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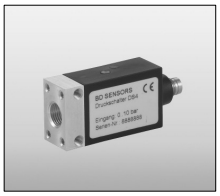
BD SENSORS pressure measurement

Operating Manual CE

Electronic Pressure Switch DS 4



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The addresses of our distribution partners are listed on our homepage **www.bdsensors.com**. It is possible to download data sheets, operating manuals, ordering codes and certificates, as well.

1. General information

1.1 Information on the operating manual

This operating manual contains important information on proper usage of the device. Read this operating manual carefully before installing and starting up the pressure measuring device.

Adhere to the safety notes and operating instructions which are given in the operating manual. Additionally applicable regulations regarding occupational safety, accident prevention as well as national installation standards and engineering rules must be complied with!

This operating manual is part of the device, must be kept nearest its location, always accessible to all employees.

1.2 Symbols used

⚠ DANGER! – dangerous situation, which may result in death or serious injuries

⚠ WARNING! – potentially dangerous situation, which may result in death or serious injuries

⚠ CAUTION! – potentially dangerous situation, which may result in minor injuries

! CAUTION! – potentially dangerous situation, which may result in physical damage

☞ NOTE – tips and information to ensure a failure-free operation

1.3 Target group

⚠ WARNING! To avoid operator hazards and damages of the device, the following instructions have to be worked out by qualified technical personnel.

1.4 Limitation of liability

By non-observance of the operating manual, inappropriate use, modification or damage, no liability is assumed and warranty claims will be excluded.

1.5 Intended use

- The electronic pressure switch DS 4 has been designed for pneumatics and vacuum applications. Due to the materials aluminium for the pressure port and silicon for the pressure sensor, the DS 4 is suited for use with non-aggressive gases or compressed air. The housing for the switching electronics consists of PA 6.6. The new microcontroller switching electronics offer – besides the standard functions – many additional features for an optimal adaptation to the measuring requirements. The one or two freely programmable contacts whose status is indicated by differently coloured LEDs can be quickly and comfortably configured either by means of the optionally available configuration kit CIS 680 or CIS 681 or the programming device P6.
- It is the operator's responsibility to check and verify the suitability of the device for the intended application. If any doubts remain, please contact our sales department in order to ensure proper usage. BD SENSORS is not liable for any incorrect selections and their effects!
- The technical data listed in the current data sheet are engaging and must be complied with. If the data sheet is not available, please order or download it from our homepage. (http://www.bdsensors.com/products/download/datasheets)

⚠ WARNING! – Danger through improper usage!

1.6 Package contents

Please verify that all listed parts are undamaged included in the delivery and check for consistency specified in your order:

- pressure switch DS 4
- mounting instructions

2. Product identification

The device can be identified by its manufacturing label. It provides the most important data. By the ordering code the product can be clearly identified.

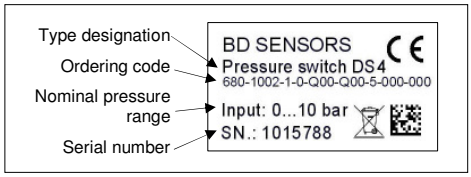


Fig. 1 manufacturing label

! The manufacturing label must not be removed from the device!

3. Installation

3.1 Mounting and safety instructions

⚠ WARNING! Install the device only when depressurized and currentless!

⚠ WARNING! This device may only be installed by qualified technical personnel who has read and understood the operating manual!

! Handle this high-sensitive electronic precision measuring device with care, both in packed and unpacked condition!

! There are no modifications/changes to be made on the device.

! Do not throw the package/device!

! To avoid damaging the diaphragm, remove packaging directly before starting assembly.

! Handle the unprotected diaphragm very carefully - it is very sensitive and may be easily damaged.

! Do not use any force when installing the device to prevent damage of the device and the plant!

☞ Take note that no assembly stress occurs at the pressure port, since this may cause a shifting of the characteristic curve.

☞ In hydraulic systems, position the device in such a way that the pressure port points upward (ventilation).

3.2 General installation steps

- Carefully remove the pressure measuring device from the package and dispose of the package properly.
- Then go ahead as detailed in the specific instructions below.

