Mechanical Pressure Switches
Catalogue
Mechanical Pressure Switches







Overview

Control
Control
every move

Barksdale
CONTROL PRODUCTS
CRANE Barksdale, Inc./Barksdale GmbH
A Subsidiary of Crane Co.

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Introduction

Applications

Mechanical pressure switches, also known as hydro-electric pressure monitors, are used to connect or disconnect electric circuits. A pressure switch can serve as a control unit and as an optical or acoustic monitor or indicator. Barksdale pressure switches are chiefly used in hydraulic systems for monitoring minimum pressures, such as protecting pumps from dry operation or as protection for oil lubrication systems. They can also be used for monitoring maximum pressures, such as automatic switch-off or warning device before a pressure relief valve reaches its limit pressure (fig. 1).

Another application for Barksdale pressure switches is the control of storage loading processes. After the storage capacity is reached (Pmax) the flow is stopped and the pump shuts down. When the storage pressure drops below a defined minimum value (Pmin), the pump is automatically started again. The switch hysteresis (Pmax - Pmin) can be freely selected with two pressure switches and one solenoid valve (fig. 2).

Within certain pressure ranges the storage process can be controlled with only one pressure switch, the KD1 compact pressure switch which Barksdale specifically designed for this application. The pressure set points Pmax and Pmin are factory set according to your requirements.

Life Span and Accuracy

The life span and accuracy of pressure switches depend on the frequency and peaks of pressure changes, the number of load cycles and temperature influences. For proportional operation pressure switches the highest accuracy is achieved above 70 %, the longest life span below 30 % of the performance range (fig. 3). The best combination of life span and accuracy is, however, between 30% and 70% of the performance range.

Contact Materials

Barksdale pressure switches have silver contact micro switches. On request we also supply micro switches with gold-plated contacts. Gold-plated are almost exclusively used on micro switches that are only exposed to low electrical loads.

Fig. 4 depicts the standard values for the use of silver or gold-plated contacts. We are happy to assist you in the selection of the material best suited for your application.

Summary:

The product of current and voltage should not exceed 0.12 VA. Recommended values: current should range at < 400 mA and voltage at < 30 V. If operated on alternating current the above values are peak values.

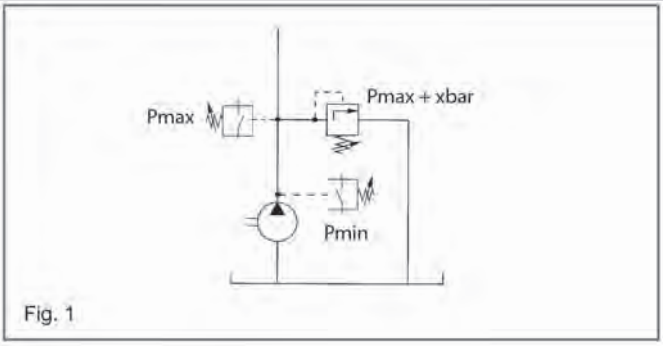


Fig. 1

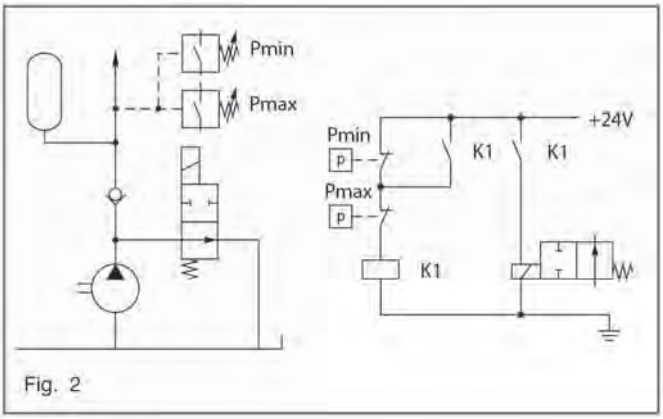


Fig. 2

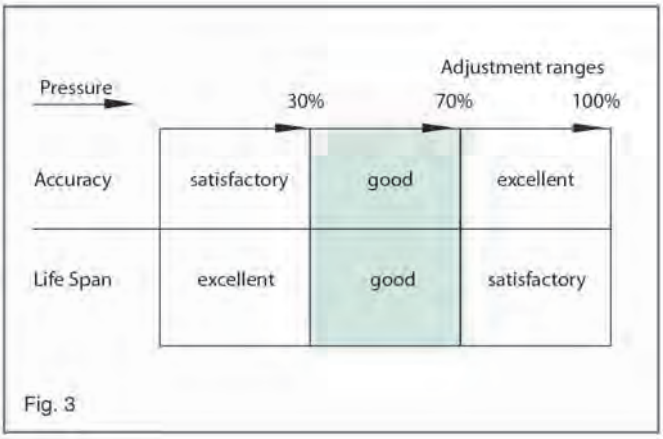


Fig. 3

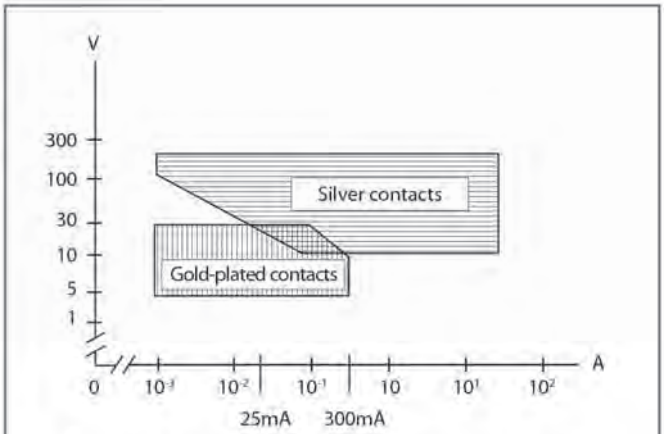


Fig. 4: Range of application of the various contact materials

Introduction

Contact Protection

The micro switches (MS) used in the pressure switches are normally suitable for both direct and alternating current operation. Inductive, capacitive and lamp loads may, however, considerably reduce the life span of a micro switch and, under extreme circumstances, even damage the contacts.

Contact Protection

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Capacitive Loads and Lamp Loads

Capacitive and lamp loads may be accompanied by very high discharge rates or start-up current rushes 15 times higher than the rated value. Under such circumstances, current limiters (for instance a protective resistance) should be used (fig. 5 and 6).

Inductive Loads

High inductive peak loads during disconnection may considerably reduce the life span of a micro switch. The electric circuit can be protected by following the wiring diagram in figure 7 and 8. The ratings of the individual elements (diode, varistor etc.) are determined by the corresponding application.

Pulsation and Vibrations within the System?

How to remedy the problem:

Pulsation and vibrations within the system can affect the function of the pressure switch. There are two different types of pressure switches: one type is sufficiently protected against pulsation and vibrations occurring during operation due to its solid design, the others are designed for precision adjustment which, consequently, makes them more sensitive to such influences. Please refer to the summary for compact pressure switch values regarding vibration resistance. To ensure proper functioning of the pressure switch, please observe the following recommendations:

Mechanical Vibrations

Use rubber buffers between units and wall for wall mounted units.

Pulsation/Vibration of the Medium

Use flexible hoses instead of pipes.

If this is technically not possible, place "pulsation restrictors" in front of the pressure switch, for example:

- ► helical pipes
- ► commercial pulsation snubbers
- ► diaphragm accumulators

As air pockets can enhance pulsation, please ensure that the hydraulic system is properly vented.

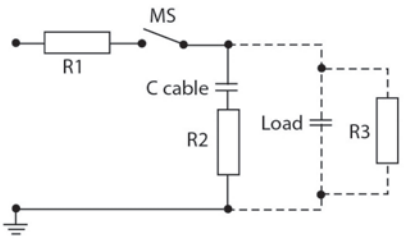


Fig. 5: Protection in case of capacitive loads
R1 - Protection against start-up current rushes
R2, R3 - Protection against high discharge currents

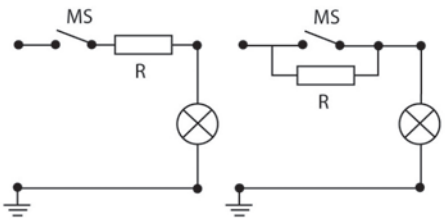


Fig. 6: Lamp load provided with resistance in parallel or series connection to switch

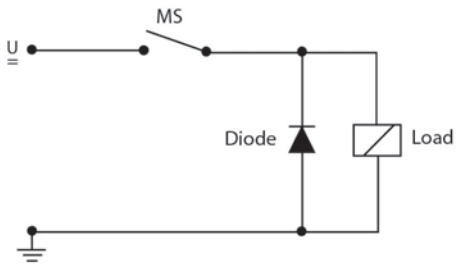


Fig. 7: Protection in case of continuous current and inductive load by recovery diode

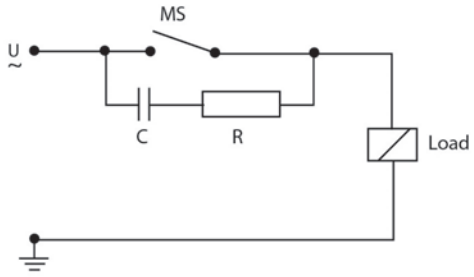


Fig. 8: Protection in case of alternating current and inductive load by RC-link

Metal Diaphragm

Metal diaphragm pressure switches with direct-acting pressure sensor and the snap-acting micro switch provide very high accuracy and long life span.

Applications

Machine and tool engineering,
Autoclave,
Pump control,
Refrigerant monitoring,
Petrochemical industry,
Process technology,
Filter monitoring,
Hydraulic power units

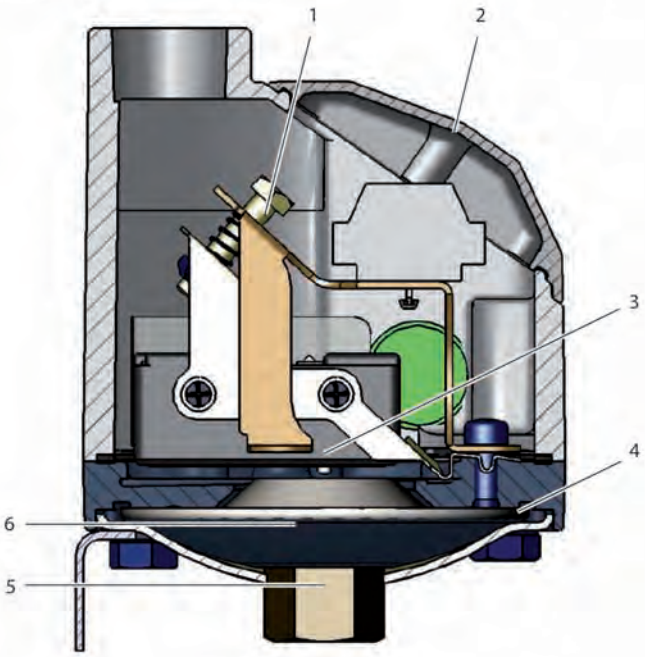
Adjustment ranges

-1 ... 10.3 bar

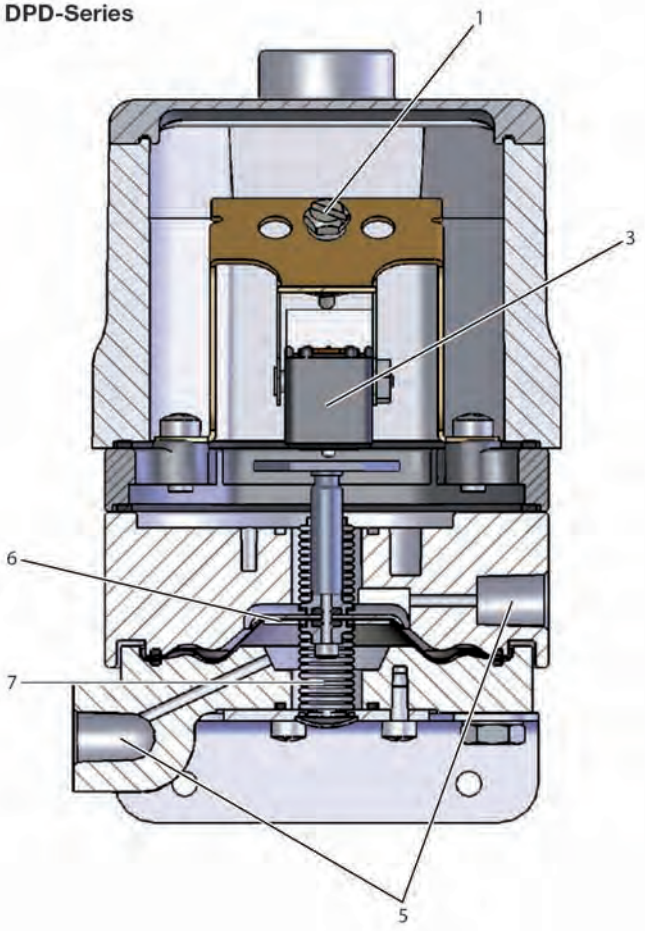
Summary of main components

Item 1	Fine-pitch screw allows precise set point adjustment
Item 2	Various housing types allow many applications in normal and hazardous installations; also Exi, Exd and UL
Item 3	Large variety of micro switches with different accuracy and switching voltages
Item 4	Wetted parts:DT: 1.4504/1.4564/14568*DPDT: Aluminium/1.4504/1.4564/1.4568* * = (17.7-PH)
Item 5	Pressure connections with NPT thread
Item 6	Stainless steel diaphragm
Item 7	Differential pressure switches:two bellows for sealing without friction

D-Series



DPD-Series



Bourdon Tube

Bourdon tube pressure switches with direct-acting pressure sensor and the snap-acting micro switch provide very high accuracy and long life span.

Applications

Pump control,
Die-casting machines,
Press control,
Power plants,
Petrochemical industry,
Process technology

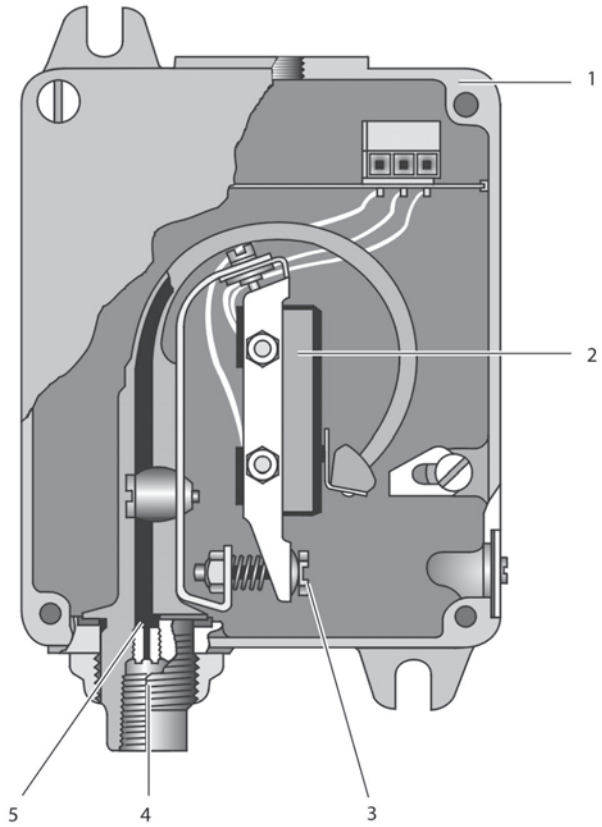
Adjustment ranges

4.8 ... 950 bar

Summary of main components

Item 1	Various housing types allow many applications in normal and hazardous installations; also Exi, Exd and UL
Item 2:	Large variety of micro switches with different accuracy and switching voltages
Item 3:	Fine-pitch screw allows precise set point adjustment
Item 4:	Pressure connections with NPT thread,
Item 5:	Wetted parts made of stainless steel

B-Series



Approvals

For approvals and options please refer to the summary below.

Compact

Pressure switches with a diaphragm or piston-type spring-loaded pressure element and snap-acting micro switch are characterized by their compact design.

Applications

OEM applications,
Mobile and industrial hydraulic and pneumatic systems,
Test bed and apparatus engineering, Heavy industry

Adjustment ranges

Series 8000: 0.6...600 bar
Series 9000: 10...400 bar

Summary of main components

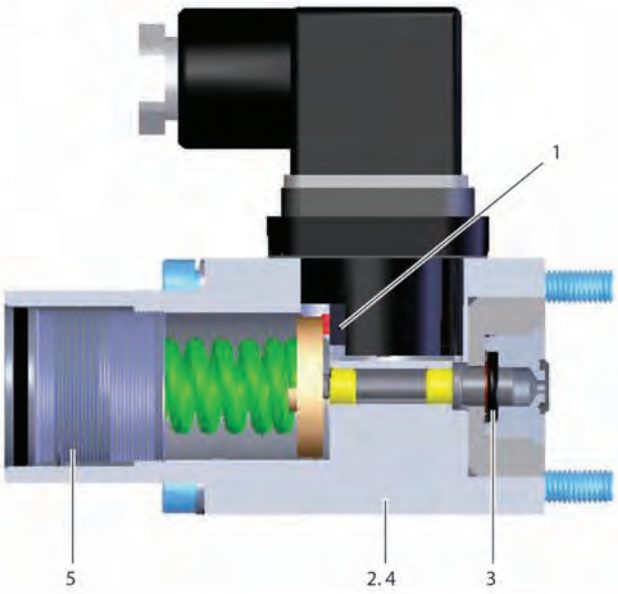
► Option: factory set individual set points

Item 1:	High-accuracy micro switch. Silver or gold-plated contacts dependent on the application-specific requirements. Approvals: Exi
Item 2:	Housing parts made of stainless steel and aluminium.
Item 3:	Elastomer diaphragm or low-friction piston seal
Item 4	Same housing design for diaphragm and piston types allow many applications.
Item 5	Various pressure ranges allow precise setting between 0.6 and 600 bar or 10...400 bar respectively. Adjustment of set points though hexagon socket (5mm) Option: tactory set individual set points

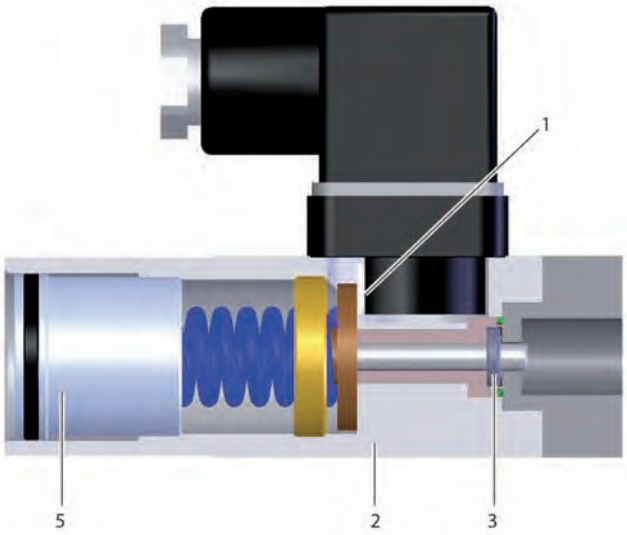
Approvals

For approvals and options please refer to the summary below.

Series 8000



Serie 9000



Compact

Pressure switches with a diaphragm or piston-type spring-loaded pressure element and snap-acting micro switch are characterized by their compact design.

Applications

Mobile hydraulics,
Motor control,
Hydraulic clamping,
Building and agricultural machines,
Brake system control,
Hydraulic accumulator control

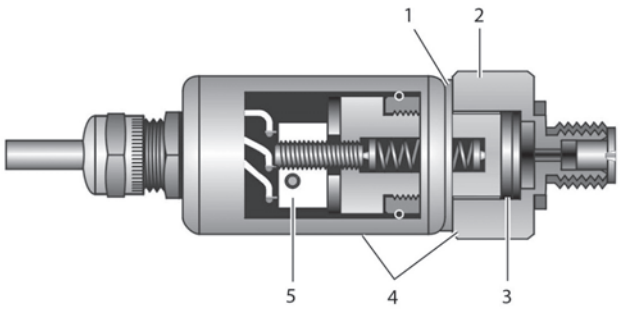
Adjustment ranges

KLM: 1 ... 40 bar
KLK: 30 ... 400 bar
KD1: 30 ... 300 bar

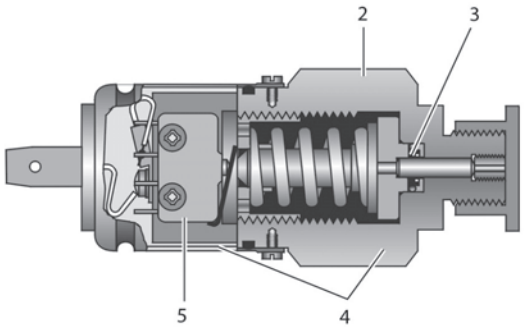
Summary of main components

Item 1:	KD1 and KL series only available with factory setting, unauthorized adjustment excluded Silver and gold-plated contacts for KD1 series. Approvals KLM/KLK: Exi
Item 2:	Same housing design for diaphragm and piston types allow many applications.
Item 3:	Elastomer diaphragm or low-friction piston seal
Item 4:	Housing parts made of stainless steel and aluminium or of stainless steel and brass or stainless steel.
Item 5:	KLM/KLK: High-accuracy micro switch. Silver or gold-plated contacts dependent on the application-specific requirements. KD1: Adjustable hysteresis

KLM/KLK



KD1



Approvals

For approvals and options please refer to the summary below.

