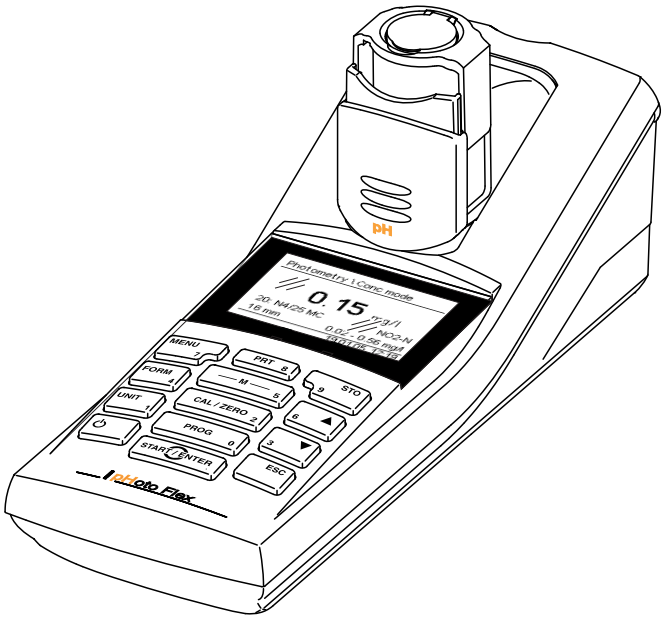
QUICK START GUIDE

ba75977e05 07/2022



pHotoFlex® pH

LED FILTER PHOTOMETER WITH INTEGRATED pH FUNCTION

WTW

a xylem brand

Contents

Part of the process of consequently improving our products is the continuous further development of the range of photometric tests offered and the meter irmware. All current data for the pHotoFlex® pH can be found on the Internet under www.xylemanalytics.com:

- Firmware
- Method data
- Analysis specifications
- Operating manual

You can easily transfer new firmware to your instrument with the aid of the AK 540/B cable and a PC. More detailed information can be found in the detailed operating manual on the CD-ROM provided.

Safety

Safety information

Safety instructions point out dangers:

WARNING
indicates a possibly dangerous situation that can lead to serious (irreversible) injury or death if the safety instruction is not followed.

CAUTION
indicates a possibly dangerous situation that can lead to slight (reversible) injury if the safety instruction is not followed.

NOTE
indicates a possibly dangerous situation where goods might be damaged if the actions mentioned are not taken.

Safe operation

CAUTION
Danger of eye damage by visible and invisible LED radiation.
In the cell shaft of the Turb 430 IR there are light emitting diodes (LEDs) of the 1M class.
Do not look at the radiation using optical instruments.
With normal, authorized use there is no hazard.

Authorized use

This meter is authorized exclusively for carrying out the following measurements in the laboratory:

- Analysis of substances in water and aqueous solutions using round cells
- Concentration measurement
- Absorbance and transmission measurement

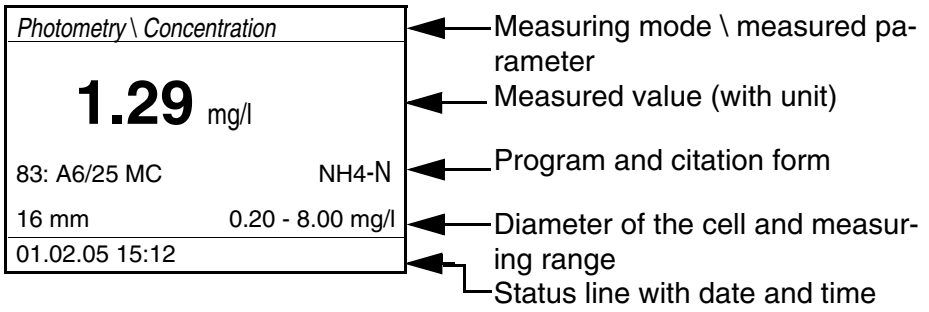
Only the operation and running of the meter according to the instructions and technical specifications given in this operating manual is authorized (see TECHNICAL DATA, page 20).

Any other use is considered unauthorized.

