

## 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 and output short circuit protections guard 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 seven standard output options:

- A. 0.5 Vdc to 4.5 Vdc ratiometric output from 5 Vdc excitation
- B. 4 mA to 20 mA current from 9.5 Vdc to 30 Vdc excitation
- C. 1.0 Vdc to 6.0 Vdc regulated output from 8 Vdc to 30 Vdc excitation
- D. 0.25 Vdc to 10.25 Vdc regulated output from 14 Vdc to 30 Vdc excitation
- E. 0.5 Vdc to 4.5 Vdc regulated output from 7 Vdc to 30 Vdc excitation
- F. 0 mV to 50 mV from 5 Vdc excitation
- G. 1 Vdc to 5 Vdc output from 8 Vdc to 30 Vdc excitation

#### POTENTIAL APPLICATIONS

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

# MLH Series

**Table 1. Pressure Range Specifications<sup>1</sup> (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	stainless steel 300 series and Haynes 214 alloy, Hastelloy C22 sensor available (contact factory)
Housing material	black plastic – Amodel AS-4133 HS – PPA
Weight	57.0 g [2.0 oz] (typical for Packard MetriPak 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, operating and storage temperature range	-40 °C to 125 °C [-40 °F to 257 °F]

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

Parameter	Ratiometric (A) <sup>1</sup>	Current (B)	Regulated (C)	Regulated (D)	Regulated (E)	mV (F)	Regulated (G)
Zero output	0.5 Vdc	4.0 mA	1.0 Vdc	0.25 Vdc	0.5 Vdc	0 ±2.5 mV	1.0 Vdc
Full scale span (FSS)	4.0 Vdc (0.5 to 4.5 Vdc)	16 mA (4 to 20 mA)	5.0 Vdc (1.0 to 6.0 Vdc)	10.0 Vdc (0.25 to 10.25 Vdc)	4.0 Vdc (0.5 to 4.5 Vdc)	50 mV (0 to 50 mV)	4.0 Vdc (1.0 to 5.0 Vdc)
Excitation	5 Vdc (6.0 Vdc max.)	9.5 Vdc to 30.0 Vdc	8.0 Vdc to 30.0 Vdc	14.0 Vdc to 30.0 Vdc	7.0 Vdc to 30.0 Vdc	5.0 Vdc (6.0 Vdc max.)	8.0 Vdc to 30.0 Vdc
Supply current	4.0 mA typical (8 mA max.)	N/A	5.0 mA typical (17 mA max.)	5.0 mA typical (17 mA max.)	5.0 mA typical (17 mA max.)	8.0 mA typical (17 mA max.)	5.0 mA typical (17 mA max.)
Source (nominal)	1.0 mA	N/A	1.0 mA	1.0 mA	1.0 mA	N/A	1.0 mA
Sink (nominal)	1.0 mA at zero output	N/A	1.0 mA at zero output	1.0 mA at zero output	1.0 mA at zero output	N/A	1.0 mA at zero output
Supply rejection ratio	90 db	90 db	90 db	90 db	90 db	N/A	90 db
Output impedance	25 Ω max.	N/A	25 Ω max.	25 Ω max.	25 Ω max.	2000 Ω	25 Ω max.

