

FOR CLEAN WATER AND SEWAGE WATER

# NIVOPRESS N

HYDROSTATIC LEVEL TRANSMITTERS

3 YEARS WARRANTY @ NIVELCO – WHERE ELSE?

**NIVELCO**

LEVEL TRANSMITTERS



## NIVOPRESS N HYDROSTATIC LEVEL TRANSMITTERS FOR CLEAN WATER AND SEWAGE

### MAIN FEATURES

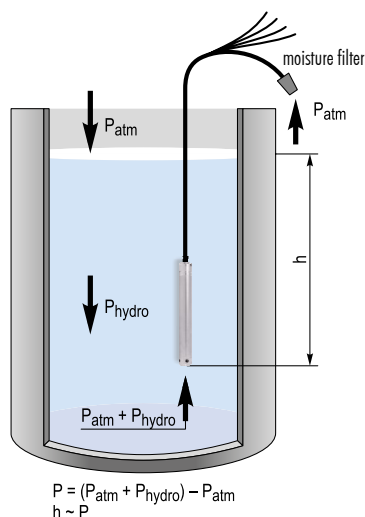
- Measuring range up to 200 m (656 ft)
- IP68 protection
- Remote programmable
- Submersible or screw-in types
- Ø 22/24 mm (Ø 0.85/1 inch) tube
- HART communication
- 2- or 3-wire versions
- 2x 4-20 mA output (level + temperature)
- Built-in Pt100 temperature sensor
- Overvoltage and inverse polarity protection
- Wide range of accessories
- Ex version
- Can be certified for potable water
- Available with capacitance ceramic, piezoresistive stainless steel or ceramic sensor

### APPLICATIONS

- Level and temperature measurement of drinking water wells, tanks, pools
- Submersible pump control
- Screw-in submersible type with IP68 protection for applications with risk of flooding
- Clean or slightly contaminated liquids
- Sewage, wastewater
- Draw-down protection
- Sewage lift station control
- Saline solutions, seawater