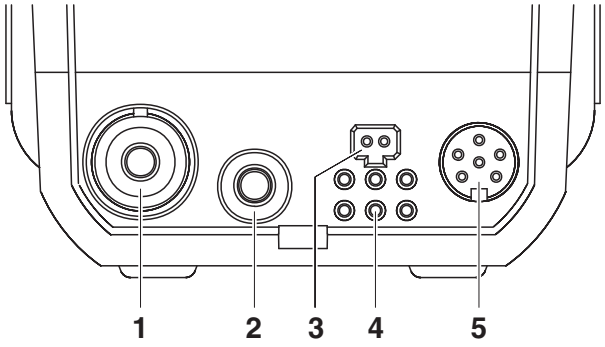
Display and socket field

Display

The graphic display shows all information of the current measurement in the measured value display. The illumination enables to read the display even in the darkness.



Socket field



1 pH electrode
2 pH temperature sensor
3 Power pack (9 V DC, see section 7.1)
4 Contact points for operation with the LabStation
5 RS232 (serial) interface

Power supply

You can operate the meter either with batteries, rechargeable battery or a power pack.

The *LoBat* display indicator appears when the batteries or rechargeable battery is nearly discharged.

General operating principles

This section contains basic information on the operation of the pHotoFlex® pH.

Operating modes

- Measurement
  The display indicates measurement data in the measured value display
- Calibration
  The display indicates a calibration process with calibration information, or a process to carry out a zero adjustment
- Data transmission
  The meter transmits measuring datasets or calibration records to the serial interface
- Configuration
  The display indicates a menu with further menus, settings and functions

Keypad

	Select the measuring mode **<M>** (long keystroke): – *Photometry* – *pH & ORP* Select the measured parameter within a measuring mode **<M>** (short keystroke): – *pH & ORP*: *pH*, *ORP* – *Photometry*: *Concentration*, *Absorbance*, *% Transmission*
	Start calibration (measuring mode *pH & ORP*) Start zero adjustment or blank value measurement via the *Photometry* \ *Adjustment* menu (measuring mode, *Photometry*) **<CAL/ZERO>**
	In the *Photometry* measuring mode: Select a program for concentration measurement **<PROG>**
	Open menus / confirm entries / start measurement **<START/ENTER>**
	Call up the *Configuration* menu (all settings are made here) **<MENU>**
	In the *Photometry* measuring mode, measured parameter, *Concentration*: switch over between available citation forms **<FORM>**
	In the *Photometry* measuring mode, measured parameter, *Concentration*: Switch over between available units **<UNIT>**

	Switch the meter on/off **<ON/OFF>**
	Output display contents to RS232 interface (e.g. print) **<PRT>**
	Open the *Store* menu: **<STO>** Quick storing: 2 x **<STO>**
	Highlight menu items or selection / set values **<▲>**, **<▼>**
	Switch to the next higher menu level / cancel input **<ESC>**

Keys with an additional number printed on are assigned doubly. This enables to directly enter numbers in special menus. Thus, you can, for example, conveniently enter the date and time via the number keys.

Measured value display

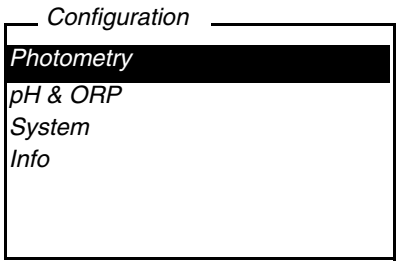
In the measured value display, you can

- select a measuring mode with **<M>** (long pressure)
- select a measured parameter in the active measuring mode (e. g. pH <– > mV) with **<M>** (short pressure)
- open the menu with **<MENU>**
- switch to the higher *Start* menu with **<ESC>**.

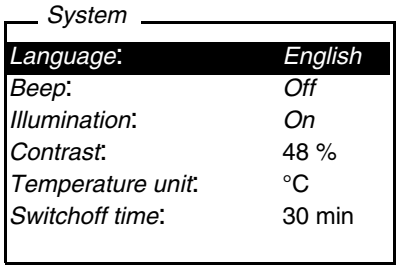
Menus and dialogs

The menus for settings and dialogs in procedures contain further submenus. The selection is made with the **<▲> <▼>** keys.
The current selection is highlighted as white text on a black background.

