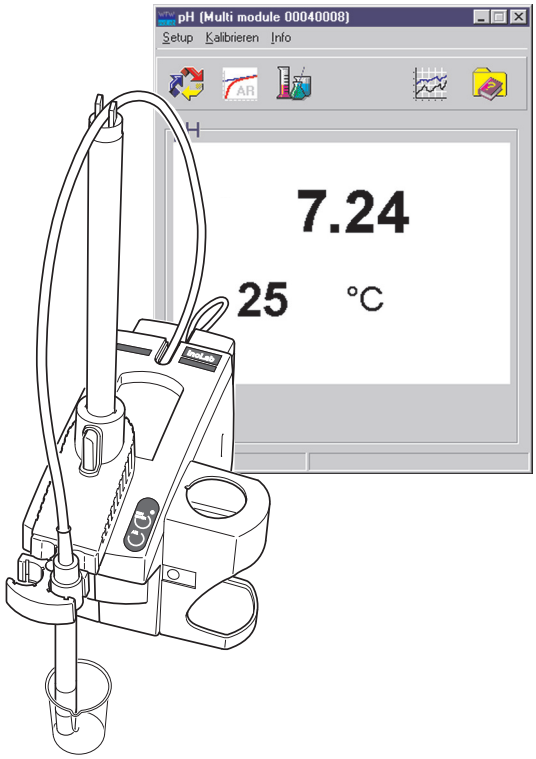
Operating manual

inoLab 740



inoLab 740
active multifunction boxes

ba75530e03 07/2010

Accuracy when going to press

The use of advanced technology and the high quality standard of our instruments are the result of continuous development. This may result in differences between this operating manual and your instrument. Also, we cannot guarantee that there are absolutely no errors in this manual. Therefore, we are sure you will understand that we cannot accept any legal claims resulting from the data, figures or descriptions.

Warranty

We guarantee the instrument described for 3 years from the date of purchase.
The instrument warranty covers manufacturing faults that are discovered within the warranty period.
The warranty does not cover components that are replaced during maintenance work, e. g. batteries.

The warranty claim extends to restoring the instrument to readiness for use but not, however, to any further claim for damages. Improper handling or unauthorized opening of the instrument invalidates any warranty claim.

To ascertain the warranty liability, return the instrument and proof of purchase together with the date of purchase freight paid or prepaid.

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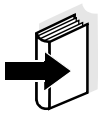
1 Overview

inoLab 740 active multifunction boxes (measuring modules) can be operated via a PC or an inoLab Terminal 740.

The present manual describes the connection of an inoLab 740 active multifunction box to a PC.

Remote control using the MultiLab® pilot software is described in the operating manual of the software. The current version of the MultiLab® pilot software is available on the Internet under http://www.WTW.com.

Connection to an inoLab Terminal 740 and remote control using the terminal is described in the *inoLab 740 with Terminal 740* operating manual.



Note
Information on accessories is given in the WTW catalog, LABORATORY AND FIELD INSTRUMENTATION, or on the Internet.

More information or installation instructions can be requested from WTW:

- Application reports
- Primers
- Safety datasheets.

Hardware requirements

- Computer with Pentium processor or higher
- A minimum of 128 Mbytes RAM
- Hard disk with at least 200 Mbytes available memory
- CD-ROM drive
- One free USB or serial COM interface (RS232C) for each meter to be connected.

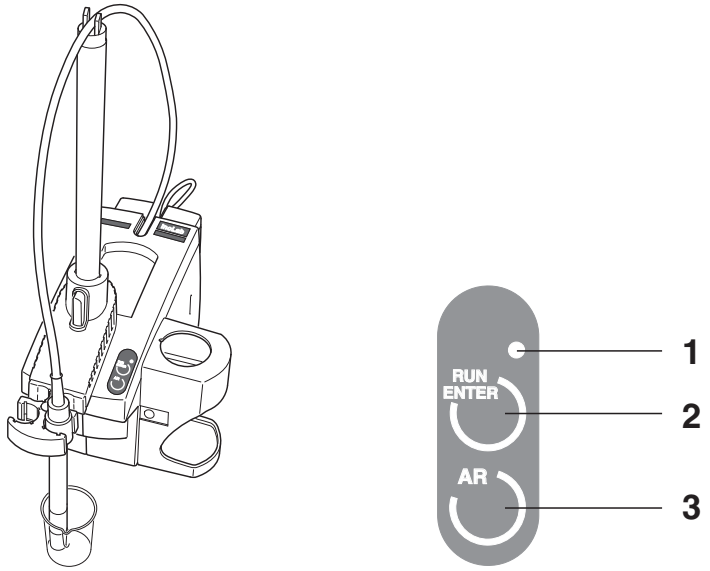
Software requirements

- Windows 98SE or higher.

1.1 Active multifunction box

Each active mutifunction box has its own software in order to process the probe signals and to communicate with the terminal or PC.

Active multifunction box



Operating elements of the active multifunction box

1	Status indicator of the AutoRead function LED off: AutoRead function is deactivated LED illuminates: AutoRead function is active LED flashes: AutoRead measurement has been started
2	RUN ENTER: Start AutoRead measurement (if the AutoRead function is active) Save the current measured value into the file for the manual storage last opened
3	AR: Activate/deactivate the AutoRead function

2 Safety

This operating manual contains basic instructions that you must follow during the commissioning, operation and maintenance of the inoLab 740 measuring system. Consequently, all responsible personnel must read this operating manual before working with the measuring system. The operating manual must always be available within the vicinity of the measuring system.

