

NIPRESS

DK-300, DK-400 and DK-800
pressure switch family

Installation and programming manual
1st edition



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DK-300



DK-400



DK-800

CONTENTS

1. INTRODUCTION.....	4
2. ORDER CODES.....	5
2.1 DK-300 ORDER CODE	5
2.2 DK-400 ORDER CODE	6
2.3 DK-800 ORDER CODE	7
3. TECHNICAL DATA.....	8
3.1 DIMENSIONS (DK-300, DK-800).....	9
3.2 DIMENSIONS (DK-400, DL-400)	10
3.3 ACCESSORIES.....	10
3.4 SPECIAL CONDITIONS OF SAFE USE.....	11
4. INSTALLATION	11
4.1 INSTALLATION INSTRUCTION	11
4.2 WIRING	12
4.3 EXAMPLES OF ARRANGEMENTS	14
5. PROGRAMMING	14
5.1 OPERATING INFORMATION	14
5.2 CONFIGURATION	14
5.3 PASSWORD SYSTEM	15
5.4 CONFIGURATION EXAMPLE OF THE ANALOGUE OUTPUT	15
5.5 HYSTERESIS AND COMPARE MODE	15
5.6 STRUCTURE OF THE MENUSYSTEM	16
5.7 DESCRIPTION OF THE MENUSYSTEM.....	18
6. TROUBLESHOOTING.....	20
7. MAINTENANCE AND REPAIR	20
8. STORAGE CONDITIONS.....	20

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

1. INTRODUCTION

The NIPRESS DK-300 series is an electronic pressure switch with stainless steel internal or flush sensor. This device is a 2- or 3-wire mini compact pressure switch with rotatable LCD display for absolute and gauge pressure. It can be ordered with 1 – 4 PNP transistor, 4 – 20 mA or 0 – 10 V output, available in a wide range of measurement ranges within the -1 – 0 bar and 0 – 600 bar.

The DK-400 series is an electronic pressure switch with welded stainless steel flush sensor. This makes it suitable for numerous applications in various industrial sectors and is also ideal for viscous or pasty media. This device is a 2- or 3-wire compact pressure switch with rotatable LCD display for absolute and gauge pressure. It can be ordered with 1 – 4 PNP transistor, 4 – 20 mA or 0 – 10 V output, available in a measurement range of -1 – 0 bar or 0 – 40 bar.

The DK-800 series is an intelligent pressure switch and a digital display with ceramic sensor designed for using in general industrial applications. Its flush diaphragm version is suitable for the usage in viscous, pasty or highly contaminated media. The standard version comes with PNP contact outputs and a rotatable display.

2. ORDER CODES

2.1 DK-300 ORDER CODE (NOT ALL COMBINATIONS POSSIBLE!)

NIPRESS D **K** - 3 -

MEASURING MODE	CODE	PROCESS CONNECTION	CODE	RANGE / OVERLOAD CAPABILITY [bar]	CODE	ACCURACY	CODE	OUTPUT / Ex	CODE
Switch	K	1/4" BSP	A	-1 - 0 / 5	0	0.25% ⁽²⁾	1	1 PNP switching output	7
		1/2" BSP	C	0 - 0.1 / 0.5	1	0.5%	2	2 PNP switching output	9
		3/4" BSP ⁽¹⁾	D	0 - 0.16 / 1	R			4 PNP switching output ⁽³⁾	E
		1/4" NPT	G	0 - 0.25 / 1	2			4 - 20 mA 2-wire, 1 PNP switching output / Ex ia	F
		1/2" NPT	H	0 - 0.4 / 2	3				
				0 - 0.6 / 5	4				
				0 - 1 / 5	5				
				0 - 1.6 / 10	6				
				0 - 2.5 / 10	7				
				0 - 4 / 20	8				
				0 - 6 / 40	9				
				0 - 10 / 40	A				
				0 - 16 / 80	B				
				0 - 25 / 80	C				
				0 - 40 / 105	D				
				0 - 60 / 210	E				
				0 - 100 / 210	F				
				0 - 160 / 600	G				
				0 - 250 / 1000	H				
				0 - 400 / 1000	J				
				0 - 600 / 1000	K				

⁽¹⁾ flush membrane (max. 40 bar)

⁽²⁾ $p \geq 0.4$ bar

⁽³⁾ only with 3-wire analogue output and with M12x1 (8 pin) electric connection

2.2 DK-400 ORDER CODE (NOT ALL COMBINATIONS POSSIBLE!)

NIPRESS D - 4 -

MEASURING MODE	CODE
Switch up to +125 °C	K
Switch up to +300 °C ⁽¹⁾	L

PROCESS CONNECTION	CODE
1/2" BSP ⁽²⁾	C
3/4" BSP	D
1" BSP	E
3/4" TriClamp	T
1" TriClamp	L
1 1/2" TriClamp	M
2" TriClamp	N
DN25 DIN11851 ⁽³⁾	O
DN40 DIN11851 ⁽³⁾	P
DN50 DIN11851 ⁽⁴⁾	R
VARIVENT DN40/50 ⁽⁵⁾	V

RANGE / OVERLOAD CAPABILITY [bar]	CODE
-1 – 0 / 5	0
0 – 0.1 / 0.5	1
0 – 0.16 / 1	R
0 – 0.25 / 1	2
0 – 0.4 / 2	3
0 – 0.6 / 5	4
0 – 1 / 5	5
0 – 1.6 / 10	6
0 – 2.5 / 10	7
0 – 4 / 20	8
0 – 6 / 40	9
0 – 10 / 40	A
0 – 16 / 80	B
0 – 25 / 80	C
0 – 40 / 105	D

ACCURACY	CODE
0.25% ⁽⁶⁾	1
0.5%	2

OUTPUT / Ex	CODE
1 PNP switching output	7
2 PNP switching output	9
4 PNP switching output ⁽⁷⁾	E
4 – 20 mA 2-wire, 1 PNP switching output / Ex ia	F

