Features

- Two wire system
- Piezoresistive measuring element
- Output signal 4-20 mA,
  adjustable within 1 : 4 of the nominal pressure range
- Conformity error ≤ ±0.1 % FS
- Standard DIN measuring ranges from
  0 … 100 mbar up to 0 … 25 bar or selection of measuring ranges in mWC or psi
- Temperature compensation within
  -10°C ... +50°C [+14°F ... +122°F]
- Optional overvoltage (lightning) protection according to EN 61000-4-5
- Compact and robust

Picture

Specifications

All specifications, unless otherwise noted, at DC 24 V supply voltage, R_L = 100 Ω, T_{amb} = 25°C [77°F].

Measurement Range Independent Technical Data

Type	Two wire current transmitter
Output signal	4 … 20 mA
Resolution	12 bit (< 0.025 % FS)
Interface for adjustment	HART-like
Output 0% adjustability	-5% of orig. FS ... +105% of orig. FS (rel. measurement)) 0% of orig. FS ... +105% of orig. FS (abs. measurement)
Output 100% adjustability	-5% of original FS ... +105% of original FS
Difference (0% - 100%) adjustability	≥ 25% of original FS and ≥ 50 mbar [0.725 psi]
Damping adjustability	~ 30 ms (default), 100 ms, 1 s, 10 s = 30 Hz (default), 10 Hz, 1 Hz, 0.1 Hz cut-off frequency
Supply voltage	DC 9 ... 33 V
Reverse polarity protection	integrated, standard
Overvoltage (lightning) protection	optional
Supply voltage influence	< 0.1 % FS
Dielectric strength case / supply	500 V
Load resistance limitation	R_L [Ω] ≤ (+U_B [V] - 9 [V]) / 0.02 [A]
Load resistance influence	< 0.1 % FS
Protection class	IP68 (~NEMA 6P)
Medium temperature range	-5°C ... +50°C [+23°F ... +122°F]
Temperature Compensation range	-10°C ... +50°C [+14°F ... +122°F]
Storage temperature range	-10°C ... +50°C [+14°F ... +122°F]
Acid resistance	pH5 ... pH9

Weight	approx. 190 g [0.419 lb.] without surge protection approx. 210 g [0.463 lb.] with surge protection plus approx. 260 g [0.573 lb.] with weight extension
Measuring cell, diaphragm, housing	Stainless steel 1.4435 (316L)
Seals	Viton
Cable	Choice of PE / PUR / FEP cable with integrated pressure equalising pipe
Outer diameter	6 mm [0.24"] PE / PUR; 5 mm [0.2"] FEP
Leads	0.22 mm^2 [AWG 24], Cu wire 7 x 0.20 tinned
Resistance	≤ 82.9 mΩ/m [25.3 mΩ/ft.] (one conductor)
Minimum cable bending radius	100 mm [4"]
Tensile load	< 400 N [90 lbf] (PE / PUR cables) < 15 N [3.4 lbf] (FEP cables)
Tensile strength	> 500 N [112 lbf]
Pressure equalising pipe diameter	Ø 1.4 / 0.8 mm [0.055" / 0.03"] PE / PUR; Ø 1.1 / 0.6 mm [0.04" / 0.02"] FEP
PE cable (foodstuffs approved / drinking water)	
Halogen-free	
Permitted environmental temperature	-20°C … +70°C [-4°F ... +158°F]
Weight	Approx. 41 g/m [0.44 oz/ft]
PUR cable (mechanically robust)	
Halogen-free	
Permitted environmental temperature	-20°C … +95°C [-4°F ... +203°F]
Weight	Approx. 45 g/m [0.48 oz/ft]
FEP cable (high temperature range)	
Permitted environmental temperature	-40°C … +90°C [-40°F ... +194°F]
Weight	Approx. 55 g/m [0.59 oz/ft]

Electromagnetic Compatibility

Emissions	
Basic specification emissions	EN 61000-6-3
Emissions class B	EN 55022
Immunity	
Basic specification noise immunity	EN 61000-6-2
Electrostatic discharge	EN 61000-4-2 (4 kV contact, 8 kV air)
Radiated electromagnetic field	EN 61000-4-3 (10 V/m, 80 ... 1000 MHz, 80% AM 1 kHz)
Radiated electromagnetic field (GSM)	EN 61000-4-3 (10 V/m, 950 MHz, 200 Hz on/off)
Fast transients (burst)	EN 61000-4-4 (2 kV)
Conducted electromagnetic interference	EN 61000-4-6 (10 V/m, 0,15 ... 80 MHz, 80% AM 1 kHz)
Impulse voltage (surge)	EN 61000-4-5 (10 kA 8/20µs) [only with the option overvoltage (lightning) protection]

