Operating Instruction

for

Electronic Pressure Switch

Model: PDD

Order from: C A Briggs Company
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2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.
The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

3. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition. Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:
The standard delivery includes:

- Electronic Pressure Switch model: PDD
- Operating Instructions

4. Regulation Use

Pressure switches serve for the regulation and monitoring of pressure in containers, hydraulic and pneumatic systems, and refrigeration technology etc. This instrument may only be used with liquids that are compatible with the wetted parts.

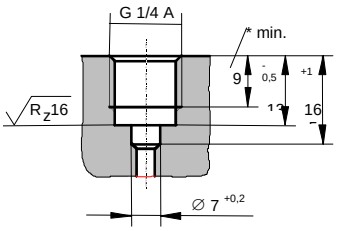
5. Operating Principle

KOBOLD pressure sensors / switches series PDD are cost effective electronic pressure switches with digital indication of actual pressure. Two switch points, on / off-switch delay and hysteresis that are within the measuring range are programmable.
A piezo resistive ceramic sensor is used. The units can be used where high switching accuracy is needed. Long-term stability, repeatability and the compact and robust design makes it an ideal unit for use in OEM applications.

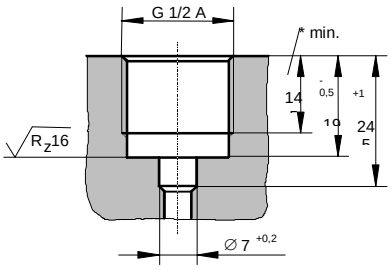
6. Mechanical Connection

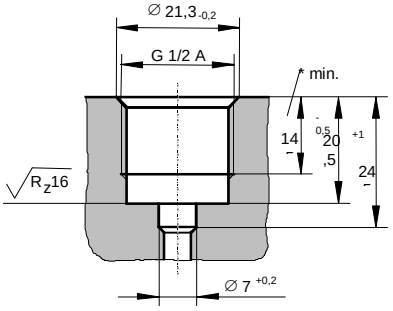
The pressure tappings should be prepared according to the following specification for the screw-in holes.
For the purpose of sealing, disc-sealing (DIN 16 258) or profile sealing may be an adequate choice. The correct torque depends on the material, and the form of the seal and the pressure connection of the pressure sensor.
The mounting place should be free from strong vibrations and radiant heat.
The admissible site conditions of pressure sensors are to be maintained.
After making pressure connection and electrical connection, the sensors are ready for use.

Sealing (DIN 16288)



Flat sealing





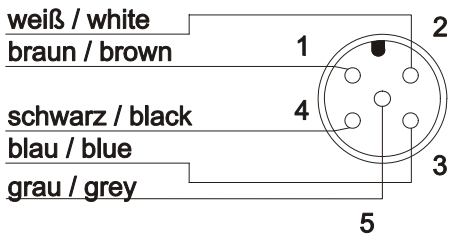
7. Electrical Connection

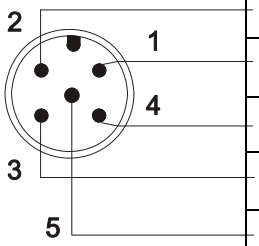
Attention! Ensure that the voltage levels of your supply system are in agreement with the voltage levels given on this manual.

- Make sure that the supply wires are de-energised.
- The connection is via an M 12x1 plug, as shown below.
- Matching couplings with different cable lengths are available optionally.

Attention! Incorrect wiring will lead to damage of the unit's electronics.

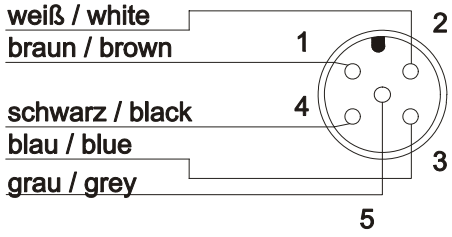
Plug connections

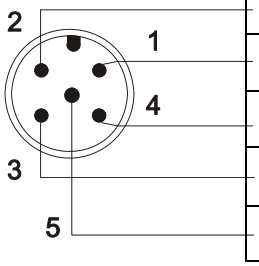




PDD-1	PDD-2
not connected	not connected
+24 VDC	+24 VDC
PNP-Output	NPN-Output
0 V / GND	0 V / GND
0 V / GND	0 V / GND

Plug



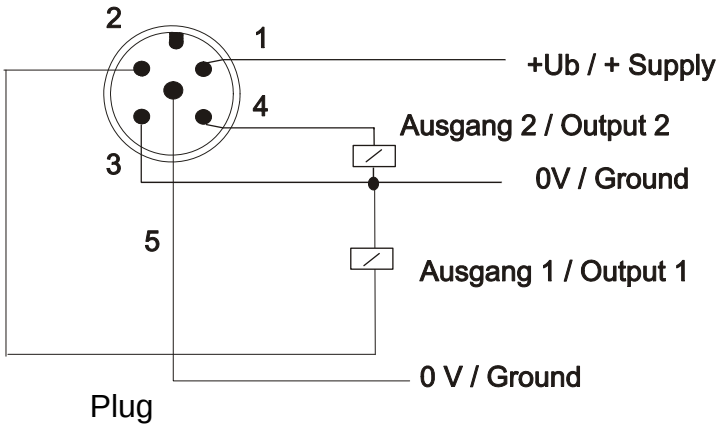


PDD-5	PDD-7
PNP-Output 1	NPN-Output 1
+24 V_{DC}	+24 V_{DC}
PNP-Output 2	NPN-Output 2
0 V / GND	0 V / GND
0 V / GND	0 V / GND