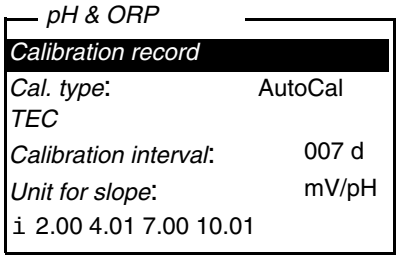
- Menus
  The name of the menu is displayed at the upper edge of the frame. Menus are opened by confirming with **<START/ENTER>**. Example:



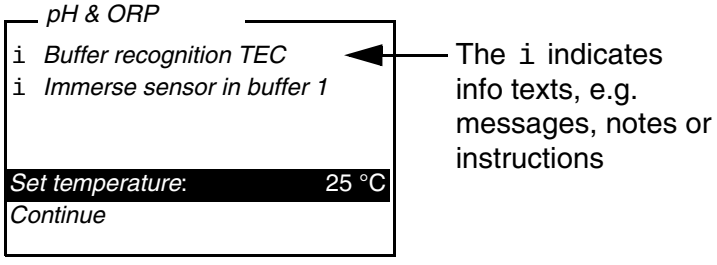
- Settings
  Settings are indicated by a colon. The current setting is displayed on the right-hand side. With **<START/ENTER>**, the selection of the possible settings is opened. Subsequently, the setting can be changed with **<▲> <▼>** and**<START/ENTER>**.
  Example:



- Functions
  Functions are designated by the name of the function. They are immediately carried out by confirming with **<START/ENTER>**.
  Example: display the *Calibration record* function
  (in the *pH & ORP* / *Calibration* menu).



- Messages
  Information or operating instructions are indicated by the i symbol. They cannot be selected.
  Example:



Initial commissioning

Switching on the meter

Press the **<ON/OFF>** key.
For a few seconds, the *Start* menu appears with a selection of the measuring modes. The measuring mode last selected is highlighted.

After a few seconds, the meter automatically switches to the measuring mode and measured parameter used last.

Setting the language

The English language is set on delivery. Set a different language as follows:

1 Open the *Configuration* menu with the **<MENU>** key.

2 Open the *Configuration* / *System* / *Language* menu with the **<▲> <▼>** and **<START/ENTER>** keys.

3 Select the required language with the **<▲> <▼>** keys and confirm with **<START/ENTER>**.

4 Quit the menu with the **<M>** key.

Setting the date and time

The date and time are set in the menu,
Configuration / *System* / *Continue ...* / *Date/time*.

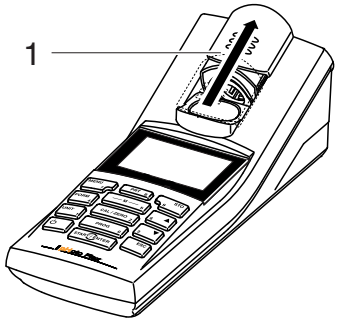
Operation

Inserting a cell

To be able to insert cells in the pHotoFlex® pH, the cell shaft has to be prepared to take in a cell.

1 Push the dust cover (1) upward.
The cell shaft for 28 mm cells is open.

- Insert a 28 mm cell (see below)
- Insert a 16 mm cell (see page 10)

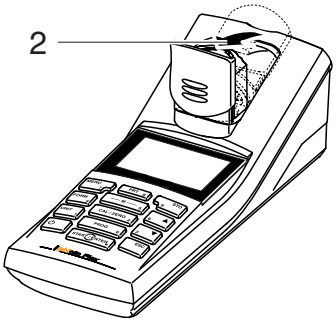


Inserting a 28 mm cell

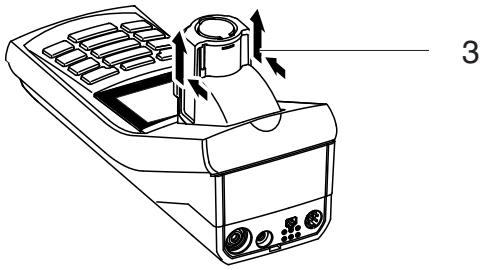
2 Insert the cell so that it is positioned on the bottom of the cell shaft.
The cell is ready to be measured.

