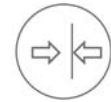


Technical manual BA 0710



Pressure



Precont D40 Pressure transmitter

for continuous measuring and surveillance of pressures
in gases, vapors, liquids and dusts

Pressure ranges 0...0,2 bar to 0...16 bar / -1...0 bar

Ceramic membrane with various process connections

Suitable for wide process temperature range from - 40 °C to +125 °C

Various usability, especially for hygienic applications

Humidity resistant construction for climatic extreme conditions
like high air humidity or also at condensed water formation

ATEX II 1/2 G Ex ia IIC T4 resp. ATEX II 1/2 D Ex iaD 20/21 T60°C/T102°C
Certification for the use in explosion hazardous areas

Excellent accuracy up to $\leq 0,1\%$

Programmable evaluation electronic with high brightness LED-display


- in 2-wire-technology with current signal 4...20 mA or
- in 3-wire-technology with voltage signal 0...10 V
- with two PNP switching outputs

ACS-CONTROL-SYSTEM
know how mit system



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Application description

The devices of the series **Precont D40** with integrated digital evaluation electronic are compact pressure transmitter for continuous measuring and surveillance of pressures from –1 up to 16 bar within gases, vapors, liquids and dusts within closed container or pipelines, also in explosive hazardous areas, at process temperatures from – 40°C to +125°C.

The use of a capacitive measuring sensor with ceramic membrane or of a strain gauge with metallic membrane, by use of various, also front flush process connections resp. process diaphragm seals, allows the use in nearly all fields of industry, especially also in hygienic applications.

Due to the construction, the device is especially suitable for the use in areas with high air humidity and condensed water formation, where conventional devices can not or can only be operated with a expensive installed pressure compensation capillary.

Function

The device is used for pressure measurement.

Characteristics of the ceramic measuring membrane

The system pressure is applied to the ceramic membrane and causes there a variation of the capacity at the back side of the membrane.

A pressure transmitting liquid is not used.

The ceramic membrane offers excellent characteristics like highest pressure and pressure blow strength up to forty times the nominal pressure, vacuum resistance, very high resistance against chemicals, corrosion and abrasion as well as very good insensitiveness against temperature shocks, highest accuracy and reproducibility, good long term stability and a very low temperature influence.

Signal processing

The pressure dependent variation of capacity is recorded in high resolution by a processor, adjusted acc. to the settings and converted in high resolution into an output signal of 4...20mA or 0...10V.

Due to the integrated linearization function with up to 25 linearization points it is possible to realize a linearization of the measuring signal, e.g. for the volume calculation in conical or laying cylindrical container.

According to the resp. settings the PNP switching outputs are driven.

The switching state of the two PNP switching output are indicated by each an LED.

By 3 keys and the four digit LED display all settings for the display, the analogue output as well as the PNP switching outputs can be set resp. adjusted.

A transmitter fast adjustment per key combinations is also possible.

Available pressure ranges – permissible overload resp. burst pressure

pressure range	burst pressure in bar
-1...0 bar	18
0...0,2 bar	18
0...0,4 bar	18
0...0,6 bar	18
0...1 bar	18
0...1,6 bar	25
0...2,5 bar	25
0...4 bar	40
0...6 bar	40
0...10 bar	40
0...16 bar	40

Safety notes



Each person that is engaged with inauguration and operation of this device, must have read and understood this technical manual and especially the safety notes.


Installation, electrical connection, inauguration and operation of the device must be made by a qualified employee according to the informations in this technical manual and the relevant standards and rules.

The device may only be used within the permitted operation limits that are listed in this technical manual. Every use besides these limits as agreed can lead to serious dangers.

The materials of the device must be chosen resp. checked for suitability to the respective application requirements (contacting substances, process temperature). An unsuitable material can lead to damage, abnormal behavior or destruction of the device and to the resulting dangers.

The device may not used as sole device for prevention of dangerous conditions in machines and plants.

This device meets article 3 (3) of the EC directive 97/23/EC (pressure equipment device directive) and is designed and produced in good engineer practice.

The device meets the legal requirements of all relevant EC directives.  0158



Safety notes for electrical operating supplies for explosive hazardous areas

If a device is installed and operated in explosive hazardous areas, the general Ex construction standards (EN/IEC 60079-14, EN/IEC 61241-14, VDE 0165), this safety notes and the enclosed EC conformity certificate incl. supplements must be observed.

The installation of explosive hazardous systems must be carried out principally by specialist staff.

The device meets the classification

	T_a Medium	T_a Housing
II 1/2 G Ex ia IIC T4	-20... +60 °C	-20...+85 °C
II 1/2 D Ex iaD 20/21 T60°C / T102°C (T57°C)	-20... +60 °C	-20...+85 °C (+40 °C)
II 2 G Ex ib IIC T4	-20...+85 °C	-20...+85 °C
II 2 D Ex ibD 21 T102°C	-20...+85 °C	-20...+85 °C
II 2 G Ex ib IIC T4	-20...+125 °C	-20...+50 °C
II 2 D Ex ibD 21 T125°C	-20...+125 °C	-20...+50 °C

The highest surface temperature is determined inside the housing at complete fill up, that means thermal isolation. The power at the sensor is negligible.

The devices are conceived for measuring of pressures in explosive hazardous areas.

The measured medium may also be combustible gases, vapors, liquids and dusts.

The permitted operating temperatures and pressures are type and variant dependent and can be found in this technical manual.

For applications, which require devices of category 1/2 or category 1, the process pressure and temperature range of the medium has to be between 0,8 bar and 1,1 bar and between -20 °C and 60 °C.

The permissible maximum values for U_i , I_i and P_i are equal for variants A/B/C/D/E/F/G/H. To this there must be paid especially attention in the case of combining more intrinsically safe circuits at the variants with voltage output 0...10V (variants E/F/G/H) and at the variants with PNP switching outputs (variants A/E). The rules for combination of intrinsically safe circuits must be applied.

The PA terminal inside the connection housing resp. the process connection must be connected to the potential compensation of the explosive hazardous area.

At variants of the devices with chargeable plastic parts (e.g. cable resp. connection housing), a warning marking points out to the safety measures, that must be applied because of the electrostatic charging in operation and especially in the case of maintenance activities.

avoid friction - no dry cleaning - no assembling in pneumatic conveying stream

Installation

The installation of the device at a position, where high pressure pulses can occur, should be avoided. Adjustment and function control can be made easier, if the device is mounted behind a stop fitting.

The installation of the device should be made if possible at temperature calmed places to get a reliable measuring result. Large temperature steps, e.g. at filling of a hot liquid into a cold system, can produce a short-time higher measuring signal deviation at the variant with ceramic measuring membrane. At a large amplification of the measuring signal this deviation will be also amplified accordingly. The deviation will be completely neutralized after the adaptation of the measuring membrane of the pressure transmitter to the temperature.

At a step from +20°C ...+80°C this neutralization can wile up to 3 minutes.

The installation position has influence on the measuring result of the kind of a zero value shift because of the deadweight of the measuring membrane. This deviation can be eliminated by an offset adjustment. Zero and end value must be shifted by the same amount.

Drive the system pressure free prior installation resp. deinstallation of the sensor.

The tightening of the process connection with screw-in thread may only be done at the hexagon by a suitable spanner.

The maximum permitted torque strength is 50 Nm.

The screw in of the process connection by using the connection housing is not permitted.

The housing can be rotated every time, also at operation, by 330°.

Avoid the pollution of the pressure compensation vent. The hindrance of the pressure compensation can lead to faulty measuring results.

The correct function of the device within the specific technical data can only be guaranteed, if the permitted temperature in the area of the connection housing (see technical data) will not be exceeded.

This can be achieved by the using of the temperature decoupler or also by isolation of the medium carrying part of the plant or by other constructive measures to reduce the transferring of an extreme temperature to the connection housing.

Maintenance

The device is free of maintenance.

Special substances can lead to solid coatings on the membrane.

Such depositions can lead to faulty measurement results of the device.

In the case of coat forming liquids the membrane must be regularly cleaned e.g. with clear water.

Don't use sharp tools or aggressive chemicals for cleaning.

Repair

A repair may only be carried out by the manufacturer.

If the device must be sent back for repair, the following informations must be enclosed:

- An exact description of the application.
- The chemical and physical characteristics of the product.
- A short description of the occurred error.

Before returning the device for repair, the following measures must be proceeded:

- All stick product residues must be removed. This is especially important, if the product is unhealthily, e.g. caustic, toxic, carcinogenic, radioactive etc.
- A returning must be refrained, if it is not possible by 100% to remove the unhealthily product completely, because e.g. it is penetrate into cracks or is diffused through plastic.