**Note:**

1. Maintains ratiometricity at 5 ±0.25 Vdc excitation. Product can tolerate 6 Vdc excitation without damage.

# All Metal Pressure Sensors

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

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

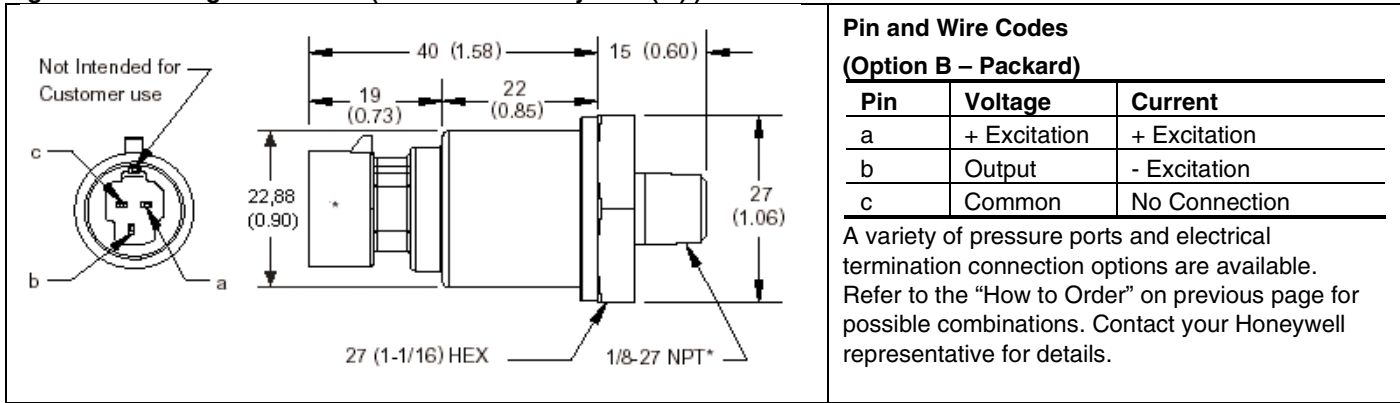
**Notes:**

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 1. Nomenclature and Order Guide<sup>1</sup>**

<p><b>Series</b> ——— MLH 500 P S B 06 B</p> <p><b>Pressure Range</b></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>050</td></tr> <tr><td>500</td><td>060</td></tr> <tr><td>1000</td><td>060</td></tr> </tbody> </table> <p><b>Unit</b></p> <p>P = psi B = bar</p> <p><b>Reference</b></p> <p>G = Gage (psi) S = Sealed Gage (psi)<sup>5</sup></p> <p><b>Electrical Termination</b></p> <p>B = Packard MetriPak 150 C = Hirschman (mates with G4W1F) D = M12 x 1 (Brad Harrison micro) G = DIN 43650-C, 8 mm-male H = Amp Superseal 1.5<sup>2</sup> L = Cable (1 meter) M = Cable (3 meter) P = Flying Leads (20 AWG – 6 in) T = Deutsch DTM04-3P (integral) <i>(Mating connectors are not supplied.)</i></p>	PSI	BAR	050	006	100	010	150	016	200	025	250	040	300	050	500	060	1000	060	<p><b>Output</b></p> <p>A = 0.5 Vdc to 4.5 Vdc Ratiometric B = 4 mA to 20 mA Current Loop 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 F = 0 mV to 50 mV<sup>3</sup> G = 1 Vdc to 5 Vdc Regulated</p> <p><b>Pressure Connection</b></p> <p>01 = 1/4-18 NPT 02 = M12 x 1.5 (ISO 6149)<sup>4</sup> 03 = M14 x 1.5 (ISO 6149)<sup>4</sup> 04 = 3/8-24 UNF (SAE-3 O-Ring Boss)<sup>4</sup> 05 = M18 x 1.5 (ISO 6149)<sup>4</sup> 06 = 1/8 in-27 NPT 07 = 1/2 in-20 UNF (SAE-5 O-Ring Boss)<sup>4</sup> 08 = M10 x 1 (ISO 6149)<sup>4</sup> 09 = 1/4 in SAE Female Schrader (7/16-20 UNF-2B Internal Thread) 10 = 7/16-20 UNF (SAE-4 O-Ring Boss)<sup>4</sup> 11 = 1/2 in NPT 12 = 9/16-18 UNF (SAE-6 O-Ring Boss)<sup>4</sup> 13 = PT 1/4-19 BSP Tapered Thread 14 = G 1/4-19 (DIN 3852-2)<sup>4</sup> 15 = G 1/8 with O Ring Groove<sup>4</sup> 16 = M16 x 1.5 (ISO 6149)<sup>4</sup> 17 = G 1/4 with O-Ring Groove<sup>4</sup> 18 = G 1/8 (DIN 3852-2)<sup>4</sup> 19 = PT 1/8-28 BSP Tapered Thread 20 = M20 x 1.5 (ISO 6149)<sup>4</sup> 21 = 1/2-20 (SAE J514)<sup>4</sup></p>	<p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. 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.</li> <li>2. Available with "A" output only.</li> <li>3. Available with "L," "M" or "P" electrical terminations only.</li> <li>4. Supplied with O-ring.</li> <li>5. Sealed gage devices are not available for ranges below 100 psi.</li> </ol>
PSI	BAR																			
050	006																			
100	010																			
150	016																			
200	025																			
250	040																			
300	050																			
500	060																			
1000	060																			

**Figure 2. 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.

**⚠ 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**

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. 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 it 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 we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer 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 printing. However, we assume no responsibility for its use.

**⚠ WARNING**

**PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

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

**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:

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