

DATA SHEET

# P3 Absolute pressure transducer

## SPECIAL FEATURES

- Nominal (rated) pressure 10 bar to 3,000 bar
- For static and dynamic pressure variance, pressure peaks and pressure fluctuations
- Principle of measurement: foil strain gage

### Top Class

- Better temperature response
- Individually documented values
- Improved accuracy class
- Closer sensitivity tolerance (suitable for parallel connection, for differential pressure measurement, for example)
- PT100 for temperature compensation in four-wire circuit



P3 Top Class

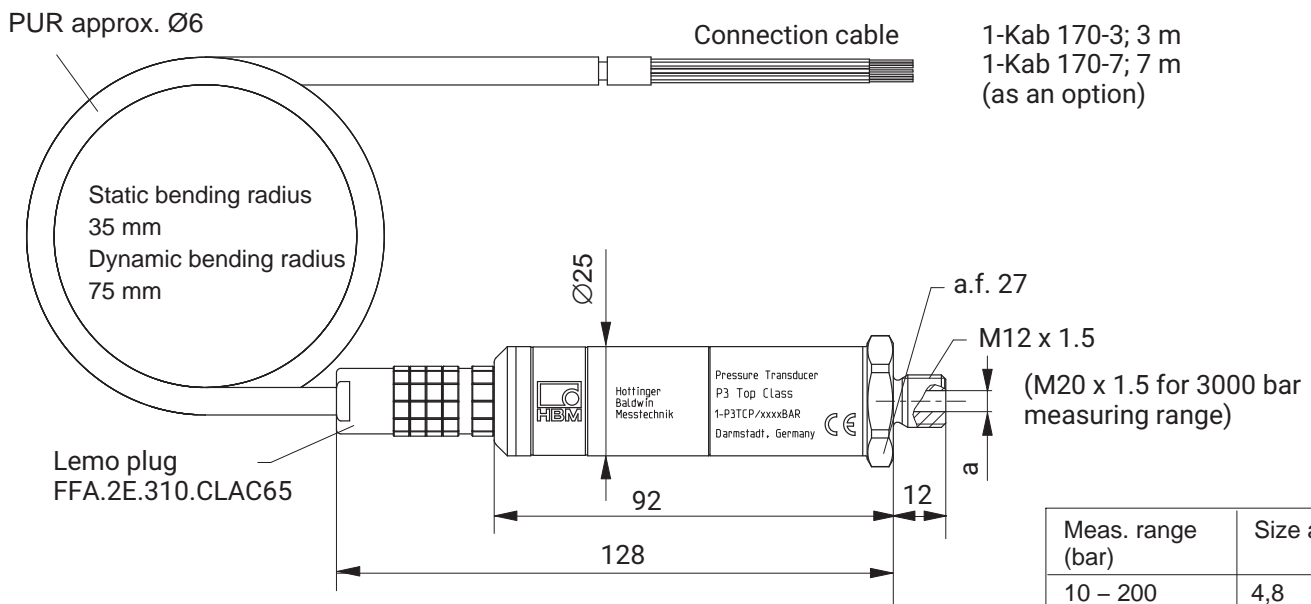


P3MB version with fixed cable



P3MBP version with plug connection

## DIMENSIONS



Dimensions (in mm; 1 mm = 0.03937 inches) for P3 Top Class


Meas. range (bar)	Size a
10 – 200	4,8
500 – 2500	5,0

SPECIFICATIONS FOR P3, P3MB AND P3MBP PER DIN 16086

<b>Type</b>		<b>P3, P3MB, P3MBP</b>								
<b>Mechanical input quantities</b>										
<b>Pressure type</b>		absolute pressure								
<b>Principle of measurement</b>		foil strain gage								
<b>Measuring range, 0 bar...</b>	bar	10	20	50	100	200	500	1000	2000	3000
<b>Accuracy class<sup>1)</sup></b>		0.2	0.15	0.2	0.15	0.1	0.1	0.1	0.2	0.2
<b>Output characteristics</b>										
<b>Nominal (rated) sensitivity</b>	mV/V	2							1.5	
<b>Sensitivity tolerance</b>	%	0.25	0.2	0.2	0.15	0.1	0.1	0.1	0.2	0.2
<b>Effect of temperature on zero signal</b> in the nominal (rated) excitation voltage range per 10 K, rel. to nominal (rated) sensitivity										
in the nominal (rated) temperature range	%	± 0.1								
in the operating temperature range	%	± 0.15								
<b>Effect of temperature on sensitivity</b> in the nominal (rated) excitation voltage range per 10 K, rel. to actual value										
in the nominal (rated) temperature range	%	± 0.1								
in the operating temperature range	%	± 0.2								
<b>Characteristic curve deviation</b> (setting of initial point)	%	± 0.20	± 0.15	± 0.2	± 0.15	± 0.10	± 0.10	± 0.10	± 0.2	± 0.2
<b>Repeatability</b> per DIN 1319	%	± 0.05								

