



DS 233

Differential Pressure Switch for Gases and Compressed Air in Compact Version

Silicon Sensor

accuracy according to IEC 60770:
0.35 % FSO

Differential pressure

from 0 ... 6 mbar up to 0 ... 1000 mbar

Output signal

2-wire: 4 ... 20 mA
3-wire: 4 ... 20 mA
0 ... 10 V

Special characteristics

- ▶ aluminium housing
- ▶ LED display
- ▶ rotatable and configurable display module
- ▶ suited for non-aggressive gases and compressed air

Optional versions



- ▶ 1 / 2 PNP contacts
- ▶ customer specific versions

The DS 233 is a differential pressure switch with digital display for non-aggressive gases and compressed air. Because of its compact and robust aluminium housing it is particularly suited for machine and plant engineering.

Basic element of the DS 233 is a piezoresistive silicon pressure sensor, which features high accuracy and excellent long term stability.

As standard the DS 233 offers a PNP contact and a rotatable display module with 4-digit LED display for representing the differential pressure. Optional up to two freely configurable contacts are available.

Preferred areas of use are

-  Plant and machine engineering
-  Heating and air conditioning



Input pressure range											
Nominal pressure p_N (over, differential pressure) [mbar]	0...6	0...10	0...20	0...40	0...60	0...100	0...160	0...250	0...400	0...600	0...1000
Nominal pressure p_N symmetric (differential pressure) [mbar]	± 6	± 10	± 20	± 40	± 60	± 100	± 160	± 250	± 400	± 600	± 1000
Overpressure [mbar]	100	100	200	350	350	1000	1000	1000	1000	3000	3000

Contact ¹	
Standard	1 PNP contact
Option	2 independent PNP contacts
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{Switch} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant
Accuracy of contacts ²	$p_N > 160$ mbar: ≤ ± 0.35 % FSO 40 mbar ≤ p_N ≤ 160 mbar: ≤ ± 1 % FSO $p_N < 40$ mbar: ≤ ± 2 % FSO
Repeatability	≤ ± 0.1 % FSO
Switching frequency	max. 10 Hz
Switching cycles	> 100 x 10 ⁶
Delay time	0 ... 100 sec

¹ max. 1 contact for 2-wire current signal with plug ISO 4400, no contact possible with 3-wire in combination with plug ISO 4400

Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / $V_S = 13 ... 36 V_{DC}$ permissible load: $R_{max} = [(V_S - V_{Smin}) / 0.02 A] \Omega$ response time: < 10 msec
3-wire current signal	4 ... 20 mA / $V_S = 19 ... 30 V_{DC}$ adjustable (turn-down of span 1:5) ³ permissible load: $R_{max} = 500 \Omega$ response time: < 3 sec
3-wire voltage signal	0 ... 10 V / $V_S = 15 ... 36 V_{DC}$ permissible load: $R_{min} = 10 k\Omega$ response time: < 3 msec
Without analogue output	$V_S = 15 ... 36 V_{DC}$
Accuracy ²	$p_N > 160$ mbar: ≤ ± 0.35 % FSO 40 mbar ≤ p_N ≤ 160 mbar: ≤ ± 1 % FSO $p_N < 40$ mbar: ≤ ± 2 % FSO

² accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

³ with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Performance	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / k
Long term stability	≤ ± 0.2 % FSO / year

Thermal effects (offset and span)				
Nominal pressure p_N [mbar]	≤ 10	≤ 20	≤ 250	> 250
Tolerance band [% FSO]	≤ ± 2	≤ ± 1.5	≤ ± 1	≤ ± 0.5
TC, average [% FSO / 10 K]	± 0.3	± 0.25	± 0.15	± 0.08
in compensated range	0 ... 60 °C			

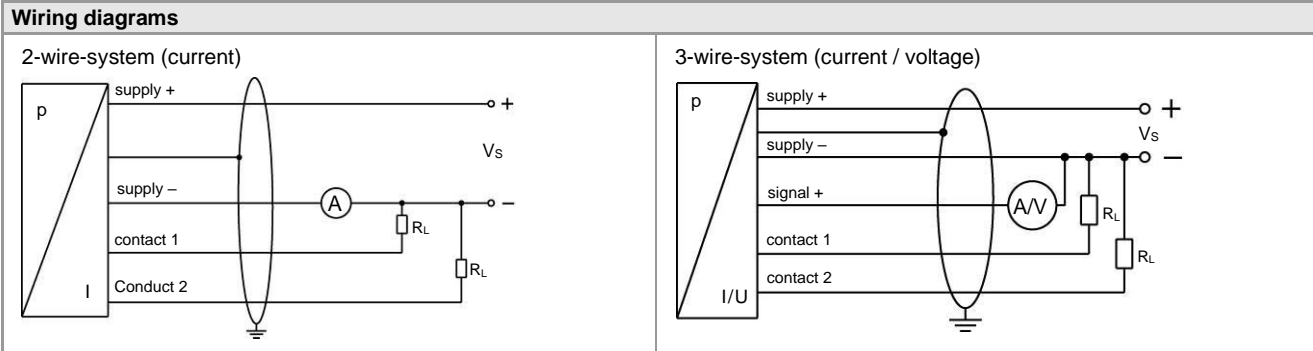
Permissible temperatures	
Medium	-25 ... 125 °C
Electronics / environment	-25 ... 85 °C
Storage	-40 ... 100 °C

Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

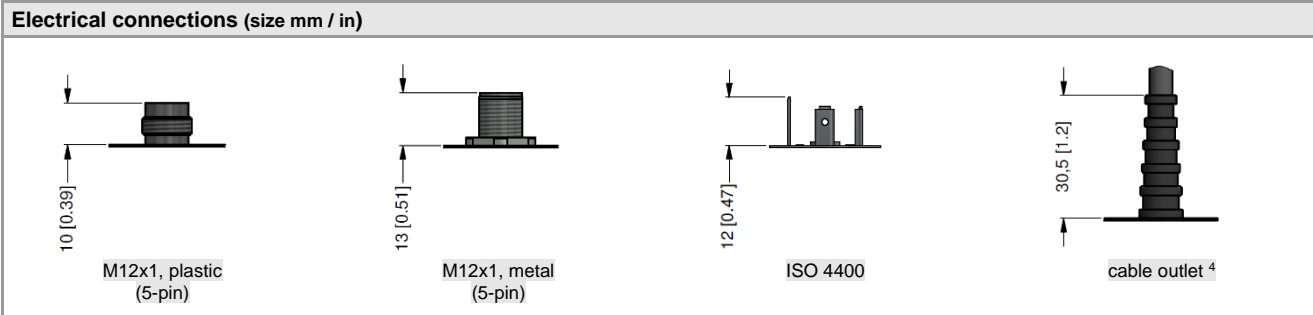
Mechanical stability	
Vibration	10 g RMS (20 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	100 g / 11 msec according to DIN EN 60068-2-6

Materials	
Pressure port	aluminium, silver anodized
Housing	aluminium, silver anodised
Display housing	PA 6.6, polycarbonate
Seal	PUR
Sensor	silicon, RTV, ceramics Al ₂ O ₃ , Epoxy, stainless steel
Media wetted parts	pressure port, housing, seal, sensor

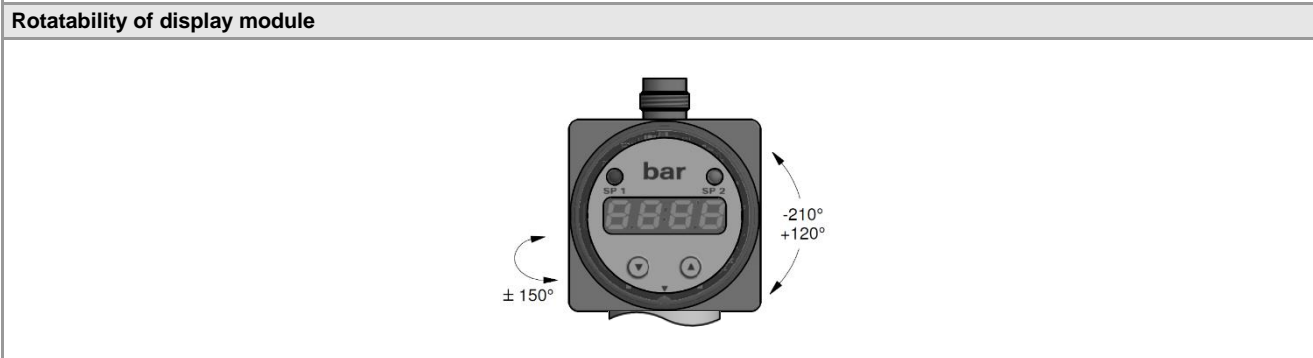
Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 ... 30 sec (programmable); measured value update 0.0 ... 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Weight	approx. 350 g
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU



Pin configuration				
Electrical connection	M12x1, plastic (5-pin)	M12x1, metal (5-pin)	ISO 4400	cable colours (IEC 60757)
Supply +	1	1	1	WH (white)
Supply -	3	3	2	BN (brown)
Signal + (only 3-wire)	2	2	3	GN (green)
Contact 1	4	4	3	GY (grey)
Contact 2	5	5	-	PK (pink)
Shield	via pressure port	plug housing / pressure port	ground pin	GNYE (green-yellow)



⁴ standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C), optionally cable with ventilation tube

