



pHOptica micro

*Fiber Optic pH System
for pH microsensors*

www.wpiinc.com

INSTRUCTION MANUAL

PC-controlled one-channel fiber optic pH system for pH microsensors; excitation wavelength of 470 nm; quartz-quartz glass-fibers of 140 μm outer diameter connected by ST-fiber connectors.



World Precision Instruments

pH*Optica micro*

Specification:

Micro fiber optic pH transmitter for use with
pH microsensors

Software version:

pHOpt (Version 2.0.0)

Document filename: IM_pHOptica-micro_dv2

All rights reserved. No parts of this work may be reproduced in any form or by any means - graphic, electronic, or mechanical, including photocopying, recording, taping, or information storage and retrieval systems - without the written permission of the publisher.

Products that are referred to in this document may be either trademarks and/or registered trademarks of the respective owners. The publisher and the author make no claim to these trademarks.

While every precaution has been taken in the preparation of this document, the publisher and the author assume no responsibility for errors or omissions, or for damages resulting from the use of information contained in this document or from the use of programs and source code that may accompany it. In no event shall the publisher and the author be liable for any loss of profit or any other commercial damage caused or alleged to have been caused directly or indirectly by this document.

Specifications may change without prior notice.

World Precision Instruments, Inc.

USA: International Trade Center, 175 Sarasota Center Boulevard, Sarasota FL 34240-9258 USA
Tel: 941-371-1003 • Fax: 941-377-5428 • E-mail: info@wpiinc.com • Internet: <http://www.wpiinc.com>

Germany: Zossener Str. 55, 10961 Berlin, Germany . Tel: 030-6188845 . Fax: 030-6188670 . E-mail: wptide@wpi-europe.com

China & Hong Kong: WPI Shanghai Trading Co., Ltd. . Tel: +86 688 85517 . E-mail: ChinaSales@china.wpiinc.com

UK: 1 Hunting Gate, Hitchin, Hertfordshire SG4 0TJ . Tel: 44 (0) 1462 424700 . Fax: 44(0) 1462 424701 . E-mail: wpiuk@wpi-europe.com

Table of Contents

1	Preface.....	3
2	Description of the pHOptica micro Transmitter	4
2.1	Scope of Delivery.....	5
2.2	Front Panel	6
2.3	Rear Panel	6
3	Installation	8
3.1	Set-up.....	8
3.2	Software Installation.....	9
3.3	USB Serial Driver Installation	9
4	Operation	12
4.1	Adjustment of Regional Settings of the Operating System	12
4.2	Starting the Device	14
4.3	Calibration	16
4.3.1	Manual Calibration.....	16
4.3.2	Multipoint Calibration	17
4.3.3	Calibration from File.....	19
4.3.4	Auto Zero	20
4.4	Measurement.....	22
4.4.1	Control Bar	24
4.4.2	Graphical Display (Chart).....	25
4.5	Saving or Exporting Measurement Data	27
4.6	Analog Output.....	28
4.7	Software Menu Structure	29
5	Technical Data.....	30
5.1	Specifications.....	30
5.2	Analog Output and External Trigger	33
6	Operational Notes	34
6.1	Optical Output.....	34
6.2	Temperature Compensation	34
6.3	Warm-Up Time.....	34
6.4	Power Adapter.....	34
6.5	Analog Outputs	34
6.6	RS232 Interface / USB Interface.....	34
6.7	Maintenance	34
6.8	Service	35
7	CE and FCC Conformity	36
8	Concluding Remarks	37

1 Preface

You have chosen a new, innovative technology for measuring pH.

The pHOtica micro is a compact, easy to transport and completely PC-controlled micro fiber optic pH transmitter. The data evaluation is PC supported as well.

The pHOtica micro was developed especially for fiber optic pH microsensors. It is based on a novel technology, which creates very stable, internally referenced measured values. This allows a more flexible use of pH microsensors in various fields of interest.

Optical pH microsensors (also called optrodes) have several important features:

- They are small.
- Their signal does not depend on the flow rate of the sample.
- They allow measurements with high spatial resolution whenever this is required.

Therefore, they are ideally suited for the examination of small sample volumes. A set of different pH microsensors is available to make sure you have the sensor which matches your application.

Please feel free to contact our service team to find the best solution for your application.

Your WPI Team

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY BEFORE WORKING WITH THIS DEVICE.

2 Description of the pHOptica micro Transmitter

The pHOptica micro is a precise single channel pH transmitter with fiber optic pH microsensors based on 140 μm optical fibers. The small outer dimensions and low power consumption make it suitable for portable use. For operation, a PC / notebook is required. The pHOptica micro is controlled using a comfortable software, which also saves and visualizes the measured values.



Fig. 1 pHOptica micro, micro fiber optic pH transmitter for use with pH microsensors

The pHOptica micro has two analog outputs (0 - 4 V) and one trigger input (TTL) to be connected to a data logger. Analog connectors are BNC connectors.

The analog outputs are programmable to deliver pH, temperature or the raw values (phase shift or amplitude). The data are retrieved via PC / notebook and RS232 (digital) or using the external trigger input (analog).

pHOptica micro features:

- Single point calibration
- Two analog outputs
- One trigger input
- Digital data output
- External temperature measurement

2.1 Scope of Delivery



Fig. 2 Case with all delivered equipment

- pH transmitter pHOtica micro
- Software pHOpt (CD)
- USB serial driver (CD)
- USB cable
- RS232 cable
- Power supply (110 - 240 VAC, 18 VDC)
- Temperature sensor PT 1000

Additionally required equipment (not supplied):

- pH-sensitive chemical optical microsensor
You can find sensors mounted into different types of housings on www.wpiinc.com
- PC / Notebook for comfortable data recording and configuration
System requirements:
Microsoft® Windows® XP, Microsoft® Windows® Vista™ or Microsoft® Windows® 7;
Processor power according to minimum requirements of the respective operating system

2.2 Front Panel

The front panel is equipped with a connector for the fiber optic microsensor, a connector for the temperature sensor, a control LED and an ON / OFF switch.



Fig. 3 Transmitter front panel

ELEMENT	DESCRIPTION	FUNCTION
POWER	ON / OFF switch Control LED	Switches the device ON and OFF. red: device off green: device on orange: standby
pH SENSOR	ST fiber connector	Connect the fiber optic microsensor here.
TEMP	Connector for PT 1000 temperature sensor	Connect the PT 1000 temperature sensor for temperature compensated measurements here.

2.3 Rear Panel

Two standard BNC connectors are added for analog output channels 1 and 2, another one for external trigger input. The electrical specifications of all rear panel connectors are given in chapter 5 "Technical Data". Please follow these notes to avoid mistakes.



Fig. 4 Transmitter rear panel

ELEMENT	DESCRIPTION	FUNCTION
12 VDC	Line adapter for power supply	Connect the power supply cable. Use the provided parts only.
RS232	USB / RS232 interface (male)	Connect the device with the USB or RS232 data cable to your PC / notebook. Use the provided parts only.
CH 1	Analog out (channel 1)	Connect the device with external devices, e.g. a data logger.
CH 2	Analog out (channel 2)	Connect the device with external devices, e.g. a data logger.
EXT TRIG	External trigger input	Connect the device with external devices, e.g. a data logger with a trigger output, pulse generator.

3 Installation

3.1 Set-up

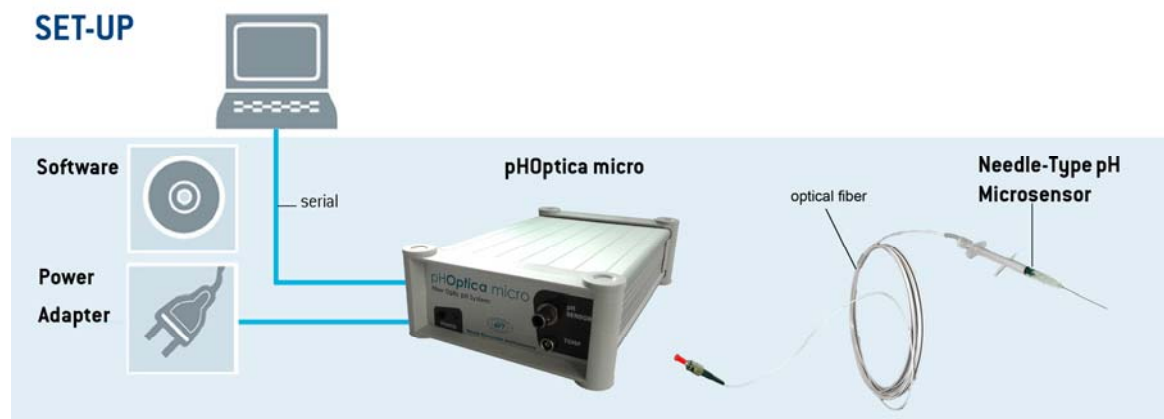


Fig. 5 Set-up for pHOptica micro

A typical set-up is shown in Fig.5. A microsensor is connected optically via an optical fiber to the transmitter which is connected via USB or a serial COM port to a PC.