Target group

The measuring system was developed for use in the laboratory. Thus, we assume that, as a result of their professional training and experience, the operators will know the necessary safety precautions to take when handling chemicals.

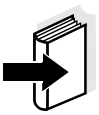
Symbols used



Caution
indicates safety instructions that must be followed to prevent damage to persons and property.



Note
indicates notes that draw your attention to special features.



Note
indicates cross-references to other documents, e.g. application reports, operating manuals of electrodes, etc.

2.1 Authorized use

This measuring system is authorized exclusively for potentiometric, conductimetric or amperometric measurements in the laboratory. The technical specifications as given in chapter 6 TECHNICAL DATA must be observed. Only the operation and running of the measuring instrument according to the instructions given in this operating manual is authorized.
Any other use is considered **unauthorized**.

2.2 General safety instructions

This measuring system is constructed and tested in compliance with the EN 61010-1 safety regulations for electronic measuring instruments.
It left the factory in a safe and secure technical condition.

Function and operational safety

The smooth functioning and operational safety of the measuring system can only be guaranteed if the generally applicable safety measures and the specific safety instructions in this operating manual are followed during operation.

The smooth functioning and operational safety of the measuring system can only be guaranteed under the environmental conditions that are specified in chapter 6 TECHNICAL DATA.

If the measuring system was transported from a cold environment to a warm environment, the formation of condensate can impair the functioning of the meter. In this event, wait until the temperature of the measuring system reaches room temperature before putting the meter back into operation.



Caution
The measuring system is only allowed to be opened by personnel authorized by WTW.

Safe operation

If safe operation is no longer possible, the measuring system must be taken out of service and secured against inadvertent operation!
Safe operation is no longer possible if the measuring system

- has been damaged in transport
- has been stored under adverse conditions for a lengthy period of time
- is visibly damaged
- no longer operates as described in this manual.

If you are in any doubt, please contact the supplier of the measuring system.

Obligations of the purchaser

The purchaser of this measuring system must ensure that the following laws and guidelines are observed when using dangerous substances:

- EEC directives for protective labor legislation
- National protective labor legislation
- Safety regulations
- Safety datasheets of the chemical manufacturers.

3 Commissioning



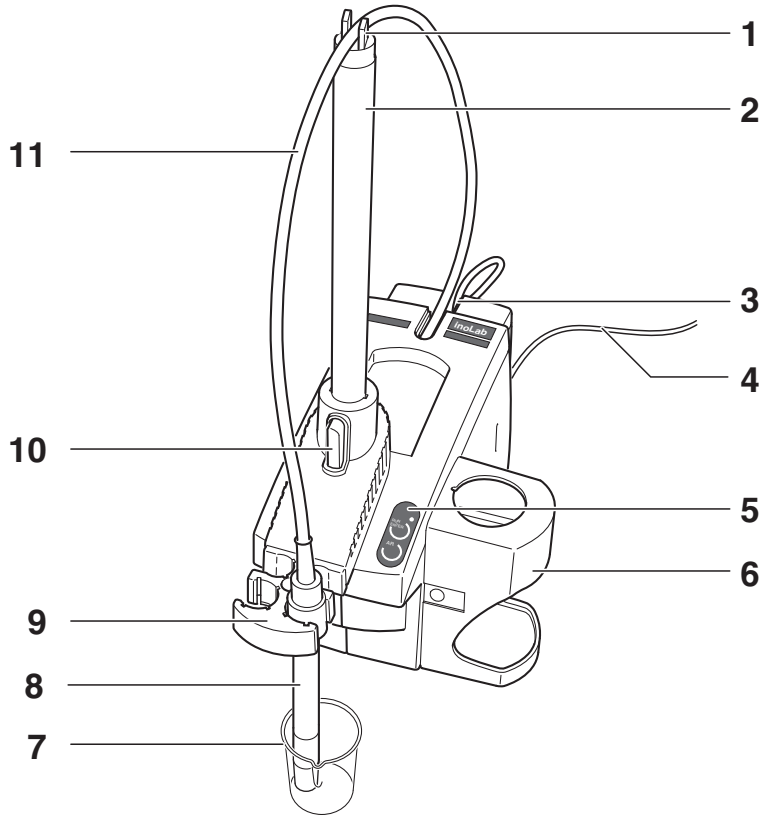
Caution
The measuring module is supplied with low voltage (5 V DC) either over a USB interface or over a keyboard interface on the PC.
For connection on the USB interface only use the original AK 340/B cable with the ADA USB/Ser adapter.
For connection on the keyboard interface only use the original AK 340/B cable to supply the active multifunction box with power.



Note
The MultiLab® pilot software works together with all inoLab 740 multifunction boxes.

3.1 Preparing the inoLab 740 measuring system

A measuring system ready for operation comprises the following:



1	Cable holder
2	Stand rod
3	Opening to the cable shaft
4	Connection cable to the PC (AK M-PC)
5	Keys to measure with AutoRead and to store measured values
6	Locking holder
7	Beaker with test sample
8	Probe
9	Freely adjustable probe holder
10	Locking key for probe holder
11	Connection cable: Probe - active multifunction box

Perform the following activities before commissioning the system:

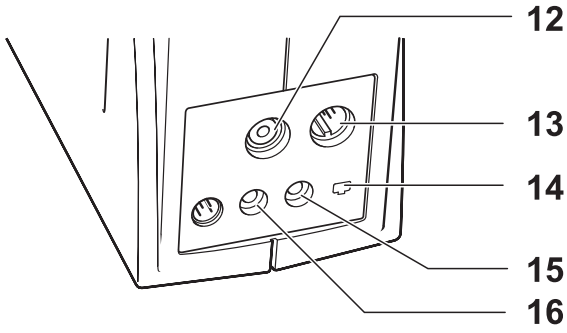
- prepare the active multifunction box and probe(s)
- connect the active multifunction box to the PC
- install and start the MultiLab® pilot software

Preparing the active multifunction box

1	Place the active multifunction box on a flat surface and protect it from intense light and heat.
2	Insert the stand rod (2) in the active multifunction box.
3	Fix the probe holder (9) on the stand rod.
4	Adjust the height of the probe holder (9) using the locking key (10).

