Duty, Media-Isolated Pressure Transducers 1 bar to 70 bar | 15 psi to 1000 psi

### DESCRIPTION

The MIP Series offers a heavy-duty, media-isolated pressure transducer using piezoresistive sensing technology with ASIC (Application Specific Integrated Circuit) signal conditioning in a compact stainless-steel housing. The MIP Series transducers are fully calibrated and temperature compensated from -40°C to 125°C [-40°F to 257°F]. MIP Series transducers are developed for use with a wide range of media including aggressive fluids and water, and provide a cost-competitive solution for wide-ranging applications in tough environments.

### DIFFERENTIATION

- **Great customer value:** Multiple configuration possibilities provide flexibility of use in the application with no upfront NRE or tooling charges
- **Durable:** Provide the tough environmental specifications needed, including insulation resistance and dielectric strength, and EMC performance



Certified to  
NSF/ANSI/CAN 61

### 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](#).

### FEATURES

- Pressure range:
  - 1 bar to 70 bar
  - 15 psi to 1000 psi absolute
  - 8 bar to 70 bar
  - 100 psi to 1000 psi sealed gage
- Rugged, stainless steel construction
- Ratiometric output: 0.5 Vdc to 4.5 Vdc
- Current output: 4 mA to 20 mA
- Regulated output: 1 Vdc to 6 Vdc, 0.25 Vdc to 10.25 Vdc, 0.5 Vdc to 4.5 Vdc and 1 Vdc to 5 Vdc
- Operating temperature: -40°C to 125°C
- Total Error Band:
  - Ratiometric output:  $\pm 0.75\%$  FSS to  $\pm 1.0\%$  FSS
  - Current and regulated output:  $\pm 1\%$  FSS to  $\pm 2.0\%$  FSS
- Industry-leading accuracy as low as  $\pm 0.15\%$  FSS BFSL
- Long term stability:  $\pm 0.25\%$  FSS
- Radiated immunity: 100 V/m
- Drinking water approval: NSF/ANSI/CAN 61
- UL, CE, UKCA, RoHS, REACH compliant
- Insulation resistance:  $>100\text{ M}\Omega$ , 1000 Vdc (in dry, non-ionized air)
- Multiple industry-standard pressure port types provide greater flexibility and configurable options for hermetically sealed process connection
- Load dump protection for transportation application as per ISO7637-2 & ISO 16750-2
- Reverse voltage protection in regulated and current output variants
- Surge immunity:  $\pm 1\text{ kV}$  line to ground per IEC 61000-4-5



### VALUE TO CUSTOMERS

- **Cost-effective:** Small size helps engineers to reduce design and manufacturing costs while maintaining the performance and reliability of the systems
- **Accuracy:** Total Error Band (TEB) as low as  $\pm 0.75\%$  within -40°C to 125°C compensated temp range and wide pressure range enable engineers to enhance system performance by improving resolution and system accuracy
- Wide supply voltage range, variety of pressure ports, output options and wide operating temperature range simplify the use in the application
- High insulation resistance and dielectric strength
- **Ratiometric output:** 0.5 to 4.5V output with sensor diagnostics for debugging internal and external failures
- **Current output:** 4 mA to 20 mA output Supports transmission of output signals over longer distances
- **Regulated output:** Multiple voltage output variants available. Transportation variant consists of load dump protection. Over and reverse voltage protection
- **EMC performance:** Operates reliably in the presence of electromagnetic fields, such as wireless signals, RF communication, and electrical devices
- **Hermetically welded design:** Supports almost all media without the use of an internal seal. The sensors are designed to be used in harsh environments with aggressive media

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# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS

## MIP SERIES

**TABLE 1. APPLICATIONS**

| Industry                                       | Media                                                                                                                                        |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Industrial:<br>pumps<br>compressors<br>process | water, hydraulic fluids<br>compressed air<br>food, beverage, oil, gas, steam                                                                 |
| HVAC/R                                         | refrigerants (butane, propane, ammonia, CO <sub>2</sub> , R134A, R407C, R410A, R448A/Solstice® N40, R32 and R1234ze, R1234yf, glycol + water |
| Transportation                                 | gasoline, diesel fuel, engine oil, brake fluid, coolants, CNG                                                                                |
| Medical                                        | O <sub>2</sub> , N <sub>2</sub> , CO <sub>2</sub> , N <sub>2</sub> O, air                                                                    |

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

| Characteristic                     | Ratiometric Output (AA)        | Current Output (CH)                     | Regulated Output (BC,BD,BE,BG)                                                                      |
|------------------------------------|--------------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------|
| Supply voltage (V <sub>s</sub> )   | 5.0 Vdc ±0.25 Vdc              | 8 Vdc to 30 Vdc <sup>1</sup>            | BC, BE & BG : 8 Vdc to 32Vdc <sup>3</sup><br>BD : 12 Vdc to 32 Vdc <sup>3</sup>                     |
| Output transfer function           | 10 % to 90 % of V <sub>s</sub> | 4 mA to 20 mA                           | BC : 1 Vdc to 6 Vdc<br>BD : 0.25 Vdc to 10.25 Vdc<br>BE : 0.5 Vdc to 4.5 Vdc<br>BG : 1 Vdc to 5 Vdc |
| Output load (pull up or pull down) | ≥ 2 kΩ                         | (V <sub>s</sub> - 8) x 50Ω <sup>2</sup> | ≥ 10 kΩ                                                                                             |
| Short circuit protection           | yes                            | yes                                     | yes                                                                                                 |
| Current consumption                | 6.5 mA ±1 mA                   | —                                       | 5 mA ±1 mA                                                                                          |
| Over/reverse voltage               | ±40 Vdc                        | ±35 Vdc                                 | ±36 Vdc                                                                                             |

<sup>1</sup> Supply voltage: Must be de-rated to 8 Vdc to 25 Vdc for above 100°C to 125°C [212°F to 257°F].

<sup>2</sup> Applies at 25°C [77°F]. See Figure 4 for Current Output Supply Voltage.

<sup>3</sup> For Regulated cable variant with load dump requirement, the minimum supply voltage should be greater than output voltage by +4 V

**TABLE 3. 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:<br>Metri-Pack 150 version<br>cable harness version<br>DIN version | IP65, IP67<br>IP65, IP67, IP69K<br>IP65                                                                                                                            |
| External freeze/thaw resistance                                                       | >6 cycles from -30°C to 50°C [-22°F to 122°F] (Metri-Pack 150 version only)                                                                                        |
| Wetted materials:<br>port<br>diaphragm<br>external seal for ports                     | stainless steel 304L<br>stainless steel 316L<br>nitrile (-30°C to 100°C [-22°F to 212°F]) (other materials available)                                              |
| Electrical connector material                                                         | PBT 30 %GF (UL V-O)                                                                                                                                                |
| Cable material (jacket and insulation)                                                | TPE (Thermoplastic Elastomer) flame retardant-type cable is FT1 rated per CSA AWM-I-A/B-II-A/B specification, -40°C to 125°C [-40°F to 257°F], three 24 AWG wires. |

**TABLE 4. SENSOR PRESSURE TYPES**

| Pressure type            | Description                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Absolute                 | Output is calibrated to be proportional to the difference between applied pressure and a fixed reference to a perfect vacuum (absolute zero pressure).                                                                                                                                                                                                                                                                             |
| Sealed gage <sup>1</sup> | Sensor construction is identical to the absolute version, with a built-in reference at zero pressure in order to minimize measurement error over temperature. The output is calibrated to be proportional to the difference between applied pressure and a reference of 1 standard atmosphere (1.012 barA   14.7 psiA). Example: 100 psi sealed gage has a calibrated pressure range from 14.7 psi absolute to 114.7 psi absolute. |

<sup>1</sup> Sealed gage option only available in pressure ranges at or above 8 bar | 100 psi.

# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS

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| TABLE 5. PERFORMANCE SPECIFICATIONS (AT 25°C [77°F] AND UNDER UNLESS OTHERWISE NOTED.)                                                                                                        |                                                                                                                                                                                                                                                                                          |                                                                                              |                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Characteristic                                                                                                                                                                                | Ratiometric Output (AA)                                                                                                                                                                                                                                                                  | Current Output (CH)                                                                          | Regulated Output (BC,BD,BE,BG)                                                        |
| Total Error Band <sup>1</sup>                                                                                                                                                                 | >10 bar or >150 psi: ±0.75 %FSS (-40°C to 125°C)<br>≤10 bar or ≤150 psi: ±1.0 %FSS <sup>2</sup> (-40°C to 125°C)                                                                                                                                                                         | ±1.0 %FSS (-20°C to 85°C)<br>±2.0 %FSS (-40°C to 125°C)                                      | ±1.0 %FSS (-20°C to 85°C)<br>±2.0 %FSS (-40°C to 125°C)                               |
| Operating temperature range                                                                                                                                                                   | -40°C to 125°C [-40°F to 257°F]                                                                                                                                                                                                                                                          |                                                                                              |                                                                                       |
| Accuracy BFSL <sup>3</sup>                                                                                                                                                                    | ±0.15 %FSS                                                                                                                                                                                                                                                                               | ±0.25 %FSS                                                                                   | ±0.25 %FSS                                                                            |
| Long term stability (1000 hr, 25°C)                                                                                                                                                           | ±0.25 %FSS                                                                                                                                                                                                                                                                               |                                                                                              |                                                                                       |
| Typical output resolution                                                                                                                                                                     | 0.05 % Full Scale Pressure                                                                                                                                                                                                                                                               |                                                                                              |                                                                                       |
| Typical response time <sup>4</sup>                                                                                                                                                            | 1 ms                                                                                                                                                                                                                                                                                     | 2 ms                                                                                         | 2 ms                                                                                  |
| Startup time <sup>5</sup>                                                                                                                                                                     | 7 ms                                                                                                                                                                                                                                                                                     |                                                                                              |                                                                                       |
| EMC rating (CE Conformity):<br>surge immunity (all leads)<br>electrostatic discharge<br>radiated immunity<br>fast transient burst<br>immunity to conducted disturbances<br>radiated emissions | ±1 kV line to ground per IEC 61000-4-5<br>±4 kV contact, ±8 kV air per IEC 61000-4-2<br>10 V/m (80 MHz to 1000 MHz) per IEC 61000-4-3<br>±1 kV per IEC 61000-4-4<br>3 V (150 kHz to 80 MHz) per IEC 61000-4-6<br>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 2.5 GHz) per ISO 11452-2                                                                                                                                                                                                                                             | 100 V/m (300 MHz to 2.7 GHz) per ISO 11452-2<br>100 V/m (100 kHz to 400 MHz) per ISO 11452-5 | 100 V/m (200 MHz to 2.7 GHz) per ISO 11452-2                                          |
| Bulk current injection - common mode                                                                                                                                                          | –                                                                                                                                                                                                                                                                                        | –                                                                                            | 60 mA, 1 MHz to 200 MHz for Industrial<br>100 mA, 1 MHz to 200 MHz for Transportation |
| Insulation resistance                                                                                                                                                                         | >100 MΩ at 1k Vdc (60 s)                                                                                                                                                                                                                                                                 |                                                                                              |                                                                                       |
| Dielectric strength                                                                                                                                                                           | <1 mA at 500 Vac (60 s)                                                                                                                                                                                                                                                                  | <1 mA at 1000 Vac (60 s)                                                                     | <1 mA at 1000 Vac (60 s)                                                              |
| Life                                                                                                                                                                                          | >10 million full scale pressure cycles                                                                                                                                                                                                                                                   |                                                                                              |                                                                                       |
| UL Conformity                                                                                                                                                                                 | Compliant <sup>6</sup>                                                                                                                                                                                                                                                                   | Compliant <sup>6</sup>                                                                       | –                                                                                     |

<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 5).

<sup>2</sup> **TEB:** Above 100°C [212°F] for pressure ratings less than 4 bar [58 psi], TEB is ±1.5 %FSS for ratiometric outputs and 2.0 % FSS for other outputs.

<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> **Response time:** The time taken by the transducer to change output from 10 % to 90 % of full scale in response to a 0 % to 100 % full scale step input pressure.

<sup>5</sup> **Startup time:** The time needed to receive valid output after power up.

<sup>6</sup> UL marking currently not applicable for all transducers above 60 bar pressure range and for MIPS regulated transducers.

| TABLE 6. 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                          | 207                         | 15 to 43.5         | 87                         | 3000                        |
| >3 to 12                  | 24                         |                             | >43.5 to 174       | 348                        |                             |
| >12 to 70                 | 120                        |                             | >174 to 1000       | 1740                       |                             |

<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.

# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS

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Figure 1. Nomenclature and Order Guide

For example, **MIPAN1XX010BSAAX** defines an MIP Series Heavy Duty, Media Isolated Pressure Transducer, Metri-Pack 150 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.