The pHOpt_v2.0.0 software is compatible with Microsoft® Windows® XP, Microsoft® Windows Vista™, and Microsoft® Windows® 7.

Remove the rubber cap from the optical sensor connector (ST connector) and keep the cap. After measurements or for storing the transmitter the rubber cap should be put back on to keep the optical sensor connector clean.

! It is recommended to clean the ST connector with a dust free cleaning wipe or a cleaning implement for ST connectors before the measurement. Make sure to insert the cleaning implement into the inner part of the connector; then turn it three or four times.

Remove the protective cap from the male plug on the optical fiber and insert it in the ST connector of the pHOptica micro. The ST plug has to be inserted and slightly turned clockwise to fasten it. Be careful not to snap off the optical fiber; best hold the fiber between forefinger and thumb at the bayonet lock of the male plug (see Fig. 6).



Fig. 6 Attaching the pH microsensor to the connector on the transmitter

There is a red mark on the temperature sensor connector of the pHOptica micro. The temperature sensor plug also has a red mark. Match those two marks before inserting the temperature sensor plug into the connector on the transmitter front panel; else the plug might get damaged.

3.2 Software Installation

The software is working with English and German regional settings. Please change your setting to one of these settings before installing the software (see also chapter 4.1).

1. Please close all other applications as they may interfere with the software.
2. Insert the supplied CD-ROM into the respective drive.
3. Start the installation by double clicking setup.exe.
4. Follow the instructions of the installation wizard.

3.3 USB Serial Driver Installation

The USB-RS232-RJ 4/4 requires

- At least one available USB port
- Windows XP / Vista / 7

Connect the USB cable to the PC / notebook and insert the delivered driver CD.

The **Found New Hardware Wizard** will launch automatically. Select **No, not this time** from the options and click **Next**.



Fig. 7 Found New Hardware Wizard

Select **Install from a list or specific location (Advanced)**; then click **Next**.



Fig. 8 Found New Hardware Wizard

Select **Search for the best driver in these locations** and go to **Search for removable media (floppy, CD-ROM...)**. Click **Next** to proceed.

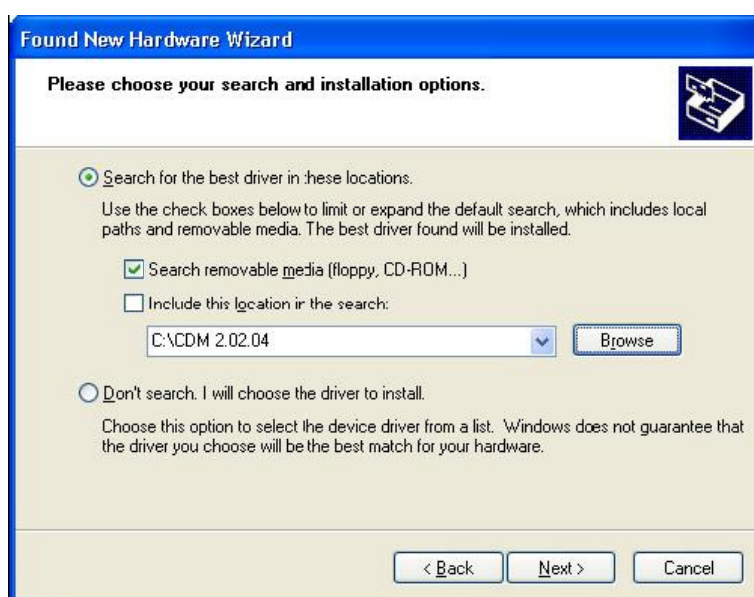


Fig. 9 Found New Hardware Wizard

Then Windows will copy the required driver files. Windows should then display a message indicating that the installation was successful. Click **Finish** to complete the installation.

4 Operation

4.1 Adjustment of Regional Settings of the Operating System

The software is working with English and German regional settings.

To change the regional settings on your PC press **Start** and go to the **Control Panel**. Choose **Regional and Language Options**.



Fig. 10 Control Panel – Classic View

Select the **Regional Options** tab (e.g. English (United States)) and click **Customize**.

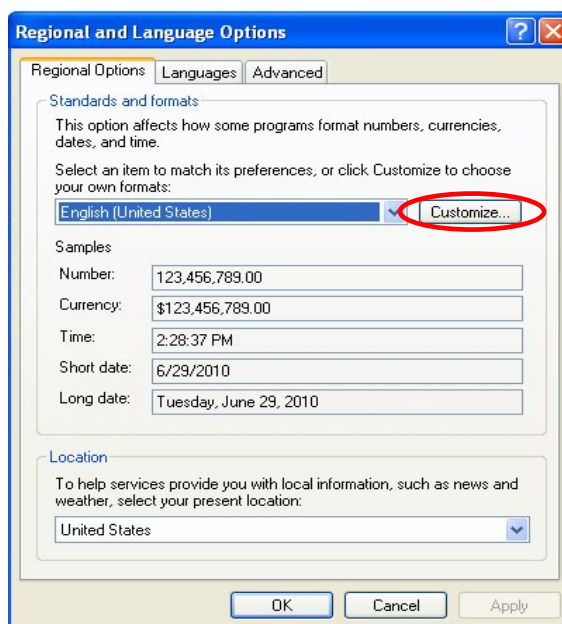


Fig. 11 Regional and Language Options window

A window opens; select the **Numbers** tab and choose the dot `.` in the **Decimal Symbol** drop down menu. In the drop down menu **Digit grouping symbol** you have to choose space ` ` . Then press **Apply** and **OK**.

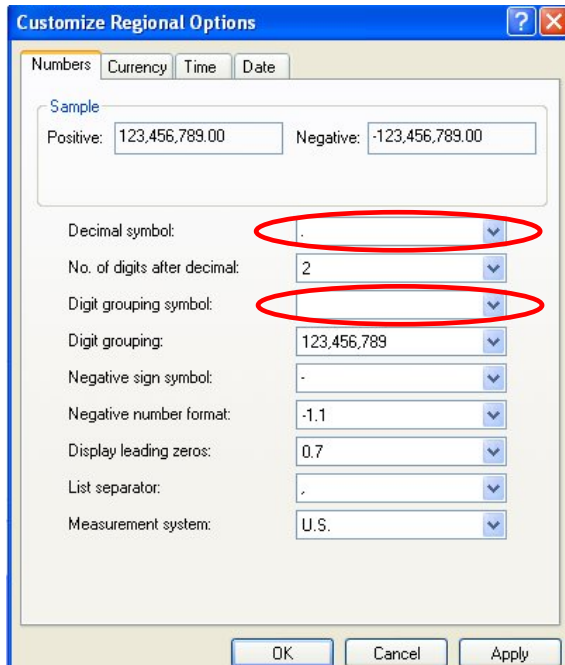


Fig. 12 Customize Regional Options window – Numbers tab

Click **Customize** again and go to the **Date** tab now. In the drop down menu **Short date format** you have to select `dd.MM.yy` and choose the dot `.` in **Date separator**. Again press **Apply** and **OK**.

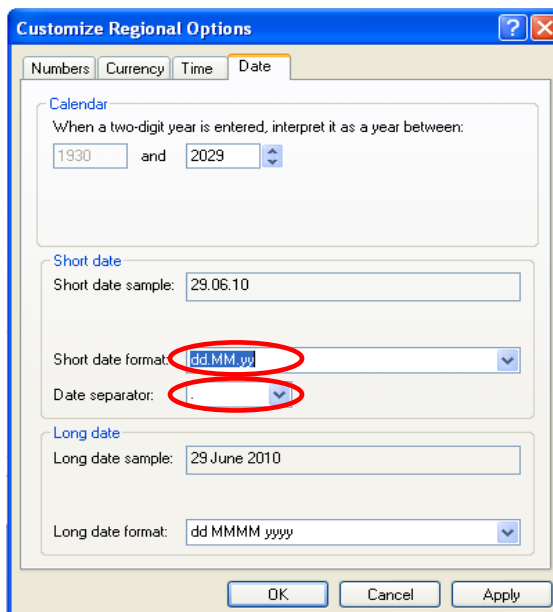


Fig. 13 Customize Regional Options window – Date tab

Press **OK** in the **Regional and Language Options** window, and you have finished adjusting the regional settings.

