Solid State Electronic Pressure Switch with Integral LED Display Model PSD-10

Applications

- Hydraulics and pneumatics
- Filter monitoring
- Pump control
- Machine tools

Special features

- 4-digit LED display
- User programmable switch points
- Second switch output may be programmed for error display
- case rotates 280° for optimal viewing
- Optional analog output

PSD-10 Pressure switch

Description

User friendly design
These state-of-the-art pressure switches feature a rugged, compact design. The slanted, 0.35" high four digit red LED display is easy to read from a distance even when installed in areas with bright ambient lighting. Once installed, the display can be rotated 280º to optimize the viewing angle. Engineering units, zero and span, and switch points are all user programmable. The user menu and all programming parameters are accessible using the keypad on the front of the unit. Selectable password protection prevents unauthorized changes to preset programming data.

Proven pressure sensing technology
The PSD-10 uses ceramic sensors or stainless steel thin film sensor technology depending upon the pressure range. Both time proven sensor technologies provide high accuracy, excellent repeatability and long-term stability. The industrial design is extremely resistant to radio frequency interference, mechanical shock, and vibration.

Designed for flexibility
The PSD-10 combines the function of a pressure switch, digital gauge, and pressure transmitter in a compact, durable design. It is available with one or two individually programmable switch points and an optional analog output. Switch outputs or built-in LED indicators on the front panel can be used to provide switch status.

The extremely flexible, easy-to-use design provides access to a number of switch parameters to fit a wide variety of applications. Programmable parameters include switch points, forward or reverse switch action, hysteresis, delay times, engineering units, password protection and min/max display. The optional analog output can provide a 4-20 mA or 0-20 mA signal and is fully programmable.

Specifications Model PSD-10

Sensor type	**Ceramic**			**Thin film**					
Pressure range	-14.7PSI...30PSI	-14.7PSI...100PSI	-14.7PSI...250PSI	500PSI	1000PSI	2000PSI	3000PSI	5000PSI	9000PSI
Maximum pressure*	72PSI	290PSI	580PSI	1160PSI	2900PSI	4640PSI	7250PSI	11,600PSI	17,400PSI
Burst pressure**	87PSI	360PSI	725PSI	5800PSI	11,600PSI	14,500PSI	17,400PSI	24,650PSI	31,900PSI

*Pressure applied up to the maximum rating will cause no permanent change in specifications but may lead to zero and span shifts

