Thank you for choosing a NIVELCO instrument.
We are sure that you will be satisfied throughout its use!

NIVOPRESS

HYDROSTATIC LEVEL TRANSMITTER

USER'S MANUAL

1. APPLICATION

The **NIVOPRESS N** submersible hydrostatic level transmitters are applicable for the continuous level measurement of clean or chemically faintly contaminated liquids in wells, open reservoirs or tanks. The NC type is recommended for level detection of polluted water. The **NIVOPRESS** is easy to install into already existing tanks and in deep drilled wells and is especially recommended for controlling submersible pumps. The use of the supplemental accessories is recommended. Using the **NAW-104** 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 (except **NC□-2□□-□**) have HART® communication interface. The **N□K-5□□-□ Ex** types can be used in explosion hazardous environment.

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		0 – 200 m (0 – 656 ft) water head	0 – 20 m (0 – 65 ft) water head	0 – 200 m (0 – 656 ft) water head		
		As per order code				
Overload allowed (as a function of range)		3x	20x (≤ 3 m w.h.) 10x (> 3 m w.h.)	3x (≤ 20 m w.h.) 2x (> 20 m w.h.)		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)		$R \geq \frac{(U_t - U_{min})}{0,02\,A}$				≥ 5 kohm
Built-in temperature sensor		HART® secondary value, accuracy: ±3 °C (±5.4°F)	–	HART® secondary value, accuracy: ±3 °C (±5.4°F)		–
Linearity error (level transmitter)		±0.25%		±0.45% (≤ 20 m w.h.) ±0.25% (> 20 m w.h.)		±0.25%
Temperature error		≤ ±0.1% / 10 K				≤ ±0.2% / 10 K
Operating temperature*		-30 °C … +60 °C (-22 °F … +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** Ø22 x 173 mm (NP, NF: Ø0.87 x 6.8 inch) **NZ, NR:** Ø38 x 174 mm (NZ, NR: Ø1.5 x 6.85 inch)	Ø40 x 146 mm (Ø1.55 x 5.75 inch)	**NK, NN** Ø22 x 173 mm (Ø0.87 x 6.8 inch) **ND, NH:** Ø38 x 174 mm (Ø1.5 x 6.85 inch)	Ø24 x 212 mm (Ø1 x 8.3 inch)	**NPH:** Ø22 x 173 mm (NPH: Ø0.87 x 6.8 inch) **NZH:** Ø38 x 174 mm (NZH: Ø1.5 x 6.85 inch)
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 °C … +60 °C (32 °F … +140 °F); Accuracy: ±3 °C (±5.4 °F)				-
Additional temperature transmitter **N□P** types		Pt100 B sensor, 2-wires				-
Material of wetted parts	Sensor	1.4404	Al_2O_3 ceramic			1.4404
	Housing	1.4571			POM-C	1.4571
	Cable coating	Polyurethane / FEP				
	Sealing	Viton® (FKM)				
	Protecting cap	1.4571	–	1.4571	POM-C	1.4571

*special order max. +75 °C

SPECIAL DATA FOR EX CERTIFIED MODELS

TYPE	**N□□-5□□-□**
Power supply	14 – 30 V DC
Ex marking	Up to 100 m (328 ft) cable length: Ex II 1G Ex ia IIC T6 Ga, between 100 m (328 ft) and 300 m (985 ft) cable length: Ex II 1G Ex ia IIB T6 Ga
Temperature range	-30 °C … +60 °C (-22 °F … +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 °C … +70 °C (-40 °F … +158 °F)	
Material	Polistyrol	
Cable gland	M20 x1.5 (cable ∅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 °C … + 60 °C (-4 °F … +140 °F)	
OVERVOLTAGE PROTECTION	**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!

2.1 ACCESSORIES

- User's Manual
- Warranty Card
- Declaration of Conformity

Manufacturer:
NIVELCO Process Control Co.
H-1043 Budapest, Dugonics u. 11.
Phone: (36-1) 889-0100 ■ Fax: (36-1) 889-0200
E-mail: sales@nivelco.com ■ www.nivelco.com

CE 1418

2.2 ORDER CODE (NOT ALL COMBINATIONS POSSIBLE!)

NIVOPRESS N ☐☐ – ☐☐☐ – ☐

SENSOR / CABLE MATERIAL / HOUSING / PROCESS CONN.	CODE
Ceramic (capacitive) / PUR / 1.4571	**C**
Ceramic (capacitive) / FEP / 1.4571	**T**
Stainless steel (piezoresistive) / PUR / 1.4571	**P**
Stainless steel (piezoresistive) / FEP / 1.4571	**F**
Stainless steel (piezoresistive) / PUR / 1.4571 / ¾" threaded	**Z**
Stainless steel (piezoresistive) / FEP / 1.4571 / ¾" threaded	**R**
Ceramic (piezoresistive) / PUR / 1.4571	**K**
Ceramic (piezoresistive) / FEP / 1.4571	**N**
Ceramic (piezoresistive) / PUR / 1.4571 / ¾" threaded	**D**
Ceramic (piezoresistive) / FEP / 1.4571 / ¾" threaded	**H**
Ceramic (piezoresistive) / PUR / POM	**B**
Ceramic (piezoresistive) / FEP / POM	**G**

