



# ULTRA-FAST AND PRECISE PRESSURE TRANSMITTERS

# SERIES M5HB

BANDWIDTH 50 KHZ / FOR USE UP TO 180 °C / ACCURACY 0,1 %FS

The Series M5 pressure transmitters, with their 0...50 kHz dynamic range and M5 pressure connection, are optimized both for dynamic (i.e. fast pressure pulsations at close proximity) as well as static pressure measurements. The sensor design enables good media compatibility and supports measurements at temperatures of up to 180 °C without cooling adapters.

### Electronics

The circuitry for the Series M5HB was specifically developed to take advantage of the high dynamic range of the M5 sensor head. The signal path remains entirely analog, although it is readjusted in real time by means of a high-precision digital compensation circuit. This ensures the full dynamic range of the sensor and the accuracy of the measurement signal are maintained across the entire 0...50 kHz bandwidth. With a temperature range of -40...+125 °C, the remote signal converter satisfies the exceptional demands associated with hostile environments; e.g., engine test benches. The sensor head alone (see the data sheet for the Series M5), i.e., without the remote signal converter, is available for those applications better served by a sensor with 80 mV output (@ 1 mA supply). Included with this configuration is a calibration card providing the user with actual test data taken from the sensor during factory calibration.

### Sensor technology

The Series M5 sensor incorporates a stable silicon sensor which is backside-soldered directly to a supporting element designed for excellent fluid dynamics. This construction eliminates the disadvantages of sealants, adhesives, separating membranes or capillary tubes in high temperature environments. The practically-flush connection to the measurement media is critical to the excellent dynamic range of 0...50 kHz. The micromechanical design delivers absolute measuring ranges of 3, 10 and 30 bar, overpressure protection of up to 5 times measuring range and effective isolation of mounting forces.

### Performance characteristics

- High operating temperature of the sensor head up to 180 °C
- Broad compensated temperature range, with a choice of either -20...125 °C or -40...180 °C
- Excellent dynamic response, up to 50 kHz (pulsation measurements)
- Insensitive to shock and vibration
- Extremely compact design, pressure connection: M5 x 0,5 fine thread
- Teflon FEP cable with IP67 ferrule, suitable for use on test benches
- Pressure ranges of 3 bar, 10 bar and 30 bar (absolute)



Series M5HB



Sensor Head

**Sensor head (1:1)**

**Series M5HB**

**ELECTRICAL CONNECTIONS**  
(shielded cables recommended)

Function	M12 A-coded	Binder 723
GND	1	1
+OUT	2	2
+Vcc	3	3
RS485A	4	4
RS485B	5	5
CASE	Thread	Thread

Recommended tightening torque 1,5...2,5 Nm

CE



## Specifications

Pressure ranges, absolute				
PAA	0...3	0...10	0...30	bar
Overpressure / burst pressure	15	50	90	bar

Intermediate ranges show the overpressure resistance for the next biggest range listed.

PAA: Absolute pressure. Zero at vacuum.

Accuracy <sup>1)</sup>	± 0,1 %FS
Total Error Band <sup>2)</sup> (choice of)	± 0,5 %FS @ -20 to +125 °C sensor temperature ± 1,0 %FS @ -40 to +180 °C sensor temperature
Operating Temperature of Sensor Head	-50...+180 °C
Operating Temperature of Electronics	-40...+125 °C
Temp. Coefficients for Amplifier Electronics	± 0,01 %/K max.

<sup>1)</sup> Linearity (best straight line), hysteresis and repeatability

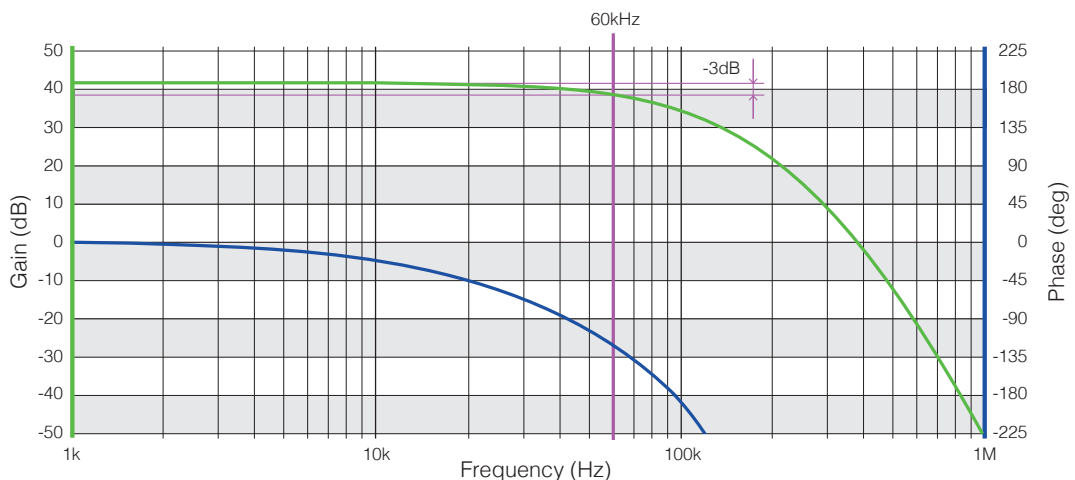
<sup>2)</sup> Accuracy and temperature error

Type	3-wire with RS485
Signal Output	0...10 V
Excitation	13...32 VDC
Load Resistance	> 5 kΩ
Limiting Frequency (-3 dB)	50 kHz min.
Power Consumption (off-load)	15 mA max.
Electrical Connections	M12 plug (5-pin), Binder 723 (5-pin)
Pressure Connection	Metric fine thread: M5 x 0,5 male
Cable (between sensor and electronics)	1,5 m FEP cable with Ø 2,9 mm shield
Insulation	> 10 MΩ @ 300 VDC
Materials in Contact with Media	Stainless steel AISI 316L (DIN 1.4404 / 1.4435), silicon, gold, external copper seal
Media Compatibility	Gases, refrigerants, oils, fuels (diesel, petrol) Corrosive and abrasive media must be avoided For liquids (pressure peak) the 21PHB is recommended
Protection	IP67 (with a suitable mating plug)
EMC	EN 61000-6-2 / EN 61000-6-3 / EN 61326-2-3
Options	<ul style="list-style-type: none"> <li>• Other pressure connections via thread adapter</li> <li>• Other compensated pressure and temperature ranges</li> <li>• Without compensation electronics as Series M5 (see datasheet)</li> <li>• With X-line electronics (more precise, fg = 1,3 kHz) instead of HB electronics</li> </ul>

The temperature of the sensor head can be read-out and monitored by the RS485 USB interface converter K-114 and the royalty-free Software CCS30. Moreover, the zero point can be readjusted over the digital interface.

Identification:  
Class.Group: 5.40

### Frequency response for the amplifier electronics of the Series M5HB



The 'HB' electronics designation stands for high bandwidth and is associated with the project name HummingBird.