3.3 Installation steps for internal thread G1/8"

- Use a suitable seal for sealing, e. g. Teflon strip, flat gasket or O-ring, on the screwed end of the counterpart.
- Ensure that the surface of the taking part is perfectly smooth and clean.
- Tighten the counterpart with a wrench (max. torque 3 Nm).

3.4 Installation steps for internal thread M5

- For sealing use an O-ring that fits properly into the groove. (O-ring is not included in the scope of delivery)
- Ensure that the surface of the counterpart is perfectly smooth and clean.
- Screw the counterpart (e.g. screw connection, quick coupling) by hand into the pressure switch.
- Tighten the counterpart with a wrench (max. torque 1 Nm).

3.5 Installation steps for flange mounting (possible with internal thread M5)

- For sealing use an O-ring that fits properly into the groove. (O-ring is not included in the scope of delivery)
- Ensure that the surface of the counterpart is perfectly smooth and clean.
- There are 4 threads (M3) for flange mounting.
- Install the device with 2 or 4 screws on the intended flange. When using low pressure ranges and usual conditions for the application are given, 2 screws will suffice.
- Tighten the screws; the surfaces of pressure switch and counterpart must bear on each other.

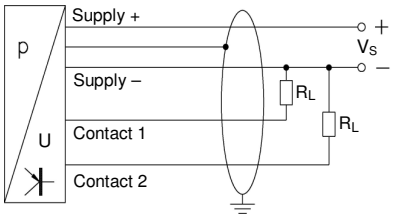
4. Electrical Installation

⚠ WARNING! Install the device in currentless environments only!

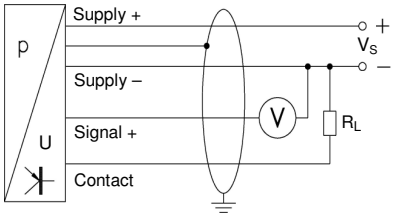
Establish the electrical connection of the device according to the technical data shown on the manufacturing label, the following table and the respective wiring diagram.

Wiring diagrams:

without analogue output



with analogue output



Pin configuration:

Electrical connection	M8x1 (4-pin)
Supply +	1
Supply –	3
Signal + (for analogue output)	2
Contact 1	4
Contact 2	2

☞ For the electrical connection a shielded and twisted multicore cable is recommended.

5. Initial start-up

⚠ WARNING! Before start-up, the user has to check for proper installation and for any visible defects.

⚠ WARNING! The device can be started and operated by authorized personnel only, who have read and understood the operating manual!

⚠ WARNING! The device has to be used within the technical specifications, only (compare the data in the data sheet)!

6. Operation

Set point adjustment – factory set

The set points are factory set either to ordered values or to BD SENSORS standard:

Switching function	n/o (normally opened)
Switching mode	hysteresis mode
Switch on point	80 % FSO
Switch off point	75 % FSO
Switch on/switch off delay	off

Set point adjustment – user specific

Every DS 4 can be quickly and comfortably configured either by means of the optionally available configuration kits CIS 680 or CIS 681 as well as the programming device P6. These devices can be ordered as accessories from BD SENSORS. In the following, a short description of these possibilities is given:

Configuration via configuration kit

The DS 4 can be connected to a PC via the programming adapter and configured by the programming-software P-Set. The setting of the following parameters for both set points is possible:

- operation mode (hysteresis or window mode)
- switch-on and switch-off point
- set point negation
- switch on and switch off delay

The programming adapter is part of the programming kits CIS 680 and CIS 681 which contains i.a. a CD-ROM with the configuration software P-Set. All cables required for connecting the pressure switch have to be plugged to the programming adapter (included in scope of delivery). The user only requires a Windows® PC with serial interface (CIS 680) or USB-interface (CIS 681).
Installing the configuration software P-Set is very easy. P-Set runs on all Windows® PC's (95, 98, ME, 2000, NT, XP).