Electrical connection

The electrical connection of the device must be carried out according to the respective country specific standards. Incorrect installation or adjustment could cause applicationally conditioned risks.

Use only twisted shielded signal and measurement wires and install these wires separated from power leading wires. Connect the cable shield only at one side to earth, ideally at the installation place of the device. The metallic parts of the device with connection housing plug - type S resp. cable - type K are electrically connected with the earthing connection screw. At the variant with connection housing terminal box – type A all metallic parts are connected with terminal 1 - PE/shield. The device must be grounded, e.g. by the earth terminal screw or by the process connection.

At the housing variant with terminal box, the terminals for wire cross-section from 0,5...2,5mm², for the connection of a cable are placed below the electronic module. This is plugged and can be pushed easily. After the connection of the cable, the module must be correctly inserted again.

The cable gland is suitable für cable diameter from 4,5 to 10 mm.

After the installation of the cable the cable gland must be firmly screwed to ensure the tightness of the connection housing. The same is valid for the screw cap of the housing.

The voltage applied to the terminal contacts may not exceed 45 V to avoid damage of the electronic. All connections are polarity protected.

The minimum resp. maximum supply voltage depends on the respective variant:

Variant	not Ex	Ex
type A/B/E/F/G/H	16,5...45V DC	16,5...30V DC
type C/D	12,5...45V DC	12,5...30V DC

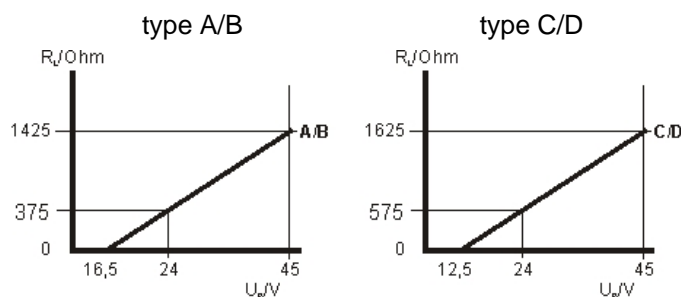
A load, e.g. the measuring shunt of an evaluation device, in series with a sensor of the variant A/B/C/D with 4...20 mA current signal in 2-wire-technology reduces the supply voltage available at the sensor. Dependent on version resp. minimum supply voltage, it results in a maximum value for this resistor, where a correct function is still possible.

The maximum load at signal current 20mA can be calculated by the equation:

$$R_L \text{ max} = (V_{S \text{ act.}} - V_{S \text{ min}}) / 20\text{mA}$$

with $V_{S \text{ act.}}$ = applying supply voltage and $V_{S \text{ min}}$ = minimum supply voltage.

The following graph shows the characteristics for the resistor values at 24 V and 45 V.



Inductive loads at the pnp switching outputs, e.g. relays or contactors may only be used with a free-wheeling diode or a RC protection circuit to avoid high voltage peaks.

The load at the PNP switching output will be connected to the terminal +terminal of the supply voltage by a semiconductor switch contactless and by this bounce-free. At an activated switching state a positive signal near supply voltage is feed to the output.

At deactivated switching state and at failure of supply voltage the semiconductor switch is shut off.

The PNP switching output is current limited to 0,2...0,25 A and is overload and short circuit protected.

Assignment

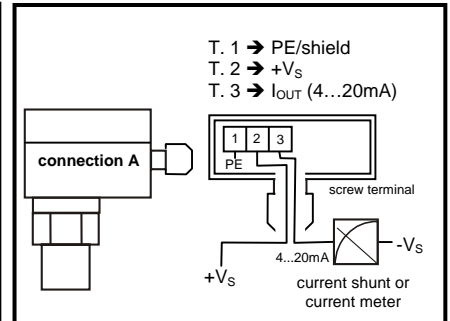
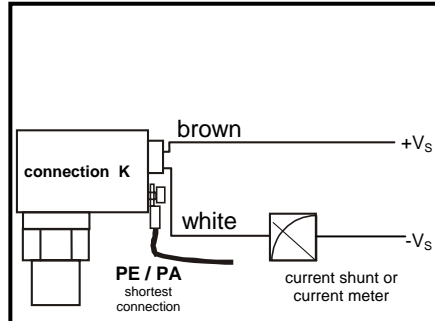
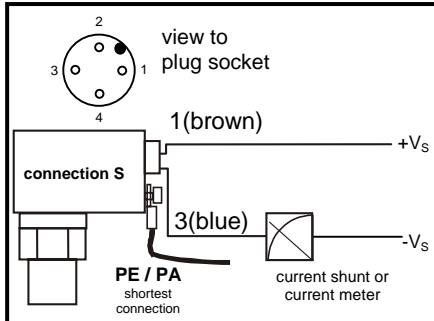
**connection type S
plug M12x1**

**connection type K
cable**

**connection type A
terminal box**

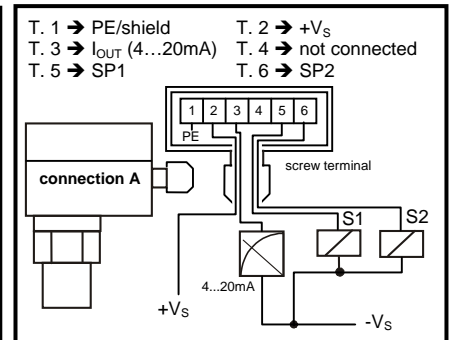
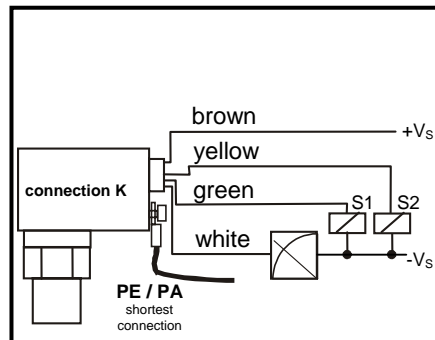
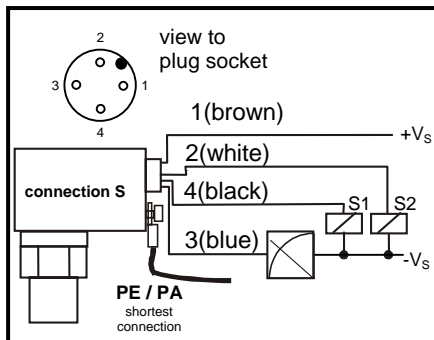
2 – wire – technology / signal 4...20 mA

variant B/C/D



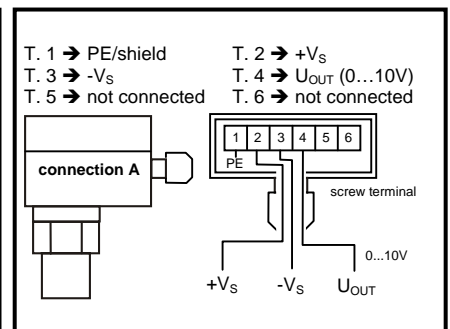
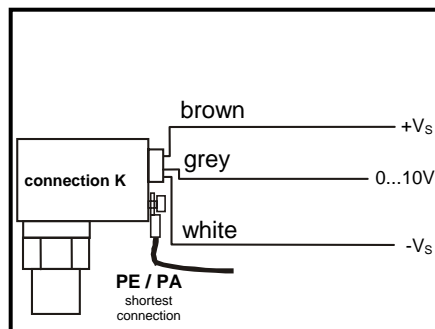
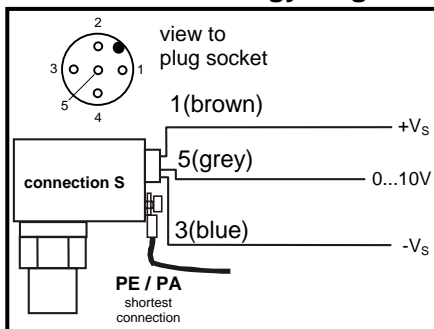
2 – wire – technology / signal 4...20 mA / 2x PNP switching output

