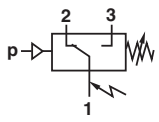
Electro-mechanical pneumatic pressure switches

20D Standard pressure -1 ... 25 bar / 20D Low pressure -0,025 ... 1,6 bar / 20DD Differential 0,02 ... 6 bar

G1/4



Switching function:
Microswitch SPDT
(commutator)

Terminals 1 - 3:
Contacts close on
rising pressure

Terminals 1 - 2:
Contacts open on
rising pressure

- High accuracy
- Microswitch with gold plated contacts
- Suitable for intrinsically safe operation
- Optional electrical connections
- Optional fixed or adjustable switching pressure difference
- Robust metal housing

TECHNICAL DATA

Medium:
For neutral, non-inflammable gases

Temperature:

Fluid	Ambient
-10 ... +100°C	-25 ... +80°C

Please contact our technical service for use below +2°C

Media viscosity:
1000 mm^2/s max.

Switching pressure difference/hysteresis:
Fixed - option
Adjustable - option

Repeatability:
±1% of final value
(depending on regulating pressure)

Degree of protection (conforming to DIN 40050):
IP65

Mounting position:
Optional

Resistance to shock and vibration(avoid if possible):
4 g max. (sinusoidal) / 5 Hz max.

Sealing:
≤ 10^{-7} mbar · l · s^{-1}

Pulsations:
Not permitted

Switching cycles:
20/min. max. standard version
10/min. max. low pressure version

MATERIALS

Housing: aluminium diecast
Sensor: brass or stainless steel
Seals: stainless steel-bellows

20D Pneumatic - standard pressure - fixed switching pressure difference

Operating pressure range *1)	Over pressure *2)	Switching pressure difference for sensor codes 00 typical (bar)		Switching pressure difference for sensor codes 05 typical (bar)		MODELS
(bar)	(bar)	Lower range Min.	Upper range Max.	Lower range Min.	Upper range Max.	
-1 ... 0	10	0,06	0,07	0,06	0,07	**181 01 00**
-1 ... 1	10	0,06	0,08	0,08	0,09	**181 02 00**
-1 ... 1,6	10	0,08	0,09	0,08	0,09	**181 03 00**
-1 ... 2,5	10	0,08	0,12	0,09	0,12	**181 04 00**
0,05 ... 1	10	0,06	0,08	0,07	0,08	**181 11 00**
0,1 ... 2,5	10	0,07	0,09	0,11	0,15	**181 13 00**
0,5 ... 4	20	0,20	0,25	0,30	0,33	**181 14 00**
0,5 ... 6	20	0,20	0,30	0,30	0,35	**181 15 00**
0,5 ... 10	20	0,30	0,40	0,30	0,40	**181 16 00**
1 ... 16	50	0,60	0,80	0,70	0,80	**181 17 00**
1 ... 25	50	0,70	0,90	0,70	0,90	**181 18 00**

Connector is not included; special pressure ranges on request

*1) Atmospheric air pressure

*2) Short term pressure peaks should not exceed this value. Normal operation should be within switching pressure range. Over pressure equals maximum test pressure.

For further information

www.norgren.com/info/en5-014

20D Pneumatic - standard pressure range - adjustable switching pressure difference

Operating pressure range *1)	Over pressure *2)	Switching pressure difference for sensor codes 00 (typical)			Switching pressure difference for sensor codes 05 (typical)			MODELS
		Lower range	Upper range		Lower range	Upper range		
			Min.	Max.		Min.	Max.	
(bar)	(bar)	(bar)	(bar)	(bar)	(bar)	(bar)	(bar)	
-1 ... 0	10	0,12	0,13	0,70	0,12	0,13	0,70	**180 01 00**
-1 ... 1	10	0,13	0,14	1,00	0,19	0,21	1,00	**180 02 00**
-1 ... 1,6	10	0,17	0,20	2,50	0,22	0,24	2,50	**180 03 00**
-1 ... 2,5	10	0,17	0,20	2,50	0,22	0,24	2,50	**180 04 00**
0,05 ... 1	10	0,08	0,11	0,70	0,15	0,16	0,70	**180 11 00**
0,1 ... 2,5	10	0,11	0,15	2,00	0,34	0,40	2,00	**180 13 00**
0,5 ... 4	20	0,30	0,40	2,50	0.80	0,80	2,50	**180 14 00**
0,5 ... 6	20	0,35	0,50	5,00	0,80	0,90	5,00	**180 15 00**
0,5 ... 10	20	0,40	0,80	8,00	0,90	1,90	8,00	**180 16 00**
1 ... 16	50	0,80	1,10	12,00	1,70	2,00	12,00	**180 17 00**
1 ... 25	50	1,00	1,50	20,00	1,80	2,80	20,00	**180 18 00**

Connector is not included; special pressure ranges on request.