4.2 Starting the Device

1. Connect the pHOptica micro via the supplied USB cable to a serial COM port of your PC / notebook. (Alternatively, you can connect the pHOptica micro via the RS232 cable to a serial COM port of your PC / notebook. Tighten the cable with the screws on your PC / notebook.)
2. Connect the power supply.
3. Please close all other applications as they may interfere with the software. Start the software pHOpt.

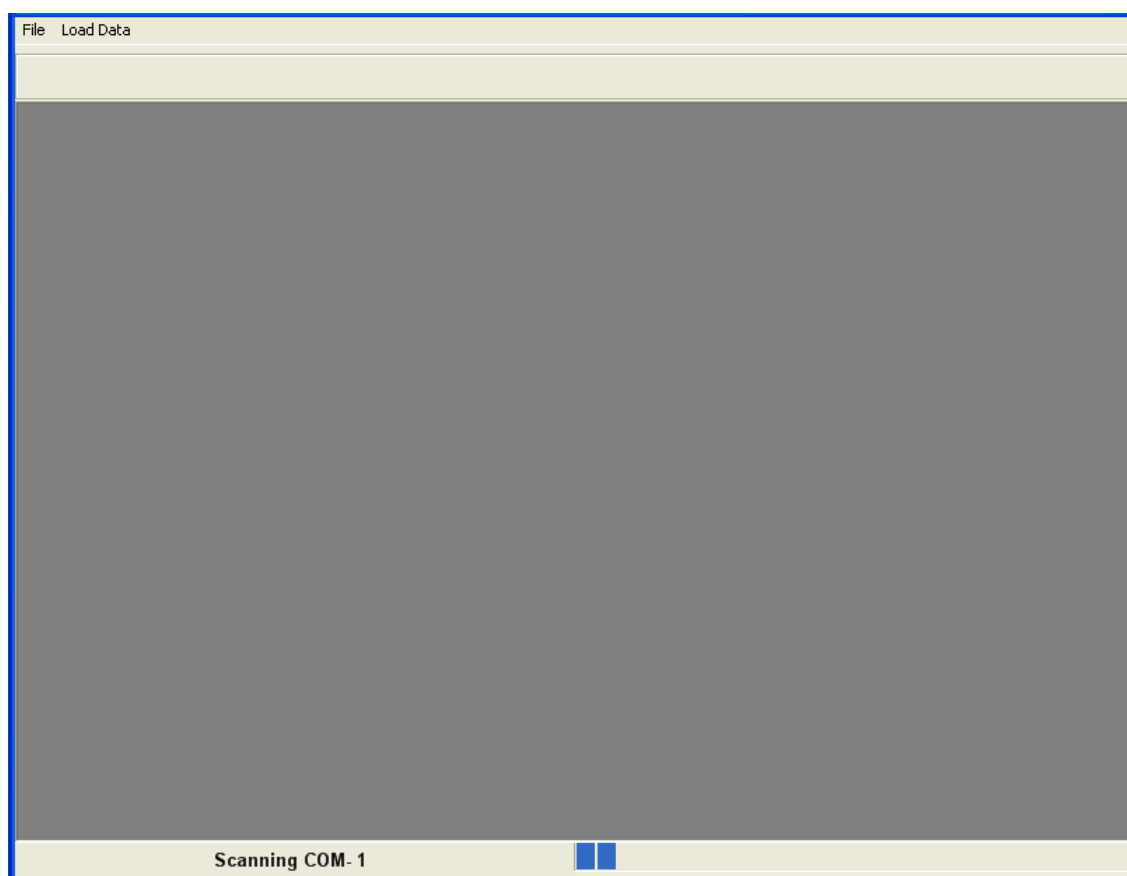


Fig. 14 Initial Window - Software is scanning to detect connected pHOptica micro devices

The software is scanning all COM ports available to detect and configure all connected pHOptica micro devices. Up to 10 devices can be controlled simultaneously.

- !** If no device is detected, please check all connections and proper installation of serial COM ports and scan for devices by pressing "ctrl + S".

The window shown below is displayed after the connected transmitters got detected:

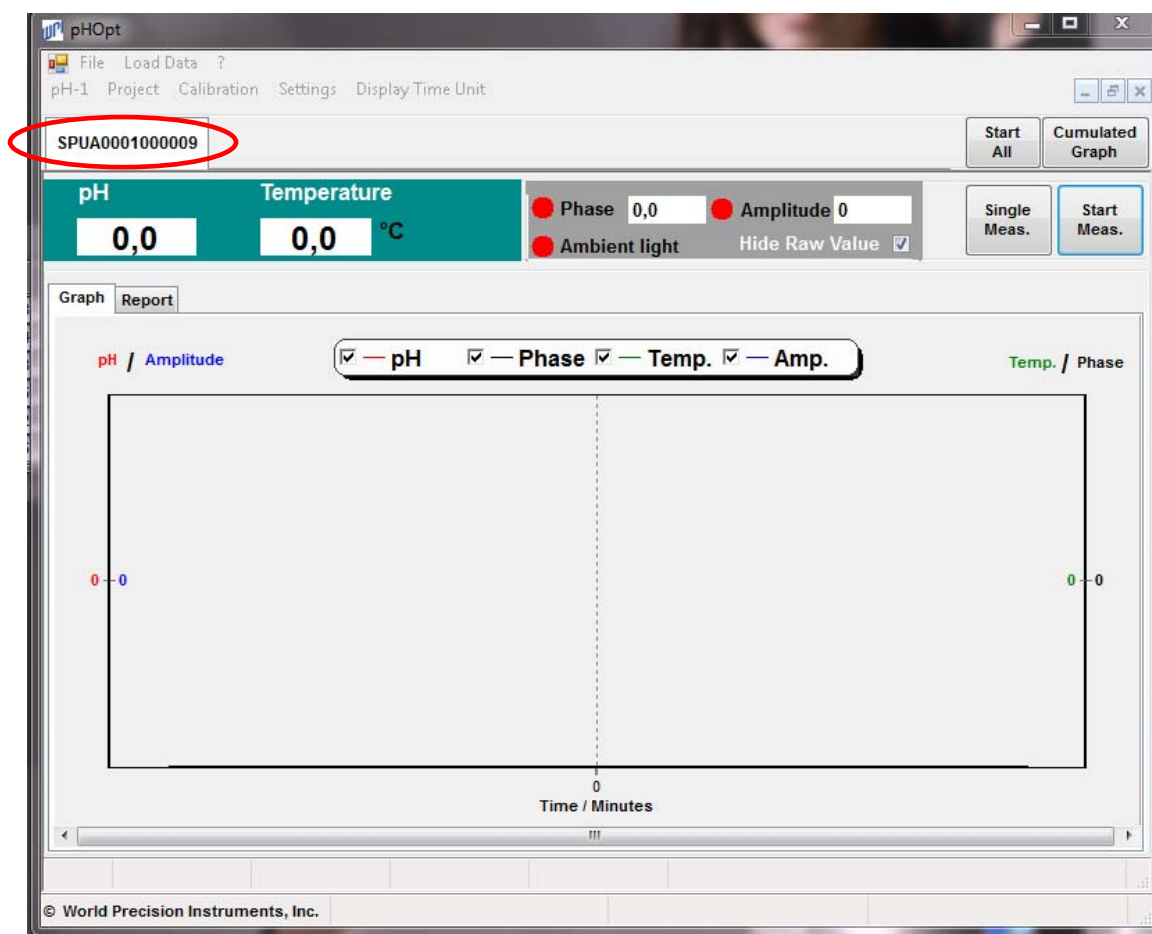


Fig. 15 Initial display of pHOpt software

The serial number of the activated transmitter is displayed. The devices are activated by clicking on the respective serial number.

4.3 Calibration

! Colored buffers often used for pH electrodes can interfere with chemical optical sensors. Please do not use colored buffers for calibrating chemical optical pH sensors.

