PNIV3 Series

Level sensing relative and absolute pressure transmitter
0 ... 0.6 - 16 bar

Ref : 4015
Rev : A

DESCRIPTION

The relative and absolute level probe is based on ceramic technology. This probe has excellent linearity and durability, and is used for continuous monitoring of the filling level of water and drinking water. Due to its compact construction, this probe is particularly suitable for applications where a small footprint is required. The small diameter of 18.5 mm allows mounting in 3/4 inch tubes.
For an optimal electrical connection, the level probe is available with a current output, but also with a ratiometric output or a digital output. Thus this level probe is also suitable for applications with battery power.

TECHNICAL CHARACTERISTICS

MODEL									
OUTPUT Pressure range	Relative (bar)	0....+0.6	0....+1.0	0....+1.6	0....+2	0 ...+ 4.0	0 ...+ 6.0	0 ...+ 10.0	0 ...+ 16.0
	Absolute (bar)	0.8...+1.4	0.8...+2.0	0.8...+3.0					

Fluide	- Groundwater - Drinking water (with EPDM O-ring)			
	2 wire (Analog)	3 wire (Analog)	3 wire (with temperature) (Digital)	4 wire (with temperature) (Analog)
Current consumption	< 23 mA	< 3 mA	< 3 mA	< 3 mA
Power supply	10 ... 30 VDC	5 VDC ±10%	5 VDC ±10%	5 VDC ±10%
OUTPUT output	4 ... 20 mA	ratiom. 10 ... 90%	3000 ... 11000 Digits	ratiom. 10 ... 90%
Overvoltage protection	$< \frac{\text{Tension alim}-10\text{V}}{0.02\text{ A}}\ \Omega$	>10 kΩ / < 100 nF		>10 kΩ / < 100 nF
OPERATING CONDITION Medium and ambiante temperature	From -20 ... +80 °C			
Storage temperature	From -40 ... +80 °C			

PRECISION

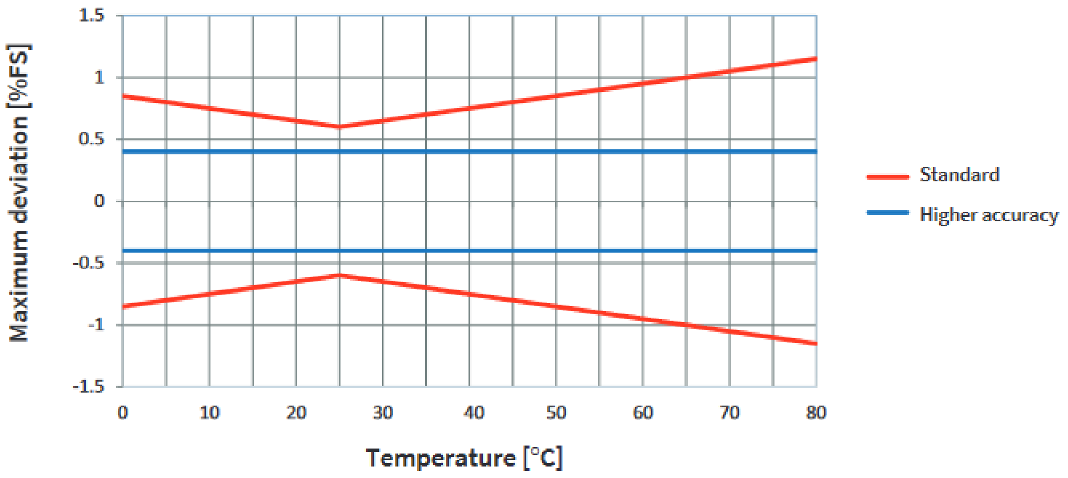
Standard

Parameter	Unit	
Max deviation at 25 °C	% FS	± 0.6
Resolution	% FS	0.1
Thermal characteristic	% FS/10k	± 0.1
Long term stability acc. IEC EN 60770-1 max.	% FS	± 0.25

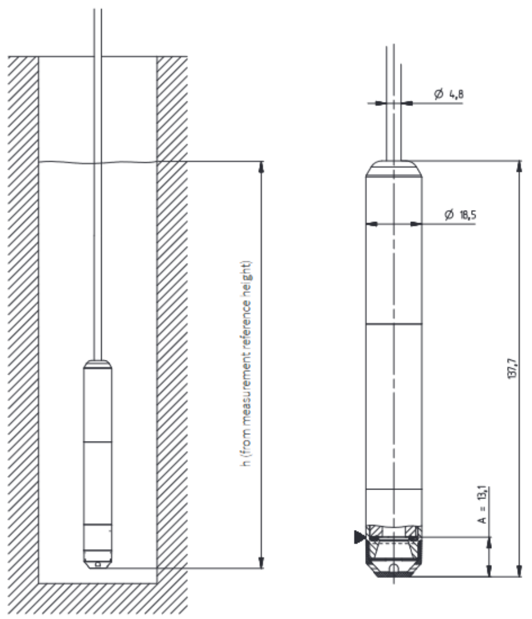
Higher accuracy

Parameter	Unité	
Max deviation	% FS	± 0.4
Resolution	% FS	0.1
Stabilité à long terme selon IEC EN 60770-1 max.	% FS	± 0.25