Accessories
Plug with cable ZUB-KAB-12K002

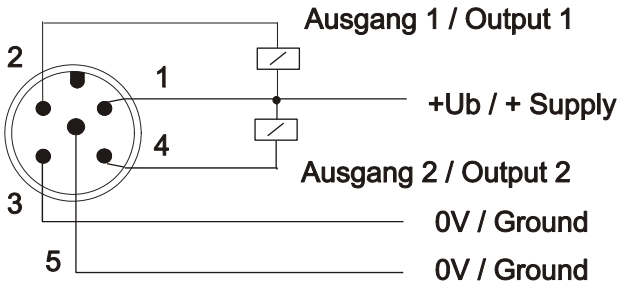
Plug

PNP Wiring



Plug

NPN Wiring



Plug

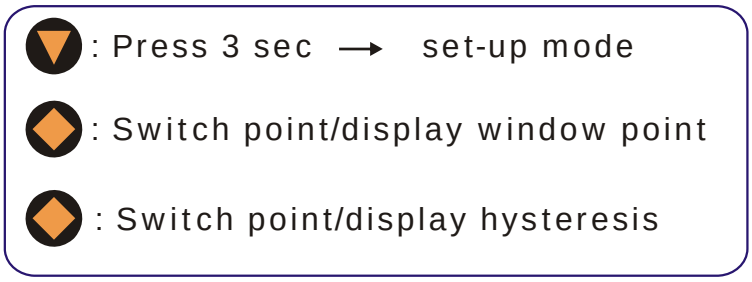
8. Commissioning

Attention! Please take note that during operation at high temperatures, the surface and the elements within the unit may become very hot!

Connect the pressure switch according to the figure shown on the previous page, and supply the device with the specified voltage.
After switching the unit on, the measuring range (full scale) is displayed for 3 seconds.

8.1. Function Keys

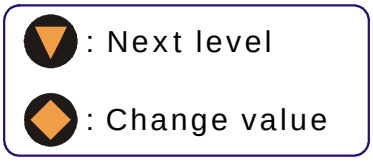
In Normal mode (Measuring mode)

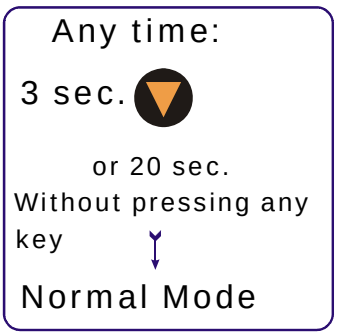


PDD-1x and PDD-2x

PDD-5x and PDD-7x

In set up mode





9. Set-Up

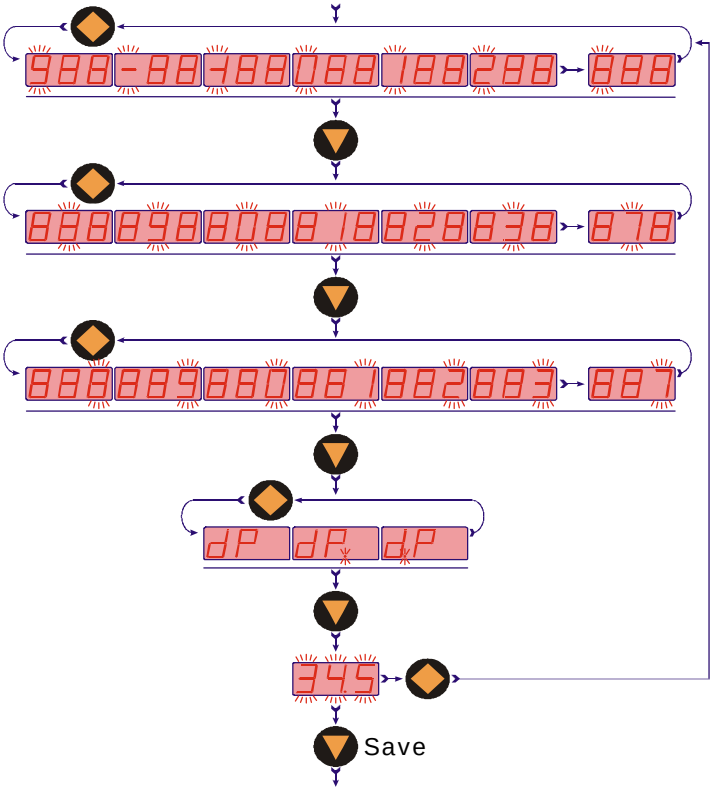
The following parameters may be changed:

	Display range	**Standard factory pre-set**
Switch point (**Spo, SP1, SP2**)	-199...999	50 % f.s.
Hysteresis (**HYS, HY1, HY2**)	-199...0	000
Window point (**duo, only PDD-1/-2**)	Switch point ...999	--- (inactive)
Filter (**Filt**)	1/2/4/8/16/32/64	1
Time response **(dS1, dS2, dr1, dr2)** ->PDD –5/7 (**dSE,drE**) -> PDD –1/2	0,0...99,5 sec.	0,0
Contact type (**Con, Co1, Co2**)	(**N.O.**) or (**N.C.**) contact	**N.O.** contact
Zero-point (**S-A**, Start adjust)	000	is adjusted
Code (**CCo**, change code)	000...999	000

9.1. Parameter setting

From main menu option (e.g. Switching point, "**SPo**"), press "◆" key in order to go to Parameter set up. The following flow diagram shows the sequence of steps required to change a single parameter.

