

Operating Instructions for Display Pressure Switch

Model: PSD



We don't accept warranty and liability claims neither upon this publication nor in case of improper treatment of the described products.

The document may contain technical inaccuracies and typographical errors. The content will be revised on a regular basis. These changes will be implemented in later versions. The described products can be improved and changed at any time without prior notice.

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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:

- Display Pressure Switch model: PSD
- Operating Instructions

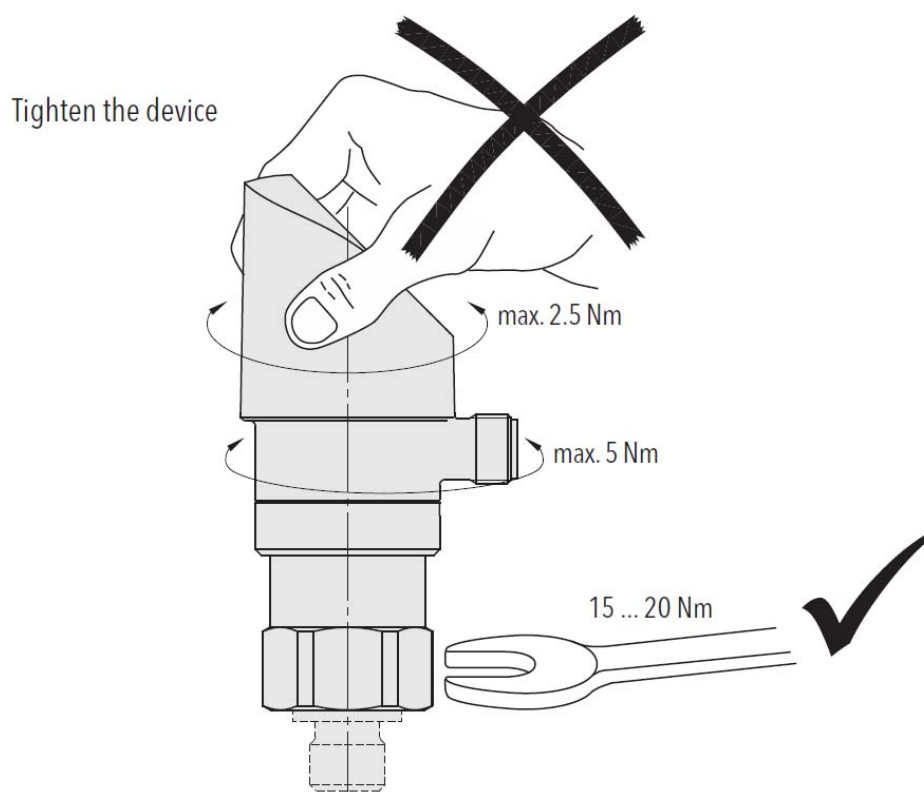
4. Regulation Use

Any use of the Display Pressure Switch, model: PSD, which exceeds the manufacturer's specification, may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