Maxixmum deviation



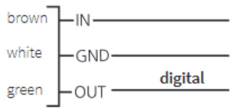
Dimensions (mm)/ Electrical connexions



h - Fluid level
▶ - Measurement reference height
A - Distance from protection cover to the position of measuring diaphragm

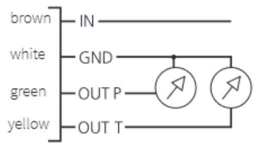
The electronic GND is connected with a 1MΩΩresistor to the level transmitter housing.

Digitale (one wire interface)

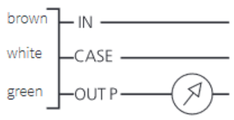


ratiom. 10 ... 90%

ratiom. 10 ... 90% with temperature



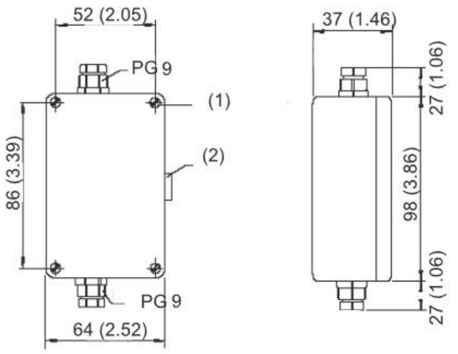
4 ... 20 mA



The case connection is connected with the level transmitter housing.

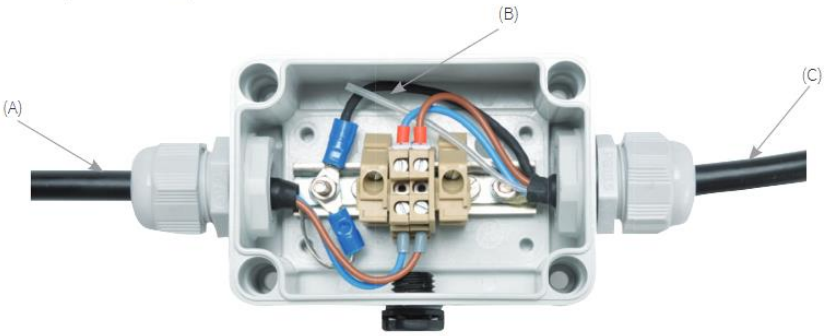
Accessories

Connection box

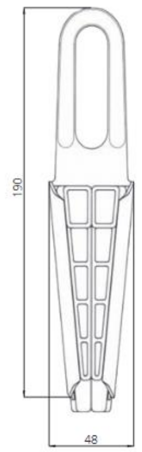


(1) Mounting hole
(2) Vent valve

(A) Measuring value process
(B) Vent pipe
(C) to the transmitter



Cable hanger



hot-dip galvanized steel –
PA6 glass fibre reinforced

Cable Ø 4.5 ... 6.5

Calculation of levels

General level with relative pressure sensor:

$$h = \frac{\Delta p}{\rho \cdot g}$$

General level with absolute pressure sensor:

$$h = \frac{P_{TS} - P_{Baro}}{\rho \cdot g}$$

which

$$P_{TS} = \frac{U_{TS} - U_{TS\_NP}}{U_{TS\_EW} - U_{TS\_NP}} \cdot \left(P_{TS\_EW} - P_{TS\_NP}\right) + P_{TS\_NP}$$

and

$$P_{Baro} = \frac{U_{Baro} - U_{Baro\_NP}}{U_{Baro\_EW} - U_{Baro\_NP}} \cdot \left(P_{Baro\_EW} - P_{Baro\_NP}\right) + P_{Baro\_NP}$$

Using a second level sensor as barometric air pressure sensor

For level sensor with current output use nominal signal values for I_{TS} ... instead of variables U_{TS} ... (resp. I_{Baro} ... instead of U_{Baro} ...)