4.3.1 Manual Calibration

All pH microsensors are pre-calibrated. Calibration data are listed on the Final Inspection Protocol of the microsensors which is provided together with each sensor:

Data

HP5			
T= 37° C, PBS 40mM, 140mM ionic strength, 10mg/l phenol red			
Constant	Actual value	Valid range	QC-passed?
Imin	54.70	45-60	OK
Imax	24.84	30-15	OK
pH0	6.36	6.0-8.0	OK
dpH	0.59	0.3-1.0	OK
Temperature	37	35-40	OK

Fig. 16 Calibration data on the Final Inspection Protocol

The calibration details listed on the protocol can be typed in this dialog.

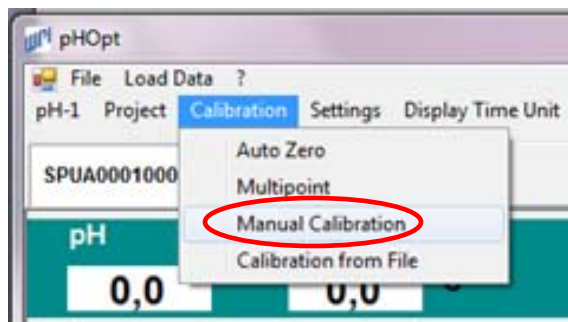


Fig. 17 Submenu for Manual Calibration

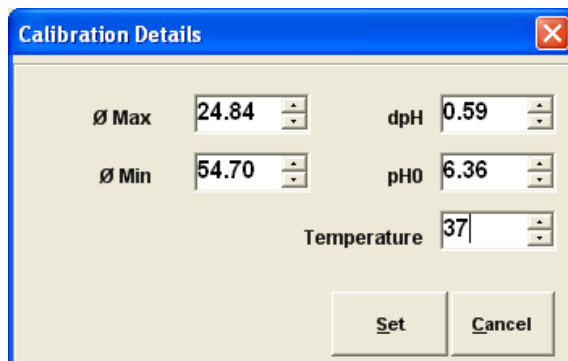


Fig. 18 Dialog for Calibration Details

4.3.2 Multipoint Calibration

A multipoint calibration is required to obtain best accuracy. It is necessary especially when working with difficult samples, e.g. with background fluorescence.

A multipoint recalibration is recommended to ensure precise measurement. The transmitter and microsensor can only perform optimally by recalibrating the transmitter in combination with the microsensor.

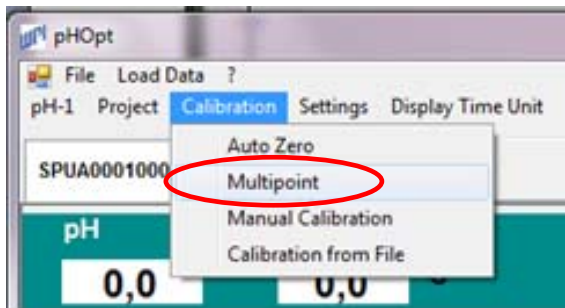


Fig. 19 Submenu for Multipoint Calibration

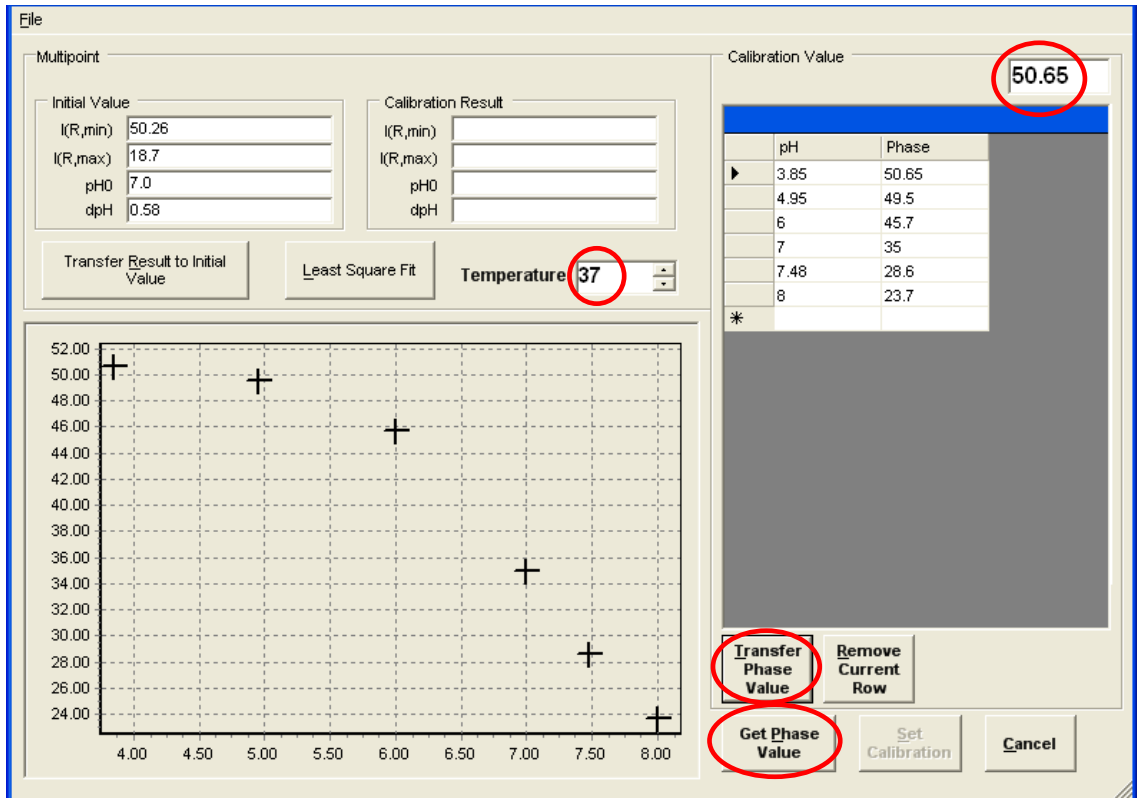


Fig. 20 Dialog for Multipoint Calibration

Enter the temperature of the sample in the temperature box. Please ensure that the microsensor is inserted properly in a sample of known pH. Wait for about 3 minutes until the

measured phase angle is stable. Then press **Get Phase Value**. The currently measured phase value is displayed in the upper right corner.

	pH	Phase
▶	3.85	50.65
	4.95	49.5
	6	45.7
	7	35
	7.48	28.6
	8	23.7
*		

Fig. 21 Display for pH / phase value data couples

Type the current pH in the active row.

Press **Transfer Phase Value** to transfer the current phase value into the active row.

Create at least 5 data couples by changing pH of the sample. Ensure that the pH values cover your pH range of interest. Suitable pHs are 4, 5, 6, 7, 8 and 9.

