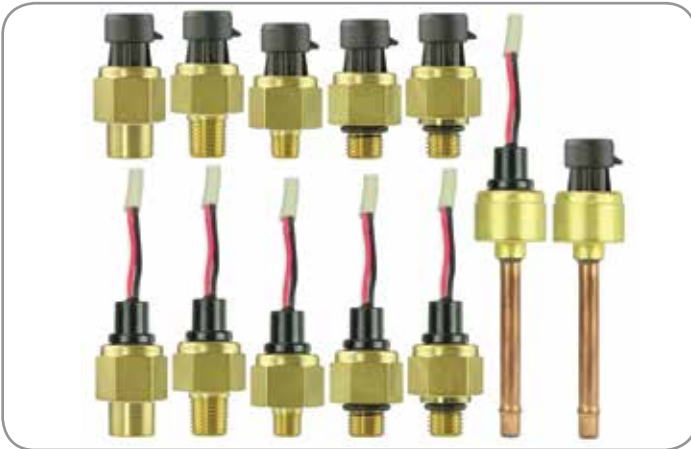


Heavy Duty Pressure Transducers

PX3 Series, 1 bar to 50 bar | 15 psi to 700 psi

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Issue B

Datasheet



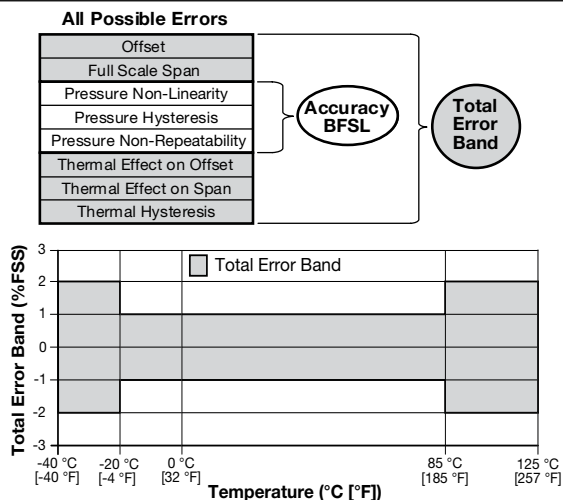
DESCRIPTION

Honeywell's PX3 Series Heavy Duty Pressure Transducers use piezoresistive sensing technology with ASIC (Application Specific Integrated Circuit) signal conditioning in a brass housing and Metri-Pack 150 or cable harness electrical connections. The PX3 Series are fully calibrated and temperature compensated from -40 °C to 125 °C [-40 °F to 257 °F].

VALUE TO CUSTOMERS

- Total Error Band (TEB) ± 1.0 %FSS from -20 °C to 85 °C: Provides the most comprehensive, clear and meaningful indication of the sensor's true measurement performance over a specified temperature range; small error promotes system uptime and efficiency. (See Figure 1.)

Figure 1. TEB Definition and Temperature Performance



- High insulation resistance and dielectric strength: Protect the user and sensor in high over-voltage situations, and ensures that the device is compliant with industry standards.
- High EMC performance: Operates reliably in the presence of electro-magnetic fields, such as near wireless signals, RF communication, and electrical devices.
- High external freeze/thaw resistance: Survives exposure to frost, commonly found in refrigeration systems. (See Figure 2.)

Figure 2. PX3 Series External Freeze/Thaw Resistance



- Reduced current consumption: Helps to reduce energy costs, and enhances product life if used in battery driven systems.
- Media compatibility: Common HFC (hydrofluorocarbon) refrigerants such as R410A and R134A, next generation low global warming potential (GWP) refrigerants such as R448A (Solstice® N40), R32 and R1234ZE, petroleum oils, lubricants, hydraulic fluids, brake fluids, air and water. For ammonia and other corrosive media, see Honeywell's SPT Series.

DIFFERENTIATION

- Optional diagnostics mode: 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 upfront NRE or tooling charges.
- Durable: Provides the tough environmental specs needed, including insulation resistance and dielectric strength, freeze-thaw resistance (see Figure 2), and EMC performance.