Connecting the probe

5	Place the probe (8) into the probe holder (9).
6	Place the cable (11) of the probe (8) in the cable holder (1) at the stand rod or at the probe holder (9).



12	pH/ORP electrode or ion sensitive electrode
13	D. O. probe or conductivity measuring cell
14	Stirrer connection for D. O. probe StirrOx G
15	Reference electrode
16	Temperature sensor



Caution

Only connect probes to the active multifunction box that cannot feed excessive voltages or currents (> SELV and > circuit with current limiter). Almost all commercial electrodes - especially WTW electrodes - meet these requirements.

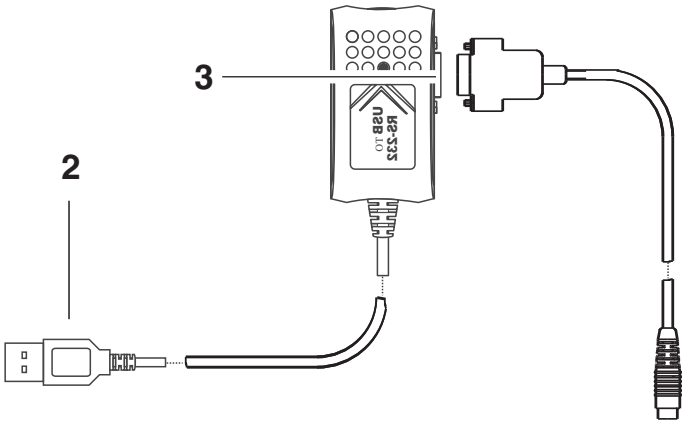
7	Connect the probe (8) to the relevant socket (12 or 13) of the active multifunction box.
8	If necessary, connect the plug for the temperature probe in the probe to the socket (16).
9	Prepare the beaker with the test solution (7).
10	Adjust the height of the probe holder (9) by pressing the locking key (10) so that the probe (8) is immersed in the test solution.
11	for pH, ORP or ISE electrodes with separate reference electrodes: Connect the reference electrode to the socket (15).
12	Put the probe cable (11) into the cable shaft (3) so that it is stored safely.

3.2 Connecting active multifunction boxes to the PC

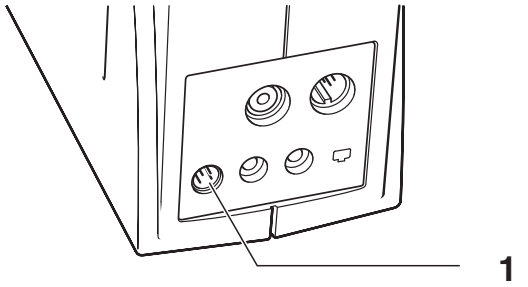
You can run up to four active multifunction boxes on a PC. Communication of multifunction box and PC takes place via a USB or serial COM interface.

USB interface

1	Plug the USB plug (2) of the Ada USB/Ser adapter into a USB interface of the PC. The USB interface can be used for serial plugs.



2	Using the AK 340/B connection cable, connect the serial connection of the USB adapter (3) to the RS232 socket (1) of the multifunction box.



Up to four active multifunction boxes can be connected to the PC. Four AK 340/B connection cables and four Ada USB/Ser USB adapters are required for this.

Serial interface

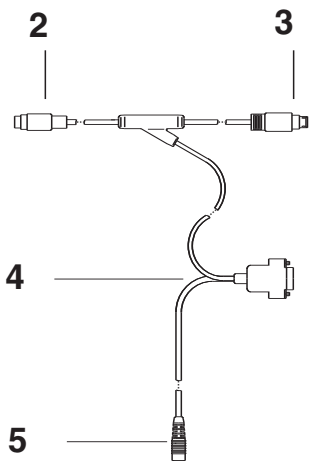
Connection to the PC is made using the AK M-PC cable.
The AK M-PC cable has a PS2 plug and socket.

Communication between the active multifunction box and PC takes place via the serial interface. The power required by the active multifunction box is taken from the PC via the transition piece on the connection cable between the keyboard and PC.

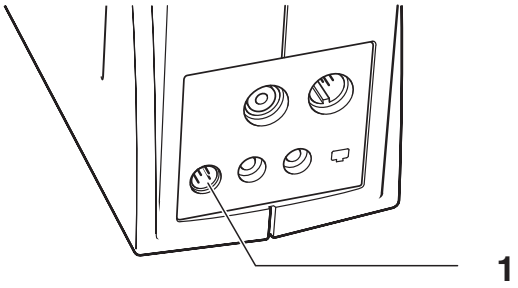
Note
If your PC has a DIN keyboard interface instead of the PS2 keyboard interface, connect the PS2 - DIN adapter provided to the PS2 plug (3) and the PS2 socket (2) of the AK M-PC connection cable.

