

## All Metal Pressure Sensors

### MLH Pressure Sensors

### MLH Series

#### FEATURES

- All metal wetted parts – for use in wide variety of fluid applications
- No Internal elastomeric seals – no o-ring compatibility issues
- Amplified outputs – eliminates cost of external amplifiers
- Reverse polarity and overvoltage protection – protection against reversed excitation
- Less than 500  $\mu$ s response time – accurate high speed measurement
- Rated IP65 or better – protection from harsh environments
- Exceeds CE heavy industrial EMC – can be used in areas of high RFI/EMI

#### TYPICAL APPLICATIONS

- Diesel Engines
- Refrigeration and HVAC/R
- General industrial
- General hydraulics
- Off road vehicles
- Braking systems
- Natural gas vehicles



Model MLH pressure sensors combine the latest in Application Specific Integrated Circuit (ASIC) technology with proven media isolated metal diaphragm design. This digitally compensated sensor offers an unparalleled value and performance combination 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.

The MLH has six standard output options:

- 0.5 Vdc to 4.5 Vdc ratiometric output from 5 Vdc excitation
- 4 mA to 20 mA current from 9.5 Vdc to 35 Vdc excitation
- 1.0 Vdc to 6.0 Vdc regulated output from 8 Vdc to 35 Vdc excitation
- 0.25 Vdc to 10.25 Vdc regulated output from 14 Vdc to 35 Vdc excitation
- 0.5 Vdc to 4.5 Vdc regulated output from 7 Vdc to 35 Vdc excitation
- 0 mV to 50 mV from 5 Vdc excitation

MLH sensors deliver  $\pm 0.25$  % full scale accuracy Best Fit Straight Line (BFSL) and 1 % Total Error over a temperature range of -40 °C to 125 °C [-40 °F to 257 °F]. Industry standard, field proven connectors and process ports are offered for high reliability and user flexibility.

#### **⚠ 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 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.**

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*MLH Series*

## SPECIFICATIONS

### Pressure Ranges

Units (psi)	psiG	psiG	psiG	psiG	psiG	psiS	psiS	psiS	psiS	psiS	psiS	psiS
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	10000	16000
Burst Pressure	500	1000	1500	2000	2500	3000	5000	10000	20000	30000	30000	30000

Units (bar)	barG	barG	barG	barS								
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	1000	1100
Burst Pressure	60	100	160	250	400	600	1000	1600	2068	2068	2068	2068

(Comparable metric units follow same proof and burst specifications)

### Physical

Material in contact with media	Stainless steel and Haynes 214 alloy (all wetted materials are equivalent or better than 300 series stainless steel)
Weight	57.0 gm [2.0 oz]

### Environmental

Shock	50 g's peak [5 milliseconds], 100 g's peak [11 ms]
Vibration	Figure 514.2-5, Curve AK, Table 514.2-V, Random Vibration Test [Overall g rms = 20.7 minimum]

### Electrical

	Ratiometric (A)	Current (B)	Regulated (C)	Regulated (D)	Regulated (E)	milliVolt (F)
Zero Output	0.5 Vdc	4.0 mA	1.0 Vdc	0.25 Vdc	0.5 Vdc	0 +/- 2.5 mV
Full Scale Output <sup>1</sup>	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)
Excitation	5 Vdc ± 250 mV (6.0 Vdc max.)	9.5 Vdc to 35.0 Vdc	8.0 Vdc to 35.0 Vdc	14.0 Vdc to 35.0 Vdc	7.0 Vdc to 35.0 Vdc	5.0 Vdc (6.0 Vdc Max.)
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.)	4.0 mA typical (8 mA max.)	8.0 mA typical (17 mA max.)
Source (nominal)	1.0 mA	N/A	1.0 mA	1.0 mA	1.0 mA	N/A
Sink (nominal)	1.0 mA @ zero output	N/A	1.0 mA @ zero output	1.0 mA @ zero output	1.0 mA @ zero output	N/A
Supply Rejection Ratio	90 db	90 db	90 db	90 db	90 db	N/A
Output Impedance	25 Ohm max.	N/A	25 Ohm max.	25 Ohm max.	25 Ohm max.	≥ 2000 Ohms

