DSB, DSF: Pressure monitors and pressure switches

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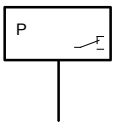

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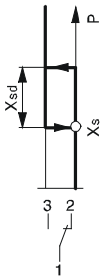

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How energy efficiency is improved

Demand-led controlling and monitoring, without auxiliary energy.

Areas of application

For controlling and monitoring pressures in liquids, gases and vapours according to the VdTÜV 'Pressure 100' guidelines. Especially suitable for applications in compact installations, for fitting onto pipes or walls.

Features

- Pressure range: –1 to +40 bar
- Contact rating: 4 mA, 5 V to 10 A, 250 V
- Up to 110 °C media temperature
- Gold-plated silver contacts
- Switching point can be adjusted
- Variable switching difference
- Sealable
- Complies with Pressure Equipment Directive (PED) 97/23/EC, Cat. IV as a safety pressure limiter

Technical description

- Ambient temperature: –20 to +70 °C
- IP 65
- Brass sensor or stainless steel for aggressive media
- Standard housing-mounted plug with cable connector for cables of 6 to 10 mm in diameter
- Plastic housing with transparent cover made of impact-resistant thermoplastic
- Pressure connection G½"A

Type	Setting range bar	Variable switching difference [4] (averages) bar	Max. pressure bar	Max. sensor temp. °C	Weight kg
Pressure sensor of brass for non-aggressive media; X_S = lower switching point					
DSB 138 F001	0...1.6	0.25...0.65	12	70	0.5
DSB 140 F001	0...2.5	0.25...0.75	12	70	0.5
DSB 143 F001	0...6	0.3...1.6	16	70	0.5
DSB 146 F001	0...10	0.8...3.7	30	70	0.4
DSB 152 F001	6...16	1...4	30	70	0.4
DSB 158 F001	0...25	1...7.5	60	70	0.4
DSB 170 F001	5...40	1.4...7.5	60	70	0.4
Pressure sensor of stainless steel for aggressive media; X_S = lower switching point					
DSF 125 F001	–1...1.5	0.25...0.75	12	110	0.5
DSF 127 F001	–1...5	0.3...1.5	16	110	0.5
DSF 135 F001	0...0.6	0.12...0.60	12	110	0.5
DSF 138 F001	0...1.6	0.25...0.7	12	110	0.5
DSF 140 F001	0...2.5	0.25...0.75	12	110	0.5
DSF 143 F001	0...6	0.3...1.5	16	110	0.5
DSF 146 F001	0...10	0.8...3.0	18	110	0.5
DSF 152 F001	0...16	1.2...3.8	60	110	0.3
DSF 158 F001	0...25	1.5...8.0	60	110	0.3
DSF 170 F001	15...40	1.7...8.2	60	110	0.3

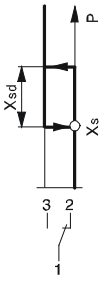
Contact rating		Degree of protection	IP 65 (EN 60529)
as silver contacts [1]	10(4) A, 250 V~	Protection class	I (IEC 60730)
	50 W, 250 V=	Test marks [5]	DWFS (SDBFS) [3] ID: 0000006024
minimum	100 mA, 24 V		TÜV
as gold contacts [2]	400 mA, 24V; 10 VA	PED	Cat. IV (as a safety pressure limiter)
minimum	4 mA, 5 V		
Permissible vacuum loading	–1.0 bar	Wiring diagram	A01499
DSB 138; 140; 143	–0.7 bar	Dimension drawing	M07815
		Fitting instructions	MV 505560
Ambient temperature	–20...70 °C	Material declaration	MD 23.760

1) See technical notes: *RC circuit under inductive load*
2) If the contacts are loaded in excess of the value stated above, the gold plating will be damaged. They then lose the properties of gold contacts and can thereafter be used only as silver contacts
3) As a safety pressure limiter when an external electric locking facility is connected
4) See technical notes: 'Influence of switching difference'
5) Certificates can be downloaded from www.tuv.com

