Pressure Switches Series 20D

Pressure switches for all-fluid technique

- **Microswitch with gold-plated contacts (silver plated for field mounting)**
- **Electrical connection: Connector acc. to DIN 43650 or terminal in combination with cable gland acc. to DIN 46320 or NPT thread**

Technical Data

Fluid:
Neutral and aggressive gases and liquids
Mounting:
Optional
Port Sizes:
G 1/4 female, G 1/2 male, 1/4 NPT female, 1/2 NPT male
Operating pressure:
-1 to 100 bar
Ambient temperature:
-25 °C to +80 °C
-40 °C to +80 °C (field)
Operating viscosity:
Max. 1000 mm^2/s
Fluid temperature:
-10 °C to +100 °C
Maximum temperature at switching element:
+80 °C
Sealing:
> 10^{-7} mbar · l · s^{-1}
Repeatability:
±1% of final value (referred to pressure control)
Pulsations:
Not permitted
Vibrations / Shocks to be avoided:
4 g max. (sinusoidal) / max. 5 Hertz
Switching cycles:
max. 20/minute
Degree of protection:
IP65
Materials:

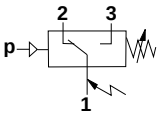
Housing:	aluminium die cast	(standard)
	aluminium die cast, tin plated	(field)
Sensor:	Brass 1.4404	
	St. st. 1.4305 / 1.4404	
	St. st. 1. 4571	

Sealing:
Stainless steel bellow
El.-connection/Sensor combinations:
See table overleaf

Ordering information
please see page 2

Switching function:

Microswitch SPDT
Terminals 1-3:
Contacts close on rising pressure
Terminals 1-2:
Contacts open on rising pressure



General Information / Selection criteria

The complete catalog number consists of 7 digits:

Order example:
for a pressure switch with a set point of 4 bar, fixed switching difference, G 1/2 male fluid connection suitable for water, outdoor location,
order part number 1811511.

18 H XX YY

- **18** – Identification of 20 D
- **H** – 1 = fixed switching difference; 0 = adjustable switching difference
- **XX** – Pressure range and related switching differences
- **YY** – Sensor variation with related/available electrical and fluid connections

Pressure range codes (XX) for 181 models (fixed switching difference)

XX Code	Pressure range	Over pressure	Switching differences for sensor options codes 00, 10 + 20		Switching differences for sensor options codes 11, 14, 21 + 24		Switching differences for sensor opt. codes 03, 05, 06, 13, 15, 16, 23 + 25	
			Lower range (bar)	Upper range (bar)	Lower range (bar)	Upper range (bar)	Lower range (bar)	Upper range (bar)
01	-1 – 0	10	0,06	0,07	0,07	0,08	0,06	0,07
02	-1 – 1	10	0,06	0,08	0,07	0,10	0,07	0,08
04	-1 – 2,5	10	0,08	0,12	0,09	0,12	0,09	0,12
11	0,05 – 1	10	0,06	0,08	0,07	0,08	0,07	0,08
13	0,1 – 2,5	10	0,07	0,09	0,09	0,10	0,11	0,15
14	0,5 – 4	20	0,20	0,25	0,30	0,33	0,30	0,33
15	0,5 – 6	20	0,20	0,30	0,30	0,35	0,30	0,35
16	0,5 – 10	20	0,30	0,40	0,30	0,40	0,30	0,40
17	1 – 16	50	0,60	0,80	0,70	0,80	0,70	0,80
18	1 – 25	50	0,70	0,90	0,70	0,90	0,70	0,90
19*	5 – 63	85	0,90	1,50	1,00	2,00	1,00	2,00
10***	5 – 100	150	2,50	5,00	3,00	7,00	3,00	7,00

Pressure range codes (XX) for 180 models (adjustable switching difference)

