

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

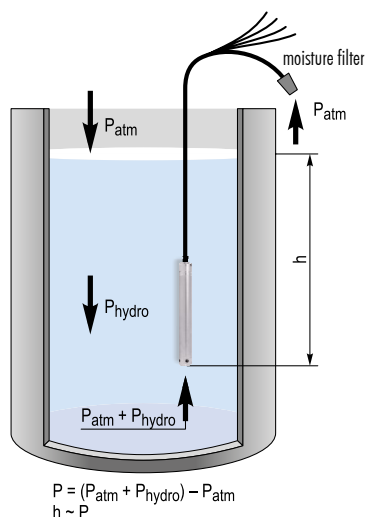
- Measuring range up to 200 m (656 ft)
- IP68 protection
- Remote programmable
- Submersible or screw-in types
- Ø 22/24 mm (Ø 0.85/1 inch) tube
- HART communication
- 2- or 3-wire versions
- 2x 4-20 mA output (level + temperature)
- Built-in Pt100 temperature sensor
- Overvoltage and inverse polarity 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



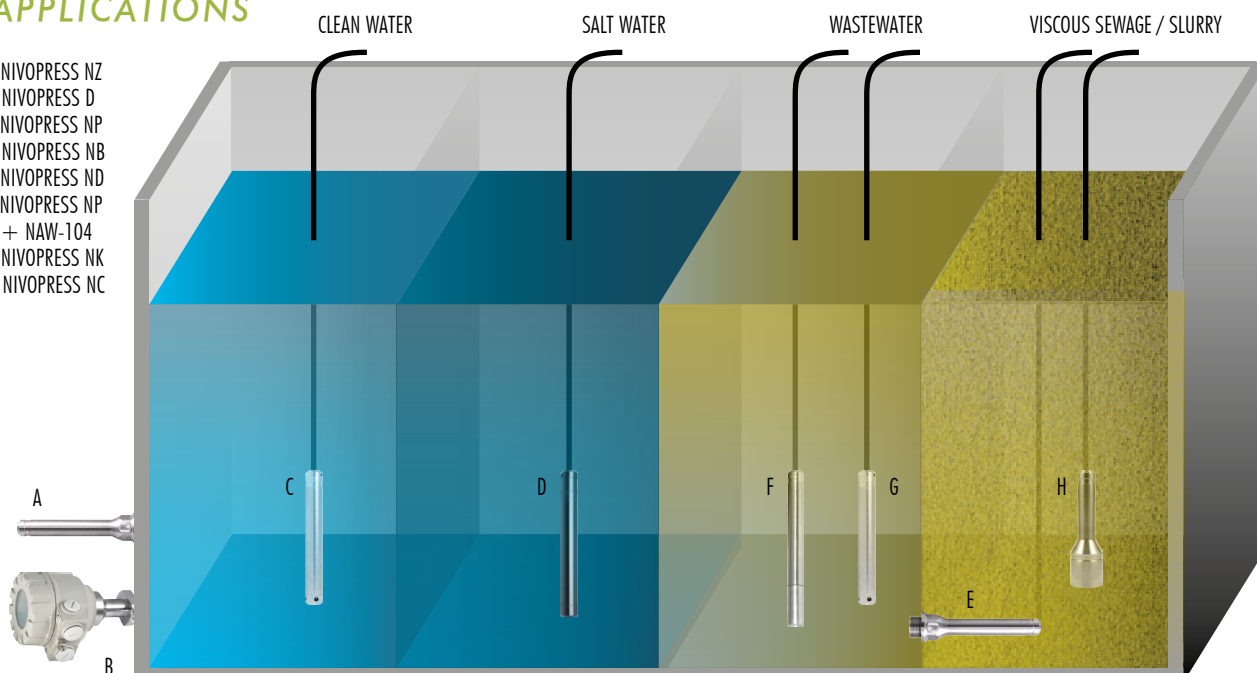
GENERAL DESCRIPTION



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) 10x (h > 3 mvo)	3 x	
Output		4 – 20 mA + HART		4 – 20 mA	4 – 20 mA + HART	0 – 10V (0 V ≤ 80 mV) measured to the power supply
Power supply		12 – 30 V DC				18 – 30 V DC / 6 mA
Max. load (U _t = power supply; U _{min} = min. power supply)		$R_{min} = \frac{(U_t - U_{min})}{0.02 \text{ A}}$				≥ 5 kΩ
Temperature transmitter 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 mm ² (AWG22)				
Cable length		0 ... 300 m (0 ... 985 ft) as order code				
