

MLH Series

All Metal Pressure Sensors



DESCRIPTION

MLH Series pressure sensors combine Application Specific Integrated Circuit (ASIC) technology with a media isolated, metal diaphragm design. This digitally compensated sensor offers value and performance, making it the ideal pressure sensing solution for demanding applications. Fully temperature compensated, calibrated and amplified, the MLH is available in 50 psi to 8,000 psi pressure ranges.

MLH sensors deliver $\pm 0.25\%$ full scale accuracy Best Fit Straight Line (BFSL) and as low as 2% total error over a temperature range of $-40\text{ }^{\circ}\text{C}$ to $125\text{ }^{\circ}\text{C}$ [$-40\text{ }^{\circ}\text{F}$ to $257\text{ }^{\circ}\text{F}$]. Industry standard connectors and process ports are offered for enhanced reliability and user flexibility.

FEATURES

- All metal wetted parts for use in wide variety of fluid applications
- No internal elastomeric seals mean no o-ring compatibility issues
- Amplified outputs eliminate cost of external amplifiers
- Input reverse voltage protection guards against mis-wiring
- Less than 2 ms response time provides accurate, high speed measurement
- Rated IP65 or better for protection from harsh environments

The MLH has six standard output options:

- A. 0.5 Vdc to 4.5 Vdc ratiometric from 5 Vdc excitation
- B. 4 mA to 20 mA
- C. 1 Vdc to 6 Vdc regulated
- D. 0.25 Vdc to 10.25 Vdc regulated
- E. 0.5 Vdc to 4.5 Vdc regulated
- G. 1 Vdc to 5 Vdc regulated

POTENTIAL APPLICATIONS

- Compressors
- Refrigeration and HVAC/R
- General industrial
- General hydraulics
- Multiple transportation applications including braking and alternate fuels
- Medical

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Table 1. Pressure Range Specifications¹ (At 25 °C [77 °F] and at rated excitation unless otherwise specified.)

| psi | | | | | | | | | | | | |
|----------------|-----|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| Pressure | 50 | 100 | 150 | 200 | 250 | 300 | 500 | 1000 | 2000 | 3000 | 5000 | 8000 |
| Proof pressure | 150 | 300 | 450 | 600 | 750 | 900 | 1500 | 2000 | 4000 | 6000 | 7500 | 12000 |
| Burst pressure | 500 | 1000 | 1500 | 2000 | 2500 | 3000 | 5000 | 10000 | 20000 | 30000 | 30000 | 30000 |
| bar | | | | | | | | | | | | |
| Pressure | 6 | 10 | 16 | 25 | 40 | 60 | 100 | 160 | 250 | 350 | 500 | 550 |
| Proof pressure | 18 | 30 | 48 | 75 | 80 | 120 | 200 | 320 | 500 | 700 | 750 | 825 |
| Burst pressure | 60 | 100 | 160 | 250 | 400 | 600 | 1000 | 1600 | 2068 | 2068 | 2068 | 2068 |

Note:

1. Comparable metric units follow same proof and burst specifications.

Table 2. Physical and Environmental Specifications

| Parameter | Characteristic |
|--|--|
| Material in contact with media | port: stainless steel 304L; diaphragm: Haynes 214 alloy |
| Housing material | black plastic – Amodel AS-4133 HS – PPA |
| Weight | 57.0 g [2.0 oz] (typical for Delphi Metri-Pack 150 and 1/8 NPT port) |
| Shock | 100 g peak [11 ms] |
| Vibration | MIL-STD-810C, Figure 514.2-5, Curve AK, Table 514.2-V, Random Vibration Test [overall g rms = 20.7 min.] |
| Compensated and operating temperature range: 0.5 Vdc to 4.5 Vdc ratiometric output all regulated and 4 mA to 20 mA outputs | -40 °C to 125 °C [-40 °F to 257 °F] -40 °C to 125 °C [-40 °F to 257 °F] See Figures 2 and 3 for operating area details. |
| Storage temperature range | -40 °C to 125 °C [-40 °F to 257 °F] |
| Approvals | UL Component Recognition for USA and Canada: File No. E258956 |

Table 3. Electrical Specifications (At 25 °C [77 °F] and at rated excitation unless otherwise specified.)