FEATURES

- Pressure range: 1 bar to 50 bar | 15 psi to 700 psi (absolute and sealed gage)
- Ratiometric output: 0.5 Vdc to 4.5 Vdc or 0.33 Vdc to 2.97 Vdc
- Fully calibrated and temperature compensated
- Total Error Band: ± 1.0 %FSS from -20 °C to 85 °C [-4 °F to 185 °F]
- External freeze/thaw resistance: 6 cycles from -30 °C to 50 °C [-22 °F to 122 °F]
- Insulation resistance: >100 MOhm, 1500 Vdc
- Dielectric strength: AC1500V, 1 min. or AC1800V, 1 s
- Current consumption: 3.5 mA max.
- EMC (radiated immunity): 200 V/m per ISO 11452-2
- Ingress protection IP67 (Metri-Pack 150), IP69K (cable harness)
- Response time: <2 ms
- RoHS, REACH, and CE compliant
- Six industry-standard pressure port types, including a tube port which provides for hermetically-sealed process connection

POTENTIAL APPLICATIONS

- Industrial: Refrigerant pressure monitoring in HVAC/R systems; air compressor system pressure
- Transportation: Air system monitoring; hydraulic oil pressure monitoring

PORTFOLIO

Honeywell's PX3 Series joins the PX2 Series, MLH Series, and SPT Series heavy duty pressure transducers.

Heavy Duty Pressure Transducers

PX3 Series, 1 bar to 50 bar | 15 psi to 700 psi

Table 1. Electrical Specifications

| Characteristic | Parameter |
|---|--|
| Supply voltage: 5 Vdc 3.3 Vdc | ±0.25 Vdc ±0.25 Vdc |
| Over voltage and reverse voltage | ±16 Vdc |
| Current consumption: 5 Vdc supply 3.3 Vdc supply | 3.0 mA max. 1.6 mA to 2.1 mA |
| Short circuit protection | yes |
| Nominal output transfer function: 5 Vdc supply 3.3 Vdc supply | 0.5 Vdc to 4.5 Vdc (ratiometric to supply) 0.33 Vdc to 2.97 Vdc (ratiometric to supply) |

Table 2. Performance Specifications (At 25 °C [77 °F] and under unless otherwise noted.)

| Characteristic | Parameter |
|--|---|
| Operating temperature range ¹ | -40 °C to 125 °C [-40 °F to 257 °F] |
| Storage temperature range ¹ | -40 °C to 125 °C [-40 °F to 257 °F] |
| Compensated temperature range | -40 °C to 125 °C [-40 °F to 257 °F] |
| Total Error Band ² : -20 °C to 85 °C [-4 °F to 185 °F] <-20 °C, >85 °C [<-4 °F, >185 °F] | ±1.0 %FSS ±2.0 %FSS |
| Accuracy BFSL ³ | ±0.25 %FSS |
| Response time | <2 ms (10% to 90% step change in pressure) |
| Turn on time ⁴ | <7 ms |
| EMC rating ⁵ : surge immunity (all leads) _____ electrostatic discharge _____ radiated immunity _____ fast transient burst _____ immunity to conducted disturbances _____ radiated emissions _____ radiated immunity _____ | ±1000 V 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 per IEC 61000-4-6 40 dB (30 MHz to 230 MHz), 47 dB (230 MHz to 1000 MHz) per CISPR 11 200 V/m per ISO 11452-2 |
| Insulation resistance | >100 MOhm, 1500 Vdc |
| Dielectric strength | AC1500V, 1 min. or AC1800V, 1 s |
| Load resistance | >5 kOhm |
| Life | greater than 10 million full scale pressure cycles over the calibrated pressure range |

¹ Dependent on external and internal seal and cable jacket materials. See Table 5 and Figure 5 for temperature range details.

² 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 1.

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. See Figure 1.

⁴ Turn on Time: Duration from power applied until first valid output.

⁵ Tested using 1.5 m [59.1 in] cable.

