USER MANUAL

PRESSURE METER

PCE-PDA SERIES

ENGLISH



User manuals in various languages (français, italiano, español, português, nederlands, türk, polski) can be found via our product search on:
www.pce-instruments.com

GENERAL

These instructions for use describes the functions of the digital pressure gauge PCE-PDA and provide the user directions for its use.

Safety Warning
Incorrect use of the digital pressure gauge PCE-PDA or non-performance of these instructions can result in damage of the instrument or an injury of the operator. All personnel responsible for the operation of the instrument must be properly trained and informed about the dangers and must carefully follow these instructions for use and safety directions, see further in this document.

Pressure Measuring
Pressure measuring by means of the digital pressure gauge PCE-PDA starts immediately after connecting pressure on the positive pressure input (2) = measuring of the relative overpressure or the negative pressure input (1) = measuring the relative underpressure. If both the relative and negative outputs are connected at the same time to different pressures, the PCE-PDA gauge measures the pressure difference. This data is displayed on the main display (6). If the nominal pressure range is exceeded 2.4 times, the main display will show OL = overload.
Overload is indicated on the secondary display by means of signs - - - -



If the gauge cannot display the measured pressure in the chosen unit, it will display OL and - - - -. Thus pay attention to a proper setting of the unit in accordance to the nominal pressure of the gauge.

Permitted Measured Media
The PCE-PDA gauge is constructed only for measuring non-aggressive gases and non- aggressive liquids. In case of connecting to an unsuitable media, the gauge can be unretrievably damaged. If you are not sure about the character of the measured medium, please contact your distributor.

Symbols
The below mentioned symbols are used in these instructions for use to indicate the cases when incorrect activity might result in the following difficulties:



PROHIBITIONS – non-observance of them could result in bodily harm or to irretrievable damage of the PCE-PDA gauge.



RECOMMENDATIONS – they warn about different difficulties of the operation. Non-observance of them can result in the gauge dysfunction or wrong measurement.



TIPS – help and advise the user to use the gauge correctly.

INSTRUMENT DESCRIPTION

The digital pressure gauge series PCE-PDA is a battery portable service and workshop device, intended for a wide use in industry, energetics, medical technology, air-conditioning, laboratories, etc. It is also suitable for the 4Pa test. Its advantages are especially measuring accuracy, a wide pressure range, possibility of a ten times increase of sensibility, simple operation, small dimensions, low consumption, a big amount of additional functions, USB communication through a standard microUSB cable. The manual multifunctional pressure gauge PCE-PDA is fitted into an ergonomically shaped casing from quality ABS plastic, rubberized on the sides. The front side of the gauge is dominated by a big graphic display with white backlights, covered with a foil keyboard with nine control buttons. For measuring pressure ranges higher than 100 Pa, it is allowed to measure both gas and liquid non-aggressive media, but gauges for ranges lower than 100 Pa allow to measure only non-aggressive gases.

1 - negative pressure input
2 - positive pressure input
3 - battery state indicator
4 - time
5 - date
6 - main display
7 - datalogger state indicator
8 - pressure unit
9 - 10 x increase of sensitivity
10 - secondary display
11 - help line
12 - offset zeroing button
13 - menu button
14 - on / off button
15 - OK button
16 - navigating buttons (UP/ DOWN/RIGHT/LEFT)
17 - backlight on / off button
18 - microUSB connector
19 - ABS casing
20 - anti-slip rubber



TECHNICAL PARAMETERS

Model	PCE-PDA 1L	PCE-PDA 01L	PCE-PDA A100L	PCE-PDA 100L	PCE-PDA 10L	PCE-PDA 1000L
Nominal pressure range	2 kPa	200 Pa	200 kPa	200 kPa	20 kPa	2000 kPa
Pressure measurement range	±2 kPa	±200 Pa	0 ... 200 kPa absolute	-100 ... 200kPa	±20 kPa	-100 ... 2000kPa
Max. overpressure	10 kPa	1 kPa	200 kPa	300 kPa	40 kPa	2000 kPa
Burst pressure	100 kPa	20 kPa	300 kPa	400 kPa	100 kPa	3000 kPa
Accuracy	±0.5 % f.s.	±1 % f.s.	±0.5 % f.s.	±0.5 % f.s.	±0.5 % f.s.	±0.5 % f.s.
Way of pressure measuring	Differential	Differential	Absolute	Differential	Differential	Relative
Pressure connection	inlet for a quick coupler 5mm					
Operating temperature range	0 ... +50 °C					
Storage temperature	10 ... 55 °C					
Protection (case)	IP 41					
Power supply	2 x 1.5 V AA battery / 1.2 V rechargeable NiMh battery					
Current consumption	50 mA with backlight, 10 mA without backlight					
External dimensions	145 x 85 x 35 mm					
Weight (with battery)	Approx. 285 g					

A differential pressure gauge with a disconnected negative pressure input measures relative pressure.