⁽¹⁾ In case of vacuum up to +150 °C

⁽²⁾ $p \geq 1$ bar

⁽³⁾ 0.25 – 40 bar

⁽⁴⁾ 0.25 – 25 bar

⁽⁵⁾ $p_N \leq 25$ bar

⁽⁶⁾ $p \geq 0.4$ bar

⁽⁷⁾ Only with 3-wire analogue output and with M12x1 (8 pin) electric connection

2.3 DK-800 ORDER CODE (NOT ALL COMBINATIONS POSSIBLE!)

NIPRESS D **K** - 8 **2** -

MEASURING MODE	CODE
Switch	K

PROCESS CONNECTION	CODE
1/4" BSP	A
1/2" BSP	C
3/4" BSP ⁽¹⁾	D
1/4" NPT	G
1/2" NPT	H

RANGE / OVERLOAD CAPABILITY [bar]	CODE
-1 - 0 / 4	0
0 - 0.4 / 1	3
0 - 0.6 / 2	4
0 - 1 / 2	5
0 - 1.6 / 4	6
0 - 2.5 / 4	7
0 - 4 / 10	8
0 - 6 / 10	9
0 - 10 / 20	A
0 - 16 / 40	B
0 - 25 / 40	C
0 - 40 / 100	D
0 - 60 / 100	E
0 - 100 / 200	F
0 - 160 / 400	G
0 - 250 / 400	H
0 - 400 / 600	J
0 - 600 / 800	K

ACCURACY	CODE
0.5%	2

OUTPUT / Ex	CODE
1 PNP switching output	7
2 PNP switching output	9
4 PNP switching output ⁽²⁾	E
4 - 20 mA 2-wire, 1 PNP switching output / Ex ia	F

⁽¹⁾ $0.6 \leq P_N \leq 60$ bar

⁽²⁾ Only with 3-wire analogue output and with M12x1 (8 pin) electric connection

3. TECHNICAL DATA

Type		DK□-3□□-□	DK□-4□□-□, DL□-4□□-□	DK□-8□2-□
Measurement range		-1 – 0 bar; 0 – 600 bar (-14.5 – 0 psig; 0 – 8700 psig) according to the order code	-1 – 0 bar; 0 – 40 bar (-14.5 – 0 psig; 0 – 580 psig) according to the order code	-1 – 0 bar; 0 – 600 bar (-14.5 – 0 psig; 0 – 8700 psig) according to the order code
Overload capability		According to the order code		
Accuracy		0.5% Optional: 0.25% ($p \geq 0.4$ bar [5.8 psig])		0.5%
Medium temperature		-40 °C ... +125 °C (-40 °F ... +257 °F)	-40 °C ... +125 °C (-40 °F ... +257 °F) silicone oil; ⁽¹⁾ -10 °C ... +125 °C (14 °F ... +257 °F) food grade oil	-40 °C ... +125 °C (-40 °F ... +257 °F) ⁽²⁾
Ambient temperature ⁽²⁾		-40 °C ... +85 °C (-40 °F ... +185 °F) (with integrated cable: -5 °C ... +70 °C [23 °F ... +158 °F])		
Sensor type		Piezoresistive		
Materials of the wetted parts	Sensor	Stainless steel 1.4435 (316L)	Stainless steel 1.4435 (316L); Optional: HASTELLOY® C-276 (2.4819)	Ceramic Al ₂ O ₃ 96%
	Sensor sealing	FKM; Optional: welded version, without sealing (max. 40 bar [580 psig])	FKM (recommended medium temperature $\leq +200$ °C [392 °F]); FFKM (recommended medium temperature $> +200$ °C [392 °F]); TriClamp, hygienic flange (DIN11851), VARIVENT: without sealing	FKM EPDM ($P_N \leq 160$ bar [2320 psig])
	Process conn.	Stainless steel 1.4404 (316L)	Stainless steel 1.4435 (316L)	Stainless steel 1.4404 (316L); PVDF ⁽⁵⁾
Housing		Stainless steel 1.4404 (316L)		
Output		1 PNP switch output ⁽³⁾ or 2 PNP switch output ⁽³⁾ or 4 PNP switch output ⁽⁴⁾		
Analog output (optional) / Power supply / Load resistance		4 – 20 mA output (2-wire) / 13 V – 36 V DC / $R_{max} = [(U_{Supply}-13V) / 0.02 A] \Omega$; 4 – 20 mA output (3-wire adjustable) / 19 V – 30 V DC / $R_{max} = 500 \Omega$; 0 – 10 V output (3-wire) / 15 V – 36 V DC / $R_{min} = 10 k\Omega$; Without analogue output / 15 V – 36 V DC / -		
Display		4 digits (7 mm), red LED display; Range of indication: -1999 ... +9999; Accuracy: 0.1% ± 1 digit; Damping: 0.3 – 30 s (adjustable)		
Process connection		According to the order code		
Electrical connection		M12x1 (5 pin – metal) / M12x1 (8 pin – plastic) / ISO4400 / Integrated cable – standard 2 m PVC cable or custom cable lengths –without ventilation tube		
Ingress protection		IP65		
Electrical protection		SELV Class III		
Mass		min. 0.16 kg (min. 0.35 lb)	~ 0.16 kg – 0.25 kg (~ 0.35 – 0.55 lb)	~ 0.2 kg (~ 0.44 lb)

⁽¹⁾ For DK-400 types max. temperature of the medium for nominal pressure gauge > 0 bar: +150 °C (+302 °F) for 60 minutes with a max. environmental temperature of +50 °C (+122 °F)

⁽²⁾ For DK-800 in case of PVDF pressure port the minimum permissible temperature is -30 °C (-22 °F)

⁽³⁾ For devices with ISO 4400 connection, only 2-wire transmitter can be used with 1 PNP switch. It is not possible to use a PNP contact with a 3-wire transmitter, and only 1 PNP switch is possible for Ex devices.