<sup>1)</sup> Accuracy class is not a DIN 16086 concept. The figure conforms to the maximum single deviation; that is the characteristic curve deviation (setting of initial point) and deviations as a result of temperature, related to a difference of 10 K.

### Test report P3MB, P3MBP



#### Prüfprotokoll

test certificate / protocole d'essai

<b>Typ:</b> P3	<b>Auftrag:</b> 801103344
<b>Nennmessbereich:</b> 500 bar	<b>Prüfer:</b> Goebel
<b>Ident.Nr.:</b> 121910237	<b>Datum:</b> 2010-09-30

**Prüfergebnisse:**

Eingangsgröße des Messbereichs [%]	Ausgangsgröße [mV/V]
0	0.0000
50	0.9992
100	1.9980
50	1.0001
0	0.0001

**Aus den Prüfergebnissen berechnete und sonstige messtechnische Eigenschaften:**

<b>Kennwert C [mV/V]</b>	1.9980
<b>Kennlinienabweichung, Anfangspunkteinstellung [%vC]</b>	0.036
<b>Relative Umkehrspanne [%vC]</b>	0.045

**Allgemeine Zusatzinformationen:**

Alle weiteren messtechnischen Eigenschaften des Aufnehmers sind durch Typprüfungen und laufende Produktkontrollen des Qualitätswesens abgesichert.  
 All other metrological characteristics of the transducer are verified by type testing and regular product audits of the quality department.  
 Toutes les autres caractéristiques techniques de ce capteur sont garanties par le service Qualité, au moyen d'essais et de contrôles sur le produit.

Zertifiziert nach ISO 9001 und ISO 14001 (DQS-69091)      Akkreditiertes DKD Kalibrierlaboratorium und BHM-Prüflaboratorium  
 ISO 9001 and ISO 14001 certified / Certification selon ISO 9001 et ISO 14001      Accredited DKD calibration laboratory and BHM testing laboratory  
 Laboratoire accrédité en la DKD et laboratoire d'essais BHM  
 DKD-K-00101; D-PL-12029-01

Hoffinger Baldwin Messtechnik GmbH    Im Tiefen See 45    D-64293 Darmstadt    233.00-1043PP  
 Ausgabe 15245 Version b    05.01.2011 Moor    KPS 16

Information on the linearity of the individual transducer

Information on the sensitivity, characteristic curve deviation and rel. reversibility error of the individual transducer.

SPECIFICATIONS P3 TOP CLASS PER DIN 16086

Type	P3 Top Class											
Mechanical input quantities												
Pressure type	absolute pressure											
Principle of measurement	foil strain gage											
Measuring range, 0 bar...	bar	10	20	50	100	200	500	750	1000	2000 2500	3000	
Accuracy class <sup>2)</sup>		0.2	0.15	0.15	0.13	0.1						
Output characteristics												
Nominal (rated) sensitivity	mV/V	2 ± 0.15%									1.5 ± 0.15%	
Sensitivity tolerance	%	0.2	0.15			0.10						
Zero signal tolerance	%	± 1										
Creep upon unloading 15 min.	%	0.2	0.15	0.05	0.03							
Effect of temperature on zero signal in the nominal (rated) excitation voltage range per 10 K, rel. to nominal (rated) sensitivity	%	± 0.05										
in the nominal (rated) temperature range	%	± 0.10										
in the operating temperature range	%											
Effect of temperature on sensitivity in the nominal (rated) excitation voltage range per 10 K, rel. to actual value	%	± 0.05										
in the nominal (rated) temperature range over 0 °C	%	± 0.1										
in the nominal (rated) temperature range below 0 °C	%	± 0.2										
in the operating temperature range	%											
Characteristic curve deviation (setting of initial point)	%	0.20	0.15	0.15	0.13	0.10						
Rel. interpolation error (max. deviation) of a cubic interpolation function over the test series	%	0.10	0.08	0.05								
Long-term stability of zero signal and span (data per year)	%	0.4						0.20				
Repeatability per DIN 1319	%	± 0.05										