CONTROL

PCE-PDA is controlled by means of a 9-button foil keyboard, situated on the front side of the gauge.

» ON/OFF – serves for switching on and off of the gauge. For switching it on/off, itis necessary to hold the button for 0.25s.

» ZERO – serves for resetting the offset, or rather modification of the initialmeasuring level. When the inlets are disconnected from the measured pressure orthe positive inlets and the zero button. A successful reset is confirmed by asound signal. But if the pressure is connected and the zero button is pressed,the gauge will be reset to the currently connected pressure level, so called taring.When the pressure is disconnected, the gauge will display the value of the tarepressure, but with the opposite sign. The zero button also resets the numeric values of the adjustable items in themenu. After the cursor is clicked on the numeric value and the zero button isheld, the value will be adjusted to zero.



But zero does not necessarily have to be the default value!

» MENU – serves as entry/return to the basic menu

» LIGHT – serves for switching on/off of the display backlights.

» OK – serves for the choice confirmation in the menu or for confirmation of theadjusted values

» UP/DOWN/RIGHT/LEFT – navigating buttons serve for the movement of the cursor in the menuand adjusting the requested values. They can also have different uses according tothe chosen function. See the help line.

MENU

The menu is entered by means of the MENU button. This way are displayed the actual possible adjustments and accessible functions of the given version of PCE-PDA. Cursor is moved by means of the UP/DOWN/RIGHT/LEFT buttons and the values are confirmed by the OK button.

Sensitivity
The sensitivity function enables the user a ten times increase of the gauge sensitivity and also definition on the main display by 1 digit. But the accuracy of the gauge remains unchanged, e.g. 0.5% of the nominal range. Switching on/off of the function is indicated by an icon on the main display.

Damping
Damping in the PCE-PDA gauge is realized by means of an adjustable time constant, in the range 0.1 ... 9.9 second. It is possible to switch it on/off directly from the menu or whenever during the measuring by means of the < DAMP button, see the help line. Switching it on/off is confirmed by a sound signal.

Unit
The user can choose from 17 pressure units. They are units of the SI and Pascal systems and their multiples, but also units used in other different branches. The choice is executed by the UP/DOWN/RIGHT/LEFT buttons and the confirmation by the OK button. The chosen unit is related to the pressure values on the main display, to the values on the secondary display and also to the ± limit of the pressure difference in the leakage test.

FUNCTIONS

Temperature
It is possible to display the temperature on the pressure sensor bridge on the secondary display. While measuring the medium pressure with the same temperature as the environment, we can say that it is the orienteering temperature of the environment. The temperature is given in degrees of Celsius. Calibration and the declared gauge accuracy are not related to the temperature data.

MIN / MAX
The max/min function is designed for detection of both positive and negative pressure peaks and impacts with the time constant >100ms. The gauge measures with a period of 1/10s, faster events might not be detected. The result of this measuring is again displayed on the secondary display. The actual maximum and also minimum can be reset by means of the INIT> button.

Leakage Test
This enables the user measuring of a pressure change in the adjusted time period (test time). The test is started by the ^START button. If the test time is adjusted to 00:00:00, the test runs to pressing the vSTOP button, otherwise it is stopped automatically according to the adjusted time. It is also possible to adjust the ± limit of the pressure difference, if it is exceeded, it is announced by a sound signal and the value of the pressure difference flashes on the secondary display. If the test is not switched on, it is possible to initialize the pre-adjusted values by the INIT> button.
If the data function is activated, the record is started together with the leakage test by the ^START button and is stopped by the vSTOP button.

Speed/Flow (Root function)
The PCE-PDA gauge carries out the calculation of the flow speed on the basis of measuring the differential pressure on the plate. These plates can for example be Pitot´s tube, Prandtl´s tube or another throttling organ. The plate properties are represented by the K constant and a power constant x. The K constant has the default value 1 and can gain values 0 ... 9.999.
The x constant has the default value ½ (0.5000 – square root) and can be adjusted to the value 0,0001 to 0.9999. It is also necessary to set the density of the measured medium ρ(ró) (default air 1.29 kg/m3) and the section of the measured pipe S.