Table 3. Pressure Reference Definitions

| Pressure Reference | Definition |
|--------------------------|---|
| Absolute | Output is calibrated to be proportional to the difference between applied pressure and a fixed reference to perfect vacuum (absolute zero pressure). |
| Sealed gage ¹ | 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 (1.013 barA 14.7 psiA). Example: 100 psi sealed gage has a calibrated pressure range from 14.7 psi absolute to 114.7 psi absolute. (See Figure 3.) |

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

Heavy Duty Pressure Transducers

PX3 Series, 1 bar to 50 bar | 15 psi to 700 psi

Figure 3. Ratiometric Output Option AA for 100 psi, Absolute vs Sealed Gage

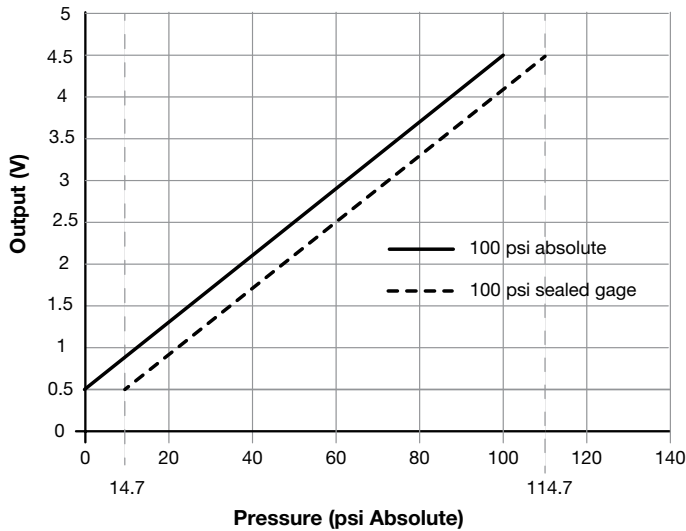


Table 4. Pressure Ratings

| bar | | | psi | | |
|--------------------|---------------|----------------|--------------------|---------------|----------------|
| Operating Pressure | Over-pressure | Burst Pressure | Operating Pressure | Over-pressure | Burst Pressure |
| 1 | 5 | 8 | 15 | 70 | 115 |
| 1.6 | 5 | 8 | 30 | 150 | 250 |
| 2 | 10 | 17 | 50 | 250 | 400 |
| 2.5 | 10 | 17 | 100 | 450 | 750 |
| 4 | 17 | 27 | 150 | 450 | 750 |
| 6 | 31 | 51 | 200 | 450 | 1150 |
| 8 | 31 | 51 | 250 | 450 | 1150 |
| 10 | 31 | 51 | 300 | 1000 | 1500 |
| 16 | 32 | 80 | 500 | 1000 | 1500 |
| 20 | 69 | 103 | 600 | 1000 | 1500 |
| 25 | 69 | 103 | 667 | 1000 | 1500 |
| 35 | 69 | 103 | 700 | 1000 | 1500 |
| 40 | 69 | 103 | - | - | - |
| 46 | 69 | 103 | - | - | - |
| 50 | 69 | 103 | - | - | - |

Diagnostics Mode

The PX3 Series diagnostics mode allows the device to indicate when internal or external faults occur. If an internal fault occurs, the output will rail to the preset lower or upper limit values shown in Figure 4 and Table 5.

External faults will result in the sensor's output exceeding those preset limits (lower or upper). (For example, if the external sensor ground (signal) were lost, the sensor output would exceed the upper rail of 97.5%.)

Figure 4. Analog Output with Diagnostics

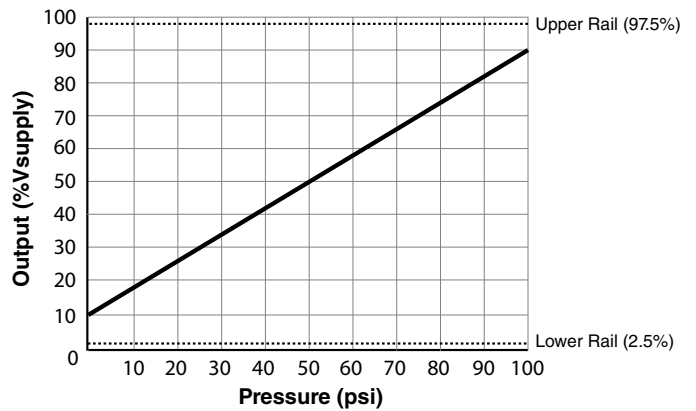


Table 5. Output Transfer Function Codes

| Fault Condition | Analog Diagnostic Rail |
|-----------------------------------|------------------------|
| EEPROM Corrupt | below lower rail |
| Sensor Bridge Open (any element) | above upper rail |
| Sensor Bridge Short (any element) | above upper rail |
| Low supply voltage | below lower rail |
| Loss of ground connection | above upper rail |

