Thank you for choosing NIVELCO instruments.
We are convinced that you will be satisfied with our product.

NIVOPRESS

HYDROSTATIC LEVEL TRANSMITTER

USER'S MANUAL

Manufacturer:
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CE 1418

1. APPLICATION

NIVOPRESS N submersible hydrostatic level transmitters are applicable for the continuous level measurement of clean liquids or liquids with slight chemical contamination in wells, open reservoirs or tanks. The NC is recommended for level detection of contaminated water. **NIVOPRESS N** is easy to install in tanks and deep wells, and especially recommended for controlling submersible pumps. The use of supplemental accessories is recommended. Using a sewage adapter direct contact between the sewage and the diaphragm of the built-in pressure sensor can be avoided. 2-wire types are available with built-in 4-wire Pt100 temperature sensor or separate 2-wire temperature transmitter. 2-wire types have HART® communication interface. The Ex-types are available for explosion hazardous environments.

2. TECHNICAL DATA

SUBMERSIBLE PROBE		**2-wire**				**3-wire**
TYPE		**NP, NF, NZ, NR**	**NC, NT**	**NK, NN, ND, NH**	**NB, NG**	**N□H**
Measurement range[1]		0…200 mH_2O	0…20 mH_2O	0…200 mH_2O		0…200 mH_2O
		As per order code				
Overload allowed (as a function of range)		3x	20x (≤3 mH_2O) 10x (>3 mH_2O)	3x (≤20 mH_2O) 2x (>20 mH_2O)		3x
Output		4…20 mA + HART®	4…20 mA	4…20 mA + HART®		0...+10 V (0 V ≤ 80 mV)
Power supply		12…30 V DC				18…30 V DC / 6 mA
Load (U_t = power supply.; U_{min} = min. power supply 12 V)		$R_{max} = \frac{(U_t - U_{min})}{0{,}02\,A}$				≥ 5 kΩ
Built-in temperature sensor		HART® secondary value, accuracy: ±3°C (±5.4°F)	–	HART® secondary value, accuracy: ±3°C (±5.4°F)		–
Thermal compensation error [2]		±0.2%	Not applicable	±0.2%		Not applicable
Linearity error (level transmitter)		±0.25%		±0.45% (≤20 m H_2O) ±0.25% (>20 m H_2O)		±0.25%
Temperature error		≤ ±0.1% / 10 K		≤ ± 0.1% / 10 K		≤ ±0.2% / 10 K
Operating temperature [3]		−30…+60 °C (−22…+140 °F)				
Process connection		NAA-209 cable mounting wedge clamp, threaded types with ¾" BSP thread				
Ingress protection		IP68				
Electrical protection		Class III				
Electrical connection		Shielded cable with breathing capillary Ø7 mm (Ø0.275 inch)				
Wire cross section		0.34 mm² (AWG 22)				
Cable length		0…300 m (0…985 ft) as per order code; (Ex ia IIC: max. 100 m [328 ft])				
Dimensions		**NP, NF:** Ø22x173 mm (Ø0.87 x 6.8") **NZ, NR:** Ø38x174 mm (Ø1.5 x 6.85")	Ø40x146 mm (Ø1.55 x 5.75")	**NK, NN:** Ø22x173 mm (Ø0.87 x 6.8") **ND, NH:** Ø38x174 mm (Ø1.5 x 6.85")	Ø24 x 212 mm (Ø1 x 8.3")	**NPH:** Ø22 x 173 mm (NPH: Ø0.87 x 6.8") **NZH:** Ø38 x 174 mm (NZH: Ø1.5 x 6.85")
Mass		**NP, NF:** probe: 0.2 kg (0.44 lb) **NZ, NR:** probe: 0.3kg (0.66 lb)	Probe: 0.4 kg (0.88 lb)	Probe: 0.2 kg (0.44 lb)		
		Cable: PUR cable: 0.065 kg/m, FEP cable: 0.072 kg/m				
Additional temperature transmitter **N□D** types		Output: 4…20 mA; Power supply: 14…30 V DC; Temperature range: 0…+60 °C (+32…+140 °F); Accuracy: ±3 °C (±5.4 °F)				-
Additional temperature transmitter **N□P** types		Pt100B sensor, 4-wires				-
Material of wetted parts	Sensor	1.4404 or (1.4571 and 1.4435)	Al_2O_3 ceramic			1.4404 or (1.4571 and 1.4435)
	Housing	1.4571			POM-C	1.4571
	Cable coating	Polyurethane / FEP				
	Sealing	Viton® (FKM)				
	Protecting cap	1.4571	–	1.4571	POM-C	1.4571