**Notes:** 1. All specifications are measured at 25 °C [77 °F] and at rated excitation unless otherwise specified.

### Performance

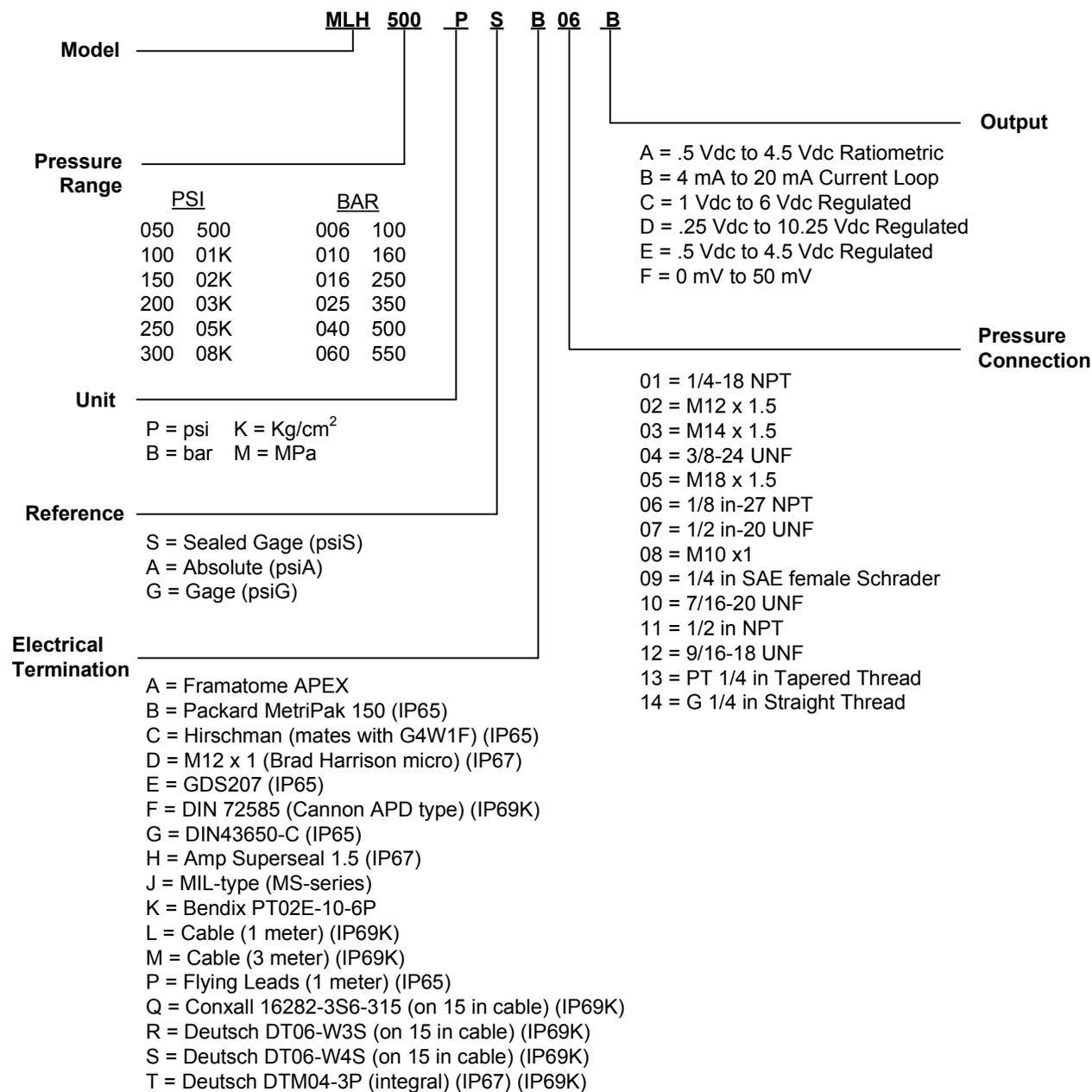
Response Time	< 500 μs
EMI/RFI	Exceeds CE heavy industrial [30 v/m radiated 150 kHz to 1 GHz]
Accuracy	± 0.25 % F.S.O. best fit straight line. Includes: non-linearity, hysteresis, non-repeatability. Thermal errors not included. 0.5 % < 100 psi
Total Error Band	±1 % Typical (+/- 2 % max.) F.S.O. Includes: zero offset error, span error, thermal effect on zero and thermal effect on span, non-linearity, hysteresis, non-repeatability
Compensated Operating and Storage Temperature Range	-40 °C to 125 °C [-40 °F to 257 °F]

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### HOW TO ORDER



**Note:** Not all combinations are available. Minimum quantity orders apply. Additional pressure ranges and special calibration versions are available contact your local sales representative for assistance.

## Installation Instructions for the MLH Series Pressure Sensors

ISSUE 1  
50010132

### **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.**

#### **GENERAL INFORMATION**

Sensors with pressure ranges less than 300 psi are vented to the atmosphere through a case vent hole that is protected with a vapor inhibiting material.

#### **PRESSURE OVERLOADS**

### **CAUTION**

#### **PRODUCT DAMAGE**

- Do not exceed the pressure overload rating.