| Series                    |                                                                                           | MIP A N1 X X 010B S AA X <sup>1</sup> |                        |             |              |             |                          |             |          |  |  | Special                  |                                    |
|---------------------------|-------------------------------------------------------------------------------------------|---------------------------------------|------------------------|-------------|--------------|-------------|--------------------------|-------------|----------|--|--|--------------------------|------------------------------------|
| <b>MIP</b>                | Media Isolated Pressure                                                                   |                                       |                        |             |              |             |                          |             |          |  |  | <b>X</b>                 | No selection                       |
|                           |                                                                                           |                                       |                        |             |              |             |                          |             |          |  |  | <b>L</b>                 | Load dump protection <sup>5</sup>  |
| Electrical Connector Type |                                                                                           |                                       |                        |             |              |             |                          |             |          |  |  | Output Transfer Function |                                    |
| <b>A</b>                  | Metri-Pack 150, Standard (UL V-0)                                                         |                                       |                        |             |              |             |                          |             |          |  |  | <b>AA</b>                | Ratiometric: 5.0 Vs, 10% to 90% Vs |
| <b>C</b>                  | DIN-C, Standard (EN175301-803C)                                                           |                                       |                        |             |              |             |                          |             |          |  |  | <b>CH</b>                | Current: 4 mA to 20 mA             |
| <b>K</b>                  | Cable harness <sup>2,5</sup> , 0,5 m [1.3 ft] cable length                                |                                       |                        |             |              |             |                          |             |          |  |  | <b>BC</b>                | Regulated: 1 Vdc to 6 Vdc          |
| <b>E</b>                  | Cable harness <sup>2,5</sup> , 1,0 m [3.2 ft] cable length                                |                                       |                        |             |              |             |                          |             |          |  |  | <b>BD</b>                | Regulated: 0.25 Vdc to 10.25 Vdc   |
| <b>F</b>                  | Cable harness <sup>2,5</sup> , 2,0 m [6.6 ft] cable length                                |                                       |                        |             |              |             |                          |             |          |  |  | <b>BE</b>                | Regulated: 0.5 Vdc to 4.5 Vdc      |
| <b>G</b>                  | Cable harness for CH output transfer function <sup>2</sup> , 3,0 m [9.8 ft] cable length  |                                       |                        |             |              |             |                          |             |          |  |  | <b>BG</b>                | Regulated: 1 Vdc to 5 Vdc          |
| <b>H</b>                  | Cable harness for CH output transfer function <sup>2</sup> , 5,0 m [16.4 ft] cable length |                                       |                        |             |              |             |                          |             |          |  |  | Pressure Reference       |                                    |
|                           |                                                                                           |                                       |                        |             |              |             |                          |             |          |  |  | <b>A</b>                 | Absolute                           |
|                           |                                                                                           |                                       |                        |             |              |             |                          |             |          |  |  | <b>S</b>                 | Sealed gage <sup>4</sup>           |
|                           |                                                                                           |                                       |                        |             |              |             |                          |             |          |  |  | Pressure Range           |                                    |
|                           |                                                                                           |                                       |                        |             |              |             |                          |             |          |  |  | bar                      |                                    |
|                           |                                                                                           |                                       |                        |             |              |             |                          |             |          |  |  | psi                      |                                    |
|                           |                                                                                           | <b>001B</b>                           | 1 bar                  | <b>020B</b> | 20 bar       | <b>015P</b> | 15 psi                   | <b>500P</b> | 500 psi  |  |  |                          |                                    |
|                           |                                                                                           | <b>002B</b>                           | 2 bar                  | <b>025B</b> | 25 bar       | <b>030P</b> | 30 psi                   | <b>600P</b> | 600 psi  |  |  |                          |                                    |
|                           |                                                                                           | <b>004B</b>                           | 4 bar                  | <b>035B</b> | 35 bar       | <b>050P</b> | 50 psi                   | <b>667P</b> | 667 psi  |  |  |                          |                                    |
|                           |                                                                                           | <b>006B</b>                           | 6 bar                  | <b>040B</b> | 40 bar       | <b>060P</b> | 60 psi                   | <b>700P</b> | 700 psi  |  |  |                          |                                    |
|                           |                                                                                           | <b>008B</b>                           | 8 bar                  | <b>046B</b> | 46 bar       | <b>100P</b> | 100 psi                  | <b>750P</b> | 750 psi  |  |  |                          |                                    |
|                           |                                                                                           | <b>010B</b>                           | 10 bar                 | <b>050B</b> | 50 bar       | <b>150P</b> | 150 psi                  | <b>800P</b> | 800 psi  |  |  |                          |                                    |
|                           |                                                                                           | <b>012B</b>                           | 12 bar                 | <b>055B</b> | 55 bar       | <b>200P</b> | 200 psi                  | <b>850P</b> | 850 psi  |  |  |                          |                                    |
|                           |                                                                                           | <b>016B</b>                           | 16 bar                 | <b>060B</b> | 60 bar       | <b>250P</b> | 250 psi                  | <b>870P</b> | 870 psi  |  |  |                          |                                    |
|                           |                                                                                           |                                       |                        | <b>070B</b> | 70 bar       | <b>300P</b> | 300 psi                  | <b>01KP</b> | 1000 psi |  |  |                          |                                    |
|                           |                                                                                           |                                       |                        |             |              |             |                          |             |          |  |  | Special                  |                                    |
|                           |                                                                                           |                                       |                        |             |              |             |                          |             |          |  |  | <b>X</b>                 |                                    |
|                           |                                                                                           |                                       |                        |             |              |             |                          |             |          |  |  | <b>X</b>                 |                                    |
| Pressure Port Type        |                                                                                           |                                       |                        |             |              |             |                          |             |          |  |  |                          |                                    |
| <b>F1</b>                 | 7/16-20 UNF                                                                               | <b>M1</b>                             | M12 x 1.5 <sup>3</sup> | <b>N2</b>   | 1/8-27 NPT   | <b>S1</b>   | 9/16-18 UNF <sup>3</sup> |             |          |  |  |                          |                                    |
| <b>G1</b>                 | G1/4 A-G <sup>3</sup>                                                                     | <b>M3</b>                             | M14 x 1.5 <sup>3</sup> | <b>R1</b>   | R1/4-19 BSPT | <b>S2</b>   | 7/16-20 UNF <sup>3</sup> |             |          |  |  |                          |                                    |
| <b>G2</b>                 | G1/4 A-L <sup>3</sup>                                                                     | <b>N1</b>                             | 1/4-18 NPT             | <b>R2</b>   | R1/8-28 BSPT | <b>S3</b>   | 3/8-24 UNF <sup>3</sup>  |             |          |  |  |                          |                                    |

<sup>1</sup> Contact Honeywell Sales for custom configurations.

<sup>2</sup> See Table 3 for cable material specifications.

<sup>3</sup> Other external seal materials are available for G1, G2, M1, M3, S1, S2, and S3 pressure port types.

<sup>4</sup> Sealed gage option only available in pressure ranges at or above 8 bar | 100 psi.

<sup>5</sup> Load dump protection is available for regulated output with cable harness only.

### CAUTION

#### PRODUCT 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 particulates. 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 particular deposits.
- Ensure that the media does not create a residue when dried. Build-up of residue inside the transducer may affect its output.
- Ensure that the transducer housing is properly grounded.
- For cable harness versions, ensure that the cable bend radius is maintained at a minimum of 38 mm [1.50 in] in the end application assembly.

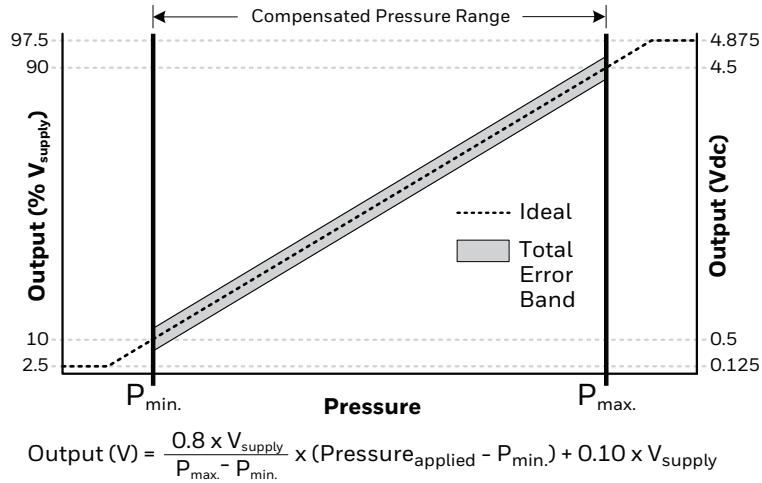
Failure to comply with these instructions may result in product damage.



# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS MIP SERIES

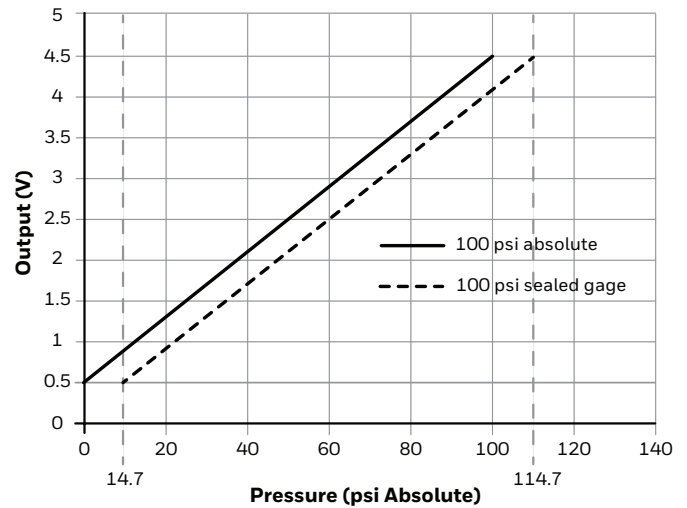
**Figure 2. Ratiometric Output Transfer Function**

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.

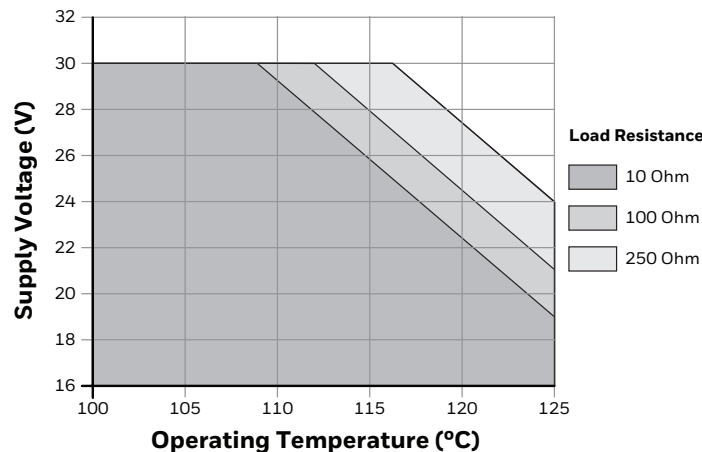


**Figure 3. Absolute vs. Sealed Gage**

Example shown is for 100 psi.



**Figure 4. Current Output Supply Voltage vs. Temperature**



## Transfer Function for Regulated and Current Output Pressure Examples

$$\text{Pressure} = \frac{(\text{Output} - \text{Output}_{min.}) \times (P_{max.} - P_{min.})}{\text{Output}_{max.} - \text{Output}_{min.}} + P_{min.}$$

Where:

- Output<sub>max.</sub> = Ideal output at maximum pressure
- Output<sub>min.</sub> = Ideal output at minimum pressure
- P<sub>max.</sub> = maximum value of pressure range [bar/psi]
- P<sub>min.</sub> = minimum value of pressure range [bar/psi]
- Pressure = Transducer pressure reading [bar/psi]
- Output = Transducer Voltage/current output

Example listing: MIPAN1XX010BSCHX -

10 bar sealed gage, 4 mA to 20 mA output

Output<sub>max.</sub> = 20 mA

Output<sub>min.</sub> = 4 mA

P<sub>max.</sub> = 11.012 bar

P<sub>min.</sub> = 1.012 bar

Output from the sensor = 12 mA

Calculated pressure =  $((12-4) \times (11.012-1.012) / (20-4)) + 1.013 = 6.013$  bar

Example listing: MIPAN1XX010BABEX -

10 bar absolute, 0.5 Vdc to 4.5 Vdc output

Output<sub>max.</sub> = 4.5 Vdc

Output<sub>min.</sub> = 0.5 Vdc

P<sub>max.</sub> = 10 bar

P<sub>min.</sub> = 0 bar

Output from the sensor = 2.5 Vdc

Calculated pressure =  $((2.5-0.5) \times (10-0) / (4.5-0.5)) + 0 = 5$  bar

# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS

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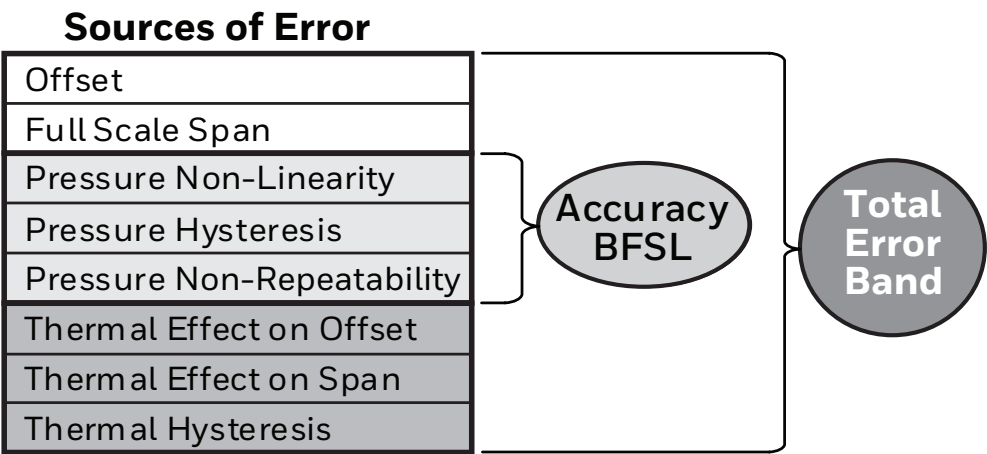
### TOTAL ERROR BAND

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 6. TEB Components for the MIP Series

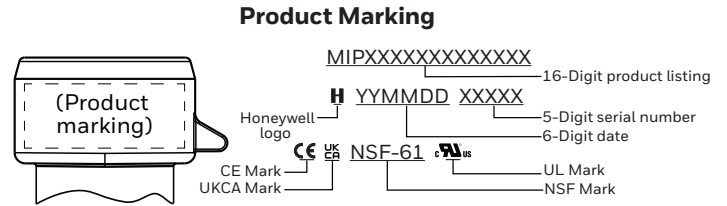
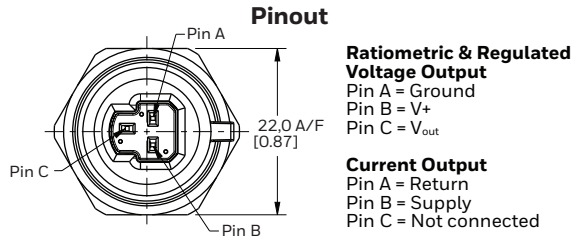


| TABLE 7. OUTPUT DIAGNOSTIC CODE FOR RATIOMETRIC OUTPUT |                                               |
|--------------------------------------------------------|-----------------------------------------------|
| FAULT CONDITION                                        | ANALOG DIAGNOSTIC RAIL                        |
| Sensor internal failures                               | 97.5 % of V <sub>supply</sub> (See Figure 2.) |
| Over pressure                                          | 97.5 % of V <sub>supply</sub> (See Figure 2.) |
| Under pressure (for sealed gage only)                  | 2.5 % of V <sub>supply</sub> (See Figure 2.)  |
| Power or ground loss                                   | high (external pull-up resistor)              |
| Power or ground loss                                   | low (external pull-down resistor)             |

# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS

## MIP SERIES

Figure 7. Metri-Pack 150 Mounting Dimensions (for reference only. mm [in])



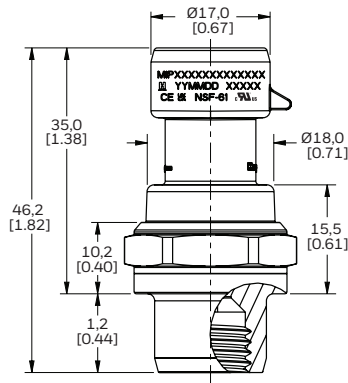
### F1: 7/16-20 UNF 1/4 inch 45° Flare Female Schrader (SAE J512)

Seal: 45° cone

Mating geometry: SAE J512

Installation torque: 17 N m [12 ft-lb]

Weight: 36 g [1.3 oz]



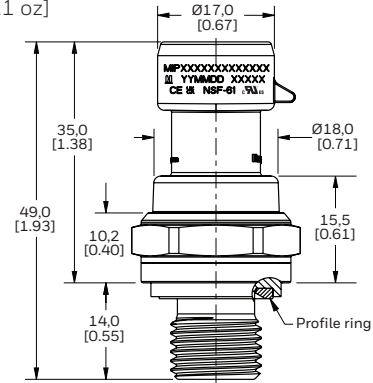
### G1: G1/4 A-G (ISO 1179-3)

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]



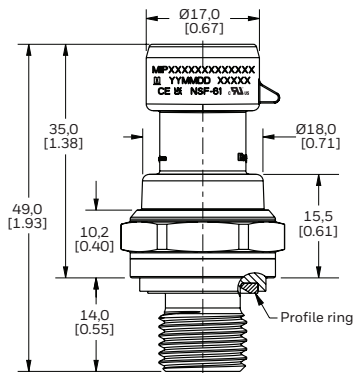
### G2: G1/4 A-L (ISO 1179-2)

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]



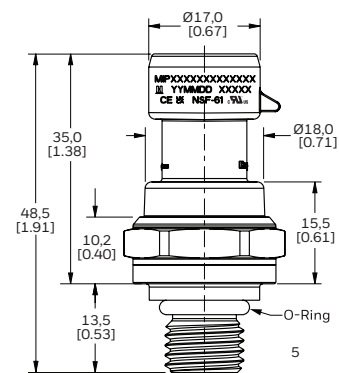
### M1: M12 x 1.5 (ISO 6149-3)

Seal: O-ring (included)

Mating geometry: ISO 6149-1

Installation torque: 20 N m [15 ft-lb]

Weight: 34 g [1.2 oz]



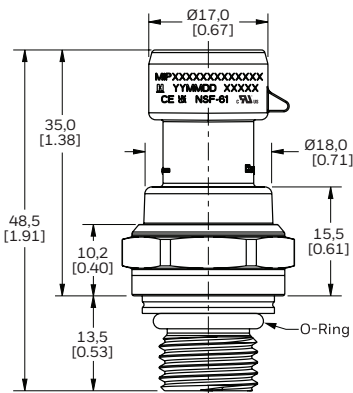
### M3: M14 x 1.5 (ISO 6149-2)

Seal: O-ring (included)

Mating geometry: ISO 6149-1

Installation torque: 30 N m [22.1 ft-lb]

Weight: 39 g [1.4 oz]



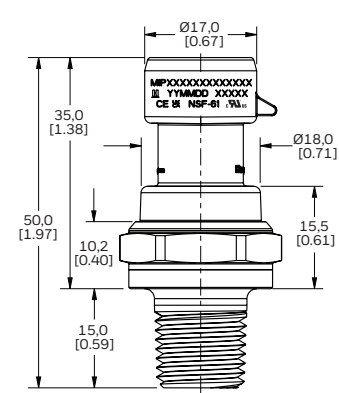
### N1: 1/4-18 NPT

Seal: Pipe thread

Mating geometry: ANSI B1.20.1

Installation torque: Two to three turns from finger tight

Weight: 38 g [1.3 oz]



# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS

## MIP SERIES

Figure 7. Metri-Pack 150 Mounting Dimensions (continued)

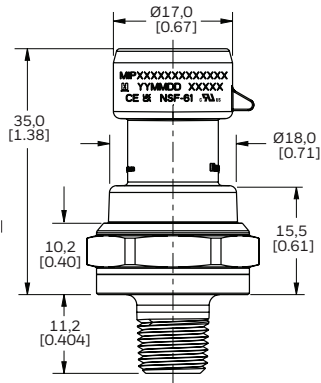
### N2: 1/8-27 NPT

Seal: Pipe thread

Mating geometry: ANSI B1.20.1

Installation torque: Two to three turns from finger tight

Weight: 30 g [1.0 oz]



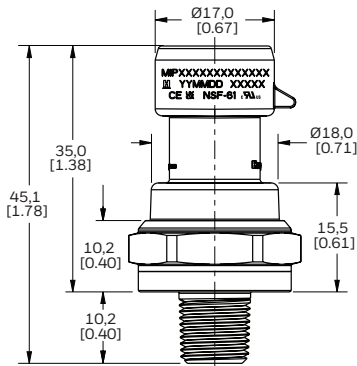
### R2: R1/8-28 BSPT (ISO 7-1)

Seal: Pipe thread

Mating geometry: ISO 7-1

Installation torque: Two to three turns from finger tight

Weight: 29 g [1.0 oz]



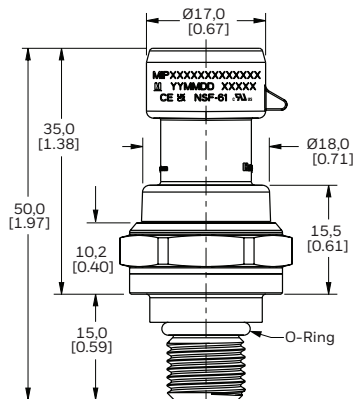
### S2: 7/16-20 UNF (SAE J1926-2)

Seal: O-ring (included)

Mating geometry: SAE J1926-1

Installation torque: 18 N m [13.3 ft-lb]

Weight: 36 g [1.3 oz]