If your PC has a free 25-pin serial interface instead of the free 9-pin interface, connect the 9/25 adapter provided to the 9-pin COM plug (4).

1	Disconnect the existing PC keyboard from the PC.
2	Connect the PS2 plug (3) of the AK M-PC connection cable to the keyboard interface on the PC.

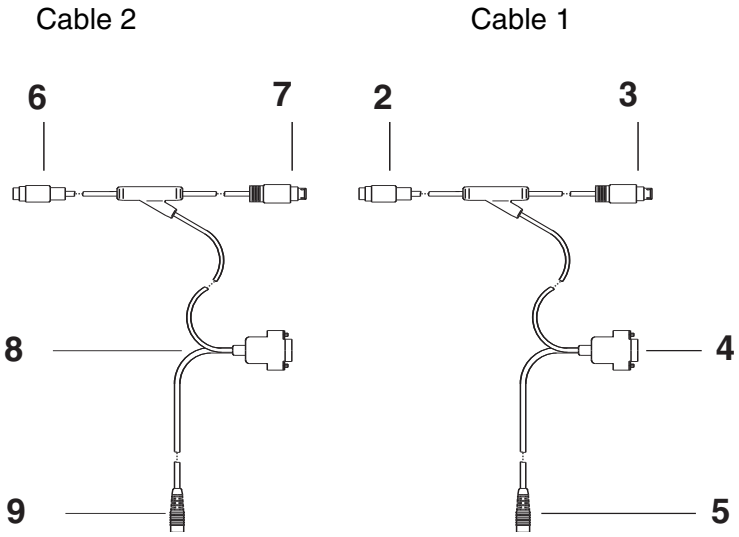


3	Plug the PC keyboard into the socket (2) of the AK M-PC connection cable.
4	Plug the RS232 plug (4) of the AK M-PC connection cable into a serial interface (COM 1 to COM 4) on the PC.
5	Plug the multifunction box plug (5) of the AK M-PC connection cable into the socket (1) of the active multifunction box.



Up to four active multifunction boxes can be connected to the PC. To do so, four AK M-PC connection cables are required. The following example of two active multifunction boxes illustrates the principle of how to connect the cables with two or more active multifunction boxes.

6	Disconnect the PC keyboard from the socket (2).
7	Connect the PS2 plug (7) of the second AK M-P cable to the socket (2) of the first AK M-PC cable.



8	Plug the PC keyboard into the socket (6) on the second cable to the PC.
9	Plug the RS232 plug (8) of the second AK M-PC cable to the PC into another serial interface (COM 1 to COM 4) on the PC.
10	Plug the multifunction box plug (9) of the second AK M-PC connection cable into the socket (1) of the second active multifunction box.

3.3 Additional devices/options

11	Attach the locking holder (6) to the active multifunction box.
12	Connect the external temperature probe to the sockets (15 and 16) (see page 13).
13	Connect the D. O. probe with stirrer (StirrOx G) to the socket (14) (see page 13).
14	Connect the barcode reader to the PC keyboard interface or to the socket (7) of the second connection cable to the PC.

Note
Only Wedgetype barcode readers are suitable to be connected to the keyboard interface.

Also observe the connection instructions in the operating manual of your barcode reader.

3.4 Installing the MultiLab® pilot

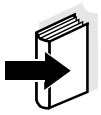


Note
The MultiLab® pilot software is on the CD-ROM supplied. The software is continuously developed further. The current software version is available for download on the Internet under http://www.WTW.com.

1	Start the MultiLab® pilot installation program.
2	Follow the user guide.



Note
After the installation is finished, the *Data* subdirectory is the standard directory for the *Save* and *Open* functions. Here you will find some sample files, which you can also open in the offline mode.

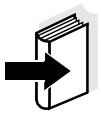


Note
Remote control using the software is described in the operating manual of the MultiLab® pilot software.

4 Maintenance, cleaning, disposal

Maintenance

The measuring system is almost maintenance-free.



Note
See the relevant operating manuals of the probes for instructions on maintenance.

Cleaning

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



Caution
The housing is made of a synthetic material (ABS). Thus, avoid contact with acetone or similar detergents that contain solvents. Remove any splashes immediately.

Disposal

This measuring system is sent out in a protective transport packing.

We recommend: Keep the packing material. The original packing protects the instrument against damage during transport.

Dispose of the measuring module as electronic waste at an appropriate collection point. It is illegal to dispose of them in household refuse.

5 What to do if...

System messages due to errors are listed together with their possible causes and remedies.

5.1 PC messages

Red probe symbol

Cause	Remedy
Calibration interval expired	Recalibrate the measuring system

Measuring module does not react to keystroke

Cause	Remedy
Operating state undefined or electromagnetic interference too high	Disconnect and then reconnect the AK M-PC cable to the measuring module (if the error occurs repeatedly, reduce the electromagnetic interference in the environment of the measuring module)

Lengthy stability check with AutoRead

Cause	Remedy
No stable measured value	Provide stable measuring conditions (e.g. temperature)
Defective probe	Use another probe

5.2 pH/voltage system messages

For the inoLab 740 multifunction boxes:
pH, pH/ION, pH/Cond and Multi.