| Parameter | Ratiometric (A) | Current (B) | Regulated (C) | Regulated (D) | Regulated (E) | Regulated (G) |
|------------------------|------------------------------------|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------|---------------------------------|
| Zero output | 0.5 Vdc | 4 mA | 1 Vdc | 0.25 Vdc | 0.5 Vdc | 1 Vdc |
| Full scale span (FSS) | 4 Vdc (0.5 Vdc to 4.5 Vdc) | 16 mA (4 mA to 20 mA) | 5 Vdc (1 Vdc to 6 Vdc) | 10 Vdc (0.25 Vdc to 10.25 Vdc) | 4 Vdc (0.5 Vdc to 4.5 Vdc) | 4 Vdc (1 Vdc to 5 Vdc) |
| Excitation | 5 Vdc (6 Vdc max.) ¹ | 9.5 Vdc to 30 Vdc ² | 8 Vdc to 30 Vdc ² | 14 Vdc to 30 Vdc ² | 7 Vdc to 30 Vdc ² | 8 Vdc to 30 Vdc ² |
| Supply current | 4 mA typ. (8 mA max.) | N/A | 5 mA typ. (17 mA max.) | 5 mA typ. (17 mA max.) | 5 mA typ. (17 mA max.) | 5 mA typ. (17 mA max.) |
| Source (nominal) | 1 mA | N/A | 1 mA | 1 mA | 1 mA | 1 mA |
| Sink (nominal) | 1 mA at zero output | N/A | 1 mA at zero output | 1 mA at zero output | 1 mA at zero output | 1 mA at zero output |
| Supply rejection ratio | 90 dB | 90 dB | 90 dB | 90 dB | 90 dB | 90 dB |
| Output impedance | 25 Ω max. | N/A | 25 Ω max. | 25 Ω max. | 25 Ω max. | 25 Ω max. |

Notes:

1. Maintains ratiometricity at 5 ±0.25 Vdc excitation. Product can tolerate 6 Vdc excitation without damage.
2. See Figures 2 and 3 for more information regarding maximum excitation voltage vs. operating temperature.

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Table 4. Performance Specifications (At 25 °C [77 °F] and at rated excitation unless otherwise specified.)

| Parameter | Characteristic |
|---|--|
| Response time | <2 ms |
| Accuracy ¹ : ≥100 psi <100 psi | ±0.25% FSS ±0.50% FSS |
| Total error band ² : Gage: <300 psig ≥300 psig Seal gage: ≥300 psig Seal gage <u>without</u> L, M, P termination: 100 psig to 299 psig (-40 °C to 85 °C [-40 °F to 185 °F]) 100 psig to 299 psig (>85 °C to 125 °C [>185 °F to 257 °F]) ≥300 psig (-40 °C to 125 °C [-40 °F to 257 °F]) Seal gage <u>with</u> L, M, P termination: 100 psig to 299 psig (-40 °C to 65 °C [-40 °F to 149 °F]) 100 psig to 299 psig (>65 °C to 125 °C [>149 °F to 257 °F]) ≥300 psig (-40 °C to 65 °C [-40 °F to 149 °F]) ≥300 psig (>65 °C to 125 °C [>149 °F to 257 °F]) | ±3% FSS ±2% FSS ±2% FSS ±3% FSS ±10% FSS ±2% FSS ±10% FSS ±15% FSS ±5% FSS ±15% FSS |

Notes:

1. Includes pressure non-linearity (BFSL), pressure hysteresis and non-repeatability. Thermal errors are not included.
2. Includes zero error, span error, thermal effect on zero, thermal effect on span, thermal hysteresis, pressure-non-linearity, pressure hysteresis and non-repeatability.

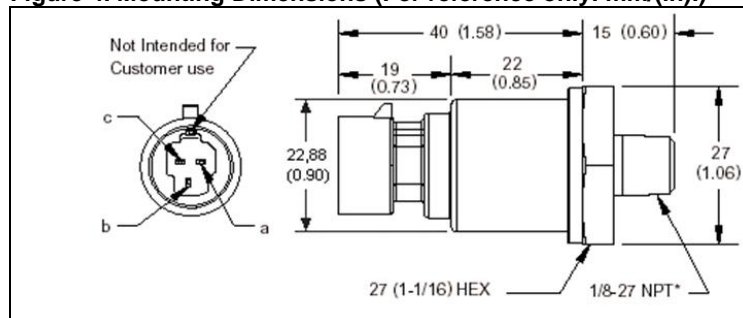
Figure 2. Operating and Temperature Compensated Area for All Regulated Output Options



Figure 3. Operating and Temperature Compensated Area for 4 mA to 20 mA Output



Figure 4. Mounting Dimensions (For reference only. mm/(in.))



Pin and Wire Codes (Option B – Packard)

| Pin | Voltage | Current |
|-----|--------------|---------------|
| a | + excitation | + excitation |
| b | output | - excitation |
| c | common | no connection |

A variety of pressure ports and electrical termination connection options are available. Refer to the “How to Order” on previous page for possible combinations. Contact your Honeywell representative for details.