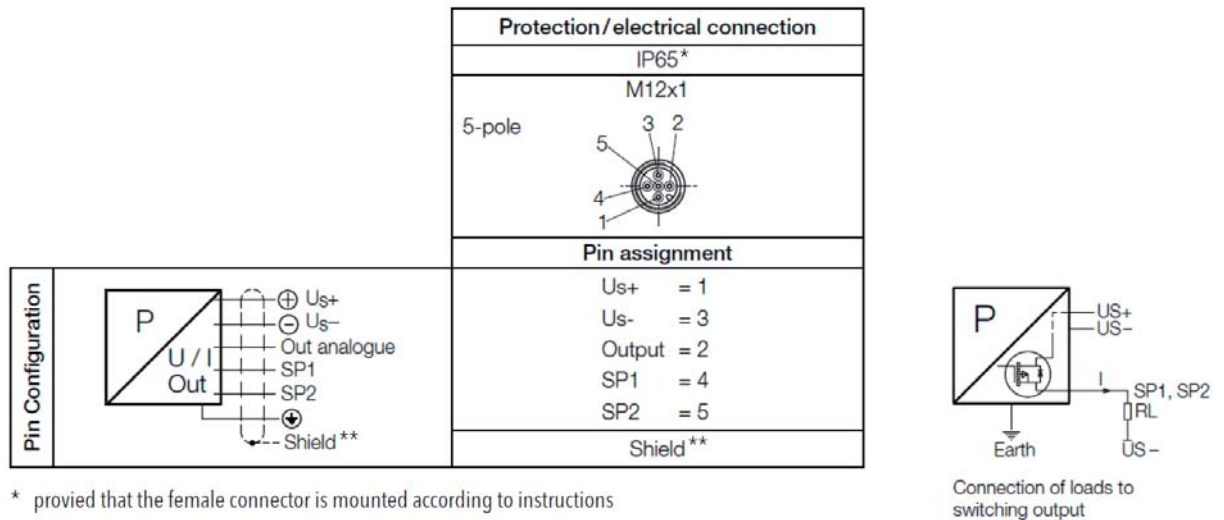
5. Operating Principle

KOBOLD is a leading international supplier of high quality sensors and monitoring instruments among other things for measurement of pressure and temperature. The PSD is the ideal combination of pressure switch and transmitter with a pressure display. The parameters can be set on the device. The settings in combination with a comprehensive set of options make the PSD suitable for a wide range of demanding applications.