Simplification of formula for level sensor with ratiometric output:

$$P_{TS} = \frac{U_{TS} - 0.1 \cdot U_{IN}}{0.8 \cdot U_{IN}} \cdot \left(P_{TS\_EW} - P_{TS\_NP}\right) + P_{TS\_NP}$$

$$P_{Baro} = \frac{U_{Baro} - 0.1 \cdot U_{IN}}{0.8 \cdot U_{IN}} \cdot \left(P_{Baro\_EW} - P_{Baro\_NP}\right) + P_{Baro\_NP}$$

Using a second level sensor as barometric air pressure sensor

Legend:

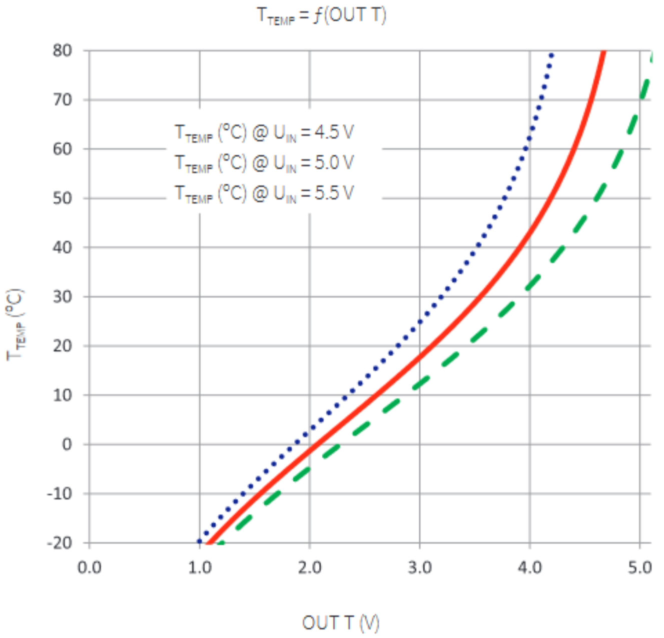
h	level [m]	ρ	density of media [kg/m³]
		g	acceleration of fall 9.80665 [m/s²]
Δp	measured relative pressure [Pa]		
P_{TS}	measured pressure of level sensor [Pa]	U_{TS}	signal on level sensor output [V or mA]
P_{BARO}	measured pressure of barometer [Pa]	U_{BARO}	Signal on barometer output [V or mA]
P_{TS_NP}	minimal nominal pressure of level sensor [Pa]	U_{TS_NP}	minimal nominal signal of level sensor [V or mA]
P_{TS_EW}	maximum nominal pressure of level sensor [Pa]	U_{TS_EW}	maximum nominal signal of level sensor [V or mA]
P_{BARO_NP}	minimal nominal pressure of barometer [Pa]	U_{BARO_NP}	minimal nominal signal of barometer [V or mA]
P_{BARO_EW}	maximum nominal pressure of barometer [Pa]	U_{BARO_EW}	maximum nominal signal of barometer [V or mA]

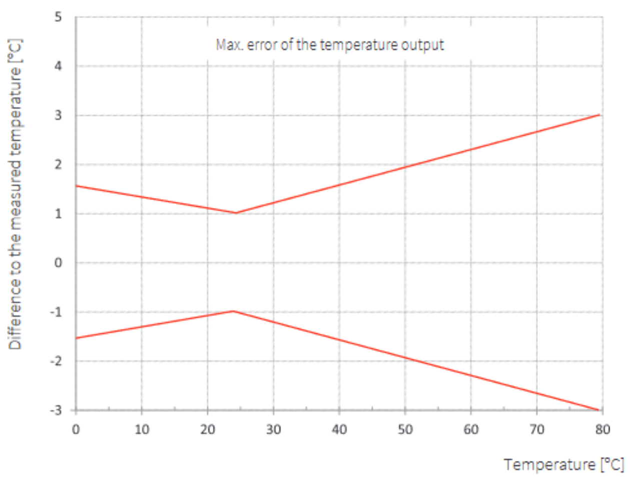
Specification temperature output

ratiom. 10 ... 90%

$$T_{TEMP} = T_0 + 1 \Bigg/ \left(a + b \cdot \ln\left(R \cdot \left[\frac{U_{IN}}{OUT\ T} - 1\right]\right) + c \cdot \ln\left(R \cdot \left[\frac{U_{IN}}{OUT\ T} - 1\right]\right)^3 \right)$$

T_{TEMP}	Sensor temperature [°C]	OUT T	sensor signal [V]
T_0	-273.15 [°C]	R	20'000 [Ω]
		U_{IN}	power supply 5V ±10%
a	0.001204001		
b	0.000208775		
c	0.000000294		





Digital

$$T_{TEMP} = \left(\frac{T_{Dig}}{255} \cdot 200°C\right) - 50°C$$

T_{TEMP}	Sensor temperature [°C]
T_{Dig}	digital value (0 ... 255 digits)

Max. error ±3 °C (bei 0 ... 80 °C)

CONTACT

MESUREX
13 Rue des Corroyés
78730 Saint Arnoult en Yvelines (France)

Tel : +33 (0) 1 30 41 23 62
Mail : mesurex@mesurex.fr
Web : www.mesurex.fr