Error message, *OFL*

Cause	Remedy
pH/voltage electrode:	
– Not connected	– Connect electrode
– Air bubble in front of the diaphragm	– Remove air bubble
– Air in the diaphragm	– Extract air or moisten diaphragm
– Cable broken	– Replace electrode
– Gel electrolyte dried out	– Replace electrode

Error message, *E3*

Cause	Remedy
pH/ORP electrode:	
– Diaphragm contaminated	– Clean diaphragm
– Membrane contaminated	– Clean membrane
– Moisture in the plug	– Dry plug
– Electrolyte obsolete	– Replenish electrolyte or – Replace electrode
– Electrode obsolete	– Replace electrode
– pH electrode: broken	– Replace electrode
– ORP electrode: short-circuit	– Replace electrode

Measuring system:	
– Incorrect calibration procedure	– Select correct procedure
– Incorrect solution temperature (without temperature probe)	– Set up correct temperature
– Socket damp	– Dry socket

Buffer solutions	
– Incorrect buffer solutions	– Change calibration procedure
– Buffer solutions too old	– Use only once. Note the shelf life
– Buffer solutions depleted	– Change solutions

No stable measured value

Cause	**Remedy**
pH/ORP electrode:	
– Diaphragm contaminated	– Clean diaphragm
– Membrane contaminated	– Clean membrane

Test sample:	
– pH value not stable	– Measure with air excluded if necessary
– Temperature not stable	– Adjust temperature if necessary

Electrode + test sample:	
– Conductivity too low	– Use suitable electrode
– Temperature too high	– Use suitable electrode
– Organic liquids	– Use suitable electrode

Obviously incorrect measured values

Cause	**Remedy**
Electrode + test sample:	
– pH electrode unsuitable	Use suitable electrode
– Temperature difference between buffer and test sample too high	Adjust temperature of buffer or sample solutions

5.3 Ion concentration system messages

For the inoLab 740 multifunction boxes:
pH, pH/ION, pH/Cond and Multi.

Error message, *OFL*

Cause	Remedy
Ion sensitive electrode or reference electrode	
– Not connected	– Connect electrode
– Cable broken	– Replace electrode

Error message, *E3*

Cause	Remedy
Ion-sensitive electrode:	
– Slope is not in the range 50 ... 70 mV or 23 ... 35 mV	– Replace electrode – recalibrate
– Moisture in the plug	– Dry plug
– Electrode obsolete	– Replace electrode
– Measuring in a range unsuitable for the electrode	– Use a suitable electrode
Measuring system:	
– Calibration procedure: Wrong sequence of standards for three point calibration	– Select correct sequence
– Socket damp	– Dry socket

Temp error

Cause	Remedy
During calibration:	
– Calibration standards do not have the correct temperature (max. ± 2 °C temperature difference)	– Adjust the temperature of the calibration standards
In measurement:	
– Test sample does not have the correct temperature (max. ± 2 °C temperature difference from calibration temperature)	– Adjust the temperature of the test sample

Cal error

Cause	Remedy
During calibration:	
– Calibration standards are too close to each other $IU_2 - U_1I \leq 5$ mV $IU_3 - U_2I \leq 5$ mV	– Use other calibration standards
In measurement:	
– Measured value is outside the calibration limits	– Recalibrate with suitable standards as necessary

5.4 D. O. system messages

For the inoLab 740 multifunction boxes:
Oxi, BSB/BOD and Multi.

Error message, *OFL*

Cause	Remedy
Display range exceeded	
– Not connected	– Connect probe
– Cable broken	– Replace probe
– Depleted	– Replace probe
– Short-circuit between gold and lead electrode	– Clean probe and replace it if necessary

Error message, *E3*

Cause	Remedy
Invalid calibration	
– Electrolyte solution depleted	– Regenerate probe
– Membrane contaminated	– Clean membrane
– Electrode system poisoned	– Regenerate probe
– Obsolete	– Replace probe
– broken	– Replace probe

Error message, *E7*

Cause	Remedy
Membrane damaged	
– Membrane damaged	– Regenerate probe
– Membrane head screwed on not tight enough	– Screw membrane head tight

Display of *StirrerError*

Cause	Remedy
With StirrOx G probe	
– Current at the stirrer supply is too high	– Replace the StirrOx G

Measured value too low

Cause	Remedy
Probe + test sample:	
– Insufficient flow	– Provide flow to the probe

Measured value too high

Cause	Remedy
Probe + test sample:	
– High amount of dissolved substances	– Correct solubility function using the salinity equivalent
– Air bubbles bump on the membrane with high velocity	– Avoid direct flow to the membrane
– The carbon dioxide pressure is too high (> 1 bar)	– Measuring not possible

5.5 Conductivity system messages

For the inoLab 740 multifunction boxes:
Cond, pH/Cond and Multi.

Error message, *OFL*

Cause	Remedy
Measuring cell + test sample:	
– Measuring cell not connected	– Connect measuring cell
– Cable broken	– Replace measuring cell
– The measured value is outside the measuring range	

Error message, *E3*

Cause	Remedy
Measuring cell + test sample:	
– Measuring cell contaminated	– Clean cell and replace it if necessary
– Calibration solution not suitable	– Check calibration solutions

6 Technical data

Ambience conditions

Storage	- 25 °C ... + 65 °C
Operation	0 °C ... + 40 °C
Admissible relative humidity	Yearly mean: < 75 % 30 days /year: 95 % Other days: 85 %

Mechanical structure

Type of protection	IP 43 without integrated printing device
Climatic class	2

Electrical safety

Protective class	3

Guidelines and norms used

EMC	E.C. guideline 89/336/EEC EN 61326-1:1998 EN 61000-3-2 A14:2000 EN 61000-3-3:1995 FCC Class A
Instrument safety	E.C. directive 73/23/EEC EN 61010-1 A2:1995
Climatic class	VDI/VDE 3540
Type of protection	EN 60529:1991
Protective class	EN 61010-1

Test certificates

CETLUS, CE

Dimensions and weight

Length [mm]	300
Width [mm]	100
Height [mm] (without stand) (with stand)	 170 500
Weight [kg]	approx. 1.3

Power supply

The power is supplied via the connection cable from the PC.