Diaphragm Seal Piston

Due to their design diaphragm seal piston pressure switches provide high accuracy, long life span and high proof pressure.

Applications

Hydraulic/pneumatic systems,
Shipbuilding applications,
Machine and tool engineering,
Dosing machines, plant engineering,
Sprinkler control

Adjustment ranges

-1 ... 42 bar

Summary of main components

Item 1:	Large variety of micro switches with different accuracy and switching voltages.
Item 2:	Wetted parts: Diaphragm: NBR, FKM or PTFE (E-Series + EPDM, CR) Fitting: aluminium, polysulfone, (stainless steel), or nickel-plated aluminium
Item 3:	Pressure connections with NPT or G threads
Item 4:	Fine-pitch screw allows precise set point adjustment Several pressure ranges allow following set points: E series: - 0.9 ... 34 bar P series: 0.1 ... 107 bar MSPS series: 0.1 ... 6.8 bar
Item 5:	For many applications in normal and hazardous installations; also Exi and explosion proof housing acc. to CSA and UL.
Item 6:	Visual indication of set point for E1S and E1H

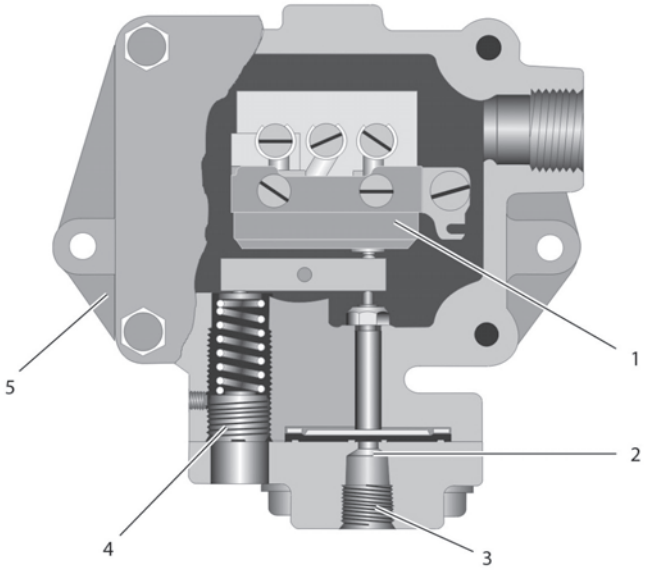
Special Functions

Type E1H can be equipped with manual reset for alarm functions with G-Micro switch option.
Type E1S and E1H are available with R-Micro switch for adjustable hysteresis (adjustable deadband).

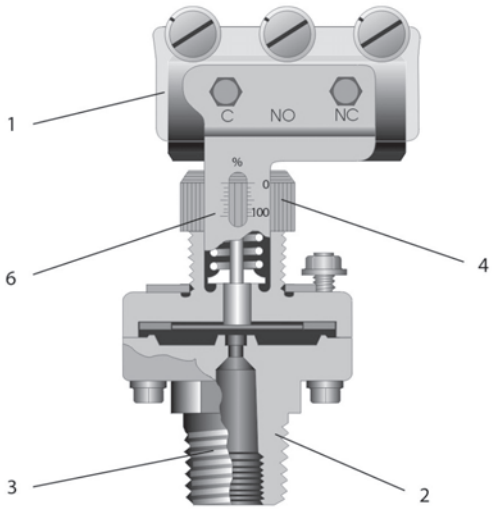
Approvals

For approvals and options please refer to the summary below.

P-Series



E-Series



Overview







Model	D1S, D2S	D1T, D2T	D1X / D2X
Measuring element	Stainless steel diaphragm	Stainless steel diaphragm	Stainless steel diaphragm
Features	Adjustable switch contacts for vacuum and overpressure	Adjustable switch contacts for vacuum and overpressure	Adjustable switch contacts for vacuum and overpressure
Applications	Machine-tool industry, autoclave, pump control, refrigerant monitoring	Machine-tool industry, autoclave, pump control, refrigerant monitoring	Petrochemicals industry, process technology
Adjustment ranges	-0.006 ... -1 bar up to 0.005 ... 10.3 bar	-0.006 ... -1 bar up to 0.005 ... 10.3 bar	-0.006 ... -1 bar up to 0.012 ... 10.3 bar
Number of contacts	1 or 2	1 or 2	1 or 2
Max. switch frequency/min	20	20	20
Accuracy	±1 %	±1 %	±1 %
Temperature range	-40 °C... +75 °C	-40 °C... +75 °C	-40 °C... +75 °C
Vibration tolerance	satisfactory	satisfactory	satisfactory
Process connection (without adaptor)	1/4“ NPT female, 1/2“ NPT female, stainless steel	1/4“ NPT female, 1/2“ NPT female, stainless steel	1/4“ NPT female, 1/2“ NPT female, stainless steel
Electrical connection:	lead wires, PVC 1.5 mm2	Cable gland	Terminal strip
Max. electrical rating	up to 480 V AC / 250 V DC	up to 480 V AC / 250 V DC	acc. to ATEX
Options	Gold-plated contacts, hermetically sealed contacts	Gold-plated contacts, hermetically sealed contacts	Gold-plated contacts, hermetically sealed contacts
Housing	without	aluminium	Aluminium, pressure proof
Protection class	IP00	IP65	IP65
Approvals	Exi	Exi	Exi and Exd, UL

Overview

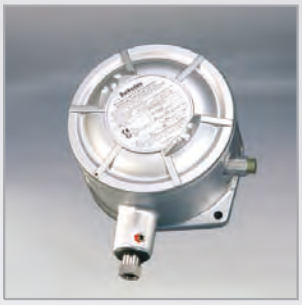






Model	DPD1T / DPD2T	B1S, B2S	B1T, B2T
Measuring element	Stainless steel diaphragm	Bourdon tube	Bourdon tube
Features	Adjustable switch contacts for vacuum and overpressure	Adjustable switch contacts, for high pressure	Adjustable switch contacts, for high pressure
Applications	Filter monitoring, hydraulic power units	Pump control, die-casting machines, press control, power plants	Pump control, die-casting machines, press control, power plants
Adjustment ranges	0.02 ... 10.2 bar	4.8 ... 950 bar	4.8 ... 950 bar
Number of contacts	1 or 2	1 or 2	1 or 2
Max. switch frequency/min	20	20	20
Accuracy	±1 %	±1%	±1%
Temperature range	-40 °C... +75 °C	-40 °C... +75 °C	-40 °C... +75 °C
Vibration tolerance	satisfactory	satisfactory	satisfactory
Process connection (without adaptor)	1/8“ NPT female, stainless steel	1/4“ NPT female, high pressure G 1/4 female, stainless steel	1/4“ NPT female, high pressure G 1/4 female, stainless steel
Electrical connection:	Cable gland, plug DIN EN 175 301-803-A (prev. DIN 43650) Form A	lead wires, PVC 1.5 mm^2	cable gland, plug DIN EN 175 301-803-A (prev. DIN 43650)
Max. electrical rating	up to 480 V AC / 250 V DC	up to 480 V AC / 250 V DC	up to 480 V AC / 250 V DC
Options	Gold-plated contacts, hermetically sealed contacts	Gold-plated contacts, hermetically sealed contacts	Gold-plated contacts, hermetically sealed contacts
Housing	Aluminium	without	aluminium
Protection class	IP65	IP00	IP65
Approvals	Exi	Exi	Exi

Overview





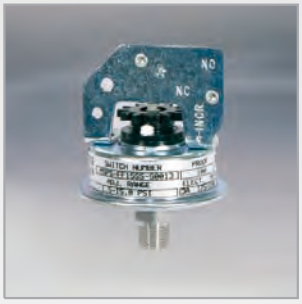


Model	B1X / B2X	E1S	E1H
Measuring element	Bourdon tube	Plastic diaphragm / piston	Elastomer diaphragm / piston
Features	Adjustable switch contacts, for high pressure	Adjustable switch contacts, for vacuum and overpressure	Adjustable switch contacts, for vacuum and overpressure
Applications	Petrochemicals industry, process technology	Machine-tool industry, dosing machines, plant engineering, lubricant monitoring	Machine-tool industry, dosing machines, plant engineering, sprinkler control
Adjustment ranges	5.3 ... 496 bar	-0.28 ... -0.9 bar up to 0.1 ... 34bar	-0.28 ... -0.9 bar up to 0.1 ... 34 bar
Number of contacts	1 or 2	1	1
Max. switch frequency/min	20	30	30
Accuracy	±1%	±2%	±2%
Temperature range	-40 °C... +75 °C	-30 °C... +70 °C	-30 °C... +70 °C
Vibration tolerance	good	good	good
Process connection (without adaptor)	1/4“ NPT female, high pressure G 1/4 female, stainless steel	1/4“ NPT female, 1/8“ NPT female, 1/2“ NPT male, G 1/4 female, aluminium / polysulfone / stainless steel	1/4“ NPT female, 1/8“ NPT female, 1/2“ NPT male, G 1/4 female, Aluminium / polysulfone / stainless steel
Electrical connection	Terminal strip	Screw terminals	Plug DIN EN 175 301-803-A (prev. DIN 43650) Form A
Max. electrical rating	acc. to ATEX	up to 480 V AC / 250 V DC	up to 480 V AC / 250 V DC
Options	Gold-plated contacts, hermetically sealed contacts	Gold-plated contacts, adjustable hysteresis	Gold-plated contacts, manual reset, adjustable deadband
Housing	Aluminium, pressure proof	without	Aluminium, cap polycarbonate or stainless steel
Protection class	IP65	IP00	IP65
Approvals	Exi and Exd, UL	Exi	Exi

Overview







Model	P1H	P1X	MSPS
Measuring element	Elastomer diaphragm / piston	Elastomer diaphragm / piston	Elastomer diaphragm / piston
Features	Adjustable switch contacts, rugged housing	Adjustable switch contacts	Compact construction, adjustable switch contacts, via adjustment screw
Applications	Hydraulic / pneumatic power units, shipbuilding applications	Hydraulic / pneumatic power units, shipbuilding applications	Air conditioning ventilation control steam ejectors
Adjustment ranges	0.1 ... 107 bar	0.1 ... 107 bar	0.1...6.8 bar
Number of contacts	1	1	1
Max. switch frequency/min	30	30	30
Accuracy	±2%	±2%	±2%
Temperature range	-30 °C... +70 °C	-30 °C... +70 °C	-5 °C... +70 °C
Vibration tolerance	good	good	good
Process connection (without adaptor)	1/4“ NPT female, 1/2“ NPT female, aluminium or stainless steel	1/4“ NPT female, 1/2“ NPT female, aluminium or stainless steel	1/8“ NPT male, stainless steel
Electrical connection	Cable gland, plug DIN EN 175 301-803-A (prev. DIN 43650) Form A	Cable gland	Spade connectors
Max. electrical rating	up to 480 V AC / 250 V DC	up to 250 V AC / 250 V DC	up to 250 V AC / 125 V DC
Options	Gold-plated contacts, hermetically sealed contacts	Gold-plated contacts, hermetically sealed contacts	---
Housing	Aluminium	Aluminium	without
Protection class	IP65	IP65	IP00
Approvals	Exi, Nace	Exi and Exd, CSA, UL, Nace	Exi

Overview





Model	9671X / 9681X	9692X
Measuring element	Elastomer diaphragm / piston	Elastomer diaphragm / piston
Features	Compact construction, adjustable switch contacts, via adjustment wheel, Ex vers. acc. to ATEX	Compact construction, adjustable switch contacts, via adjustment wheel, Ex vers. acc. to ATEX
Applications	Process industry, petrochemical plants, machine tool industry, compressors	Process industry, petrochemical plants, machine tool industry, compressors
Adjustment ranges	-0.17 ... -1 bar up to 0.33 ... 34.4 bar	10.3 ... 689,7 bar
Number of contacts	1 switch contact	1 switch contact
Max. switch frequency/min	30	30
Accuracy	±2%	±2%
Temperature range	-30 °C... +70 °C	-30 °C... +70 °C
Vibration tolerance	good	good
Process connection (without adaptor)	1/4“ NPT female	1/4“ NPT female
Electrical connection	Leads 450 mm PVC, conduit connection 1/2“ NPT male	Leads 450 mm PVC, conduit connection 1/2“ NPT male
Max. electrical rating	up to 250 V AC / 125 V DC acc. to ATEX	up to 250 V AC / 125 V DC acc. to ATEX
Options	1 switching contact with DPDT function, gold-plated contacts	gold-plated contacts
Housing	Stainless steel, explosion proof enclosure	Stainless steel, explosion proof enclosure
Protection class	IP65	IP65
Approvals	Exi and Exd, UL, CSA, ATEX	Exi and Exd, UL, CSA, ATEX

Overview





Model	Series 8000	Series 8000	Series 9000
Measuring element	Elastomer diaphragm	Steel piston	Steel piston
Features	Compact construction, Adjustable switch contact	Compact construction, Adjustable switch contact	Compact construction, Adjustable switch contact
Applications	OEM applications, mobile- and industrial-hydraulics and pneumatics, test bed and apparatus engineering, heavy industry	OEM applications, mobile- and industrial-hydraulics and pneumatics, test bed and apparatus engineering, heavy industry	OEM applications, mobile- and industrial-hydraulics and pneumatics, test bed and apparatus engineering, heavy industry
Adjustment ranges	0.6 ... 45 bar	5.0 ... 600 bar	10 ... 400 bar
Number of contacts	1	1	1
Max. switch frequency/min	30	60	60
Accuracy	±2%	±1%	±2%
Temperature range	-20 °C... +80 °C	-40 °C... +80 °C	-20 °C... +80 °C
Vibration tolerance	good	good	good
Process connection (without adaptor)	CETOP 40 x 40 mm	CETOP 40 x 40 mm	
Electrical connection	Plug DIN EN 175 301-803-A (prev. DIN 43650)	Plug DIN EN 175 301-803-A (prev. DIN 43650)	Plug DIN EN 175 301-803-A (prev. DIN 43650)
Max. electrical rating	up to 250 V AC / 250 V DC	up to 250 V AC / 250 V DC	up to 250 V AC / 24 V DC
Options	Gold-plated contacts, various process and electrical connections	Gold-plated contacts, various process and electrical connections	---
Housing	Aluminium or stainless steel	Aluminium or stainless steel	Aluminium
Protection class	IP65	IP65	IP65
Approvals	GL, Exi, cULus	GL, Exi, cULus	GL

Overview





Model	KLK	KLM	KD1
Measuring element	Steel piston	Elastomer diaphragm	Steel piston
Features	Compact construction, adjustable factory set switch contacts	Compact construction, factory set switch contacts	Compact construction, adjustable factory set switch contacts
Applications	Mobile hydraulics, Motor control, hydraulic clamping	Mobile hydraulics, motor control, hydraulic clamping	Building and agricultural machines, brake system control, hydraulic accumulator control
Adjustment ranges	30 ... to 400 bar	1... to 40 bar	30... to 300 bar
Number of contacts	1	1	1
Max. switch frequency/min	60	30	60
Accuracy	±1 %	±2%	±1 %
Temperature range	-40 °C... +80 °C	-20 °C... +80 °C	-40 °C... +80 °C
Vibration tolerance	excellent	excellent	excellent
Process connection (without adaptor)	M12 x 1.5 male G 1/4 male, brass	M12 x 1.5 male G 1/4 male, stainless steel	M12 x 1.5 male, brass
Electrical connection	Cable gland with cable, plug DIN EN 175 301-803-A (prev. DIN 43650) Form C	Cable gland with cable, plug DIN EN 175 301-803-A (prev. DIN 43650) Form C	Spade connector, cable gland with cable
Max. electrical rating	up to 60 V AC / 60 V DC	up to 60 V AC / 60 V DC	up to 60 V AC / 60 V DC
Options	Gold-plated contacts	Gold-plated contacts, high pressure version, up to 150 bar	Gold-plated contacts, large hysteresis
Housing	Stainless steel and brass	Stainless steel	Stainless steel and brass
Protection class	Plug IP65, cable IP67	Plug IP65, cable IP67	Plug IP65, cable IP67
Approvals	Exi	Exi	Exi

Metal Diaphragm Pressure Switches D1S/D2S

Mechanical single/dual pressure switch
Repeatability ±1.0 % at constant temperature

Features

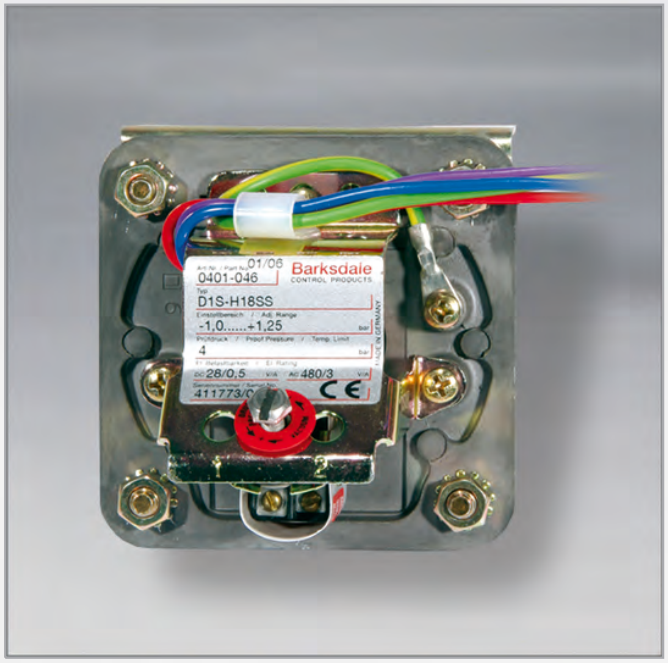
Metal diaphragm pressure switch
Wettet parts welded.
Direct action, no friction, high accuracy

Adjustment ranges

0.005 ... 10.3 bar and
-0.006 ... -1 bar (Vacuum)