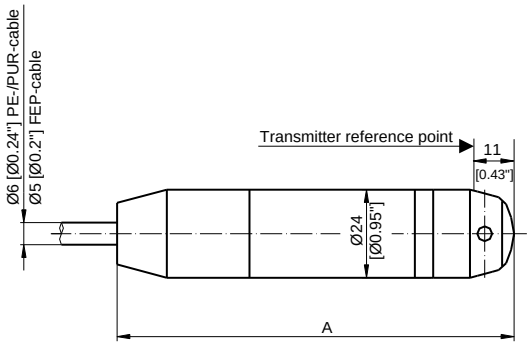
Quality Tests

CE The transmitters fulfil the requirements for noise immunity and emissions of the EMC directive 89/336/EEC.

Measurement Range Specific Technical Data

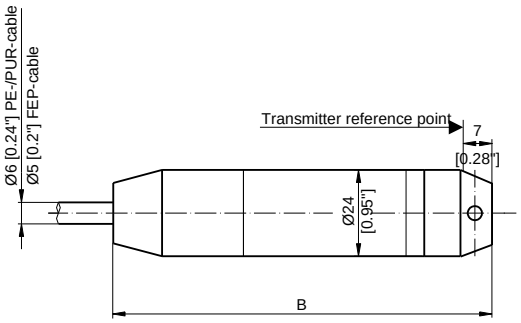
Pressure ranges		**< 0,2 bar** [2.9 psi]	**≥ 0,2 ... 1 bar** [2.9...14.5 psi]	**≥ 1 ... 25 bar** [14.5...362.6 psi]
Overload		3 bar [43.5 psi]	3 bar [43.5 psi]	3 x FS
Bursting pressure		> 200 bar [2900 psi]	> 200 bar [2900 psi]	> 200 bar [2900 psi]
Conformity error incl. hysteresis and repeatability -5°C ... +50°C [+23°F...+122°F]		≤ ±0.2 % FS	≤ ±0.1 % FS	≤ ±0.1 % FS
Temperature error zero / span -10°C ... +50°C [+14°F...+122°F]	typ.	≤ ±100 ppm FS/°C	≤ ±60 ppm FS/°C	≤ ±60 ppm FS/°C
	max.	≤ ±150 ppm FS/°C	≤ ±100 ppm FS/°C	≤ ±100 ppm FS/°C
Long term drift	typ.	≤ 0.2 % FS/a	≤ 0.2 % FS/a	≤ 0.1 % FS/a

Dimensions [mm]



Closed version (standard):

A = 137 mm [5.4"] with / without overvoltage protection
Plus 87 mm [3.4"] with weight extension



Open version:

B = 133 mm [5.2"] with / without overvoltage protection
Plus 87 mm [3.4"] with weight extension

Ordering Information

Table 1:
The exact order number for an article is formed from the individual options codes according to the table (with the BAAN-Configurator PCF or manually).

MPB	**PCF Order Number**														
	1/2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Type															
MPB	PB														
Pressure type															
Gauge		1													
Measurement range															
0 ... 100 mbar = 0 ... 1.45 psi			0	0											
0 ... 160 mbar = 0 ... 2.32 psi			0	1											
0 ... 250 mbar = 0 ... 3.63 psi			0	2											
0 ... 400 mbar = 0 ... 5.8 psi			0	3											
0 ... 600 mbar = 0 ... 8.7 psi			0	4											
0 ... 1.0 bar = 0 ... 14.5 psi			0	5											
0 ... 1.6 bar = 0 ... 23.2 psi			0	6											
0 ... 2.5 bar = 0 ... 36.25 psi			0	7											
0 ... 4.0 bar = 0 ... 58 psi			0	8											
0 ... 6.0 bar = 0 ... 87 psi			0	9											
0 ... 10 bar = 0 ... 145 psi			1	0											
0 ... 16 bar = 0 ... 232 psi			1	1											
0 ... 25 bar = 0 ... 362.5 psi			1	2											
0 ... 1 mWC			6	0											
0 ... 2 mWC			6	1											
0 ... 5 mWC			6	2											
0 ... 10 mWC			6	3											
0 ... 20 mWC			6	4											
0 ... 50 mWC			6	5											
0 ... 1.5 psi			7	0											
0 ... 3.0 psi			7	1											
0 ... 7.5 psi			7	2											
0 ... 15 psi			7	3											
0 ... 30 psi			7	4											
0 ... 75 psi			7	5											
0 ... 150 psi			7	6											
0 ... 300 psi			7	7											
Special range			9	9											
Version															
Closed version					5	5									
Electrical connection															
PE cable (food approved)							1	3							
PUR cable (robust)							1	5							
FEP cable (large temperature range])							2	1							
Output signal															
4 ... 20 mA without overvoltage (lightning) protection									0	5					
4 ... 20 mA with overvoltage (lightning) protection									0	8					
Accuracy															
±0.2 % FS, only for FS < 200 mbar											4				
±0.1 % FS, only for FS ≥ 200 mbar											2				
Temperature range															
Compensated -10°C ... +50°C (medium -5 ... 50°C)												4			
Cable length															
Cable length in meter (always ≥ 001)													x	x	x