variant A



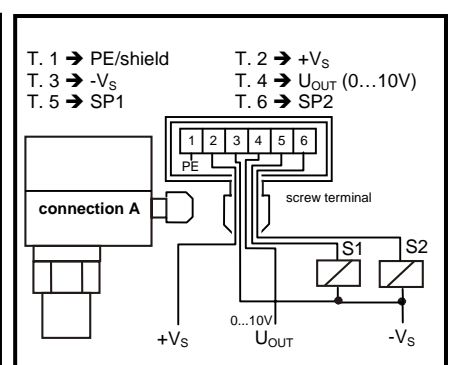
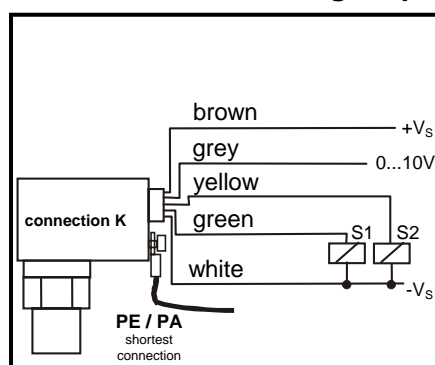
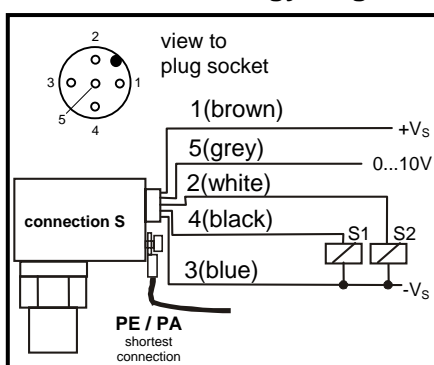
3 – wire – technology / signal 0...10 V

variant F/G/H



3 – wire – technology / signal 0...10 V / 2x PNP switching output

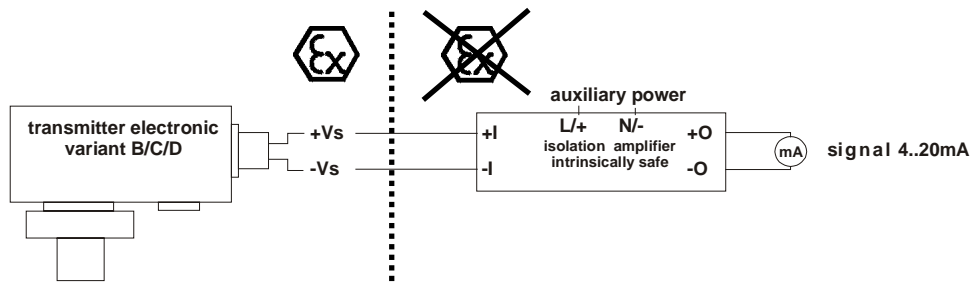
variant E



Electrical connection in an explosion hazardous area

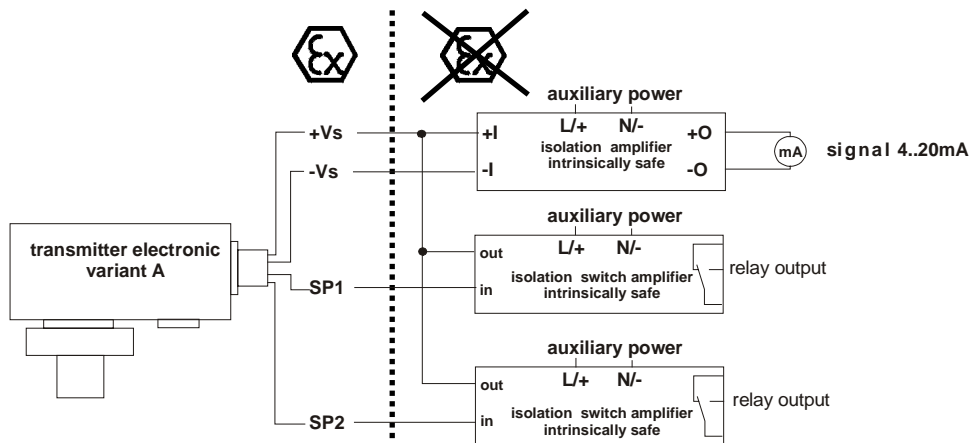
2 – wire – technology / signal 4...20 mA

variant B/C/D



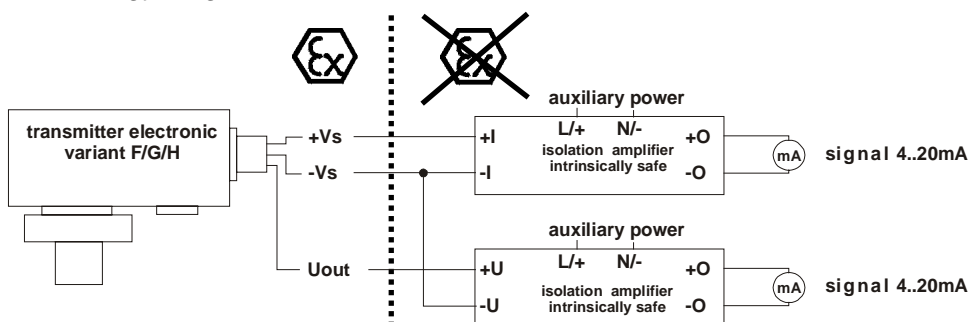
2 – wire – technology / signal 4...20 mA / 2x PNP switching output

variant A



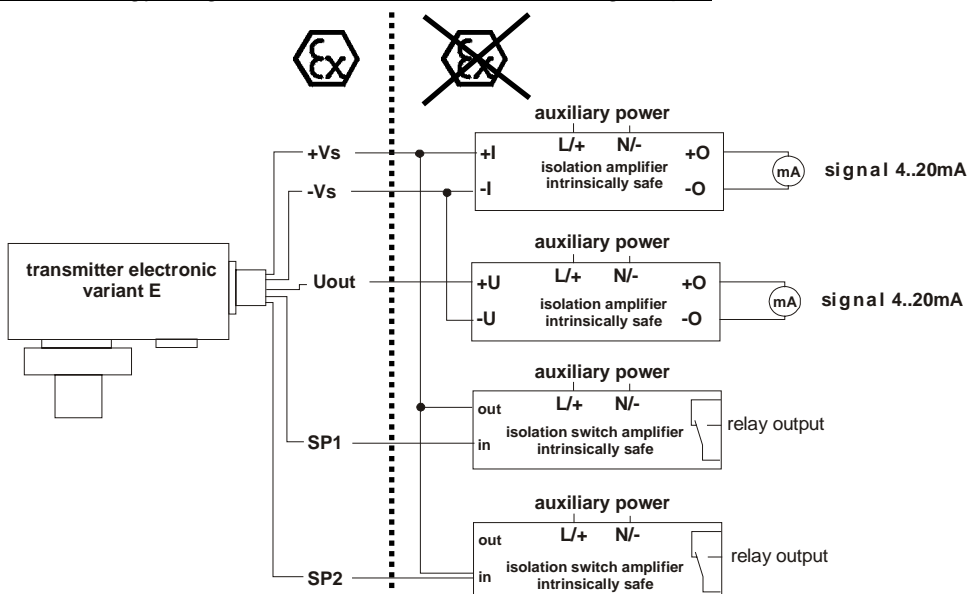
3 – wire – technology / signal 0...10 V

variant F/G/H

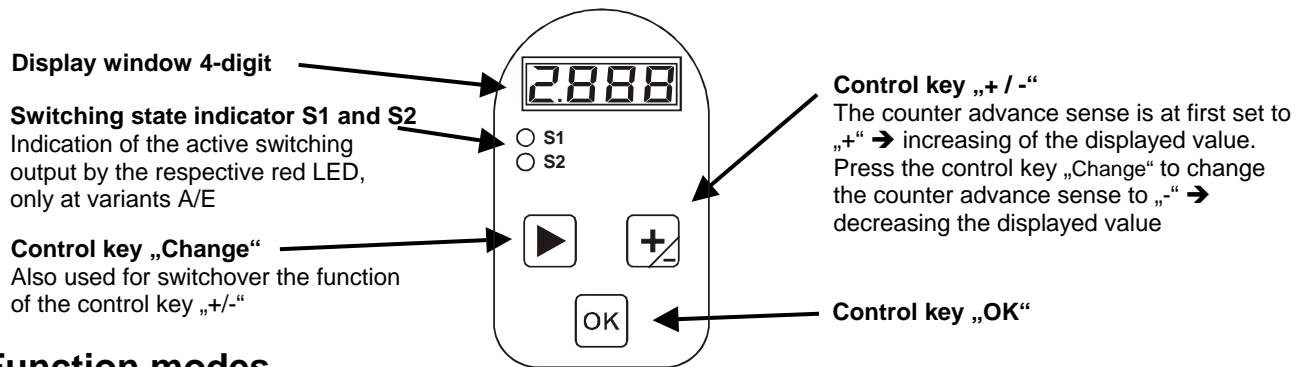


3 – wire – technology / signal 0...10 V / 2x PNP switching output

variant E



Operation and display elements



Function modes

run mode

The pressure transmitter records the applied system pressure and proceeds the chosen functions according to the set parameter. The measuring value is displayed in the display window.