*1) Atmospheric air pressure.

*2) Short term pressure peaks should not exceed this value. Normal operation should be within switching pressure range. Over pressure equals maximum test pressure.

OPTIONS SELECTOR

18★ ★★ ★★

Switching pressure difference	Substitute
Adjustable	**0**
Fixed	**1**

Operating pressure range (bar)	Substitute
-1 ... 0	**01**
-1 ... 1	**02**
-1 ... 1,6	**03**
-1 ... 2,5	**04**
0,05 ... 1	**11**
0,1 ... 2,5	**13**
0,5 ... 4	**14**
0,5 ... 6	**15**
0,5 ... 10	**16**
1 ... 16	**17**
1 ... 25	**18**

Sensor material	Electrical connection	Substitute
Brass/1.4404	DIN EN 175301-803; G1/4	**00**
Brass/1.4404	M20 x 1,5; G1/4	**05**

20D Pneumatic - low pressure - fixed switching pressure difference

Operating pressure *1)	Over pressure *2)	Switching pressure difference (typical)		Dimension no.	MODELS
		Lower range	Upper range		
(bar)	(bar)	(bar)	(bar)		
0 ... 0,025	0,5	0,003	0,004	1	**1812500**
0 ... 0,06	0,5	0,004	0,006	1	**1812600**
0,004 ... 0,16	0,5	0,004	0,008	1	**1812700**
0 ... 0,25	0,5	0,004	0,009	1	**1812800**
0,05 ... 0,6	15	0,03	0,06	2	**1814100**
0,05 ... 1,6	15	0,03	0,12	2	**1814300**

20D Pneumatic - low pressure - adjustable switching pressure difference

Operating pressure *1)	Over pressure *2)	Switching pressure difference (typical)			Dimension no.	MODELS
		Lower range	Upper range			
			Min.	Max.		
(bar)	(bar)	(bar)	(bar)	(bar)		
0 ... 0,025	0,5	0,008	0,011	0,025	1	**1802500**
0 ... 0,06	0,5	0,009	0,015	0,04	1	**1802600**
0 ... 0,16	0,5	0,011	0,023	0,12	1	**1802700**
0 ... 0,25	0,5	0,011	0,028	0,2	1	**1802800**
0,05 ... 0,6	15	0,09	0,16	0,5	2	**1804100**
0,05 ... 1,6	15	0,13	0,25	1,2	2	**1804300**

Special pressure ranges on request

*1) Atmospheric air pressure

*2) Short term pressure peaks should not exceed this value. Normal operation should be within switching pressure range. Over pressure equals maximum test pressure.

Electro-mechanical pneumatic pressure switches

20D Standard pressure -1 ... 25 bar / 20D Low pressure -0,025 ... 1,6 bar / 20DD Differential 0,02 ... 6 bar
G1/4

20DD Pneumatic differential pressure switch - fixed switching pressure difference
One pressure sensor *1)

Differential pressure range *2)	Switching pressure difference		Operating pressure range *3)	Over pressure *4)	Switching cycles per minute	Pressure sensor material			Weight	MODELS
(bar)	Lower range (bar)	Upper range (bar)	(bar)	(bar)	(min^{-1})	Housing	Bellows	Other materials	(kg)	
0,2 ... 1,6	-1 ... 16	0,12	0,17	20	10	Brass	Stainless steel	Solder	1,20	**1819205**
0,3 ... 4	-1 ... 16	0,2	0,25	20	10	2.0401	1.4401		1,20	**1819405**
0,5 ... 6	-1 ... 25	0,6	0,7	30	10				1,20	**1819505**

*1] Tested in accordance with DIN 89011, 5.2., within the frequency range 25 ... 100 Hz; within the frequency range 2 ... 25 Hz tested with amplitude 1.6 mm.
*2] The differential pressure is the pressure difference between both pressure sensing elements under operating conditions.
*3] The working pressure range indicates the required minimum pressure as well as the load on the pressure sensor under operating conditions.
*4] Short term pressure peaks should not exceed this value. Normal operation should be within switching pressure range.
Over pressure equals maximum test pressure.