Parameterisation

With the aid of the programming kit MPPKIT available as an accessory, the software of the submersible transmitter can be parameterised with a PC (see also Data Sheet 21.210.0066900.001 and Operating Instructions 21.810.0066900.001).

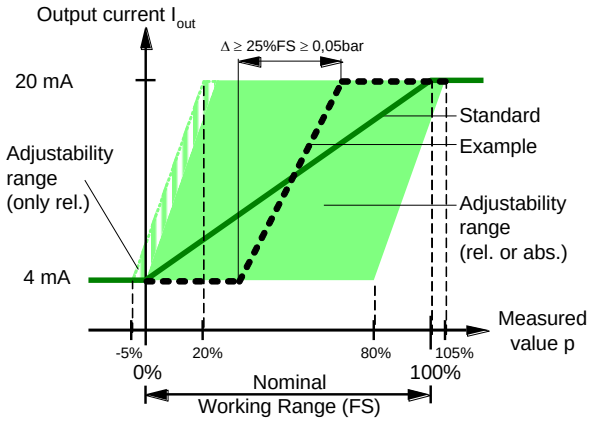
- Range selection for output current 4 ... 20 mA

  With the range selection 4 ... 20 mA, the 4 mA and 20 mA current values can be assigned to measured values other than the standard 0% and 100% of the nominal measuring range. (Typically with 4 mA a value from the range -5% ... +25% of the nominal measuring range, with 20 mA, a value from the range +25% ... +105% of the nominal measuring range.) In this way, a sub-range or even a negative pressure can be measured. The difference Δ between the minimum and maximum must amount to at least 25% of the nominal measuring range and be at least 50 mbar.

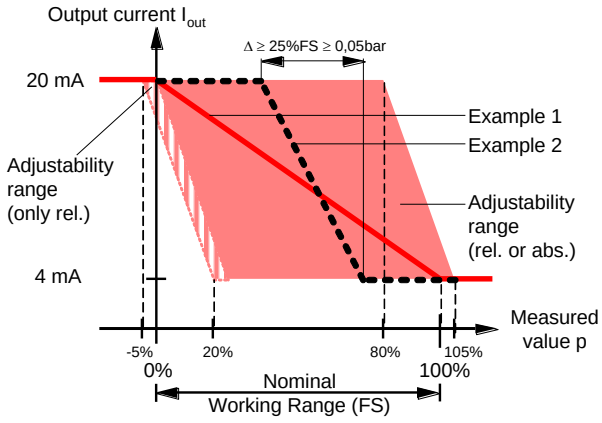
  Inverted control can be achieved by exchanging the values for 4 mA and 20 mA.

  The ranges of adjustability are presented graphically in the following illustrations:

  Non-inverted Control:



  Inverted Control:



- Programmable Damping of the Current Output
  The analog output can be damped with a low pass filter of the 1st order. The adjustability enables values between ~ 33 ms (default) and 10 s.

  Note: During commissioning, damping is preferably left at the minimum value.
- Recalibrating the transmitter (calibration 0 % or 100 %) enables compensation of the drift which inevitably occurs with resistive pressure transducers. The zero drift alone or the combination of zero drift and slope change can be compensated. In doing so, the original calibration of the transmitter is not lost and can be recalled as necessary.