Dimensions		Ø 24x212 mm (1x8.3 inch)	NK,NN: Ø 22x173 mm (0.87x6.8 inch) ND,NH: Ø 38x174 mm (1.5x6.85 inch)	Ø 40x146 mm (1.55x5.75 inch)	NP,NF: Ø 22x173 mm (0.87x6.8 inch) NZ,NR: Ø 38x174 mm (1.5x6.85 inch)	
Mass		Probe: 0.15 kg	NK,NN: Probe: 0.2 kg (0.44 lb) ND,NH: Probe: 0.3 kg (0.66 lb)	Probe: 0.4 kg (0.88 lb)	NP,NF: Probe: 0.2 kg (0.44 lb) NZ,NR: Probe: 0.3 kg (0.66 lb)	
Material of wetted parts	Sensor	Al ₂ O ₃			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 _i = 30 V, I _i = 100 mA, P _i = 0.8 W, C _i = 12 nF + h x 0.4 nF; L _i = 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 _{out}	I+(°C)	 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+ NAW-104	NZ/ND	NZ/ND+ NAZ-103	NC	NB/NG	NB/NG+ 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

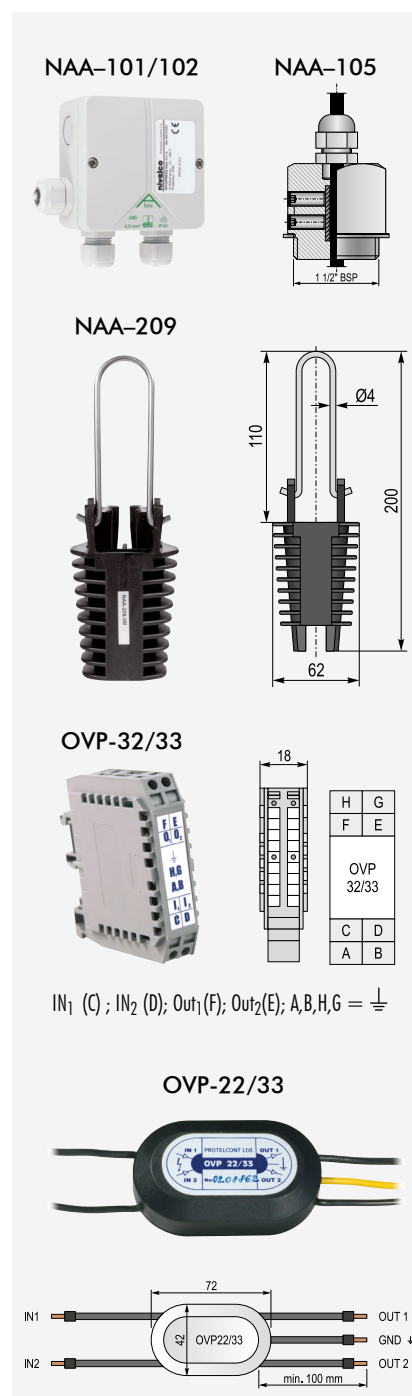
NAW-104, NAW-107, NAZ-103: Sewage adapter made from 1.4571 (316 Ti) stainless steel or plastic (POM). The NP/NK/NB type probes can be equipped with the suitable sewage adapter (NAW-104 or NAW-107) by snapping instead of the sensor protective cap. The NAZ-103 type sewage adapters can be screwed to the 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