This relation is valid for the speed calculation:

$$v = k \times \left(\frac{2dP}{\rho} \right)^{x} [m/s]$$

Where:
v=flow speed,
k=plate constant,
dP= measured differential pressure,
ρ=measured medium density in kg/m^3,
x=power constant

For the flow calculation:

$$Q = v \times S\left[m^3/s\right]$$

Where:
Q=flow,
v= measured flow speed,
S=section in m^2

None
With the choice None function, the secondary display remains blank.

Hold Function
The HOLD function holds the actual measured pressure value on the main display. It is active after pressing the UP/DOWN/RIGHT/LEFT button HOLD>. After it is released, the main display shows values according to the actual adjustment of the PCE-PDA.

Datalogger
- Number of records in one or up to 1000 sets.
- Measuring time 1s ... 256 hours. If the measuring time is 000:00:00, the record runstill pressing the REC OFFv or STOPv button (leakage test, datalogger) or filling up thememory.
- Record period 1s ... 24 hours.

Recording to the datalogger must be allowed in the menu by pressing data recording, which is displayed on the display by datalogger state indicator. The figure to the right of it displays % of filling up the datalogger memory. If the record is allowed, the ^REC ON button is displayed at all functions, after its pressing the record to the memory is started. The record is indicated by a rotating arrow in the icon datalogger state indicator. The REC OFFv button serves for stopping the record.

The record format in the datalogger memory:

Characteristic	Date & time	Temperature	Pressure	Unit	Sec. value 1	Unit 1	Sec. value 2	Unit2

Record into the datalogger in the Sleep mode. This record mode is used for long-term measuring with a longer record period with respect to the battery life. For the activation of the sleep mode, it is necessary to start the record into the datalogger by means of the ^REC ON or ^START button and then it is enough to switch off the gauge by pressing the Gauge on/ off button. The gauge is then switched on automatically only for the record of values to the datalogger memory. If the sleep mode is active, the datalogger state indicator is displayed with a 5s period.

Backlights
The PCE-PDA gauge display backlights are switched on and off by means of the light button. It can also be adjusted in the menu\backlights. The user can change:

» Brightness (0=without backlights, 5=maximum brightness).

» Contrast (0=minimum contrast, 5=maximum contrast).

» Time before automatic switching off of the backlights stated in minutes (0=withoutbacklights time limit, 5=5minutes).



The time of battery operation depends on the brightness of the display backlights and the time it is switched on.

Time / Date
The time is stated in the format hh:mm:ss
The date in the format dd:mm:yyyy
The information about the date and the time remain in the gauge's display for approx. 5 minutes when the power supply is disconnected.

Info about the instrument
A part of the Info about the instrument is the type of the instrument, the pressure range of the instrument, the serial number of the instrument and the version of the firmware and also the language option. The option Factory setting returns by the confirmation YES all settings to the values saved at the construction.

POWER SUPPLY AND CHARGING

Power Supply
PCE-PDA can be power supplied from two pieces of AA batteries or two pieces of AA rechargeable accumulators. When inserting the batteries, it is necessary to observe the right polarity, see the label placed at the bottom of the battery space. It is also possible to power supply the gauge by means of a USB supply (5V and 500mA). Always only after the first switch on of the gauge after changing batteries, the display with the choice of batteries appears.



Pay attention to the proper choice of batteries / accumulators. An incorrect choice could damage the gauge.