⁽⁴⁾ The use of 4 PNP contacts is only possible with analogue 3-wire 4 – 20 mA or 0 – 10 V transmitter equipped with M12x1, 8-pin connection

⁽⁵⁾ 1/2" BSP, $p \leq 60$ bar; 3/4" BSP, 0,6 bar $\leq p \leq 25$ bar

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Permissible medium temperature for DK-400 with cooling element (max. +300 °C [572 °F]):

- Silicone oil fill fluid: in case of overpressure: -40 °C...+300 °C (-40 °F...+572 °F) in vacuum (also for $P_{ABS} \leq 1$ bar): -40 °C...+150 °C (-40 °F...+302 °F)
- Food grade oil fill fluid: in case of overpressure: -10 °C...+250 °C (+14 °F...+482 °F) in vacuum: -10 °C ... +150 °C (+14 °F...+302 °F)

SPECIAL DATA FOR EX CERTIFIED MODELS (ONLY FOR 4 – 20 mA / 2-WIRE)

ATEX Approval, Ex ia:

Type	DK-300	DK-400, DL-400	DK-800
Ex marking		(Pending)	
Power supply		$U_{supply} = 15 - 28$ V DC	
Intrinsically safe data		Use only with Ex ia certified power supply module! $U_{imax} = 28$ V DC, $I_{imax} = 93$ mA, $P_{imax} = 660$ mW, $C_i \approx 0$ nF, $L_i \approx 0$ mH	
Max. switching current ⁽⁶⁾		70 mA	
Permissible temperatures for environment		-25 °C ... +70 °C (-13 °F ... +158 °F)	
Connecting cables (by factory)		Cable capacitance: 100 pF/m,	Cable inductance: 1 µH/m

⁽⁶⁾ The real switching current depends on the power supply unit

3.1 DIMENSIONS (DK-300, DK-800)

DKC-3□□-□ DKC-8□□-□ 1/2" BSP	DKD-3□□-□ ($P_n \leq 40$ bar) DKD-8□□-□ (0,6 bar $\leq P_n \leq 60$ bar) 3/4" BSP	DKQ-3□□-□ DKQ-8□□-□ WITH DISPLAY (TOP VIEW)	DKA-3□□-□ DKA-8□□-□ 1/4" BSP	DKH-3□□-□ DKH-8□□-□ 1/2" NPT	DKG-3□□-□ DKG-8□□-□ 1/4" NPT

If nominal pressure $P_n > 400$ bar the length of devices increases by 19 mm in case of non-IS version and by 39 mm in case of IS version.

3.2 DIMENSIONS (DK-400, DL-400)

DKC-4□□-□ (P ≥ 1 bar) 1/2" BSP	DKD-4□□-□ 3/4" BSP	DKE-4□□-□ 1" BSP

DKT-4□□-□ / DKL-4□□-□ / DKM-4□□-□ / DKN-4□□-□ TriCLAMP – 3/4", 1", 1 1/2", 2"	DKO-4□□-□ / DKP-4□□-□ / DKR-4□□-□ DIN11851 hygienic connections	DKV-4□□-□ VARIVENT, P _N ≤ 25 bar	DLO-4□□-□ COOLING ELEMENT (+300 °C / 572 °F)

Size	3/4"	1"	1 1/2"	2"	Size	DN 25	DN 40	DN 50
A [mm]	14	23	32	45	A [mm]	23	32	45
B [mm]	25	50.5	50.5	64	B [mm]	44	56	68.5
C [mm]	10	10	11		C [mm]	10	10	11
P _N [bar]	≥ 4 / ≤ 8	≥ 0.25 / ≤ 16	≤ 16	≤ 16	P _N [bar]	≥ 0.25 / ≤ 40	≥ 0.25 / ≤ 40	≥ 0.25 / ≤ 25

3.3 ACCESSORIES

- Installation and programming manual
- Warranty card
- EU declaration of conformity

3.4 SPECIAL CONDITIONS OF SAFE USE

Before turning on the device, make sure the installation is complete, and there are no visible defects. The device may only be used within the limitations specified in the technical specifications.

Protection against electrostatic charge:

The devices may partially contain static charging capable plastic components. The presence of electrostatic charges may cause a risk of spark generation and ignition and therefore electrostatic charges must be completely prevented:

- Use a shielded cable!
- Avoid friction on plastic surfaces!
- Do not clean the device dry! For example, use a wet duster!

Ex ia certified transmitters may only be operated in qualified, certified and approved galvanically isolated intrinsically safe Ex ia circuits complying with the technical data and the device's explosion protection marking. The metal housing of the device must be connected to the EP (equipotential) network!

4. INSTALLATION

Due to its small size and weight NIPRESS DK-300, DK-400, DK-800 can be mounted directly on tanks, pipelines, machines, etc. without support assembly.

To provide a chance for replacement of the instrument during operation the use of closing armature is recommended. A simple ball valve will be suitable for lower pressure, but for higher pressure (above 6 bar) a three-way blow-off needle-valve is suggested.

Remove the packaging and protective cap directly before starting assembly to avoid damaging the diaphragm.

In the case of level measurement, it is advisable to screw the transmitter into the stump on the side of the tank.

The display and the plastic housing are equipped with a rotation limiter. Do not rotate the display beyond the rotation limits.

4.1 INSTALLATION INSTRUCTION

Depending on the medium measured, the medium may cause a hazard to the installer, so wear suitable protective clothing, gloves, and goggles.

In the case of mounting and dismounting, only the designed surface can be used for torque transmission (wrench) on the device.

Be careful because the front membrane is vulnerable!