The analogue output and the switching outputs are driven. A switched-on switching output is signaled by the come on of the respective red switching condition light-emitting diode.

The exceeding of the frame specifications, abnormal behavior conditions or also device malfunctions are displayed by the display values EEEE resp. $-\text{EEE}$.

By pushing the control key „+ / -“ the software version will be displayed

Programming mode

To access to the adjustment menu push the control key „OK“ and enter the **password 3009**.

Fast adjustment mode

By pushing of key combinations in the run mode the transmitter can be operated without using the adjustment menu.

Zero value adjustment with applied pressure signal:

Short pushing the key's „Change“ and „OK“ in succession and hold approx. 6 seconds.

The output signal 4mA / 0V is generated that can be varied by „+ / -“ resp. „Change“ and „+ / -“.

By pushing the key „OK“, the current pressure value is captured as lower pressure reference value, assigned to the previously adjusted output signal and the changed settings are stored loss protected.

A jump back to the run mode is carried out.

End value adjustment with applied pressure signal:

Short pushing the key's „+ / -“ and „OK“ in succession and hold approx. 6 seconds.

The output signal 20mA / 10V is generated that can be varied by „+ / -“ resp. „Change“ and „+ / -“.

By pushing the key „OK“, the current pressure value is captured as upper pressure reference value, assigned to the previously adjusted output signal and the changed settings are stored loss protected.

A jump back to the run mode is carried out.

Damping adjustment:

Short pushing the key's „Change“ and „+ / -“ in succession and hold approx. 6 seconds.

The damping value can now be varied. This value can be varied arbitrary by „+ / -“ resp. „Change“ and „+ / -“ from 0 to 60 seconds in 100 steps of each 0,6 seconds, at variants C / G from 0 to 6 seconds in 10 steps of each 0,6 seconds. By pushing the key „OK“, the value is captured and stored loss protected.

A jump back to the run mode is carried out.

Reset to factory values:

At devices of variants C / G, a reset to factory values will be carried out by pushing the key „OK“ for approx. 5 seconds at a restart after removing the supply voltage. All customer specific adjustment values will be lost.

Attention:

If the lower pressure reference value (zero) is adjusted higher than the upper pressure reference value (span), the output signal falls **below** 3,8mA resp. to 0V. The display shows EEEE as long as the key „OK“ is pushed. A readjustment has to be done correctly (zero < span).

Function description

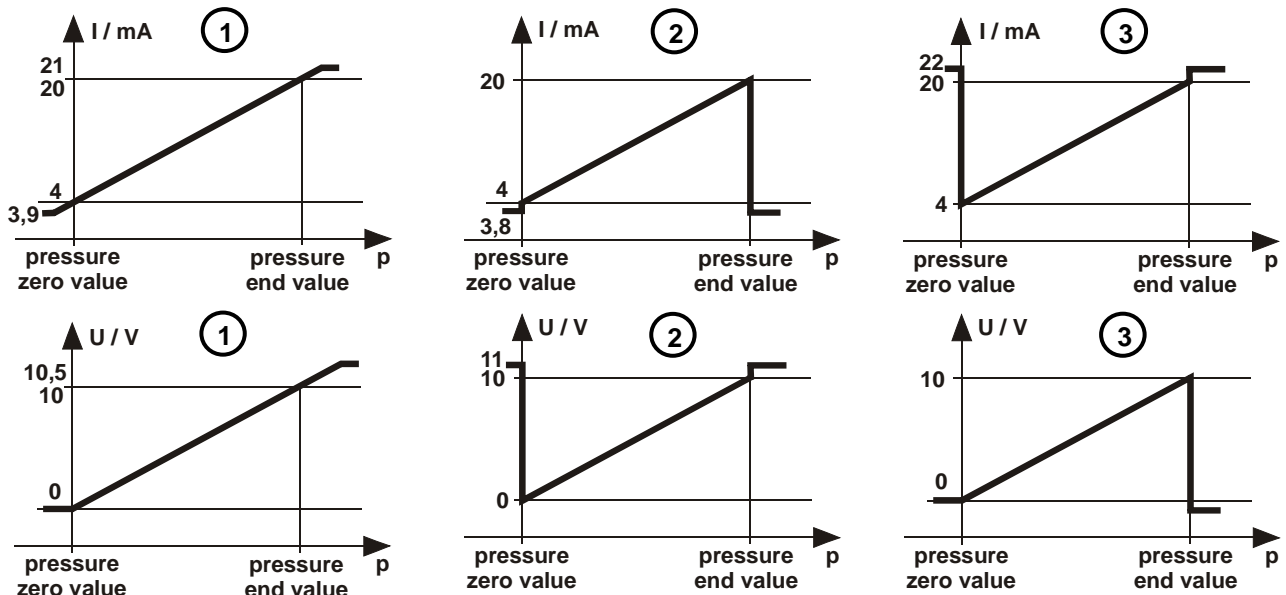
Analogue output

The pressure signal is transmitted to the analogue output, in which the adjusted pressure zero value equals an output current of 4 mA resp. an output voltage of 0 V and the adjusted pressure end value equals an output current of 20 mA resp. an output voltage of 10 V.

At an adjustment by *Zero resp. Span*, the pressure zero value resp. the pressure end value and thus the zero value (4 mA / 0 V) resp. the end value (20 mA / 10 V) of the analogue output can be shifted.

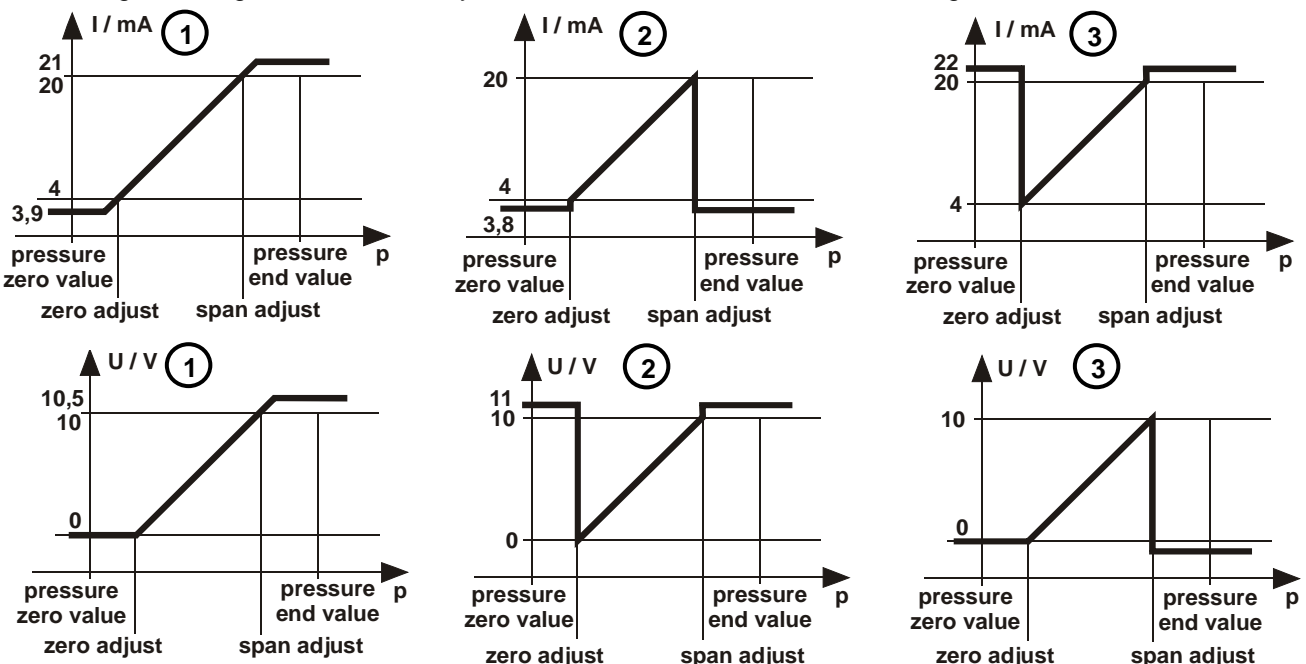
The output signal behaves depending on the set mode in three different possibilities:

- ① Linear signal transmission in the range from 3,9 mA to 21 mA resp. 0 V to 10,5 V. The limit values are kept at exceeding or underrun.
- ② Linear signal transmission in the range from 4 mA to 20 mA resp. 0 V to 10 V. At exceeding or underrun of these limit values a jump to 3,8 mA resp. 0 V is proceeded for an error evaluation.
- ③ Linear signal transmission in the range from 4 mA to 20 mA resp. 0 V to 10 V. At exceeding or underrun of these limit values a jump to 22 mA resp. 11 V is proceeded for an error evaluation.