6. Mechanical Connection



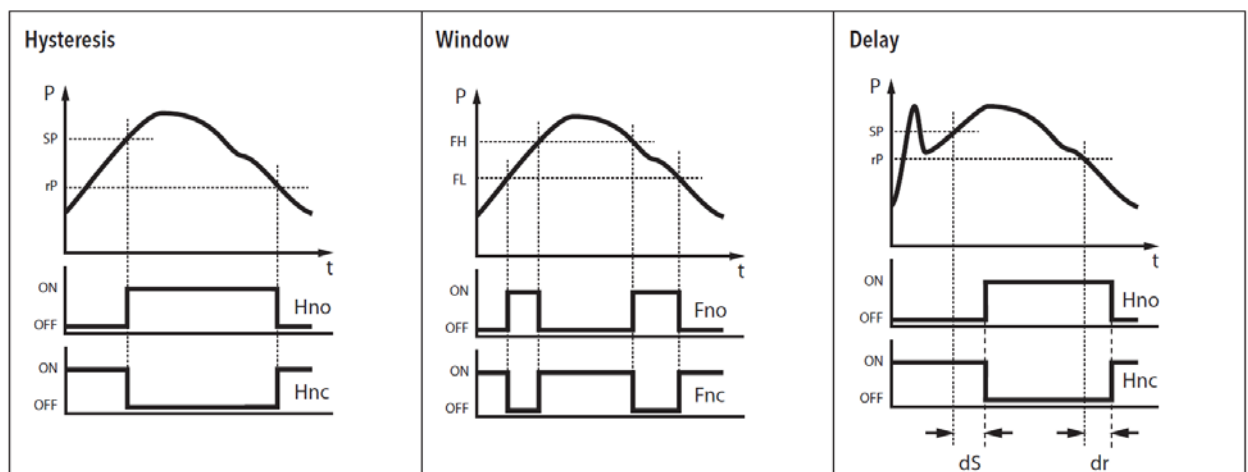
7. Electrical Connection



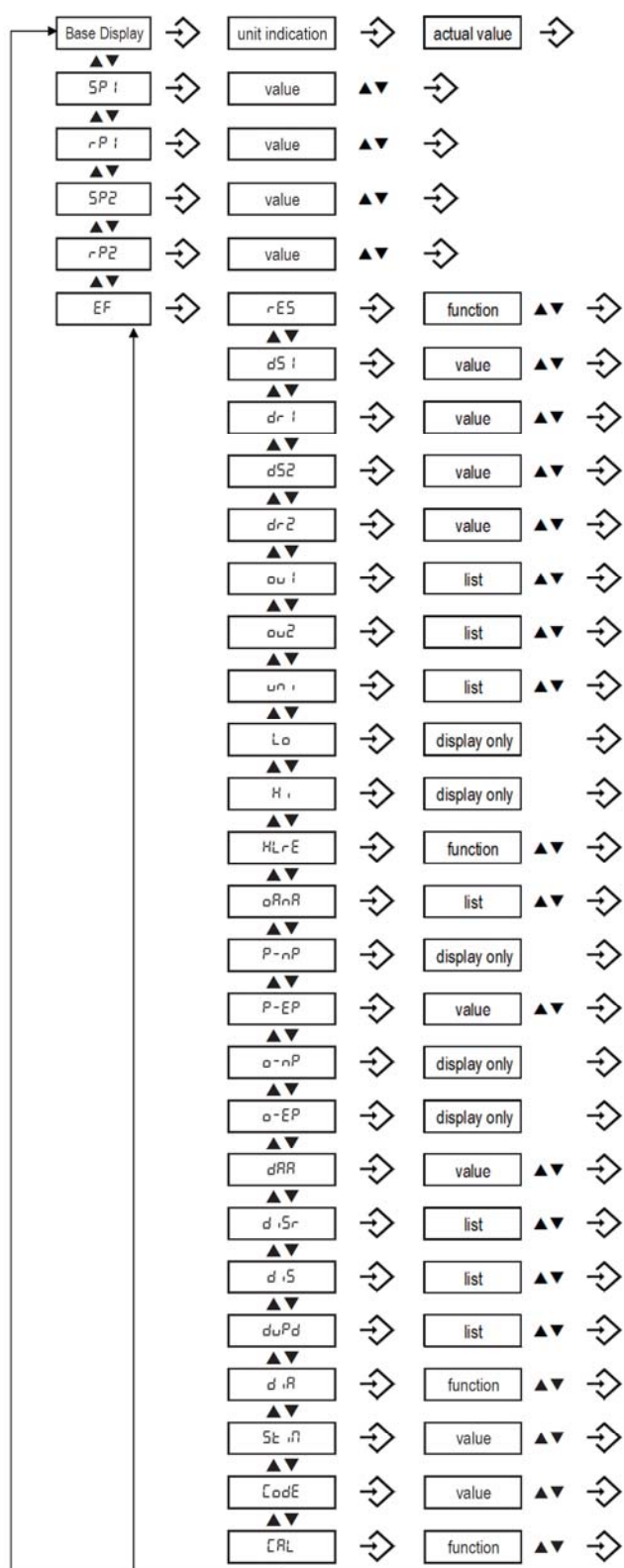
7.1 Output signal / supply voltage

Output	I_{SUPPLY}	U_{SUPPLY}
4...20 mA	$\leq 30 \text{ mA}$	15...30 VDC
0...10 VDC	$\leq 30 \text{ mA}$	15...30 VDC