[1] m H_2O means: 1 metre of water column,1 mH_2O ~ 0.1 bar
[2] valid if temperature compensation is active, can be switched in parameter HART - P10b
[3] special order max. +75 °C (+167 °F)

2.1 ACCESSORIES

- User's Manual
- Warranty Card
- EU declaration of Conformity

ADDITIONAL DATA FOR EX CERTIFIED MODELS – ATEX APPROVAL NO.: BKI16ATEX0009

Type	**N□□–5□□–□ Ex**
Power supply	14…30 V DC
Ex marking	Up to 100 m (328 ft) cable length: Ⓔx II 1G Ex ia IIC T6 Ga, between 100 m (328 ft) and 300 m (985 ft) cable length: Ⓔx II 1G Ex ia IIB T6 Ga
Reference document	npk4110m0600h_04
Temperature range	−30…+60 °C (−22…+140 °F)
Intrinsically safe data	U_i = 30 V, I_i = 100 mA, P_i = 0.8 W **for IIC gas group**: C_i ≤ 52 nF, L_i ≤ 1.4 mH (calculated with **100 m** [328 ft] integrated cable), **for IIB gas group**: C_i ≤ 132 nF, L_i ≤ 1.6 mH

ACCESSORIES

Cable terminal box	**NAA–101**
Dimensions	93 x 93 x 55 mm (3.66 x 3.66 x 2.16 inch)
Ingress protection	IP65
Operating temperature	−40…+70 °C (−40…+158 °F)
Material	Polystyrol
Cable gland	M20x1.5 (cable outer diameter ∅5…∅10 mm [∅0.2…∅0.4 inch])
Electrical connection	Terminal block for cable with max. cross section of 2.5 mm² (AWG 13)

Cable terminal box with overvoltage protection*	**NAA–102**
Data	See: NAA-101
Electrical data	See: OVP
Cable mounting wedge clamp	**NAA–209**
Max. mech. load	300 m (985 ft) cable
Operating temperature	−20…+60 °C (−4…+140 °F)

Overvoltage protection	**OVP–12/33*, OVP–22/33***	**OVP–32/33***
Mounting	outdoor	EN 60715 - 35 mm (1⅜ inch) rail
Dimensions	72 x 42 x 19 mm (2.8 x 1.65 x 0.75 inch)	62 x 65 x 18 mm (2.44 x 2.56 x 0.7 inch)
Ingress protection	IP54	IP20
Breakdown voltage	33 V	
Absorbed energy	600 W / 1 ms	
Internal resistance	13 Ω	
Leakage current	≤ 10 μA	

**only for 2-wire 4…20 mA equipments!*

	Threaded spacer		Material
Adapters	NAZ-101-0	¾" BSP – ½" BSP	KO35 (1.4571)
	NAZ-102-0	¾" BSP – M20x1.5	
	NAZ-105-0	¾" BSP – 1" NPT	
	NAZ-106-0	¾" BSP – 1" BSP	

2.2 Order Code (not all combinations possible!)

NIVOPRESS N ☐☐ – ☐☐☐ – ☐

Sensor / Cable material / Housing material	Code
Ceramic (capacitive)	
PUR / 1.4571	C(1)
FEP / 1.4571	T(1)
Stainless steel (piezoresistive)	
PUR / 1.4571	P
FEP / 1.4571	F
PUR / 1.4571 / ¾" threaded	Z
FEP / 1.4571 / ¾" threaded	R
Ceramic (piezoresistive)	
PUR / 1.4571	K
FEP / 1.4571	N
PUR / 1.4571 / ¾" threaded	D
FEP / 1.4571 / ¾" threaded	H
PUR / POM	B(1)
FEP / POM	G(1)