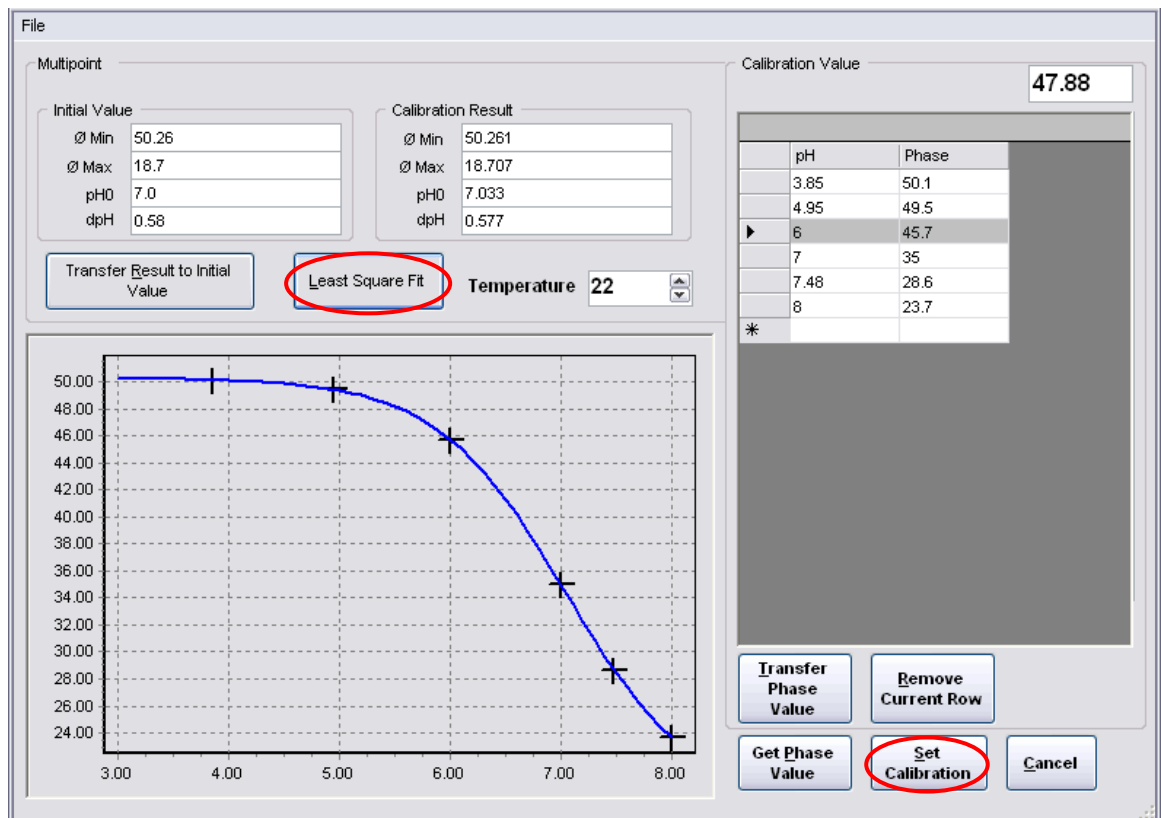


Fig. 22 Dialog for Multipoint Calibration

Press **Least Square Fit** to create the calibration constants and **Set Calibration** to transfer the calculated constants to the device.

4.3.3 Calibration from File

The dialog allows to store calibration data in a file and to upload previous sets of calibration data. This helps organizing different sets of calibration data for different microsensors and allows storing recalibration data.

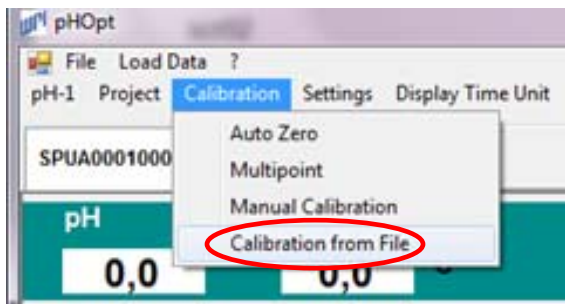


Fig. 23 Submenu for Calibration from File

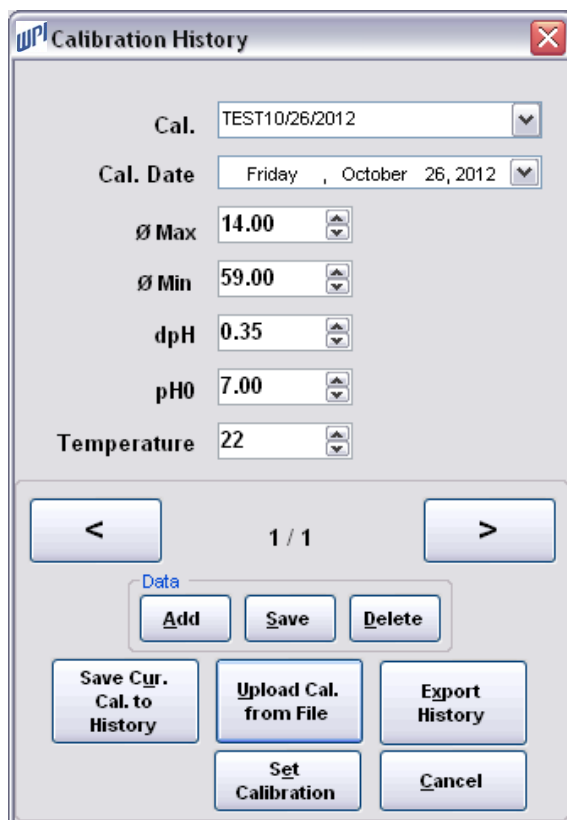


Fig. 24 Dialog for uploading and saving calibration data

Each set of calibration data can be stored under a new name. A multitude of different sets of calibration data can be stored in one history file. The arrows allow navigating the entries of the calibration history.

Add Data creates a new entry in the history. Type in the calibration data, name and date you would like to add to the history.

Save Data adds the current content of the window to the history.

Delete Data removes the current calibration data from the history.

Save Cur.Cal. to History adds the data of the current calibration to the history and clears the window.

Upload Cal. from File opens the dialog to import previously saved calibration histories to the current history.

Export History saves the current history to a file. Data format is xml.

Set Calibration applies the data of the currently shown calibration to the calibration data used in the device.

Cancel closes the window.

4.3.4 Auto Zero

Auto Zero offers a one point calibration which is recommended in case of a significant offset of the measured pH and a known starting pH.

! The microsensors used for Auto Zero has to be calibrated prior to this procedure.

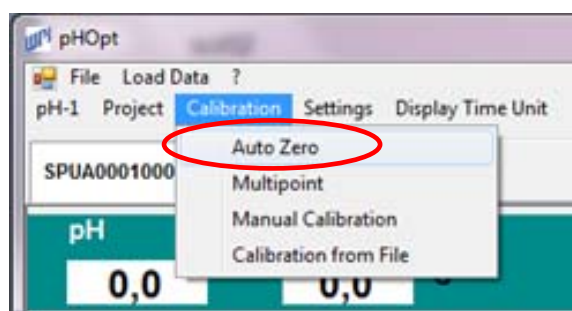


Fig. 25 Submenu for Auto Zero

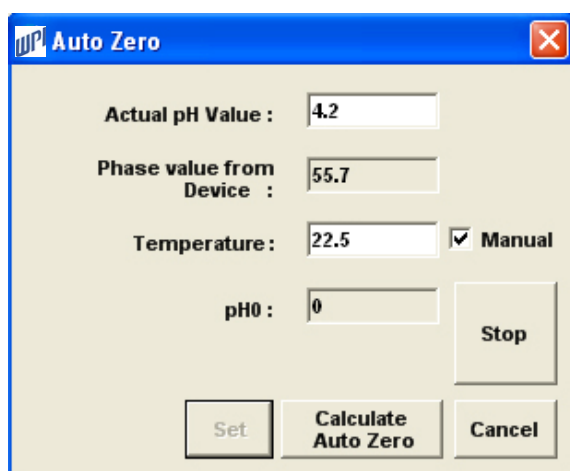


Fig. 26 Dialog for Auto Zero

Please ensure that the microsensor is inserted properly in a media of known pH and wait for about 3 minutes until the measured phase angle is stable. The transmitter is constantly measuring now. Enter the current pH of your sample.

! If the phase angle does not show a sensible value the **Calculate Auto Zero** button is inactive and it is not possible to perform Auto Zero.

If the temperature sensor is connected to the transmitter, insert it in the sample. The temperature box in the dialog will show the measured value. If the temperature sensor is not connected or not inserted in the sample activate **Manual** and type in the current temperature of the sample.

You can stop updating phase values by pressing **Stop**. Press **Calculate Auto Zero** to recalculate the point of inflection of the calibration curve. Press **Set** to recalibrate or **Cancel** to discard.

4.4 Measurement

! We recommend creating a project file prior to each measurement by entering the submenu **Project / Save** (see also chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**).

The software offers two measurement types:

Pressing **Single Measurement** will result in a single measurement displayed in a graph temporarily stored.

Start Measurement or in case of more than one pHOptica micro connected **Start All** opens the dialog:

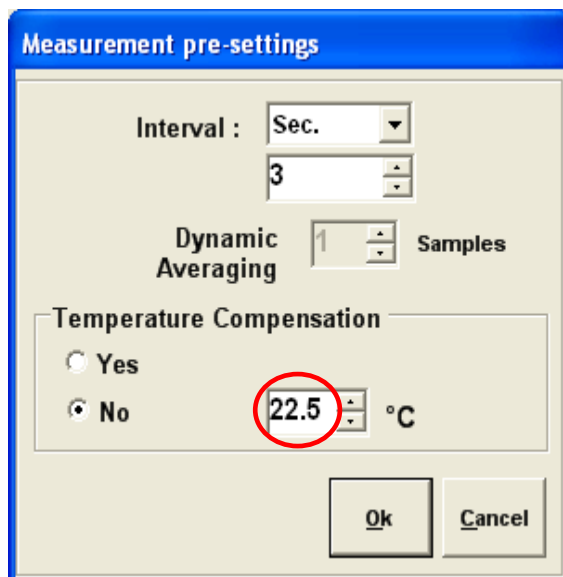


Fig. 27 Dialog for Measurement pre-settings

By pressing **Start Measurement** only the measurement pre-settings of the activated transmitter will be changed. Using **Start All** the measurement pre-settings will be the same for all transmitters connected.