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Table 6. Environmental and Mechanical Specifications

| Characteristic | Parameter |
|---|--|
| Shock: threaded ports tube port | 100 G per MIL-STD-202G, Method 213B, Cond. F (at 25 °C [77 °F]) 100 G per MIL-STD-202F, Method 213B, and Condition C |
| Vibration: threaded ports tube port | 20 G sweep, 10 Hz to 2000 Hz (at 25 °C [77 °F]) 10 Hz to 55 Hz, 2 mm displacement, tested as per IEC 60068-2-6; Test FC. (at 25°C [77°F]) |
| Ingress protection: Metri-Pack 150 electrical connector cable harness electrical connector | IP67 IP69K |
| Ambient humidity | 0 %RH to 95 %RH, non-condensing |
| External freeze/thaw resistance | >6 cycles from -30 °C to 50 °C [-22 °F to 122 °F] |
| Wetted materials: threaded ports _____ tube port _____ braze filler _____ internal media seal _____ sensing element and substrate _____ adhesives _____ | brass C36000 (lead (Pb) content: 3.7% max.) copper UNS C12200 (lead (Pb) free) silver and copper alloy seal material as required by the application (see seal material media compatibility options below) alumina, glass, silicon epoxy |
| Internal seal material media compatibility ¹ : HNBR (option H) silicone (option S) | refrigerants, petroleum oils, lubricants air, water, hydraulic fluids |
| Other materials: Metri-Pack 150 electrical connector external O-ring seal on G1, M1 ports | PBT 30% GF nitrile (-30 °C to 125 °C [-22 °F to 257 °F]) |

¹ Honeywell can assist with selecting suitable seal material for the media based on the seal manufacturer's recommendation. The customer should test the compatibility with the media to ensure that it is correct for the application.

CAUTION PRODUCT DAMAGE

- 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.)
- When using mating parts made of stainless steel, use a thread sealant with anti-seize properties to prevent thread galling. Ensure the sealant is rated for the application.
- Use appropriate tools (such as an open ended wrench or deep well socket) to install transducers.
- Always hand-start transducers into the hole to prevent cross threading and damage.
- Ensure that torque is not applied to the electrical connector.
- 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.

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

CAUTION PRODUCT DAMAGE TO TUBE PORT

Ensure that the temperature of the brass port and plastic connector is maintained below 125 °C during flame brazing. Exposure to temperatures higher than 125 °C can cause permanent product damage and can compromise ingress protection leading to short circuits.

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

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Figure 5. Nomenclature and Order Guide

For example, **PX3AN1BS150PAAAX** defines a PX3 Series Heavy Duty Pressure Transducer, Metri-Pack 150, standard (UL V-0) electrical connector type, 1/4-18 NPT pressure port type, brass housing body, silicone: -40 °C to 125 °C [-40 °F to 257 °F] seal material and temperature range, 150 psi pressure range, absolute pressure reference, ratiometric: 0.5 Vdc to 4.5 Vdc output transfer function, no special

PX3 A N1 B S 150P A A X

Series

PX3 Heavy Duty Pressure Transducer¹

Electrical Connector Type²

A Metri-Pack 150, Standard (UL V-0)³

E PVC Cable: 1 m [3.2 ft]⁴
-40 °C to 100 °C
[-40 °F to 212 °F]

F PVC Cable: 2 m [6.6 ft]⁴
-40 °C to 100 °C³
[-40 °F to 212 °F]

M XLPE Cable: 1 m [3.2 ft]⁴
-40 °C to 125 °C
[-40 °F to 257 °F]

N XLPE Cable: 2 m [6.6 ft]⁴
-40 °C to 125 °C³
[-40 °F to 257 °F]

Pressure Port Type⁵

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

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

M1 M12 x 1.5
(ISO 6149-3)

N1 1/4-18 NPT

N2 1/8-27 NPT

T1 Tube

Housing Body Material

B Brass (C36000)