**Failure to comply with these instructions may result in reduced life, or electrical failure.**

The MLH Series pressure sensors will withstand high overloads; however, if the overload rating is exceeded, the life of the MLH Series may be reduced and electrical failure may occur. Both static and dynamic overloads must be considered, particularly in hydraulic system applications. Hydraulic pressure fluctuations can have very high and very fast peak pressures, as in a water hammer effect.

An oscilloscope is recommended for determining if high-pressure transients exist in a system. If system pressure pulses are expected, choose a sensor with a pressure rating high enough to allow continuous operation at the highest expected pressure spikes.

A pressure 'snubber' may be used to reduce the peak pressure applied to the sensor. Snubbers may be obtained from the Mott Corp., Farmington, CT, USA (860) 747-6333. Catalog #4100-1/8-SS is recommended.

#### **MEDIA COMPATIBILITY**

### **CAUTION**

#### **PRODUCT DAMAGE**

- Use non-abrasive, chemically compatible media to prevent damage to diaphragm or port materials.

**Failure to comply with these instructions may result in product failure.**

The MLH Series pressure port and diaphragm is an assembly of Haynes 214 alloy and 304 stainless steel.

#### **INSTALLATION**

### **CAUTION**

#### **PRODUCT DAMAGE**

- Use a hex wrench for installation. Never apply torque to the connector housing or the body of the sensor.
- Do not subject the sensor to high temperatures from soldering, brazing, or welding of the system plumbing or operating environments above the specified maximum temperature.

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

Ratiometric voltage and mV output devices require a regulated 5.0 Vdc supply. All other versions can use an unregulated supply within the ranges noted under the excitation specifications. The power supply should be off while wiring.

#### **ELECTROMAGNETIC ENERGY/NOISE**

### **CAUTION**

#### **PRODUCT DAMAGE/ERRATIC OPERATION**

- Do not use in areas where electromagnetic energy may affect sensor operation.

**Failure to comply with these instructions may result in improper operation and/or product failure.**

The MLH Series has been rated for high immunity to electrical noise; however, care should be taken when used around high voltage sources that emit high levels of radiated electromagnetic energy like variable frequency motor drives, solenoids, radio transmitters and engine ignition systems. The use of shielded cable is also recommended.

#### **BENCH TEST**

For incoming inspection or sensor failure evaluation, connect the sensor to a dc voltage supply (off). The supply voltage should be set within the range specified for the model. Based on the sensors specified output, connect the output lead(s) to a digital dc or mA meter. With no pressure on the sensor, turn on the power supply and read the output signal on the voltmeter. The reading should correspond to the specification indicated for null offset. If not, check the connections, wire color code and the setting of the power supply.

#### **WIRING INSTRUCTIONS**

The wiring code for electrical connection is shown in Tables 2 and 3.

When using a connector, the use of the correct size wire is important to ensure environmental sealing. Fill all holes in the connector seal even if only two leads are used. Honeywell recommends using a crimping tool for crimping wires to the connector pins. Contact the individual connector manufacturer for mating connector wiring.

**TABLE 1. SPECIFICATIONS**

Parameter	Excitation	Signal Output
Ratiometric	5.0 Vdc ±0.25 Vdc	0.5 Vdc to 4.5 Vdc
Regulated	7.0 Vdc to 35 Vdc	0.5 Vdc to 4.5 Vdc
	8.0 Vdc to 35 Vdc	1.0 Vdc to 6.0 Vdc
	14.0 Vdc to 35 Vdc	0.25 Vdc to 10.25 Vdc
	7.0 Vdc to 30 Vdc	1 Vdc to 5 Vdc
Unamplified output	5.0 Vdc	0 mV to 50 mV
Current output	9.5 Vdc to 35 Vdc	4 mA to 20 mA with 25 Vdc excitation
Compensated operating and storage temperature	-40 °C to 125 °C [-40 °F to 257 °F]	
Weight	2 g	

