



IDS 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 IDS 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 IDS 233 is a piezoresistive silicon pressure sensor, which features high accuracy and excellent long term stability.

As standard the IDS 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.



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 / $V_S = 13 \dots 36 V_{DC}$ permissible load: $R_{max} = [(V_S - V_{Smin}) / 0.02 A] \Omega$ response time: < 10 msec
3-wire current signal	4 ... 20 mA / $V_S = 19 \dots 30 V_{DC}$ 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 / $V_S = 15 \dots 36 V_{DC}$ permissible load: $R_{min} = 10 k\Omega$ response time: < 3 msec
Without analogue output	$V_S = 15 \dots 36 V_{DC}$
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) / Permissible temperatures	
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

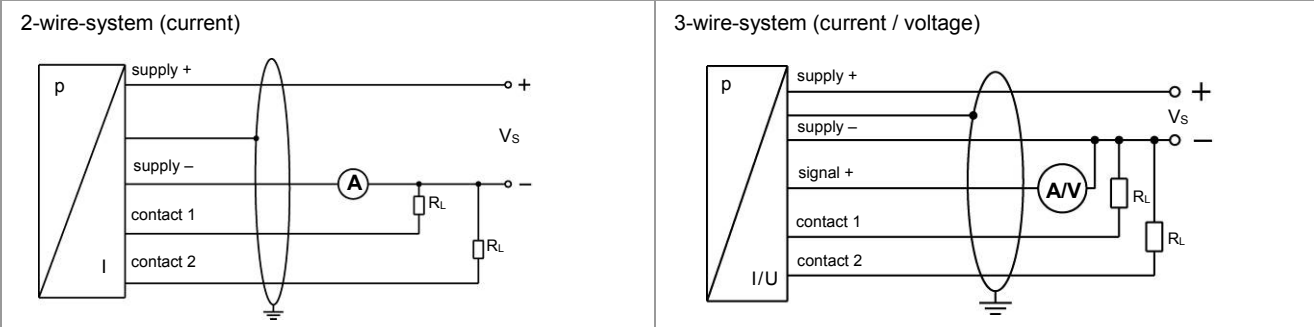
Mechanical stability	
Vibration	10 g RMS (20 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	100 g / 11 msec according to DIN EN 60068-2-6

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

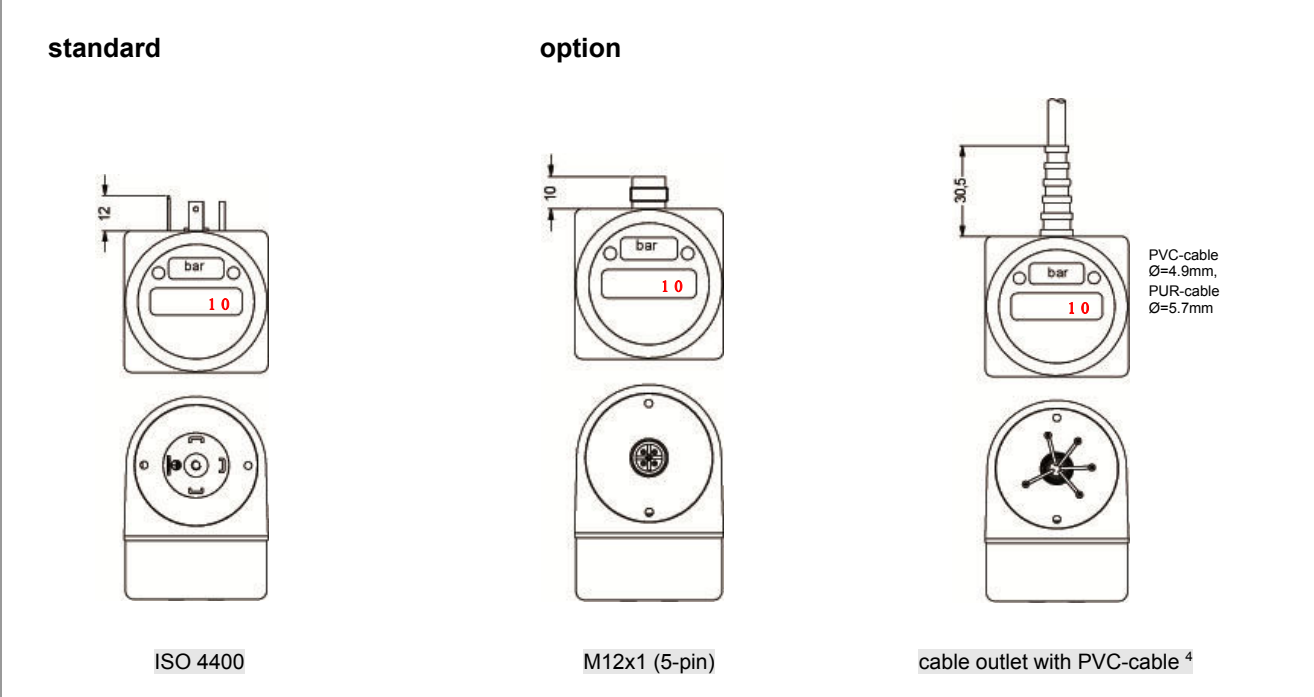
Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 ... 30 sec (programmable); measured value update 0.0 ... 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: 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	ISO 4400	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	cable colours (IEC 60757)
Supply +	1	1	1	wh (white)
Supply -	2	3	3	bn (brown)
Signal + (only 3-wire)	3	2	2	gn (green)
Contact 1	3	4	4	gy (grey)
Contact 2	-	5	5	pk (pink)
Shield	ground contact	via pressure port	plug housing/pressure port	gnye (green-yellow)