Applications

Machine and tool engineering,
Autoclaves,
Pump control,
Refrigerant monitoring



Technical Data

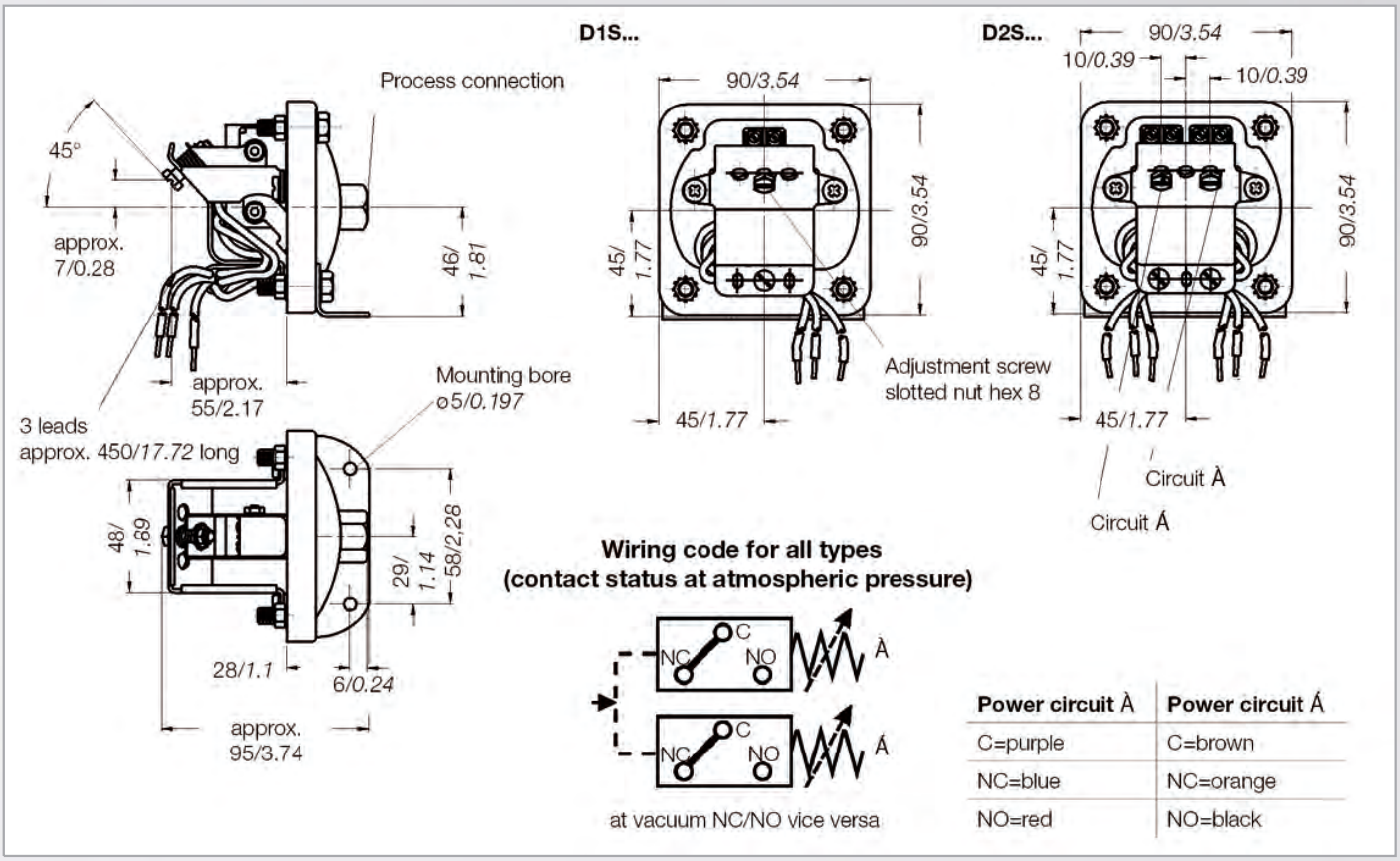
Wetted parts:	Stainless steel 17 - 7PH/SS304
Repeatability:	±1 % at constant temperature
Switching rate:	max. 20/min
Temperature range:	-40 °C... +75 °C
Protection class:	IP00
Housing:	Without housing for installation in control panels
Process connection:	1/4" NPT female thread Optional: 1/2" NPT female thread (P2)

Electrical connection:	Lead wire PVC 1.5 mm², length appr. 450 mm
Electrical ratings and hysteresis:	A large variety of micro switches offers different electrical ratings and hysteresis for many applications.
Weight:	D1S-...: approx. 0.6 kg D2S-...: approx. 0.7 kg
Set point adjustment:	Turn the adjustment screw clockwise to decrease the set point
Approval:	---

Pressure Ranges

Pressure range code	Adjustment range [bar]		Max. operating pressure [bar]	Proof pressure [bar]	Max. hysteresis of switch types in bar (end of range)	
	Increasing press.	Decreasing press.		(short term)	H, GH [bar]	M, GM [bar]
Overpressure						
2SS	0.005 ... 0.11	0.001 ... 0.11	0.15	0.2	0.004	0.006
3SS	0.012 ... 0.20	0.002 ... 0.196	0.5	0.7	0.004	0.010
18SS	0.050 ... 1.20	0.030 ... 1.20	3.0	4.0	0.010	0.040
80SS	0.300 ... 5.50	0.030 ... 5.30	8.0	10.7	0.110	0.240
150SS	0.500 ... 10.30	0.100 ... 9.90	15.0	20.0	0.180	0.420
Vacuum						
3SS	-0.006 ... -0.20	-0.002 ... -0.196	0.15	0.2	0.004	0.009
18SS	-0.040 ... -1.00	-0.020 ... -0.970	0.5	1.00	0.020	0.060

Dimensions (mm / *inch*)



Power circuit À	Power circuit Á
C=purple	C=brown
NC=blue	NC=orange
NO=red	NO=black

Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. load A	Res. load A	Volt DC	Ind. load A	Res. load A	Comments
H	Micro switch with silver contacts	125 250 480*	10 10 3	10 10 3	6 to 24	0.50	0.5	Small hysteresis; High AC-/ low DC-load
M	Micro switch with silver contacts	125 250 480*	10 10 3	10 10 3	12 24 250	5.00 1.00 0.25	15.0 2.0 0.4	Medium hysteresis; High AC- and DC-loads
GH	Micro switch with gold contacts for low voltage and low current	125	1	1	24	1.00	1.00	Small hysteresis
GM		30	0.1	0.1	30	0.10	0.1	Medium hysteresis

Options

P2 = 1/2" NPT F SS Process connection

Order Code

Example for order number

Type			Micro switch	Pressure range code		Options
D1S	or	D2S	- H	3SS	-	P2

Your order number

Type			Micro switch	Pressure range code		Options
	or		-		-	

Metal Diaphragm Pressure Switches D1T/D2T

Mechanical single/dual pressure switch
Repeatability ±1.0 % at constant temperature



Features

- Metal diaphragm pressure switch
- Wetted parts welded
- Direct acting, no friction, high accuracy
- Approvals: Ex ia, UL, CSA, marine, SIL2/3 (IEC 61508)

Adjustment ranges

0.005 ... 10.3 bar and
-0.006 ... -1 bar (Vaccum)

Applications

Machine and tool engineering,
Autoclaves, pump control,
Refrigerant monitoring, chemical industry
Ship building applications

Technical Data

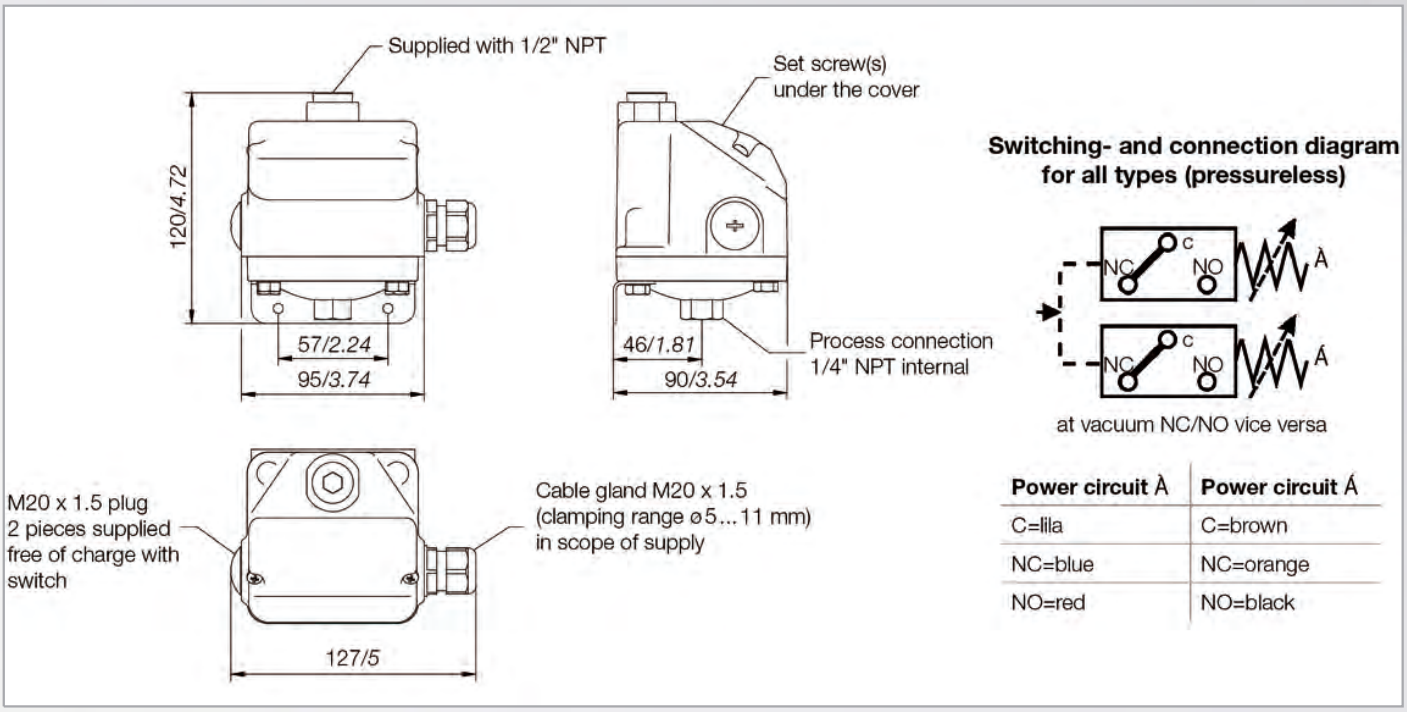
Wetted parts:	Stainless steel 17 - 7PH / SS304
Repeatability:	±1 % at constant temperature
Switching rate:	max. 20/min
Temperature range:	-40 °C... +75 °C
Protection class:	IP65
Housing:	Top part: aluminium powder coated bottom part: aluminium anodized
Process connection:	1/4" NPT female thread Optional: 1/2" NPT female thread (P2)
Electrical connection:	WAGO terminal and cable gland M20 x 1.5; clamping range ø 5 ... 11 mm

Electrical load capacity and hysteresis:	Many micro switch versions with different switching powers and hysteresis are available and make it possible to make customized changes.
Weight:	D1T-...: approx. 1.0 kg D2T-...: approx. 1.1 kg
Set point adjustment:	Turn the adjustment screw clockwise to decrease the set point
Intrinsically safe:	The switches are also available for intrinsically safe applications. Add "Exi" in case of ordering. Maximum rating according to ATEX: Umax = 28 V Imax = 50 mA
Approval:	---

Pressure Ranges

Pressure range code	Adjustment range [bar]		Max. operating pressure [bar]	Proof pressure [bar]	Max. hysteresis of switch types in bar (end of range)	
	Increasing press.	Decreasing press.		short term	H, GH [bar]	M, GM [bar]
Overpressure						
2SS	0.005 ... 0.11	0.001 ... 0.11	0.15	0.2	0.004	0.006
3SS	0.012 ... 0.20	0.002 ... 0.196	0.5	0.7	0.004	0.010
18SS	0.050 ... 1.20	0.030 ... 1.20	3.0	4.0	0.010	0.040
80SS	0.300 ... 5.50	0.030 ... 5.30	8.0	10.7	0.110	0.240
150SS	0.500 ... 10.30	0.100 ... 9.90	15.0	20.0	0.180	0.420
Vacuum						
3SS	-0.006 ... -0.20	-0.002 ... -0.196	0.15	0.2	0.004	0.009
18SS	-0.040 ... -1.00	-0.020 ... -0.970	0.5	1.0	0.020	0.060

Dimensions (mm / *inch*)



Power circuit À	Power circuit Á
C=lila	C=brown
NC=blue	NC=orange
NO=red	NO=black

Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. load A	Res. load A	Volt DC	Ind. load A	Res. load A	Comments
H	Micro switch with silver contacts	125 250	10 10	10 10	6 to 24	0.50	0.5	Small hysteresis; High AC-/ low DC-load
M	Micro switch with silver contacts	125 250	10 10	10 10	12 24 250	5.00 1.00 0.25	15.0 2.0 0.4	Medium hysteresis; High AC- and DC-loads
GH	Micro switch with gold-plated contacts for low voltage and/or low current	125	1	1	24	1.00	1.00	Small hysteresis
GM		30	0.1	0.1	30	0.10	0.1	Medium hysteresis

Options

	D1T-...		D2T-...
ST1	Plug, 3-pin + E, DIN EN 175 301-801-A (prev. DIN 43650)	ST3	Plug, 6-pin + E, DIN 43651
ST2	Amphenol plug 4-pin + E	EXI	for intrinsically safe application
EXI	for intrinsically safe application		

Order Code

Example for order number

Type			Micro switch	Pressure range code	Options	Approval
D1T	or	D2T	- H	3SS	- ST2	- EXI

Your order number

Type			Micro switch	Pressure range code	Options	Approval
	or		-		-	-

Metal Diaphragm Switches

D1X/D2X

Mechanical single/dual pressure switch
Repeatability ±1.0 % at constant temperature



Features

- Metal diaphragm pressure switch
- Wetted parts welded
- Direct action, no friction, high accuracy
- Approvals: Ex ia, Ex d, UL, SIL2/3 (IEC 61508)

Adjustment ranges

0.012 ... 10.3 bar and
-0.006 ... -1 bar (Vacuum)

Applications

Petrochemical industry,
Process technology

Technical Data

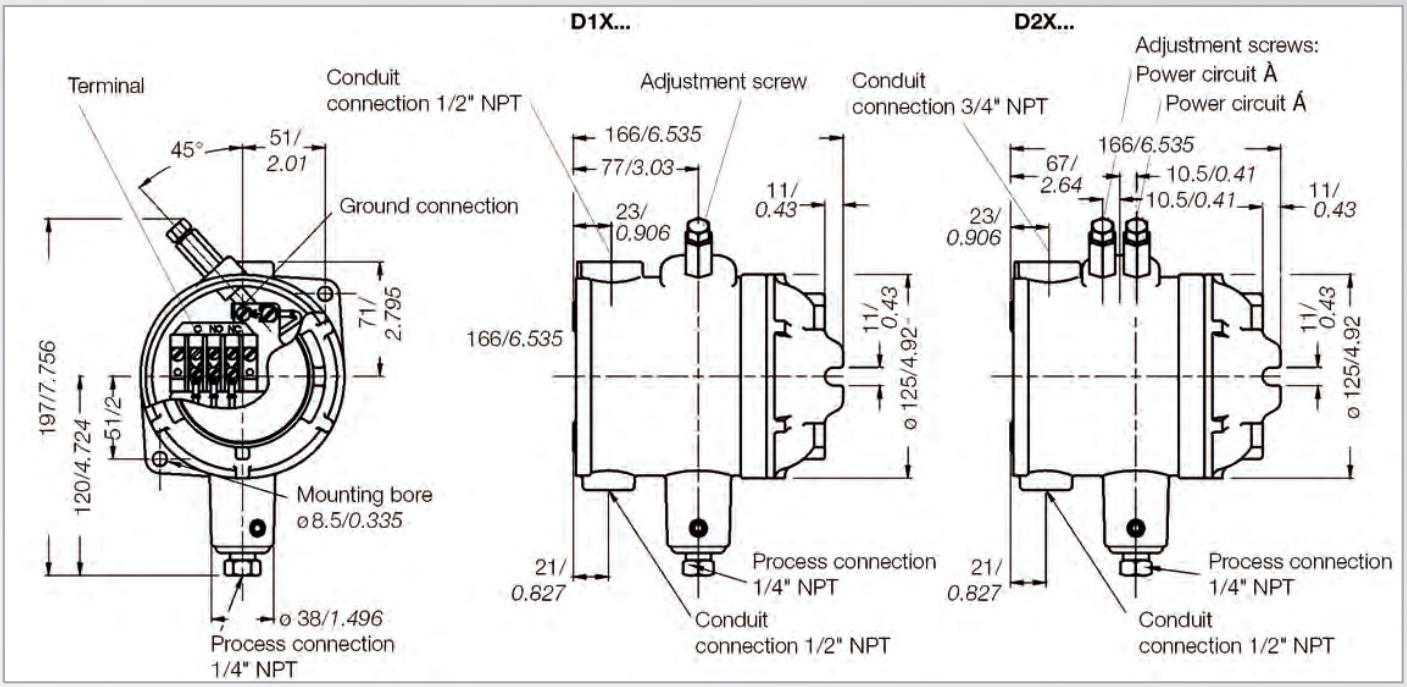
Wetted parts:	Stainless steel 17 - 7PH/SS304
Repeatability:	±1 % at constant temperature
Switching rate:	max. 20/min
Temperature range:	-40 °C... +75 °C
Protection class:	IP65
Housing:	Explosion proof housing, aluminum anodized and lacquered
Process connection:	1/4" NPT female thread Optional: 1/2" NPT female thread (P2)
Electrical connection:	Internal terminal strip (0.5 - 2.5 mm2), approved cable gland has to be provided by the customer
Electrical ratings and hysteresis:	A large variety of micro switches offers different electrical ratings and hysteresis for many applications.

Weight	D1X-...: approx. 2.7 kg D2X-...: approx. 2.8 kg
Set point adjustment:	Turn the adjustment screw clockwise to decrease the set point
Intrinsically safe:	The switches are designed for intrinsically safe applications. Please add "Exi" to your ordering details when placing an order. To comply with the intrinsically safe approval following max. ratings must not be exceeded: Umax = 28 V Imax = 50 mA
Approval:	Ex: Ex d II C T6 acc. to ATEX cULus: Class I, Groups B, C, D Class II, Groups E, F, G acc. to Underwriter Laboratories Inc. and Canadian Standard Assn.

Pressure Ranges

Pressure range code	Adjustment range [bar]		Max. operating pressure [bar]	Proof pressure [bar]	Max. hysteresis of switch types in bar (end of range)	
	Increasing press.	Decreasing press.		(short term)	H, GH [bar]	M, GM [bar]
Overpressure						
3SS	0.012 ... 0.2	0.002 ... 0.196	0.5	0.7	0.004	0.010
18SS	0.050 ... 1.2	0.030 ... 1.2	3.0	4.0	0.010	0.040
80SS	0.300 ... 5.5	0.030 ... 5.3	8.0	10.7	0.100	0.220
150SS	0.500 ... 10.3	0.100 ... 9.9	15.0	20.0	0.180	0.400
Vacuum						
3SS	-0.006 ... -0.2	-0.002 ... -0.196	0.15	0.2	0.004	0.009
18SS	-0.040 ... -1.0	-0.020 ... -0.970	0.5	1.0	0.020	0.060

Dimensions (mm / *inch*)



Approvals

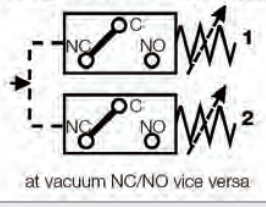
EX	Ex d approval
UL	cULus approval
EXI	Ex i approval

Options

P2 = 1/2" NPT F SS Process connection

Wiring Code 1

Wiring code for all types (contact status at atmospheric pressure)



Power circuit 1	Power circuit 2
C=purple	C=brown
NC=blue	NC=orange
NO=red	NO=black

Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. load A	Res. load A	Volt DC	Ind. load A	Res. load A	Comments
H	Micro switch with silver contacts	125 250 480*	10 10 3	10 10 3	6 to 24	0.50	0.5	Small hysteresis; High AC / low DC loads
M	Micro switch with silver contacts	125 250 480*	10 10 3	10 10 3	12 24 250	5.00 1.00 0.25	15.0 2.0 0.4	Medium hysteresis; High AC and DC loads
GH	Micro switch with gold-plated contacts for low voltage and/or low current	125	1	1	24	1.00	1.00	Small hysteresis
GM		30	0.1	0.1	30	0.10	0.1	Medium hysteresis

Order Code

Example for order number

Type				Micro switch	Pressure range		Options		Approval
D1X	or	D2X	-	H	3SS	-	P2	-	EX

Your order number

Type				Micro switch	Pressure range		Options		Approval
	or		-			-		-	

Metal Diaphragm Diff. Press. Switches DPD1T/DPD2T

Mechanical single/dual pressure switch
Repeatability ±1.0 % at constant temperature



Features

- Metal diaphragm pressure switches
- Wetted parts welded
- Direct action, no friction, high accuracy
- Approvals: Ex ia, marine, SIL2 (IEC 61508)

Adjustment ranges

0.02 ... 10.2 bar, differential pressure

Applications

Machine and tool engineering,
Autoclaves,
Pump control,
Refrigerant monitoring,
Ship building applications

Technical Data

Wetted parts:	Stainless steel 17 - 7PH Aluminium, nickel-plated O-rings: FKM
Repeatability:	±1 % at constant temperature
Switching rate:	max. 20/min
Temperature range:	-40 °C... +75 °C
Protection class:	IP65
Housing:	Top part: aluminium powder coated Bottom part: aluminium nickel-plated
Process connection:	1/8" NPT female thread
Electrical connection:	Internal terminal strip (0.5 - 2.5 mm^2) Standard: WAGO terminal and cable gland M20 x 1.5; clamping range ø5 ... 11 mm