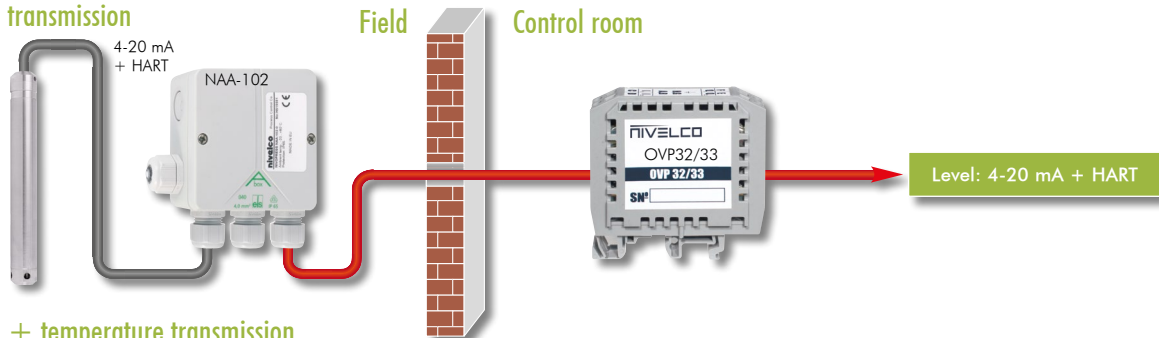
Cable terminal box	NAA-101	
Dimensions	93 x 93 x 55 mm (3.66 x 3.66 x 2.16 inch)	
Ingress protection	IP65	
Operating temperature	-40 °C ... +70 °C (-40 °F ... +158 °F)	
Material	Plastic	
Cable gland	M20x1.5 (cable Ø 5... Ø 10 mm (0.2 ... 0.4 inch)	
Electrical connection	Terminal block for cable with max. cross section of 2.5 mm ² (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 (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	
Serial resistance	13 Ω	
Leakage current	≤ 10 μA	