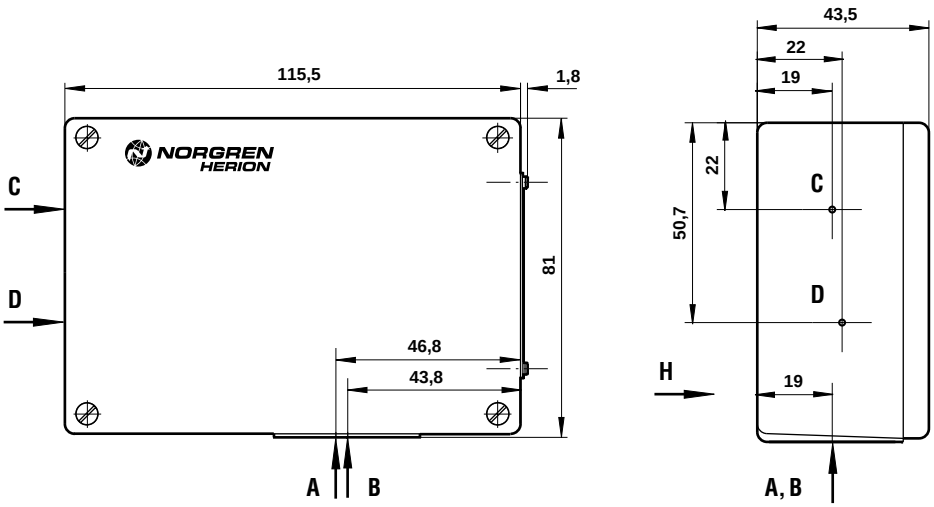
XX Code	Pressure range	Over pressure	Switching differences for sensor options codes 00, 10 + 20 (bar)			Switching differences for sensor options codes 03, 05, 06, 10, 11, 13, 14, 15, 16, 21, 23, 24, 25 (bar)		
			Lower range	Upper range Minimum	Upper range Maximum	Lower range	Upper range Minimum	Upper range Maximum
01	-1 – 0	10	0,12	0,13	0,70	0,12	0,13	0,70
02	-1 – 1	10	0,13	0,14	1,00	0,19	0,21	1,00
04	-1 – 2,5	10	0,17	0,20	2,50	0,22	0,24	2,50
11	0,05 – 1	10	0,08	0,11	0,70	0,15	0,16	0,70
13	0,1 – 2,5	10	0,11	0,15	2,00	0,20	0,25	2,00
14	0,5 – 4	20	0,30	0,40	2,50	0.80	0,80	2,50
15	0,5 – 6	20	0,35	0,50	5,00	0,80	0,90	5,00
16	0,5 – 10	20	0,40	0,80	8,00	0,90	1,90	8,00
17	1 – 16	50	0,80	1,10	12,00	1,70	2,00	12,00
18	1 – 25	50	1,00	1,50	20,00	1,80	2,80	20,00
19*	5 – 63	85	2,00	3,00	20,00	2,30	3,50	20,00
10***	5 – 100	150	3,50	7,00	55,00	4,00	9,00	55,00

Sensor variation codes (YY)

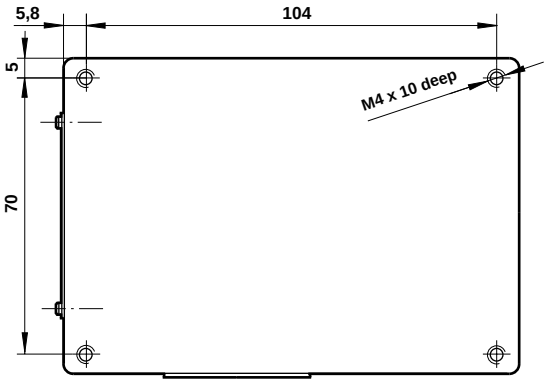
YY Code	Materials	El. connection	Fluid connection	Design
00	Brass/1.4404	DIN 43650**	G1/4 female	-
03	Brass/1.4404	1/2 NPT	1/4 NPT female	-
05	Brass/1.4404	Pg 13,5	G1/4 female	-
06	Brass/1.4404	Pg 16	G1/4 female	-
10	1.4305/1.4404	DIN 43650**	G1/2 male	-
11	1.4305/1.4404	Pg 16	G1/2 male	Field
13	1.4305/1.4404	1/2 NPT	1/2 NPT male	-
14	1.4305/1.4404	1/2 NPT	1/2 NPT male	Field
15	1.4305/1.4404	Pg 13,5	G1/2 male	-
16	1.4305/1.4404	Pg 16	G1/2 male	-
20	1.4571	DIN 43650**	G1/2 male	-
21	1.4571	Pg 16	G1/2 male	Field
23	1.4571	1/2 NPT	1/2 NPT male	-
24	1.4571	1/2 NPT	1/2 NPT male	Field
25	1.4571	Pg 13,5	G1/2 male	-