Output	Code
2-wire 4…20 mA + HART®	K
3-wire 0…10 V DC	H(1)
Level: 4…20 mA + HART® Temperature: 4…20 mA	D(1)
Level: 4…20 mA + HART® Temperature: Pt100B	P

Version	Code
Standard NC	2
Standard	4
Ex	5

Measuring range(2)	Code
1 mH_2O	1
2 mH_2O	2
5 mH_2O	3
10 mH_2O	4
20 mH_2O	5
50 mH_2O	6
100 mH_2O	7
200 mH_2O	8

Code	Cable length			Code
0	0 m	Up to 100 m	0 m	0
1	10 m		1 m	1
:	:		:	:
9	90 m		9 m	9
A	100 m	Over 100 m	0 m	0
B	200 m		10 m	1
C	300 m		:	:
			90 m	9

(1) *Ex version not available*
(2) *m H_2O means: 1 meter high water column, 1 mH_2O ~ 0.1 bar*

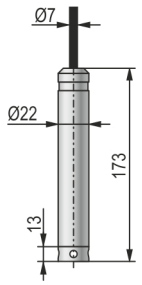
Accessories to order

Cable terminal box	**NAA-101**
Cable terminal box with OVP	**NAA-102**
Cable holding sliding sleeve 1½" BSP	**NAA-105**
Cable mounting wedge clamp 1½" NPT	**NAA-209**

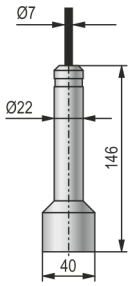
Sewage adapter	**NAW-104, NAW-107, NAZ-103**
Overvoltage protection units	**OVP-12/33, OVP-22/33 (outdoor)**
	OVP-32/33 (DIN rail mountable)
Adapters	**NAZ-101-0, NAZ-102-0, NAZ-105-0, NAZ-106-0**

2.3 Dimensions

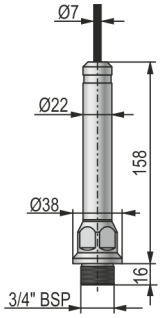
NP / NF / NK / NN probe



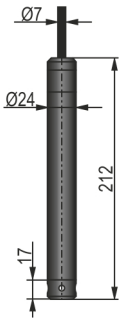
NC / NT probe



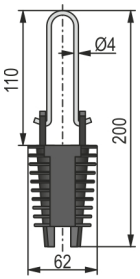
NZ / NR / ND / NH probe



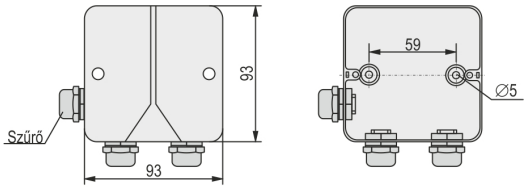
NB / NG probe



NAA–209 Cable holding wedge clamp

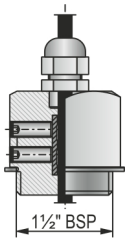


NAA–101, NAA–102 – cable terminal box



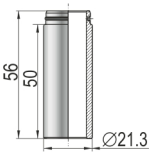
NAA-102 terminal box is featuring an OVP-12/33 overvoltage protection unit

NAA–105 Cable holding sliding sleeve

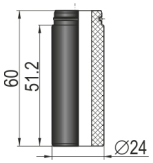


Sewage adapter

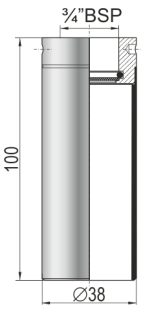
NAW–104



NAW–107

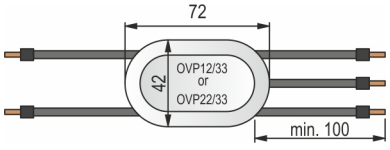


NAZ–103

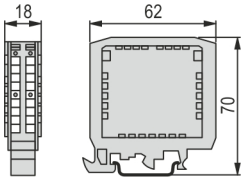


Overvoltage protection unit

OVP–12/33, OVP–22/33



OVP–32/33



(All units are in mm unless otherwise indicated.)