[from main menu option]



1. Set position

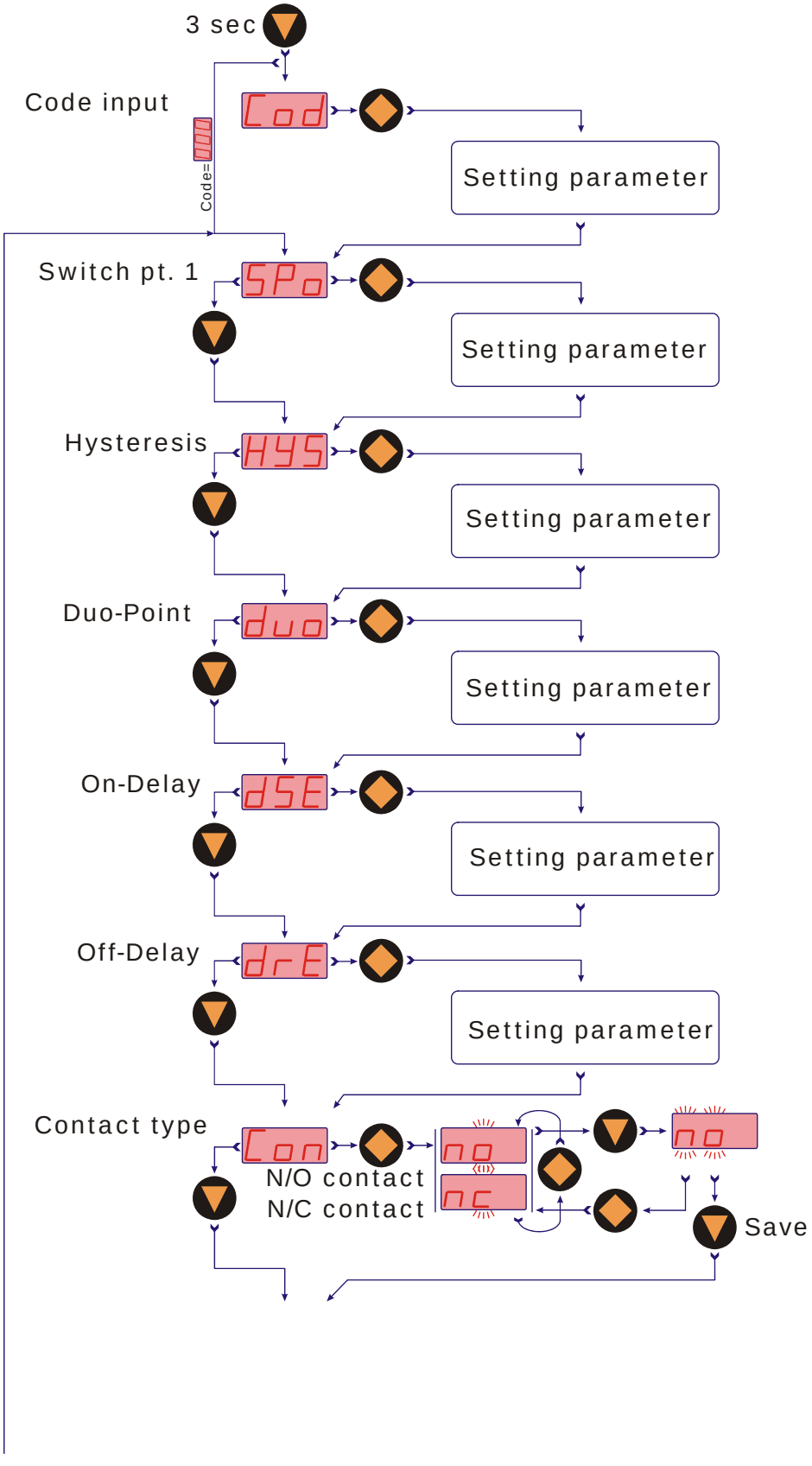
2. Set position

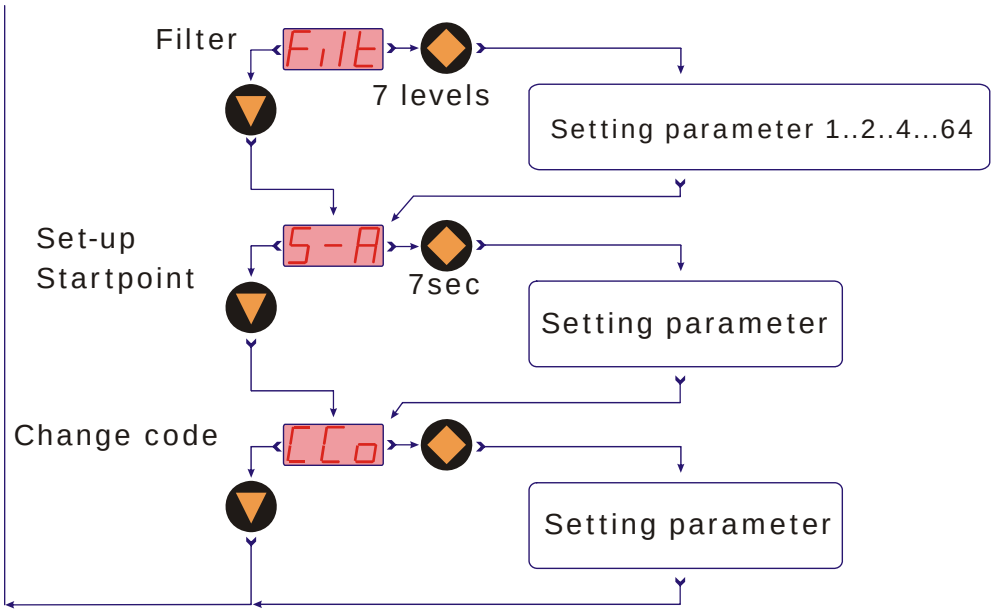