Adjust your desired measurement interval, dynamic averaging (only active in 1 s and 2 s mode) and temperature compensation.

In case you want to discard measurement data enter the submenu **Clear**. This will clear the projects graph and data.

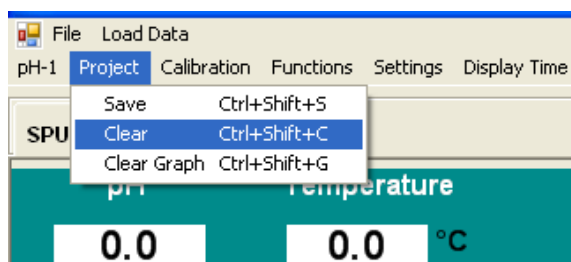


Fig. 28 Submenu for clearing project graphs and data

If there is more than one transmitter connected to the software you can start each transmitter individually by pressing **Start Measurement** at the activated transmitter, or start all transmitters simultaneously by pressing **Start All**.

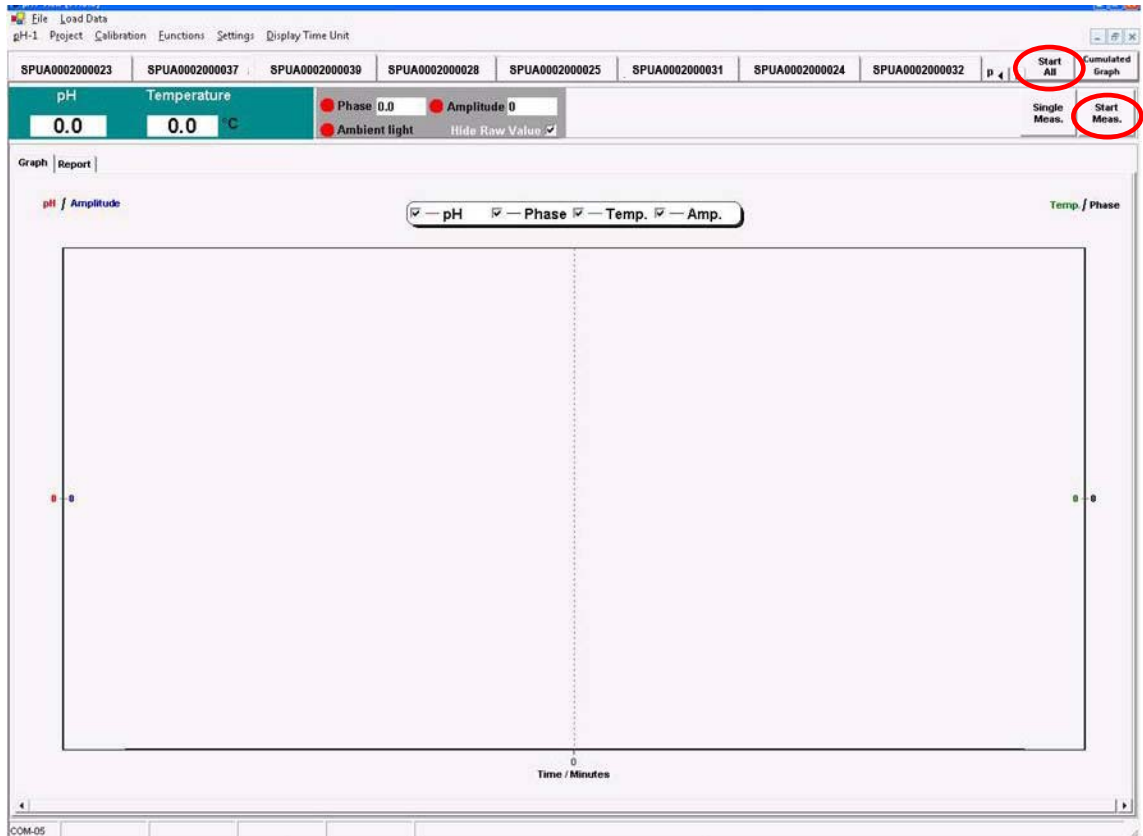


Fig. 29 Multiple transmitters connected to the software

Close the active data set or transmitter by entering the submenu **Exit**.

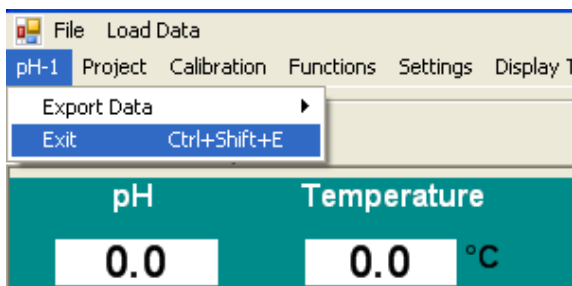


Fig. 30 Submenu to close active data set or transmitter

4.4.1 Control Bar

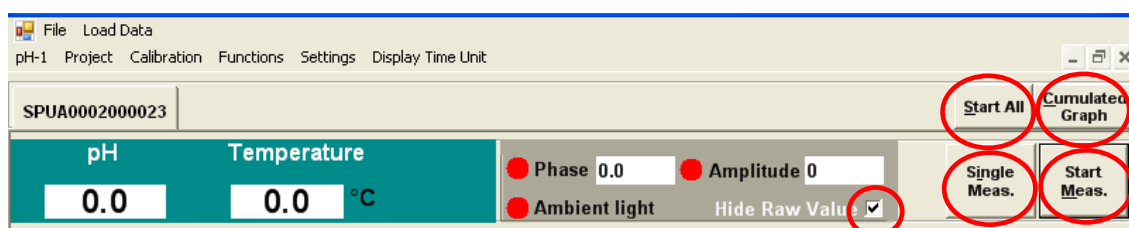


Fig. 31 pHOpt Control Bar

The control bar contains a numerical display for pH and temperature as well as warning lights and a numerical display (to be switched on and off by clicking **Hide Raw Value**) for the raw values amplitude and phase.

The **Start All** button activates measurements of all connected devices, the **Cumulated Graph** button opens a window with all active and uploaded measurements.

The **Single Measurement** button starts a single measurement of the activated device while the **Start Measurement** button opens the dialog for a continuous measurement of the activated device.

4.4.2 Graphical Display (Chart)



Fig. 32 Graphical Display

The graphical display shows the data of uploaded measurements or active devices. By clicking the check boxes **pH**, **Phase**, **Temp.** (Temperature), and **Amp.** (Amplitude) the respective graph will be hidden or shown. With a double click on the respective axis, limits can be defined. Zooming is possible by a left mouse click and movement from the upper left corner to the lower right corner of the area of interest. Zooming out is done vice versa.

Enter the menu **Display Time Unit** to define the displayed time unit on the x-axis.

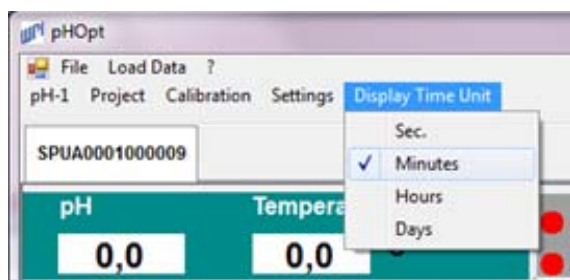


Fig. 33 Submenu to define the displayed time unit on the x-axis

The **Cumulated Graph** button opens a window in which all active and uploaded measurements are displayed. The data of the individual transmitters can be selected separately. Clicking on the check boxes to the left of the transmitter serial numbers will either hide or show the data of the respective devices.

The report area contains information about the status of the activated transmitter and lists the data string of the device sent to the software.