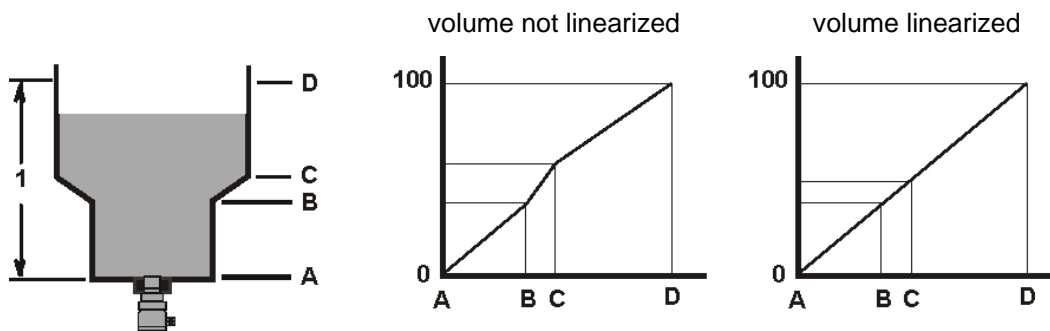
At an adjustment by *Zero – with signal resp. Span – with signal*, in addition to the shift of pressure zero value resp. the pressure end value, there can be arbitrarily shift the zero value (4 mA / 0 V) resp. the end value (20 mA / 10 V) of the analogue output in the range from 3,9 to 21 mA resp. 0...10,5 V.

An inverting of the signal can be done by the extension menu at the menu item signal inversion.



Linearization

Due to the integrated linearization function with up to 25 linearization points it is possible to realize a linearization of the measuring signal, e.g. for the volume calculation in conical or laying cylindrical container.



The linearization can be operated with applied pressure signal as well as without applied pressure signal.

Linearization with applied signal – wet adjustment

At the linearization with applied signal for each linearization point the current pressure value will be measured and assigned to the display value that must be entered.

The display value should be set within the range of the display scaling, defined by Zero and Span, but can be set to -999 to 9999.

The first linearization point LP1 should, but must not be assigned to the display value Zero, because this display value is assigned with the output signal 4 mA / 0 V.

The last linearization point should, but must not be assigned to the display value Span, because this display value is assigned with the output signal 20 mA / 10 V.

Linearization without applied signal – dry adjustment

At the linearization without applied signal for each linearization point a needed pressure value can be entered and assigned with the needed display value, that must be entered too.

The pressure value, that must be entered equals the display value of the device at factory set display adjustment. If the sensor is set by factory to bar, thus also the pressure must be entered in bar, this is also valid for mbar, psi or other factory settings.

The entered display value should be set within the range of the display scaling, defined by Zero and Span, but can be set to -999 to 9999.

The first linearization point LP1 should, but must not be assigned to the display value Zero, because this display value is assigned with the output signal 4 mA / 0 V.

The last linearization point should, but must not be assigned to the display value Span, because this display value is assigned with the output signal 20 mA / 10 V.

Programming example

The device is mounted into a container like in the scheme above. Because the container has a conical expansion and the volume should be displayed, the output must be linearized.

The filling level 1 equals the full measuring range of the sensor.

The output (4...20mA) of the sensor is connected to an indication device, that shows the container content in liter.

At the programming with applied signal it can be proceeded like follows

- In the menu item LP_ of the linearization menu the value 4 for 4 linearization points must be entered.
- Select the menu item MSig for linearization with applied signal.
- Because the minimum level A is at empty container, the factory set minimum value should be set. Thus at the linearization point LP1 the factory setting will be set by pressing the key OK.
- The first real linearization point is set to the position B at the container. Now the container will be filled up to B and the display value and thus also the output current at the linearization point LP2 will be adjusted as long as the connected indication device shows the correct volume in liter. This value will be set by OK.
- After this the container must be filled up to position C and at the linearization point LP3 the display value resp. the output current must be adjusted, till the indication device shows the correct value. This value will be set also by OK.
- Because the position D at the container equals the end pressure of the sensor, once again the factory settings should be set. Thus the linearization point LP4 must be set without changing's by pressing the key OK.

PNP – switching output

The switching function realizes a stable switching condition, independent from system conditioned pressure fluctuations around the adjusted set point.

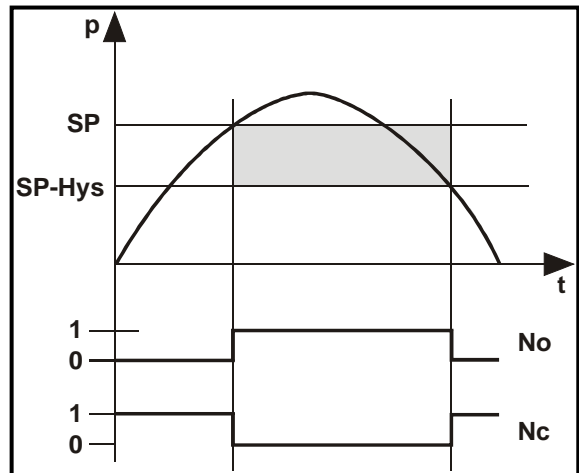
It can also be used for realizing a pressure controlled two-position control.

The switching range is determined separately by the switch point – SP – and hysteresis – HYS – for the respective switching output.

For the switch point as well as for the hysteresis an arbitrary value referring to the display scaling can be input.

The switch back point result from switch point deducting hysteresis, as equation $SP - Hys$.

There is no default minimum value for hysteresis, that means the distance between switch resp. switch back point.



The working principle can be set separately for each switching output to: open-circuit principle resp. no normally open or to closed-circuit principle resp. nc normally closed

The switching output S1 can be also used for error indication function alternatively to the limit value function. Doing this a switching action happens, if the output signal becomes higher than 20mA/10V resp. lower than 4mA/0V.

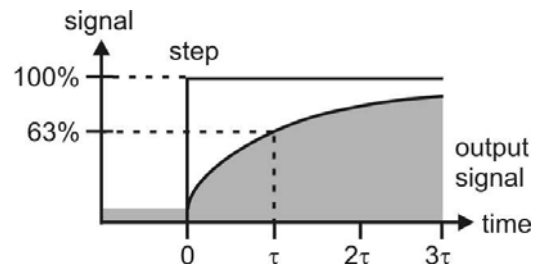
Damping

The damping influences the reaction speed of display, output signal and switching output at a change of the pressure.

The behaviour of display and output signal follows an exponential characteristic with the damping time constant τ .

Within the time period τ the output signal increases respectively by 63% of the existing deviation.

With 99,3%, the end value is nearly achieved after 5τ .



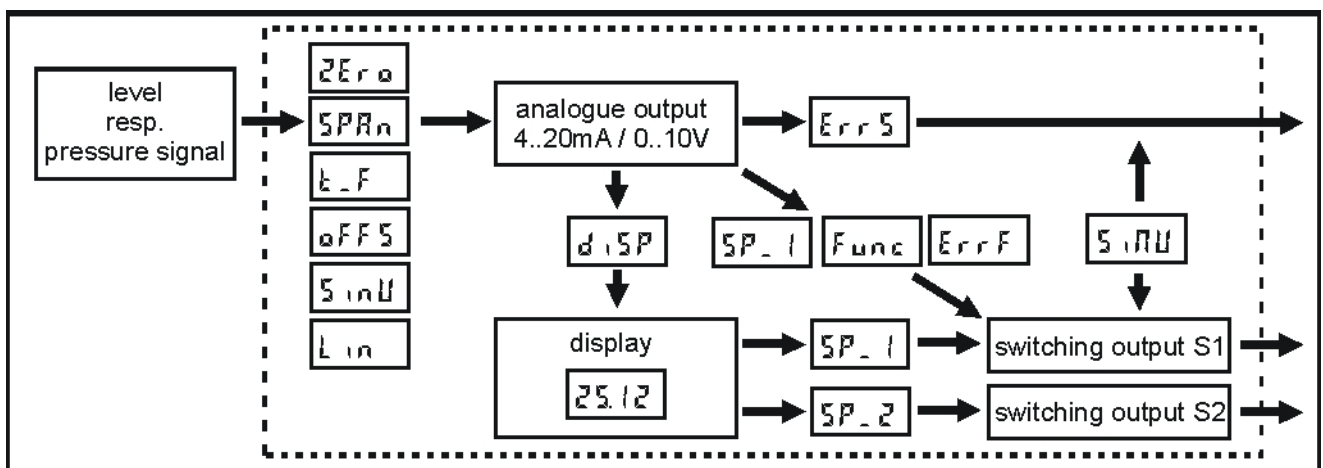
At the variants A / B / E / F the damping can be adjusted from 0...60 seconds in 100 steps from 0...100, whereby one step equals 0,6 seconds.