3. Set position

Adjust decimal point
Save selected value or
set new value

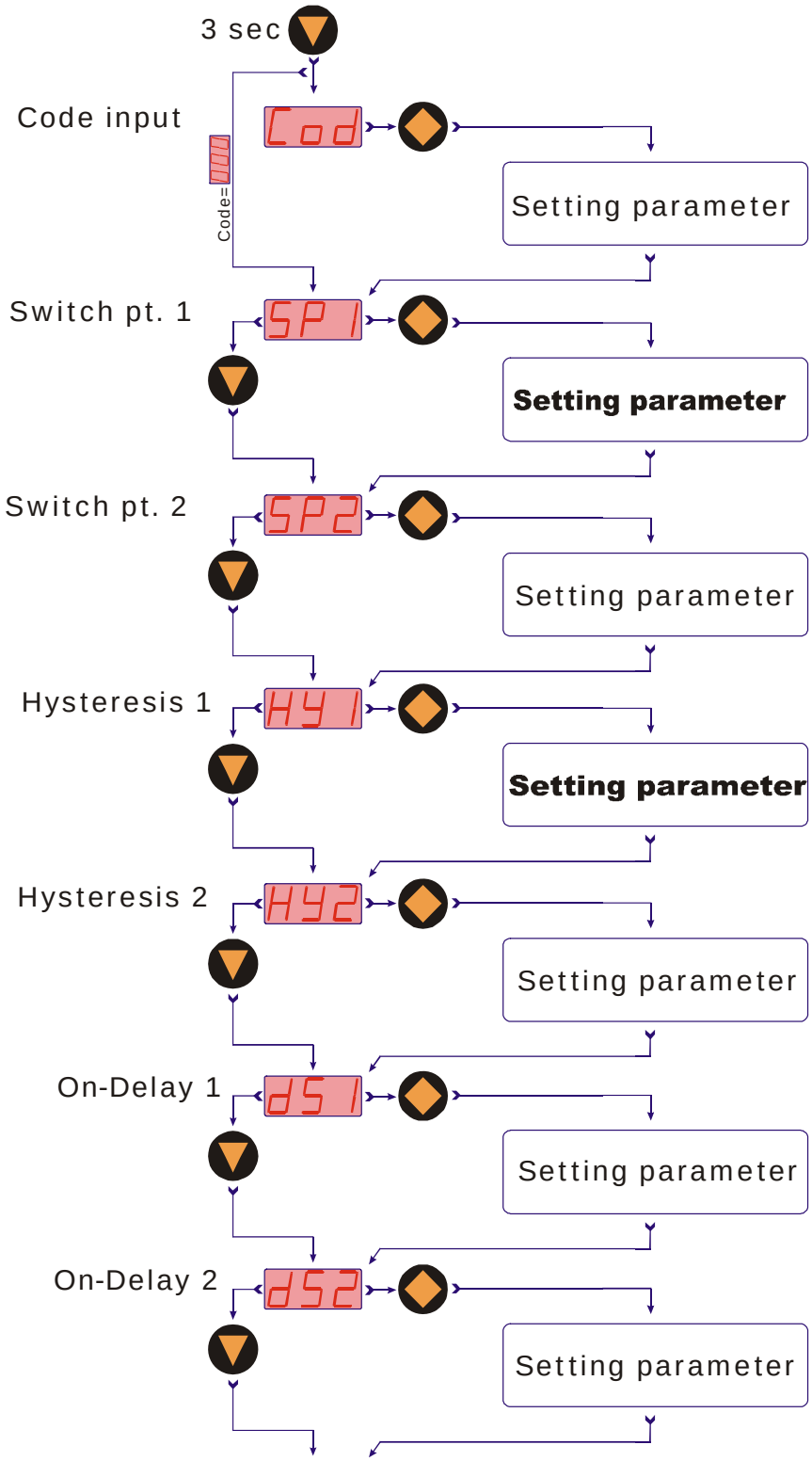
[To next main menu option]