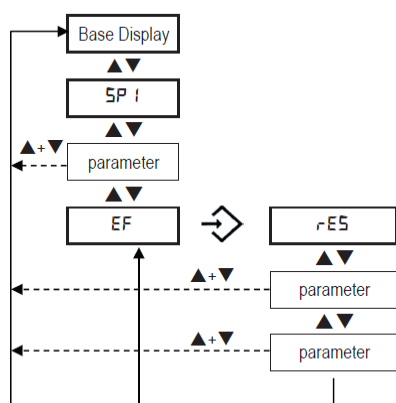
Switching output functions



8. Operating menu



Description	Value range
Switch point SP1 (Hysteresis) or Window high FH1	SP1 > rP1, FH1 > FL1 Hysteresis ≥ 1 % FS
Reset point rP1 (Hysteresis) or Window low FL1	rP1 < SP1, FL1 < FH1 Hysteresis ≥ 1 % FS
Switch point SP2 (Hysteresis) or Window high FH2	SP2 > rP2, FH2 > FL2 Hysteresis ≥ 1 % FS
Reset point rP2 (Hysteresis) or Window low FL2	rP2 < SP2, FL2 < FH2 Hysteresis ≥ 1 % FS
Reset to factory settings	
Switching delay time for SP1/FH1	0.01 ... 99.99s
Switching delay time for rP1/FL1	0.01 ... 99.99s
Switching delay time for SP2/FH2	0.01 ... 99.99s
Switching delay time for rP2/FL2	0.01 ... 99.99s
Function switching output 1	Hysteresis NO (Hno), Hysteresis NC (Hnc) Window NO (Fno), Window NC (Fnc)
Function switching output 2	Hysteresis NO (Hno), Hysteresis NC (Hnc) Window NO (Fno), Window NC (Fnc)
Pressure unit	bar/MPa/kPa/psi/m WC/mm WC
Lowest measured pressure	
Highest measured pressure	
Reset highest and lowest pressure value	
Analogue output type	I, U, off
Pressure zero point	
Pressure end point	50 % ... 100 % FS
Analogue output zero point	
Analogue output end point	
Damping analogue output rise time 10 ... 90 % nominal pressure	0.01 ... 3.00 s
Display rotate	no, yes (180°)
Display mode	actual, highest, lowest, off, act. - 1 decimal, act. - 2 dec., act. - 3 dec.
Display update rate	1, 2, 5, 20 Hz
Diagnostic mode	
Sampling time for logger	0.1 ... 999.9 s, off (0)
Access code	4-digit code
Factory use	



By pressing ▲+▼ simultaneously the menu will return to the base display or automatically after ca. 60 s without operation.

pw* When performing a parameter change by pressing ▲ or ▼ and if an access code has been defined, it has to be entered digit by digit.

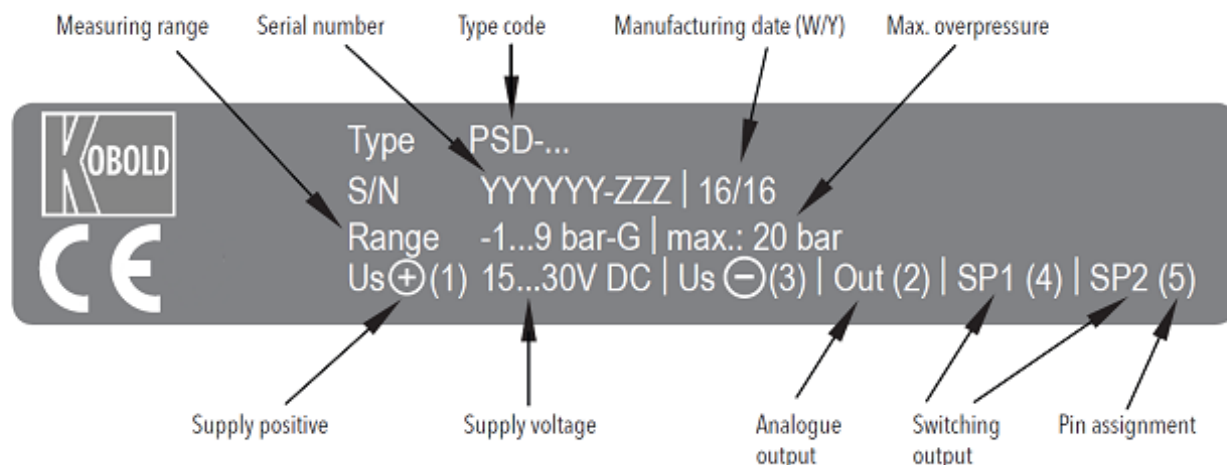


After confirming the new parameter value, the menu item of the changed parameter will be displayed.