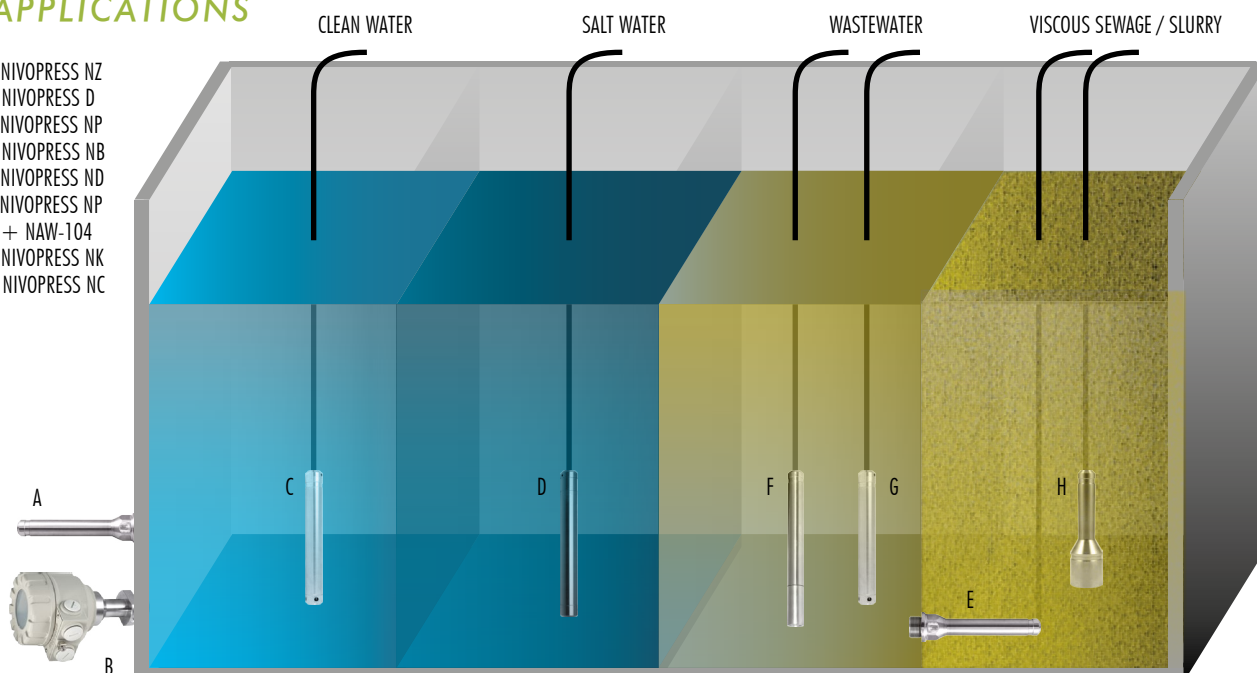
### GENERAL DESCRIPTION



The **NIVOPRESS N** hydrostatic borehole level transmitters are designed to measure the level of clean or contaminated liquids. The pressure sensor at the bottom of the probe measures the hydrostatic pressure ( $P_{hydr}$ ) of the liquid column above it and compares with the atmospheric pressure ( $P_{atm}$ ). The atmospheric pressure is led to the sensor through a breathing capillary which is equipped with a moisture filter that prevents the moisture reaching the electronics and decreasing the accuracy of the measurement. This enables the atmospheric pressure to be subtracted from the measured pressure to get the hydrostatic pressure which is proportional to the height of the liquid column ( $h$ ). The electronics converts the sensor's signal into an output signal. If temperature measurement (of the liquid) is needed beside the level measurement a combined (level + temperature) transmitter should be used. The installation and wiring of the transmitter is helped by the wide variety of accessories. A sewage adapter working on the principle of the diving bell can be snapped (NP) or can be screwed (NZ) into the place of the protecting cap to avoid the direct contact between the sensor and the measured contaminated liquid. An extra mechanical protection is built in the NZ type sewage adapters in the form of a mechanical filter. The **N-500** types can be used in hazardous environments. The **NZ** screw-in type transmitters are recommended for applications where there is a risk of flooding. The **NB/NG** plastic housing types are designed for those applications where the aggressive medium (e.g. saline solutions or seawater) could cause galvanic corrosion of the stainless steel body.

### APPLICATIONS

- A: NIVOPRESS NZ
- B: NIVOPRESS D
- C: NIVOPRESS NP
- D: NIVOPRESS NB
- E: NIVOPRESS ND
- F: NIVOPRESS NP + NAW-104
- G: NIVOPRESS NK
- H: NIVOPRESS NC