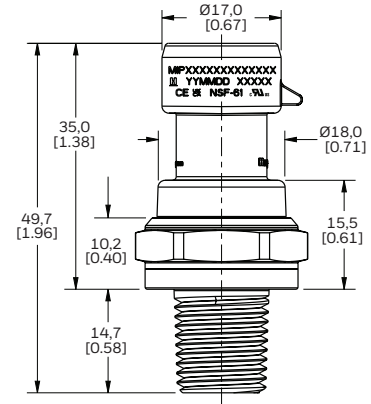
### R1: R1/4-19 BSPT (ISO 7-1)

Seal: Pipe thread

Mating geometry: ISO 7-1

Installation torque: Two to three turns from finger tight

Weight: 36 g [1.3 oz]



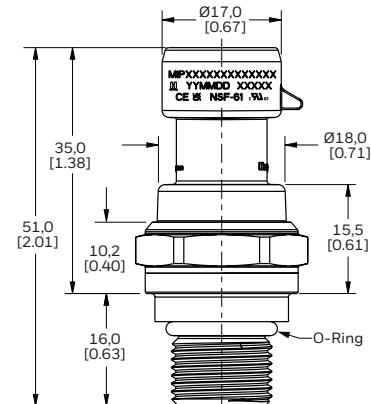
### S1: 9/16-18 UNF (SAE J1926-2)

Seal: O-ring (included)

Mating geometry: SAE J1926-1

Installation torque: 30 N m [22.1 ft-lb]

Weight: 44 g [1.6 oz]



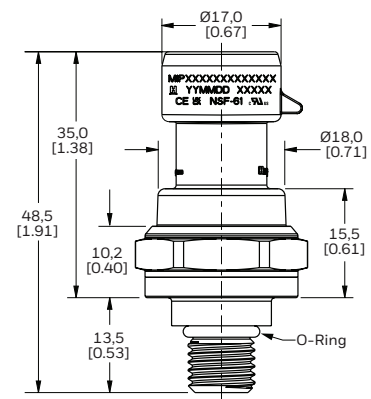
### S3: 3/8-24 UNF (SAE J1926-2)

Seal: O-ring (included)

Mating geometry: SAE J1926-1

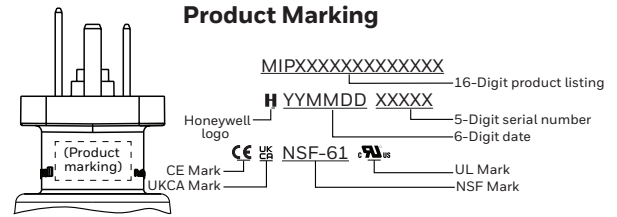
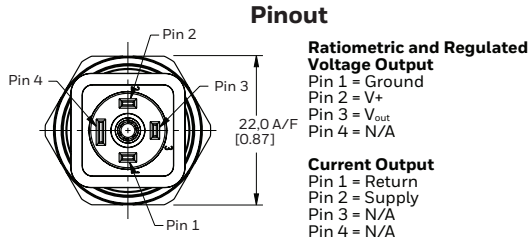
Installation torque: 10 N m [7.4 ft-lb]

Weight: 32 g [1.1 oz]



# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS MIP SERIES

Figure 8. DIN-C Mounting Dimensions (for reference only. mm [in])



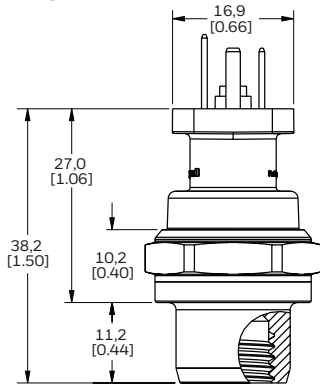
## F1: 7/16-20 UNF 1/4 inch 45° Flare Female Schrader (SAE J512)

Seal: 45° cone

Mating geometry: SAE J512

Installation torque: 17 N m [12 ft-lb]

Weight: 36 g [1.3 oz]



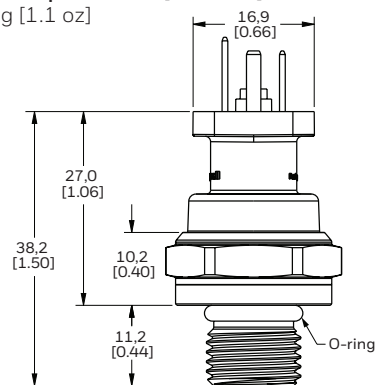
## G1: G1/4 A-G (ISO 1179-3)

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]



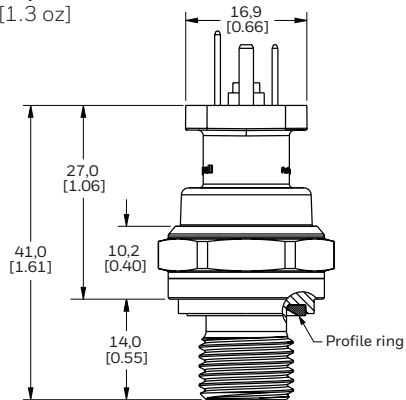
## G2: G1/4 A-L (ISO 1179-2)

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]



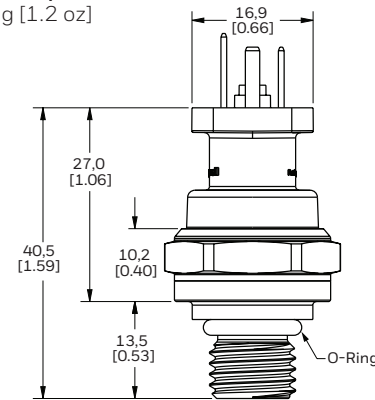
## M1: M12 x 1.5 (ISO 6149-3)

Seal: O-ring (included)

Mating geometry: ISO 6149-1

Installation torque: 20 N m [15 ft-lb]

Weight: 34 g [1.2 oz]



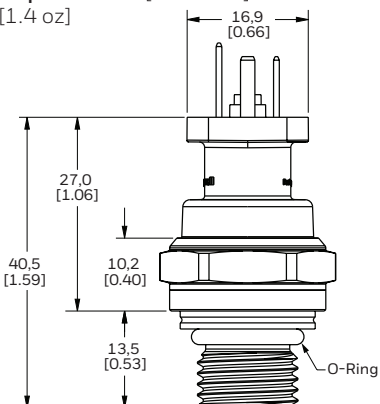
## M3: M14 x 1.5 (ISO 6149-2)

Seal: O-ring (included)

Mating geometry: ISO 6149-1

Installation torque: 30 N m [22.1 ft-lb]

Weight: 39 g [1.4 oz]



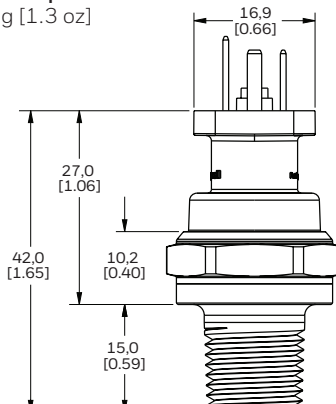
## N1: 1/4-18 NPT

Seal: Pipe thread

Mating geometry: ANSI B1.20.1

Installation torque: Two to three turns from finger tight

Weight: 38 g [1.3 oz]



# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS

## MIP SERIES

Figure 8. DIN-C Mounting Dimensions (continued)

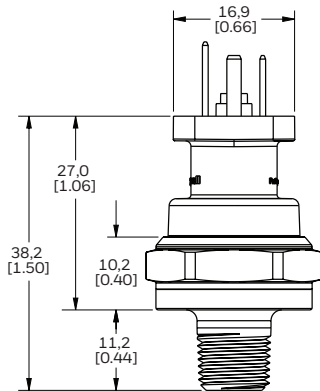
### N2: 1/8-27 NPT

Seal: Pipe thread

Mating geometry: ANSI B1.20.1

Installation torque: Two to three turns from finger tight

Weight: 30 g [1.0 oz]



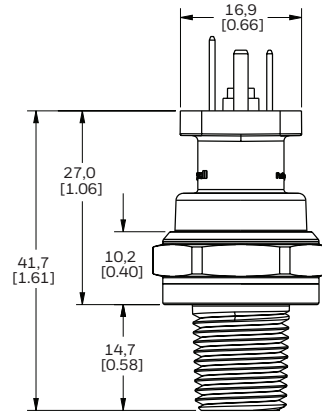
### R1: R1/4-19 BSPT (ISO 7-1)

Seal: Pipe thread

Mating geometry: ISO 7-1

Installation torque: Two to three turns from finger tight

Weight: 36 g [1.3 oz]



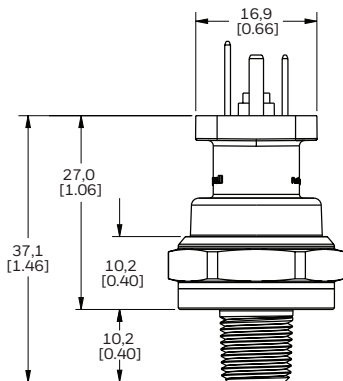
### R2: R1/8-28 BSPT (ISO 7-1)

Seal: Pipe thread

Mating geometry: ISO 7-1

Installation torque: Two to three turns from finger tight

Weight: 29 g [1.0 oz]



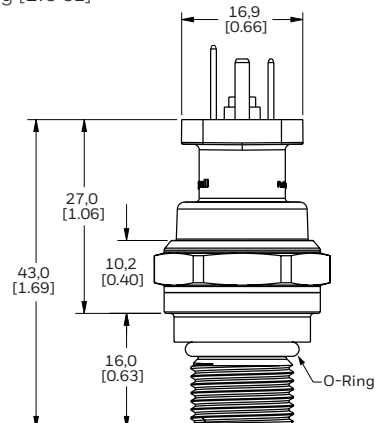
### S1: 9/16-18 UNF (SAE J1926-2)

Seal: O-ring (included)

Mating geometry: SAE J1926-1

Installation torque: 30 N m [22.1 ft-lb]

Weight: 44 g [1.6 oz]



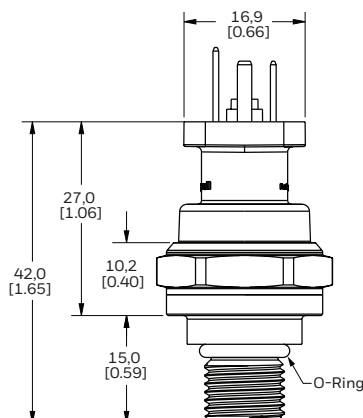
### S2: 7/16-20 UNF (SAE J1926-2)

Seal: O-ring (included)

Mating geometry: SAE J1926-1

Installation torque: 18 N m [13.3 ft-lb]

Weight: 36 g [1.3 oz]



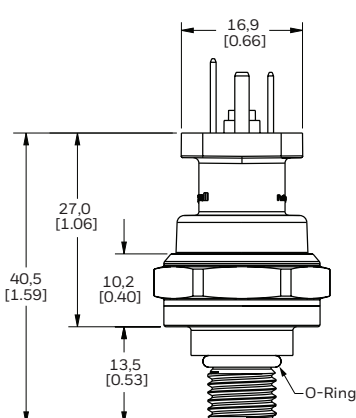
### S3: 3/8-24 UNF (SAE J1926-2)

Seal: O-ring (included)

Mating geometry: SAE J1926-1

Installation torque: 10 N m [7.4 ft-lb]

Weight: 32 g [1.1 oz]

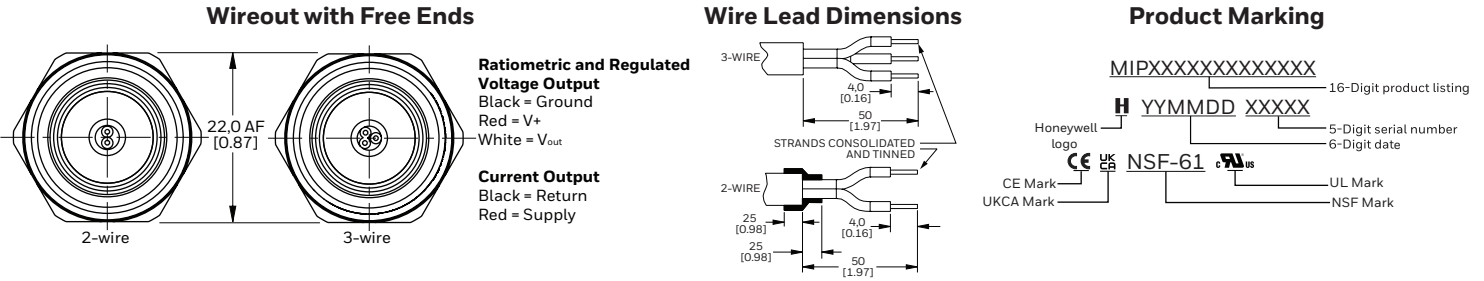




# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS

## MIP SERIES

Figure 9. Cable Harness Mounting Dimensions (for reference only. mm [in])



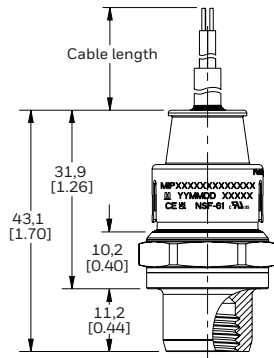
### F1: 7/16-20 UNF 1/4 inch 45° Flare Female Schrader (SAE J512)

Seal: 45° cone

Mating geometry: SAE J512

Installation torque: 17 N m [12 ft-lb]

Weight: 68 g [2.4 oz]



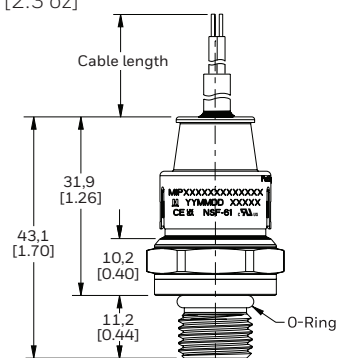
### G1: G1/4 A-G (ISO 1179-3)

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: 65 g [2.3 oz]