<sup>2)</sup> Accuracy class is not a DIN 16086 concept. The figure conforms to the maximum single deviation; that is the characteristic curve deviation (setting of initial point) and deviations as a result of temperature, related to a difference of 10 K.

Extended test report

Page 1

**Test report P3 Top Class**

Page 2

Information on the linearity of the individual transducer

Information on the sensitivity, characteristic curve deviation and rel. reversibility error of the individual transducer.

Information on the max. interpolation error as a % and the coefficient of the cubic compensation function in the form  $X = R \cdot Y^3 + S \cdot Y^2 + T \cdot Y$  of the individual transducer

Information on the temperature dependency of the individual transducer

Information on the temperature coefficient of the zero signal and on the temperature coefficient of the output span of the individual transducer.

## THE FOLLOWING DATA APPLIES TO P3 AND P3 TOP CLASS

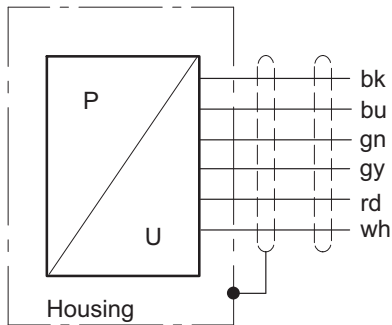
Mechanical input quantities											
Measuring range, 0 bar...	bar	10	20	50	100	200	500 750	1000	2000 2500	3000	
Initial value	bar	0									
Operating range at reference temperature	%	0...200				0...150					
Overload limit at reference temperature	%	250				200					
Test pressure	%	250				200			150		
Dynamic loading											
Permissible pressure	%	100									
Permissible oscillation width to achieve a typical 10,000,000 DIN 50100 load cycles	%	70									
Dead volume	mm <sup>3</sup>	2500		2000			800		900		
Control volume	mm <sup>3</sup>	9	7				1.5				
Output characteristics											
Fundamental resonance frequency	kHz	13	15	26	38	67	100				
Input resistance at reference temperature	Ω						350 ±5				
Output resistance at reference temperature	Ω						350 ±5				
Insulation resistance	MΩ						5000				
Electrical strength	V						90				
Excitation voltage											
Reference excitation voltage	V						5				
Nominal (rated) excitation voltage	V						0.5 ... 7.5				
Operating range	V						0.5 ... 12				
Ambient conditions											
Permissible voltage between measuring circuit and transducer ground at reference temperature	V						50				
Materials for parts which come into contact with the environment		1.4301; 1.4541; 1.4542; 1.4548; 1.6354 PU / chrome-plated and nickel-plated brass									
Reference temperature	°C						23				
Nominal (rated) temperature range	°C						-10 ... +80				
Limiting temperature range	°C						-40 ... +100				
Storage temperature range	°C						-40 ... +100				
Impact resistance (tested to DIN 40046)											
Impact acceleration	m/s <sup>2</sup>						1000				
Impact duration	ms						4				
Impact form	-						Half sine wave				
Acceleration sensitivity per 10 m/s <sup>2</sup> for exciting frequencies of 20% of the natural frequency	%						<±0.001				
Mechanical specifications											
Pressure connection		M12 x 1.5							M20 x 1.5		
Electrical connection		Lemo connector ERA.2E.310.SSL or a fixed 3 m cable or an HS6P device plug									
Bending radius of the connection cable, min. static	mm						35				
dynamic	mm						75				
Mounting position							any				
Weight without cable approx.	g						approx. 200				
Degree of protection (per DIN 40050, IEC 529)							IP67				