Parameter

Name	Standard setting (accessory ZS)	Value range	Short name
Switch point SP1 (hysteresis mode) Upper switch point FH1 (window mode)	75% measuring range	SP1>RP1 FH1>FL1 hysteresis≥1% FS	SP1
Reset point RP1 (hysteresis mode) Lower switch point FL1 (window mode)	25% measuring range	RP1<SP1 FL1<FH1 hysteresis ≥ 1% FS	RP1
Switch point SP2 (hysteresis mode) Upper switch point FH2 (window mode)	75% measuring range	SP2>RP2 FH2>FL2 hysteresis≥ 1% FS	SP2
Reset point RP2 (hysteresis mode) Lower switch point FL2 (window mode)	25% measuring range	RP2<SP2 FL2<FH2 hysteresis ≥ 1% FS	RP2
Switch point delay time SP1 (hysteresis mode) Switch point delay time FH1 (window mode)	0	0...99.99 s	dS1
Switch point delay time RP1 (hysteresis mode) Switch point delay time FL1 (window mode)	0	0...99.99 s	dR1
Switch point delay time SP2 (hysteresis mode) Switch point delay time FH2 (window mode)	0	0...99.99 s	dS2
Switch point delay time RP2 (hysteresis mode) Switch point delay time FL2 (window mode)	0	0...99.99 s	dR2
Functions switching output 1	Hysteresis, closer (Hno)	Hysteresis NO (Hno), hysteresis NC (Hnc), window NO (Fno), window NC (Fnc)	ou1
Functions switching output 2	Hysteresis, closer (Hno)	Hysteresis NO (Hno), hysteresis NC (Hnc), window NO (Fno), window NC (Fnc)	ou2
Pressure units	bar	bar, psi, MPa, kPa, mWC	uni
Measuring range adjustment	100 % nominal pressure	50...100% nominal pressure	P-EP
Damping (analogue output)	0.01 s	0.01...3.00 s (time constant)	dAA
Display rotation	no	no, yes (180°)	disr
Display mode	Current pressure value	Pressure value: current, highest, lowest, display off Current value: decimal places selectable (max. 3)	dis
Display update	2	1, 2, 5, 20 Hz	duPd

9. Type label description



10. Technical Information

Measuring principle:	thin film on steel
Measuring range:	-1...+1.5 to 0...600 bar -14.5...+22 to 0...7500 psi adjustable 50...100 % FS
Output signal:	4...20 mA 0...10 V _{DC} , switchable mA or V
Switching output:	2 transistors PNP
Accuracy@ 25° C typ.:	±0.5 % FS typ.
Media temperature:	-25° C...+85° C
Ambient temperature:	-25° C...+85° C
Pressure unit for display:	bar, psi, MPa, kPa, m WC, mm WC

Electrical data

Output/supply voltage:	4...20 mA: 24 or 0-10 V _{DC} / 24 (15...30) V _{DC}
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Switch-on-delay:	typ. 200 ms
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Inverse-polarity protection, Short-circuit strength @ 25° C during 5 min.;	integrated
Current consumption:	≤30 mA

Environmental conditions

Media temperature:	-25° C...+85° C
Ambient temperature:	-25° C...+85° C
Protection ¹⁾ :	IP65
Humidity:	max. 95% relative
Vibration:	10 g (10...2000 Hz)
Shock:	50 g/ 3 ms

¹⁾ see electrical connection

Analogue output

Output signal:	switchable 4-20 mA or 0-10 V _{DC}
Accuracy:	TEB ²⁾ @ -25 °C...+85° C [% FS typ.] ± 1.75 accuracy @ +25° C [% FS typ.] ±0.5 NLH ²⁾ @ +25° C (BSL) [% FS typ.] ±0.2 TC ²⁾ zero point and span [% FS typ.] ±0.03 long term stability 1 year [% FS typ.] ±0.1
Current limiting output signal:	4-20 mA (overload) 0...10 V _{DC} : <40 mA (short-circuit)
Damping (rise-time):	0.01...3.00 s/10...90% nominal pressure