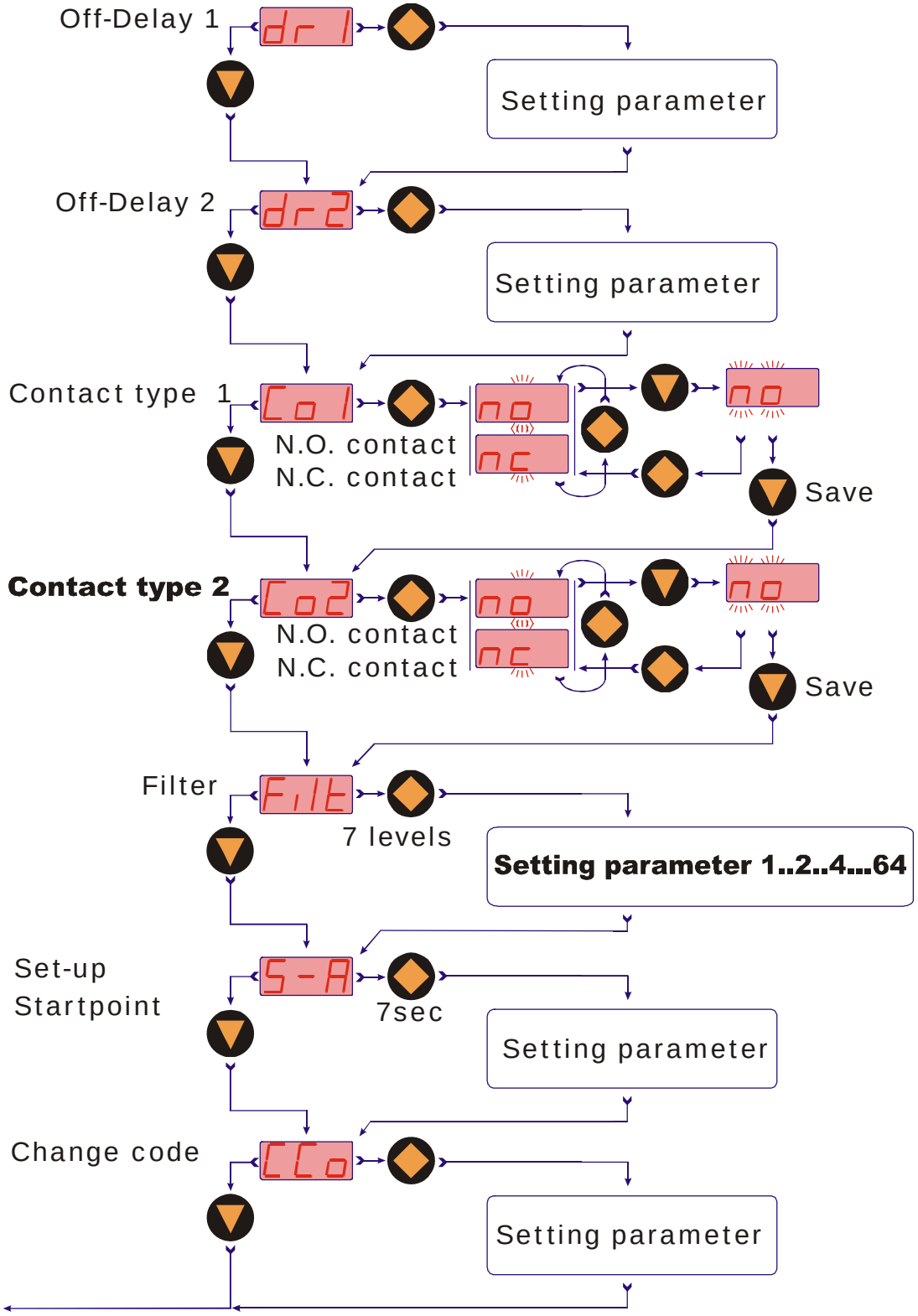
9.2. Set-up for PDD-1x and PDD-2x




Filter
FiLt
7 levels
Setting parameter 1..2..4...64
Set-up
Startpoint
S-A
7sec
Setting parameter
Change code
CCo
Setting parameter

9.3. Set-up for PDD-5x and PDD-7x




Off-Delay 1
dr 1
Setting parameter
Off-Delay 2
dr2
Setting parameter
Contact type 1
Co1
no
nc
N.O. contact
N.C. contact
no
Save
Contact type 2
Co2
no
nc
N.O. contact
N.C. contact
no
Save
Filter
FiLt
7 levels
Setting parameter 1..2..4...64
Set-up
Startpoint
S-A
7sec
Setting parameter
Change code
CCo
Setting parameter

10. Main Menu Options

10.1. Switch point

In menu option "**SPo**", **“SP1”**, **“SP2”** the switch point can be set. A value between -199 and 999 can be selected. Additionally, a decimal place can be assigned to this value. The decimal point can be set after the first or the second place (e.g. 10**.**0 or 1**.**00). If the displayed value exceeds or equals the adjusted switch point and the window point is not set, then the switch will be active. An active switch is signalled by the LED being lit.
In case the hysteresis is set to zero, then the switch will be inactive if the value is lower than the switch point.