The set time (value x 0,6 seconds) equals 5τ .

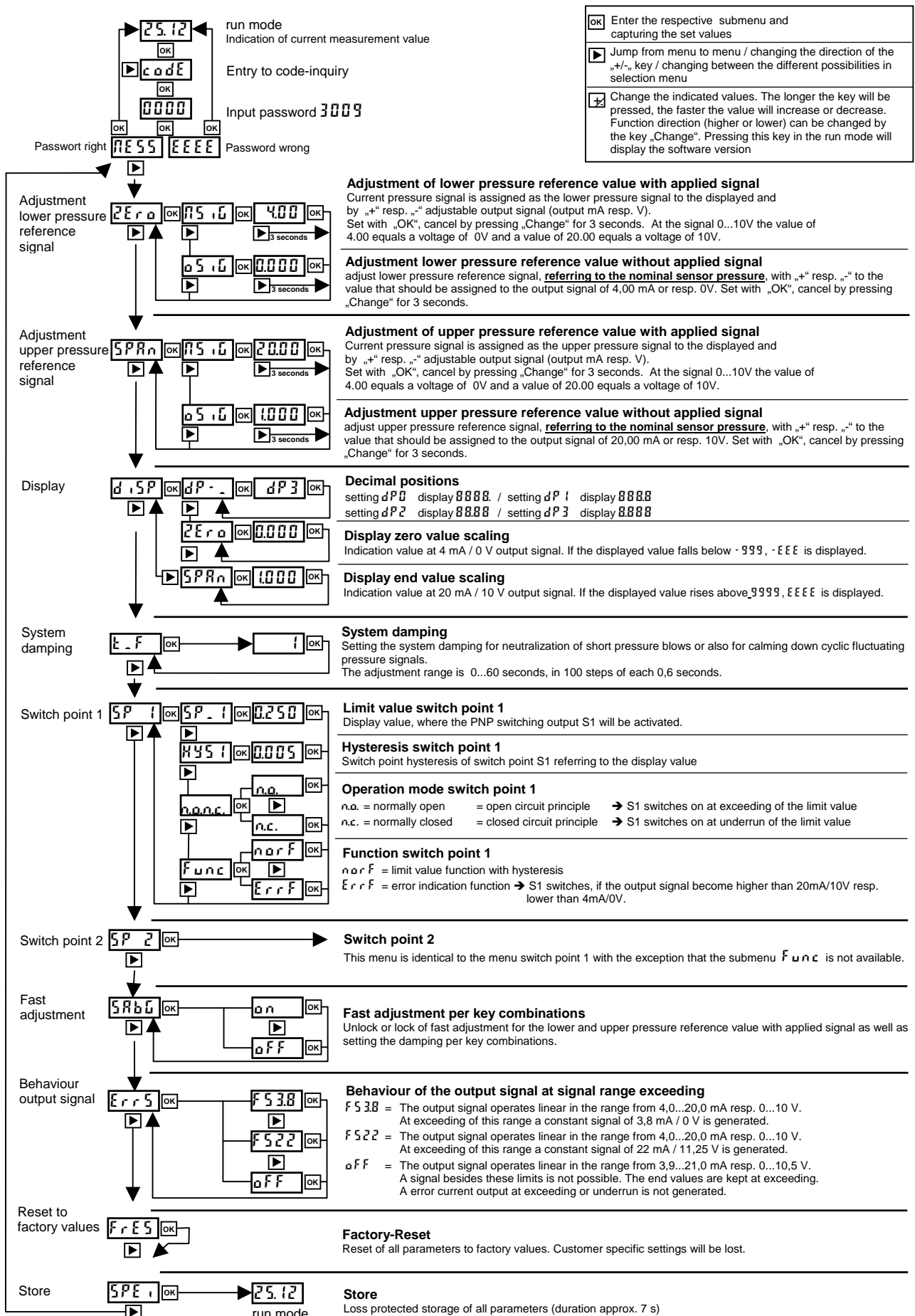
At the variants type C and G the damping can be adjusted from 0...6 seconds in 10 steps from 0...10, whereby one step equals 0,6 seconds.

The set time (value x 0,6 seconds) equals 5τ .