Accessories

0035465 000	Brass throttling screw for damping pressure surges
0114467 000*	Steel capillary tube (1 m) for damping pressure surges
0192222 000*	Cap nut with solder connector
0192700 000*	Copper capillary tube (1 m) for damping pressure surges
0214120 000*	Stainless-steel throttling screw for damping pressure surges
0259239 000*	Brass adaptor (G½ to 7/16" 20-UNF-2A) for copper pipes of ∅ 6 mm
0292001 000	Setpoint as per customer's specifications (± 3% of setting range, but at least ± 0.2 bar)
0292002 000	Switching difference set to customer's specifications (± 5% of setting range, but at least ± 0.5 bar, with accessory 0292001 only)
0292004 000	Sealed setpoint screw (with accessory 0292001 only)
0292018 001*	Throttling screw for damping pressure surges in low-viscosity media
0292150 001*	Fixing bracket for wall mounting
0296936 000*	Fixing bracket for rails (top-hat rail EN 60715, 35 × 7.5 or 35 × 15); with accessory 0292150 only)
0311572 000*	Brass screw fitting for copper pipes of ∅ 6 mm
0381141 001*	Copper gasket for G½

*) Dimension drawing or wiring diagram is available under the same number



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Operation

Whenever the pressure falls below the lower switching point (variable setpoint X_S), the contacts switch over from 1-3 to 1-2. When the pressure exceeds the lower switching point by the amount of the switching difference X_{Sd}, the contacts switch over from 1-2 to 1-3.

The switching difference can be set externally via a set screw: one turn of the screw alters the switching difference by about 20% of the whole range.

Engineering and fitting notes

The pressure limiters conform to European regulation 97/23/EC on pressure equipment and, as safety components, belong to equipment category IV. The devices also comply with low-voltage regulation 2006/95/EC and EMC regulation 2004/108/EC. The safety pressure limiters are suitable for use in installations that comply with TRD604, sheets 1 and 2.

These devices can be employed as safety pressure limiters for falling or rising pressure if an electric interlock circuit (see examples of use) is used and the requirements in DIN 57116/VDE 0116 have been fulfilled. The electrical equipment must comply with VDE 0660 or VDE 0435.

Additional information

Materials that come into contact with the medium:

- Pressure sensor of brass (DSB): brass, stainless steel and nitrile rubber
- Pressure sensor of stainless steel (DSF): stainless steel, material nos. 1.4104 and 1.4541

Additional technical data

CE conformity as per	
EMC Directive 2006/95/EC	EN 60730-1/ EN 60730-2-6
EMC Directive 2004/108/EC	EN 61000-6-1/ EN 61000-6-2 EN 61000-6-3/ EN 61000-6-4
PED 97/23/EC, Cat. IV	VdTÜV 'Pressure 100' EN 12952-11 EN 12963-9

Electrical life expectancy:

- The switching components have been tested as per ENEC-00144 certificate 6(6) A, 250 V~, 5E4 electrical switching cycles; the temperature of the pressure switch applies
- Typically:

cos φ = 1:
10 A, 250,000 switching operations
5 A, 400,000 switching operations
2 A, approx. 10^6 switching operations

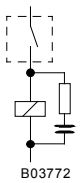
cos φ = 0.6:-
3 A, 400,000 switching operations

cos φ = 0.3: [1)]
3 A, 250,000 switching operations
2 A, 400,000 switching operations
1 A, 700,000 switching operations

Mechanical life expectancy of the pressure bellows:
as per 'Pressure 100' > 2 ×10^6 strokes

1) cos φ < 0.3: substantial reduction in life expectancy; with RC circuitry, life expectancy is as for cos φ > 0.3 (see also technical notes).