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

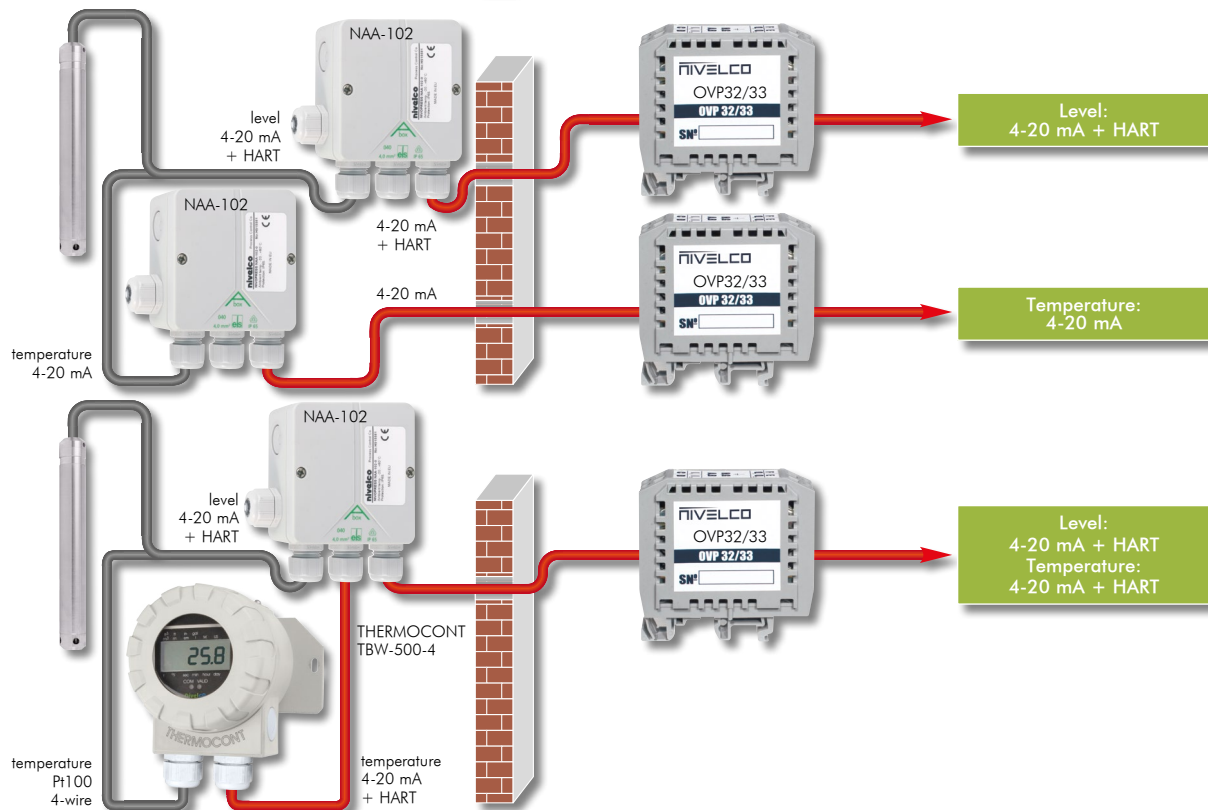


MEASURING CIRCUITS

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

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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



NIVELCO PROCESS CONTROL CO.

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FOR LIQUIDS

NIVOPRESS D

HYDROSTATIC LEVEL TRANSMITTERS



3 YEARS WARRANTY @ NIVELCO – WHERE ELSE?

NIVELCO

LEVEL TRANSMITTERS

NIVOPRESS D HYDROSTATIC LEVEL TRANSMITTERS FOR LIQUIDS

MAIN FEATURES

- 0.25% accuracy
- Gauge or absolute pressure transmitter
- Piezoresistive sensor with stainless steel flush diaphragm
- Wide pressure range selection
- Temperature compensation
- HART communication
- Plug-in display
- Wide variety of process connections
- IP 65 protection
- Ex version

APPLICATIONS

- Liquids and masses in tanks and vessels
- Chemicals with dense vapour or gas layers above the surface
- Foaming liquids
- Viscous or corrosive materials



GENERAL DESCRIPTION

NIVOPRESS D hydrostatic level- and pressure transmitters operate in 2-wire systems and convert relative or absolute pressure (input signal) into 4-20 mA (output signal). The piezoresistive sensor measures the hydrostatic pressure and it compares the water head with the actual atmospheric pressure. The sensor is protected by a stainless steel flush diaphragm which transfers the pressure value to the piezoresistive sensor through silicon oil. Intelligent electronics provides on-site programming with SAP-200 plug-in display or remote programming with HART communication. Intrinsically safe (Ex ia approved) models are available for use in hazardous environments. **NIVOPRESS D** hydrostatic gauge pressure transmitters are suitable for level- and pressure measurement tasks in tanks, vessels and pipes especially in food and beverages industry (for example milk and any other food dollops) applications. The flat surface of the diaphragm avoids the risk of material build up and the maximum medium temperature of 125 °C (275 °F) allows proper (CIP) cleaning required by the regular cleaning processes of the food industry and similar hygienic applications.

OPERATION

PRINCIPLE OF LEVEL MEASURING BY HYDROSTATIC PRESSURE:

Providing constant density the level depends on the pressure head.