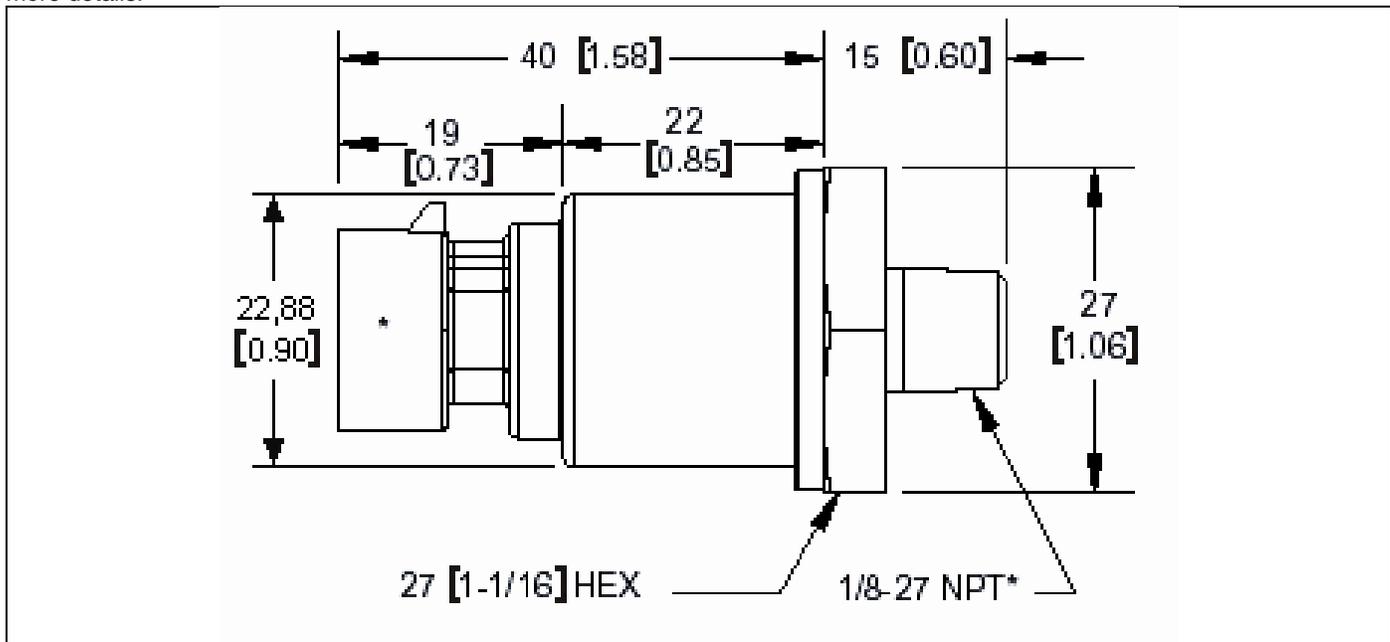
**TABLE 2. PRESSURE RANGES**

Units	psiG	psiG	psiG	psiG	psiG	psiS	psiS	psiS	psiS	psiS	psiS	psiS	psiS
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	

Units	barG	barG	barG	barS									
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	

**FIGURE 1. MOUNTING AND DIMENSIONAL DRAWING (For reference only mm [in].)**

A variety of pressure port and electrical termination connection options is available. Contact your Honeywell representative for more details.



**TABLE 3. VOLTAGE AND CURRENT OUTPUT MODELS WITH PIN ASSIGNMENTS**

Data Sheet Code	Connector Name	Sensor Back View	VOLTAGE OUTPUT (3-WIRE) MODELS Pin Assignments				CURRENT OUTPUT (2-WIRE) MODELS Pin Assignments			
			A	B	C	D	A	B	C	D
			1	2	3	4	1	2	3	4
B	Packard Metripack		+ Excitation	Output	Common	—	+ Excitation	- Excitation (return)	N/C	
C	Hirschmann G4W		N/C	Output	Common	+ Excitation	N/C	N/C	- Excitation (return)	+ Excitation
G	Din 43650 form C		+ Excitation	Common	N/C	Output	+ Excitation	- Excitation (return)	N/C	N/C
H	AMP 1.4 Superseal		Common	Output	+ Excitation	—	N/C	- Excitation (return)	+ Excitation	—
L, M or P	Cable Lead	Red = A White = B Black = C	+ Excitation	Output	Common	—	+ Excitation	- Excitation (return)	N/C	—
D	M12-1 Brad Harrison		+ Excitation	Common	Output	N/C	+ Excitation	- Excitation (return)	N/C	N/C
T	Deutsch DTM04-3P		+ Excitation	Common	Output	—	+ Excitation	- Excitation (return)	N/C	—

**TABLE 4. MILLIVOLT OUTPUT MODELS WITH PIN ASSIGNMENTS**

Data Sheet Code	Connector Name	Sensor Back View	(4-WIRE) MODELS Pin Assignments			
			A	B	C	D
			1	2	3	4
C	Hirschmann G4W		+ Signal	- Excitation	- Signal	+ Excitation
G	Din 43650 form C		+ Signal	- Excitation	- Signal	+ Excitation
L, M or P	Cable Lead	Red = A Green = B Black = C White = D	+ Excitation	+ Output	Common	- Output
D	M12-1 Brad Harrison		+ Signal	- Excitation	- Signal	+ Excitation