* Not available with sensor options 00, 03, 05, and 06.
** Connector not within scope of supply. If required pls. order separately 0570110
*** Only for sensor options 10, 11, 13, 14, 15, 16

Dimensional drawing (mm)

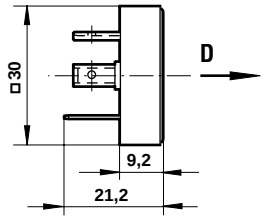
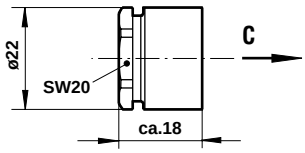
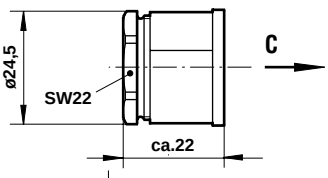
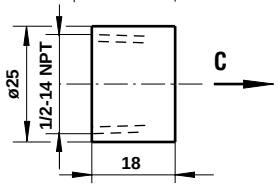


View H



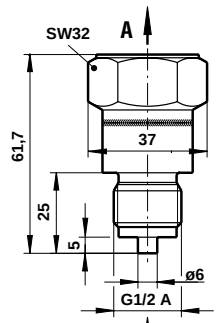
Electrical connection

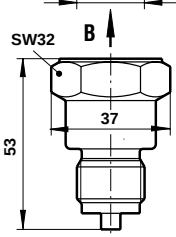
SW = Across-Flats Dimensions

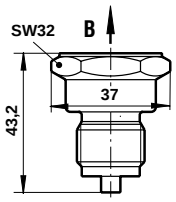
		Sensor Variation Code (YY)
	Connector acc. to DIN 43650	00 10 20
	Cable gland Pg 13.5 acc. to DIN 46320	05 15 25
	Cable gland Pg 16 acc. to DIN 46320	06 11 16 21
	Threaded conn. 1/2 NPT	03 13 14 23 24

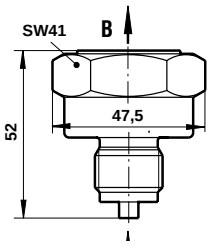
Pressure Sensor

Combination of Pressure- and Sensor Codes







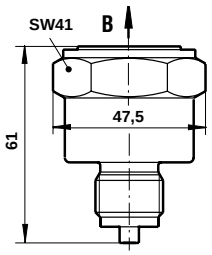


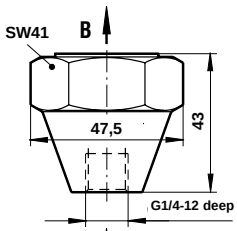
XX / YY

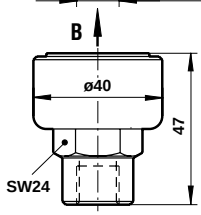
10/10		
10/11		
10/15		
10/16		
10/20		
10/21		
10/25		
19/10		
19/11		
19/15		
19/16		
19/20		
19/21		
19/25		
18/10	17/10	
18/11	17/11	
18/15	17/15	
18/16	17/16	
18/20	17/20	
18/21	17/21	
18/25	17/25	
16/10	15/10	14/10
16/11	15/11	14/11
16/15	15/15	14/15
16/16	15/16	14/16
16/20	15/20	14/20
16/21	15/21	14/21
16/25	15/25	14/25