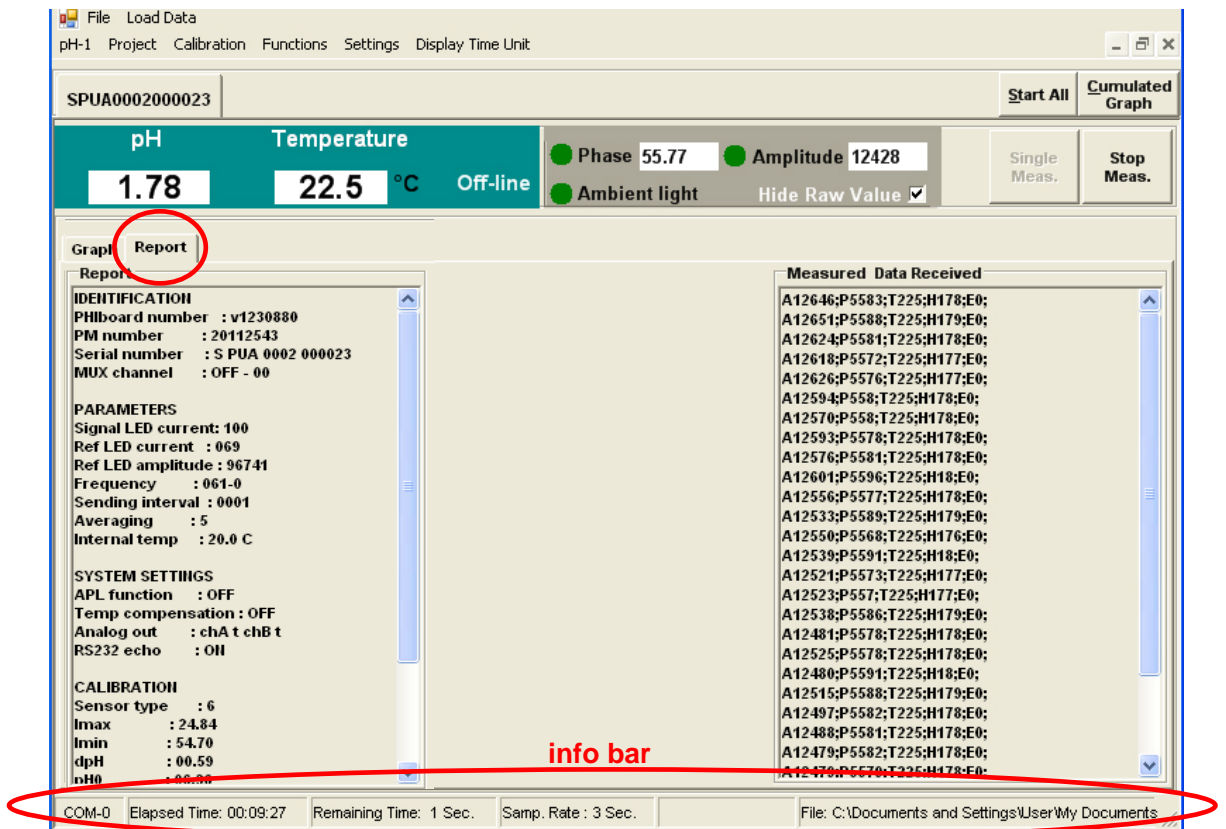


Fig. 34 Report display showing the info bar

The info bar located at the bottom of the screen provides information about the connected serial COM port, the running measurement (elapsed time, remaining time until the next measurement) and information about file name and location.

4.5 Saving or Exporting Measurement Data

The dialog **Save Project** allows internal data saving. Click **Select File** to choose a location for the project file and then name it. Store the data by clicking **Save & Exit** or cancel the process by clicking **Cancel**.

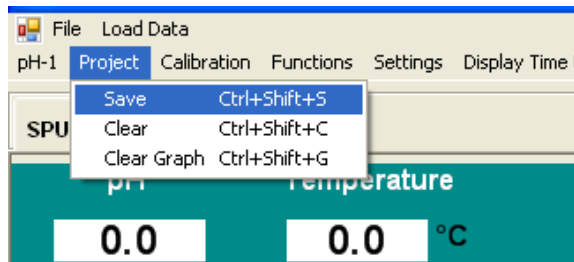


Fig. 35 Submenu for saving projects

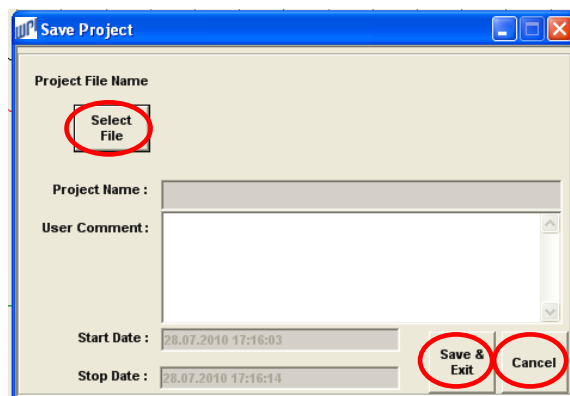


Fig. 36 Dialog for saving projects

It is possible to continue measurements after the data got stored. Saving the project again will then replace the already saved project file. The data generated during the last measurement will be added to the previously stored data.

The submenu **Export Data** allows exporting the current project into an Excel or ASCII file. A dialog is opened, in which you can choose a location for the file and name it.

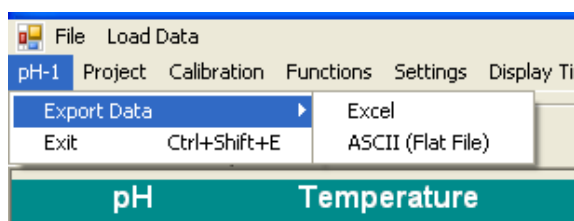


Fig. 37 Submenu for exporting data

4.6 Analog Output

The submenu **Analog Output** opens the dialog for configuring the analog out of the device. There are different options for output parameters. For each channel you can choose one output parameter from the list.

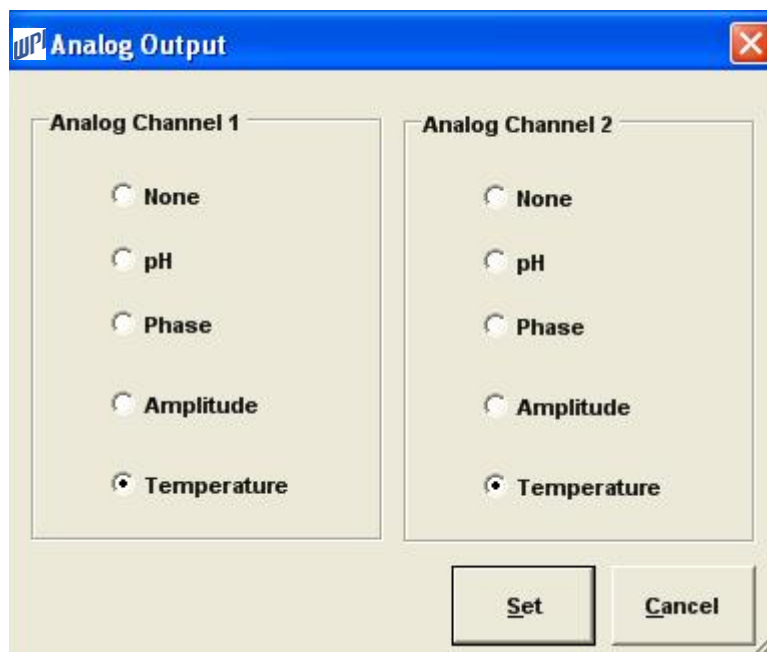


Fig. 38 Dialog for analog output configuration

4.7 Software Menu Structure

The first menu row contains general commands:

File	Load Data
<p>→ Scan devices searches for pH-1 devices connected to COM / USB ports.</p>	<p>opens the dialog for uploading previous measurements.</p>
<p>→ Exit closes the software.</p>	

The second menu row contains the tool bar of the selected device or data set.

pH-1	Project	Calibration	Settings	Display Time Unit
<p>→ Export data opens the dialog for exporting data to Excel or ASCII.</p>	<p>→ Save opens the dialog for saving the current project.</p>	<p>→ Auto Zero opens the dialog for a one point calibration.</p>	<p>→ Analog output opens the dialog for configuring the analog out of the device.</p>	<p>defines the displayed time unit on x-axis.</p>
<p>→ Exit closes the active data set or device.</p>	<p>→ Clear clears the current projects graph and data.</p>	<p>→ Multipoint opens the dialog for a multipoint calibration.</p>		
		<p>→ Manual Calibration opens the dialog for typing in calibration data.</p>		
		<p>→ Calibration from File opens the dialog for uploading or saving calibration data.</p>		