**ECONOMICAL, STANDARD VERSIONS AVAILABLE FROM STOCK:**

Measuring range, 0 bar to ...	Product number		
	P3 Top Class Lemo FFA 2E.310	P3MB cable connection 3 m cable, free ends	P3MBP with HS6P plug connection
10 bar	1-P3TCP/10BAR	1-P3MB/10BAR	1-P3MBP/10BAR
20 bar	1-P3TCP/20BAR	1-P3MB/20BAR	1-P3MBP/20BAR
50 bar	1-P3TCP/50BAR	1-P3MB/50BAR	1-P3MBP/50BAR
100 bar	1-P3TCP/100BAR	1-P3MB/100BAR	1-P3MBP/100BAR
200 bar	1-P3TCP/200BAR	1-P3MB/200BAR	1-P3MBP/200BAR
500 bar	1-P3TCP/500BAR	1-P3MB/500BAR	1-P3MBP/500BAR
750 bar	1-P3TCP/750BAR	-	-
1 000 bar	1-P3TCP/1000BAR	1-P3MB/1000BAR	1-P3MBP/1000BAR
2 000 bar	1-P3TCP/2000BAR	1-P3MB/2000BAR	1-P3MBP/2000BAR
2 500 bar	1-P3TCP/2500BAR	-	-
3 000 bar	1-P3TCP/3000BAR	1-P3MB/3000BAR	1-P3MBP/3000BAR

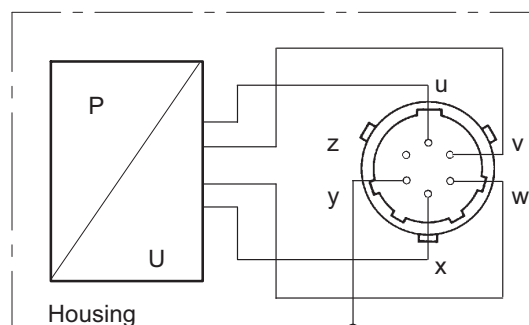
**PIN ASSIGNMENT P3MB AND P3MBP**

**P3MB Pin assignment**



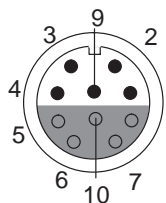
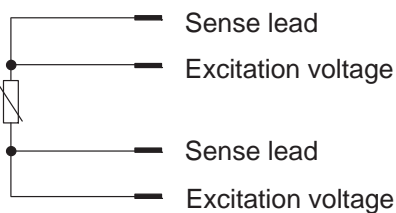
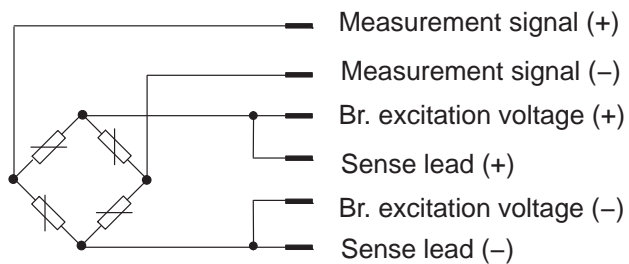
Standad version