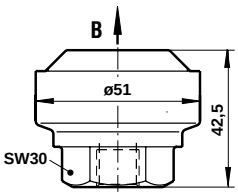
Pressure Sensor

Combination of Pressure- and Sensor Codes







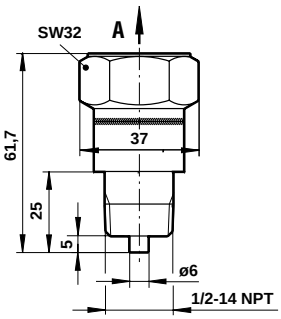


XX / YY

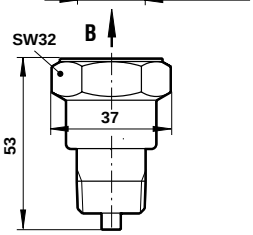
13/10	11/10	04/10	02/10	01/10
13/11	11/11	04/11	02/11	01/11
13/15	11/15	04/15	02/15	01/15
16/16	11/16	04/16	02/16	01/16
13/20	11/20	04/20	02/20	01/20
13/21	11/21	04/21	02/21	01/21
13/25	11/25	04/25	02/25	01/25
18/00	17/00			
18/05	17/05			
18/06	17/06			
16/00	15/00	14/00		
16/05	15/05	14/05		
16/06	15/06	14/06		
13/00	11/00	04/00	02/00	01/00
13/05	11/05	04/05	02/05	01/05
13/06	11/06	04/06	02/06	01/06

Pressure Sensor

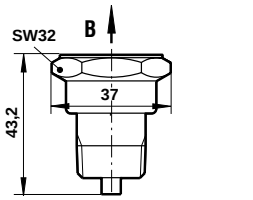
Combination of Pressure- and Sensor Codes



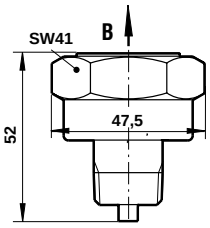
XX / YY
10/13
10/14
10/23
10/24



XX / YY
19/13
19/14
19/23
19/24



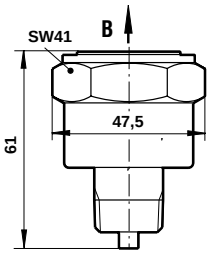
XX / YY		
18/13	17/13	
18/14	17/14	
18/23	17/23	
18/24	17/24	



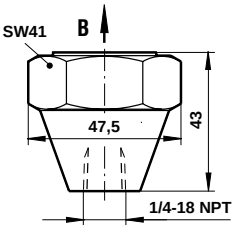
XX / YY		
16/13	15/13	14/13
16/14	15/14	14/14
16/23	15/23	14/23
16/24	15/24	14/24

Pressure Sensor

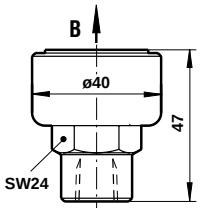
Combination of Pressure- and Sensor Codes



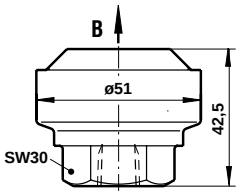
XX / YY				
13/13	11/13	04/13	02/13	01/13
13/14	11/14	04/14	02/14	01/14
13/23	11/23	04/23	02/23	01/23
13/24	11/24	04/24	02/24	01/24