Special

X

Output Transfer Function

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

DA Ratiometric, 5.0 V: 10% to 90% Vs (diagnostics on)⁶

AC Ratiometric, 3.3 V: 10% to 90% Vs

DC Ratiometric, 3.3 V: 10% to 90% Vs (diagnostics on)⁶

Pressure Reference

A Absolute

S Sealed gage⁷

Pressure Range³


| | bar | psi |
|-------------|---------|---------------------|
| 001B | 1 bar | 015P 15 psi |
| 1.6B | 1.6 bar | 030P 30 psi |
| 002B | 2 bar | 050P 50 psi |
| 2.5B | 2.5 bar | 100P 100 psi |
| 004B | 4 bar | 150P 150 psi |
| 006B | 6 bar | 200P 200 psi |
| 008B | 8 bar | 250P 250 psi |
| 010B | 10 bar | 300P 300 psi |
| 016B | 16 bar | 500P 500 psi |
| 020B | 20 bar | 600P 600 psi |
| 025B | 25 bar | 667P 667 psi |
| 035B | 35 bar | 700P 700 psi |
| 040B | 40 bar | |
| 046B | 46 bar | |
| 050B | 50 bar | |

Seal Material and Temperature Range^{2,8}

H HNBR (Hydrogenated Nitrile Butadiene Rubber):
-30 °C to 125 °C [-22 °F to 257 °F] (50 hr at 135 °C [257 °F])

S Silicone: -40 °C to 125 °C [-40 °F to 257 °F]

Mating Connector³



¹ Not all catalog listing combinations are shown. Custom products are available. Please contact Honeywell.

² Custom configurations such as varied cable lengths, end mating connectors, different O-ring materials, and different pressure ranges are available.

³ Metri-Pack 150 mating connectors with shielded cable and 22 AWG wire are available from Honeywell. Order part no. 3685301 for 1 m [9.8 ft] cable length and part no. 3685302 for 3 m [3.2 ft] cable length.

⁴ PVC Flame Retardant (FR) type cable is FT1 rated per IEC60332-1; XLPE non-flame retardant cable is FT2 rated per IEC60332-1.

⁵ See Table 5 for pressure port materials.

⁶ See page 3 for Diagnostics Mode information.

⁷ Sealed gage option only available in pressure ranges at or above 8 bar | 100 psi.

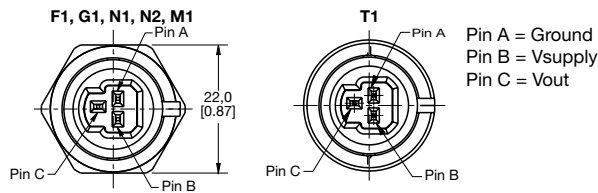
⁸ See Table 5 for seal material media compatibility.

Heavy Duty Pressure Transducers

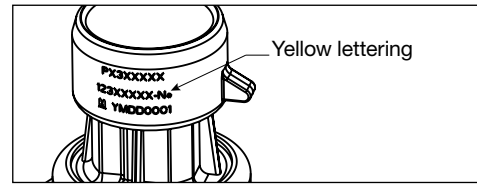
PX3 Series, 1 bar to 50 bar | 15 psi to 700 psi

Figure 6. Metri-Pack Mounting Dimensions (For reference only. mm/[in].)

Pinout

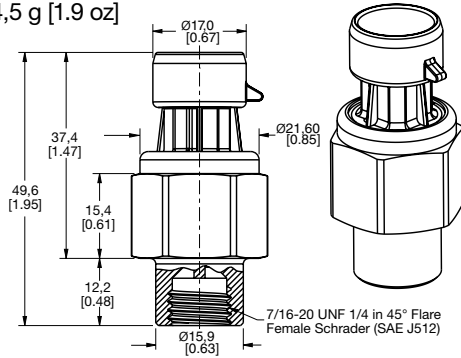


General product marking



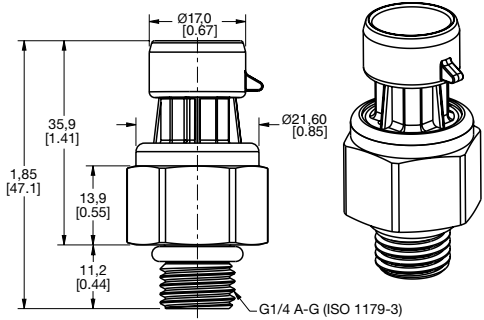
F1: 7/16-20 UNF 1/4 inch 45° Flare Female Schrader (SAE J512)

Seal: 45° cone
 Mating geometry: SAE J512
 Installation torque: 17 N m [12.5 ft-lb]
 Weight: 54,5 g [1.9 oz]