Switching output

Accuracy:	accuracy@ +25° C [% FS typ.] ± 0.5 TEB ²⁾ @ -25 °C...+85° C [% FS typ.] ± 1.0 accuracy @ +25° C long term stability 1 year [% FS typ.] ±0.3
Adjustment range of switchpoints:	0...100% FS
Switching hysteresis:	≥ 1% FS switchpoint > reset point
Switching resistance:	≤ 3 Ω
Output function:	hysteresis, window; normally open (NO), normally closed (NC)
Switching current:	≤ 0.5 A each switching output
Current limiting:	≤ 2 A each switching output
Switching frequency:	max. 200 Hz
Delay time:	0...99.99 s

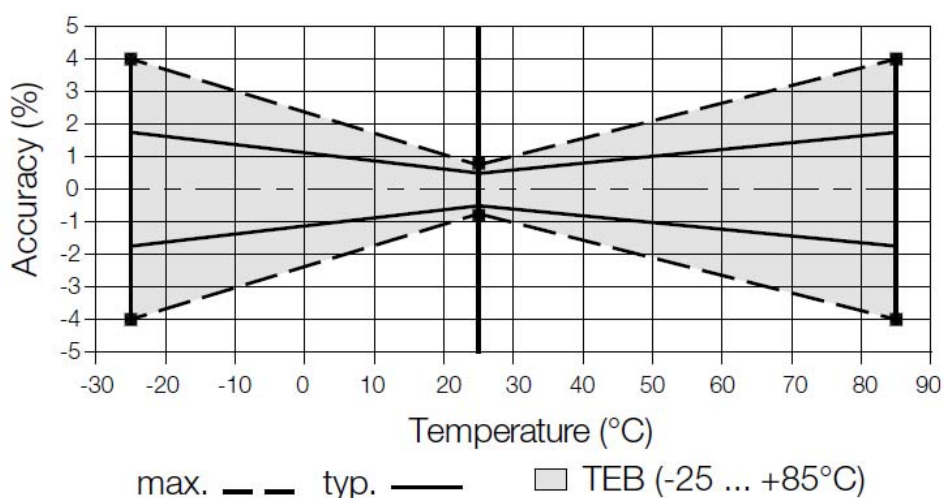
²⁾ see »Terminology«

Display

Display:	4-digit 7-segment display 180 ° flippable with disable function standard decimal places: ≤9: 3 decimal places 10...99: 2 decimal places 100...999: 1 decimal place
Switching status indication:	2 LED, red
Operation:	with 3 buttons and menu navigation according to VDMA 24574-1
Display reduction:	0.1 % FS
Display range:	-3...103% FS
Setting parameters:	see table "Parameter"

Mechanical data

Sensor (wetted parts)	1.452 (AISI630)
Pressure connection (wetted parts):	1.452 (AISI630)
Housing:	steel, die cast metal galvanised, display housing plastic
Connection:	G $\frac{1}{4}$ male, adapter can be ordered as separate item
Sealing:	FPM
Male electrical plug:	PA-plug M12x1.5 pin
Mounting torque:	15...20 Nm
Housing alignment:	display 335 ° rotatable, max. 2.5 Nm electrical connection 343° rotatable, max. 5 Nm
Pressure peak damping element:	ø 0.4 mm
Weight:	~189 g