$$P_{\text{hydr}} = 10^{-5} \rho \cdot g \cdot h$$

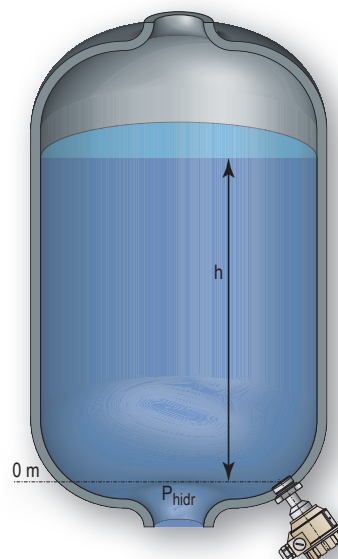
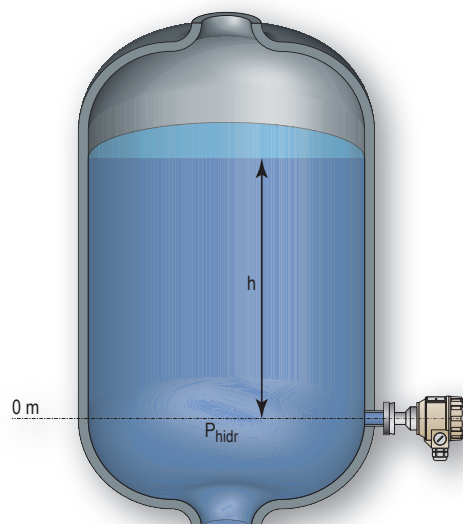
$$\downarrow$$

$$h = 10^5 \frac{P_{\text{hydr}}}{\rho \cdot g}$$

$$\downarrow$$

$$\text{Possible maximum value of „h”: } h_{\text{max}} = 10^5 \frac{P_{\text{hydr.max}}}{\rho \cdot g}$$

P_{hydr} [bar] = hydrostatic pressure
 ρ [kg/m³] = density of the medium
 g [m/s²] = gravitational acceleration
 h [m] = distance between middle of the diaphragm and level of the medium
 $P_{\text{hydr.max}}$ = highest pressure value set in the default



TECHNICAL DATA

Type	NIVOPRESS D-500	NIVOPRESS D-600
Measured process value	level, pressure	
Sensor	Piezoresistive silicium sensor, with stainless steel flush diaphragm	
System	2-wire	
Power supply	10 ... 36 V DC	
Measurement range	-1 ... 400 bar g (-14.5 ... 5800 psi g) (as per order codes)	
Overpressure	0.5 ... 600 bar g (7.25 ... 8700 psi g) (as per order codes)	
Downscale rate	≈ 1 : 2	
Zero point offset	50% of the measurement range	
Accuracy (linearity error)	p > 0.4 bar g (5.8 psi g) ±0.25 % p ≤ 0.4 bar (5.8 psi g) ±0.5 %	
Output	Analogue	4-20 mA
	Display	SAP-203 - 6-digit plug-in LCD display
	Digital communication	4-20 mA + HART
Ambient temperature	p < 100 bar g (1450 psi g): 0 °C ... +70 °C (32 °F ... 158 °F)	-30 °C ... +70 °C (-22 °F ... +158 °F), with display: -25 °C ... +70 °C (-13 °F ... +158 °F)
	Ex type: see „Special data for Ex certified models” table	
Range of temperature compensation	p < 100 bar g (1450 psi g): 0 °C ... +70 °C (32 °F ... 158 °F) p ≤ 0.4 bar g (5.8 psi g): 0 °C ... 50 °C (32 °F ... 122 °F)	
Medium temperature	-25 °C ... +125 °C (-13 °F ... 257 °F)	
Material of wetted parts	Protection diaphragm	DIN 1.4435 (316L) stainless steel
	Process connection	
	Sealing	
p < 100 bar g (1450 psi g): Viton; p > 100 bar g (1450 psi g): NBR; on special request: EPDM		
Pressure transmitting medium	Silicon oil, on special request: food industry compatible oil	
Housing material	Paint coated aluminium	Plastic (PBT)
Process connection	As per order codes	
Electrical connection	2 x M20x1.5 plastic cable glands, for 6...12 mm (0.25 ... 0.5 inch) cable + 2 x NPT ½ " internal thread for cable protective pipe terminal block for 0.5...1.5 mm ² (AWG 20 ... AWG 15) wire cross section	
	Ex type: see „Special data for Ex certified models” table	
Electrical protection	Class III.	
Ingress protection	IP 65	
Explosion protection	See „Special data for Ex certified models” table	-
Weight	≈ 2 kg (4.4 lb)	≈ 1.6 kg (3.5 lb)