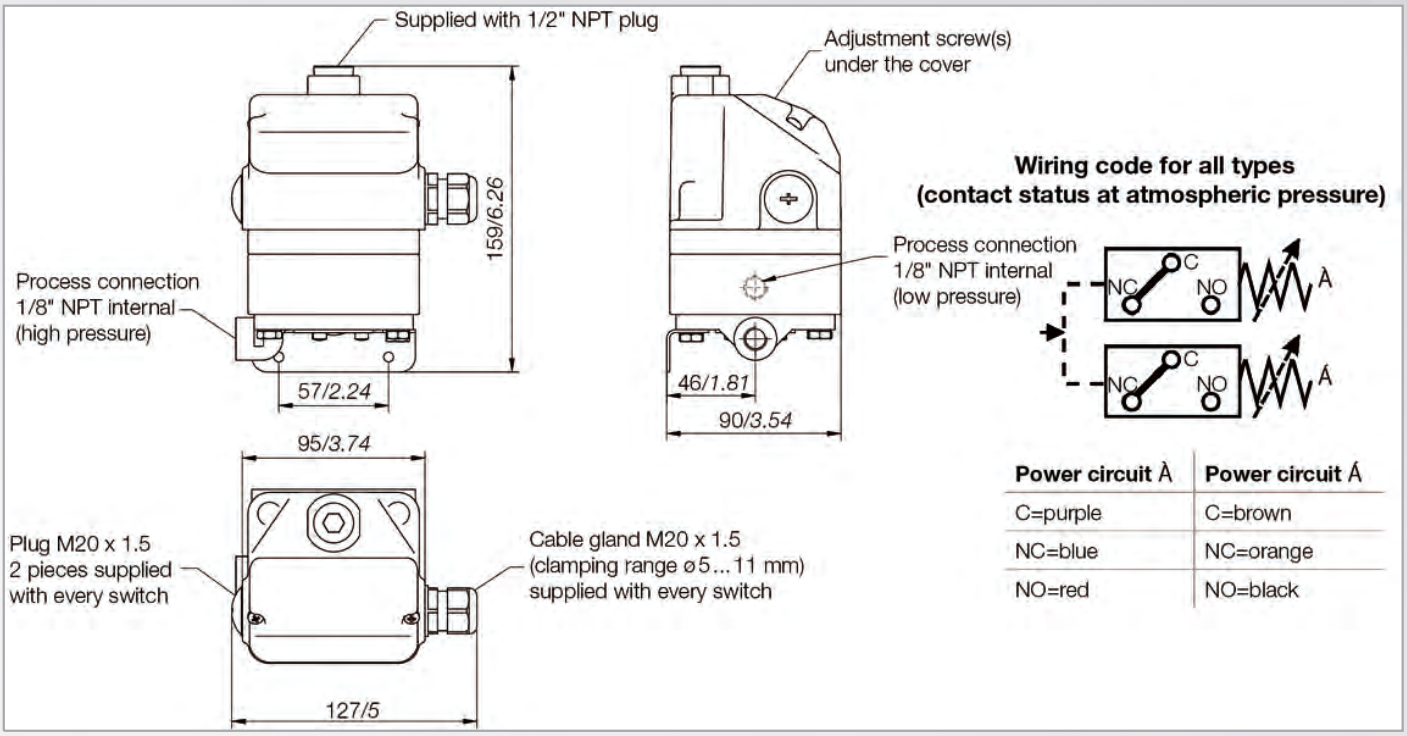
Electrical ratings and hysteresis:	A large variety of micro switches offers different electrical ratings and hysteresis for many applications.
Weight:	DPD1T-...: approx. 1.6 kg DPD2T-...: approx. 1.7 kg
Set point adjustment:	Turn the adjustment screw clockwise to decrease the set point
Intrinsically safe:	The switches are designed for intrinsically safe applications. Please add "Exi" to your ordering details when placing an order. To comply with the intrinsically safe approval following max. ratings must not be exceeded: Umax = 28 V Imax = 50 mA
Approval:	---

Pressure Ranges

* Static operating pressures up to 28 bar possible. Differential pressure of the adjustable range must not be exceeded.

Pressure range code	Adjustment range [bar] *		Max. operating pressure [bar]	Proof pressure [bar]	Max. hysteresis of switch types in bar (end of range)	
	Increasing press.	Decreasing press.		(short term)	H, GH [bar]	M, GM [bar]
Overpressure						
3SS	0.02 ... 0.2	0.002 ... 0.2	0.5	0.7	0.004	0.01
18SS	0.05 ... 1.2	0.030 ... 1.2	3,0	4.0	0.010	0.04
80SS	0.40 ... 5.4	0.030 ... 5.2	8,0	10.7	0.100	0.22
150SS	0.70 ... 10.2	0.100 ... 9.7	15,0	20.0	0.180	0.40

Dimensions (mm / *inch*)



Power circuit À	Power circuit Á
C=purple	C=brown
NC=blue	NC=orange
NO=red	NO=black

Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. load A	Res. load A	Volt DC	Ind. load A	Res. load A	Comments
H	Micro switch with silver contacts	125 250	10 10	10 10	6 to 24	0.50	0.5	Small hysteresis; High AC-/ low DC-load
M	Micro switch with silver contacts	125 250	10 10	10 10	12 24 250	5.00 1.00 0.25	15.0 2.0 0.4	Medium hysteresis; High AC- and DC-loads
GH	Micro switch with gold-plated contacts for low voltage and/or low current	125	1	1	24	1.00	1.00	Small hysteresis
GM		30	0.1	0.1	30	0.10	0.1	Medium hysteresis

Options

	DPD1T-...		DPD2T-...
ST1	Plug, 3-pin + E, DIN EN 175 301-801-A (prev. DIN 43650)	ST3	Plug, 6-pin + E, DIN EN 43651
ST2	Amphenol plug 4-pin + E	EXI	for intrinsically safe application
EXI	for intrinsically safe application		

Order Code

Example for order number

Type				Micro switch		Pressure range code		Options		Approval
DPD1T	or	DPD2T	-	H		3SS	-	ST2	-	EXI

Your order number

Type				Micro switch		Pressure range code		Options		Approval
	or		-				-		-	

Bourdon Tube Pressure Switches

B1S/B2S

Mechanical single/dual pressure switch
Repeatability ±1.0 % at constant temperature

Features

Bourdon tube pressure switch
All welded parts wetted.
Direct acting, no friction, high accuracy

Adjustment ranges

4.8 ... 950 bar

Applications

Pump control,
Die-casting machines,
Press control,
Power plants,
Alarm functions



Technical Data

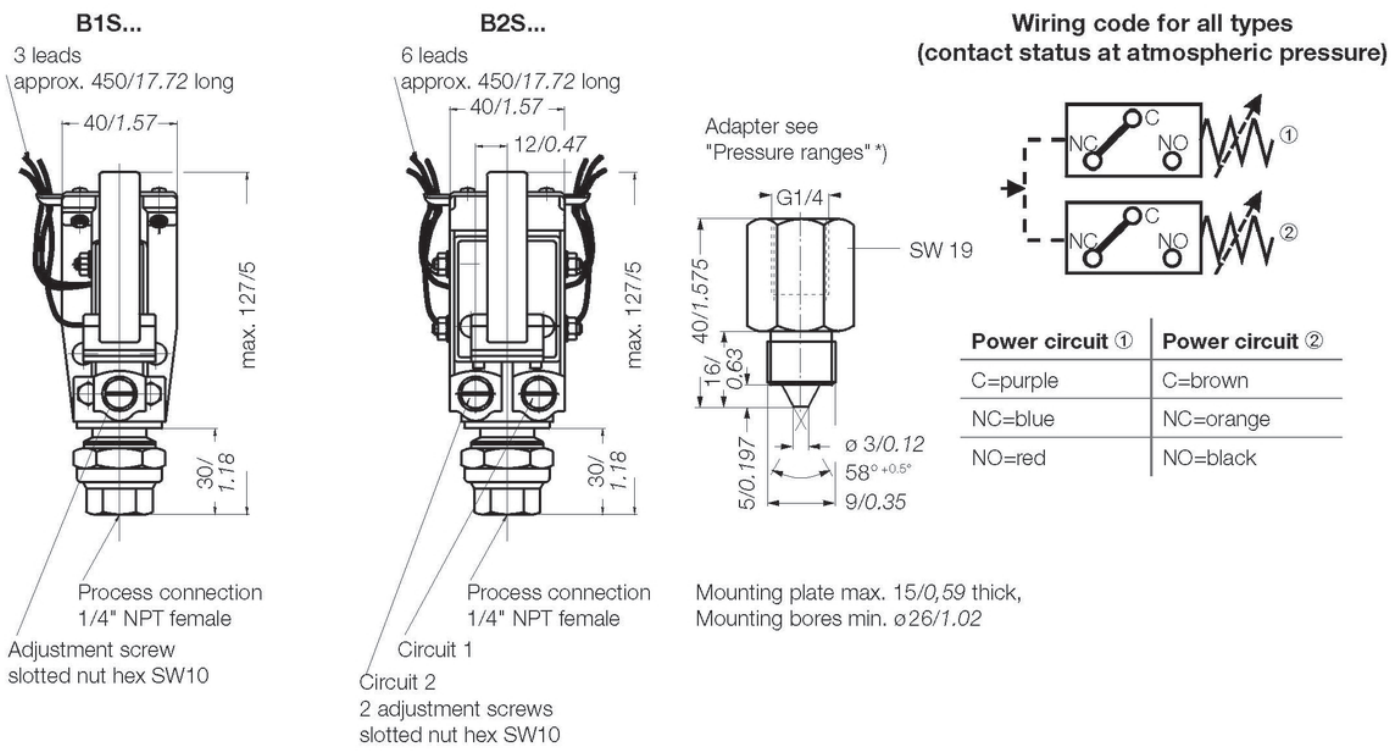
Wetted parts:	
Process connection:	Stainless steel 1.4401
Bourdon tube:	Stainless steel 1.4401
Repeatability:	±1 % at constant temperature
Switching rate:	max. 20/min
Temperature range:	-40 °C... +75 °C
Protection class:	IP00
Housing:	Without housing for installation in control panels:
Process connection:	1/4" NPT female thread except ranges marked with *). These switches have proof pressures above 500 bar and are provided with high pressure thread with adapter "G1/4 female".
Electrical connection:	Lead wire PVC 1.5 mm², length appr. 450 mm

Electrical ratings and hysteresis:	A large variety of micro switches offers different electrical ratings and hysteresis for many applications.
Weight:	B1S-...: approx. 0.6 kg B2S-...: approx. 0.7 kg
Set point adjustment:	Turn the adjustment screw clockwise to decrease the set point
Intrinsically safe:	The switches are designed for intrinsically safe applications. Please add "Exi" to your ordering details when placing an order. To comply with the intrinsically safe approval following max. ratings must not be exceeded: Umax = 28 V Imax = 50 mA
Approval:	---

Connection Chart

Pressure range code	Adjustment range [bar]		Max. operating pressure [bar]	Test pressure [bar]	Max. hysteresis of switch types in bar (end of range)	
	Increasing press.	Decreasing press.		(short term)	H, GH [bar]	M, GM [bar]
12SS	4.8 ... 82	3.4 ... 81	90	100	0.96	1.86
32SS	13.7 ... 220	11.0 ... 217	250	280	2.68	5.44
48SS	22.4 ... 330	16.5 ... 325	370	415	2.75	5.90
65SS*	30.3 ... 448	22.5 ... 440	500	560	3.58	7.92
120SS*	79.3 ... 827	41.4 ... 790	850	1035	16.90	37.90
180SS*	79.3 ... 950	41.4 ... 950	999	1380	16.90	37.90

Dimensions (mm / *inch*)



Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. load A	Res. load A	Volt DC	Ind. load A	Res. load A	Comments
H	Micro switch with silver contacts	125 250 480*	10 10 3	10 10 3	6 to 24	0.50	0.5	Small hysteresis; High AC-/ low DC-load
M	Micro switch with silver contacts	125 250 480*	10 10 3	10 10 3	12 24 250*	5.00 1.00 0.25	15.0 2.0 0.4	Medium hysteresis; High AC- and DC-loads
GH	Micro switch with gold-plated contacts for low voltage and/or low current	125	1	1	24	1.00	1.00	Small hysteresis
GM		30	0.1	0.1	30	0.10	0.1	Medium hysteresis

* on request

Order Code

Example for order number

Type			Micro switch	Pressure range code
B1S	or	B2S	- H	48SS

Your order number

Type			Micro switch	Pressure range code
	or		-	

Bourdon Tube Pressure Switches

B1T/B2T

Mechanical single/dual pressure switch
Repeatability ±1.0 % at constant temperature



Features

- Bourdon tube pressure switch
- All welded parts wetted
- Direct acting, no friction, high accuracy
- Approvals: Ex ia, UL, CSA, marine, SIL2/3 (IEC 61508)

Adjustment ranges

4.8 ... 950 bar

Applications

Pump control,
Die-casting machines,
Press control,
Power plants,
Alarm functions

Technical Data

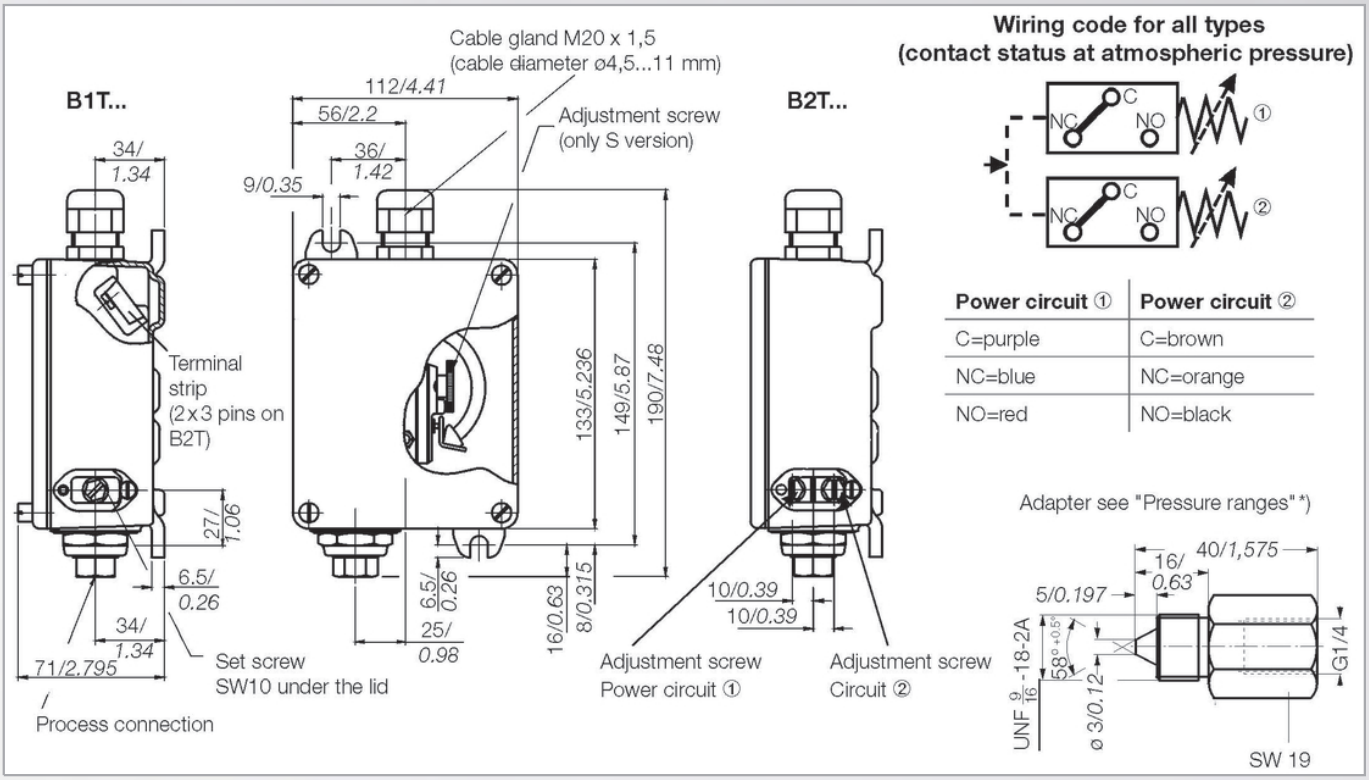
Wetted parts: Process connection: Bourdon tube:	 Stainless steel 1.4401 Stainless steel 1.4401
Repeatability:	±1 % at constant temperature
Switching rate:	max. 20/min
Temperature range:	-40 °C... +75 °C
Protection class:	IP65
Housing:	Aluminium, anodized
Process connection:	1/4" NPT female thread except ranges marked with *). These switches have proof pressures above 500 bar and are provided with high pressure thread with adapter "G1/4 female".
Electrical connection:	Internal terminal strip (0.5 ... 2.5 mm2) Standard: WAGO terminal and cable gland M20 x 1,5

Electrical ratings and hysteresis:	A large variety of micro switches offers different electrical ratings and hysteresis for many applications.
Weight:	B1T-...: approx. 1.1 kg B2T-...: approx. 1.2 kg
Set point adjustment:	Turn the adjustment screw clockwise to decrease the set point
Intrinsically safe:	The switches are designed for intrinsically safe applications. Please add "Exi" to your ordering details when placing an order. To comply with the intrinsically safe approval following max. ratings must not be exceeded: Umax = 28 V Imax = 50 mA
Approval:	---

Pressure Ranges

Pressure range code	Adjustment range [bar]		Max. operating pressure [bar]	Proof pressure [bar]	Max. hysteresis of switch types in bar (end of range)	
	Increasing press.	Decreasing press.		(short term)	H, GH [bar]	M, GM [bar]
12SS	4.8 ... 82	3.4 ... 81	100	120	0.96	1.86
32SS	13.7 ... 220	11.0 ... 217	250	330	2.68	5.44
48SS	22.4 ... 330	16.5 ... 325	400	500	2.75	5.90
65SS*	30.3 ... 448	22.5 ... 440	550	670	3.58	7.92
120SS*	79.3 ... 827	41.4 ... 790	900	1200	16.90	37.90
180SS	79.3 ... 950	41.4 ... 950	999	1600	16.90	37.90

Dimensions (mm / *inch*)



Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. load A	Res. load A	Volt DC	Ind. load A	Res. load A	Comments
H	Micro switch with silver contacts	125 250 480*	10 10 3	10 10 3	6 to 24	0.50	0.5	Small hysteresis; High AC-/ low DC-load
M	Micro switch with silver contacts	125 250 480*	10 10 3	10 10 3	12 24 250*	5.00 1.00 0.25	15.0 2.0 0.4	Medium hysteresis; High AC- and DC-loads
GH	Micro switch with gold-plated contacts for low voltage and/or low current	125	1	1	24	1.00	1.00	Small hysteresis
GM		30	0.1	0.1	30	0.10	0.1	Medium hysteresis

* on request

Options

	B1T-...		B2T-...
ST1	Plug, 3-pin + E, DIN EN 175 301-801-A (prev. DIN 43650)	ST3	Plug, 6-pin + E, DIN EN 43651
ST2	Amphenol plug 4-pin + E	EXI	for intrinsically safe application
EXI	for intrinsically safe application		

Order Code

Example for order number

Type			Micro switch	Pressure range code		Options
B1T	or	B2T	- H	48SS	-	ST2

Your order number

Type			Micro switch	Pressure range code		Options
	or		-		-	

Bourdon Tube Press. Switches Ⓔx

B1X/B2X

Mechanical single/dual pressure switch
Repeatability ±1.0 % at constant temperature



Features

- Bourdon tube pressure switch
- All welded parts wetted
- Direct acting, no friction, high accuracy
- Approvals: Ex ia, Ex d, UL, CSA, SIL 2/3 (IEC 61508)

Adjustment ranges

5.3 ... 496 bar

Applications

Petrochemicals industry,
Process technology,
Shipbuilding technology,
Alarm applications