OUTPUT	CODE
2-wire 4 – 20 mA +HART®	**K**
3-wire 0 –10 V DC	**H**
4 – 20 mA, level + HART® and 4 – 20 mA temperature	**D**
4 – 20 mA +HART® and Pt100B	**P**

VERSION	CODE
Normal NC	**2**
Normal	**4**
Ex	**5**

MEASURING RANGE *	CODE
1 m water head	**1**
2 m water head	**2**
5 m water head	**3**
10 m water head	**4**
20 m water head	**5**
50 m water head	**6**
100 m water head	**7**
200 m water head	**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**

**can be set within the range on special request*

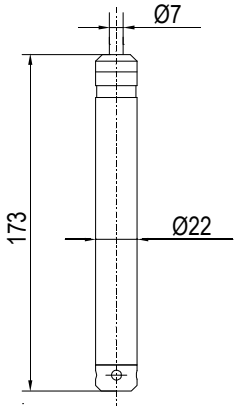
ACCESSORIES

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

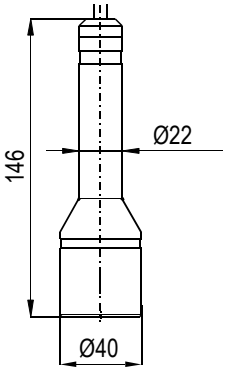
Sewage adapter	**NAW-104**
Overvoltage protection units	**OVP 22 / 33 (outdoor)**
	OVP 32 / 33 (rail mountable)