**P3MBP Pin assignment**

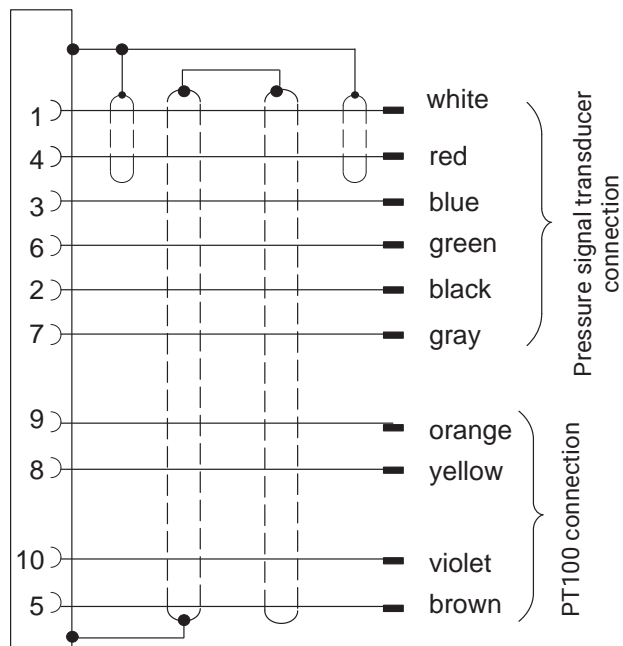


Option with HS6P plug

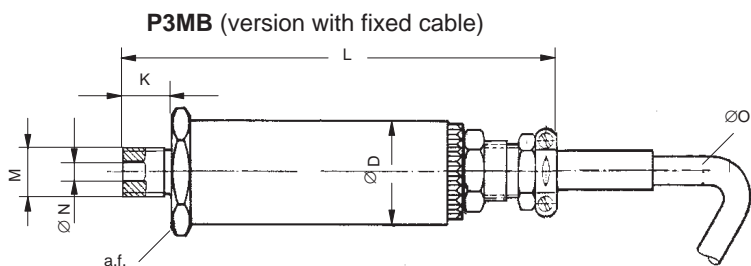
## PIN ASSIGNMENT P3 TOP CLASS



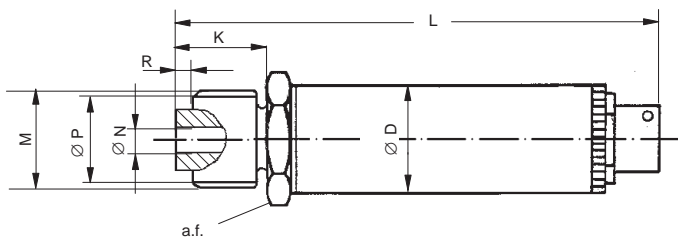
Lemo socket FFA.2E.310.CLAC65  
View: pressure transducer



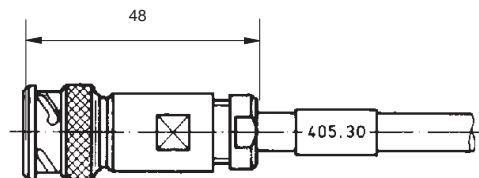
## DIMENSIONS FOR P3MB AND P3MBP VERSIONS (P3 TOP CLASS SEE FIRST PAGE)



P3MBP (version with plug connection)



HK6S cable socket



Connection cable **not** included in the scope of supply

P3MB		D	K	L	M	N	O	P	a.f.	R
with cable connection	10 bar...2000 bar	25	12	112	M12 x 1.5	5	6.5	-	27	-
	3000 bar	25	20	129	M20 x 1.5	5	6.5	17.5	27	3
with plug connection	10 bar...2000 bar	25	12	97	M12 x 1.5	5	-	-	27	-
	3000 bar	25	20	105	M20 x 1.5	5	-	17.5	27	3

## ACCESSORIES

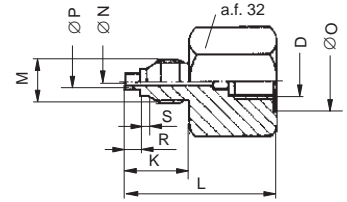
### Included in scope of supply

1 USIT ring U12.7 x 20 x 1.5 for P3MB.../ 10 bar to 500 bar  
 1 double-cone seal, 1.4305, for P3MB .... / 500 bar ... 3000 bar;  
 Bag with 2 x conical seals made of material 1.4305

### To be ordered separately

Connecting branches for measuring ranges to 500 bar  
 Material: stainless steel 1.4305

Type	D	K	L	M	N	O	P	R	S
P3M/500/M20	M12 x1.5	25	50	M20 x 1.5	4	20.2	5	5	3
P3M/500/R1/2	M12 x 1.5	20	50	G1/2	4	20.2	5	5	3



All dimensions in mm

Connection cable P3TCP 1-Kab170-3 or 1-Kab170-7; Connection cable 1-KAB405.30A-3 (for variants with HS6P plug, to be ordered separately); Connection cables 1-Kab170-3 or 1-Kab170-7 must be ordered separately.