Technical Data

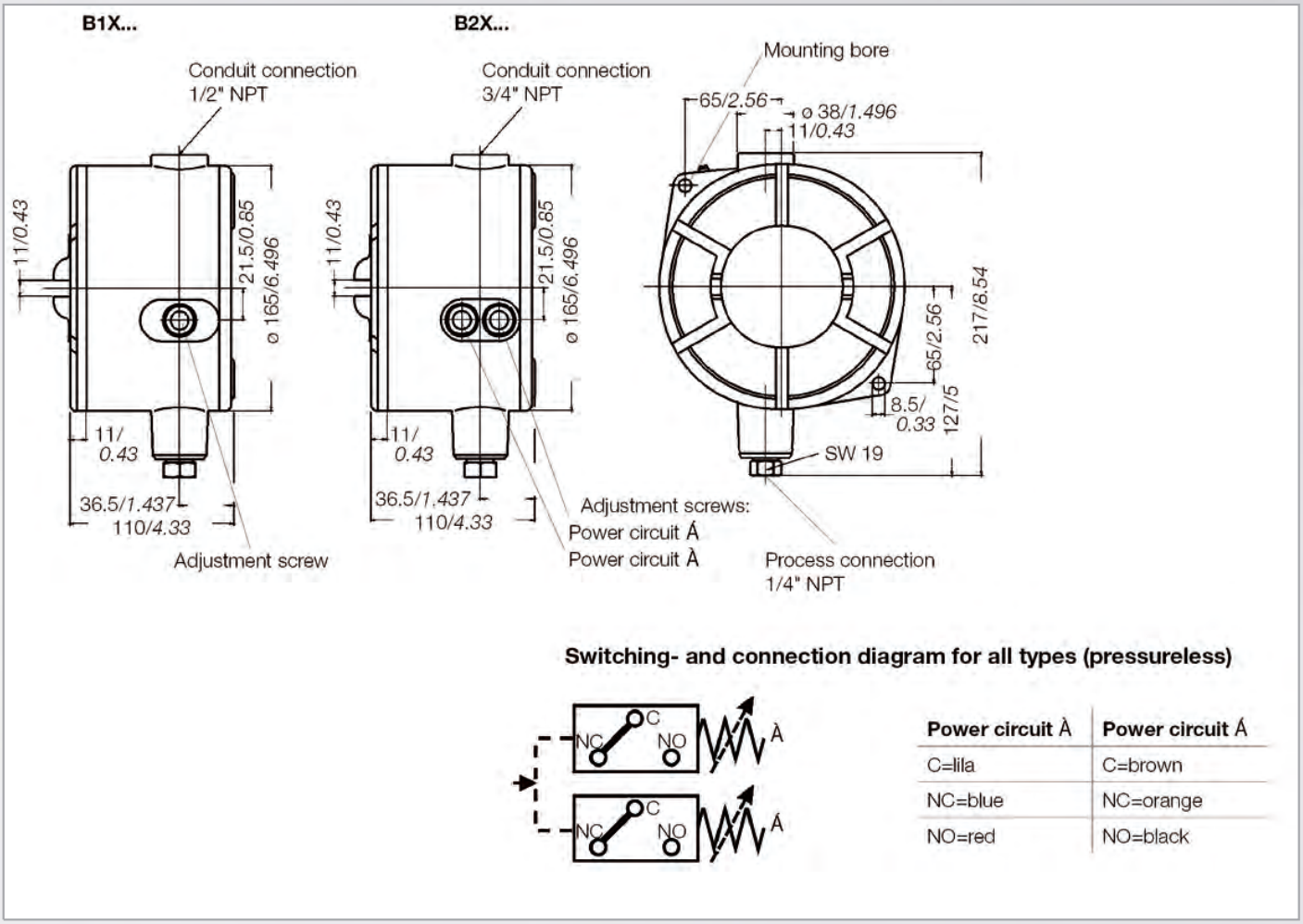
Wetted parts: Process connection: Bourdon tube:	 Stainless steel 1.4401 Stainless steel 1.4401
Repeatability:	±1 % at constant temperature
Switching rate:	max. 20/min
Temperature range:	-40 °C... +75 °C
Protection class:	IP65
Housing:	Explosion proof housing, aluminum anodized and lacquered
Process connection:	1/4" NPT female thread except ranges marked with*). These switches have proof pressures above 500 bar and are provided with high pressure thread with adapter G1/4'' IG.
Electrical connection:	Internal terminal strip (0.5 - 2.5 mm^2), approved cable gland has to be provided by the customer
Electrical rating and hysteresis:	Many micro switch versions with different switching powers and hysteresis are applicable and make it possible to make customized changes.

Weight:	B1X-...: approx. 3.9 kg B2X-...: approx. 3.9 kg
Set point adjustment:	Turn the adjustment screw clockwise to decrease the set point.
Intrinsically safe:	The switches are designed for intrinsically safe applications. Please add "Exi" to your ordering details when placing an order. To comply with the intrinsically safe approval following max. ratings must not be exceeded: Umax = 28 V Imax = 50 mA
Approval:	**Ex: Ex d II C T6 acc. to ATEX** **cULus:** Class I, Groups B, C, D Class II, Groups E, F, G acc. to Underwriter Laboratories Inc. and Canadian Standard Assn.

Pressure Ranges

Pressure range code	Adjustment range [bar]		Max. operating pressure [bar]	Proof pressure [bar]	Max. hyst. of the different switches in bar (end of range)	
	Increasing press.	Decreasing press.		(short term)	H, GH [bar]	M, GM [bar]
12SS	5.3... 83	3.4... 81	100	125	0.96	1.86
20SS	13.7... 137	11.0... 134	250	330	2.68	5.44
32SS	22.4... 220	16.5... 215	400	500	2.75	5.90
72SS*	79.3... 496	41.4... 459	600	950	16.90	37.90

Dimensions (mm / *inch*)



Switching- and connection diagram for all types (pressureless)

Power circuit À	Power circuit Á
C=lila	C=brown
NC=blue	NC=orange
NO=red	NO=black

Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. load A	Res. load A	Volt DC	Ind. load A	Res. load A	Comments
H	Micro switch with silver contacts	125 250 480*	10 10 3	10 10 3	6 to 24	0.50	0.5	Small hysteresis; High AC-/ low DC-load
M	Micro switch with silver contacts	125 250 480*	10 10 3	10 10 3	12 24 250*	5.00 1.00 0.25	15.0 2.0 0.4	Medium hysteresis; High AC- and DC-loads
GH	Micro switch with gold-plated contacts for low voltage and/ or low current	125	1	1	24	1.00	1.00	Small hysteresis
GM		30	0.1	0.1	30	0.10	0.1	Medium hysteresis

* on request

Approvals

EX	Ex d approval
UL	cULus approval
EXI	Ex i approval

Options

P2 = 1/2" NPT F SS Process connection

Order Code

Example for order number

Type			Micro switch	Pressure range code		Options		Approval
B1X	or	B2X	- H	72SS	-	P2	-	UL

Your order number

Type			Micro switch	Pressure range code		Options		Approval
	or		-		-		-	

Diaphragm Seal Piston Press. Switches

E1S

Mechanical single switch
Repeatability ±2.0 % at constant temperature

Features

Diaphragm seal piston pressure switch,
scale for setpoint reference

Adjustment ranges

-0.28 ... -0.9 bar, vacuum
0.1 ... 34 bar, pressure

Applications

Machine and tool engineering,
Dosing machines,
Plant engineering,
Lubricant monitoring



Technical Data

Wetted parts: Diaphragm: Process connection:	 NBR Optional: FKM, PTFE, EPDM, CR anodized aluminium Optional: brass, polysulfone, aluminium nickel-plated
Repeatability:	±1 % at constant temperature
Switching rate:	max. 20/min
Temperature range:	-30 °C... +70 °C
Protection class:	IP00
Housing:	Without housing for installation in control panels
Process connection: Pressure switches: Vacuum switches (VAC):	**1/4" NPT female** **Optional:** 1/8" NPT female + 1/2" NPT male (P6) G1/4 female (P7) 1/4" NPT female (P4) 1/8" NPT female +1/2" NPT male (P6)

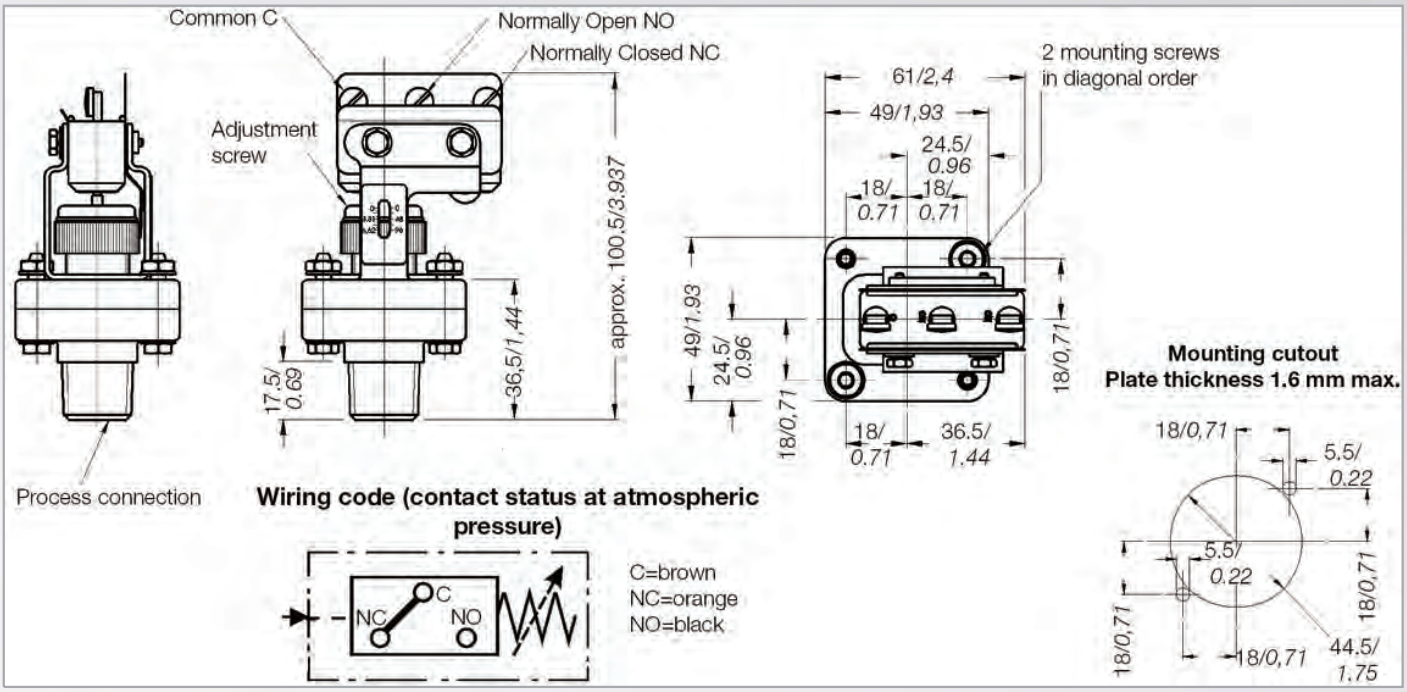
Electrical connection:	Screw terminals
Electrical rating and hysteresis:	Many micro switch versions with different switching powers and hysteresis are applicable and make it possible to make customized changes.
Weight:	E1S-...: approx. 0.35 kg
Set point adjustment: Pressure switches: Vacuum switches:	 Turn the adjustment screw clockwise to increase the set point. Switching point lowers by turning the adjustment screw clockwise.
Intrinsically safe:	The switches are designed for intrinsically safe applications. Please add "Exi" to your ordering details when placing an order. To comply with the intrinsically safe approval following max. ratings must not be exceeded: Umax = 28 V Imax = 50 mA
Approval:	---

Pressure Ranges

* Designed for 70 bar proof pressure, for practical production reasons, however, the standard proofing pressure is 30 bar.

Pressure range code	Adjustment range [bar]		Max. operating pressure [bar]	Proof pressure [bar] *	Max. hysteresis of switch types in bar (end of range)	
	Increasing press.	Decreasing press.		(short term)	H, GH [bar]	M, [bar]
Pressure switches						
15	0.10 ... 1.0	0.04 ... 1.0	46	30 / 70	0.08	0.080
90	0.80 ... 6.0	0.20 ... 5.0	46	30 / 70	0.55	0.680
250	2.10 ... 17.0	0.70 ... 16.0	46	30 / 70	1.37	1.440
500	3.70 ... 34.0	1.72... 32.0	46	30 / 70	1,93	2.750
Vacuum switches						
VAC	-0.28 ... -0.9	-0.20... -0.82	2.0	-1.0	0.08	0.077

Dimensions (mm / *inch*)



Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. load A	Res. load A	Volt DC	Ind. load A	Res. load A	Comments
H	Micro switch with silver contacts	125 250	10 10	10 10	6 to 24	0.50	0.50	Small hysteresis; High AC / low DC loads
M	Micro switch with silver contacts	125 250	10 10	10 10	12 24 250	5.00 1.00 0.25	15.0 2.0 0.4	Medium hysteresis; High AC and DC loads
GH	Micro switch with gold-plated contacts for low voltage and/or low current	125	1	1	24	1.00	1.00	Small hysteresis

Process Connection / Diaphragm

Process connection		Diaphragm	
Pressure switches	Vacuum switches	VAC	not VAC
(P4) 1/4" NPT female	(P4) 1/4" NPT female	( ) NBR	( ) NBR
(P6) 1/8" NPT female + 1/2" NPT male	(P6) 1/8" NPT female + 1/2" NPT male	(V) FKM	(V) FKM
(P6-PLS) material PLS, up to 17 bar only			(T) PTFE
(P7) G1/4 female			(N) CR *
			(E) EPDM *

* on request

Order Code

Example for order number

Type		Micro switch		Pressure range code		Process connection		Diaphragm
E1S	-	H		250	-	P6	-	V

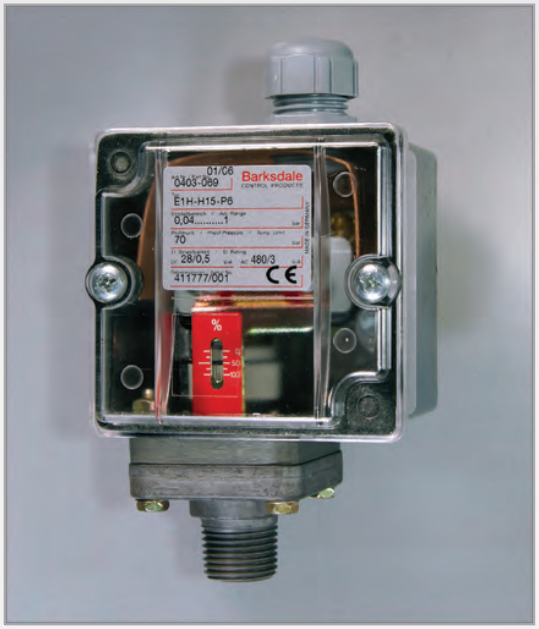
Your order number

Type		Micro switch		Pressure range code		Process connection		Diaphragm
	-				-		-	

Diaphragm Seal Piston Press. Switches

E1H

Mechanical single switch
Repeatability ±2.0 % at constant temperature



Features

Diaphragm seal piston pressure switch,
scale for setpoint reference

Adjustment ranges

-0.28 ... -0.9 bar and
0.1 ... 34 bar

Applications

Machine and tool engineering,
Dosing machines,
Plant engineering,
Sprinkler control

Technical Data

Wetted parts: Diaphragm: Process connection:	 NBR Optional: FKM, PTFE, EPDM, CR anodized aluminium Optional: brass, polysulfone, aluminium nickel-plated
Repeatability:	±1 % at constant temperature
Switching rate:	max. 20/min
Temperature range:	-30 °C... +70 °C
Protection class:	IP65
Housing:	Aluminium, anodized Top cover: Poycarbonate (PC)
Process connection: Pressure switches: Vacuum switches (VAC):	**1/4" NPT female (P4)** **Optional:** 1/8" NPT female 1/2" NPT male (P6) G1/4 female (P7) 1/4" NPT female (P4) 1/8" NPT female +1/2" NPT male (P6)

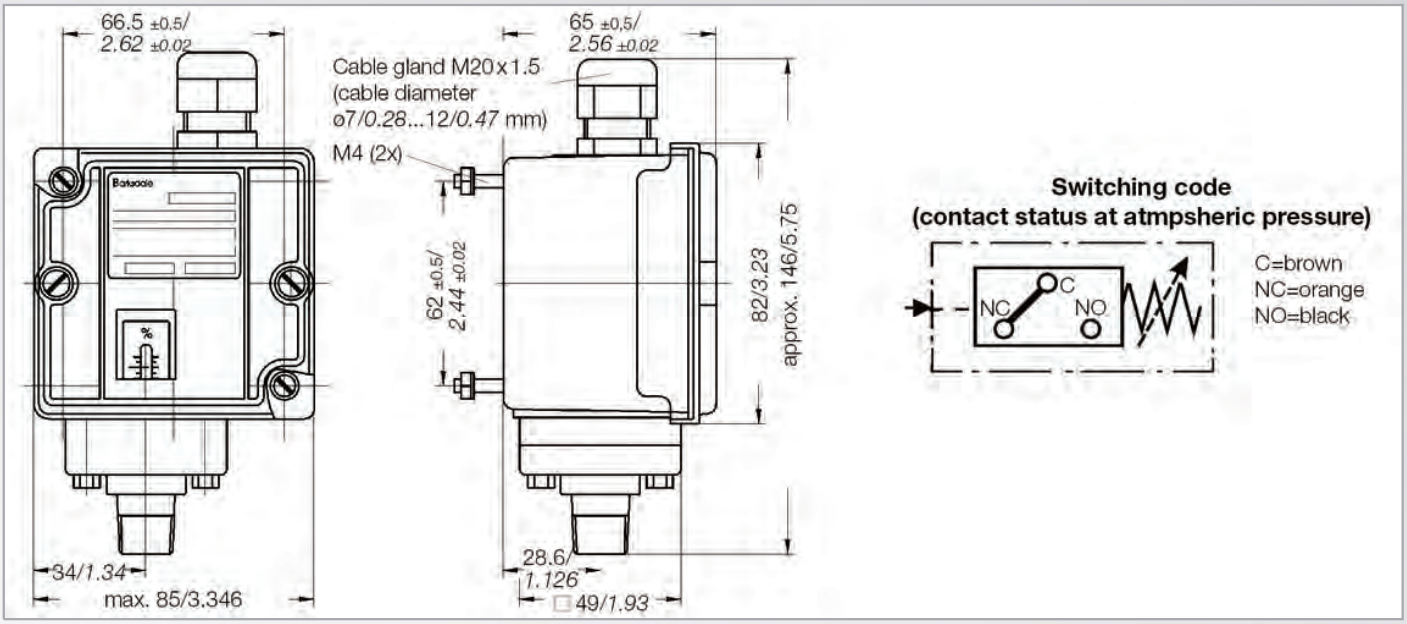
Electrical connection:	Screw terminals and cable gland M20x1.5 mm
Electrical ratings and hysteresis:	A large variety of micro switches offers different electrical ratings and hysteresis for many applications.
Weight:	E1H-...: approx. 0.7 kg
Set point adjustment: Pressure switches: Vacuum switches:	 Turn the adjustment screw clockwise to increase the set point. Turn the adjustment screw clockwise to decrease the set point.
Intrinsically safe:	The switches are designed for intrinsically safe applications. Please add "Exi" to your ordering details when placing an order. To comply with the intrinsically safe approval following max. ratings must not be exceeded: Umax = 28 V Imax = 50 mA
Approval:	---

Pressure Ranges

* Designed for 70 bar proof pressure, for practical production reasons, however, the standard proofing pressure is 30 bar.