## TECHNICAL DATA

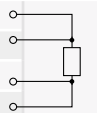
| Type                                                                               |                | 2-wire                                                                                                                |                                                                                |                                    |                                                                          | 3-wire                                                |
|------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------|
|                                                                                    |                | NB, NG                                                                                                                | NK, NN / ND, NH                                                                | NC, NT                             | NP, NF / NZ, NR                                                          | NPH, NFH / NZH, NRH                                   |
| Sensor type                                                                        | Principle      | Piezoresistive                                                                                                        |                                                                                | Capacitance                        | Piezoresistive                                                           |                                                       |
|                                                                                    | Material       | Ceramic                                                                                                               |                                                                                |                                    | Stainless steel                                                          |                                                       |
| Housing                                                                            |                | Plastic                                                                                                               | Stainless steel                                                                |                                    |                                                                          |                                                       |
| Measuring range                                                                    |                | 0 ... 20 m (0 ... 65 ft) water head                                                                                   |                                                                                |                                    | 0 ... 200 m (0 ... 656 ft) water head                                    |                                                       |
|                                                                                    |                | As per order code; the current output can be customized in the pressure range from 2% to 130% with remote programming |                                                                                |                                    |                                                                          |                                                       |
| Overload allowed (versus range)                                                    |                | 3 x                                                                                                                   |                                                                                | 20x (h ≤ 3 mvo)<br>10x (h > 3 mvo) | 3 x                                                                      |                                                       |
| Output                                                                             |                | 4 – 20 mA + HART                                                                                                      |                                                                                | 4 – 20 mA                          | 4 – 20 mA + HART                                                         | 0 – 10V (0 V ≤ 80 mV)<br>measured to the power supply |
| Power supply                                                                       |                | 12 – 30 V DC                                                                                                          |                                                                                |                                    |                                                                          | 18 – 30 V DC / 6 mA                                   |
| Max. load (U <sub>f</sub> = power supply;<br>U <sub>min</sub> = min. power supply) |                | $R_{\min} = \frac{(U_f - U_{\min})}{0.02 \text{ A}}$                                                                  |                                                                                |                                    |                                                                          | ≥ 5 kΩ                                                |
| Temperature transmitter<br>NPD, NZD types                                          |                | Power supply: 14 – 30 V DC / 4 – 20 mA; 0...+60°C (32 °F ... 140 °F), Accuracy: ±3°C (±5.4°F)                         |                                                                                |                                    |                                                                          |                                                       |
| Temperature sensor Pt100 B                                                         |                | N□P types                                                                                                             |                                                                                | NCP types                          | N□P types                                                                | –                                                     |
| Linearity error (level)                                                            |                | ± 0.45 %                                                                                                              |                                                                                | ± 0.25 %                           |                                                                          |                                                       |
| Temperature error                                                                  |                | ≤ ± 0.1 % / 10 K                                                                                                      |                                                                                |                                    |                                                                          | ≤ ± 0.2 % / 10 K                                      |
| Process temperature (1)                                                            |                | –30 °C ... +60 °C (-22 °F ... 140 °F)                                                                                 |                                                                                |                                    |                                                                          |                                                       |
| Process connection                                                                 |                | NAA-209 cable mounting wedge clamp, NZ, NR, ND, NH types: ¾" BSP thread                                               |                                                                                |                                    |                                                                          |                                                       |
| Ingress protection                                                                 |                | IP68                                                                                                                  |                                                                                |                                    |                                                                          |                                                       |
| Electrical protection                                                              |                | Class III.                                                                                                            |                                                                                |                                    |                                                                          |                                                       |
| Electrical connection                                                              |                | Shielded cable with breathing capillary                                                                               |                                                                                |                                    |                                                                          |                                                       |
| Cable                                                                              |                | Ø 7 mm (0.275 inch); 0.34 mm² (AWG22)                                                                                 |                                                                                |                                    |                                                                          |                                                       |
| Cable length                                                                       |                | 0 ... 300 m (0 ... 985 ft) as order code                                                                              |                                                                                |                                    |                                                                          |                                                       |
| Dimensions                                                                         |                | Ø 24x212 mm<br>(1x8.3 inch)                                                                                           | NK,NN: Ø 22x173 mm<br>(0.87x6.8 inch)<br>ND,NH: Ø 38x174 mm<br>(1.5x6.85 inch) | Ø 40x146 mm<br>(1.55x5.75 inch)    | NP,NF: Ø 22x173 mm (0.87x6.8 inch)<br>NZ,NR: Ø 38x174 mm (1.5x6.85 inch) |                                                       |
| Mass                                                                               |                | Probe: 0.15 kg                                                                                                        | NK,NN: Probe: 0.2 kg (0.44 lb)<br>ND,NH: Probe: 0.3 kg (0.66 lb)               | Probe: 0.4 kg<br>(0.88 lb)         | NP,NF: Probe: 0.2 kg (0.44 lb)<br>NZ,NR: Probe: 0.3 kg (0.66 lb)         |                                                       |
| Material of wetted parts                                                           | Sensor         | Al <sub>2</sub> O <sub>3</sub>                                                                                        |                                                                                |                                    | 1.4404 (316L)                                                            |                                                       |
|                                                                                    | Housing        | POM                                                                                                                   | 1.4571 (316 Ti)                                                                |                                    |                                                                          |                                                       |
|                                                                                    | Cable coating  | Polyurethane (PUR) or FEP                                                                                             |                                                                                |                                    |                                                                          |                                                       |
|                                                                                    | Sealings       | VITON (FKM)                                                                                                           |                                                                                |                                    |                                                                          |                                                       |
|                                                                                    | Protecting cap | POM                                                                                                                   | 1.4571 (316 Ti)                                                                | –                                  | 1.4571 (316 Ti)                                                          |                                                       |

