

**Thermo Scientific Orion
266S Intrinsically Safe
pH Meter User Guide**

ROSS and the COIL trade dress are trademarks of Thermo Fisher Scientific Inc. U.S. patent 6,793,787.

AQUAfast, Cahn, ionplus, KNIpHE, No Cal, ORION, perpHect, PerpHecT, PerpHecTion, pHISA, pHuture, Pure Water, Sage, Sensing the Future, SensorLink, ROSS, ROSS Ultra, Sure-Flow, Titrator PLUS and TURBO2 are registered trademarks of Thermo Fisher.

1-888-pHAX-ION, A+, All in One, Aplus, AQUAsnap, AssuredAccuracy, AUTO-BAR, AUTO-CAL, AUTO DISPENSER, Auto-ID, AUTO-LOG, AUTO-READ, AUTO-STIR, Auto-Test, BOD AutoEZ, Cable-Free, CERTI-CAL, CISA, DataCOLLECT, DataPLUS, digital LogR, DirectCal, DuraProbe, Environmental Product Authority, Extra Easy/Extra Value, FAST QC, GAP, GLPcal, GLPcheck, GLPdoc, ISEasy, KAP, LabConnect, LogR, Low Maintenance Triode, Minimum Stir Requirement, MSR, NISS, One-Touch, One-Touch Calibration, One-Touch Measurement, Optimum Results, Orion Star, Pentrode, pHuture MMS, pHuture Pentrode, pHuture Quatrode, pHuture Triode, Quatrode, QuiKcheK, rf link, ROSS Resolution, SAOB, SMART AVERAGING, Smart CheK, SMART STABILITY, Stacked, Star Navigator 21, Stat Face, The Enhanced Lab, ThermoSense, Triode, TRIUMpH, Unbreakable pH, Universal Access are trademarks of Thermo Fisher.

Guaranteed Success and The Technical Edge are service marks of Thermo Fisher.

PerpHecT meters are protected by U.S. patent 6,168,707.

PerpHecT ROSS electrodes are protected by U.S. patent 6,168,707.

ORION Series A meters and 900A printer are protected by U.S. patents 5,198,093, D334,208 and D346,753.

ionplus electrodes and Optimum Results solutions are protected by U.S. patent 5,830,338.

ROSS Ultra electrodes are protected by U.S. patent 6,793,787.

ORP standard is protected by U.S. patent 6,350,367.

No Cal electrodes are protected by U.S. patent 7,276,142.

© 2009 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific Inc. and its subsidiaries.

The specifications, descriptions, drawings, ordering information and part numbers within this document are subject to change without notice.

This publication supersedes all previous publications on this subject.

Changes for Software Version 3

In addition to one- and two-point calibration, the meter can perform a three-point calibration.

You can stop the calibration procedure after each completed buffer evaluation by pressing the **meas** key. Depending on the number of buffer evaluations made, the meter performs a one-, two-, or three-point calibration.

With three-point calibration the E_0 and slope are calculated for each line segment. An average E_0 is reported. Sample values are determined using the appropriate line segment.

Safety Precautions

Be sure to read and observe the following requirements!



The Orion 266S pH meter may only be opened to change the batteries outside hazardous areas. If repairs are necessary, the meter must be sent in to the factory.

Never operate the remote interface or printer within hazardous areas.



When using the meter in hazardous areas, watch for electrostatic charges! For example, never wipe off the meter with a dry cloth. Observe the relevant regulations concerning ESD.

Whenever it is likely that the protection has been impaired, the meter shall be made inoperative and secured against unintended operation.

The protection is likely to be impaired if, for example:

- the meter shows visible damage
- the meter fails to perform the intended measurements
- after prolonged storage at temperatures above 70 °C
- after severe transport stresses

Before recommissioning the meter, a professional routine test according to EN 61 010-1 shall be performed. This test should be carried out at our factory.

Information on this Instruction Manual

Italics are used for texts which appear in the display of the Orion 265A or 266S.