The cylindrical housing of the transmitter should not be gripped and tightened with a pipe wrench!

Due to electronic noise protection, the pressure switch housing is grounded. If the grounding of the technology is correct, the pressure switch does not require a separate grounding.

Otherwise, the ground must be connected to the connector and grounded at the other end of the cable.

Install the device only in depressurized and currentless state!

Mounting position: The pressure switch has been calibrated in a vertical position when the diaphragm is oriented downwards. If it is differently mounted, a tiny deviation can appear at the output in the measured values.

For oxygen applications (only DK-800) transmitters are recommended with O-rings of FKM Vi 567: permissible maximum values: 25 bar / 150° C (BAM approval), over 25 bar pressure transmitter can be used without seals.

Tightening torques:

1/4" BSP: max. 5 Nm;

1/2" BSP: max. 10 Nm;

3/4" BSP: max. 15 Nm;

1" BSP: max. 20 Nm;

1 1/2" BSP: max. 25 Nm;

Tightening torque for pressure switch with plastic process connection: max. 3 Nm.

1/4" NPT: max. 30 Nm;

1/2" NPT: max. 70 Nm.

The specified tightening torques must not be exceeded!

Do not use a pipe wrench, because its use can cause damage to the device!

Installation steps for BSP process connection (DIN 3852)

Do not use any additional sealing material such as teflon tape!

Check if the O-ring is undamaged, it has a flawless and clean surface and seated in the designated groove.

Screw the device into the corresponding thread by hand, and tighten the parts with a suitable torque wrench. If your device can be secured with a knurled ring, the pressure transmitter should only be tightened by hand!

Installation steps for NPT process connection:

Use a suitable seal (e. g. a PTFE-strip)! Screw the device into the corresponding thread by hand, and tighten it with a wrench!

Installation steps for hygienic connections (only DK-400, DL-400)

Centre the dairy pipe connection in the counterpart! Screw the cup nut onto the mounting part! Tighten it with a hook wrench!

Installation steps for "TRICLAMP and VARIVENT" connections (only DK-400, DL-400)

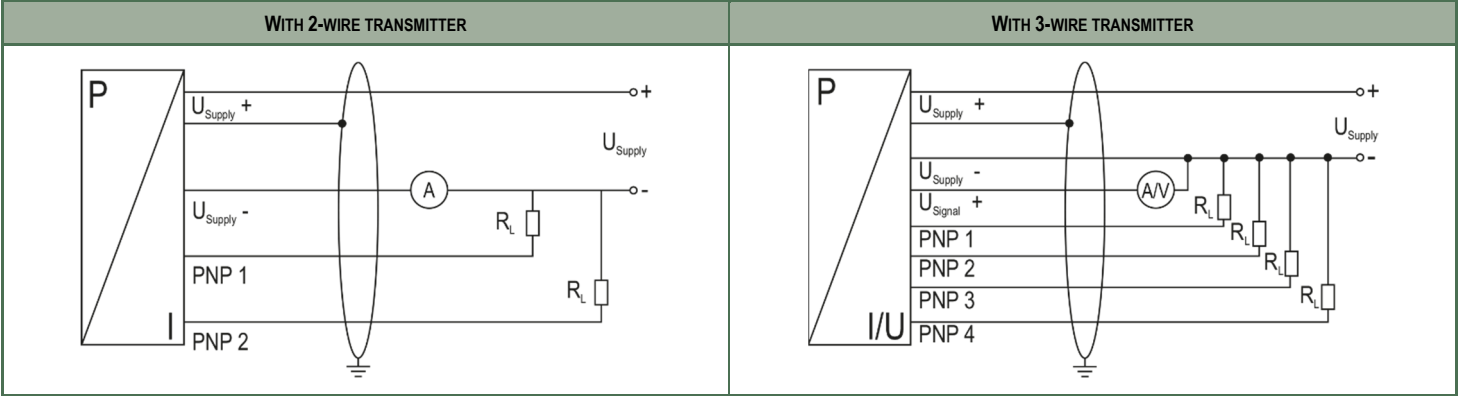
Use a suitable seal corresponding to the medium and the pressure input! Place the seal onto the corresponding mounting part! Centre the Clamp or Varivent connection on the fitting counterpart with seal! Then fit the device with a suitable fastening element (e. g. half-ring or retractable ring clamp) according to the supplier's instructions.

4.2 WIRING

Shielded and twisted multicore cable is recommended for the electrical connection. For devices with cable gland as well as cable socket, you have to make sure that the external diameter of the used cable is within the allowed clamping range. After you have connected the wires, tighten the gland screw firmly until proper sealing.
For the installation of a device with cable outlet following bending radiiuses have to be complied with:





- Cable without ventilation tube:
- static installation: 5-fold cable diameter
 - dynamic application: 10-fold cable diameter
- Cable with ventilation tube:
- static installation: 10-fold cable diameter
 - dynamic application: 20-fold cable diameter