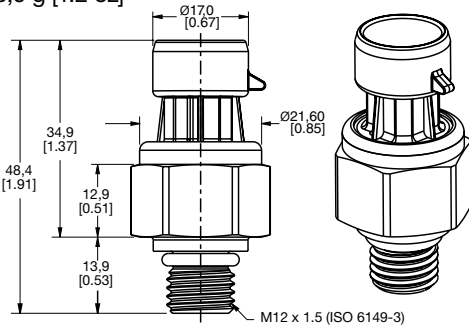
G1: G1/4 A-G (ISO 1179-3)

Seal: nitrile O-ring (included)
 Mating geometry: ISO 1179-1
 Installation torque: 50 N m [36.9 ft-lb]
 Weight: 35,1 g [1.2 oz]



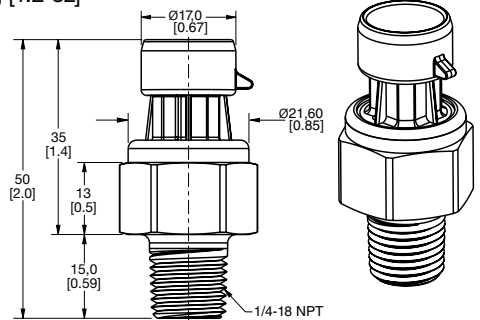
M1: M12 x 1.5 (ISO 6149-3)

Seal: nitrile O-ring (included)
 Mating geometry: ISO 6149-1
 Installation torque: 25 N m [18.4 ft-lb]
 Weight: 33,9 g [1.2 oz]



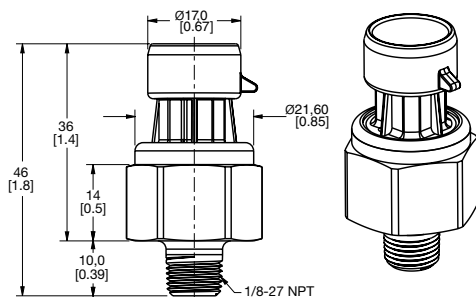
N1: 1/4-18 NPT

Seal: Pipe thread
 Mating geometry: ANSI B1.20.1
 Installation torque: Two to three turns from finger tight
 Weight: 35,1 g [1.2 oz]



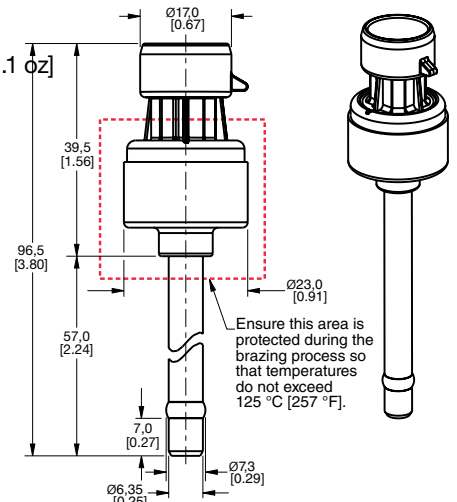
N2: 1/8-27 NPT

Seal: Pipe thread
 Mating geometry: ANSI B1.20.1
 Installation torque: Two to three turns from finger tight
 Weight: 31,2 g [1.1 oz]