Voltage	5V ± 10%
Current	max. 500mA

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.

6.1 pH/voltage

Note
The technical data of the electrodes are not taken into account here.

General information

Input resistance	5 x 10^{12} Ω
Input current	5 x 10^{-13} A typical < 5 x 10^{-12} A at 25°C
Slope (pH)	-62 ... -50 mV
Asymmetry (pH)	-30 ... +30 mV

Measuring ranges and resolution

pH

Measuring range 1 (resolution)	- 2.000 ... + 19.999 (0.001)
Measuring range 2 (resolution)	- 2.00 ... + 19.99 (0.01)

Voltage U [mV]

Measuring range 1 (resolution)	- 999.9 ... + 999.9 (0.1)
Measuring range 2 (resolution)	- 1999 ... + 1999 (1)

Temperature

T [°C] (resolution)	- 5.0 ... + 105.0 (0.1)
T [°F] (resolution)	+ 23.0 ... + 221.0 (0.1)

Accuracy (± 1 digit)

pH (± 2 units around the calibration point)

Measuring range 1	± 0.004 at + 15°C ... + 35°C
Measuring range 2	± 0.01

Voltage U [mV]

Measuring range 1	± 0.2 at + 15°C ... + 35°C
Measuring range 2	± 1

Temperature

T [°C]	NTC 30: ± 0.1 PT 1000(1): ± 0.5 at 0°C ... 15°C ± 0.1 at 15°C ... 35°C ± 1 at 35°C ... 55°C
T [°F]	NTC 30: ± 0.2 PT 1000(1): ± 0.9 at 32°F ... 59°F ± 0.2 at 59°F ... 95°F ± 1.8 at 95°F ... 131°F

(1) Operation of the PT 1000 temperature probe is possible on the measuring modules, inoLab pH 740 and pH/ION 740 only.

Temperature input

Manually [°C]	- 20 ... + 130

Electrodes & accessories

Information on electrodes to be used and other accessories is given in the WTW catalog, LABORATORY AND FIELD INSTRUMENTATION, or is available on the Internet.

6.2 Ion concentration



Note
The technical data of the electrodes are not taken into account here.

General information

Input resistance	5 x 10^{12} Ω
Input current	5 x 10^{-13} A typical < 5 x 10^{-12} A at 25°C
Slope ranges	± 25 to 35 mV and ± 50 to 70 mV

Measuring ranges and resolution

Concentration [mg/l]

Measuring range 1 (resolution)	0.000 ... 9.999 (0.001)
Measuring range 2 (resolution)	0.00 ... 99.9 (0.01)
Measuring range 3 (resolution)	0.0 ... 999.9 (0.1)
Measuring range 4 (resolution)	0 ... 1999 (1)

Temperature

T [°C] (resolution)	- 5.0 ... + 105.0 (0.1)
T [°F] (resolution)	+ 23.0 ... + 221.0 (0.1)

Electrodes & accessories

Information on electrodes to be used and other accessories is given in the WTW catalog, LABORATORY AND FIELD INSTRUMENTATION, or is available on the Internet.

6.3 Dissolved oxygen



Note
The technical data of the probes are not taken into account here.

Measuring ranges and resolution

Concentration [mg/l]

Measuring range 1 (resolution)	0 ... 19.99 (0.01)
Measuring range 2 (resolution)	0 ... 90.0 (0.1)

Saturation [%]

Measuring range 1 (resolution)	0 ... 199.9 (0.1)
Measuring range 2 (resolution)	0 ... 600 (1)

D. O. partial pressure [mbar]

Measuring range 1 (resolution)	0 ... 199.9 (0.1)
Measuring range 2 (resolution)	0 ... 1250 (1)

Temperature

T [°C] (resolution)	0.0 ... 50.0 (0.1)
T [°F] (resolution)	+ 32.0 ... + 122.0 (0.1)

Accuracy (±1 digit)

Concentration

	± 0.5% of measured value at ambient temperature of 5 °C ... 30 °C

Temperature compensation

	< 2 % at 0 ... 40 °C

Saturation

	± 0.5% of measured value when measuring in a range of ± 10 K around the calibration temperature

Oxygen partial pressure

	± 0.5% of measured value at ambient temperature of 5 °C ... 30 °C

Temperature

T [°C]	± 0.1
T [°F]	± 0.2

Correction functions

Salinity correction	0 ... 70.0 SAL
Air pressure correction	automatically using the built-in pressure sensor in the range 500 ... 1100 mbar

Probes & accessories

Information on electrodes to be used and other accessories is given in the WTW catalog, LABORATORY AND FIELD INSTRUMENTATION, or is available on the Internet.

6.4 Conductivity



Note
The technical data of the measuring cells are not taken into account here.