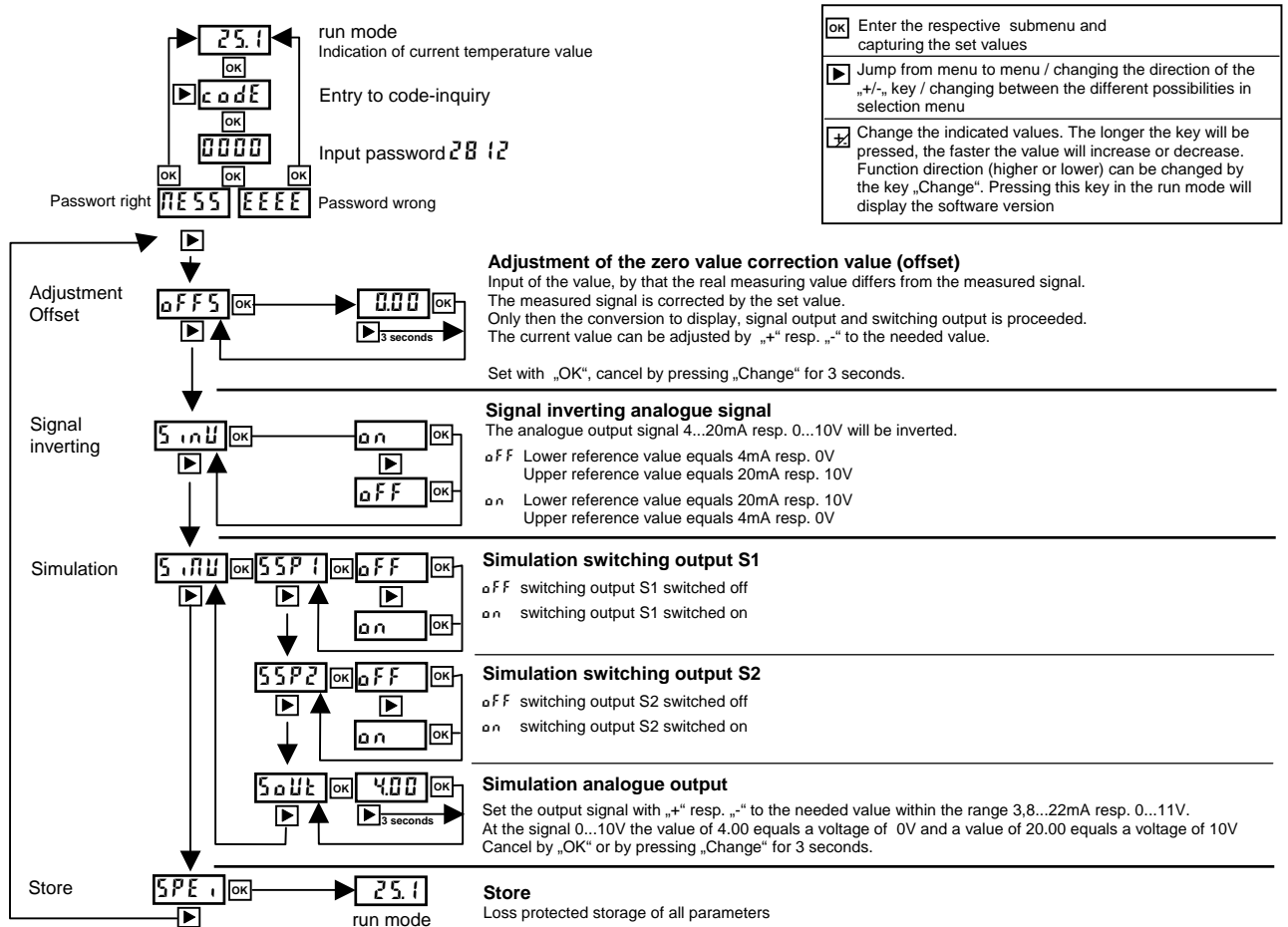
Function scheme



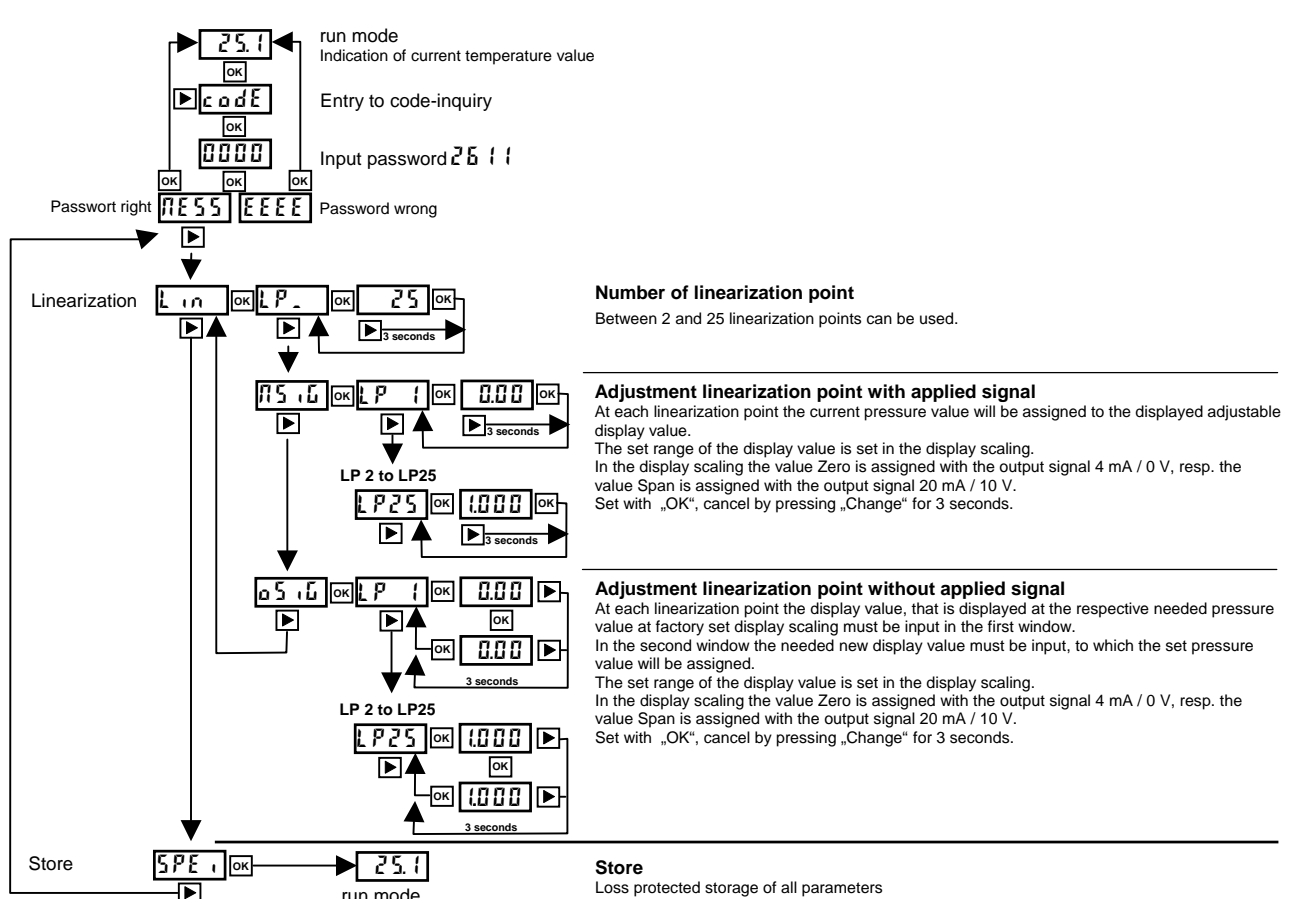
Adjustment menu – password 3009



Extension menu – password 2812



Linearization menu – password 2611



Technical data**Auxiliary supply**

Permitted supply voltage:	reverse polarity protected		
	Variant A/B/E/F/G/H	16,5...45 V DC	Ex 16,5...30 V DC
	Variant C/D	12,5...45 V DC	Ex 12,5...30 V DC
Ripple voltage:	$\leq 2 V_{PP}$	condition:	within the permitted supply voltage range
Supply current:	2-wire 4...20 mA	≤ 22 mA	PNP switching outputs no load
	3-wire 0...10 V	≤ 10 mA	PNP switching outputs no load

Analogue output 4...20 mA

Signal range:	linear characteristic from 3,9...21 mA resp. 21...3,9 mA
	error signal 3,8 mA / 22 mA
Permitted load:	$R_L \max = (V_{S \text{ act.}} - 14,5) / 20\text{mA}$
Resolution:	$\leq 1 \mu\text{A}$
Minimum delay time:	≤ 35 ms typ. (max. 70 ms) at set system damping 0
Influence of supply voltage:	$\leq \pm 0,02\% \text{ FS}^2) / 10\text{V}$

Analogue output 0...10 V

Signal range:	linear characteristic from $\leq 0,01...10,5$ V resp. $10,5... \leq 0,01$ V
	error signal $\leq 0,01$ V / 11,25 V
Permitted load:	$R_L \geq 2000 \Omega$, equals 5 mA at signal 10 V, current limited
Resolution:	$\leq 0,5$ mV
Minimum delay time:	≤ 35 ms typ. (max. 70 ms) at set system damping 0
Influence of supply voltage:	$\leq \pm 0,02\% \text{ FS}^2) / 10\text{V}$

PNP switching output

Function:	PNP switching to +Vs
Output voltage:	$V_{OUT} \geq +Vs - 2$ V
Output current:	≤ 250 mA, min. 200 mA current limited, short circuit protected
Rise up time:	≤ 700 μs output load $\leq 3000 \Omega$ resp. $\geq 4,5$ mA
Delay time:	≤ 35 ms typ. (max. 70 ms) at set system damping 0
Switching cycles:	$\geq 100.000.000$

Measuring accuracy

Characteristic deviation ^{3) 5) 6) 12)} :	$\leq \pm 0,1\% / 0,2\% \text{ FS}^2)$
Nonlinearity ^{6) 12)} :	$\leq \pm 0,1\% / 0,2\% \text{ FS}^2)$
Hysteresis ^{6) 12)} :	negligible
Long term drift ^{6) 12)} :	$\leq \pm 0,1\% \text{ FS}^2) / \text{year}$ not cumulative
Temperature deviation ^{6) 12)} :	$T_k^4)$ Zero $\leq \pm 0,20\% \text{ FS}^2) / 10$ K max. $\leq \pm 1,5\% \text{ FS}^2)$ (-20...+80°C)
	$T_k^4)$ Span $\leq \pm 0,20\% \text{ FS}^2) / 10$ K max. $\leq \pm 1,0\% \text{ FS}^2)$ (-20...+80°C) besides -20...+80°C with factor 2 for T_k

Mounting position

Maximum deviation ¹⁰⁾ :	$\leq 0,05$ mbar
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²⁾ Referring to nominal measuring span resp. full scale (FS)

³⁾ Nonlinearity + Hysteresis + Reproducibility

⁴⁾ T_k = Temperature coefficient

⁵⁾ Limit value adjustment

⁶⁾ Specification valid, if adjusted measuring range = nominal measuring range, i.e. for $TD^7) = 1$
At $TD^7) \geq 1$ (adjusted measuring range \leq nominal measuring range):

Specification at adjusted measuring range = specification at nominal measuring range x $TD^7)$

⁷⁾ Turn-Down $TD = \text{nominal measuring range (FS}^2) / \text{adjusted measuring range}$

¹⁰⁾ Device rotated by 180°, process connection upside.