5 Technical Data

5.1 Specifications

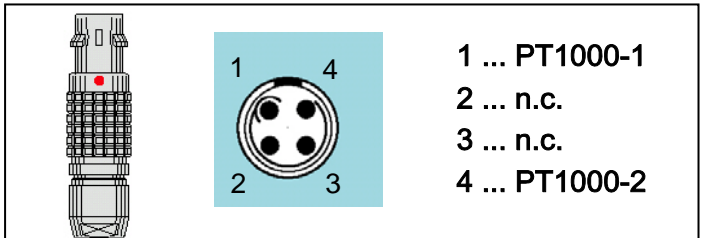
OPTICAL SENSOR

pH microsensor

Optical connector	ST compatible, Core / Center 100 / 140
Channels	1
LED peak wavelength	470 nm

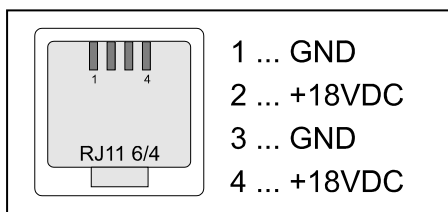
TEMPERATURE SENSOR

Potentiometric temperature sensor (Pt 1000)	Range	0 – 50 °C
	Resolution	± 0.1 °C
Temperature sensor plug	Plug type	Lemo FGG.00.304.CLAD35



DC INPUT

DC-Supply: 18 V/900 mA / type TRC-18-0830
Use the provided parts only.



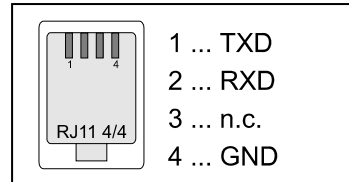
DIGITAL INTERFACE

Serial communication

- a) RS232 serial interface
19200 Baud (Databits 8, Stopbits 1, Parity none, Handshake none)
- b) USB interface

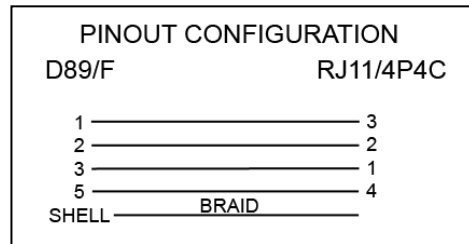
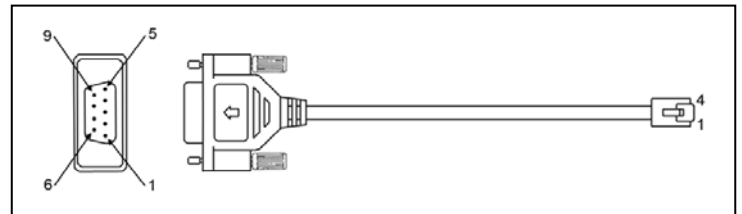
Transmitter port

RJ11 4/4 socket



Serial interface cable to PC

RJ11 4/4 to DSub9



USB interface cable to PC

RJ11 4/4 to USB type A (transmitter adapted cable)

ENVIRONMENTAL CONDITIONS

Operating temperature

0 °C to 50 °C

Storage temperature

- 10 °C to 60 °C

Relative humidity

0% to 80 % (non-condensing)

OPERATION CONTROL

LED at the front panel	Red	Device off
	Green	Device on
	Orange	Standby

DIMENSIONS / WEIGHT

185 mm x 110 mm x 45 mm

630 g

5.2 Analog Output and External Trigger

The pHOptica micro is supplied with a dual programmable 12 bit analog output with galvanic isolation and an external trigger input.

ANALOG OUTPUT SPECIFICATIONS

Channels	Dual outputs
Output range	0 – 4095 mV
Socket type	BNC connectors
Resolution	12 bit
Accuracy	± 10 mV
Galvanic isolation	500 Vrms
Shortcut protection	Yes
Output parameters (PC software allows to choose the parameter.)	pH Temperature Phase Amplitude
Equivalence coefficients:	10 mV represent:
	pH 0.1 pH
	Temperature 1 °C
	Phase 0.25°
	Amplitude 200 r.U.
Update rate	Dependent on the sampling rate of the software or if external trigger is used the update rate is dependent on the trigger pulse rate (minimum 3 s)

EXTERNAL TRIGGER INPUT

Channels	Single input
Socket type	BNC connector
Input voltage range	TTL-compatible, up to 24 V
Trigger mode	Low-High-Low
Normal state	No current
Galvanic isolation	500 Vrms
Timing specifications	Min rise & fall time for trigger 15 ns
	Max rise & fall time for trigger 2 ms
	Min pulse length 3 ms
	Min pause length 10 ms
	Min period length 13 ms
	(TTL-compatible)

6 Operational Notes

6.1 Optical Output

The ST connector is a high precision optical component. Please keep it clean and dry. Always use the rubber cap to close the output when not in use.

6.2 Temperature Compensation

Use only the temperature sensor supplied. The use of any other temperature sensor may damage the device.

6.3 Warm-Up Time

The warm-up time of the electronic and opto-electronic components of the pHOptica micro is 5 min. After 5 min. stable measuring values will be obtained.

6.4 Power Adapter

pHOptica micro always has to be used with the original power adapter (110 - 240 VAC; 50 - 60 Hz; 18 V / 900 mA; 5 W; type TRC-18-0830) which is supplied.

As an alternative power source a battery can be used that meets the DC input voltage given in chapter 5 "Technical Data". The battery adapter cable is available as an additional accessory.

6.5 Analog Outputs

WARNING: The analog outputs are not protected against any input voltage. Any voltage applied to the analog outputs can cause irreversible damage to the transmitter.

6.6 RS232 Interface / USB Interface

The transmitter uses a special interface cable. A different cable can cause malfunction. Use the provided parts only.

6.7 Maintenance

The transmitter is maintenance-free.

The housing should be cleaned only with a cloth. Avoid any moisture entering the housing. Never use benzene, acetone, alcohol or any other organic solvents.

The ST fiber connector of the microsensor can be cleaned only with lint-free cloth or a cleaning implement for ST connectors.

6.8 Service

Alignment, rework or repair work may only be carried out by a suitable qualified technician, trained by us. The safety of the user may be endangered, e. g., if the device

- Is visibly damaged;
- No longer operates as specified;
- Has been stored under adverse conditions for a lengthy period of time;
- Has been damaged in transport

If you are in doubt, the instrument should be sent back to the manufacturer for repair and maintenance.

World Precision Instruments, Inc.

Sarasota International Trade Center
175 Sarasota Center Boulevard
Sarasota, FL 34240-9258
USA

Phone 941-371-1003

Fax 941-377-5428

E-mail: wpi@wpiinc.com

www.wpiinc.com

Please contact our service team in case of any question. We look forward to helping you and are open for any proposition or criticism.

7 CE and FCC Conformity

CE Conformity

The equipment is confirmed to comply with the requirements set out in the Council Directive relating to Electromagnetic Compatibility (2004/108/EEC) and for Low Voltage (2006/95/EEC). For the evaluation of above mentioned Council Directives following harmonized standards were consulted:

EMC: EN 61326-1: 2006

LVD: EN 61010-1: 2010

Verification of FCC Rules

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

8 Concluding Remarks

Dear Customer,

With this manual, we hope to provide you with an introduction to work with the pHOptica micro fiber optic pH transmitter.

This manual does not claim to be complete. We are endeavored to improve and supplement this version.

We are looking forward to your critical review and to any suggestions you may have.

You can find the latest version at www.wpiinc.com.

With best regards,

Your WPI Team



pH *Optica micro*

*Fiber Optic pH System
for pH microsensors*

World Precision Instruments, Inc.

USA

International Trade Center, 175 Sarasota Center Blvd., Sarasota FL 34240-9258
Tel: 941-371-1003 - Fax: 941-377-5428 - E-mail: sales@wpiinc.com

UK

1 Hunting Gate, Hitchin, Hertfordshire SG4 0TJ
Tel: 44 (0)1462 424700 - Fax: 44 (0)1462 424701 - E-mail: wpiuk@wpi-europe.com

Germany

Zossener Str. 55, 10961 Berlin
Tel: 030-6188845 - Fax: 030-6188670 - E-mail: wpide@wpi-europe.com

China & Hong Kong

WPI Shanghai Trading Co., Ltd.
Rm 20a, No8 Dong Fang Rd., Lu Jia Zui Financial District, Shanghai PRC
Tel: +86 688 85517 - E-mail: chinasales@china.wpiinc.com

Internet

www.wpiinc.com - store.wpiinc.com
www.wpi-europe.com - www.wpiinc.cn