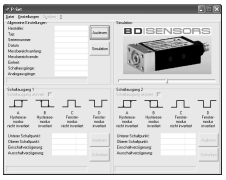


Fig. 2 Programming Software

Fig. 3 Programming adapter

Configuration via hand-held programming device P6

The programming device P6 is simply plugged between DS 4 and the female connector. Via two push-buttons and a 4-digit LED display, all possible settings can be realized. The menu system of the device includes 27 menus and is easy to handle. The following menus are – among others – available for configuration:

- read all and store all
- operation mode (for both set points)
- switch-on and switch-off point (for both set points)
- set point negation (for both set points)
- switch on and switch off delay (for both set points)
- teach switch-on and switch-off point (for both set points)
- load of stored configurations
- storage off current configurations
- showing the current pressure value
- showing the limits of the measuring range

Fig. 4 Programming device P 6

7. Placing out of service

⚠ WARNING! When dismantling the device, it must always be done in the depressurized and currentless condition! Check also if the medium has to be drained off before dismantling!

⚠ WARNING! Depending on the medium, it may cause danger for the user. Comply therefore with adequate precautions for purification.

8. Maintenance

In principle, this device is maintenance-free. If desired, the housing of the device can be cleaned when switched of using a damp cloth and non-aggressive cleaning solutions.

Depending on the measuring medium, however, the diaphragm may be polluted or coated with deposit. If the medium is known for such tendencies, the user has to set appropriate cleaning intervals. After placing the device out of service correctly, the diaphragm can usually be cleaned carefully with a non-aggressive cleaning solution and a soft brush or sponge. If the diaphragm is calcified, it is recommended to send the device to BD SENSORS for decalcification. Please read therefore the chapter "Repair" below.

! An incorrect cleaning can cause irreparable damages on diaphragm. Never use spiky objects or pressured air for cleaning the diaphragm.

9. Return

Before every return of your device, whether for decalcification, modifications or repair, it is necessary to contact us to ensure a fast handling of your request. Please inform us by sending an email to: return@bdsensors.de. Include the number of devices sent and request a RMA. Then clean the device and pack it shatterproof before send it to BD SENSORS indicating the RMA.

10. Disposal

The device must be disposed according to the European Directives 2002/96/EG and 2003/108/EG (on waste electrical and electronic equipment) Waste of electrical and electronic equipment may not be disposed by domestic refuse!

⚠ WARNING! Depending on the measuring medium, deposit on the device may cause danger for the user and the environment. Comply with adequate precautions for purification and dispose of it properly.

11. Warranty conditions

The warranty conditions are subject to the legal warranty period of 24 months from the date of delivery. In case of improper use, modifications of or damages to the device, we do not accept warranty claims. Damaged diaphragms will also not be accepted. Furthermore, defects due to normal wear are not subject to warranty services.

12. Error handling

Malfunction	Possible cause	Error detection / corrective
no analogue output signal	line break	inspect all connecting lines and the connector plugs
	defective ampere meter	inspect the ampere meter (fine-wire fuse) or the analogue input of the following device
analogue output signal too low	load resistance too low	verify the value of the load resistance.
	supply voltage too low	verify the output voltage of the power supply
no switch signal although LEDs are working	line break	inspect all connecting lines of the contacts (including the connecting plugs)
no switch signal and LEDs are not working	wrong setting of the set points	verify that all switch parameters are useful and permitted (e.g. the set parameters must lie within the applied pressure range)
device does not respond to pressure change	defective sensor	please send the device for inspection to our service address
little shift of the output signal	diaphragm is contaminated	if a contamination is suspected, please send the device to BD SENSORS for repair
large shift of the output signal	diaphragm is damaged	if damage (e. g. by overpressure) is suspected, please send the device to BD SENSORS for repair

If you detect an error, please try to eliminate it by using this table or send the device to our service address for repair.

! Improper action and opening can damage the device. Therefore repairs on the device may only be executed by the manufacturer**!**

13. Declaration of conformity / CE

The delivered device fulfils all legal requirements. The applied directives, harmonised standards and documents are listed in the EC declaration of conformity, which is available online at: http://www.bdsensors.com/products/download/certificates.
Additionally, the operational safety is confirmed by the CE sign on the manufacturing label.