10.2. Hysteresis

After setting the switch point, a hysteresis “**HYS**“, **“HYS1”**, **“HYS2”**, can be entered as a negative value in the menu. The hysteresis default value is zero. However, this can lead to an unwished switching behaviour during the operation, if the measuring signal keeps varying around the switch point or the window point. An increase in hysteresis will suppress the effect. The hysteresis refers to both the switch point and the window point (switch point minus hysteresis, window point plus hysteresis).

Example: Switch point:: 100 bar; Hysteresis: -2.5 bar
The switch will become active at and above 100 bar when the indicated value goes up, and will become inactive at 97.5 bar when the value goes down.

10.3. Window point (Duo point) (only PDD-1 and PDD-2)

Apart from the switch point, a window point (“**duo**“) can be defined. It must be larger than the switch point. With both the "window point" and the "switch point" set, the measured value can be monitored within a certain range. If a window point is set, the state of the switch underneath the switch point is similar to the one above the window point.

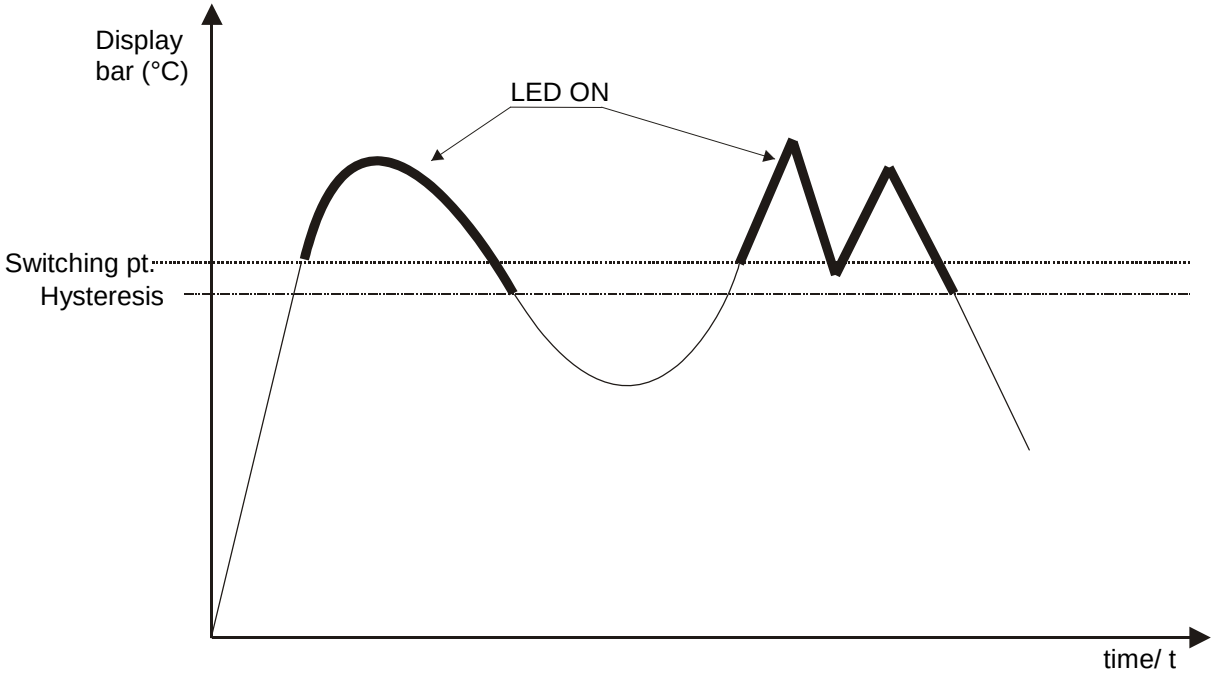
If the window point (duo) is smaller or equal to the switch point, an error message (Er4) is momentarily displayed, afterwards its value is deleted and thus its function becomes ineffective (this is valid for the window point as well as for the switch point setting).

This parameter setting is similar to the switch point setting. The window point is needed for processes, during which the pressure must be monitored within or outside a certain range.