(1) High temperature (up to 75 °C (167 °F)) version is available on special request

## SPECIAL DATA FOR Ex CERTIFIED MODELS

| Type                        | NP / NZ – 500 types                                                                                                                                                           |  |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Protection type             | Intrinsically safe                                                                                                                                                            |  |
| Ex marking                  | ATEX II 1G Ex ia IIC T6                                                                                                                                                       |  |
| Intrinsically safe data     | U <sub>i</sub> = 30 V, I <sub>i</sub> = 100 mA, P <sub>i</sub> = 0.8 W, C <sub>i</sub> = 12 nF + h x 0.4 nF; L <sub>i</sub> = 1.3 mH + h x 0.9 µH (h = cable length in meter) |  |
| Power supply                | 14 – 30 V DC                                                                                                                                                                  |  |
| Operation temperature range | –10 °C ... 60 °C (14 °F ... 140 °F)                                                                                                                                           |  |

## WIRING

| Type                                       | N□K | N□H              | N□D    | N□P                                                                                            |
|--------------------------------------------|-----|------------------|--------|------------------------------------------------------------------------------------------------|
| Cable wire                                 |     |                  |        |                                                                                                |
| 1 yellow                                   | ⏏   | ⏏                | ⏏      | ⏏                                                                                              |
| 2 red                                      | I+  | U+               | I+     | I+                                                                                             |
| 3 black/blue                               | I–  | U–               | I–     | I–                                                                                             |
| 4 uncolored                                | –   | U <sub>out</sub> | I+(°C) | <br>Pt100 |
| 6 black                                    | –   | –                | –      |                                                                                                |
| 7 black/red                                | –   | –                | –      |                                                                                                |
| 5 uncolored/blue                           | –   | –                | I–(°C) |                                                                                                |
| L breathing capillary with moisture filter | L   | L                | L      | L                                                                                              |

## DIMENSIONS

| NP/NK | NP/NK+<br>NAW-104 | NZ/ND | NZ/ND+<br>NAZ-103 | NC | NB/NG | NB/NG+<br>NAW-107 |
|-------|-------------------|-------|-------------------|----|-------|-------------------|
|       |                   |       |                   |    |       |                   |

## ACCESSORIES

A wide range of accessories make an easier and safer installation and usage of the **NIVOPRESS N** hydrostatic level transmitters.

**NAA-101:** Cable terminal box with moisture filter and terminals for wiring the unit

**NAA-102:** Cable terminal box with moisture filter and terminals with built-in OVP-22/33 type overvoltage protection unit for wiring the level transmitter

**NAA-209:** Cable mounting wedge clamp

**OVP-22/33:** Outdoor overvoltage protection unit for use in 4-20 mA loop with IP54 protection

**OVP-32/33:** Indoor overvoltage protection unit for use in 4-20 mA loop with IP20 protection, EN 60715 rail mountable type