ACCESSORIES

Connector	Connector	Brackets	Surge damper	Pressure port – reducing nipple
				
0585418 (with LED)	0570110	0574772 (steel) 0553908 (stainless steel)	0553258 (stainless steel G1/4) 0574773 (brass/steel) G1/4) 0551894 (stainless steel G1/2 ... G1/2A)	0550083 (G1/4 – G1/2) 0574764 (G1/4 – G3/8) 0550083 (G1/4A ... G1/2A) 0574765 (G1/4 – 1/4 NPT)

Switching capacity for standard and low pressure switches with gold plated contacts

Load level	Current type	Load type	U min [V]	Max. permanent current Imax [A] at U [V] 30 M 12x1	48	60	125	250	Contact life
Standard *3)	a.c.	ohmic	12	5	5	5	5	5	≥ 10^7 switching cycles
(e.g. contractors, solenoids)	a.c.	inductive, cos φ ≈ 0,7	12	3	3	3	3	3	
	d.c.	ohmic	12	5	1,2	0,8	0,4	–	
	d.c.	inductive, L/R ≈ 10 ms	12	3	0,5	0,35	0,05	–	
Minor *4)	a.c.	ohmic	5 *6)	0,34	0,2	0,17	0,08	0,04	≥ 10^7 switching cycles
(e.g. electronic circuits)	d.c.	inductive, L/R ≈ 10 ms	5 *6)	0,1	0,01	–	–	–	

Reference number: 30/min, Reference temperature: +30°C
Spark quenching with diode with d.c. and inductive load:
I max = 1,5 x I max of table
I min = 1 (mA)
Creepage and air paths correspond to insulation group B according to VDE Reg. 0110 (except contact clearance of microswitch).

*3] Gold-plating not required as it would decay.
Max. perm. in-rush current (appr. 30 ms) I a.c. = max. 15 A
*4] Gold-plating required (will not decay).
*6] Lower value of critical voltage guarantees sufficient contact safety.
Lower voltages permissible under favourable conditions.

Recommended circuit - spark quenching / intrinsically safe with d.c. voltage

1. Diode D in parallel to inductive load.
   Observance of correct polarity (positive pole to cathode).

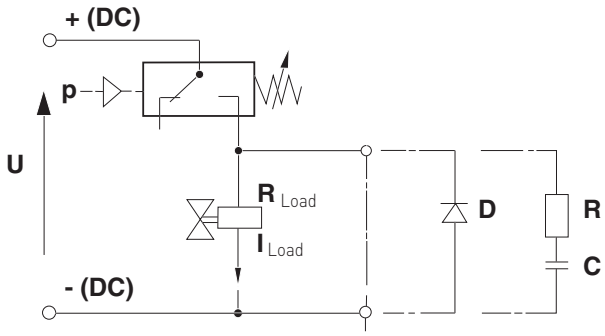
   Dimensioning specifications for quenching diode:
   Rated voltage at diode: UD ≥ 1,4 x Us

   Rated current at diode: $I_N \geq I_{Load}$

   Selection of a quick switching diode (recovery time trr ≤ 200 [ms]).

2. RC link in parallel to load in parallel to switching contact.
   Suited for d.c. and a.c. voltage.

   Dimensioning principles:
   R in Ω ≈ 0,2 x R_{Load} in Ω
   C in [µF] ≈ I_{Load} in [A]



Switching capacity for differential pressure switch with gold plated contacts

Load level	Current type	Load type	Max. permitted constant current I (A) with Us (V) 24	60	125	250
Normal (e.g.	a.c.	ohmic	15	15	15	15
contactor, solenoids)	a.c.	inductive, cos φ ≈ 0,7	4	2,5	1,5	0,9
Minor (e.g. electronic	a.c.	inductive spark quenching with RS contact	6	4	2,5	1,5
switching circuit)	d.c.	ohmic	2	0,9	0,45	0,2
	d.c.	inductive, L/R = 10 ms	1	0,3	0,09	0,02
	d.c.	inductive, spark quenching with diode	1,5	0,7	0,35	0,15

Reference number: 30/min
Reference temperature: +30°C
(with a reference temperature of + 70 °C, Imax corresponds to 50% of the tabulated values only)
I_{max} = 1.5 x I_{max} table

Contact-life appr. 1 x 10^6 switching cycles
at max. current (at 50% of max. current, contact life is appr. 3 times as long)

Mechanical life appr. 5 x 10^6 switching cycles

For non-aggressive atmosphere,
which in particular does not contain any sulphur, the following limits are valid:

Microswitch with silver contacts (standard):
U_{min} ca. 8 ... 12 V, I_{min} ca. 10 mA
Maximum values conforming to table above.