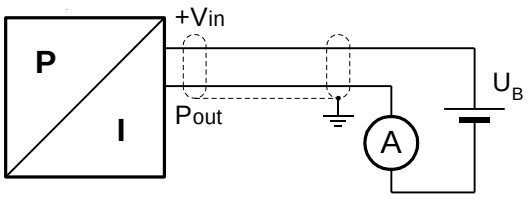
  Setting range 0%: -5% … +5% of nominal measuring range (FS)
  Setting range 100%: 95% ... 105% of nominal measuring range (FS)

Standard Settings

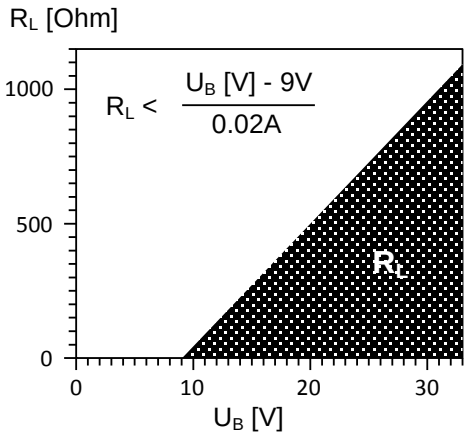
The transmitters have the following standard parameterisation:

- Current range: 4 mA ... 20 mA
- Measurement start: 4 mA = 0% of nominal measuring range (FS)
- Measurement end: 20 mA = 100% of nominal measuring range (FS)
- Damping: ~ 33 ms

Block Diagram / Electrical Connections



+Vin ↔ white
Pout ↔ yellow



Note

- The load resistance R_L is the sum of load and cable resistance.
- If the submersible transmitter is used at temperatures, where the medium can freeze over a longer time, we recommend the version with open protective cap. The version with open protective cap is recommended also in dirty water.
- In order to prevent destruction, the membrane must not be touched.
- The cable must not be tight bend or flat squeezed (because of the integrated pressure equalising pipe).
- Moisture must not be allowed to enter the pressure equalisation pipe. It is recommended that a junction box with dehumidifying agent is used.
- For applications in the field with extension cables having a cable length ≥ 5 m [16 ft.] or inside a building with cable lengths ≥ 100 m [330 ft.], a transmitter with the overvoltage protection option and an external overvoltage protection PT1x2-24DC-SET or a junction box NLAD.MPAB (at other end of the cable) must be used.
- The cable shield must be connected to a good ground potential.
- In order to compensate the long term drift an annual zero point alignment is recommended.
- Conversion table for pressure units
  (value in new unit) = coefficient x (value in old unit)

coefficient	new unit						
old unit	Pa = 1 N/m²	bar	mWC	ftWC	mmHg (Torr)	psi	kp/cm² = at
Pa = 1 N/m²	1	10^{-5}	1.02×10^{-4}	3.35	7.5×10^{-3}	1.45×10^{-4}	1.02×10^{-5}
bar	10^{5}	1	10.2	33.5	750	14.5	1.02
mWC	9.81×10^{3}	9.81×10^{-2}	1	3.28	73.6	1.42	0.1
ftWC	2.99×10^{3}	2.99×10^{-2}	0.305	1	22.4	0.433	3.05×10^{-2}
mmHg (Torr)	1.33×10^{2}	1.33×10^{-3}	1.36×10^{-2}	4.46×10^{-2}	1	1.93×10^{-2}	1.36×10^{-3}
psi	6.89×10^{3}	6.89×10^{-2}	0.703	2.31	51.7	1	7.03×10^{-2}
kp/cm² = at	9.81×10^{4}	0.981	10	32.8	736	14.2	1

Application example 2 bar = ? psi:
bar = "old unit", psi = "new unit", ⇒ "coefficient" = 14.5
2 bar = 14.5 x 2 psi = 29 psi

Accessories

	Abbreviation	Order No.
Programming-Kit consisting of interface box and Windows programming software (XP / VISTA / W7)	MPPKIT	00 66 900.001
Extension cable 2-wire, shielded (L [m])	MPZVK	04 60 502
Junction box for submersible transmitter IP66 (~NEMA 6)	NLAD.TSKL8	00 65 190.101
Junction box for submersible transmitter IP66 (~NEMA 6), 1 OVP	NLAD.MPAB	00 65 190.102
Spare desiccant bag, 2 pieces	ZWE.BEUT	00 29 201.003
OVP complete for analogue signal	PT1x2-24DC-SET	22 50 215
Suspension arrangement for submersible pressure transmitter	MPZHVT	00 65 717.001
Protection tube 2 m [6.6 ft.] (still waters)	MPZSRR	00 65 720.001
Protection tube 2 m [6.6 ft.] (running waters)	MPZSRF	00 65 721.001
Protection tube extension 2 m [6.6 ft.] for MPZSRR, MPZSRF	MPZSRV	00 65 722.001
Sensing cabinet for submersible pressure transmitter	MPZFK	00 65 543.001

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