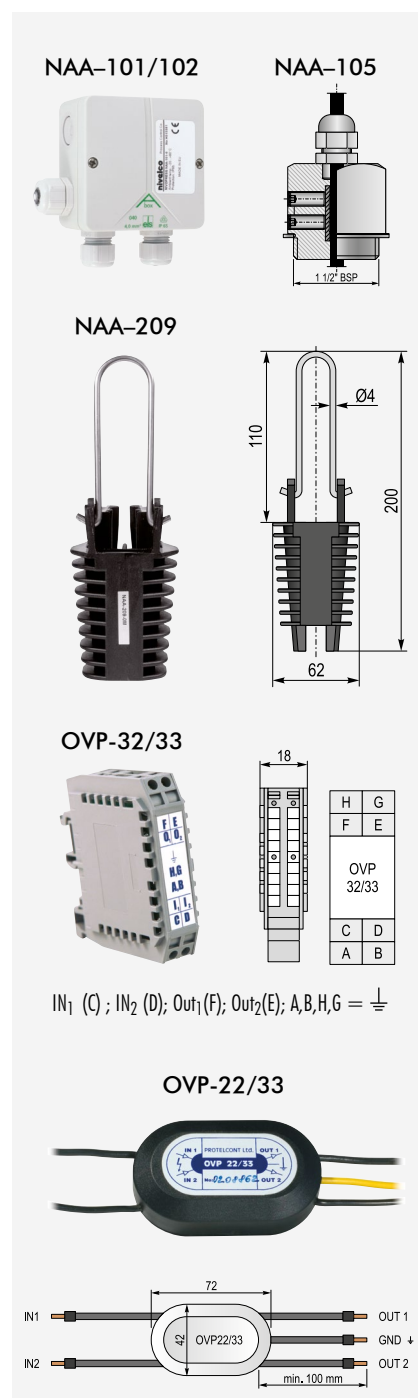
**NAW-104, NAW-107, NAZ-103:** Sewage adapter made from 1.4571 (316 Ti) stainless steel or plastic (POM). The NP/NK/NB type probes can be equipped with the suitable sewage adapter (NAW-104 or NAW-107) by snapping instead of the sensor protective cap. The NAZ-103 type sewage adapters can be screwed to the NZ/ND types with 3/4" threaded process connection. The air layer below the sewage adapter helps to avoid the direct contact between the sensor and the measured contaminated liquid.

**NAA-105, NAA-106:** Cable sliding sleeve with 1 1/2" BSP or NPT thread; material: st. steel 1.4571 (316 Ti)

### Technical data of the 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                                       | Plastic                                                                         |                                             |
| Cable gland                                    | M20x1.5 (cable Ø 5... Ø 10 mm (0.2 ... 0.4 inch)                                |                                             |
| Electrical connection                          | Terminal block for cable with max. cross section of 2.5 mm <sup>2</sup> (AWG13) |                                             |
| Cable terminal box with overvoltage protection | NAA-102(2)                                                                      |                                             |
| Data                                           | See NAA-101                                                                     |                                             |
| Electrical Data                                | See OVP                                                                         |                                             |
| Cable mounting wedge clamp                     | NAA-209                                                                         |                                             |
| Max. mechanical load                           | 300 m (985 ft) cable                                                            |                                             |
| Material                                       | Polyamide, stainless steel wedge clamp                                          |                                             |
| Operating temperature                          | -20 °C ... + 60 °C (-4 °F ... +140 °F)                                          |                                             |
| Overvoltage protection unit                    | OVP22/33(2)                                                                     | OVP32/33(2)                                 |
| Type                                           | field use                                                                       | EN 60715 rail mountable                     |
| Dimensions                                     | 72 x 42 x 19 mm<br>(2.8 x 1.65 x 0.75 inch)                                     | 62 x 65 x 18 mm<br>(2.44 x 2.56 x 0.7 inch) |
| Ingress protection                             | IP54                                                                            | IP20                                        |
| Breakdown voltage                              | 33 V                                                                            |                                             |
| Absorbed energy                                | 600 W / 1 ms                                                                    |                                             |
| Serial resistance                              | 13 Ω                                                                            |                                             |
| Leakage current                                | ≤ 10 μA                                                                         |                                             |