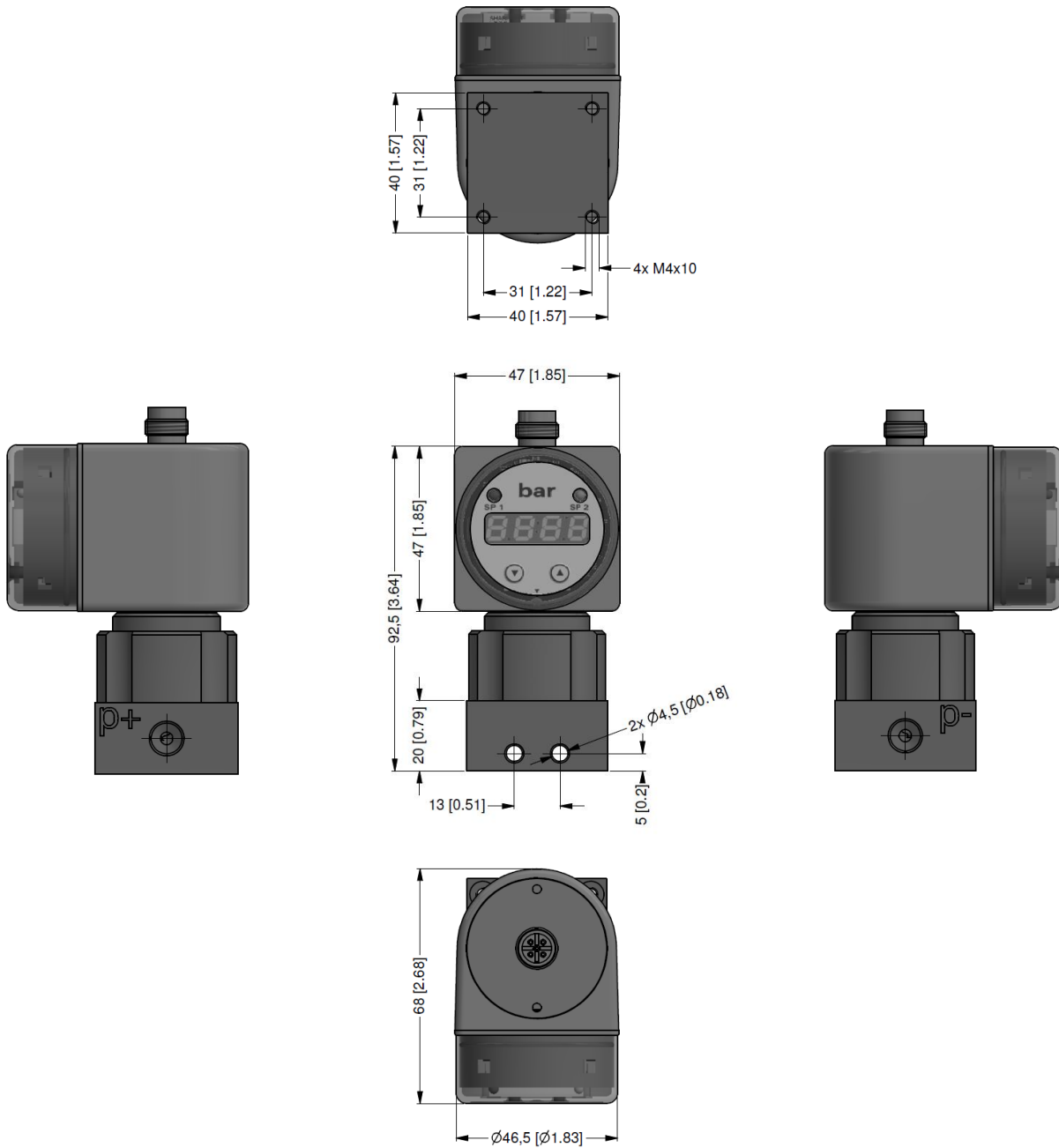


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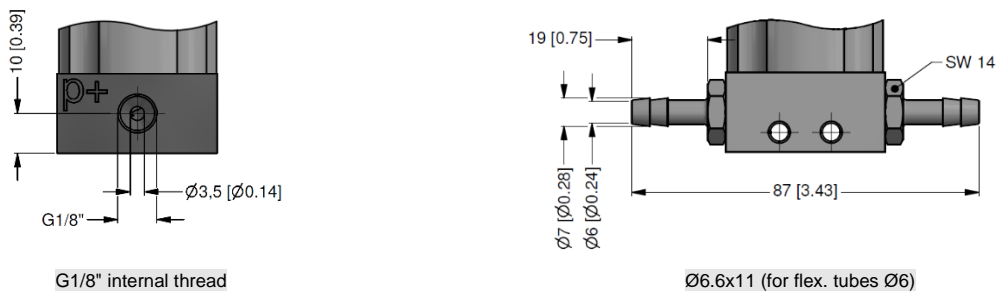
Differential Pressure Switch

Technical Data

Dimensions (mm / in)



Mechanical connection (dimensions mm / in)



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