WIRING DIAGRAMS



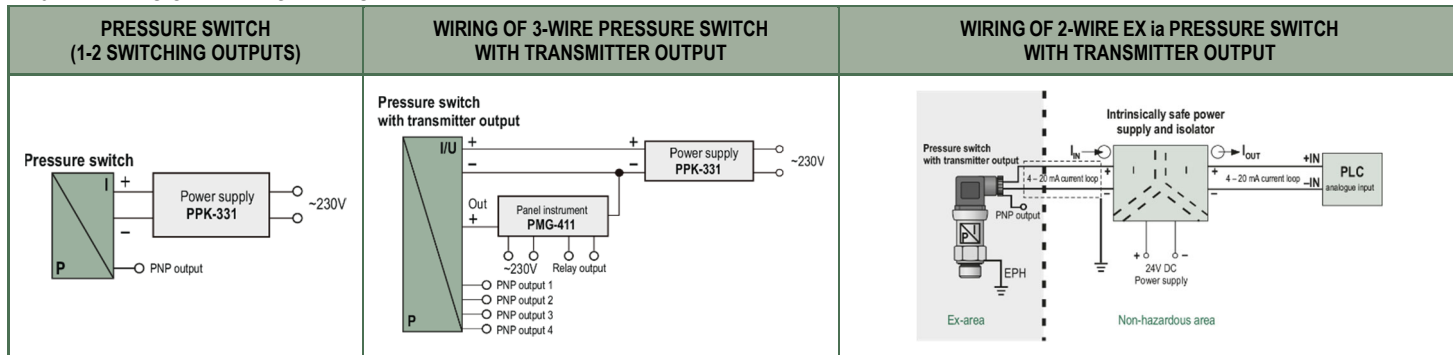
PIN CONFIGURATION

Electrical connection	M12 x 1 (5-pin, metal)	ISO4400 (2-wire transmitter + max. 1 PNP contact, or 3-wire transmitter w/o PNP contact)	M12 x 1 (8-pin, plastic)	Cable outlet ⁽¹⁾ (PVC) (PVC Ø4,9; PUR Ø5,7)
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Supply +	1	1	1	white
Supply –	3	2	3	brown
3-wire: Signal + (only in 3-wire)	2	3	2	green
Contact 1	4	3	4	grey
Contact 2	5	-	5	pink
Contact 3	-	-	6	blue
Contact 4	-	-	7	red
Shield	plug housing / pressure port	ground connection pin	via pressure port	green-yellow
				

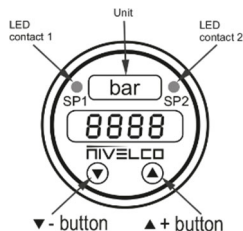
(1) Different cable types and lengths available, the permissible temperature depends on kind of cable; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 °C ... +70 °C [-23 °F ... +158 °F])

4.3 EXAMPLES OF ARRANGEMENTS



5. PROGRAMMING

5.1 OPERATING INFORMATION



The device has, according to the order, max. four LEDs which are allocated to the respective contacts. The LEDs will light up when the respective set point has been reached and the contact is active.

5.2 CONFIGURATION

Regardless of the number of PNP switches, the structure of the menu system is the same for all types of devices. They differ only by the number of menu items. Following the chart (5.6) and the menu list (5.7) they guide you through all possible menu items.

The 4-digit 7-segment display shows the measured value and provides information about the menu items.

The two buttons below the display are used for moving in the menu and setting the parameters.

Button "▲": this button allows you to move forward in the menu system or to increase the displayed value; it will also lead you to the operating mode (beginning with menu 1).

Button "▼": this button allows you to move backward in the menu system or to decrease the displayed value; it will also lead you to the operating mode (beginning with the last menu).

Pressing the two buttons simultaneously: confirm the menu items and set values.

The menu system is a closed system allowing you to scroll both forward and backward through the individual set-up menus to navigate to the desired setting item. All settings are permanently stored in an EEPROM so the settings will not be forgotten even after disconnecting from the supply voltage.

Keep in mind that changes will only take effect after pressing the two buttons together and leaving the menu item.

5.3 PASSWORD SYSTEM

Your device's menu system can be protected by a password, so it is only possible for an authorized person to make settings. If you activate password access ("PAon"), the entire menu system will be closed. For more information, see "5.7 Detailed menu items".

Entering the password will make the entire menu available again, then allow you to change the password at the special menu item 4. In case you forget your password, you can restore the instrument to the factory settings. To do this, use the special menu item 3.

5.4 CONFIGURATION EXAMPLE OF THE ANALOGUE OUTPUT (FOR 4 – 20 mA / 3-WIRE ADJUSTABLE)

By the menus **ZP** (zero point) and **EP** (end point), the analogue output can be configured. The following example shows how to use these menu items:

According to this example, your device has a measurement range of 0 – 400 bar:

So the output analogue signal looks like this:

0 bar = 4.00 mA 200 bar = 12.00 mA 400 bar = 20 mA.

If you change the value from 0 to 20 in the ZP menu item and the value from 400 to 300 in the EP menu item, the output signal changes as follows:

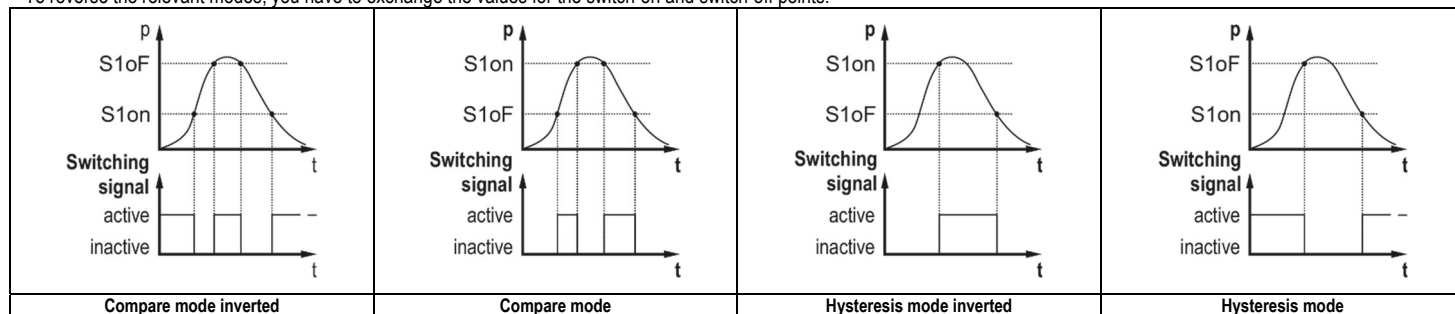
20 bar = 4.00 mA 160 bar = 12.00 mA 300 bar = 20 mA.