**Exceeding the burst pressure may result in destruction of the transmitter and possible loss of media

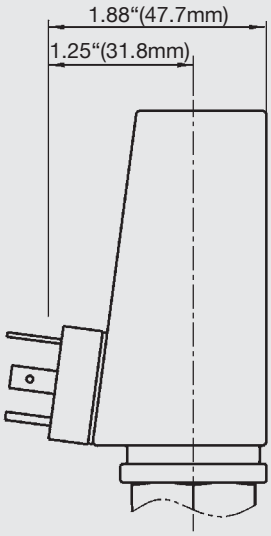
Materials			
■ Wetted parts		Ceramic ranges: Stainless steel with ceramic sensor AL_2O_3, NBR [1)]	
		Thin film ranges: all welded stainless steel	
■ Case		Zinc diecast Z 410; silver-colored lacquer finish	
■ Keypad		Polyester film	
Power supply U_B	DC V	$15 < U_B \leq 30$ (nominal 24 DC V protection class 3)	
Signal output and		{0/4 ... 20 mA; user adjustable}	
maximum load R_A		$R_A \leq (U_B - 8\ V) / 0.02\ A$ with R_A in Ohm and U_B in Volt (max. 500 Ohm)	
Switch points		Individually adjustable using the external keypad	
■ Number		1 or 2 (PNP)	
■ Function		NO / NC; windows- and hysteresis functions are user adjustable	
■ Contact rating	DC V	Supply voltage $U_B - 1.5$ V (U_B in Volt)	
■ Switching current [2)]		1.4 A (for two wired outputs, 0.7 A per switch)	
■ Response time	ms	≤ 10	
■ Accuracy	% of span	≤ 1.0	
Display			
■ Design		7-Segment-LED, red 4-digit, height .35“ (9 mm)	
■ Range		- 999 ... 9999	
■ Accuracy	% of span	≤ 1.0 ± 1 digit	
Current consumption	mA	≤ 100	
Accuracy [*)]	% of span	≤ 1.0 (limit point calibration)	
	% of span	≤ 0.5 (BFSL) (best fit straight line)	
Hysteresis	% of span	≤ 0.1 (≤ 0.3 with pressure range ≤ 300 PSI)	
Repeatability	% of span	≤ 0.1	
1-year stability	% of span	≤ 0.2 (≤ 0.3 with pressure range ≤ 300 PSI) (at reference conditions)	
Permissible temperature of			
■ Medium		-22 ... +212 °F	-30 ... +100 °C
		(-4 ... +185 °F with pressure ranges ≤ 300 PSI)	(-20 ... +85 °C with pressure ranges ≤ 300 PSI)
■ Ambient		-4 ... +185 °F	-20 ... +85 °C
■ Storage		-40 ... +212 °F	-40 ... +100 °C
Compensated temperature range		32 ... +176 °F	0 ... +80 °C
Temperature coefficients within			
compensated temperature range:			
■ Mean TC of zero	% of span	≤ 0.3 / 10 K	
■ Mean TC of range	% of span	≤ 0.3 / 10 K	
CE - conformity		89/336/EWG interference emission and immunity see EN 61 326	
		97/23/EG Pressure equipment directive, Appendix 1	
Wiring protection		Protected against reverse polarity, overvoltage and short circuiting	
Ingress protection		Per IEC 60529 / EN 60529, see page 3	
Shock resistance [3)]	g	50, 1 ms according to IEC60068-2-29	
Vibration resistance	g	20, 10-500 Hz according to IEC60068-2-6	
Tightening torque	ft lb	26 (35 Nm)	
Life cycle test		100 million typical (10 million with pressure ranges ≤ 300 PSI)	
Weight	lb	Approx. 0.62	

1) Other sealing materials on request.
2) Higher contact rating on request.
3) shock and vibration specification applies to M12 x1 plug version only
*) Including linearity, hysteresis and repeatability.
Limit point calibration in vertical mounting position with pressure connection down.
{ } Items in curved brackets are optional extras for additional price.

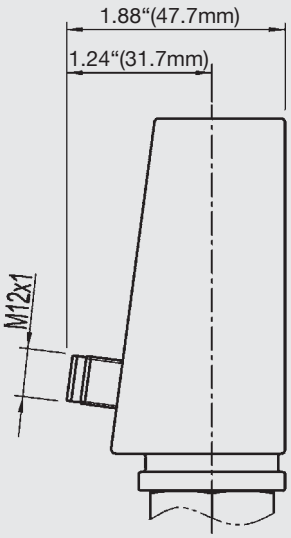
Dimensions in inches (mm)

Electrical connections

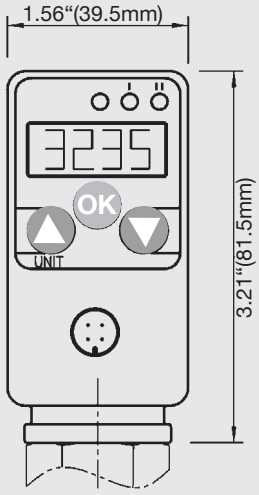
L-connector
DIN EN 175301-803,
IP 65
Order code: A4