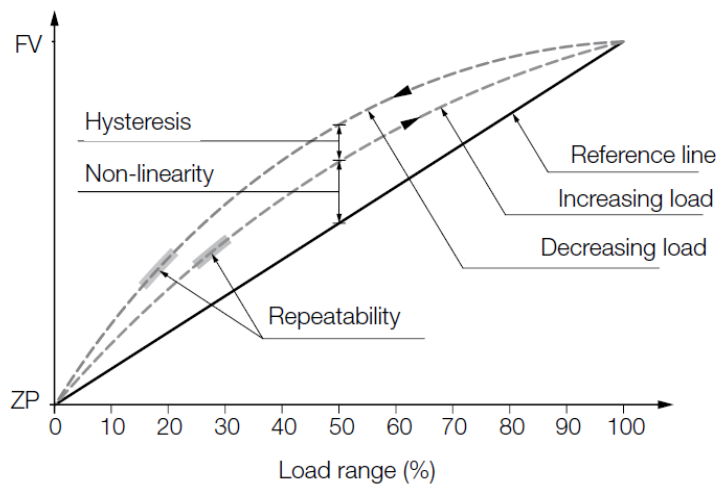


11. Terminology

Non-linearity

The largest deviation from the effective characteristic line of an ideal reference line. The reference line can be defined as a limit point adjustment, a BSL or a BSL through 0.

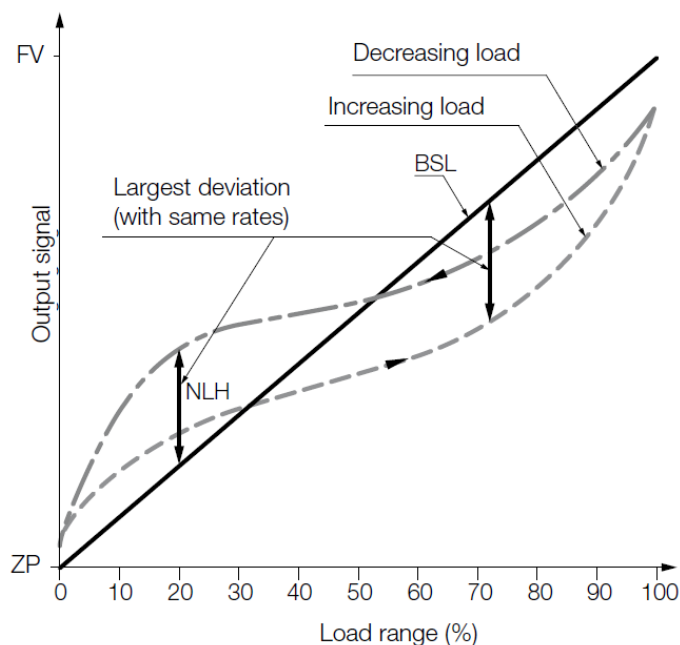
Specifications: Non-linearity, Hysteresis



BSL through Zero

As an additional requirement for the minimum value adjustment, the BSL through zero (also BSL/0) must go straight through zero or the origin.

Specifications: Accuracy NLH (BSL through zero)

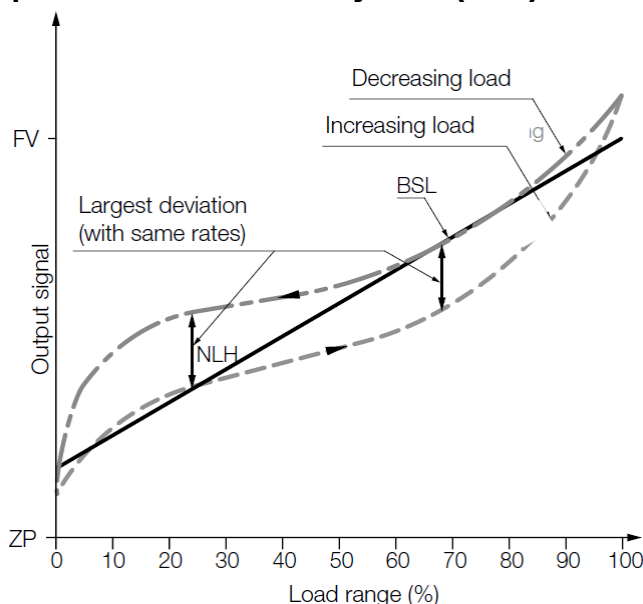


BSL Best Straight Line

The reference line according to the BSL or the minimum value adjustment is placed in such a way that the maximum positive and negative deviations are as small as possible.