HK6S cable socket, Order no. 3-3312.0095

Cable plug for Greenline Order no. 1-MS3106PEMV

15-pin D-Sub plug, Order no. 2-9278.0321

### Seal accessories

10 to 200 bar	3-4218.0002	U seal/USIT ring U12.7 x 20 x 1.5, max. 500 bar
500 bar	3-4218.0002	U seal/USIT ring U12.7 x 20 x 1.5, max. 500 bar
	2-9278.0376	bag, conical seal P3MB/500-3000 bar
1000 to 3000 bar	2-9278.0376	bag, conical seal P3MB/500-3000 bar

## OPTIONS FOR K-P3 ABSOLUTE PRESSURE TRANSDUCER

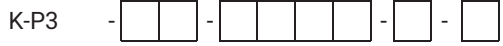
Order No.
<b>K-P3</b>

Code	Option 1: Design	
<b>MB</b>	MB - Classic, with cable connection	[not with option 3 = P]
<b>MBP</b>	MPB - Classic, with plug H6SP	[only with option 3 = P]

Code	Option 2: Measuring range
<b>010B</b>	10 bar
<b>020B</b>	20 bar
<b>050B</b>	50 bar
<b>100B</b>	100 bar
<b>200B</b>	200 bar
<b>500B</b>	500 bar
<b>01KB</b>	1000 bar
<b>02KB</b>	2000 bar
<b>03KB</b>	3000 bar

Code	Option 3: Electrical connection	
<b>K</b>	Connection cable, 3 m, unterminated	[only with option 1 = MB]
<b>Y</b>	Connection cable, 20 m, unterminated	[only with option 1 = MB]
<b>M</b>	Connection cable, 3 m, connector MS	[only with option 1 = MB]
<b>N</b>	Connection cable, 20 m, connector MS	[only with option 1 = MB]
<b>D</b>	Connection cable, 3 m, connector D15	[only with option 1 = MB]
<b>F</b>	Connection cable, 20 m, connector D15	[only with option 1 = MB]
<b>Q</b>	Connection cable, 3 m, connector D-Sub-HD	[only with option 1 = MB]
<b>R</b>	Connection cable, 20 m, connector D-Sub-HD	[only with option 1 = MB]
<b>P</b>	With plug HS6P, welded	[only with option 1 = MBP]

Code	Option 4: Transducer Identification
<b>S</b>	Without Transducer Identification (TEDS)

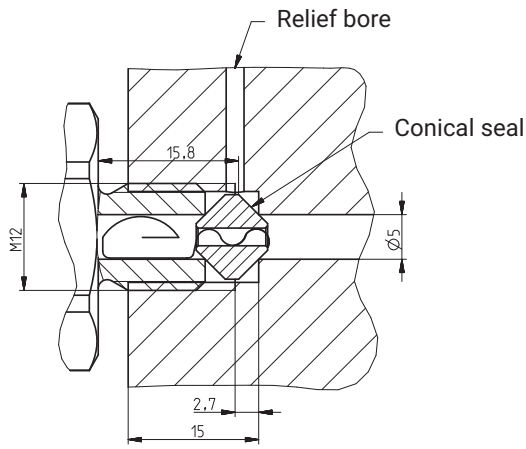




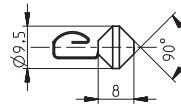
# PRESSURE TRANSDUCER MOUNTING

**P3 10 bar to 500 bar: USIT ring U12.7 x 20 x 1.5 (not shown)**

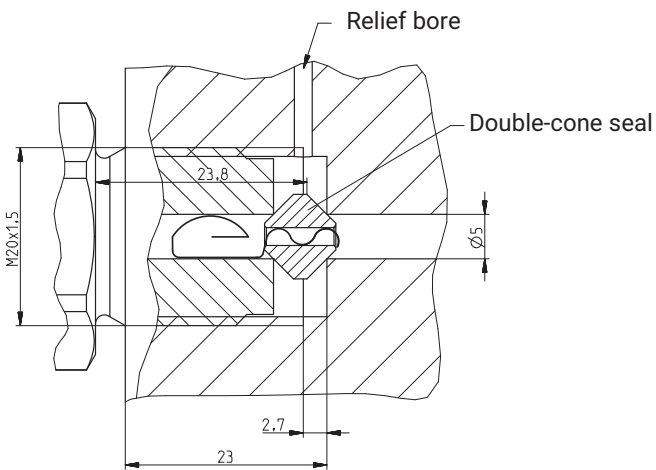
**P3 500-2500 bar**



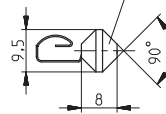
Conical seal  
500-3000 bar



**P3 3000 bar**



Double-cone seal  
with retaining spring



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