Nomenclature and Order Guide¹

| <p>Series _____ MLH _____</p> <p>Pressure Range</p> <table border="1"> <thead> <tr> <th>psi</th> <th>bar</th> </tr> </thead> <tbody> <tr><td>050</td><td>006</td></tr> <tr><td>100</td><td>010</td></tr> <tr><td>150</td><td>016</td></tr> <tr><td>200</td><td>025</td></tr> <tr><td>250</td><td>040</td></tr> <tr><td>300</td><td>060</td></tr> </tbody> </table> <p>Unit</p> <p>P = psi B = bar</p> <p>Measurement Type</p> <p>G = Gage (psi) S = Sealed gage (psi)⁴</p> <p>Electrical Termination</p> <p>B = Delphi Metri-Pack 150 C = Hirschmann (mates with G4W1F) D = M12 x 1 (Brad Harrison micro) G = DIN 43650-C, 8 mm-male H = Amp Superseal 1.5² L = Cable (1 m) M = Cable (3 m) P = Flying leads (20 AWG – 6 in) T = Deutsch DTM04-3P (integral)</p> <p><i>(Mating connectors are not supplied.)</i></p> | psi | bar | 050 | 006 | 100 | 010 | 150 | 016 | 200 | 025 | 250 | 040 | 300 | 060 | <p>Output Signal</p> <p>A = 0.5 Vdc to 4.5 Vdc ratiometric from 5 Vdc excitation B = 4 mA to 20 mA C = 1 Vdc to 6 Vdc regulated D = 0.25 Vdc to 10.25 Vdc regulated E = 0.5 Vdc to 4.5 Vdc regulated G = 1 Vdc to 5 Vdc regulated</p> <p>Pressure Connection</p> <p>01 = 1/4-18 NPT 02 = M12 x 1.5 (ISO 6149)³ 03 = M14 x 1.5 (ISO 6149)³ 04 = 3/8-24 UNF (SAE-3 O-ring boss)³ 05 = M18 x 1.5 (ISO 6149)³ 06 = 1/8 in-27 NPT 07 = 1/2 in-20 UNF (SAE-5 O-ring boss)³ 08 = M10 x 1 (ISO 6149)³ 09 = 1/4 in SAE female Schrader (7/16-20 UNF-2B internal thread) 10 = 7/16-20 UNF (SAE-4 O-ring boss)³ 11 = 1/2 in NPT 12 = 9/16-18 UNF (SAE-6 O-ring boss)³ 13 = R 1/4-19 BSPT (ISO 7-1 tapered thread) 14 = G 1/4-19 (DIN 3852-2)³ 15 = G 1/8 with O-ring groove³ 16 = M16 x 1.5 (ISO 6149)³ 17 = G 1/4 with O-ring groove³ 18 = G 1/8 (DIN 3852-2)³ 19 = R 1/8-28 BSPT (ISO 7-1 tapered thread) 20 = M20 x 1.5 (ISO 6149)³ 21 = 1/2-20 (SAE J514)³</p> | <p>Notes:</p> <ol style="list-style-type: none"> Not all combinations are available. Minimum quantity orders apply. Additional pressure ranges, port styles and special calibration versions are available. Contact your local sales representative for assistance. Available with "A" output only. Supplied with O-ring. Sealed gage devices are not available for pressure ranges below 100 psi. |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|---|
| psi | bar | | | | | | | | | | | | | | | |
| 050 | 006 | | | | | | | | | | | | | | | |
| 100 | 010 | | | | | | | | | | | | | | | |
| 150 | 016 | | | | | | | | | | | | | | | |
| 200 | 025 | | | | | | | | | | | | | | | |
| 250 | 040 | | | | | | | | | | | | | | | |
| 300 | 060 | | | | | | | | | | | | | | | |

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet 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

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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.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

E-mail: info.sc@honeywell.com

Internet: www.honeywell.com/sensing

Phone and Fax:

| | |
|---------------|---|
| Asia Pacific | +65 6355-2828 +65 6445-3033 Fax |
| Europe | +44 (0) 1698 481481 +44 (0) 1698 481676 Fax |
| Latin America | +1-305-805-8188 +1-305-883-8257 Fax |
| USA/Canada | +1-800-537-6945 +1-815-235-6847 +1-815-235-6545 Fax |

Sensing and Control
Honeywell
1985 Douglas Drive North
Golden Valley, MN 55422

www.honeywell.com/sensing

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