Bold print is used to represent keys, e.g. **cal**.



Display examples

or



keys whose functions are explained are frequently shown in the left-hand column.

Note



Notes provide important information that should be strictly followed when handling the meter.

Warning



Warning means that the instructions given must always be followed for your own safety. Failure to follow these instructions may result in injuries.

Contents

Safety Precautions	V
Information on this Instruction Manual	VI
1 Orion 265A and 266S pH Meters	1
Package Contents	1
Short Description of Meters	1
2 Operation	3
Meter Design	3
Display	4
Keypad	4
StatFace™ Electrode Monitoring	5
Connection and Start-up	6
Configuration	7
Calibration	11
Measurement	15
Data Log Memory	16
Data Log	17
Clock Mode	19
Serial Interface	20
Standard Settings for PRT300 Printer	21
Configuring the Printer	21
Printing Measured Values and GLPdoc™ Report	22
3 Troubleshooting and Maintenance	23
StatFace™ Electrode Monitoring	23
Error Messages	24
Maintenance	29

Appendix	31
Declarations of Conformity	31
Control Drawing	33
Ordering Information	35
Warranty	40
Specifications	43
Specifications for PRT300 Printer	44
4 General Information on Measurement	45
Technical Terms	50
Index	53

1 Orion 265A and 266S pH Meters

Package Contents

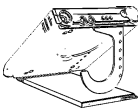


Please check the completeness of the shipment after unpacking.

The package should include:

- The Orion 265A or 266S pH meter including batteries and electrode holder
- Neck strap
- This instruction manual
- Quickstart instructions
- Interface cable incl. adapter
- PC software

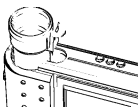
Short Description of Meters



- The Orion 265A and 266S are used for pH and temperature measurement in industry, environment, food processing and waste-water treatment.
- Operation of the Orion 266S is also permitted in hazardous areas Zone 1.
- The meters meet the European EMC regulations (89-336-EEC) and the recommendations of NAMUR NE 21.



- The meters are IP 66 protected to EN 60529 (jet water from all directions).
- Temperature compensation is automatic with a Triode electrode or an ATC temperature probe or through manual temperature.



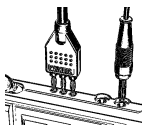
- Calibration can be performed with buffer solutions from various, preselectable buffer sets. The buffer is then automatically recognized by the AutoCal feature.

-
- ❑ You can also calibrate manually by entering individual buffer values.



- ❑ The StatFace electrode monitoring system checks the connected electrode and provides information on its state.

- ❑ The data log records up to 100 measured pH or mV values together with temperature, date and time. Logging is either manually, interval or event-controlled.



- ❑ Only three alkaline AA batteries are required for uninterrupted operation for approx. 2,000 hours.

- ❑ PC software allows complete remote control of the Orion 265A and 266S via PC. All measured values and parameters can be read out and easily processed further (e.g. using Microsoft Excel).

- ❑ Measured values and GLPdoc™ can also be sent directly to a printer via the serial interface.

- ❑ Via the serial interface, the Orion 265A and 266S can be completely remote controlled by a PC. All measured values and parameters can be read out. Measured values and GLPdoc™ can be sent directly to a printer.

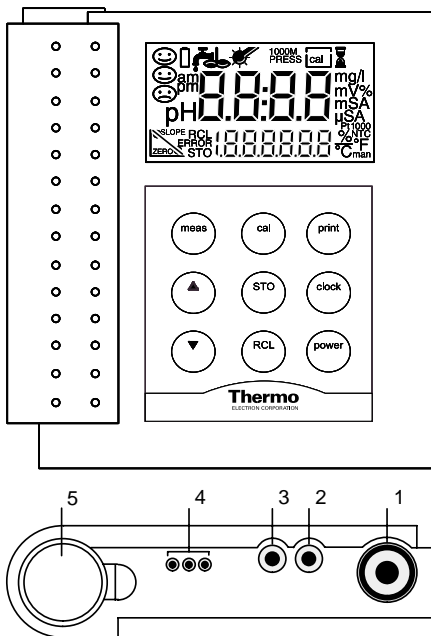
Warning



Never use the remote interface to PC or printer in hazardous areas!