XX / YY	
18/03	17/03



XX / YY		
16/03	15/03	14/03



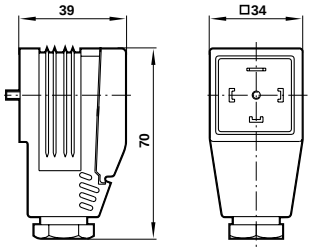
XX / YY	
13/03	11/03

Accessories

Connectors (black) with light indicator

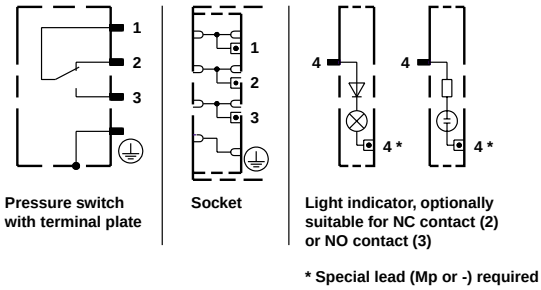
3-pin + protective conductor.
Connection acc. to DIN 43650 A.
Optionally available for DC or AC.

-with LED	12 to	28 V,	Cat. No. **0585418**
-with glow lamp	90 to	130 V,	Cat. No. **0585419**
-with glow lamp	180 to	240 V,	Cat. No. **0585420**



Pressure switch with pilot lamp

The pilot lamp shows the switching position of the connected pressure switch.



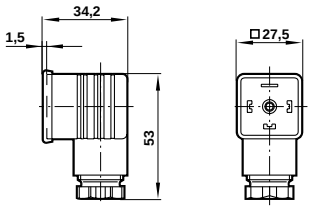
Pressure switch with terminal plate | **Socket** | **Light indicator, optionally suitable for NC contact (2) or NO contact (3)**

*** Special lead (Mp or -) required**

3-pin connector with protective conductor

acc. to DIN 43650

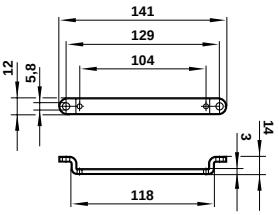
Cat. No. **0570110**



Brackets

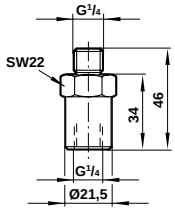
Stainless Steel
1.4301 (AISI 304)
Cat. No. **0553908**

Steel
Cat. No. **0574772**

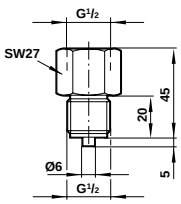


Damping chambers

Stainless Steel
1.4301 (AISI 304)
Cat. No. **0553258**



Brass/Steel
Cat. No. **0574773**



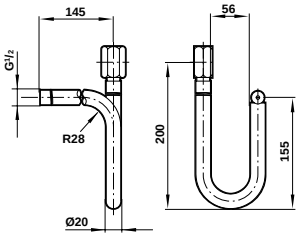
Stainless Steel
1.4301 (AISI 304)
Cat. No. **0551894**

Accessories

Water trap pipes acc. to DIN 16282

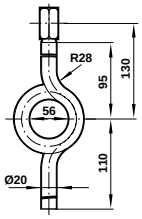
G 1/2 U-Style
Stainless Steel 1.4571 (AISI 316Ti) Cat. No. **0664828**

Steel Cat. No. **0681711**



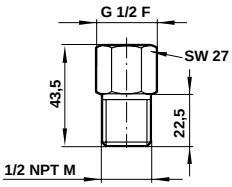
G 1/2 Circular
Stainless Steel 1.4571 (AISI 316Ti) Cat. No. **0681712**

Steel Cat. No. **0681713**

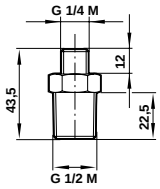


Reducing nipple for pressure connection

G 1/2 female - 1/2 NPT male
Stainless Steel
1.4305 (AISI 303/304 S)
Cat. No. **0553831**

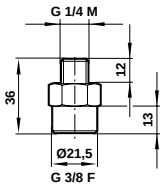


G 1/4 male - G 1/2 male
Stainless Steel
1.4305 (AISI 303/304 S)
Cat. No. **0550083**