Inserting a 16 mm cell

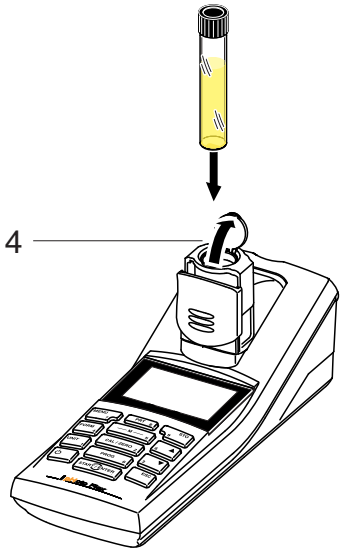
1 Put the fold-out cell shaft (2) in an upright position until it locks into place.



2 Pull up the height adapter (3).
The cell shaft is extended.



3 Open the external light cover (4) of the cell shaft.



4 Insert the 16 mm cell (marking points forward) so that it is positioned on the bottom of the cell shaft.

5 Close the external light cover (4).
The cell is ready to be measured.

Photometry

Measuring the concentration

1 Press the **<M>** key (long pressure) repeatedly until the *Photometry* measuring mode is selected.

2 Press the **<M>** key (short pressure) repeatedly until the measured parameter, *Concentration* is selected.

First concentration measurement with the pHotoFlex® pH

Photometry \ Concentration
i *Select program with <PROG>*
01.02.05 15:12

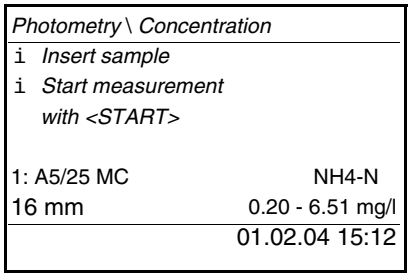
Second and all further concentration measurements

Photometry \ Concentration	
i *Select program with <PROG> or with ▲ ▼*	
1: A5/25 MC	NH4-N
16 mm	0.20 - 6.51 mg/l
01.02.05 15:12	

From the second concentration measurement, the data of the program last used is automatically displayed here.
With **<▲> <▼>** you can quickly switch between the ten programs last used.

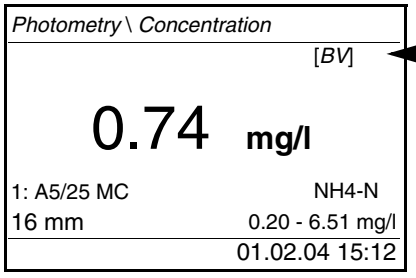
3 Open the *Program number* display with **<PROG>**,
enter the required program number with the number keys and confirm with **<START/ENTER>**.
or (from the second concentration measurement):
Select a program out of the last ten programs with **<▲> <▼>**. The program data is displayed.

If a program number is selected that requires a measured blank value, the menu automatically guides to the blank value measurement.



4 Insert the cell (see page 9).

5 Start the measurement with **<START/ENTER>**.
Measurement is started. The result is displayed.



A blank value measured by the user is used

Blank value (reagent blank value)

A blank value is required for every concentration measurement.
For some programs (methods) for concentration measurement, the blank values are already stored in the meter. For all other programs, the blank value has to be determined separately before the first measurement.

You will find more information on blank values in the photometry analysis manual. A table with the programs and required blank values can be found in the analysis specifications.

Zero adjustment

The zero adjustment, i. e. measuring and storing the absorbance of a cell filled with water, is necessary after the meter is switched on.

Additionally, we recommend to carry out a zero adjustment if the ambient temperature has changed.

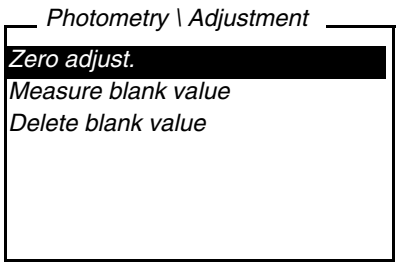
Only perform the zero adjustment against distilled water in an optically perfect cell. The zero adjustment must be performed separately for each cell type.