The values of ZP and EP are adjustable up to 1:5 of the nominal pressure range.

5.5 HYSTERESIS AND COMPARE MODE

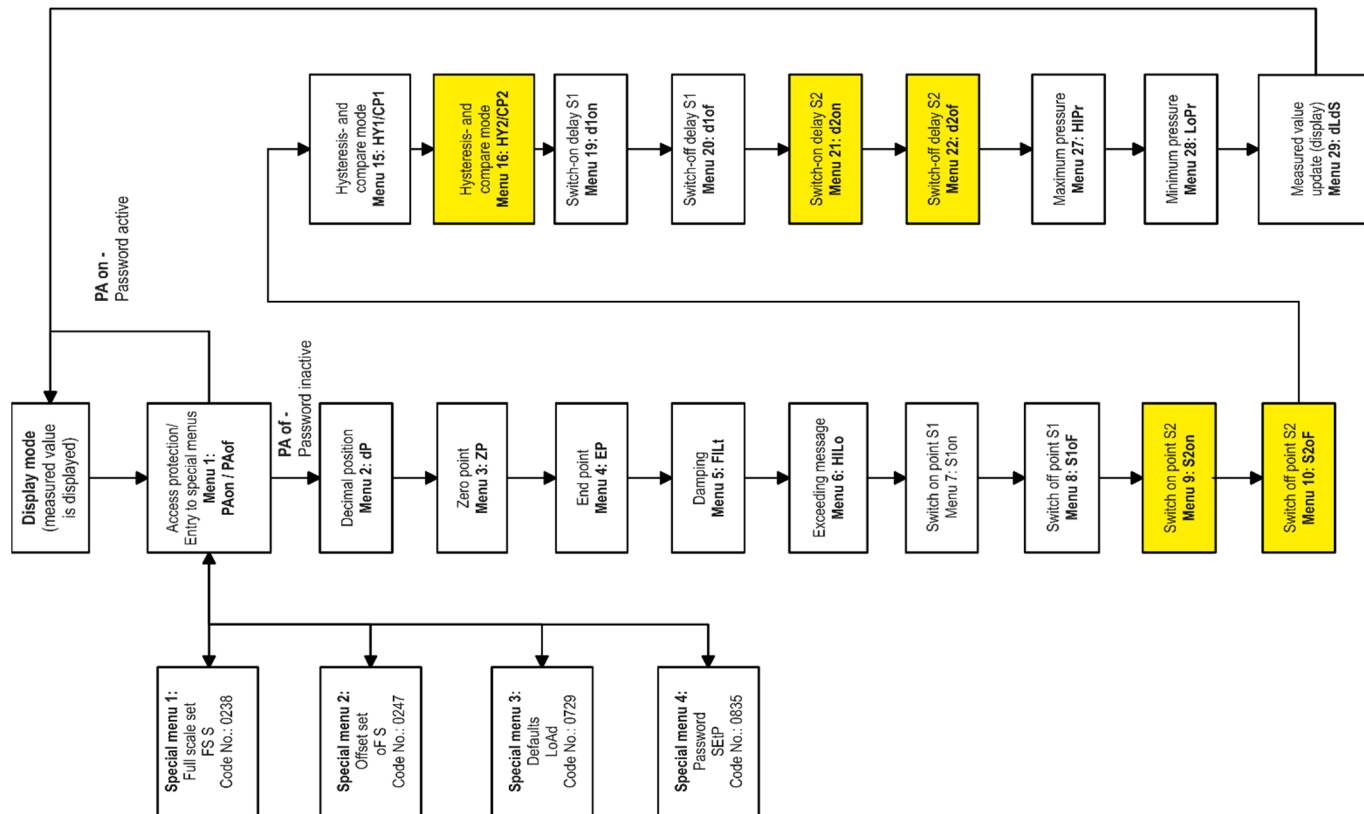
The diagrams showing the operation of the switch outputs are shown below.

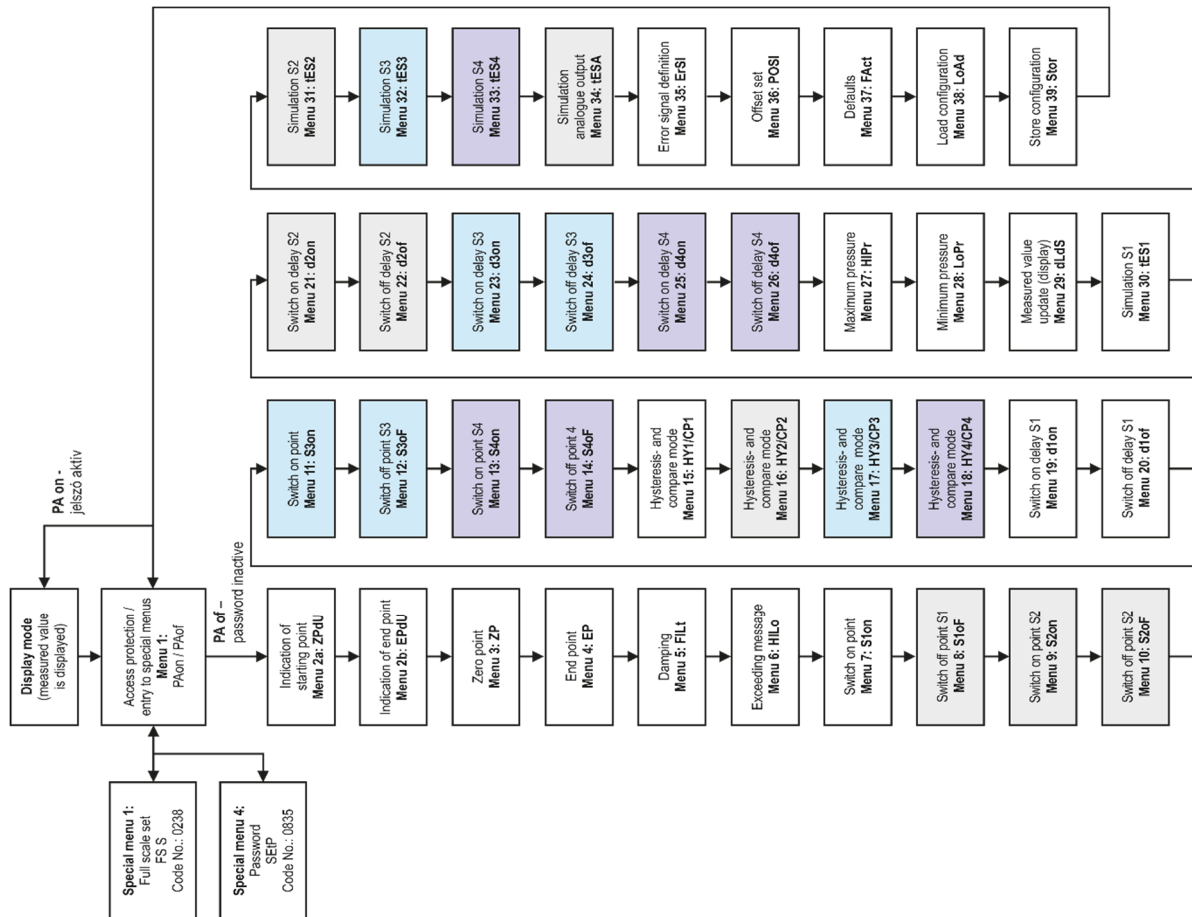
To reverse the relevant modes, you have to exchange the values for the switch-on and switch-off points.