SPECIAL DATA FOR EX CERTIFIED MODELS

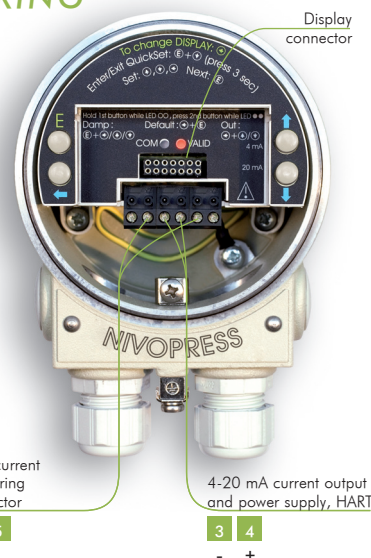
Type	NIVOPRESS D□□-500
Protection type	Intrinsically safe
Ex marking	ATEX Ⓔ II 1G EEx ia IIC T6...T4
Intrinsically safe data	U _{max} = 30 V, I _{max} = 140 mA, P _{max} = 1 W, C _i = 20 nF; L _i = 0.2 mH
Operation temperature range	Without display: -40 °C ... +70 °C (-40 °F ... +158 °F); With display: -25 °C ... +70 °C (-13 °F ... +158 °F)

NIVOPRESS D IN SYSTEM WITH A PC

The instruments with HART output can be connected to a PC using an **UNICOMM** HART-USB modem. Max. 15 normal instruments can be connected to a single HART loop. All measured values can be visualized and/or the instruments can be remote programmed via digital HART communication. Applicable software: **EView2** configuration software or **NIVISION** process visualization software.



WIRING

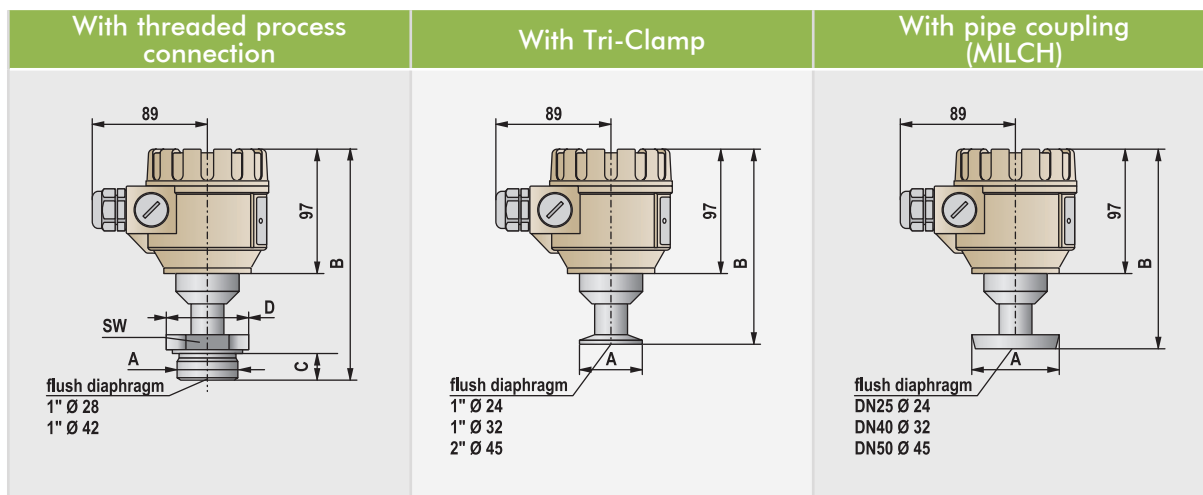


NIVOPRESS D IN HART MULTIDROP LOOP

The **MultiCONT** can handle a max. of 15 normal HART or max 4 Ex-proof HART capable NIVELCO transmitters. The digital (HART) information is processed, displayed and if needed it can be transmitted via RS485 communication line to a PC. Remote programming of the transmitters is also possible. Visualisation on PC can be accomplished with **NIVISION** process visualisation software.