¹²⁾ Higher values for special measuring range

Materials

Membrane: (medium contact)	Ceramic AL ₂ O ₃ 96% resp. 99,9%														
Process connection: (medium contact)	Steel 1.4404 (AISI 316L) /														
Temperature decoupler:	CrNi-steel														
Connection housing:	CrNi-steel														
Display window:	PC – polycarbonate (Makrolon [®])														
Device plug M12x1:	Socket CrNi-steel, insert PUR, contacts gold-plated														
Connection cable:	PE – polyethylene														
Cable gland:	Housing PA – polyamide, gasket CR / NBR														
Pressure compens. element:	Housing PA – polyamide, membrane ePTFE														
Membrane keyboard:	PES – polyester														
Gaskets:	<table> <tr> <td>medium contact</td> <td>→ FPM – fluorelastomere (Viton[®])</td> </tr> <tr> <td></td> <td>EPDM – etylene-propylene-dienmonomere</td> </tr> <tr> <td></td> <td>CR – chloroprene-rubber (Neopren[®])</td> </tr> <tr> <td></td> <td>FFKM – perfluorelastomere (Kalrez[®])</td> </tr> <tr> <td></td> <td>NBR – nitril-butadien-rubber</td> </tr> <tr> <td>others</td> <td>→ FPM – fluorelastomere (Viton[®])</td> </tr> <tr> <td></td> <td>Silicone</td> </tr> </table>	medium contact	→ FPM – fluorelastomere (Viton [®])		EPDM – etylene-propylene-dienmonomere		CR – chloroprene-rubber (Neopren [®])		FFKM – perfluorelastomere (Kalrez [®])		NBR – nitril-butadien-rubber	others	→ FPM – fluorelastomere (Viton [®])		Silicone
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	Silicone														

Environmental conditions

Environmental temperature: – 40°C...+85°C, limitation at Ex variants

additional limitations by material	Environmental temperature range
Connection cable PE	-40...+70°C

Process temperatures: – 40°C...+125°C, limitation at Ex variants

Limitations by material	Process temperature range
Gasket FPM	-25...+140°C
Gasket EPDM	-40...+130°C
Gasket CR	-40...+120°C
Gasket FFKM	-25...+140°C

Process pressure ranges: depends on variant, maximum – 1 bar ...16 bar

Overload / burst strength: depends on measuring range, see table overload pressure / burst pressure

Vacuum strength: 0 mbar_{abs}

Weight: depends on variant

Torque strength: ≤ 50 Nm at process connections with screw-in thread

Protection classification: IP67 EN/IEC 60592 IP65 at Ex variant

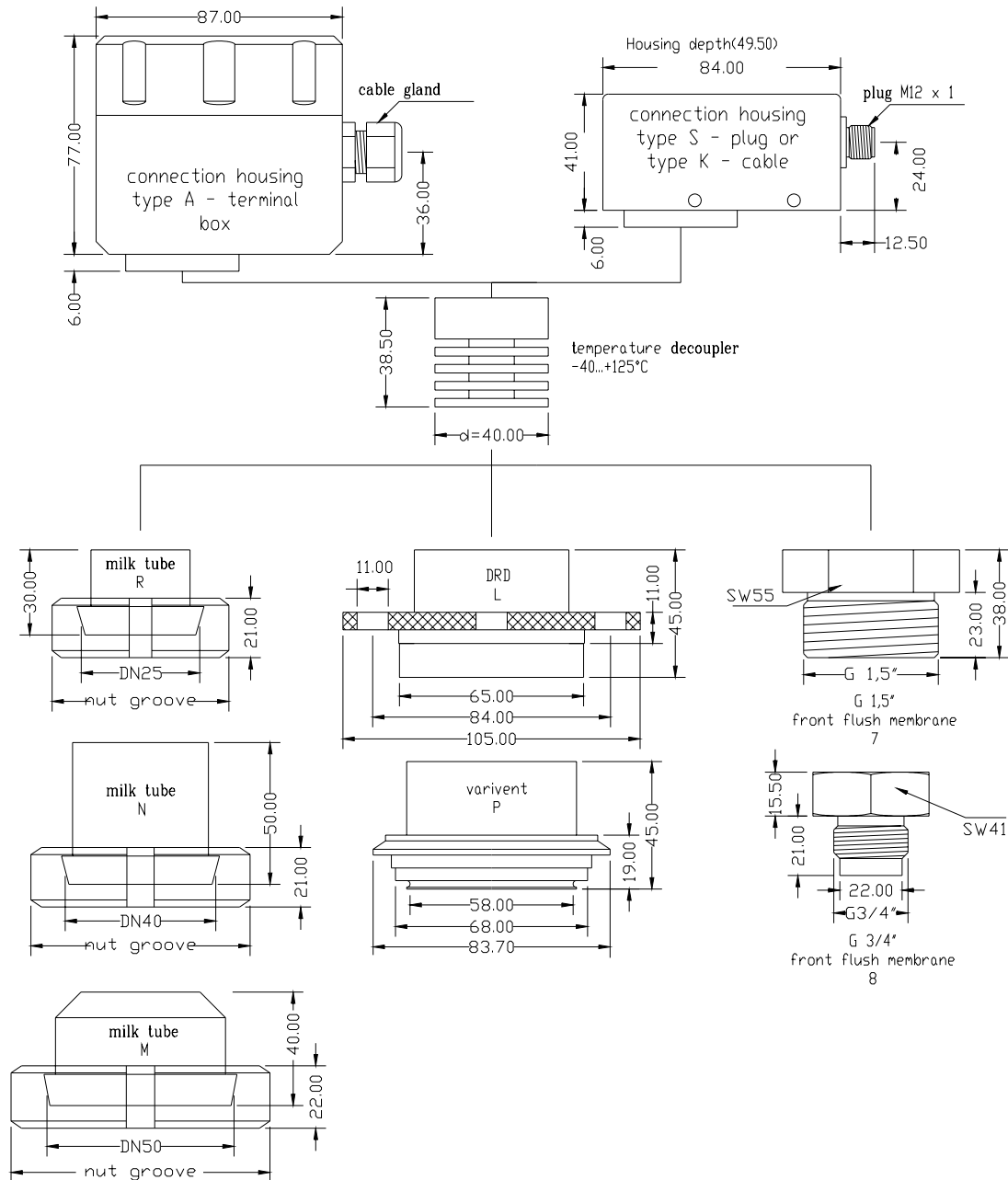
Climatic classification: 4K4H EN/IEC 60721-3

Vibration classification: 4 g 5 - 100 Hz

EM – compatibility: emission EN/IEC 61326-1 operation device class B
immunity EN/IEC 61326-1 industrial range

Reference conditions: EN/IEC 60770-1 T = 15...35 °C, relative humidity 45...75 %, environmental air pressure 860...1060 kPa

Dimension drawings



Order code overview

Digital pressure transmitter with **front flush ceramic capacitive membrane** from -1 to 16 bar

Type:

D40 Standard
 ExD40 ATEX II 1/2 G Ex ia IIC T4
 XDD40 ATEX II 1/2 D Ex iaD 20/21 T60°C/T102°C

Process connection:

7	G 1½" A	ISO228-1	front flush membrane		
8	G ¾" A	ISO228-1	front flush membrane	not for variant membrane 1 / 3	99,9%
R	Milk tube	DN 25, PN 40	DIN 11851	not for variant membrane 1 / 3	99,9%
N	Milk tube	DN 40, PN 40	DIN 11851		
M	Milk tube	DN 50, PN 40	DIN 11851		
P	Varivent	68 mm	DN40-80 / DN1½" ..6", PN25	DN100 / DN4", PN20	DN125 / DN6", PN10
L	DRD	65 mm	DN 50, PN 40		

Electronic - output:

A	2-wire-technology	signal 4...20 mA	2x PNP switching output	LED display, 3 key's
B	2-wire-technology	signal 4...20 mA		LED display, 3 key's
C	2-wire-technology	signal 4...20 mA		3 key's
D	2-wire-technology	signal 4...20 mA		fix adjusted
E	3-wire-technology	signal 0...10 V	2x PNP switching output	LED display, 3 key's
F	3-wire-technology	signal 0...10 V		LED display, 3 key's
G	3-wire-technology	signal 0...10 V		3 key's
H	3-wire-technology	signal 0...10 V		fix adjusted

Material process connection (medium contact):

V Steel 1.4404 (AISI 316L) / 1.4571 (AISI 316Ti)

Material connection housing:

C CrNi-steel

Measuring range:

02	0...0,2 bar	07	0...2,5 bar
03	0...0,4 bar	08	0...4 bar
04	0...0,6 bar	09	0...6 bar
05	0...1 bar	10	0...10 bar
06	0...1,6 bar	11	0...16 bar
07	0...2,5 bar	16	-1...0 bar
		YY	special measuring range

separate spec. necessary

Gaskets (medium contact):

1	FPM	fluorelastomere (Viton®)	
2	CR	chloroprene-rubber (Neopren®)	
3	EPDM	etylene-propylene-dienmonomere	for food applications
4	FFKM	perfluorelastomere (Kalrez®)	
6	FFKM	perfluorelastomere high density	for gas applications

Process temperature:

1 Standard -40°C to +125°C

Pressure type:

R Relative pressure

Accuracy measuring system¹⁾ – material measuring membrane (medium contact):

2	0,2%	ceramic AL ₂ O ₃	96%
1	0,2%	ceramic AL ₂ O ₃	99,9% (highly clean)
0	0,1%	Linearization protocol	ceramic AL ₂ O ₃ 96%
3	0,1%	Linearization protocol	ceramic AL ₂ O ₃ 99,9% (highly clean)

Electrical connection:

S Plug M12x1
 K Cable 2m
 A Terminal box

Precont _ _ _ **V C** _ _ **1 R** _ _

¹⁾ Higher values for special measuring range