Microswitch with gold-plated contacts:
U_{min} and I_{min}: No lower limit Sensible upper limit:
U_{max} ca. 48 V, I_{max} ca. 20 mA; (for higher values silver spring contacts are completely sufficient).

Creepage and air paths correspond to insulation group B conforming to VDE Reg. 0110 (except contact clearence of microswitch).

Proposal for spark extinction with direct voltage

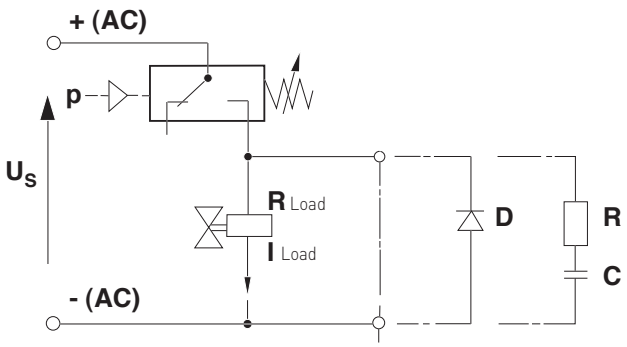
1. Diode D in parallel to inductive load.
   Observance of correct polarity (positive pole to cathode).

   Dimensioning specifications for erasing diode:
   Nominal voltage of the diode UD ≥1,4 x Us
   Nominal current of the diode IN ≥ I_{Load}

   Select fast switching diodes
   (blocking recovery time trr ≤ 200 ms)

2. RC element parallel to the load
   (or parallel to the switching contact).
   Suitable for direct voltage and alternating voltage.

   Dimensioning principles:
   R in Ω ≈ 0,2 x R_{Load} in Ω
   C in [µF] ≈ I_{Load} in [A]

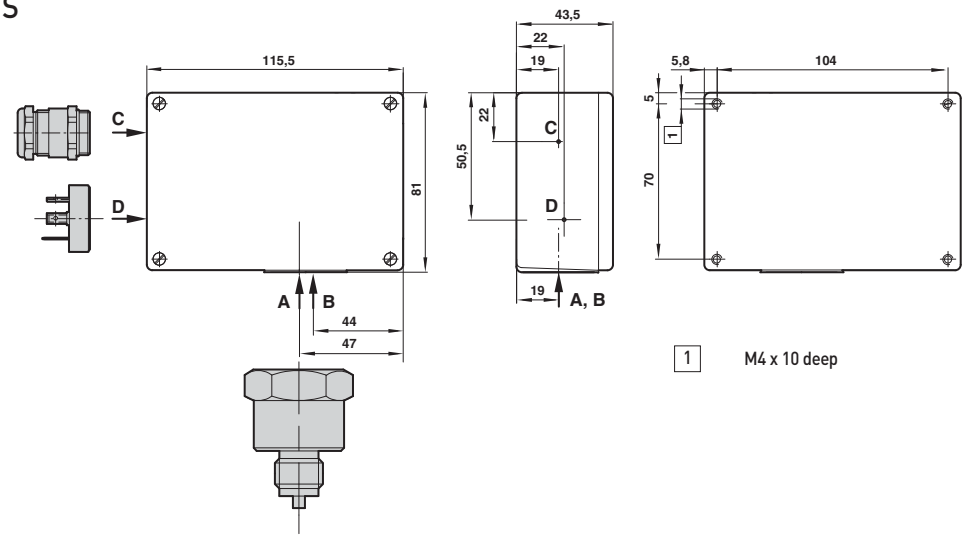


Electro-mechanical pneumatic pressure switches

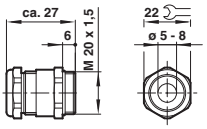
20D Standard pressure -1 ... 25 bar / 20D Low pressure -0,025 ... 1,6 bar / 20DD Differential 0,02 ... 6 bar
G1/4

20D Pneumatic - standard pressure switches

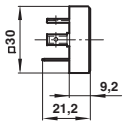
BASIC DIMENSIONS



Connector M20 x 1,5
conforming to DIN 46320



Connector conforming to
DIN EN 175301-803, form A

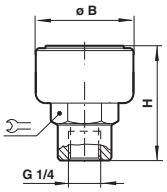


Sensor combinations

Operating pressure range Code	Sensor code 00	05	Sensor type
01	•	•	B
02	•	•	B
03	•	•	B
04	•	•	B
11	•	•	B
13	•	•	B
14	•	•	E
15	•	•	E
16	•	•	E
17	•	•	F
18	•	•	F