Technical notes



RC circuit under inductive load

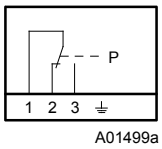
For the optimum RC circuitry, refer to the specifications supplied by the manufacturers of the relays, contactors etc. If these are not available, the inductive load can be reduced by applying the following rule of thumb:

- Capacity of the RC circuitry (μF) ≥ operating current (A)
- Resistance of the RC circuitry (Ω) ≈ coil resistance (Ω)

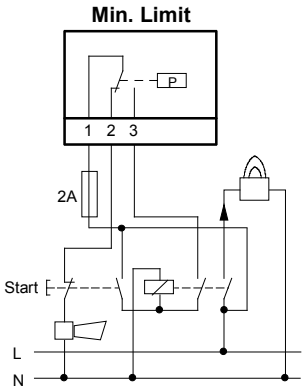
Influence coefficient on switching difference

The switching difference is slightly dependent on the setpoint. The switching differences stated in the PDS are typical values at the start of the range. The setpoint's influence on the switching difference increases the switching difference by: ΔX_{Sd} = (setpoint X_S – start of range) × 0.04.

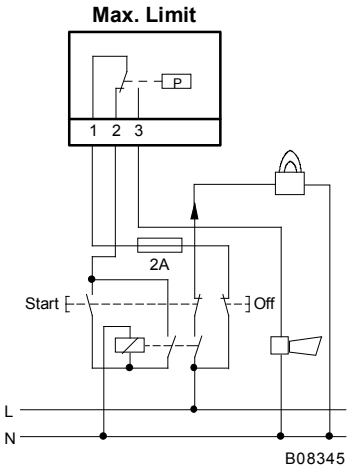
Wiring diagram



Connections for use as safety pressure limiter

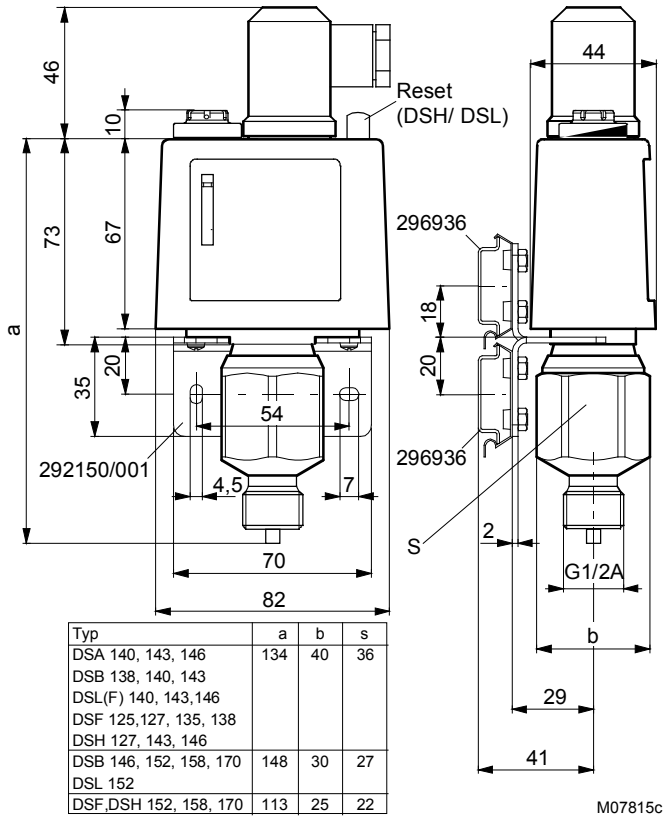


Pressure monitor as safety pressure limiter for falling pressure



Pressure monitor as safety pressure limiter for rising pressure

Dimension drawing



Typ	a	b	s
DSA 140, 143, 146 DSB 138, 140, 143 DSL(F) 140, 143,146 DSF 125,127, 135, 138 DSH 127, 143, 146	134	40	36
DSB 146, 152, 158, 170 DSL 152	148	30	27
DSF,DSH 152, 158, 170	113	25	22

