

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 NCK-2□□-□) have HART communication interface. The NCK-5□□-□ Ex types can be used in explosion hazardous environment.

### 2. TECHNICAL DATA

SUBMERSIBLE PROBE	2 WIRE				3 WIRE
	NP, NZ	NCK-2/NCP-2	NK, NN, ND, NH	NB, NG	N□H
Measurement range	0 ... 200 m water head	0 ... 20 m water head	0 ... 200 m water head		0 ... 200 m 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 / 6mA
Max. load (U <sub>i</sub> = power supply; U <sub>min</sub> = min. power supply 12 V)	$R_{min} = \frac{U_i - U_{min}}{0.02A}$				≥ 5 kΩ
Temperature transmitter N□□ types	Power supply: 14...30 V DC/4...20mA; 0...+60°C, accuracy: ±3°C				
Temperature sensor, Pt100 B	N□□ types	N□□-2 types	-		-
Linearity error (level transmitter)	±0.25 %	±0.25 %	±0.45 % (≤ 20 m w.h.) ±0.25 % (> 20 m w.h.)		±0.25 %
Temperature error	≤ ± 0.1 % / 10 K		≤ ± 0.1 % / 10 K		≤ ± 0.2 % / 10 K
Operating temperature*	-30 ... +60 °C				
Process connection	NAA-209 cable mounting wedge clamp, threaded types with 3/4" BSP thread				
Ingress protection	IP68				
Electrical protection	Class III.				
Electrical connection	Shielded cable with breathing capillary Ø 7 mm				
Wire cross section	0,34 mm <sup>2</sup>				
Cable length	0 ... 300 m as per order code; (Ex ia IIC: max. 100m)				
Dimensions	NP, NF: Ø22x173 mm NZ, NR: Ø38x174 mm	Ø40x146mm	NK, NN Ø22x173 mm ND, NH: Ø38x174 mm	Ø24x212 mm	NPH: Ø22x173 mm NZH: Ø38x174 mm
Mass	NP, NF: probe: 0.2 kg NZ, NR: probe: 0.3kg	Probe: 0.4 kg	Probe: 0.2 kg		
	Cable: PUR cable: 0.065 kg/m, FEP cable: 0.072 kg/m				
Material of wetted parts	Sensor	1.4404	Al <sub>2</sub> O <sub>3</sub> 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

\* special order max. +75°C

### SPECIAL DATA FOR EX CERTIFIED MODELS

TYPE	NPK/NPP/NFK/NFP/NZK/NZP/NRK/NRP/NKK/NKP/NNK/NNP/NDK/NDP/NHK/NHP/NCK/NCP/NTK/NTP-5□□-□
Power supply	14...30 V DC
Ex marking	Up to 100 m cable length:  II 1G Ex ia IIC T6 Ga, between 100 m and 300m cable length:  II 1G Ex ia IIB T6 Ga
Temperature range	-30 ... +60 °C
Intrinsically safe data	U <sub>i</sub> = 30 V, I <sub>i</sub> = 100 mA, P <sub>i</sub> = 0,8 W for IIC gas group: Ci ≤ 52nF, Li ≤ 1.4mH (calculated with 100 meter integrated cable), for IIB gas group: Ci ≤ 132nF, Li ≤ 1.6mH

### ACCESSORIES

<b>CABLE TERMINAL BOX</b>	<b>NAA-101</b>	
Dimensions	93 x 93 x 55 mm	
Ingress protection	IP 65	
Operating temperature	-40 °C ... +70 °C	
Material	Polistyröl	
Cable gland	M20x1.5 (cable Ø 5... Ø 10 mm)	
Electrical connection	Terminal block for cable with max. cross section of 2.5 mm <sup>2</sup>	
<b>CABLE TERMINAL BOX WITH OVERVOLTAGE PROTECTION *</b>	<b>NAA-102</b>	
Data	See: NAA-101	
Electrical data	See: OVP	
<b>CABLE MOUNTING WEDGE CLAMP</b>	<b>NAA-209</b>	
Max. mech. load	300 m cable	
Operating temperature	-20 °C ... + 60 °C	
<b>OVERVOLTAGE PROTECTION</b>	<b>OVP22/33 *</b>	<b>OVP32/33 *</b>
Mounting	outdoor	EN 60715 - 35 mm rail
Dimensions	72 x 42 x 19 mm	62 x 65 x 18 mm
Ingress protection	IP 54	IP 20
Breakdown voltage	33 V	
Absorbed energy	600 W / 1 ms	
Internal resistance	13 Ω	
Leakage current	≤ 10 µA	

\* only for 2-wire 4...20mA equipments!