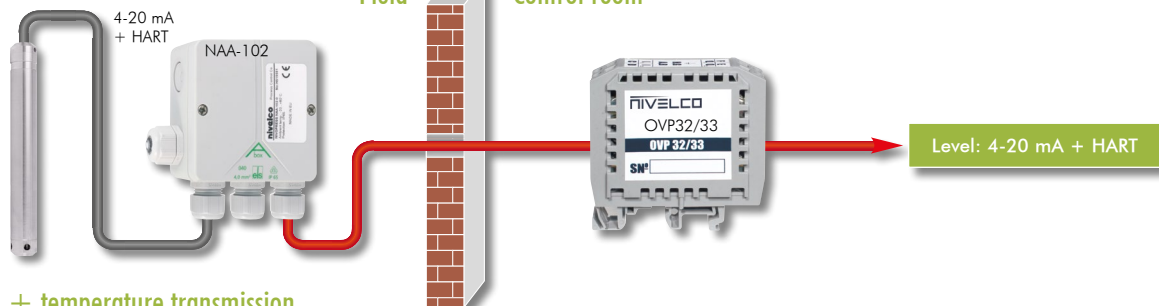
(2) only for 2-wire 4-20 mA equipments!



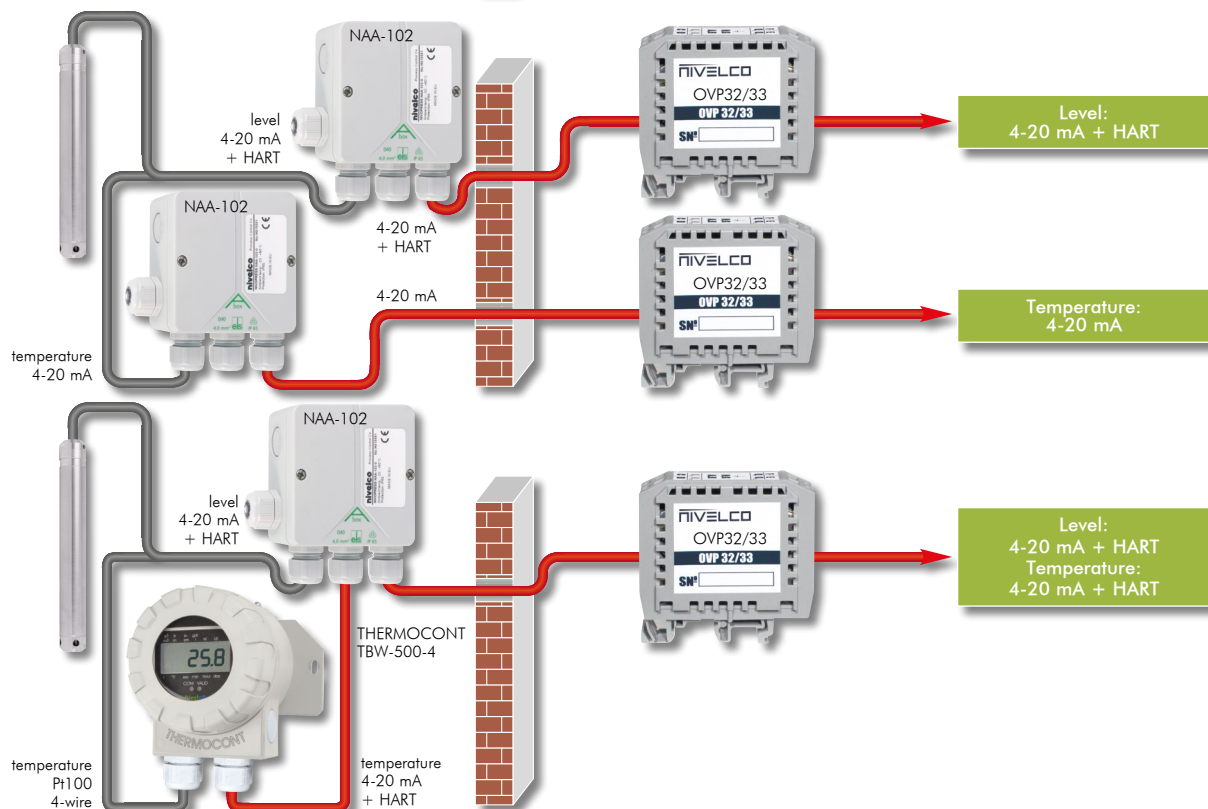


## MEASURING CIRCUITS

### Level transmission



### Level + temperature transmission



## NIVOPRESS N TRANSMITTERS IN SYSTEM WITH A PC

Instruments with HART output can be connected to a PC interfaced by a UNICOMM HART-USB modem. A HART multidrop loop can consist of a maximum of 15 transmitters. All measured values can be visualized and/or the NIVOPRESS N transmitters can be remote programmed by the PC. Applicable software: EView2 configuration software or NIVISION process visualization software.



## NIVOPRESS N TRANSMITTERS IN HART MULTIDROP LOOP

The MultiCONT processes and displays measurement data supplied by NIVELCO's HART equipped transmitters connected to a Multidrop loop. Up to 15 transmitters (also mixed models) can be connected and remote programming can be also performed through the MultiCONT. Re-transmission of the data is possible via RS485 communication line to a PC or PLC when needed.



## ORDER CODES (NOT ALL COMBINATIONS AVAILABLE)

### NIVOPRESS N hydrostatic level transmitters

NIVOPRESS N

(1) The order code of an Ex version should end in 'Ex'

(2) Not available in Ex version

(3) For maximum 20 m (65 ft) water height

(4) For HART capable units the current output can be customized in the pressure range from 2% to 130% with remote programming

(5) NK, NN, ND, NH, NB, NG: Under approval

(6) HART communication is not available for

N□K-200 and N□P-200 types

(7) Only with stainless steel sensor

## ACCESSORIES

### Accessories and auxiliary devices to order

|                   |                                                                                |                                                                                      |
|-------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Accessories       | NAA-101                                                                        | Cable terminal box with moisture filter                                              |
|                   | NAA-102                                                                        | Cable terminal box with moisture filter with OVP 22/33 (only for 2-wire types)       |
|                   | NAW-104                                                                        | Sewage adapter, can be mounted instead of the protective cap (stainless steel)       |
|                   | NAW-107                                                                        | Sewage adapter, can be mounted instead of the protective cap (plastic - POM)         |
|                   | NAZ-103                                                                        | Sewage adapter (for 3/4" threaded process connection (stainless steel)               |