Circular connector *)
5-pin, M 12x1,
IP 67
Order code: M5

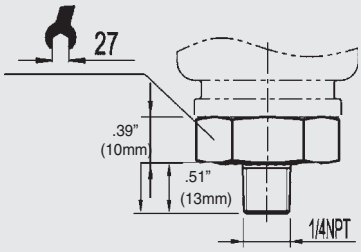


Circular connector *)
4-pin, M 12x1,
IP 67
Order code: M4

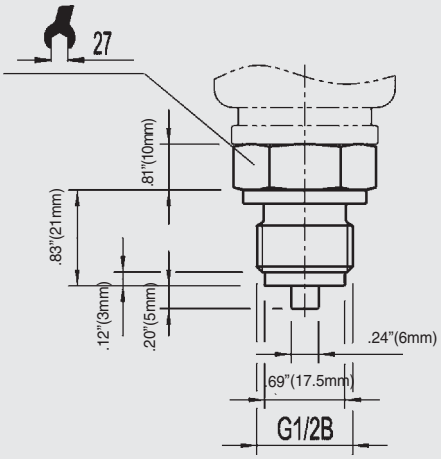


Pressure connections

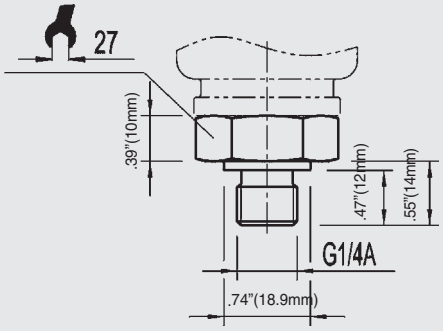
1/4 NPT male
Order code: NB



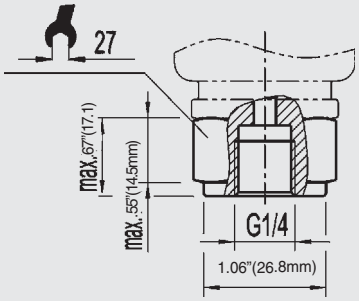
G 1/2 male
Order code: GD



G 1/4 male
DIN 3852
Order code: HD



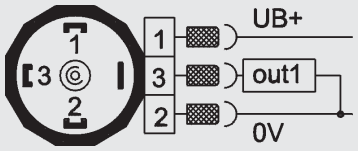
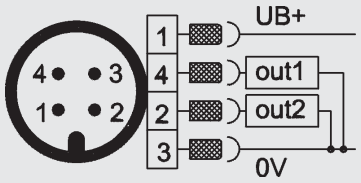
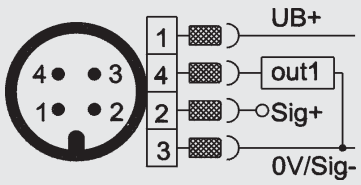
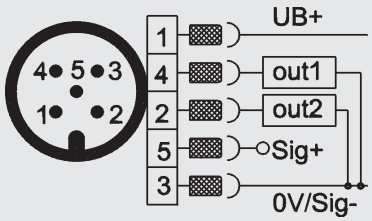
G 1/4 female
Order code: TB



*) Mating connectors are not included

Others on request

Wiring details

Output		Circuit diagram
{**1 Switch output**}	L-connector	
2 Switch outputs	M12x1 4-pin circular connector	
{**1 Switch output + 1 analog output**}	M12x1 4-pin circular connector	
{**2 Switch outputs + 1 analog output**}	M12x1 5-pin circular connector	

Legend:

out 1	external load 1	UB+	power supply positive
out 2	external load 2	0V	power supply minus
Sig+	output signal positive	Sig-	output signal minus

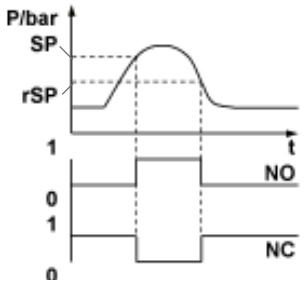
{ } Items in curved brackets are options available for additional cost.

Switch adjustments

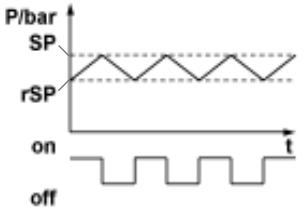
Hysteresis (figure 1 and 2)

If the system pressure changes rapidly around the programmed set point, the hysteresis can be set to prevent rapid on /off oscillations of the switch.

As the system pressure increases, the output switches when it reaches the programmed set point (SP). If the pressure falls, the output switches again when the programmed reset point (rSP) is reached.