Zero adjustment / blank value measurement

1 Press the **<M>** key (long pressure) repeatedly until the *Photometry* measuring mode is selected.

2 Press the **<M>** key (short pressure) repeatedly until the measured parameter, *Concentration* is selected.

3 Press the **<CAL/ZERO>** key.
The menu for adjustment measurements opens up.



4 Using **<▲> <▼>** and **<START/ENTER>**, select and start the *Zero adjust.* or *Measure blank value* function.
The menu-guided blank value measurement or zero adjustment starts.
Follow the instructions on the display.

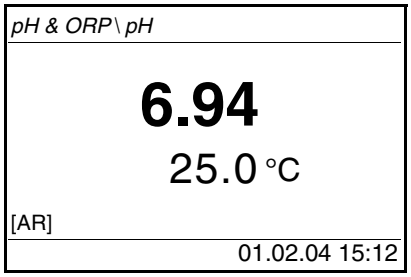
pH value / ORP voltage

1 Connect a suitable pH or ORP electrode to the pHotoFlex® pH.

2 Press the **<M>** key (long pressure) repeatedly until the *pH & ORP* measuring mode is selected.

Measuring the pH value

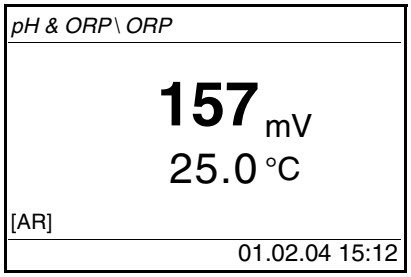
1 Immerse the pH electrode in the test sample.



2 Press the **<M>** key (short pressure) repeatedly until the measured parameter, *pH* is selected.

Measuring the ORP

1 Submerse the ORP electrode in the sample.



2 Press the **<M>** key (short pressure) repeatedly until the measured parameter, *pH* is selected.

Calibration

1 Press the **<M>** key (long pressure) repeatedly until the *pH* measuring mode is selected.

2 Press the **<CAL/ZERO>** key.
The menu-guided calibration begins.
Follow the instructions on the display.

Calibrate

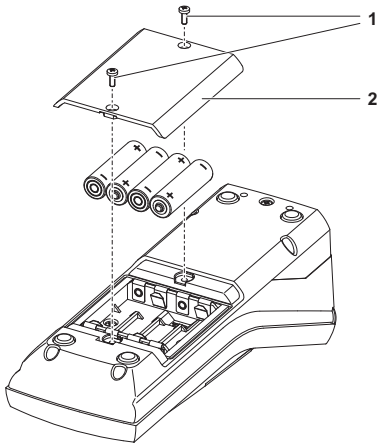
- at regular intervals
- after connecting another electrode
- when the sensor symbol flashes:
  - after the calibration interval has expired
  - after voltage interruption (e.g. empty batteries, empty rechargeable battery)

Maintenance, cleaning

Maintenance

The meter is almost maintenance-free.
The only maintenance task is replacing the batteries or rechargeable battery.

NOTE
Make sure the poles of the batteries are the right way round. The ± signs on the batteries must correspond to the ± signs in the battery compartment.



1 Open the battery compartment:
   – Unscrew the two screws (1) on the underside of the meter,
   – Remove the lid of the battery compartment (2).

2 If necessary, take four old batteries out of the battery compartment.

3 Insert four batteries (3) in the battery compartment.

4 Close the battery compartment and fix it with the screws.

Dispose of used batteries according to the local regulations of your country.

End users within the European Union are obligated to return used batteries (even ecologically compatible ones) to a collection point set up for recycling purposes.

Batteries are marked with the crossed-out waste container symbol. Therefore, they may not be disposed with the domestic waste.

Cleaning

Occasionally wipe the outside of the meter with a damp, lint-free cloth. Disinfect the housing with isopropanol as required.

NOTE
The housing components are made out of synthetic materials (polyurethane, ABS and PMMA). Thus, avoid contact with acetone and similar detergents that contain solvents. Remove any splashes immediately.

Cleaning the cell shaft

If liquid is in the cell shaft (e.g. due to a spilled cell), clean the cell shaft as follows:

CAUTION
Cells can contain poisonous or corrosive substances. If the content is released follow the danger warnings on the cell. If necessary, take corresponding protective measures (protective goggles, protective gloves etc.).