Measuring ranges and resolution

Conductivity [µS/cm]	
Measuring range 1 (resolution)	0.000 ... 1.999 (0.001) (at cell const. = 0.01 cm^{-1})
Measuring range 2 (resolution)	0.00 ... 19.99 (0.01) (at cell const. = 0.01 cm^{-1} or 0.1 cm^{-1})
Measuring range 3 (resolution)	0.0 ... 199.9 (0.1)
Measuring range 4 (resolution)	0 ... 1999 (1)
Conductivity [mS/cm]	
Measuring range 5 (resolution)	0.00 ... 19.99 (0.01)
Measuring range 6 (resolution)	0.0 ... 199.9 (0.1)
Measuring range 7 (resolution)	0 ... 1999 (1)

Specific resistance [MΩcm]	
Measuring range 1 (resolution)	0.000 ... 1.999 (0.001)
Measuring range 2 (resolution)	0.00 ... 19.99 (0.01)
Measuring range 3 (resolution)	0.0 ... 199.9 (0.1)
Measuring range 4 (resolution)	0 ... 1999 (1)

Salinity equivalents according to IOT table	
SAL	0.0 ... 70.0

Total dissolved solids TDS [mg/l]	
Measuring range (resolution) Adjustable factor	0 ... 1999 (1) 0.40 ... 1.00

Temperature

T [°C] (resolution)	– 5.0 ... + 105.0 (0.1)
T [°F] (resolution)	+ 23.0 ... + 221.0 (0.1)

Accuracy (± 1 digit)

Conductivity, specific resistance

No temperature compensation	± 0.5 %
Nonlinear temperature compensation	± 0.5 % (at 0°C ... 35°C according to EN 27 888) ± 0.5 % (at 35°C ... 50°C extended nLF function according to WTW measurements)
Linear temperature compensation	± 0.5 % 10°C ... 75°C (the accuracy percentage always relates to the measured value!)

Salinity equivalent SAL

Range 0.0 ... 42.0	± 0.1 (at 5°C ... 25°C) ± 0.2 (at 25°C ... 30°C)

Total dissolved solids TDS [mg/l]

	± 1

Temperature

T [°C]	NTC 30 Accuracy ± 0.1 PT 1000(1): Accuracy Operating temperature ± 0.5 at 0°C ... 15°C ± 0.1 at 15°C ... 35°C ± 1 at 5°C ... 55°C
T [°F]	NTC 30: Accuracy ± 0.2 PT 1000(1): Accuracy Operating temperature ± 0.9 at 32°F ... 59°F ± 0.2 at 59°F ... 95°F ± 1.8 at 95°F ... 131°F

(1) Operation of the PT 1000 temperature probe is possible on the measuring module, inoLab Cond 740 only.

Setting the cell constant

C [cm^{-1}]	0.01 0.090 ... 0.110 or 0.1(1) 0.250 ... 2.500

(1) for inoLab Cond 740 only

Cell constant, calibrated

C [cm^{-1}]	0.450 ... 0.500 0.800 ... 1.200

Reference temperature, selectable

TREF [°C]	20 25

Measuring cells & accessories

Information on measuring cells to be used and other accessories is given in the WTW catalog, LABORATORY AND FIELD INSTRUMENTATION, or is available on the Internet.

7 Lists

This chapter provides additional information and orientation aids.

Abbreviations The list of abbreviations explains display indicators and abbreviations used.

Specialist terms The glossary briefly explains the meaning of the specialist terms. However, terms that should already be familiar to the target group are not described here.

Index The index helps you to find the topics that you are looking for.

Abbreviations

$\mathcal{X}$	Conductivity value (international γ)
AR	AutoRead (drift control)
ARng	Automatic range switchover; meter measures with highest resolution
ASY	Asymmetry
AutoCal DIN	Automatic pH calibration with buffer solutions prepared according to DIN 19 266
AutoCal TEC	Automatic pH calibration with WTW technical buffer solutions according to DIN 19267
C	Cell constant [cm^{-1}] (internat. k)
°C	Temperature unit, degrees Celsius
Cal	Calibration
Cd...	Display indicator during calibration for pH measurements. Indicates the selection of the buffer dataset for buffer solutions prepared according to DIN 19 266
Cm...	Display indicator during calibration for pH measurements. Indicates the selection of buffer datasets for buffer solutions of the Merck company
ConCal	Conventional single-point or two-point calibration for pH measurements
Ct...	Display indicator during calibration for pH measurements. Indicates the selection of the buffer data records for WTW technical buffer solutions
E3	Error message, see chapter 5 WHAT TO DO IF...
°F	Temperature unit, degrees Fahrenheit
ISECal	Calibration for ion selective measurements
Lin	Linear temperature compensation
mV	Voltage unit
mV/pH	Unit of the electrode slope (internat. mV)
nLF	Nonlinear temperature compensation
OFL	Display range exceeded (Overflow)

OxiCal	Automatic calibration for D. O. measurements
pH	pH value
S	Slope (internat. k)
SAL	Salinity
SELV	Safety Extra Low Voltage
SLO	Slope setting on calibration
TC	Temperature coefficient (internat. α)
TDS	Total Dissolved Solids
TP	Temperature measurement active (Temperature Probe)
T_{Ref} 20/T20	Reference temperature of 20 °C
T_{Ref} 25/T25	Reference temperature of 25 °C
U_{ASY}	Asymmetry

Glossary

Activity
The activity corresponds to the effective concentration. Due to mutual interference, the effect of ions is different from the value that is theoretically to be expected, e.g. with electrochemical processes. With small to medium concentrations (< 1 mol/kg), the ion activity of ions is lower than their concentration. The interrelationship between the activity a and concentration c is expressed by the equation, $a_i = f_i \times c_i$.