Pressure range code	Adjustment range [bar]		Max. operating pressure [bar]	Proof pressure [bar] *	Max. hysteresis of switch types in bar (end of range)	
	Increasing press.	Decreasing press.		(short term)	H, GH [bar]	M, [bar]
Pressure switches						
15	0.10 ... 1.0	0.04 ... 1.0	46	30 / 70	0.08	0.080
90	0.80 ... 6.0	0.20 ... 5.0	46	30 / 70	0.55	0.680
250	2.10 ... 17.0	0.70 ... 16.0	46	30 / 70	1.37	1.440
500	3.70 ... 34.0	1.72... 32.0	46	30 / 70	1.93	2.750
Vacuum switches						
VAC	-0.28 ... -0.9	-0.20 ... -0.82	2.0	-1.0	0.08	0.077

Dimensions (mm / *inch*)



Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. load A	Res. load A	Volt DC	Ind. load A	Res. load A	Comments
H	Micro switch with silver contacts	125 250	10 10	10 10	6 to 24	0.50	0.5	Small hysteresis; High AC / low DC loads
M	Micro switch with silver contacts	125 250	10 10	10 10	12 24 250	5.00 1.00 0.25	15.0 2.0 0.4	Medium hysteresis; High AC and DC loads
GH	Micro switch with gold-plated contacts for low voltage and/or low current	125	1	1	24	1.00	1.00	Small hysteresis

Process Connection / Diaphragm

Process connection		Diaphragm	
Pressure switches	Vacuum switches	VAC	not VAC
(P4) 1/4" NPT female	(P4) 1/4" NPT female	( ) NBR	( ) NBR
(P6) 1/8" NPT female + 1/2" NPT male	(P6) 1/8" NPT female + 1/2" NPT male	(V) FKM	(V) FKM
(P6-PLS) material PLS, up to 17 bar only			(T) PTFE
(P7) G1/4 female			(N) CR *
			(E) EPDM*

* on request

Options

ST1	Plug, 3-pin + E, DIN EN 175 301-801-A (prev. DIN 43650)
ST2	Amphenol plug 4-pin + E
EXI	for intrinsically safe application
RD	Manual reset with G-Micro switch

Order Code

Example for order number

Type		Micro switch	Pressure range code		Process connection		Diaphragm		Option
E1H	-	H	250	-	P6	-	V	-	ST2

Your order number

Type		Micro switch	Pressure range code		Process connection		Diaphragm		Option
	-			-		-		-	

Diaphragm Seal Piston Press. Switches

P1H

Mechanical single switch
Repeatability ±2.0 % at constant temperature



Features

Mechanical pressure switches,
external setpoint adjustment

Adjustment ranges

0.1 ... 107 bar

Applications

Hydraulic and pneumatic power units,
Shipbuilding applications

Technical Data

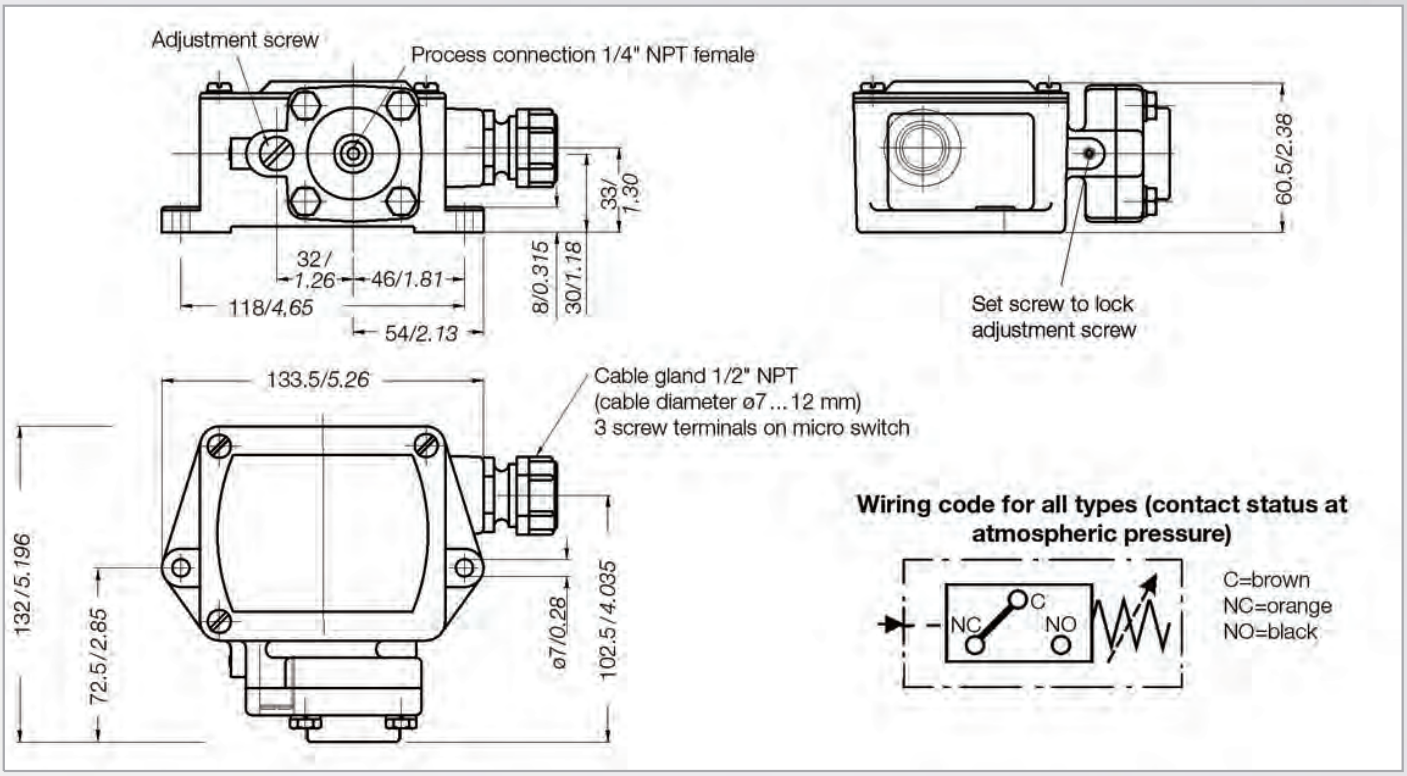
Wetted parts:	
Diaphragm:	NBR Optional: FKM, PTFE
Process connection:	Aluminium, anodized Optional: stainless steel 1.4401
Repeatability:	±2 % at constant temperature
Switching rate:	max. 20/min
Temperature range:	-30 °C... +70 °C
Protection class:	IP65
Material Housing: Cap:	 Aluminium, anodized Steel, galvanized
Process connection:	1/4" NPT female thread Optional: 1/2" NPT female thread (P2)

Electrical connection:	Screw terminals and cable gland 1/2" NPT, cable diameter ø7 ... 12 mm
Electrical ratings and hysteresis:	A large variety of micro switches offers different electrical ratings and hysteresis for many applications.
Weight:	P1H-...: approx. 1.2 kg
Set point adjustment:	Turn the adjustment screw clockwise to increase the set point
Intrinsically safe:	The switches are designed for intrinsically safe applications. Please add "Exi" to your ordering details when placing an order. To comply with the intrinsically safe approval following max. ratings must not be exceeded: Umax = 28 V Imax = 50 mA
Approval:	NACE

Pressure Ranges

Pressure range code	Adjustment range [bar]		Max. operating pressure [bar]	Proof pressure [bar]	Max. hysteresis of switch types in bar (end of range)		
	Increasing press.	Decreasing press.		(short term)	B	H, GH [bar]	K [bar]
30	0.1 ... 2.1	0.03 ... 2.0	91	137	0.14	0.06	0.17
85	0.4 ... 6.0	0.2 ... 5.8	91	137	0.50	0.17	0.58
340	0.8 ... 23.4	0.4 ... 23.0	91	137	1.50	0.41	1.83
600	2.9 ... 41.0	1.7 ... 40.0	91	137	2.00	1.17	2.42
1600	32.0... 107.0	27.0... 101.0	110	165	7.00	4.80	8.60

Dimensions (mm / *inch*)



Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. load A	Res. load A	Volt DC	Ind. load A	Res. load A	Comments
H	Micro switch with silver contacts	125 250 480	10 10 3	10 10 3	6 to 28	0.50	0.5	Small hysteresis; High AC / low DC loads
GH	Micro switch with gold contacts for low voltage and low current	125	1	1	24	0.10	1.00	Small hysteresis
K, B	Micro switch with silver contacts K: with sealed plunger and stainless steel blade	125 250 480	10	10	12 24 250	10.00 5.00 0.03	10.0 6.0 0.2	Medium hysteresis; High AC and DC loads

Material / Options / Diaphragm

Material	Options	Diaphragm
( ).... Aluminium	(P2) 1/2" NPT female SS	( ) NBR
(SS) Stainless steel		(V) FKM
		(T) PTFE

Order Code

Example for order number

Type		Micro switch	Pressure range code		Material		Options		Diaphragm
P1H	-	H	85	-	SS	-	P2	-	V

Your order number

Type		Micro switch	Pressure range code		Material		Options		Diaphragm
	-			-		-		-	

Diaphragm Seal Piston Press. Switches

P1X

Mechanical single switch
Repeatability ±2.0 % at constant temperature



Features

Mechanical pressure switches,
Switching point can be adjusted with corresponding reference unit during operation

Adjustment ranges

0.1 ... 107 bar

Applications

Hydraulic and pneumatic power units,
Autoclaves,
Shipbuilding applications

Technical Data

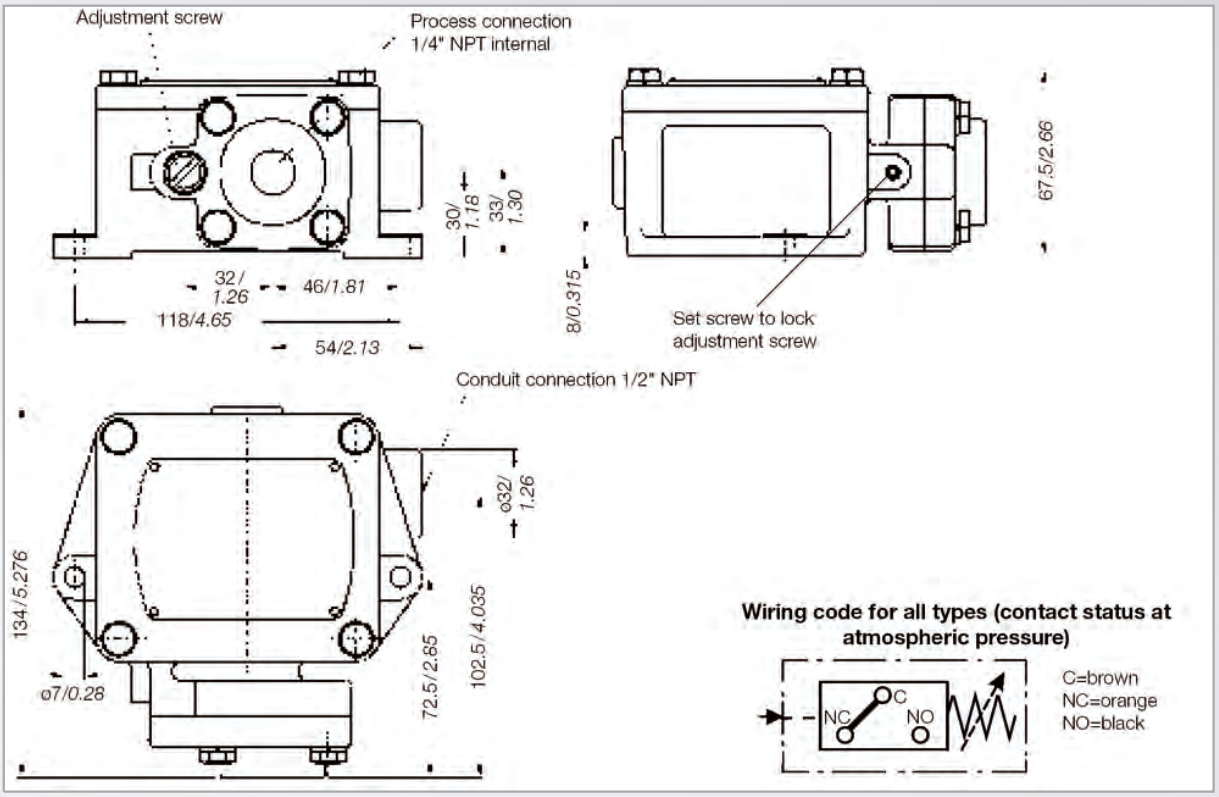
Wetted parts:	
Diaphragm:	NBR Optional: FKM, PTFE
Process connection:	Aluminium, anodized Optional: stainless steel 1.4401
Repeatability:	±2 % at constant temperature
Switching rate:	max. 20/min
Temperature range:	-30 °C... +70 °C
Protection class:	IP65
Housing:	Explosion proof housing acc. to CSA and cULus
Housing:	Aluminium, anodized
Cap:	Aluminium, anodized
Process connection:	1/4" NPT female thread Optional: 1/2" NPT female thread

Electrical connection:	Screw terminals and cable gland 1/2" NPT female thread
Electrical ratings and hysteresis:	A large variety of micro switches offers different electrical ratings and hysteresis for many applications.
Weight:	P1X-...: approx. 1.3 kg
Set point adjustment:	Turn the adjustment screw clockwise to increase the set point
Intrinsically safe:	The switches are also applicable for inherent safety applications. Add "Exi" in case of ordering. The following max. values are valid when using those switches: Umax = 28 V Imax = 50 mA
Approval:	CSA, UL File No. E37043, NACE

Pressure Ranges

Pressure range code	Adjustment range [bar]		Max. operating pressure [bar]	Proof pressure [bar]	Max. hysteresis of switch types in bar (end of range)		
	Increasing press.	Decreasing press.		(short term)	B	H, GH [bar]	K [bar]
30	0.1... 2.1	0.03... 2.0	91	137	0.14	0.06	0.17
85	0.4... 6.0	0.2... 5.8	91	137	0.50	0.17	0.58
340	0.8... 23.4	0.4... 23.0	91	137	1.50	0.41	1.83
600	2.9... 41.0	1.7... 40.0	91	137	2.00	1.17	2.42
1600	32.0... 107.0	27.0... 101.0	110	165	6.8	4.8	8.6

Dimensions (mm / *inch*)



Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. load A	Res. load A	Volt DC	Ind. load A	Res. load A	Comments
H	Micro switch with silver contacts	125 250 480	10 10 3	10 10 3	6 to 28	0.50	0.5	Small hysteresis; High AC / low DC loads
GH	Micro switch with gold-plated contacts for low voltage and low current	125	1	1	24	0.10	1.0	Small hysteresis
K, B	Micro switch with silver contacts K: with sealed plunger and/ or stainless steel blade	125 250 480	10	10	12 24 250	10.00 5.00 0.03	10.0 6.0 0.2	Medium hysteresis; High AC and DC loads

Material / Options / Diaphragm

Material	Options	Diaphragm
( ) Aluminium	(P2)1/2" NPT female SS	(-) NBR
(SS)Stainless steel		(V) FKM
		(T) PTFE

Order Code

Example for order number

Type		Micro switch	Pressure range code		Material		Options		Diaphragm
P1X	-	H	85	-	SS	-	P2	-	V

Your order number

Type		Micro switch	Pressure range code		Material		Options		Diaphragm
	-			-		-		-	

Diaphragm Seal Piston Press. Switches

MSPS

Mechanical single switch
Repeatability ±2.0 % at constant temperature



Features

Metal diaphragm pressure switch,
Set point can be adjusted with corresponding reference unit during operation

Adjustment ranges

0.1 ... 6.8 bar

Applications

Air conditioning,
Ventilation control,
Steam ejectors

Technical Data

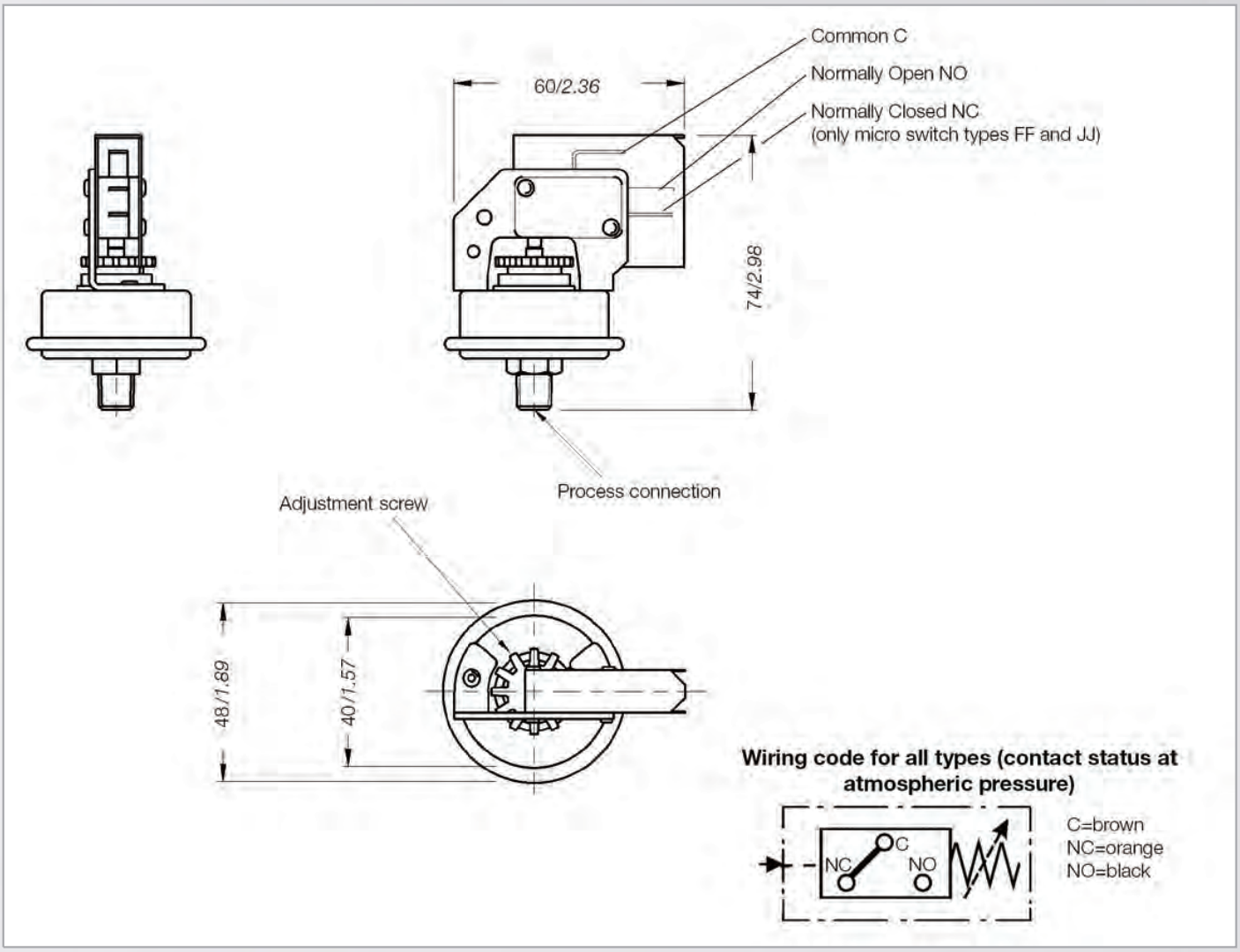
Wetted parts: Diaphragm Process connection	 NBR Stainless steel 1.4401
Stainless steel 1.4401	±1 % at constant temperature
Switching rate:	max. 20/min
Temperature range:	-5 °C... +70 °C
Protection class:	IP00
Housing:	---
Process connection:	1/8" NPT male thread
Electrical connection:	Spade connector 6,3 DIN 46244
Electrical ratings and hysteresis:	Many micro switch versions with different switching powers and hysteresis are applicable and make it possible to make customized changes.

Weight:	MSPS-...: approx. 0.2 kg
Set point adjustment:	Turn the adjustment screw clockwise to increase the set point
Intrinsically safe:	The switches are designed for intrinsically safe applications. Please add "Exi" to your ordering details when placing an order. To comply with the intrinsically safe approval following max. ratings must not be exceeded: Umax = 28 V Imax = 50 mA
Approval:	---

Pressure Ranges

Pressure range code	Adjustment range [bar]		Max. operating pressure [bar]	Proof pressure [bar]	Max. hysteresis of switch types in bar (end of range)	
	Increasing press.	Decreasing press.		(short term)	EE, FF [bar]	DD, JJ [bar]
5SS	0.1 ... 0.34	0.04 ... 0.305	4.6	6.9	0.035	0.040
15SS	0.2 ... 1.00	0.10 ... 0.900	4.6	6.9	0.055	0.068
100SS	1.2 ... 6.80	0.70 ... 6.300	6.8	10.0	0.540	0.620

Dimensions (mm / *inch*)



Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. load A	Res. load A	Volt DC	Ind. load A	Res. load A	Comments
EE, FF	Micro switch with silver contacts	125 250	3	3	---	---	---	Medium hysteresis; High AC voltage
DD, JJ	Micro switch with silver contacts	125 250	15	15	125 250	0.50 0.25	0.50 0.25	Medium hysteresis; High AC voltage

Order Code

Example for order number

Type		Micro switch		Pressure range code
MSPS	-	FF	-	15SS

Your order number

Type		Micro switch		Pressure range code
	-		-	

Compact Pressure Switches

9671X/9681X

Diaphragm seal piston sensor in explosion proof housing, for harzardous areas, accuracy class 2% f. s.