(Figure 1)

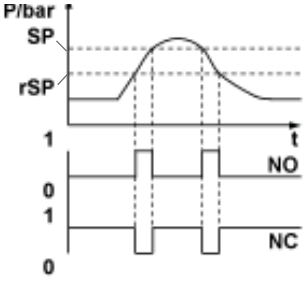


(Figure 2)

Switch window (figure 3)

The window function allows monitoring and control within a defined pressure range.

The switch will activate if the system pressure is between the programmed set point (SP) and programmed reset point (rSP).

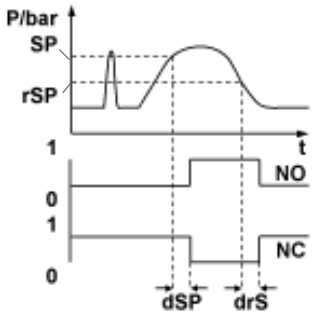


(Figure 3)

Delay time (figure 4)

The delay time is user-adjustable from 0 to 9.99 seconds. Adjusting the delay time can filter out temporary, rapid pressure changes.

The pressure change must persist as long or longer than the programmed delay time for the switch to activate. The switch will only activate after the delay time has elapsed.



(Figure 4)

Error display

Switch output 2 can be programmed as a signal to display pressure switch function errors. It is normally closed and activates if error Er1, Er2, or Er3 occurs. The LED marked “II” will also illuminate upon an error signal. The display and the output will remain active until the error condition clears.

Parameter	Factory setting	Available settings	Complete this section!
Switch 1 output			*)
Upper set point	Full scale value	Pressure range (enter as pressure value)	__ __ __ __
Lower set point	Full scale value - 10 %	Pressure range (enter as pressure value) [1]	__ __ __ __
Switching function	NO	NO	☐
		NC	☐
Switching type	Hysteresis	Window	☐
		Hysteresis	☐
Time delay for the upper set point	0.05 s	0.00 ... 9.99 s	__ , __ __
Time delay for the lower set point	0.05 s	0.00 ... 9.99 s	__ , __ __
Switch 2 output			
Upper set point	Full scale value	Pressure range (enter as pressure value)	__ __ __ __
Lower set point	Full scale value - 10%	Pressure range (enter as pressure value) [1]	__ __ __ __
Switching function	NO	NO	☐
		NC	☐
Switching type	Hysteresis	Window	☐
		Hysteresis	☐
Time delay for the upper set point	0.05 s	0.00 ... 9.99 s	__ , __ __
Time delay for the lower set point	0.05 s	0.00 ... 9.99 s	__ , __ __
Options			
Password	0000 (= no password)	0000 ... 9999	__ __ __ __
Displayed unit	PSI	MPa	☐
		PSI	☐
		bar	☐
Displayed parameter	Actual pressure	Max-value	☐
		Min- value	☐
		Display off	☐
		Switching output 2	☐
		Switching output 1	☐
		Actual pressure	☐
Analog output	4-20 mA	4-20 mA	☐
		0-20 mA	☐
Initial pressure value	Initial pressure value = 4mA	Pressure range (enter as pressure value)	__ __ __ __
(analog output)	4mA		
Full scale pressure value	Full scale value = 20 mA	Pressure range (enter as pressure value) [2]	__ __ __ __
(analog output)			
Zero offset	0.0	Factory setting	
		Adjustment to actual pressure [3]	
Reset of peak value memory	Do not delete memory	Delete memory	
		Do not delete memory	
Switch 2 output used as	No	Yes	☐
error output		No	☐
Software version	---	---	
Number of decimals displayed	[4]	Reduce by 1 decimal	☐

1) The lower set point must be a minimum of 0.5% of full scale value below the upper set point.
2) The full scale pressure value (analog output) must be 5% of span above the initial pressure value (analog output).
3) Max. 5% of full scale.
4) Depends on pressure range and engineering unit (3 digits for bar, 4 digits for psi).
*) The pressure switch will be adjusted to the factory setting if a field is left blank.

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