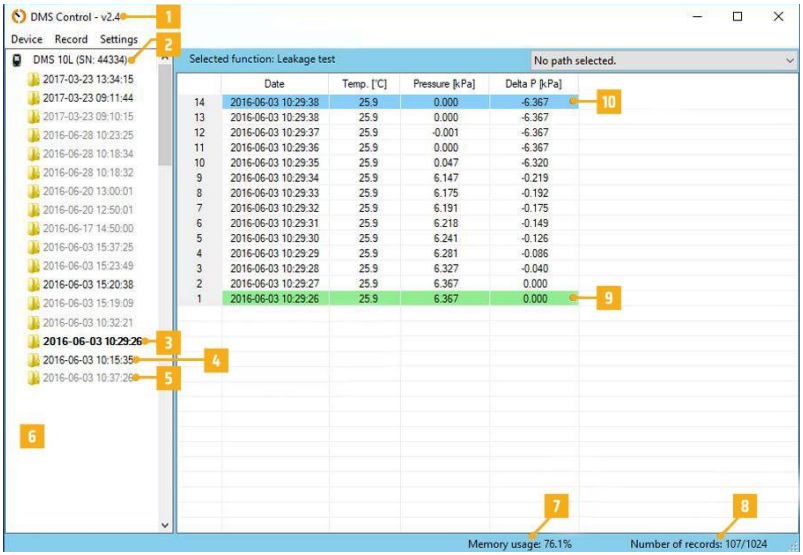
Charging
Charging is done through the USB connector on the bottom side of the gauge. The supply voltage is 5V and the supply current max. 500mA. The battery state indicator situated in the upper part of the display indicates the power supply. In a proper feeding cycle, the battery state indicator changes from zero to the full charge of the accumulators. As soon as the accumulators are fully charged, the feeding current is switched to the keeping current. Indication of this state is again displayed on the battery state indicator by flashing of the last division of the battery icon. The battery state indicator is active during charging also after switching the PCE-PDA gauge off.



It is recommended to charge always by the whole charging cycle (ca. 6 hours at the room temperature). This will prevent early discharge of the accumulators.

DMS CONTROL – SOFTWARE

The DMS Control software is freeware (compatible with Windows XP and later versions) that was developed to control the PCE-PDA portable pressure gauge, but is primarily used to download and save data from the PCE-PDA data logger's memory to a PC.
It can be downloaded from our website.



1 - software version
2 - device type and serial number
3 - active record set (displayed detail)
4 - loaded record set
5 - NO loaded record set
6 - records sets
7 - total memory usage of the datalogger
8 - number of record sets in the logger memory
9 - first entry
10 - last entry

Connection
Before connecting PCE-PDA to PC, shows the DMS-control green progress bar in the left bottom corner. Connection of the device to PC realizes by microUSB cable. After plugin the cable into the connector, basic data are downloaded within 4s from the device.

Description
The DMS-control window is divided into two logical ones sections. In left column is displayed the type of connected device and below it, are displayed record sets.

» NO Loaded record set (gray) – displays only record set name (date and time)

» Loaded record set (black) – data can be displayed in PC.



File is uploaded (user can see them), but data are not saved

» Active record set (black, bold) – applies the same as for a loaded record set, exceptthe fact, that the values of the active record set are displayed in the right section ofthe DMS Control window.

In the right section of the window are displayed concrete data from actual record set.
The individual data from datalogger are clearly displayed in table.
Format of displaying data, can be changed in menu Settings \ Data format \ Simple or Detailed.

» Record order - sorted from oldest to latest

» Sign – information about selected function
First record is marked by green color and sign 128+number of selected function
Last record is marked by blue color and sign 64+ number of selected function
Error record is marked by red color and sign 0 (Zero)

» Date – in format YYYY-MM-DD hh:mm:ss

» Temperature – mentioned in degree Celsius

» Pressure – main measured value

» Unit – of main measured value

» Other columns concern to the selected function

In right bottom corner of DMS control window is situated information about actual datalogger memory usage a number of record sets (max. 1024)

Function

» Refresh records – key F5 reload record sets

» Erase memory – or key Delete deletes data from PCE-PDA datlogger. Erasing isblocked by popup window with question, whether user really wants to delete data.

» Exit – ends DMS Control.

Data uploading

» Record sets can be uploaded individually or in bulk.

» Click on left mouse button choses the record set.

» Double click by left mouse button on PCE-PDA type are all records chosen.

» Uploading record sets is realized by right mouse button or key F2.

Saving data

Data are saved in *.CSV format with values detached by semicolons. Record sets can be saved individually or in bulk. Click on record set by the right mouse button chose save (key F3) or save as (key F4).

» Save – saves data file(s) automatically to preset folder. This folder is displayed andits select is made in top right corner of DMS-control window.

» Save as – data files cannot be saved in bulk and DMS-control asks on target pathevery time.

DISPOSAL

For the disposal of batteries in the EU, the (EU) 2023/1542 directive of the European Parliament applies. Due to the contained pollutants, batteries must not be disposed of as household waste. They must be given to collection points designed for that purpose. In order to comply with the EU directive 2012/19/EU we take our devices back. We either re-use them or give them to a recycling company which disposes of the devices in line with law. For countries outside the EU, batteries and devices should be disposed of in accordance with your local waste regulations. If you have any questions, please contact PCE Instruments.

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