NIVELCO



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### 2.1 ACCESSORIES

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

## 2.2 ORDER CODE (NOT ALL COMBINATIONS POSSIBLE!)

NIVOPRESS N   -    -

SENSOR / CABLE MATERIAL / HOUSING / PROCESS CONN.	CODE	OUTPUT	CODE	VERSION	CODE	MEASURING RANGE *	CODE	CODE	CABLE LENGTH		CODE	
Ceramic (capacitive) / PUR / 1.4571	C	2-wire 4 – 20 mA +HART	K	Normal NC	2	1 m water head	1	0	0 m	Up to 100 m	0 m	0
Ceramic (capacitive) / FEP / 1.4571	T	3-wire 0 ... 10 V DC	H	Normal	4	2 m water head	2	1	10 m		1 m	1
Stainless steel (piezoresistive) / PUR / 1.4571	P	4 – 20 mA, level + HART and 4 – 20 mA temperature	D	Ex	5	5 m water head	3	:	:		:	:
Stainless steel (piezoresistive) / FEP / 1.4571	F					10 m water head	4	9	90 m	9 m	9	
Stainless steel (piezoresistive) / PUR / 1.4571 / 3/4" threaded	Z	4 – 20 mA +HART and Pt100B	P			20 m water head	5	A	100 m	Over 100 m	0 m	0
Stainless steel (piezoresistive) / FEP / 1.4571 / 3/4" threaded	R			50 m water head	6	B	200 m	10 m	1			
Ceramic (piezoresistive) / PUR / 1.4571	K					100 m water head	7	C	300 m		:	:
Ceramic (piezoresistive) / FEP / 1.4571	N					200 m water head	8			90 m	9	
Ceramic (piezoresistive) / PUR / 1.4571 / 3/4" threaded	D											
Ceramic (piezoresistive) / FEP / 1.4571 / 3/4" threaded	H											
Ceramic (piezoresistive) / PUR / POM	B											
Ceramic (piezoresistive) / FEP / POM	G											

\* 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	OVP22/33 (outdoor)
	OVP32/33 (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		CABLE HOLDING SLIDING SLEEVE NAA-105		SEWAGE ADAPTER NAW-104
OVP 22/33 OVERVOLTAGE PROTECTION UNIT				OVP 32/33 OVERVOLTAGE PROTECTION UNIT

### 3. INSTALLATION

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

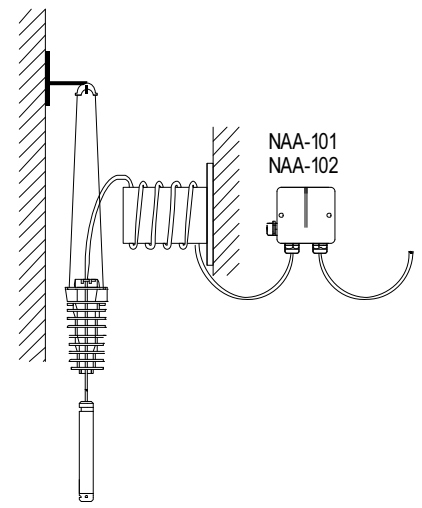
- The cable of the level transmitter should not be twisted. In case of NZ / NR types with threaded connection, make sure that the cable is not fixed prior to screw the sensor into the suitable process connection.
- Feed the special cable through the glands, arrange proper length of cable and fasten the 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 **NAA101** or **NAA102** (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.

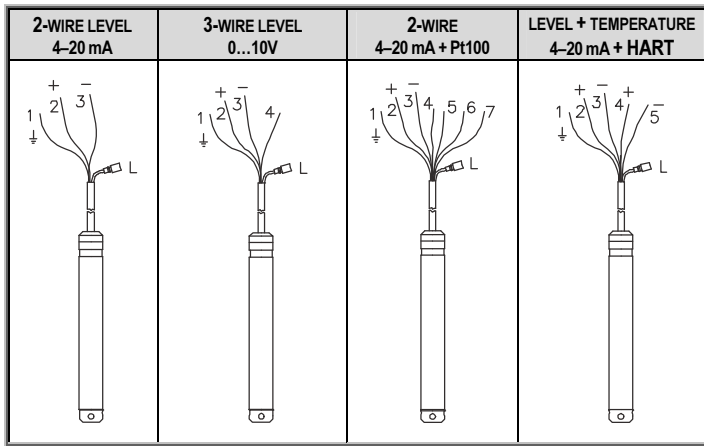
The GND of the OVP must be connected with the shortest possible wire to the protecting ground. In this case it is suggested the **NAA-102** terminal box (with OVP) is installed close to the location of the measurement.