Wiring diagrams



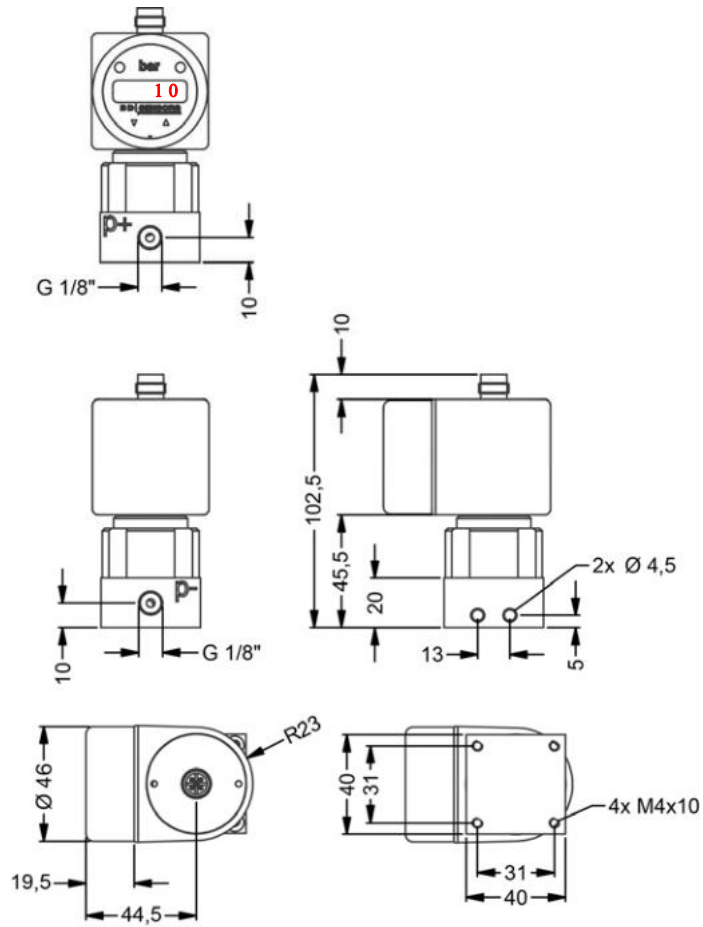
Electrical connections (dimensions in mm)



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

Mechanical connection (dimensions in mm)

Differential Pressure Switch



G1/8" internal

Ordering code

□ □ □ - □ □ □ □ - □ - □ - □ - □ □ □ - □ □ □ □ - □ - □ □ □

Pressure																			
	233	differential pressure	3	3	5														
		gauge pressure	3	3	6														
Input		[mbar]																	
		6	0	0	6	0													
		10	0	1	0	0													
		20	0	2	0	0													
		40	0	4	0	0													
		60	0	6	0	0													
		100	1	0	0	0													
		160	1	6	0	0													
		250	2	5	0	0													
		400	4	0	0	0													
		600	6	0	0	0													
		1000	1	0	0	1													
		-6 ... 6	S	0	0	6													
		-10 ... 10	S	0	1	0													
		-20 ... 20	S	0	2	0													
		-40 ... 40	S	0	4	0													
		-60 ... 60	S	0	6	0													
		-100 ... 100	S	1	0	0													
		-160 ... 160	S	1	6	0													
		-250 ... 250	S	2	5	0													
		-400 ... 400	S	4	0	0													
		-600 ... 600	S	6	0	0													
		-1000 ... 1000	S	1	0	2													
		customer	9	9	9														consult
Output																			
		without				0													
		4 ... 20 mA / 2-wire ¹				1													
		0 ... 10 V / 3-wire				3													
		4 ... 20 mA / 3-wire				7													
		customer				9													consult
Contact																			
		1 contact					1												
		2 contacts					2												
Accuracy																			
		standard for P _N > 160 mbar		0.35 %			3												
		standard for 40 mbar ≤ P _N ≤ 160 mbar		1.0 %			8												
		standard for P _N < 40 mbar		2.0 %			G												
		customer					9												consult
Electrical connection																			
		plastic male plug M12x1 (5-pin)					N	0	1										
		metal male plug M12x1 (5-pin)					N	1	1										
		male and female plug ISO 4400 ¹					1	0	0										
		cable outlet with PVC cable ²					T	A	0										
		customer					9	9	9										consult
Mechanical connection																			
		G1/8" internal thread						Q	0	0									
		Ø 6.6 x 11 (for flex. tubes Ø 6)						Y	0	0									
		customer						9	9	9									consult
Seals																			
		PUR, bonded											6						
Special version																			
		standard												0	0	0			
		customer												9	9	9			consult

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