2.3 DIMENSIONS

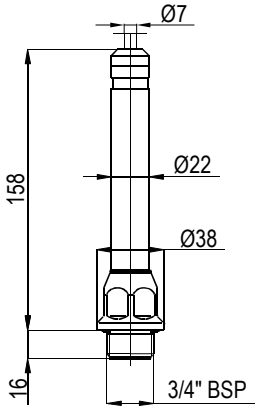
NIVOPRESS NP PROBE



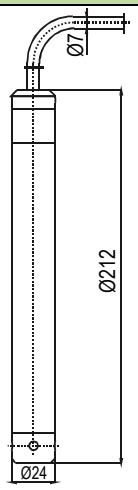
NIVOPRESS NC PROBE



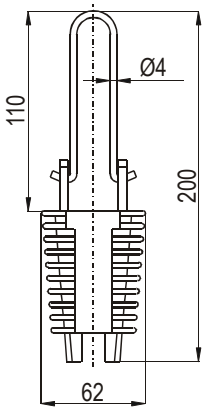
NIVOPRESS NZ PROBE



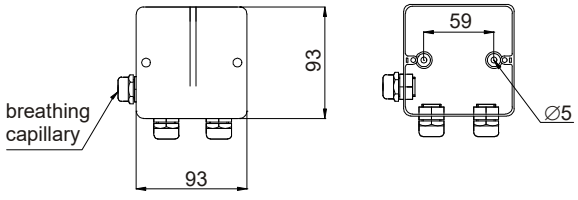
NIVOPRESS NB PROBE



CABLE HOLDING WEDGE CLAMP NAA-209

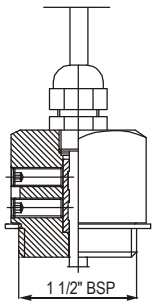


CABLE TERMINAL BOX NAA-101 and NAA-102

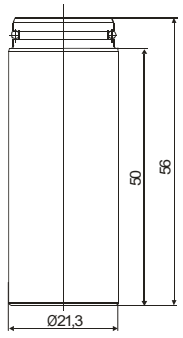


NAA-102 is featuring an OVP 22 / 33 overvoltage protection unit

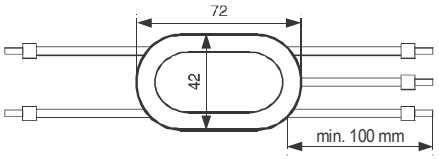
CABLE HOLDING SLIDING SLEEVE NAA-105



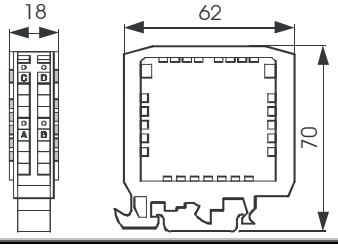
SEWAGE ADAPTER NAW-104



OVP 22 / 33 OVERVOLTAGE PROTECTION UNIT

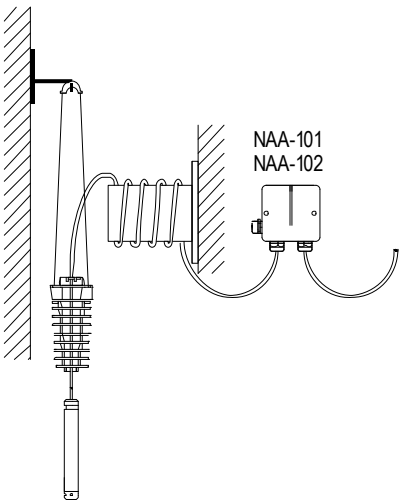


OVP 32 / 33 OVERVOLTAGE PROTECTION UNIT



3. INSTALLATION

MOUNTING EXAMPLE



For fastening the cable use NAA-209 cable mounting wedge clamp that provides a solution for hanging the cable without slipping and risk of rupture.

For the NP and NK types the NAW-104 sewage adapter can be snapped in the place of the sensor protecting cap.

For the NZ and ND types the NAZ-103 threaded sewage adapter can be used.

STEPS OF INSTALLATION

- The cable of the level transmitter should not be twisted. In case of NZ / NR types with threaded connection, make sure that the cable is not fixed prior to screw the sensor into the suitable process connection.
- Feed the special cable through the glands, arrange proper length of cable and fasten the cable with the glands.
- Excessive cable parts have to be wound on a pipe with a min. diameter of 100 mm.
  The special cable must not be cut short!
- Let the probe down to the lowest possible point, as only the height of the liquid above the probe will be measured.

For connecting the special breathing cable and the signal cable use the cable terminal box **NAA-101** or **NAA-102** (with IP65), that accommodates the cable end in an ambience free of dust and humidity. Fasten the cable terminal box (e.g. by the use of 2 pcs of M4 screw) to a plain surface. In open air or industrial applications the transmitter should be protected against transient surges / overvoltage.

The GND of the OVP must be connected with the shortest possible wire to the protecting ground. In this case it is suggested the **NAA-102** terminal box (with OVP) is installed close to the location of the measurement.

At the opposite end of the cabling the use of an additional over-voltage protection (**OVP 22 / 33** or **OVP 32 / 33**) is advised close to the processing unit.

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

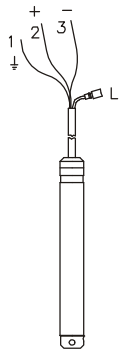
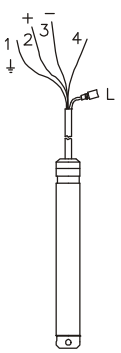
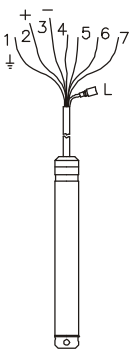
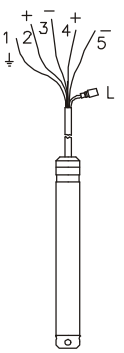
In case of Ex devices the **OVP 22 / 33** and **OVP 32 / 33** overvoltage protection unit must not be used!

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

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.

- The water temperature must not exceed 60 °C, or in case of **NZ** probe 30 °C.
- Before use of the hydrostatic level transmitter, the cleaning and disinfection of the surface must be carried out according to the related regulations of the application area. The applied cleaning detergent may not cause any damage to the hydrostatic level transmitter or in its material. For cleaning and disinfection only detergents or disinfectants authorized by the Office of the Chief Medical Officer (OCMO) may be used.
- It is recommended to rinse the device before use to remove surface deposits! The rinsing water has to be purged into the drain and must not be used for household purposes. The usage of the product in the named applications is only allowed after these precautions**.**

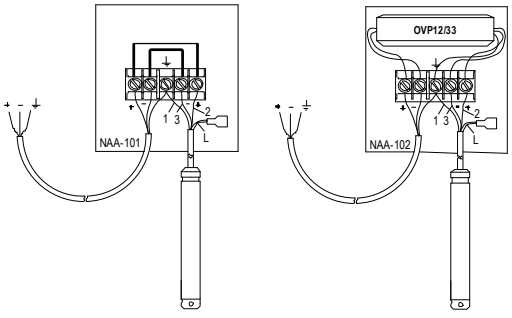
4. WIRING

2-WIRE LEVEL 4 – 20 mA	**3-WIRE LEVEL 0 – 10 V**	**2-WIRE 4 – 20 mA + Pt100**	**LEVEL + TEMPERATURE 4 – 20 mA + HART®**
			

LEGEND:

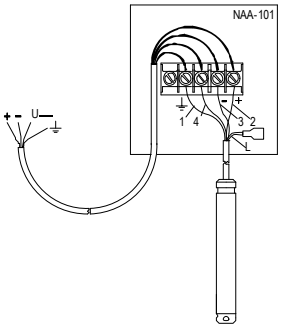
	CABLE CORE	COLOUR
1	Shielding	Yellow
2	Positive power supply	Red
3	Negative power supply, Voltage output (-)	Black with an additional blue-coloured insulation
4	NPH / NZH (3-wire) types: Voltage output (+); NPP / NZP types: Pt100 sensor current drive; NPD / NZD types: positive power supply of the temperature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

2-WIRE 4 – 20 mA

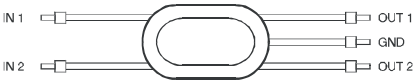


wiring of NAA-101 wiring of NAA-102

3-WIRE 0 – 10 V DC



WIRING OF OVP 22 / 33



IN1, IN2 – inputs

OUT1, OUT2 – inputs

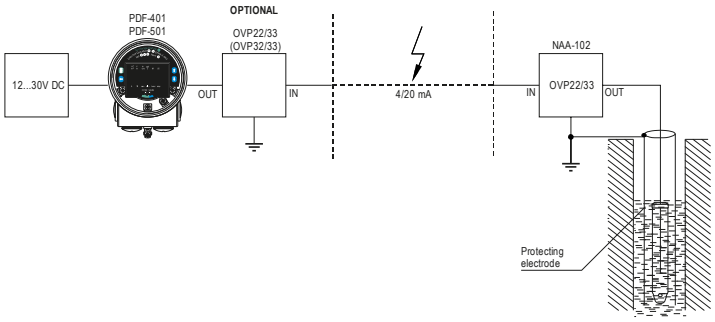
GND – ground

WIRING OF OVP 32 / 33

H	G
F	E
O_1	O_2
I_1	I_2
C	D
A	B

I1 (C), I2 (D) – inputs
O1 (F), O2 (E) – inputs
A, B, H, G – ground

Installation example using Over Voltage Protection units



4.1 SPECIAL CONDITIONS FOR SAFE USE

The 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 power supply with the previously given technical data.

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

5. PUTTING INTO OPERATION, CONFIGURATION

The unit installed and wired according to the specification is immediately operable, however the specified accuracy will be reached in six-hour time with short cable and in twenty-four-hour time with a cable of 300 m (985 ft) length. If correction of insertion length is needed loosen the cable holding sliding sleeve then place the probe to the desired level and finally fasten the cable holding sliding sleeve.

5.1 HART® OUTPUT

HART® capable transmitters are able to communicate using standard HART® commands with **NIVELCO's MultiCONT** universal process controller or through a HART®-USB modem with a PC and remote programming can be done with the **EView2** configuration software. The **MultiCONT** can power the transmitters, provides remote programming possibility and the measurement values can be transmitted on RS485 communication line if needed. (See the details in the User's and Programming manual of **MultiCONT**).

The current 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 DESCRIPTION OF PARAMETERS AND PROGRAMMING

P0:- - - a Pressure value assigned to 4 mA

P1:- - - a Pressure value assigned to 20 mA

P0 and P1 pressure values can be assigned to the 4 mA and 20 mA current 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 instrument will indicate error.

FACTORY DEFAULT:
P0 = [minimum measurable pressure value of the sensor] **mmH_2O** (usually 0000)
P1 = [maximum measurable pressure value of the sensor] **mmH_2O** (usually the possible max. value of the measurement range)

P9: Current generator test (mA)

With this parameter the user can test the current 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_2O	Level (water head)
3	ft H_2O	
4	cm H_2O	
5	m H_2O	

FACTORY DEFAULT: P10 = 2

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

a	Error indication
0	< 3.9 mA
1	> 21 mA

FACTORY DEFAULT: P12 = 0

P13: HART® short address (Polling address)

If multiple HART® capable transmitters are used in a loop the instruments have to be distinguished by their polling addresses. If 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: P13 = 0

P24: Damping Time

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

FACTORY DEFAULT: 0

6. MAINTENANCE, REPAIR

In **NPK** types in some instances, the probe may need occasional cleaning to remove surface deposits within the protective cap that can be easily snapped off. During cleaning, do not touch the sensor membrane!
In the case of threaded type probes, the membrane shield cap must be squeezing out before cleaning, and then the filter behind it should be removed. During cleaning, do not touch the sensor membrane!

7. STORAGE CONDITIONS

Ambient temperature: -10 °C … +50 °C
Relative humidity: max. 85%

npk4110a0600h_05
January 2018