Features

- Stainless steel body and parts
- Flameproof enclosure according to ATEX, UL, CSA
- Safe to adjust during operation
- 1 switching contact (SPDT)
- SIL2 (IEC 61508)

Adjustment ranges

Type 9671X: -0.17 bar ... -1 bar, vacuum
Type 9681X: 0.33 ... 34.4 bar, pressure

Applications

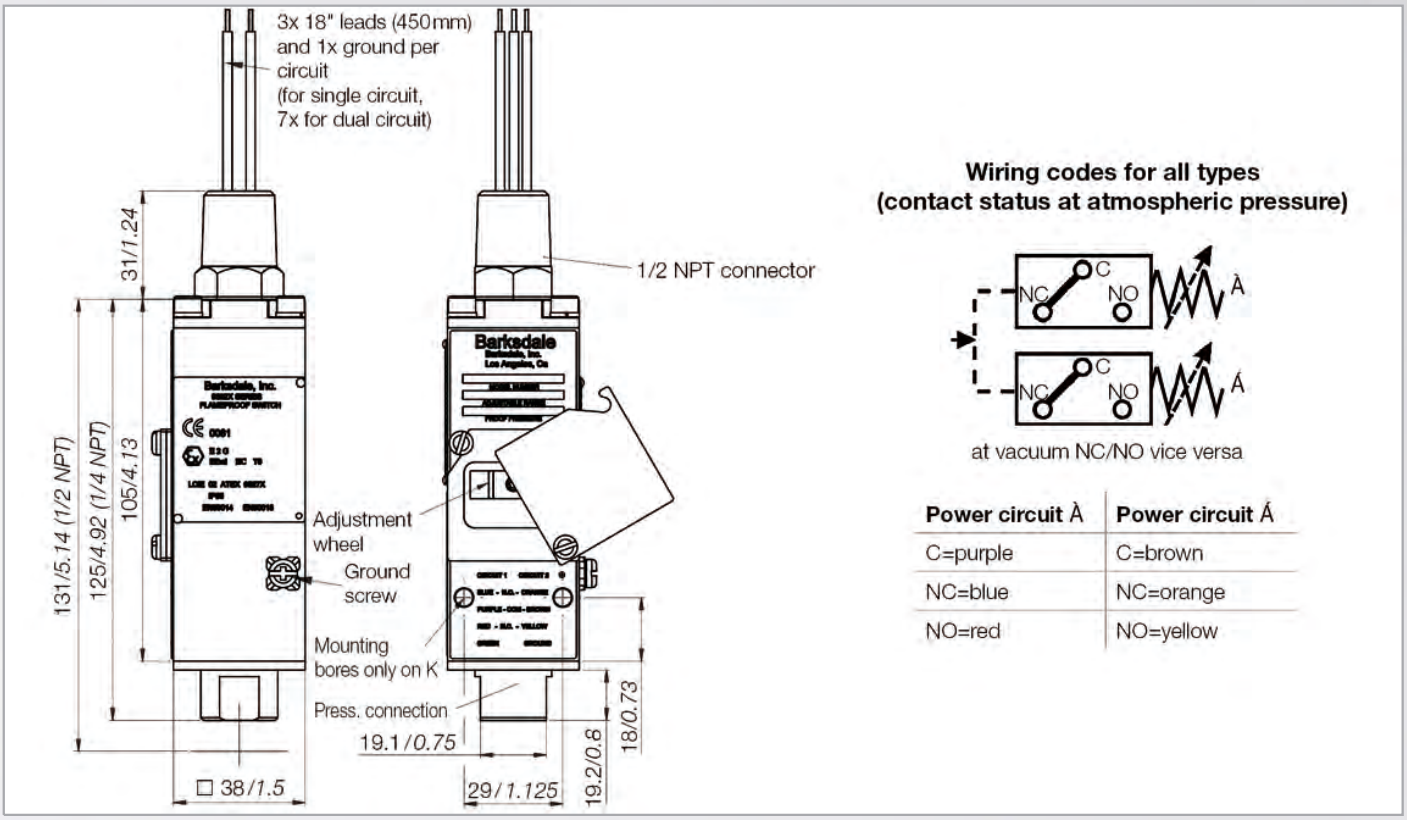
Process Industry,
Petrochemical Plants,
Machine Tool Industry,
Compressors

Technical Data

Wetted parts: Process fitting: Seals: Diaphragm:	 Stainless steel, material no. 1.4401 FKM, PTFE support ring FKM
Repeatability:	±2 % f. s.
Switching rate:	max. 30/min
Temperature range:	-20 °C ... +60 °C operating temp. -40 °C ... +75 °C Atex Ex ia -20 °C ... +60 °C Atex Ex d -20 °C ... +40 °C UL
Protection class:	IP65
Housing:	Stainless steel 1.4401, explosion proof
Process connection:	1/4" NPT female thread
Electrical connection:	1/2" NPT AG male conduit connector 18 AWG 18" (450 mm) lead wire, PVC jacket
Switch type: Rating: Option:	Switch contact SPDT 11 A, 125 / 250 V AC 5 A, 30 V DC 1 A, 125 V DC 1 switching contact, 1 x DPDT

Weight:	375 g
Set point adjustment:	Turn the adjustment wheel clockwise to increase the set point
Vibration resistance:	10 g, sine 10...500, MIL-STD 202F
Shock resistance:	50 g, 11 ms, MIL-S-901C
Approvals:	CENELEC Ex d II C T6, UL #E37043, CSA #LR22354 and Division I Class I, Group A, B, C & D; Class II, Group E, F & G
Certificate no.:	LCIE 08 ATEX 6074 X
Options:	Dual circuit 2 SPDT switches with DPDT function Gold contact switch, 1 A, 125 V AC Ex terminal box Tamper proof cover

Dimensions (mm / *inch*)



Wiring code

	Pressure 9681X		Vacuum 9671X		Option
Function	**Circuit 1**	**Circuit 2**	**Circuit 1**	**Circuit 2**	
Normally Open / NO	red	yellow	blue	orange	K with mounting holes
Common / C	purple	brown	purple	brown	
Normally Closed / NC	blue	orange	red	yellow	
Earth	green		green		

Pressure Ranges

Ordering code 1 Switch contact SPDT (standard)	Ordering code 1 Switch contact DPDT (option)	Adjustment ranges [bar]				Max. hysteresis (end of range)	Max. operating pressure	Proof pressure
		Increasing press.		Decreasing press.				
		min.	max.	min.	max.	[bar]	[bar]	[bar]
9681X-1CC-1	9681X-2CC-1	0.33	1.03	0.13	1.0	0.2	45	68
9681X-1CC-2	9681X-2CC-2	0.20	10.30	0.34	9.0	1.7	45	68
9681X-1CC-3	9681X-2CC-3	4.40	20.60	1.70	18.0	2.7	45	68
9681X-1CC-4	9681X-2CC-4	8.50	34.40	4.40	30.0	4.1	45	68
Vacuum switches								
9671X-1CC	9671X-2CC	-0.17	-1.00	-0.034	-0.71	0.3	---	2

Accessories

Order Number	Description
926-0811	Ex d - Terminal box incl. terminal (drawing 923-1533 on request)
999-0081	Tamper proof cover

Compact Pressure Switches

9692X

**Piston pressure switch with explosion proof housing, for hazardous areas,
accuracy class 2% f. s.**



Features

- Stainless steel body and parts,
- Flameproof enclosure according to ATEX, UL, EMI, (EN55011) CSA
- Safe to adjust during operation
- 1 switching contact (SPDT or DPDT)
- SIL2 (IEC 61508)

Adjustment ranges

10.3 ... 689.7 bar

Applications

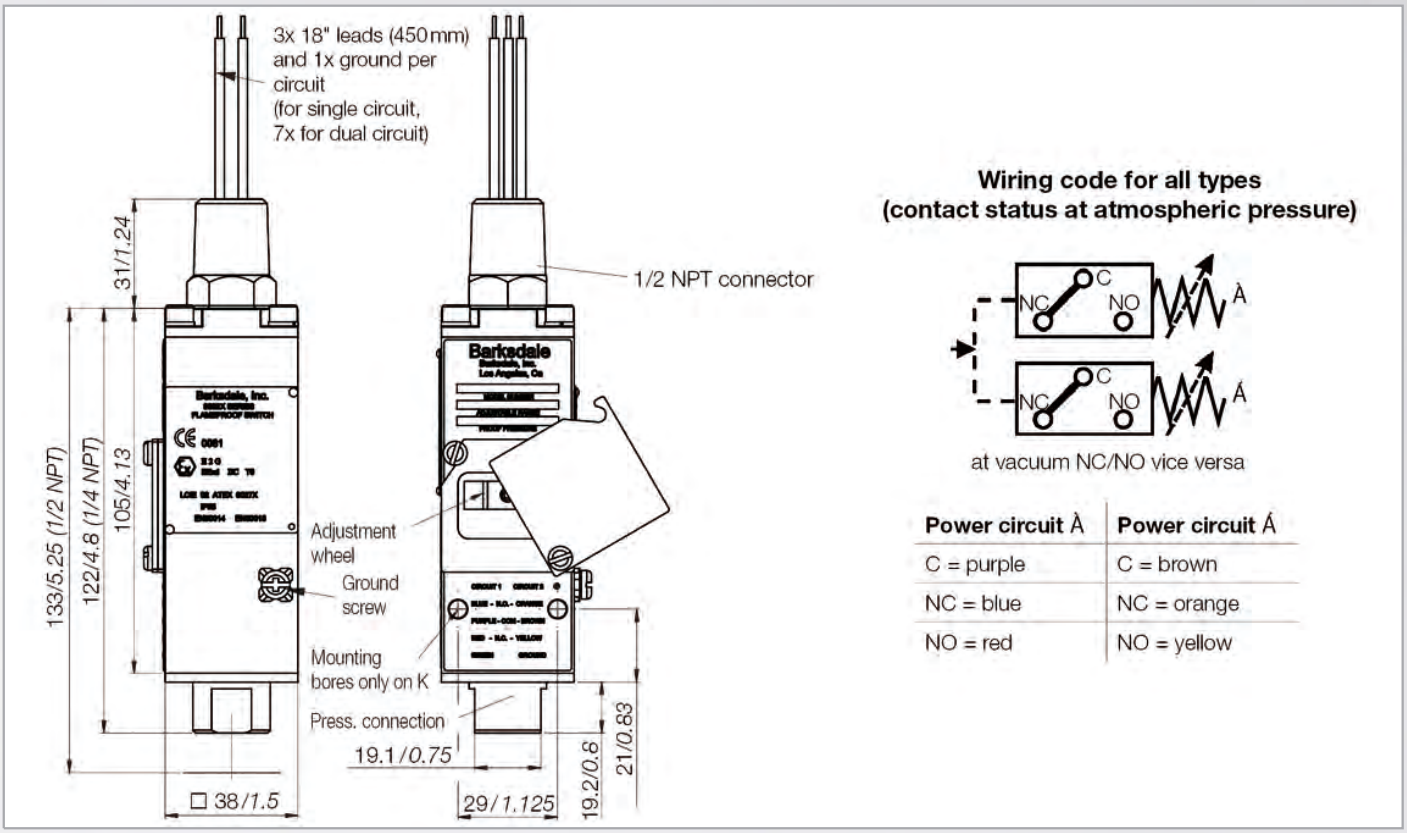
Process Industry,
Petrochemical Plants,
Machine Tool Industry,
Compressors

Technical Data

Wetted parts: Process connection: Seals: Piston:	 Stainless steel, material no. 1.4401 FKM Material no. 1.4006 (Stainless Steel)
Repeatability:	±2 % f. s.
Switching rate:	max. 30/min
Temperature range:	-20 °C ... +60 °C operating temp. -40 °C ... +75 °C Atex Ex ia -20 °C ... +60 °C Atex Ex d -20 °C ... +40 °C UL
Protection class:	IP65
Housing:	Stainless steel 1.4401, explosion proof
Process connection:	1/4" NPT female thread
Electrical connection:	1/2" NPT AG male conduit connector 18 AWG 18" (450 mm) lead wire, PVC jacket

Switch type: Rating:	Switch contact SPDT (1CC) or DPDT (2CC) 11 A, 125 / 250 V AC 5 A, 30 V DC
Weight:	375 g
Set point adjustment:	Turn the adjustment wheel clockwise to increase the set point
Vibration resistance:	10 g, sine 10...500, MIL-STD 202F
Shock resistance:	50 g, 11 ms, MIL-S-901C
Approval:	Ex d II C T6, UL #E37043, CSA #LR22354 and Division I Class I, Group A, B, C & D; Class II, Group E, F & G
Certificate no.:	LCIE 08 ATEX 6074 X
Options:	Gold contact with SPDT (1GH) or with DPDT (2GH) 1A, 125 V AC Ex terminal box Tamper proof cover

Dimensions (mm / *inch*)



Power circuit À	Power circuit Á
C = purple	C = brown
NC = blue	NC = orange
NO = red	NO = yellow

Electrical Connection

	Pressure	
Function	**Circuit 1**	**Circuit 2**
Normally Open / NO	red	yellow
Common / C	purple	brown
Normally Closed / NC	blue	orange
Earth	green	

Pressure Ranges

Ordering code 1 Switch contact SPDT (standard)	Ordering code 1 Switch contact DPDT (option)	Adjustment ranges [bar]				Max. hysteresis (end of range)	Max. operating pressure	Proof pressure
		Increasing press.		Decreasing press.				
		min.	max.	min.	max.	[bar]	[bar]	[bar]
9692X-1CC-1	9692X-2CC-1	10.3	51.7	6.9	41.4	10.3	600	1034
9692X-1CC-2	9692X-2CC-2	15.2	69.0	10.3	55.2	13.8	600	1034
9692X-1CC-3	9692X-2CC-3	34.5	207.0	27.6	179.0	27.6	600	1034
9692X-1CC-4	9692X-2CC-4	57.9	345.0	48.2	303.0	41.4	600	1034
9692X-1CC-5	9692X-2CC-5	82.8	571.0	69.0	462.9	55.2	600	1034
9692X-1CC-6	9692X-2CC-6	15.2	207.0	10.3	55.2	68.9	600	1034
9692X-1CC-7	9692X-2CC-7	368.6	689.7	344.8	606.9	137.9	690	1034

Accessories

Order Number	Description
926-0811	Ex d - Terminal box incl. terminal (drawing 923-1533 on request)
999-0081	Tamper proof cover

Compact Pressure Switches

Series 8000

Series 8000 - mechanical pressure switches in diaphragm or piston design. The successors of the product lines XTM, XTK, X1T and 96200 have the additional advantage of very low and precise switching point settings.



Features

- Modular construction
- Versatile
- High-quality materials
- 100% assays
- Long pressure spring
- Approvals: Ex ia, cULus, marine, SIL2 (IEC 61508)

Adjustment ranges

0.6...600 bar

Applications

OEM applications,
Mobile- and industrial-hydraulics and pneumatics,
Test bed and apparatus engineering,
Heavy industry

Technical Data

Wetted parts: standard: optional:	 NBR, PTFE with bronze and stainless steel 1.4301; pistons: steel FKM, EPDM, CR instead of NBR
Repeatability:	±1% type, piston pressure switch ±2% type, diaphragm pressure switch
Switching rate:	max. 60/min piston pressure switch max. 30/min diaphragm pressure switch
Temperature range: Piston switch: Diaphragm switch:	 -40 °C ... +80 °C (-40 °F ... +176 °F) -20 °C ... +80 °C (-4 °F ... +176 °F)
Protection class: standard: optional:	 IP65 (plug connector), IP68 (cable) UL Intrinsically safe ⌀ II 1G Ex ia IIB T6 (DIN plug) - EXI Ex ia IIC T6 (cable version) - EXI ⌀ II 1GD Ex ia D 20 T100 UL, Type 4, for indoor and outdoor use

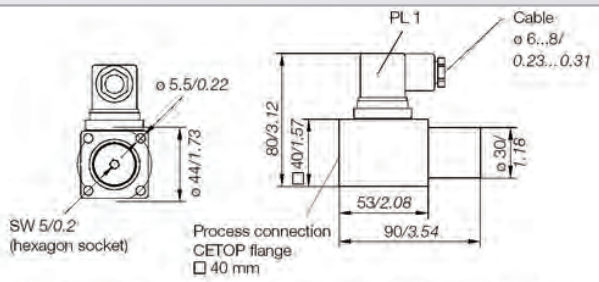
Housing: standard: optional:	 Aluminium Stainless steel 1.4305 / SS 304, Version - VA
Process connection:	CETOP flange Ø40x40 mm, (order code "1") see dimensions
Electrical connection:	see dimensions
Weight: CETOP flange version:	 350 g (0.77 lbs)
Micro switch:	Change-over contact (SPDT)
Set screw: standard optional	 Aluminium Stainless steel 1.4305 / SS304 (SW5), captive
Approvals:	GL, Ex ia, cULus, further approvals on request

Pressure Ranges and Proof Pressures

Pressure range code		Adjustment range (pressure increasing)		Adjustment range (pressure decreasing)		Max. operating pressure		Proof pressure		Max. hysteresis (end of range)
[bar]	[psi]	[bar]	[psi]	[bar]	[psi]	[bar]	[psi]	[bar]	[psi]	
		Diaphragm		Diaphragm						
1	A	0.6 ... 6.0	(8.7...87)	0.4... 5.7	(5.8...82)	50	725	80 *	(1,200)	≤15%
2	B	3.0... 20.0	(45.0...250)	2.0... 17.0	(29...246)	50	725	80 *	(1,200)	
3	C	4.0... 45.0	(60.0...650)	3.0... 41.0	(43...600)	50	725	80 *	(1,200)	
		Piston		Piston						
4	D	5.0... 180	(75...2,600)	3.0... 160	(43...2,320)	250	3600	600	(8,700)	≤15%
5	E	50.0... 350	(750...5,000)	30.0... 300	(430...4,300)	450	6500	600	(8,700)	
6	F	80.0... 600	(1,200...8,700)	55.0... 520	(800...7,550)	600	8700	900	(15,000)	

* Test pressure 200 bar (2,900 psi) upon request, results in less lifetime of the switch.

Dimensions (mm / *inch*)

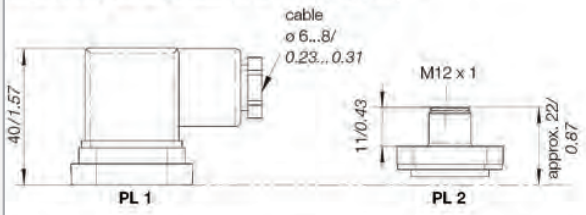


Switching- and connection diagram (pressureless)

	PL1	PL2
C	1	1
NC	2	2
NO	3	4
PE	---	3

Up to pressure stage 5 or E every pressure switch is supplied with two fastening screws M5×60 mm according to DIN 912 (10.9, galvanized).
The pressure switches of pressure stage 6 or F are supplied with four screws.