|                   | NAA-105                                                                        | Cable sliding sleeve with cable gland and 1 ½" BSP thread                            |
|                   | NAA-106                                                                        | Cable sliding sleeve with cable gland and 1 ½" NPT thread                            |
|                   | NAA-209                                                                        | Cable mounting unit with stainless steel wedge clamp                                 |
|                   | OVP-22/33                                                                      | IP54 rated outdoor overvoltage protection unit for 4-20 mA loop                      |
| OVP-32/33         | IP20 rated indoor overvoltage protection unit for 4-20 mA loop, rail mountable |                                                                                      |
| Auxiliary devices | MultiCONT P-200                                                                | Multichannel process controller / display unit, wall mountable                       |
|                   | NIPOWER PPK-331                                                                | 24V DC power supply unit, rail mountable                                             |
|                   | THERMOCONT TBW-500                                                             | Field display / temperature transmitter unit for Pt100 sensor output, wall mountable |
|                   | UNICONT PPK-312                                                                | Current controlled limit switch with SPDT relay output, rail mountable               |
|                   | UNICONT PDF-401                                                                | Universal current loop indicator for 4-20 mA transmitters, wall mountable            |
|                   | UNICONT PMM-511                                                                | Universal controller / display panel unit                                            |
|                   | UNICONT PGK-301 Ex                                                             | Intrinsically safe isolator power supply unit, rail mountable                        |
|                   | UNICOMM SAK-305                                                                | HART- USB/RS485 modem for remote programming via PC, rail mountable                  |
| UNICOMM SAT-304   | HART- USB modem for remote programming via PC                                  |                                                                                      |
|                   | EView2                                                                         | FREE download! Configuration software for remote programming via PC                  |



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