Accessories

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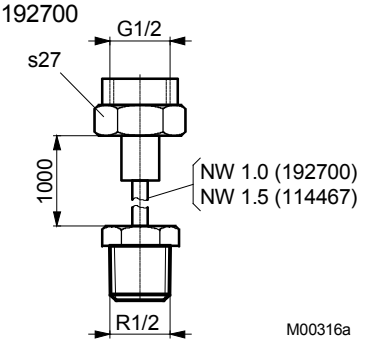

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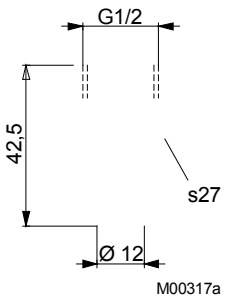

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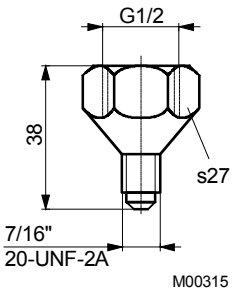

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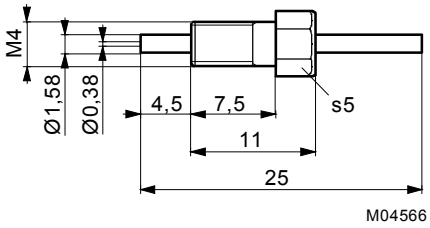

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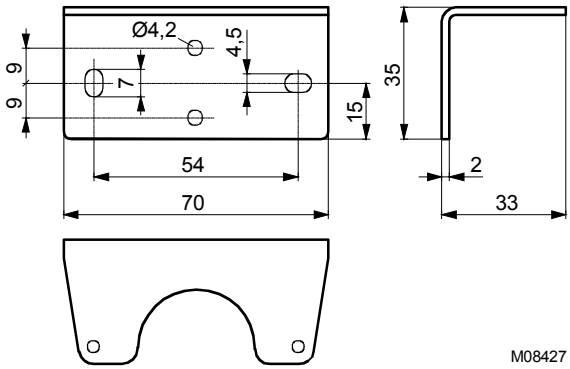

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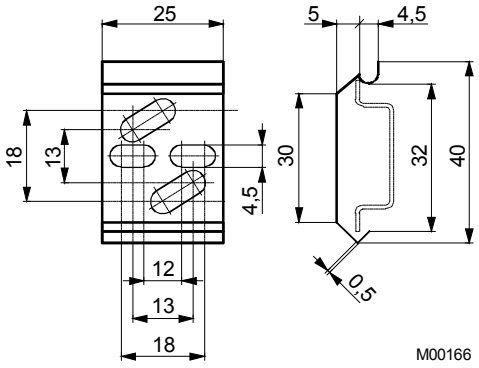

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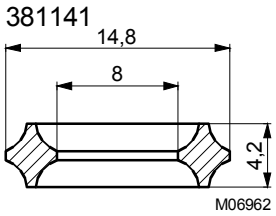

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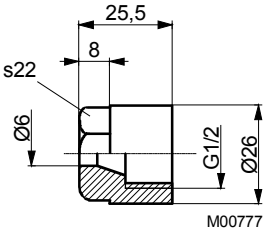

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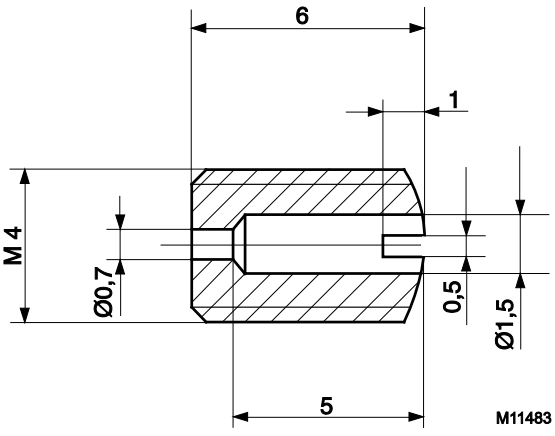

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