5.6 STRUCTURE OF THE MENUSYSTEM

STRUCTURE OF THE STANDARD 2- AND 3-WIRE AND THE 4 – 20 mA / 2-WIRE Ex ia SYSTEM





5.7 DESCRIPTION OF THE MENUSYSTEM

Menu 1 – Access protection

PAon PAon → password active → to deactivate: set password.

PAof PAof → password inactive → to activate: set password.

The default setting for the password is "0005"; modification of the password is described in "Special menu 4".

Menu 2 – Set decimal point position

dP For devices with 3-wire output 4 – 20 mA and 0 – 20 mA the decimal point was already set during production.

Menu 2a – Indication of the start of measuring range (only 4 – 20 mA / 3-wire adjustable)

2PdU Value defined at order, no input option.

Menu 2b – Indication of end of measuring range (only 4 – 20 mA / 3-wire adjustable)

EPdU Value defined at order, no input option.

Menus 3 and 4 – Set zero point / end point

2P & EP The device has been configured correctly before delivery, so a later setting of a 2-wire device is only necessary, if a differing displayed value is desired (e. g. 0 – 100 %). For 4 – 20 mA / 3-wire adjustable: this menu has a different meaning, the configuration of the zero point causes a changing of the analogue output, whereas the display value remains unchanged (zero and end point can be configured within the limits of the nominal pressure range, according to the manufacturing label); for more information see "5.4 Configuration example of the analogue output (for 4 – 20 mA / 3-wire adjustable)".

Menu 5 – Set damping

FILt This feature allows you to eliminate problems caused by rapidly changing pressure values. By setting the time (0.3 – 30 sec allowed), the delay speed for the current output signal can be delayed. The more time you enter, the longer it takes to reach the value of the current pressure output signal.

Menu 6 – Exceeding message

HiLo Set "On" or "Off".

Menu 7, Menu 9, Menu 11, Menu 13 – Set switch-on points (switching outputs S1 ... S4)

S1on Set a power-on value for the relevant output. (S1, S2, S3, S4 outputs from **S1on** to **S4on**).

Menu 8, Menu 10, Menu 12, Menu 14 – Set switch-off points (switching outputs S1 ... S4)

S1of Set a power-on value for the relevant output. (S1, S2, S3, S4 outputs from **S1on** to **S4on**).

Menu 15, Menu 16, Menu 17, Menu 18 – Select hysteresis or compare mode (Select S1, S2, S3, S4 output mode)

HY 1 & CP 1 Select the hysteresis mode (HY 1 up to HY 4) or compare mode (CP1 up to CP4) for the contacts 1 up to 4 (no. corresponds to the contact). You can find a description from the hysteresis and compare mode at 5.5 chapter.

Menu 19, Menu 21, Menu 23, Menu 25 – Set switch-on delay

d1on Set the switch-on delay value for the relevant output. (Output S1, S2, S3, S4 from **d1on** to **d4on**); (0 – 100 sec).

Menu 20, Menu 22, Menu 24, Menu 26 – Set switch-off delay

d1of Set the switch-off delay value for the relevant output. (Outputs S1, S2, S3, S4 from **d1F** to **d4oF**); (0 – 100 sec)

Menu 27 / Menu 28 – Maximum / minimum pressure display

HiPr & LoPr Displays the high pressure (**HiPr**) or low pressure (**LoPr**) value during the measurement process (the value is not stored when power is lost). To delete the values, press the two buttons again within 1 second.

Menu 29 – Measured value update (display)

dLdS Set the display refresh cycle length. (0.0 – 10 sec)

Menu 30, Menu 31, Menu 32, Menu 33 – Simulate contacts (only 4 – 20 mA / 3-wire adjustable)

tES 1 The state of the switch outputs can be simulated. You can select, activate or deactivate the up and down buttons (outputs S1, S2, S3, S4 from **tES1** to **tES4**).