DIMENSIONS



Type	DTC	DTE	DTF	DTS	DTT	Type	DTL	DTM	DTN	Type	DTO	DTP	DTR
A	1/2" BSP	1" BSP	1 1/2" BSP	1" NPT	1 1/2" NPT	Tri-Clamp	1"	1 1/2"	2"	MILCH	DN 25	DN 40	DN 50
B	190	193	185	197	189	A	50,3	50,3	64	A	44	56	68,5
C	15	19	22	26	27	B	183	183	167	B	186	170	166
D	30	50	65	52	70								
SW	27	44	55	40	55								

ORDER CODES (NOT ALL COMBINATIONS AVAILABLE)

NIVOPRESS D hydrostatic level transmitters

NIVOPRESS D ■ ■ ■ - ■ ■ ■ 1- ■ ⁽¹⁾

Version	Code	Process connection	Code	Range (gauge) / Overpressure	Code	Output / Ex	Code
2-wire transmitter	T	1/2" BSP	C ⁽²⁾⁽³⁾	-1 ... 0 bar / 3 bar	0	4-20 mA	2
2-wire transmitter + display	B	1" BSP	E ⁽⁴⁾	0 ... 0.16 bar / 0.5 bar	1 ⁽⁵⁾	4-20 mA + HART	4
		1 1/2" BSP	F	0 ... 0.25 bar / 1 bar	2 ⁽⁵⁾	4-20 mA / EEx ia	6
		1" NPT	S	0 ... 0.4 bar / 1 bar	3 ⁽⁵⁾	4-20 mA + HART / EEx ia	8
		1 1/2" NPT	T	0 ... 0.6 bar / 3 bar	4 ⁽⁵⁾		
		1" Tri-Clamp	L	0 ... 1.0 bar / 3 bar	5 ⁽⁶⁾		
		1 1/2" Tri-Clamp	M	0 ... 1.6 bar / 6 bar	6 ⁽⁶⁾		
		2" Tri-Clamp	N	0 ... 2.5 bar / 6 bar	7		
		DN 25 pipe-coupling	O	0 ... 4.0 bar / 20 bar	8		
		DN 40 pipe-coupling	P	0 ... 6.0 bar / 20 bar	9		
		DN 50 pipe-coupling	R	0 ... 10 bar / 20 bar	A		
				0 ... 16 bar / 60 bar	B		
				0 ... 25 bar / 60 bar	C		
				0 ... 40 bar / 100 bar	D		
				0 ... 60 bar / 120 bar	E		
				0 ... 100 bar / 250 bar	F		
				0 ... 160 bar / 500 bar	G		
				0 ... 250 bar / 500 bar	H		
				0 ... 400 bar / 600 bar	J		

Housing	Code
Aluminium	5
Plastic ⁽²⁾	6

Accessories and auxiliary devices to order	
SAP-203	Plug-in LCD display unit
UNICOMM SAT-304 / SAK-305	USB - HART / RS485 modem
UNICONT PGK-301	Ex isolator power supply module
NIPOWER PPK-331	24V DC power supply
UNICONT PDF-501	Universal loop display
SAS-303	EView2 configuration software

⁽¹⁾ The order code of an Ex version should end in „Ex“
⁽²⁾ Not available in Ex version
⁽³⁾ only for p ≥ 2.5 bar
⁽⁴⁾ only for p ≥ 1 bar
⁽⁵⁾ only with min 1 1/2" connection
⁽⁶⁾ only with min 1" connection

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