Specifications: Non-linearity, Hysteresis

Specifications: Accuracy NLH (BSL)



NLH Non-linearity and Hysteresis

Largest deviation from the ideal characteristic line (BSL, BSL/0 or limit point). In pressure measuring instruments, the non-linearity and pressure hysteresis are given together at a constant temperature.

Temperature Coefficient TC

Change of measured value for zero point and span as a result of changes in temperature

Long-term Stability Long-term Drift

The change of accuracy due to aging under certain reference conditions during a certain period of time, typically 1 year.

TEB Total Error Band

Total error (root from sum of the square of the deviations) due to measurement deviations (accuracy) and temperature influence (temperature coefficient TC). The temperature influence is usually given in the information across a range larger than that given in the standard (-10 ... +60 °C). Whilst DIN 16086 also continues to add to the long-term stability over a year, the information is subject to ex-works conditions for obvious reasons.

12. Order Codes

Example: **PSD-4 3 3 R2 B4 4**

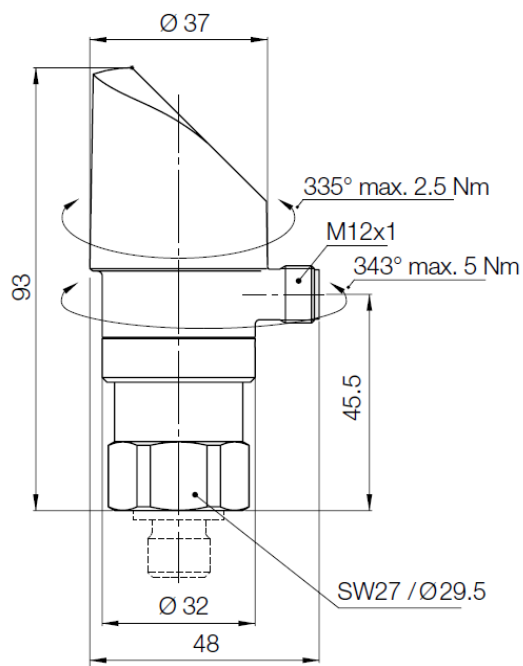
Model	Version	Electrical connection	Material	Connection	Measuring range * [bar]	Option	Special version
PSD-	4 = 2x PNP switching output, analogue output 4-20 mA	3 = M12 plug, 24 (15-30) V _{DC}	3 = FPM o-ring, st. steel connection	R2 = G $\frac{1}{4}$ male	A1 = -1...1.5 A4 = -1...9 B6 = 0...6 B7 = 0...10 B8 = 0...16 B9 = 0...25 C2 = 0...100 C3 = 0...160 C4 = 0...250 C5 = 0...400	4 = pressure peak damping element D = 0.4 mm	0 = none Y = special version (specify in clear text)

* Other ranges on request

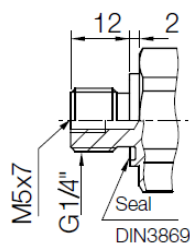
13. Dimensions

[mm]

PSD



PSD...R2...



14. EU Declaration of Conformance

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

Display Pressure Switch

Model: PSD

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

EN 61000-6-2:2006 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

EN 61000-6-3:2007 + A1:2010 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments

Also the following EC guidelines are fulfilled:

2014/30/EU
2011/65/EU

EMC Directive
RoHS (category 9)

Hofheim, 12. Febr. 2018



H. Peters
General Manager



M. Wenzel
Proxy Holder