Menu 34 – Simulate analogue output (only 4 – 20 mA / 3-wire adjustable)

tESa The value of the analog output signal can be simulated. Select one of the following settings: "oi 4" (4 mA or 2 V), "oi12" (12 mA or 6 V) and "oi20" (20 mA or 10 V)

Menu 35 – Error signal definition (only 4 – 20 mA / 3-wire adjustable)

E-F S Set the desired error signal (this is given out in case of a defect).
Permissible options:

"OFF" (no error signal), "C 0" (0 mA or 0 V), "C L0" (3.5 mA or 1.75 V) and "C HI" (23 mA or 11.5 V). The error message appears only when Menu 6 "HILO" is set to "on".

Menu 36 – Offset compensation / position correction (only 4 – 20 mA / 3-wire adjustable)

POS ! Enter the POSI menu; if offset ≠ ambient pressure it is necessary to place the device under pressure pended on mounting position (the pressure reference has to correspond to the zero point of the pressure measuring range); press the two buttons at the same time; "oF I" will be appeared on the display; press the two buttons at the same time; "Pro2" will be displayed; press the two buttons at the same time; the display will now show "o"; the reference value can now be inputted with the push buttons; the reference value is, for example, 5% (-0.2 bar) of the measuring range: -1 bar – 15 bar; enter 5% using the buttons, then press the two buttons simultaneously; the display will show "oF5". Accordingly, the right and stable pressure should be added to the system (-0.2 bar).

If the measured value displayed on the display is a bad value, the operating sequence must be repeated.

A position correction is required if the installation position is different from the calibration position (as this may cause a little deviation of the signal, so the displayed value will be wrong). The analogue output signal (for devices with analogue output signals) will have no effect; if you move the offset, the entire scale will be moved.

Menu 37 – Load defaults (only 4 – 20 mA / 3-wire adjustable)

FAcT With this menu item you can undo the previous changes and delete them. To reset the factory defaults, press the two buttons at the same time after entering this menu item. Note that any changes you have made so far will be lost, so that the password will return to "0005".

Menu 38 – Load configuration (only 4 – 20 mA / 3-wire adjustable)

LoRd Load configurations stored on the device (Menu 39). (Choose from 1 to 5).

Menu 39 – Store configuration (only 4 – 20 mA / 3-wire adjustable)

Stor Store the device configuration settings. To do this, select a number from 1 to 5.

SPECIAL MENUS:

To access the special menu, select "PAoF" with the "▲" or "▼" button, then press both buttons to activate the menu item. "1" appears on the display.

Special menu 1 – Full-scale compensation

FS S Full-scale compensation is necessary if the indicated value for full scale differs from the real full scale value in the application; compensation is only possible with a respective reference source if the deviation of the measured value is within defined limits; set "0238"; confirm with both buttons; "FS S" will appear in the display; now it is necessary to place the device under pressure (the pressure must correspond to the end point of the pressure measuring range); press both buttons, to store the signal being emitted from the pressure switch as full scale; the display will show the set endpoint, although the entire range detection signal has been moved away.

Special menu 2 – Offset compensation / position correction (only available for standard 2- / 3-wire and 4 – 20 mA / 2-wire Ex ia)

oF 5 Set "0247"; the menu description is identical with menu "POSI" (menu 36) for 3-wire-devices).

Special menu 3 – Load defaults

(only available for standard 2- / 3-wire and 4 – 20 mA / 2-wire Ex ia)

LoRd Set "0729". The menu item description is the same as "FAcT", "Menu 37" for 3-wire devices.

Special menu 4 – Set password

SEtP Set "0835"; apply the setting by pressing the two push buttons together.; "SEtP" appears on the display; now set the password using the ▲ - or ▼ -buttons.
Free to choose from 0 to 9999 except for the following code numbers: 0238, 0247, 0729, and 0835. Finally, after setting the desired code number, you must save it by pressing the two buttons together.

6. TROUBLESHOOTING

Fault	Possible causes	Fault detection / remedy
No output signal:	Connected incorrectly.	Check the connections!
	Conductor/wire breakage.	Check all wires with cable tester!
	Defective measuring device (signal input).	Check the ampere meter (and its fuse) and the analogue input of the signal processing unit!
Analog output signal too low:	Load resistance too high.	Check the value of the load resistance!
	Supply voltage too low.	Check the power supply and power / current on the transducer / transmitter!
Slight shift of the output signal:	The diaphragm of the sensor is severely contaminated.	Cleaning with non-aggressive cleaning solutions, soft brush or sponge.
	The diaphragm of the sensor is calcified or crusted.	It is recommended to clean carefully and remove dirt.
Large shift of the output signal:	The diaphragm of the sensor is damaged (caused by overpressure or mechanically).	Check the diaphragm of the sensor, if it is damaged then send the device back to the manufacturer!

7. MAINTENANCE AND REPAIR

The instrument does not require regular maintenance. If necessary possible dirt deposited should be cleaned off. The repair will be carried out at the NIVELCO' premises only. When dismantling the device, it must always be done in the depressurized and currentless condition! Check also if the medium has to be drained off before dismantling. If necessary, clean the diaphragm carefully with non-aggressive cleaning solution, soft brush or sponge. Wrong cleaning or improper touch may cause irreparable damage on the diaphragm. Therefore, never use pointed objects or pressured air for cleaning the diaphragm.

Before returning your device for repair, it has to be cleaned carefully, neutralize/decontaminate the harmful substances at the media wetted parts. Beside our appropriate form (**Returned Equipment Handling Form**) can be downloaded from homepage www.nivelco.com. You should dispatch the device with a declaration of decontamination. In the declaration, you have to declare that the decontamination process had been finished, the device is clean and non-harmful and there is no hazardous substance on it.

8. STORAGE CONDITIONS

Storage temperature: -40 °C ... +100 °C (-40 °F ... +212 °F)⁽¹⁾

⁽¹⁾At DK-800 with PVDF pressure port the minimum permissible temperature is -30 °C (-22 °F)

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NIVELCO reserves the right to change technical data without notice.