1 Switch the pHotoFlex® pH off and pull out the power plug.

2 Rinse the cell shaft with distilled water.

Cleaning the cells

Cells have to be clean, dry, and free of fingerprints and scratches. Therefore, clean them regularly:

1 Clean the cells inside and out with hydrochloric acid or laboratory soap.

2 Rinse out several times with distilled water.

3 Let them dry in the air.

4 Only hold the cells by the top or by the light protection cap so that the optical path is not impaired.

5 Before measuring, clean the cell with the enclosed cleaning cloth.

Scratches in the glass change the optical characteristics of the cell and falsify the measured value. For this reason, never use scratched cells!

What to do if...

General errors

Display, *LoBat*

Cause	Remedy
– The batteries or rechargeable battery are largely depleted	– Insert new batteries – Charge the rechargeable battery

Instrument does not react to keystroke

Cause	Remedy
– Software error – Operating condition undefined or EMC load unallowed	– Processor reset: Press the **<START/ENTER>** and **<PRT>** key simultaneously.

RS232 interface does not react

Cause	Remedy
– Software error – Operating condition undefined or EMC load unallowed	– Processor reset: Press the **<START/ENTER>** and **<PRT>** key simultaneously.

Error message, *Error 0, 8, 16, 16384*

Cause	Remedy
– Instrument error	– Repeat measurement – Meter defective, send meter for repair and quote the error number

Photometry

Measuring range undercut or exceeded

Cause	Remedy
– Program not suitable	– Select program with suitable measuring range – Dilute the sample

Obviously incorrect measured values

Cause	Remedy
– Measurement disturbed by external light	– Close the external light cover.
– Cell not correctly inserted	– Insert the cell so that it is positioned on the bottom of the cell shaft.
– Cell contaminated	– Clean the cell
– Cell shaft contaminated	– Clean the cell shaft
– Dilution set incorrectly	– Set the dilution
– Selected program unsuitable	– Select other program
– Zero measurement incorrect	– Perform zero measurement
– Blank value incorrect	– Remeasure the blank value

pH value / ORP voltage

Measuring range exceeded or undercut

Cause	Remedy
Electrode:	
– Air bubble in front of the junction	– Remove air bubble
– Air in the junction	– Extract air or moisten junction
– Gel electrolyte dried out	– Replace electrode
Test sample:	
– The pH value lies outside the measuring range	– not possible

Measured value display ---- (calibration error)

Cause	Remedy
Electrode:	
– Junction contaminated	– Clean junction
– Membrane contaminated	– Clean membrane
– Moisture in the plug	– Dry plug
– Not enough electrolyte	– Top up electrolyte

Cause	Remedy
– Electrode obsolete	– Replace electrode
– Electrode broken	– Replace electrode
– Socket damp	– Dry socket
Calibration procedure:	
– Incorrect solution temperature (without temperature sensor)	– Set up correct temperature
– Incorrect buffer solutions	– Select buffer solutions suitable for the calibration procedure
– Buffer solutions too old	– Use only once. Note the shelf life

No stable measured value

Cause	Remedy
pH electrode:	
– Junction contaminated	– Clean junction
– Membrane contaminated	– Clean membrane
Test sample:	
– pH value not stable	– Measure with air excluded if necessary
– Temperature not stable	– Temper if necessary
Electrode + test sample:	
– Conductivity too low (e.g. in ultrapure water)	– Use suitable electrode
– Temperature too high	– Use suitable electrode
– Organic liquids	– Use suitable electrode

Obviously incorrect measured values

Cause	Remedy
pH electrode:	
– Not connected	– Connect electrode
– Cable broken	– Replace cable or electrode
– pH electrode unsuitable	– Use suitable electrode

Cause	Remedy
– Temperature difference between buffer and test sample too high	– Adjust temperature of buffer or sample solutions
– Measurement procedure not suitable	– Follow special procedure

Sensor symbol flashes

Cause	Remedy
– Calibration interval expired	– Recalibrate the measuring system

Technical data

General data

Dimensions	approx. 236 x 86 x 117 mm	
Weight	approx. 0.6 kg (without batteries)	
Mechanical structure	Type of protection	IP 67
Electrical safety	Protective class	III
Test certificates	CE, FCC	
Ambient conditions	Storage	- 25 °C ... + 65 °C
	Operation	0 °C ... + 50 °C
	Climatic class	2
Allowable relative humidity	Yearly mean: 30 days /year: other days:	75 % 95 % 85 %