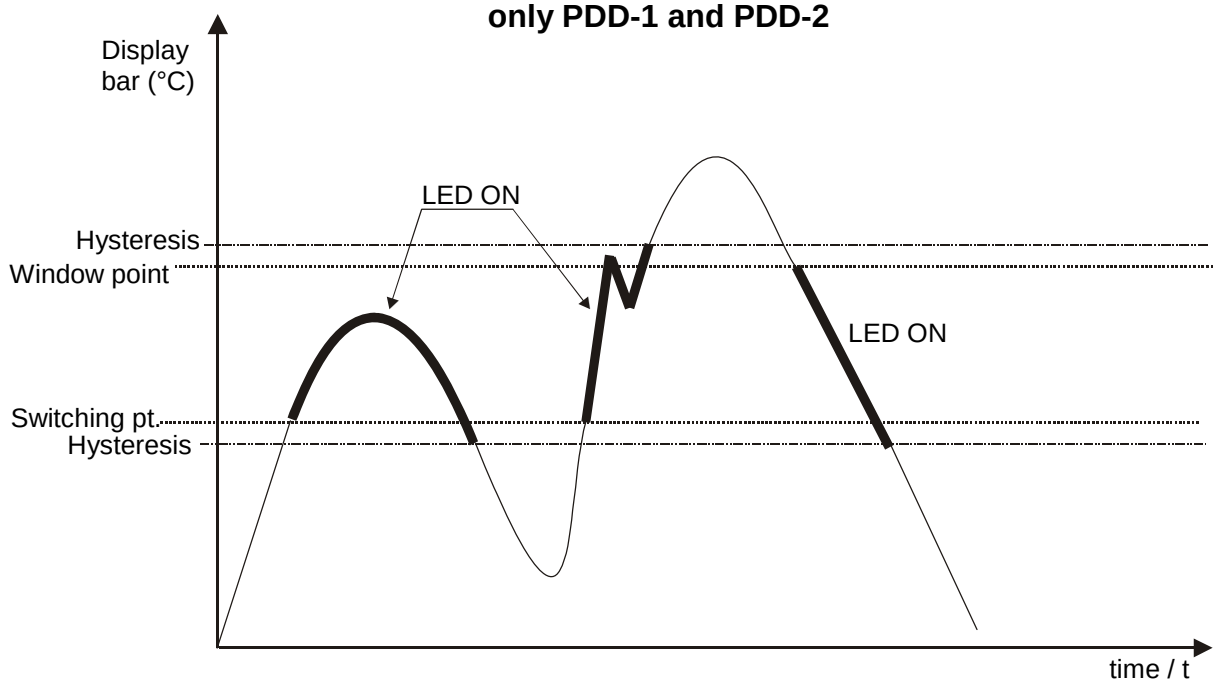
Example: Switch point: 100 bar; Window point: 150 bar; Hysteresis: -1 bar
The switch changes state when pressure exceeds 100 bar. At this moment, if the pressure remains between 99 (100-1) bar and 151 (150+1) bar, the switch remains in the active state (LED on). If the pressure increases crossing 151 bar limit or (decreases to go below 99 bar limit), the switch will revert to an inactive state.

10.4. Switching behaviour

The following diagram clarifies the switching behaviour of the pressure switch. The contact closes (type of contact: N.O.) when exceeding the switch point or falling short of the window point. It opens only again after exceeding the window point plus the hysteresis or falling below the switch point minus the hysteresis. An LED signals the switching status of the pressure switch.



only PDD-1 and PDD-2



10.5. Filter

The filter function "**Filt**" forms a running average from the measured values. The following values can be set (see section 8; set up):

1 / 2 / 4 / 8 / 16 / 32 / 64

They correspond to the number of samples used in the running average. The filter value determines the dynamic behaviour of the display value. The larger the adjusted value, the slower the display response. With a filter value of "1" the filter is switched off, i.e. the display value is equal to the unfiltered measured value.

The integrated step function detector reacts to a change of value corresponding to approx. 6.25% of the full scale value. As soon as a step function signal is detected, the instantaneous measured value is directly indicated in the display.

10.6. Time response

Using the menu items **“dS1”, “dS2”, “dr1”** and **“dr2” (PDD –5/7 and respectively “dSE” and “drE” (PDD- 1/2)** it is possible to set the switch-on-delay (delay set) and the switch-off-delay (delay reset.

The delay set causes delayed switching of the output if the switching point is exceeded.

The delay reset causes a delayed resetting of the output when falling short of the switching point – hysteresis.

The setting range for both parameters is 0.0 ... 99.5 seconds. The step rate is 0.5 seconds.

With these two functions it is also possible to suppress temporary disturbances.

10.7. Contact type

In menu option "**Con**", **“Co1”**, **“Co2”** the transistor switching output function is set. The switching function changes from

N.O. contact
to
N.C. contact, and back.

N.O. contact means: Contact closes on exceeding the switch point.
N.C. contact means: Contact opens on exceeding the switch point.

10.8. Set-up start point

In a state of no pressure, a new **Zero-point** is calibrated in menu option **“S-A“**. For security reasons, the user must press and hold the "◆" key for 7 seconds, in order to set the parameter.

10.9. Code

The function **"CCO"** (change code) is used to protect the device against unauthorised changes to the other parameters. If the code is different from 000, the user must input the previously set code first in order to make any changes in the set up mode.

Please note that if the customer code has been lost, the unit has to be returned to the manufacturer for reprogramming.

11. Maintenance

The device is maintenance-free, when used as described under "Intended Application". Deposits, which develop by contaminated media, could lead to incorrect measured values.

12. Technical Information

Housing:	stainless steel 1.4305
Connections:	G 1/4 or G 1/2 male stainless steel 1.4404 option: 1/4 NPT or 1/2 NPT others on request
Gasket:	FPM (option EPDM)
Sensor element:	piezzo resistive ceramic cell
Indication:	3-digit LED, 7mm
Resolution:	max. 0.01 bar (depending on measuring range and measuring value)
Max. temperature:	media: -20...+80 °C ambient -20...+80 °C
Max. over pressure:	3 times (measuring range ≤ 60 bar) 2 times (measuring range ≤ 250 bar) 1.5 times (measuring range = 400 bar)
Supply voltage:	$24V_{DC}$ ± 20%
Power consumption:	approx. 100 mA (without switching output)
Electr. connection:	plug M12x1
Switching output:	semiconductor PNP or NPN, short-circuit proof max. 300 mA
Contact:	N/O or /N/C, window, programmable
Switching point adjustment:	programmable via 2 buttons
Output indicator:	1 (2) LED
Hysteresis:	adjustable via 2 buttons
ON/OFF-switching delay:	0.5...99.5 s (separately adjustable)
Response time:	0.5 s
Accuracy:	±0.5 % of f.s. (±1% of full scale for measuring range < 1,6 bar)
Protection:	IP 65