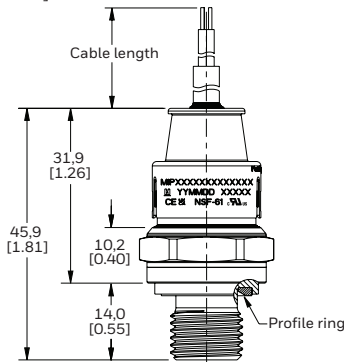
### G2: G1/4 A-L (ISO 1179-2)

Seal: ISO 9974-2/DIN 3869 profile ring (included)

Mating geometry: ISO 1179-1

Installation torque: 20 N m [15 ft-lb]

Weight: 68 g [2.4 oz]



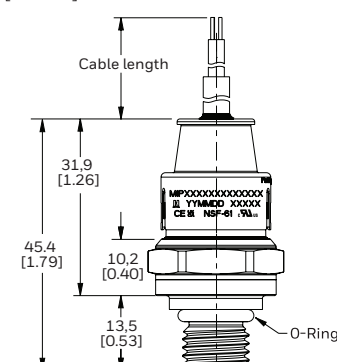
### M1: M12 x 1.5 (ISO 6149-3)

Seal: O-ring (included)

Mating geometry: ISO 6149-1

Installation torque: 20 N m [15 ft-lb]

Weight: 66 g [2.3 oz]



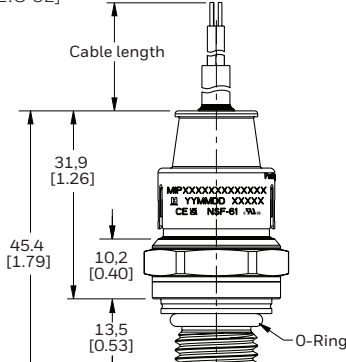
### M3: M14 x 1.5 (ISO 6149-2)

Seal: O-ring (included)

Mating geometry: ISO 6149-1

Installation torque: 30 N m [22.1 ft-lb]

Weight: 80 g [2.8 oz]



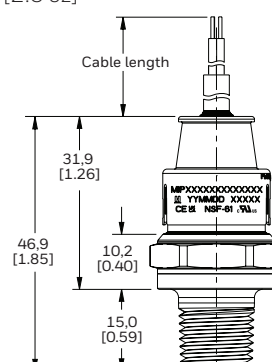
### N1: 1/4-18 NPT

Seal: Pipe thread

Mating geometry: ANSI B1.20.1

Installation torque: Two to three turns from finger tight

Weight: 79 g [2.5 oz]



# HEAVY DUTY, MEDIA-ISOLATED PRESSURE TRANSDUCERS

## MIP SERIES

Figure 9. Cable Harness Mounting Dimensions (continued)

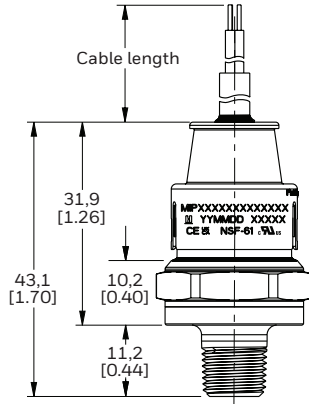
### N2: 1/8-27 NPT

Seal: Pipe thread

Mating geometry: ANSI B1.20.1

Installation torque: Two to three turns from finger tight

Weight: 62 g [2.2 oz]



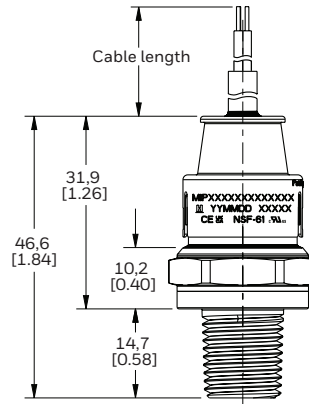
### R1: R1/4-19 BSPT (ISO 7-1)

Seal: Pipe thread

Mating geometry: ISO 7-1

Installation torque: Two to three turns from finger tight

Weight: 77 g [2.7 oz]



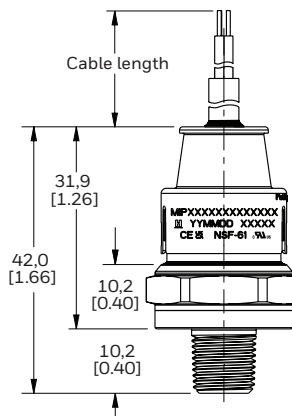
### R2: R1/8-28 BSPT (ISO 7-1)

Seal: Pipe thread

Mating geometry: ISO 7-1

Installation torque: Two to three turns from finger tight

Weight: 70 g [2.5 oz]



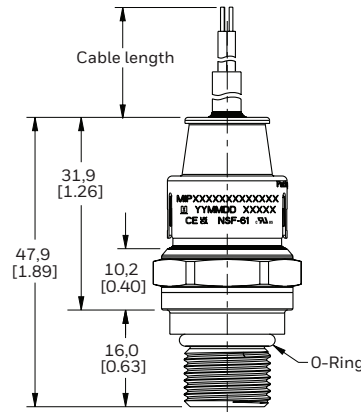
### S1: 9/16-18 UNF (SAE J1926-2)

Seal: O-ring (included)

Mating geometry: SAE J1926-1

Installation torque: 30 N m [22.1 ft-lb]

Weight: 85 g [3.0 oz]



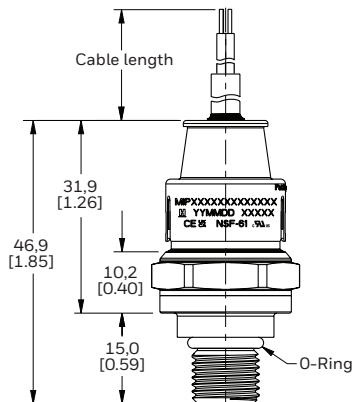
### S2: 7/16-20 UNF (SAE J1926-2)

Seal: O-ring (included)

Mating geometry: SAE J1926-1

Installation torque: 18 N m [13.3 ft-lb]

Weight: 77 g [2.7 oz]



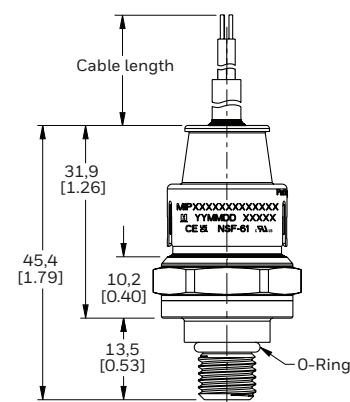
### S3: 3/8-24 UNF (SAE J1926-2)

Seal: O-ring (included)

Mating geometry: SAE J1926-1

Installation torque: 10 N m [7.4 ft-lb]

Weight: 73 g [2.6 oz]



## **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.**

### **For more information**

Honeywell Sensing & Safety 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:

|               |                     |
|---------------|---------------------|
| USA/Canada    | +1 302 613 4491     |
| Latin America | +1 305 805 8188     |
| Europe        | +44 1344 238258     |
| Japan         | +81 (0) 3-6730-7152 |
| Singapore     | +65 6355 2828       |
| Greater China | +86 4006396841      |

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[www.honeywell.com](http://www.honeywell.com)

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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.

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