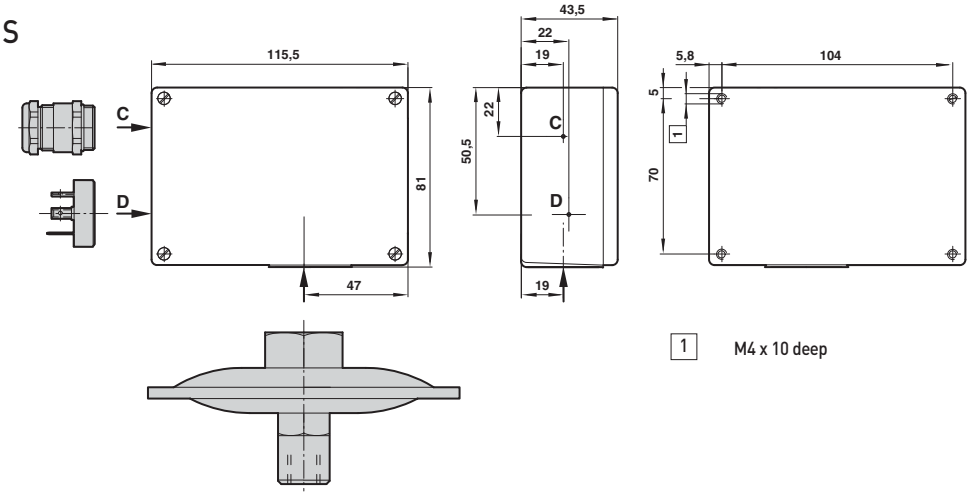
Sensor dimensions

Sensor type	H	B	
B	42,5	51	30
E	47	40	24
F	43	47,5	41

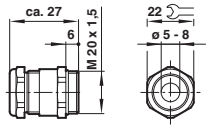


20D Pneumatic - low pressure switches

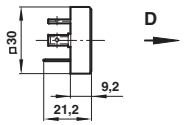
BASIC DIMENSIONS



Connector M20 x 1,5
conforming to DIN 46320



Connector conforming to DIN EN 175301-803, form A



Sensor

for pressure range substitutes 41 and 43

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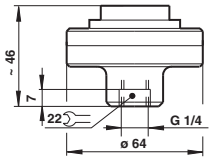
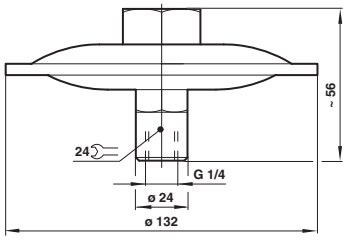


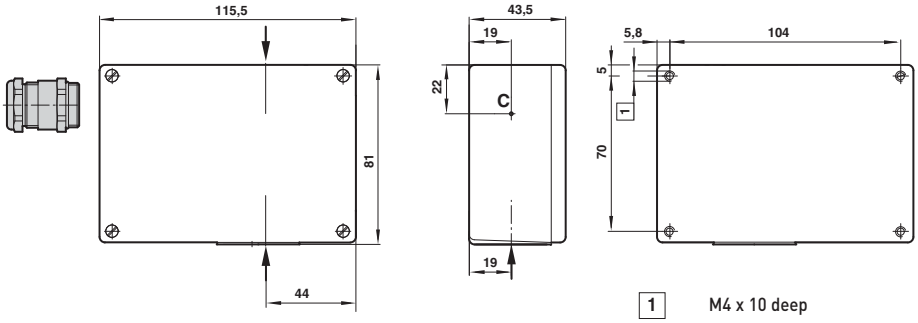
for pressure range substitutes 25, 26, 27 and 28

②



20DD Pneumatic differential pressure switches

BASIC DIMENSIONS



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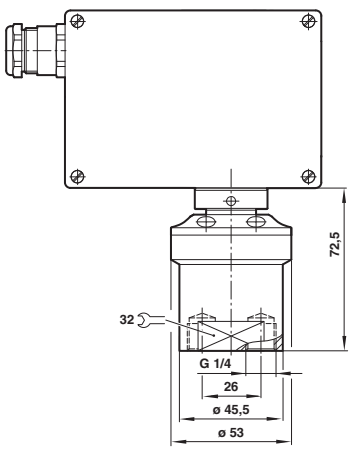

Electrical connector M20 x 1,5 conforming to DIN 46320