

Operating Manual 

Pressure Switch DS 6



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## 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.


This operating manual is copyrighted. The contents of this operating manual reflect the version available at the time of printing. It has been issued to our best knowledge. However, errors may have occurred. BD SENSORS is not liable for any incorrect statements and their effects.

– Technical modifications reserved –

## 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 6 has been designed for universal use. Preferred areas of use are, among others, machine building industry, hydraulics, measurement, and controls. Media wetted materials are stainless steel for the pressure port, ceramics  $Al_2O_3$  for the pressure sensor, and FKM or NBR for the seals. These materials have been chosen particularly in order to achieve high media compatibility even in standard version. 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 kits CIS 685 or CIS 686 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!
- It has to be ensured, that this medium is compatible with the media wetted parts.
- 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 6
- 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.

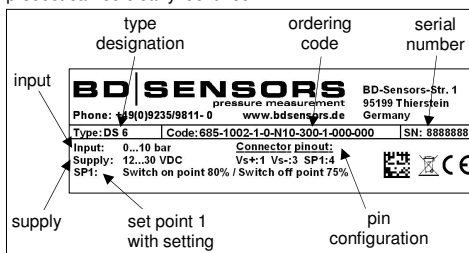






Fig.1 manufacturing label

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


## 3. Mechanical 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!


-  DANGER! Explosion hazard, with devices for oxygen applications, when used improperly. To ensure a usage without danger, the following points must be adhered to:


- Make sure, your device has been ordered and delivered as a special version for oxygen applications. You can check the manufacturing label (see figure 1). If the ordering code ends with "007", then the device is suitable for oxygen applications.
- At time of delivery the device is packed into a plastic bag in order to prevent it from impurity. Please observe the indication label "Device for oxygen, unpack only directly before assembling". Also, avoid any skin contacts during unpacking and assembly, in order to prevent greasy residues on the device.
- During installation, the respective explosion protection regulations have to be met. Check, if ATEX-approval is necessary for this type (oxygen) device. (the delivered device has no ATEX-approval)
- Note the entire design requirements meet the standard demand of BAM (DIN 19247).
- For devices with oxygen capability up to 50 bar, o-rings V747-75 with BAM-approval are being used. The max. capabilities allowed, are 40 bar/130° C and 50 bar/100° C.
- For devices with oxygen capability over 50 bar, o-rings FKM 90 are being used. These have been tested up to 95° C and 215 bar in the scientific coal research institute in Ostrava – CZ.


-  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 and protective cap directly before starting assembly. The delivered protective cap has to be stored!


-  Place the protective cap on the pressure port again immediately after disassembling.

-  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!

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


-  Provide a cooling line when using the device in steam piping.

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

## 3.2 Installation steps

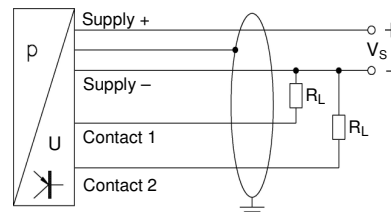
- Carefully remove the pressure measuring device from the package and dispose of the package properly.
- Check to ensure that the O-ring fits properly into the groove (seal is supplied with device).
- Ensure that the surface on which the seal should be placed is perfectly smooth and clean.
- Screw the pressure switch by hand into the thread and tighten it with a wrench (torque approx. 5 Nm).

## 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 diagram:



## Pin configuration:

Electrical connection	M12x1 (5-pin)
Supply +	1
Supply -	3
Contact 1	4
Contact 2	5
Shield	plug housing

-  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 6 can be quickly and comfortably configured either by means of the optionally available configuration kits CIS 685 or CIS 686 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 6 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 685 and CIS 686 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 685) or USB-interface (CIS 686). Installing the configuration software P-Set is very easy. P-Set runs on all Windows® PC's (95, 98, ME, 2000, NT, XP).

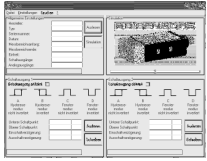


Fig. 2 Programming Software



Fig. 3 Programming adapter

### Configuration via programming device P6

The programming device P6 is simply plugged between DS 6 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
- switch-on and switch-off point
- set point negation
- switch on and switch off delay
- teach switch-on and switch-off point
- 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 off 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

### 9.1 Recalibration

During the life-time of a transmitter, the value of offset and span may shift. As a consequence, a deviating signal value in reference to the nominal pressure range starting point or end point may be transmitted. If one of these two phenomena occurs after prolonged use, a recalibration is recommended to ensure furthermore high accuracy.

### 9.2 Return

Upon every return of the device, no matter if for recalibration, decalcification, modifications or repair, it is necessary to contact us to guarantee a quick execution of your request. Please inform us by sending an email to: [return@bdsensors.de](mailto:return@bdsensors.de). Include the number of devices sent and request a RMA. Afterwards clean the device, pack it shatterproof and 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 output signal although LEDs are working	line break	inspect all connecting lines of the contacts (including the connecting plugs)
no output 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 a 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.