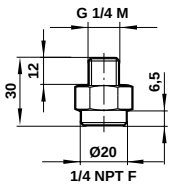
G 1/4 male - G 3/8 female
Steel

Cat. No. **0574764**

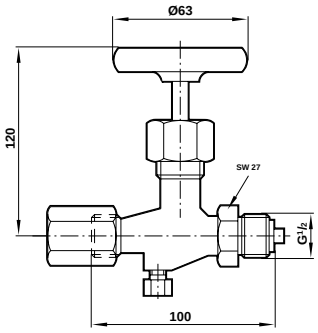


G 1/4 male - 1/4 NPT female
Brass

Cat. No. **0574765**



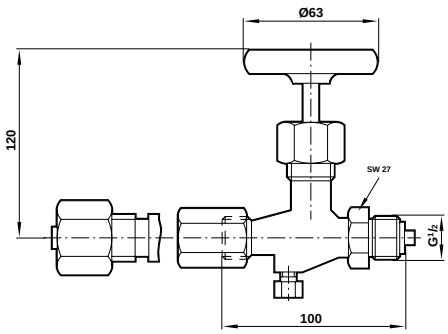
Shut down valve acc. to DIN 16270



Brass
Cat. No. **0681714**

Stainless Steel
1.4305 (AISI 303/304 S)
Cat. No. **0681715**

Shut down valve acc. to DIN 16271 with test plug



Brass
Cat. No. **0681716**

Stainless Steel
1.4305 (AISI 303/304 S)
Cat. No. **0681717**

Breaking capacity / Change-over switch with gold plated contacts

Load level	Current	Load	U_{min} [V]	Maximum permissable continous current I_{max} [A] at U [V]					Service life [4]	
				30	48	60	125	250	Electrical at I_{max}	Mechanical at I ≈ 0
Normal [1] (e.g. contractors, solenoids)	AC	Resistive	12	5	5	5	5	5	5×10^4	$\geq 10^7$
	AC	Inductive, cos φ ≈ 0.7	12	3	3	3	3	3		
	DC	Resistive	12	5	1,2	0,8	0,4	-		
	DC	Inductive, L/R ≈ 10 ms	12	3	0,5	0,35	0,05	-		
Low [2] (e.g. electronic circuits)	AC	Resistive	5 [3]	0,34	0,2	0,17	0,08	0,04	2×10^5	$\geq 10^7$
	DC	Inductive, L/R ≈ 10 ms	5 [3]	0,1	0,01	-	-	-		

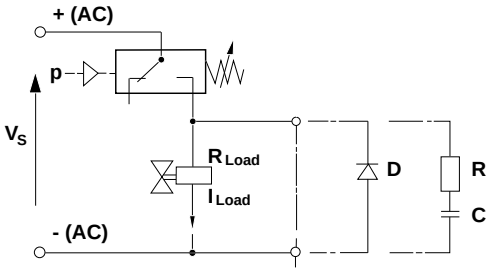
Number of switchings: 30/min.
Temperature: +30 °C
Spark quenching with diode at I/DC and inductive load:
$I_{max} = 1.5 \times I_{max}$ of table
$I_{max} = 1$ (mA)
Creeping and air distances correspond to Insulation Group B of VDE Regulation 0110 (except contact clearance of mocro-switch).

1) Gold coating not required (would be destroyed). Maximum permissable starting current (approx. 30ms) I/AC ON = 15A.
2) Gold coating required (will remain intact)
3) Lower critical voltage ensuring a sufficient contact reliability. Smaller voltages are permissable under favourable conditions (contact coating free of foreign substances)
4) Reduction of the respective current I by 50% approximately doubles service life of contacts.

Spark quenching with DC voltage (proposal)

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: $U_D \geq 1.4 \times U_V$
   Selection of a quick switching diode (recovery time trr < [200] ms).
   Rated current at diode: $I_R \geq I_{Load}$

2. RC link in parallel to load in parallel to switching contact.
   Suited for DC abd AC voltage.



Ratings:
R in Ω ≈ 0.2 x R_{Load} in Ω
C in µF ≈ I_{Load} in A