At the opposite end of the cabling the use of an additional over-voltage protection (**OVP22/33** or **OVP32/33**) is advised close to the processing unit. If safety is a priority, use of a protecting electrode enhances the efficiency of the electrical protection!

#### MOUNTING EXAMPLE



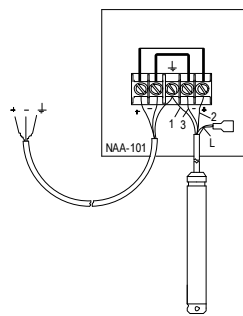
### 4. WIRING



#### LEGEND:

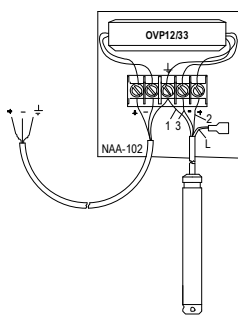
	CABLE CORE	COLOUR
1	Shielding	Yellow
2	Positive power supply	Red
3	Negative power supply, Voltage output (-)	Black with an additional blue-coloured insulation
4	NPH/NZH (3-wire) types: Voltage output (+); NPP/NZP types: Pt100 sensor current drive; NPD/NZD types: positive power supply of the temperature 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

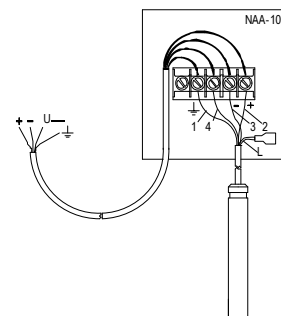


wiring of NAA-101

#### 3-WIRE 0 ... 10 V DC



wiring of NAA-102



#### WIRING OF OVP 22/33



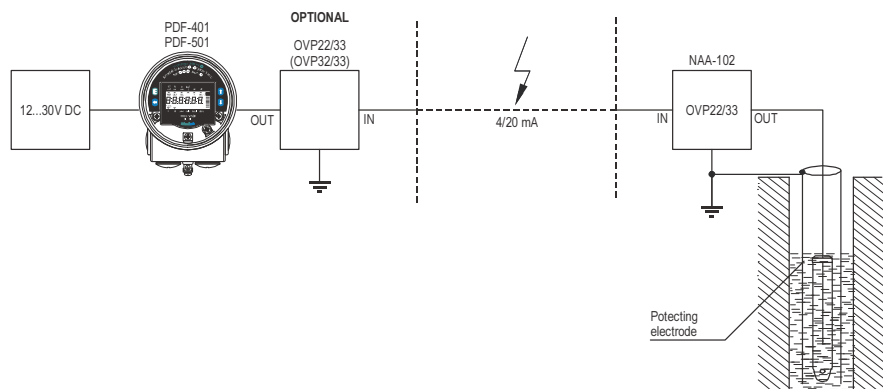
IN1, IN2 – inputs  
OUT1, OUT2 – inputs  
GND – ground

#### WIRING OF OVP 32/33

H	G
F	E
O <sub>1</sub>	O <sub>2</sub>
I <sub>1</sub>	I <sub>2</sub>
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.

#### 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 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 EVIEW 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 EVIEW software in the pressure range from 2% to 130%.

The damping time of the units can be also configured with the EVIEW 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 4mA and 20mA 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<sub>2</sub>O (usually 0000)

P1 = [maximum measurable pressure value of the sensor] mmH<sub>2</sub>O (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 <sub>2</sub> O	Level (water head)
3	ft H <sub>2</sub> O	

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 4mA 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

#### 6. MAINTENANCE, REPAIR

The unit does not require regular maintenance. In some instances, however, the probe may need occasional cleaning to remove surface deposits within the protective cap that can be easily snapped off (NPK types). Do not touch the sensor membrane. Repairs during or beyond the warranty period are to be carried out solely by the Manufacturer. Equipments sent back for repair should be cleaned or sterilised by the User. The User must declare that the above has been carried out.

#### 7. STORAGE CONDITIONS

Ambient temperature: -10 °C ... +50 °C

Relative humidity: max. 85%

#### 8. WARRANTY

NIVELCO provides warranty of 3 (three) years in compliance with details described in the Warranty Card.

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*NIVELCO reserves the right to change technical data without notice!*