Electrical connection (PL1 = standard)

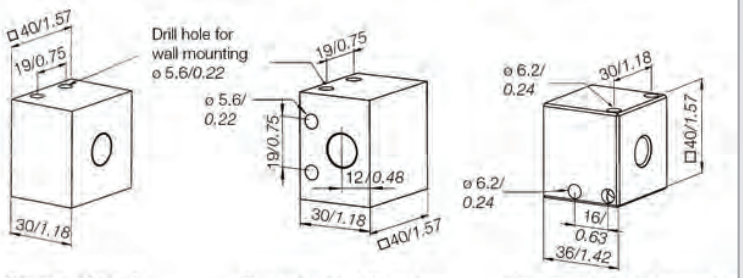


Cube plug DIN EN 175301-803 A (former DIN 43650)

Plug M12x1 mm, 4-pin

Process connections

Complete assembly with pressure switch only upon request



Connecting block **I**, straight version

Connecting block **II**, version 90° offset (optional, only upon request)

Connecting block **III**, compatible with X1T, 96100/96111 (optional, only upon request)

Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. Load A	Res. Load A	Volt DC	Ind. Load A	Res. Load A	Minimum capacitance	Intrinsic safety Ex ia
1	Silver contacts	250 V ~ 125 V ~	2.0 2.0	5.0 5.0	30 V= 250 V=	2.0 0.03	5.0 0.2	10 mA at 12 VDC	Umax = 28 V Imax = 50 mA
2	Gold contacts*	U x I = max. 0.12 VA			≤ 300 mV = ≤ 30 V =	--- ---	≤ 400 mA ≤ 4 mA	0 mA / 0 VDC	

* e.g. suitable for PLC and/or Ex ia

Seal

Code	Seal
B	NBR
N	CR
E	EPDM
V	FKM

Options

Code	Housing
VA	1.4305

Approvals

EXI	Ex ia
GL	Germanischer Lloyd
UL	cULus approval

Order Code

Example for order number

Type	Process connection	Pressure range	Micro switch Contact		Electrical connection		Seal		Options		Approvals
8	1	2	1	-	PL1	-	B	-	VA	-	GL

Your order number

8	1			-		-		-		-	

Accessories

Connecting block no.	Order No.	Process connection	Designation	Material
I	906-0953	1/4" NPT female	straight	St passivated
I	906-0954	G 1/4" female	straight	St passivated
I	906-0946	1/4" NPT female	straight	1.4301
I	906-0947	G 1/4" female	straight	1.4301
II	906-0926	G 1/4" female	90° offset	1.4301
II	906-0927	1/4" NPT female	90° offset	1.4301
III	906-0919	G 1/4" female	straight	AlMg4,5Mn0,7

Compact Pressure Switches

Series 9000

Mechanical pressure switch in piston design with 30 x 30 x 92 mm front face and precise switching point setting



Features

High-quality materials,
100% functional test,
Compact design,
Long pressure spring (precisely adjustable),
G1/4" female thread, Set screw captive

Adjustment ranges

10...400 bar

Applications

OEM applications,
Mobile and industrial hydraulics,
Test bed and apparatus engineering,
Heavy industry,
Shipbuilding

Technical Data

Wetted parts:	sealing: PTFE/FKM fitting: Stainless Steel / Aluminium piston: steel (100Cr6)
Repeatability:	±2% (typically)
Switching rate:	max. 60/min.
Temperature range: storage: piston switch:	 -40 °C ... +80 °C (-40 °F ... +176 °F) -20 °C ... +80 °C (-4 °F ... +176 °F)
Protection class:	IP65

Material: housing: electrical plug: adjustment screw:	 Stainless Steel / Aluminium Polyamid (PA) Stainless Steel (1.4305)
Process connection:	G1/4" female thread DIN ISO 228-1
Weight:	175 g (0.39 lbs)
Electrical connection:	EN 175301-8013-A plug (formerly DIN 43650)
Micro switch:	(SPDT) silver contacts
Approvals:	GL, BV others on request

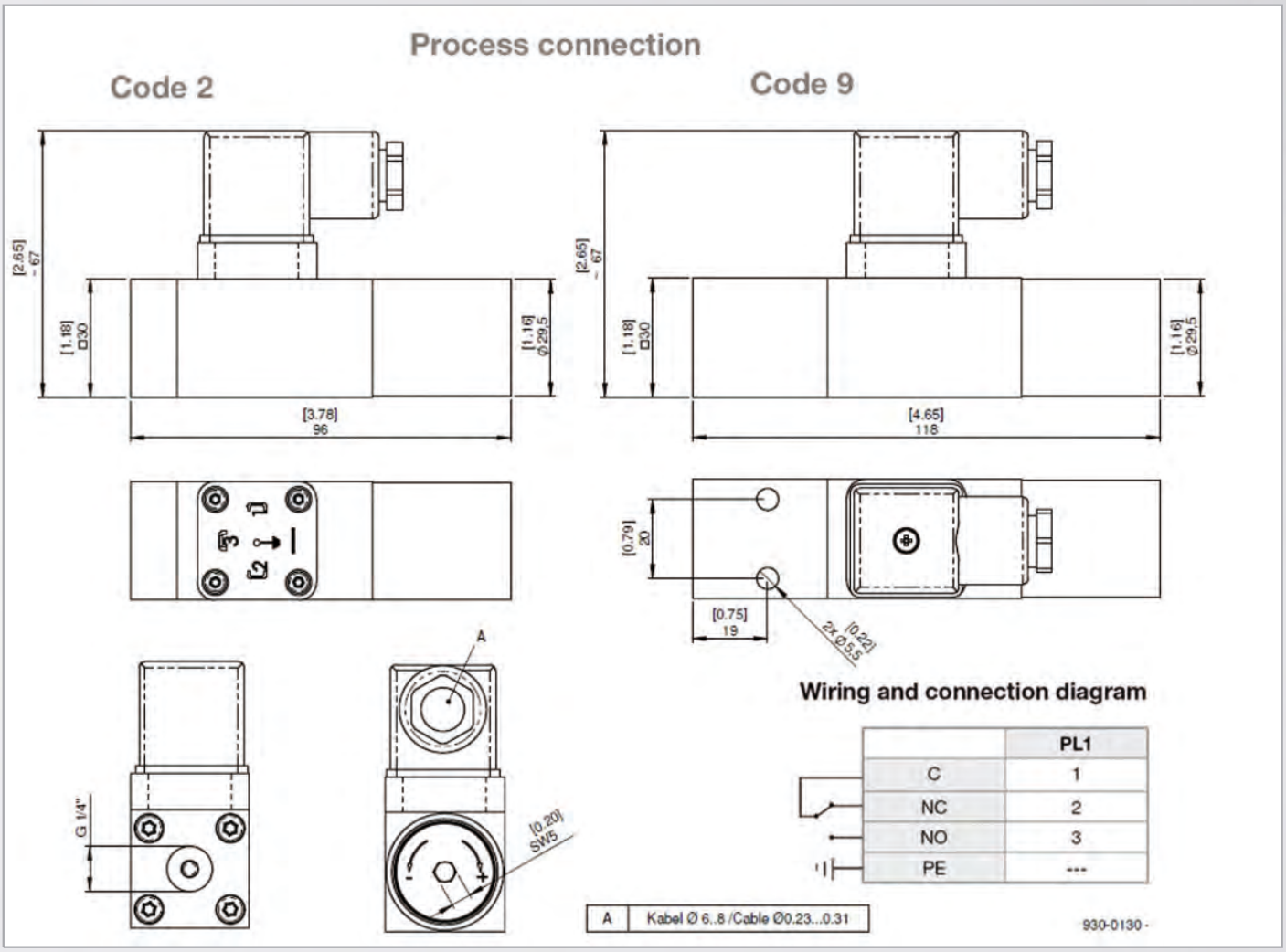
Pressure Ranges

Pressure range code [bar]	Adjustment range		Max. hysteresis at full range max %	Max. operating pressure [bar]	Proof pressure [bar]
	Decreasing press. [bar]	Increasing press. [bar]			(short term)
1	6 ... 44	10 ... 50	10%	250	300
2	15 ... 185	20 ... 200		250	300
3	35 ... 360	40 ... 400		500	600

Process Connection / Electrical Connection / Seal

Process connection	Electrical connection	Seal
(2) G1/4" IG DIN ISO 228-1 (9) G1/4" IG DIN ISO 228-1 with 2 mounting wholes (Ø 5,5mm / 20mm distance)	(PL1) Plug, 4-pin acc. to EN 175301-803-A	(V) FKM (B) NBR (E) EPDM

Dimensions (mm / *inch*)



Electrical Ratings

Micro switch	Special features	Volt AC 50/60 Hz	Ind. Load A	Res. Load A	Volt DC	Ind. Load A	Res. Load A	Minimum capacitance
1	Silver contacts	250 V~	2.5	10.0	24 V=	1.0	6.0	20 mA at 24 VDC

Approvals

GL	Germanischer Lloyd
BV	Bureau Veritas

Order Code

Example for order number

Type	Process connection	Pressure range	Micro switch contact		Electrical connection		Seal		Approvals
9	2	2	1	-	PL1	-	V	-	GL
Your order number									
9	2		1	-	PL1	-		-	

Compact Pressure Switches

KLK/KLM

Piston pressure switch Type KLK
Repeatability ±1.0 % typical
Diaphragm seal pressure switch Type KLM
Repeatability ±2.0 % typical



Features

OEM pressure switch series,
Compact design,
Threaded connection
Factory settings only fully tamper proof.

Adjustment ranges

1 ... 400 bar

Applications

Mobile hydraulics,
Motor control,
Hydraulic clamping

Technical Data

Wetted parts: ....Type KLK / KLM	NBR, PTFE Brass, roller bearing steel (KLK) Stainless steel (KLM)
Repeatability: Type KLK: Type KLM:	 ±1 % typical ±2 % typical
Switching rate: ....Type KLK: ....Type KLM:	 max. 60/min max. 30/min
Temperature range: ....Type KLK: ....Type KLM:	 -40 °C... +80 °C -20 °C... +80 °C
Protection class: ....Silicone cable (K2): ....Plug connector (S1):	 IP67 / IP69K optional IP65
Housing: ....Type KLK / KLM	Brass and stainless steel

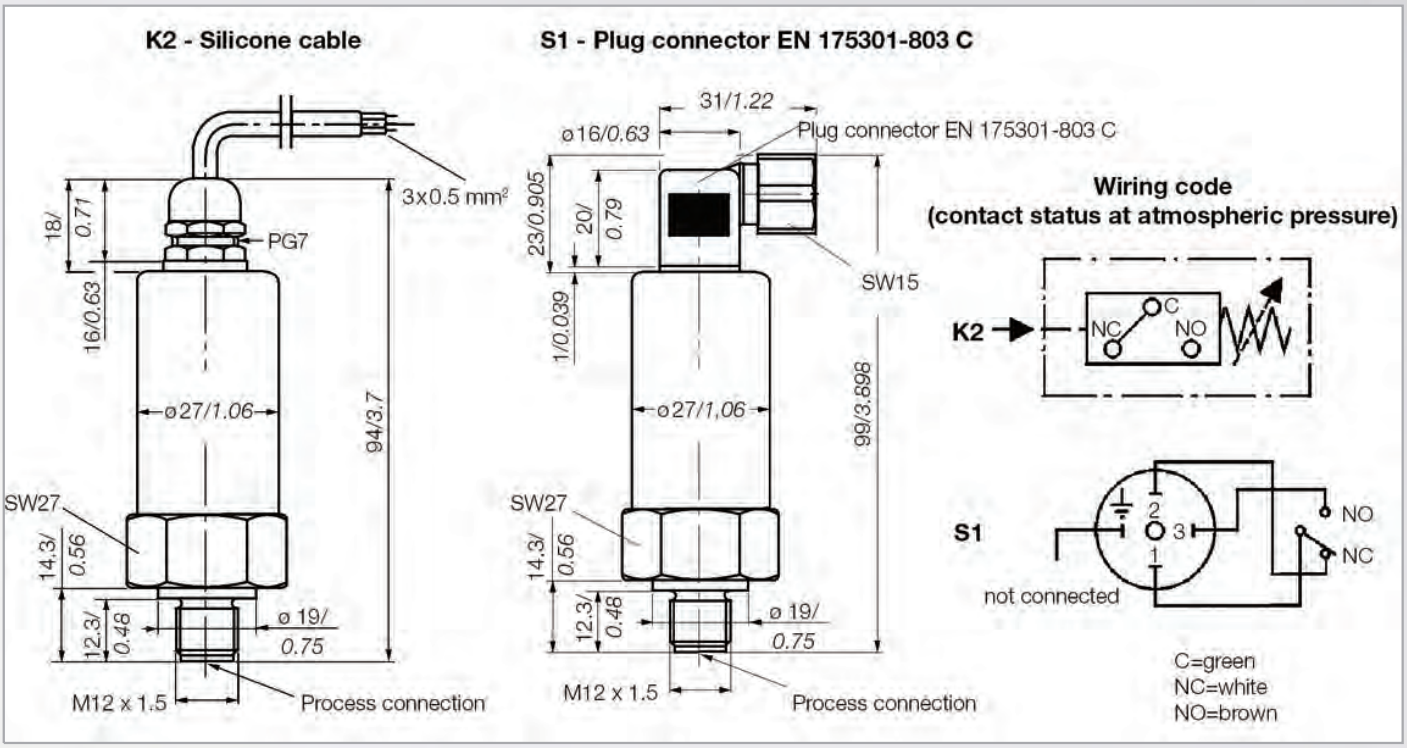
Process connection:	M12 x 1.5 mm male G1/4 male other connections on request
Electrical connection:	Silicone cable (K2) Plug connector (S1)
Electrical ratings capacity and hysteresis:	A large variety of micro switches offers different electrical ratings and hysteresis for many applications.
Weight: Type KLK: Type KLM:	 0.2 kg approx. 0.2 kg approx.
Set point adjustment:	Factory set
Intrinsically safe:	A large variety of micro switches offers different electrical ratings and hysteresis for many applications.
Approval:	Exi = Ex ia approval, further approval on request

Pressure Ranges

* Higher operating pressure (up to 150 bar) (with proof pressure 200 bar) on request. Please add to your order!

Pressure range code	Adjustment range [bar]	Proof pressure [bar]	Max. operating pressure [bar]	Max. hysteresis [bar]
	Increasing pressure	short term		end of range
KLM-006	1 ... 6	80 /200*	40*	0.6
KLM-025	5 ... 25	80 /200*	40*	2.6
KLM-040	10 ... 40	80 /200*	40*	3.8
KLK-100	30 ... 100	450	300	15
KLK-300	60 ... 300	450	300	30
KLK-400	150 ... 400	600	400	60

Dimensions (mm / *inch*)



Electrical Ratings

Micro switch	Special features	Volt DC	Ind. Load A	Res. Load A	Comments
1	Micro switch with silver contacts	30	3.0	5.0	More information on request.
2	Micro switch with gold-plated contacts	≤ 30	--	≤ 0.4	(U x I = max. 0.12 VA)

Process Connection / Electrical Connection

Process connection	Electrical connection	Diaphragm
(M1) M12 x 1,5 male	(S1) Plug connector, 3-pin + E, EN 175301-803 C	KLK: ( ) NBR
(G1) G1/4 male	(K2) Silicone cable 3 x 0.5 mm²; 600 mm long	KLM: (V) FKM
		KLM: (N) CR
		KLM: (E) EPDM

Options

EXI	for intrinsically safe application
HP (KLM only)	operating pressure up to 150 bar
IP69K (K2 only)	for Heavy Duty application

Order Code

Example for order number

Type		Type		Pressure range code		Process connection		Electr. connection		Micro switch		Diaphragm		Option
KLK	or	KLM	-	025	-	G1	-	S1	-	2	-	V	-	EXI

Your order number

Type		Type		Pressure range code		Process connection		Electr. connection		Micro switch		Diaphragm		Option
KLK	or	KLM	-		-		-		-		-		-	

Compact Piston Pressure Switches KD1

Mechanical piston pressure switch
Repeatability ±1.0 % typical



Features

OEM pressure switch,
Factory setting only fully tamper proof.
Larger deadband for pump controlling

Adjustment ranges

30 ... 300 bar

Applications

Building and agricultural machines,
Brake system control,
Hydraulic accumulator control

Technical Data

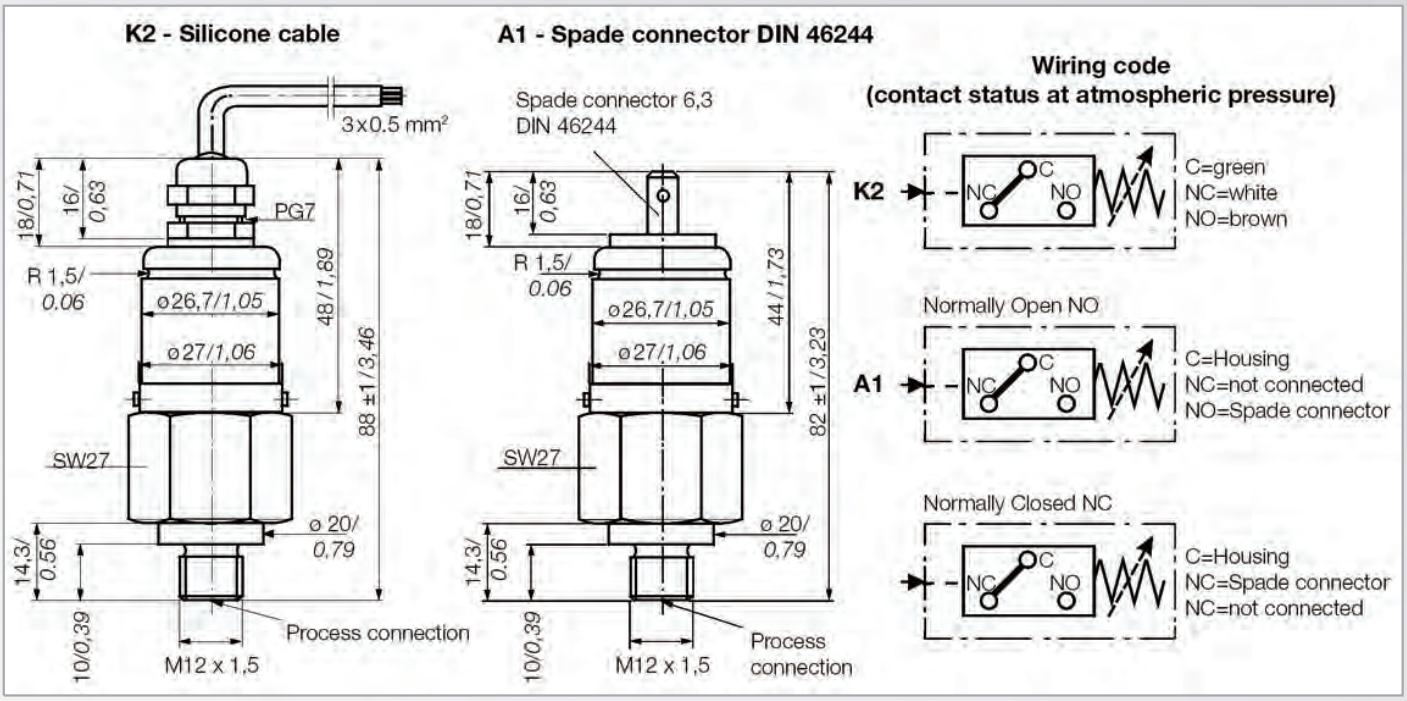
Wetted parts:	NBR, PTFE Brass, roller bearing steel
Repeatability:	±1 % typical
Switching rate:	max. 60/min
Temperature range:	-40 °C... +80 °C
Protection class: Silicone cable (K2): Spade connector (A1):	 IP67 IP65
Housing:	Compact housing made of brass and stainless steel

Process connection:	M12 x 1.5 male thread Other connections on request
Electrical connection:	Silicone cable (K2) Spade connector DIN 46244 (A1)
Electrical ratings and hysteresis:	Hysteresis factory set, see diagrams
Weight:	KD1-...: approx. 0.2 kg
Set point adjustment:	Factory set
Approval:	---

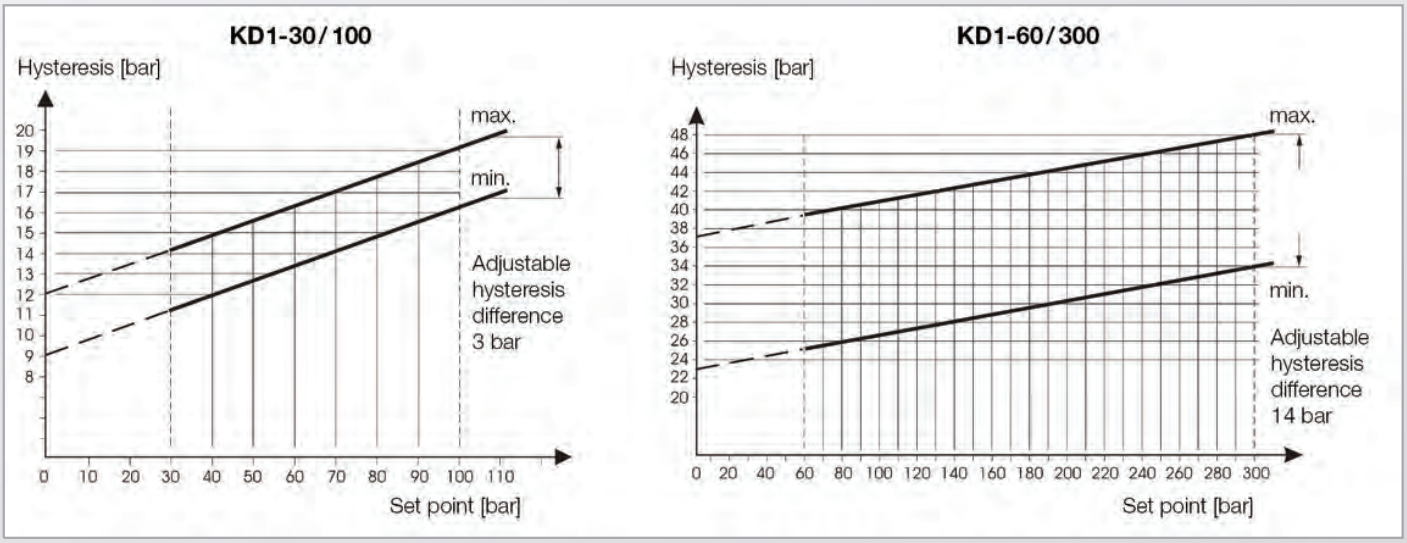
Pressure Ranges

Pressure range code	Adjustment range [bar]	Proof pressure [bar]	Max. operating pressure [bar]	Max. hysteresis [bar]
	Increasing pressure	short term		end of range
KD1-30 / 100	30 ... 100	450	300	16.5 ... 19
KD1-60 / 300	60 ... 300	450	300	34.0 ... 48

Dimensions (mm / *inch*)



Hysteresis Diagram KD1



Electrical Ratings

Special features	Volt DC	Ind. load A	Res. load A	Comments
Micro switch with silver contacts	30	3	3	More information on request.

Electrical Connection

Electrical connection	Options and accessories
(K2) Silicone cable 3 x 0.5 mm2; 600 mm long	(K1) EPD cable, 600 mm long
(A1) Spade connector 6,3 DIN 46244; green	(A2) Spade connector 6,3 DIN 46244; blue

Notes

Notes

Experts

Specialists for monitoring and control of

- Pressure
- Temperature
- Level
- Flow

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Product overview



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