3. INSTALLATION

To fasten the cable, use NAA–209 cable mounting wedge clamp that provides a solution for hanging the cable without slipping and risk of rupture.
The NAW–104 sewage adapter can be snapped in the place of the sensor protecting cap of types **NP, NF, NK, NN**.
The NAZ–103 threaded sewage adapter can be used with types **NZ, NR, ND, NH**.

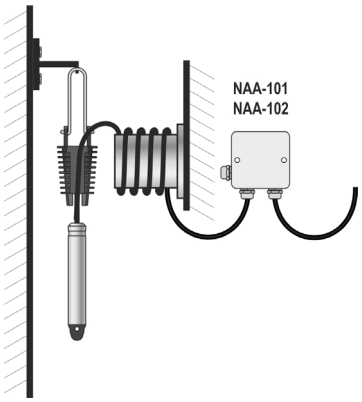
INSTALLATION STEPS

- The cable of the level transmitter must not be twisted. In the case of **NZ, NR, ND, NH** types with threaded connection, make sure the cable is not fixed before screwing the sensor into the appropriate process connection.
- Feed the special cable through the glands, set the proper cable length and fasten the cable with the glands.
- Cable overhang must be wound on a pipe with a diameter of at least 100 mm (3.94 inch). **The cable must not be cut shorter!**
- Let the probe down to the lowest possible point, as only the liquid column above the probe will be measured.

To connect the breathing cable and the signal cable use the cable terminal box NAA–101 or NAA–102 (with IP65), that accommodates the cable end in a dust and humidity free enviroment.

Attach the cable box (e.g., by using two M4 screws) to a flat surface. In open-air or industrial applications, the transmitter must be protected against transient surges and overvoltage. The GND of the OVP must be grounded with the shortest possible wire. In this case, install the NAA–102 terminal box (with OVP) close to the measurement location.

MOUNTING EXAMPLE



Usings additional over-voltage protection (**OVP–12/33, OVP–22/33, OVP–32/33**) at the opposite end of the cable, near the processing unit is recommended.

If safety is a priority, using a protecting electrode enhances the efficiency of electrical protection!

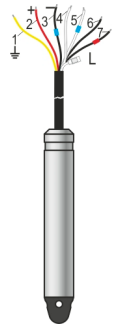
Overvoltage protection unit must not be used with Ex devices OVP-12/33, OVP-22/33, and OVP-32/33!

3.1. TERMS AND CONDITIONS FOR APPLICATIONS IN DRINKING WATER SUPPLY (HUNGARY ONLY)

The following terms and conditions are required for the use of the **NIVOPRESS NP, NZ** and **NF** type hydrostatic level transmitters in drinking water supply, domestic hot water-supply and bathwater-supply applications:

- Water temperature must not exceed 60 °C (140 °F), or in the case of NZ probe 30 °C (86 °F).
- Before using the hydrostatic level transmitter, clean and disinfect its surface in compliance with applicable regional regulations. The cleaning detergent must not cause any damage to the hydrostatic level transmitter or its material. For cleaning and disinfection, only detergents or disinfectants authorized by the Office of the Chief Medical Officer (OCMO) must be used.
- It is recommended to rinse the device to remove surface deposits before use! Rinsing water must be drained and must not be used for household purposes. The use of the device in the applications mentioned above is allowed only if these precautions are satisfied.