13. Order Codes

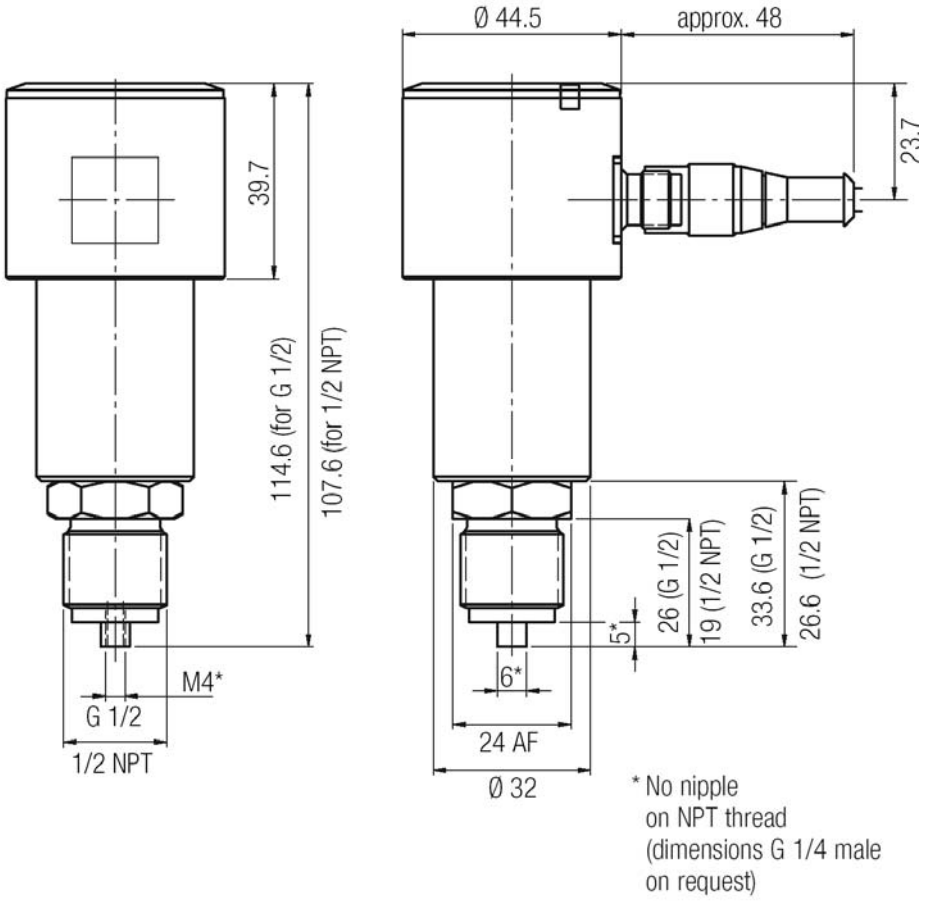
Example: **PDD-15 3 R2 C315**

Model/Output	Electrical connection	Connection	Measuring range*
PDD-15=1x PNP-switching output **PDD-25**=1x NPN- switching output **PDD-55**=2x PNP- switching output **PDD-75**=2x NPN- switching output	**3**=St. M12x1	**R2**=G 1/4 **R4**=G 1/2 **N2**=1/4 NPT **N4**=1/2 NPT	**C315**=-1...0 bar **B025**= 0...1 bar **B035**= 0...1,6 bar **B045**= 0...2,5 bar **B055**= 0...4 bar **B065**= 0...6 bar **B075**= 0...10 bar **B085**= 0...16 bar **A095**= 0...25 bar **A105**= 0...40 bar **A115**= 0...60 bar **A125**= 0...100 bar **A135**= 0...160 bar **A145**= 0...250 bar **A155**= 0...400 bar

Additional: Electrical connection

Description	Model
M12x1 socket with terminal	ZUB-KAB-12D500
M12x1 socket with 2 m cable	ZUB-KAB-12K002
M12x1 socket with 5 m cable	ZUB-KAB-12K005
M12x1 socket with Quickon-plug	ZUB-KAB-12Q000

14. Dimensions



Info! The suitable M12x1 socket with 2m cable for the M12x1 plug can be obtained with the order code: ZUB-KAB-12K002. (Illustration with socket)

15. EU Declaration of Conformance

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Electronic Pressure Switch **model: PDD-1, PDD-2, PDD-5 and PDD-7**

to which this declaration relates is in conformity with the standards noted below:

EN 61326-1 :2013
Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

EN 61010-1:2011
Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements

Also the following EC guidelines are fulfilled:

2014/30/EU **EMC Directive**
2011/65/EU **RoHS**

Hofheim, 21. Febr. 2017

H. Peters
General Manager

M. Wenzel
Proxy Holder