Power supply

Batteries	4 x 1.5 V, type AA
Operating time with battery operation	approx. 5000 measurements
Rechargeable battery (optional)	5 x 1.2 V nickel metal hydride (NiMH), type AAA
Power pack Charging device (optional)	FRIWO FW7555M/09, 15.1432.500-00 Friwo Part. No. 1883259 ---------- RiHuiDa RHD20W090150 ---------- Input: 100 ... 240 V ~ / 50 ... 60 Hz / 400 mA Output: 9 V = / 1,5 A Connection max. overvoltage category II Primary plugs contained in the scope of delivery: Euro, US, UK and Australian.

Serial interface

Connection of the cable AK 540/B or AK 540/S

Baud rate	adjustable: 1200, 2400, 4800, 9600, 19200 Baud
Type	RS232
Data bits	8
Stop bits	2
Parity	None
Handshake	RTS/CTS
Cable length	Max. 15 m

Guidelines and norms used

EMC	EC guideline 89/336/EEC EN 61326-1/A3:2003 FCC Class A
Instrument safety	EC guideline 73/23/EEC EN 61010-1 :2001
Climatic class	VDI/VDE 3540
IP protection	EN 60529:1991

FCC Class A Equipment Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Photometry

Optical measuring principle	LED photometer with filter	
Interference filter	436 nm, 517 nm, 557 nm, 594 nm, 610 nm, 690 nm	
	Accuracy:	± 2 nm
Photometric reproducibility	0.005 or better	
Photometric resolution	0.001	
Warm-up time	none	
Measuring time	approx. 2s	
Measured parameters	Concentration (method dependent, selectable display form), absorbance, transmission	
Measuring range	Absorbance:	-0.200 ... +2.000
	Transmission:	1 ... 150 %
User-defined programs	100	
Resolution Transmission	1.00 ... 9.99	0.01 %
	10.0 ... 150	0.1 %

pH value / ORP voltage

Measuring ranges, resolution

Variable	Measuring range	Resolution
pH	- 2.00 ... + 16.00	0.01
U [mV]	- 1000 ... + 1000	1
T [°C]	- 5.0 ... + 100.0	0.1
T [°F]	- 23.0 ... + 212.0	0.1

Manual temperature input

Variable	Range	Increment
T_{manual} [°C]	- 20 ... + 100	1

Accuracy (± 1 digit)

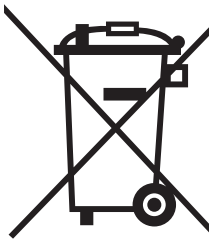
Variable	Accuracy	Temperature of the test sample
pH *	± 0.01	+ 15 °C ... + 35 °C
U [mV]	± 1	+ 15 °C ... + 35 °C
T [°C]	± 0.3	0 °C ... + 55 °C
T [°F]	± 0.54	0 °C ... + 55 °C

** when measuring in a range of ± 2 pH around a calibration point*

Disposal

Handle and dispose of all waste in compliance with local laws and regulations.

EU only: Correct disposal of this product — WEEE Directive on waste electrical and electronic equipment

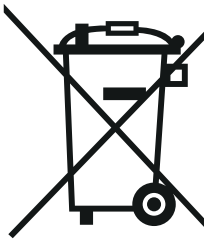


This marking on the product, accessories or literature indicates that the product should not be disposed of with other waste at the end of its working life.

To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

Waste from electrical and electronic equipment can be returned to the producer or distributor.

EU only: Correct disposal of batteries in this product



This marking on the battery, manual or packaging indicates that the batteries in this product should not be disposed of with other waste at the end of its working life. Where marked, the chemical symbols Hg, Cd or Pb indicate that the battery contains mercury, cadmium or lead above the reference levels in Directive 2006/66/EC. If batteries are not properly disposed of, these substances can cause harm to human health or the environment.

To protect natural resources and to promote material re-use, please separate batteries from other types of waste and recycle them through your local, free battery return system.

Xylem |ˈzīləm|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to www.xylem.com.

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