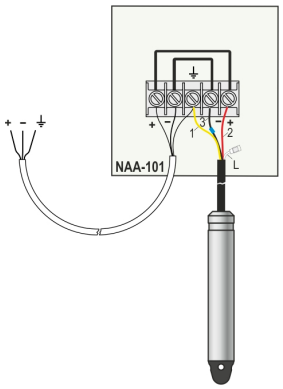
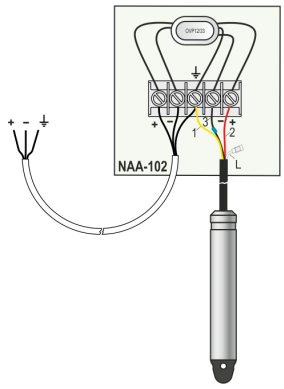
4. WIRING

2-wire level 4…20 mA	3-wire level 0–10 V	2-wire 4…20 mA + Pt100	4…20mA + HART® LEVEL + TEMPERATURE
			

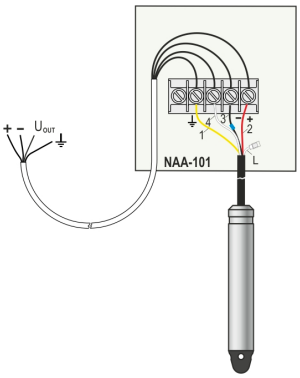
Legend:

	CABLE CORE	COLOUR
1	Shielding	Yellow
2	Positive power supply	Red
3	Negative power supply, Voltage output (-)	Black with an additional blue-coloured insulation
4	NPH/NZH (3-wire) types: Voltage output (+); NPP/NZP types: Pt100 sensor current drive; NPD/NZD types: positive power supply of the temperature transmitter	Uncolored
5	NPP/NZP types: Pt100 sensor current drive; NPD/NZD types: negative power supply of the temperature transmitter	Uncolored + blue shrinkable tube
6	NPP/NZP types: Pt100 sensing	Black
7	NPP/NZP types: Pt100 sensing	Black / red tube
L	Breathing capillary with vapour filter	–

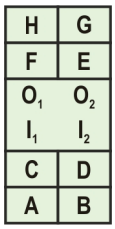
2-wire 4…20 mA

NAA–101	NAA–102
	

3-wire 0…10 V DC

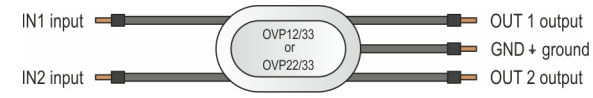
NAA–101


OVP–32/33

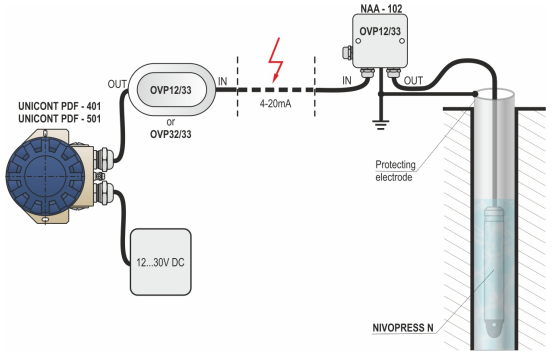


O_1 (F), O_2 (E) – outputs
I_1 (C), I_2 (D) – inputs
A, B, H, G – ground

WIRING OF OVP–12/33, OVP–22/33



INSTALLATION EXAMPLE USING OVERVOLTAGE PROTECTION UNITS



4.1 SPECIAL CONDITIONS OF SAFE USE

Hydrostatic level transmitters with Ex ia IIC and Ex ia IIB protection type can only be used in intrinsically safe loops, powered by a certified sparkless power supply, in accordance with the specified technical data.

The metal housing of the device must be connected to the EP network using the connection cable marked 1. The maximum cable length of the transmitter is 5 m (16.4 ft).

5. PUTTING INTO OPERATION, CONFIGURATION

A properly installed and suspended probe needs some time to stabilize, which depends on the cable's length. With a 300 m (985 ft) cable, stabilization might take up to several hours, depending on the circumstances. The device is ready for operation as soon as it is switched on, but it can only measure accurately after the stabilization period.
If correction of insertion length is needed, loosen the cable holder sliding sleeve, adjust the probe to the desired level, and fasten the cable holder sliding sleeve.