T1: Tube

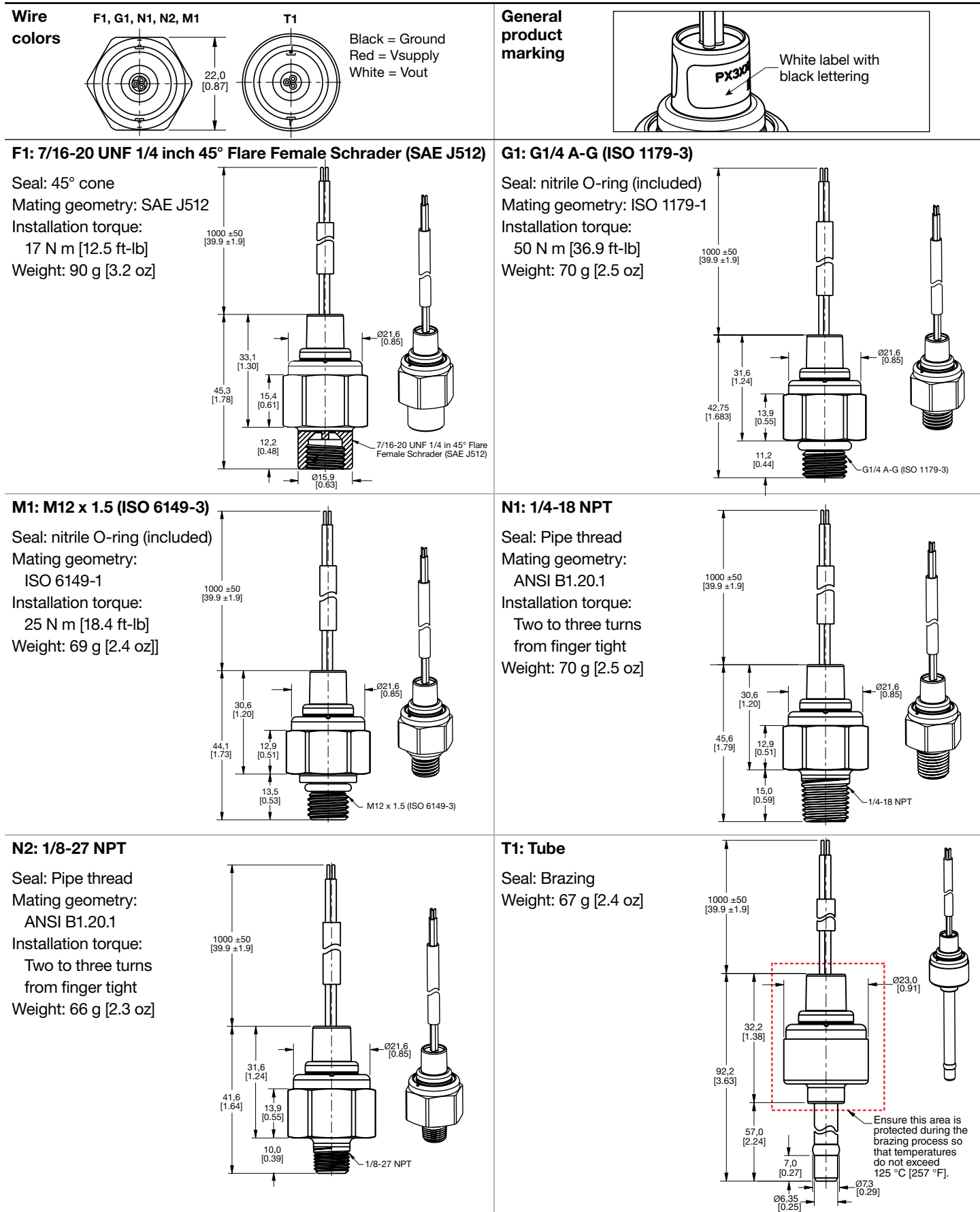
Seal: Brazing
 Weight: 32 g [1.1 oz]



Heavy Duty Pressure Transducers

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Figure 7. Cable Harness Mounting Dimensions Shown by Pressure Port Type (For reference only. mm/[in.])



ADDITIONAL INFORMATION

The following associated literature is available on the Honeywell web site at sensing.honeywell.com:

- Product line guide
- Product range guide
- Product installation instructions
- Application notes:
 - Heavy Duty Pressure Transducers, PX2 Series and PX3 Series
 - PX2 Series and PX3 Series Heavy Duty Pressure Transducers for Potential Use in Industrial Refrigeration
 - PX2 Series and PX3 Series Heavy Duty Pressure Transducers for Potential Use in Industrial HVAC/R Applications
- Technical notes:
 - Total Error Band Specification for Honeywell Heavy Duty Pressure Transducers, PX2 Series and PX3 Series
 - Media Compatibility for Honeywell Heavy Duty Pressure Transducers, PX2 Series and PX3 Series
- CAD models

⚠ 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.

⚠ WARNING **MISUSE OF DOCUMENTATION**

- The information presented in this datasheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

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.**

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.

For more information

To learn more about Honeywell's sensing and switching products, call 1.800.537.6945, visit sensing.honeywell.com, or e-mail inquiries to info.sc@honeywell.com

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9680 Old Bailes Road
Fort Mill, SC 29707
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