Adjusting
To manipulate a measuring system so that the relevant value (e. g. the displayed value) differs as little as possible from the correct value or a value that is regarded as correct, or that the difference remains within the tolerance.

Amperometry
Name of a measuring technique. The signal (depending on the measured parameter) of the probe is the electric current. The electrical voltage remains constant.

Asymmetry
Designation for the offset potential of a pH electrode. It is the measurable potential of a symmetrical electrode, the membrane of which is immersed in a solution with the pH of the nominal electrode zero point (WTW electrodes: pH = 7).

AutoRange
Name of the automatic selection of the measuring range.

AutoRead
WTW name for a function to check the stability of the measured value.

Calibration
Comparing the value from a measuring system (e. g. the displayed value) to the correct value or a value that is regarded as correct. Often, this expression is also used when the measuring system is adjusted at the same time (see adjusting).

Cell constant, k
Characteristic quantity of a conductivity measuring cell, depending on the geometry.

Conductivity
Short form of the expression, specific electrical conductivity. It is a measured value of the ability of a substance to conduct an electric current. In water analysis, the electrical conductivity is a dimension for the ionized substances in a solution.

Conductometry
Name of the conductivity measuring technique.

Electrode zero point
The zero point of a pH electrode is the pH value at which the electromotive force of the pH electrode at a specified temperature is zero. Normally, this is at 25 °C.

Electromotive force of an electrode
The electromotive force U of the electrode is the measurable electromotive force of an electrode in a solution. It equals the sum of all the galvanic voltages of the electrode. Its dependency on the pH results in the electrode function which is characterized by the parameters, slope and zero point.

Firmware	Software installed at an instrument (here: measuring module) that is fixed and cannot be changed.
Junction	The junction is a porous body in the housing wall of reference electrodes or electrolyte bridges. It arranges the electrical contact between two solutions and makes the electrolyte exchange more difficult. The expression, junction, is also used for ground or junction-less transitions.
Measured value	The measured value is the special value of a measured parameter to be determined. It is given as a combination of the numerical value and unit (e. g. 3 m;0.5 s; 5.2 A; 373.15 K).
Measured variable	The measured parameter is the physical dimension determined by measuring, e. g. pH, conductivity or D. O. concentration.
Measuring system	The measuring system comprises all the devices used for measuring, e. g. measuring instrument and probe. In addition, there is the cable and possibly an amplifier, terminal strip and armature.
Molality	Molality is the quantity (in Mol) of a dissolved substance in 1000 g solvent.
MultiCal®	WTW name stating that a measuring instrument provides several calibration procedures.
Offset potential	The measurable potential of a symmetrical electrode, the membrane of which is immersed in a solution with the pH of the nominal electrode zero point. The asymmetry is part of the offset potential.
ORP voltage	The ORP is caused by oxidizing or reducing substances dissolved in water if these substances become effective on an electrode surface (e. g. a gold or platinum surface).
OxiCal®	WTW name for a procedure to calibrate D. O. measuring systems in water vapor saturated air.
Oxygen partial pressure	Pressure caused by the oxygen in a gas mixture or liquid.
Oxygen saturation	Short name for the relative D. O. saturation. Note: The D. O. saturation value of air-saturated water and the D. O. saturation value of oxygen-saturated water are different.
pH value	The pH is a dimension for the acidic or basic effect of an aqueous solution. It corresponds to the negative decadic logarithm of the molal hydrogen ions activity divided by the unit of the molality. The practical pH value is the value of a pH measurement.
Potentiometry	Name of a measuring technique. The signal (depending on the measured parameter) of the electrode is the electrical potential. The electrical current remains constant.

Reference temperature	Fixed temperature value to compare temperature-dependent measured values. For conductivity measurements, the measured value is converted to a conductivity value at a reference temperature of 20 °C or 25 °C.
Reset	Restoring the original condition of all settings of a measuring system.
Resistance	Short name for the specific electrolytic resistance. It corresponds to the reciprocal value of the electrical conductivity.
Resolution	Smallest difference between two measured values that can be displayed by a measuring instrument.
Salinity	The absolute salinity S_A of seawater corresponds to the relationship of the mass of dissolved salts to the mass of the solution (in g/Kg). In practice, this dimension cannot be measured directly. Therefore, the practical salinity is used for oceanographic monitoring. It is determined by measuring the electrical conductivity.
Salt content	General designation for the quantity of salt dissolved in water.
Slope	The slope of a linear calibration function.
Slope (relative)	Designation used by WTW in the D. O. measuring technique. It expresses the relation of the slope value to the value of a theoretical reference probe of the same construction type.
Standard solution	The standard solution is a solution where the measured value is known by definition. It is used to calibrate a measuring system.
TDS	Total dissolved solids
Temperature coefficient	Value of the slope of a linear temperature function.
Temperature compensation	Name of a function that considers the temperature influence on the measurement and converts it accordingly. Depending on the measured parameter to be determined, the temperature compensation functions in different ways. For conductimetric measurements, the measured value is converted to a defined reference temperature. For potentiometric measurements, the slope value is adjusted to the temperature of the test sample but the measured value is not converted.
Temperature function	Name of a mathematical function expressing the temperature behavior of a test sample, a sensor or part of a sensor.
Test sample	Designation of the test sample ready to be measured. Normally, a test sample is made by processing the original sample. The test sample and original sample are identical if the test sample was not processed.

Total dissolved solids	The volume-related mass of substances dissolved in water that remains after a fixed filtration and drying procedure and is not volatile under the conditions of this procedure.

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