5.1 HART® OUTPUT

HART®-capable transmitters can communicate with NIVELCO's MultiCONT universal process controller or through a HART®-USB modem with a PC using standard HART® commands; the devices can be programmed remotely with EView2 configuration software. The MultiCONT can power the transmitters, it provides a remote programming possibility and the measured values can be transmitted via RS485 communication line if needed. (See the details in the User's and Programming manual of MultiCONT). The current loop output of the units can be also configured with the EView2 software in the pressure range from 2% to 130%.
The damping time of the units can be also configured with the **EView2** software or with any HART® standard programming interface. The damping time is a time constant of a time period. Its minimal value: 0 sec., maximal value: 99 sec.

5.2 PARAMETERS AND PROGRAMMING

P0:- - - a (lowest) Pressure value assigned to 4 mA

P1:- - - a (highest) Pressure value assigned to 20 mA

P0 and P1 (lowest and highest) pressure values can be assigned to the 4 mA and 20 mA current loop output values.
When changing the factory set values make sure that the entered values fall within the specified range of the pressure transmitter otherwise the device will indicate error.
FACTORY DEFAULT:
P0 = [minimum measurable pressure value of the sensor] **mmH$_2$O** (usually 0000)
P1 = [maximum measurable pressure value of the sensor] **mmH$_2$O** (usually the possible max. value of the measurement range)

P5: Medium density [g/cm^3]

Minimum value: 0.5 g/cm^3. Maximum value: 2 g/cm^3.

(If thermal compensation is active, it is always determined by the density curve of water, regardless of the stored density value.)

FACTORY DEFAULT: 1 g/cm^3.

P9: Current generator test (mA)

With this parameter the user can test the current loop output by entering a value between 3.9 mA and 20.5 mA and test it with an ammeter.
Warning: the test mode can be cancelled only by entering 0000 to P9.

P10:- - - a Measuring mode

a		Measuring mode
0	mbar	Pressure
1	psi	
2	mm H$_2$O	Level (water head)
3	ft H$_2$O	
4	cm H2O	
5	m H2O	

FACTORY DEFAULT: 2

P10:- - b - Thermal compensation for water

Digit "b" of the P10 parameter toggles between normal and thermally compensated mode.
The thermally compensated mode applies to water medium and is only active for level measurement. In compensated mode, the current output, and PV is the compensated level. SV is the temperature. TV is always an uncompensated value, and QV is always a compensated value.

b	Thermal compensation
0	Level measurement without thermal compensation
1	Level measurement with thermal compensation

FACTORY DEFAULT: 0

P12:- - - a Error indication by the current loop output

a	Error indication
0	< 3.9 mA
1	> 21 mA

FACTORY DEFAULT: 0

P13: HART short address (Polling address)

If multiple HART®-capable transmitters are used in a loop, the instruments are distinguished by their polling addresses. If the polling address is 0 (default), the current output is 4…20 mA, and HART® communication works on the 4…20 mA current signal. Conforming to the HART® standard max. 15 HART® devices can be connected to a HART® loop with polling addresses between 1 and 15. Thus, the output current will be set to 4 mA and only the digital HART® communication will work. Instruments connected to the same loop should not have same polling addresses or 0 polling address set.

FACTORY DEFAULT: 0

P24: Damping Time

There is a possibility to setting the output damping time. Damping time is a constant value for a time period. The minimum value is 0 seconds, the maximum is 99 seconds.

FACTORY DEFAULT: 0

6. MAINTENANCE AND REPAIR

Sometimes the orifices of the NPK's protective cap and they need cleaning to remove surface deposits. Do not touch the sensor membrane when cleaning!
The membrane cap of threaded probes must be taken off before cleaning, and the filter behind it must also be removed. Do not touch the sensor membrane when cleaning!

7. STORAGE CONDITIONS

Storage temperature: −10…+50 °C (+14…+122 °F)
Relative humidity: max. 85%

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