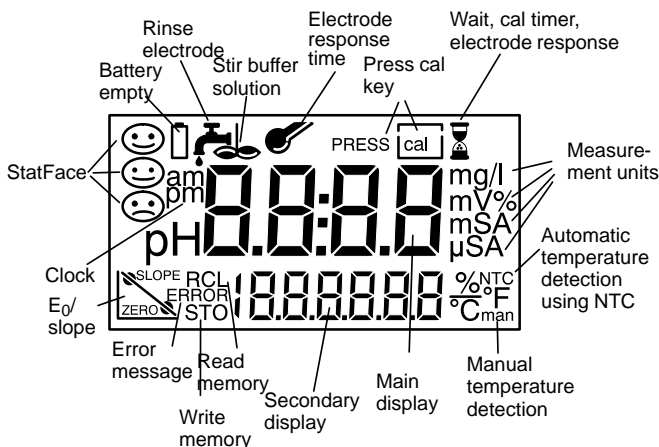
2 Operation

Meter Design



- 1 Electrode connection
- 2, 3 Temperature probe connection
- 3 Reference electrode connection
- 4 PC/printer interface connection
- 5 Electrode holder

Display



Keypad



Pressing the **power** key switches the meter on or off. When the meter is switched off, one of the StatFace status indicators is visible on the display. After power-up, the meter automatically performs a self-test and checks if a temperature probe is connected. After that it automatically goes to pH measuring mode.

Note



You can also power the meter up using the **meas** key. However, only an abbreviated self-test is performed.



Pressing the **meas** key returns the meter to measure mode from any function. Pressing **meas** while in measure mode selects the desired mode (pH or mV).



Pressing the **cal** key starts a calibration. You can choose between one or two-point calibration either using AutoCal automatic buffer recognition or with manual buffer entry.



For manual temperature compensation (no temperature probe connected), the temperature is set using the ▲ and ▼ keys.

These keys are also used to set the clock, to select memory locations and to edit selected parameters.



Pressing the **clock** key switches the meter into the clock mode. All measurement processes are cancelled and battery consumption is reduced to a minimum.



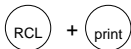
Pressing the **STO** key activates the data logger for writing measured values.



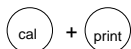
Pressing the **RCL** key activates the data logger for reading measured values.



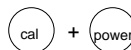
Pressing the **print** key sends the currently measured value to a printer or PC.



Pressing the **RCL** and **print** keys prints out the logged data in memory.



Pressing the **cal** and **print** keys prints out the GLPdoc™ report.



Pressing the **cal + power** keys when the meter is switched off, activates the configuration menu.

Note



When pressing two keys at the same time, make sure that the key shown at the left is pressed first.

StatFace™ Electrode Monitoring



The StatFace automatic electrode monitoring system provides information on the electrode state. E_0 , slope, response time, impedance and drying out of the electrode are evaluated.

In addition, StatFace reminds you to regularly calibrate the meter.

For more detailed information on the displayed electrode state and the individual evaluations of the parameters, please see chapter "Troubleshooting and Maintenance" (Pg. 23).

Connection and Start-up

If no temperature probe has been connected, the meter operates with the manually set temperature and the *man* indicator appears on the display.

Note



If the meter is connected to a PC and is used to take measurements in grounded samples, measuring errors may result.

Note



Prior to first measurement, the buffer set to be used must be selected and the meter calibrated.

Start-up

With the meter switched off, one of the StatFace status indicators is always visible.

Note



Even with the meter switched off, the calibration data and the contents of the data log remain stored.



Pressing the **power** key switches the meter into measure mode.

After power-up, the meter determines if the temperature probe is connected and performs a self test:

- Simultaneous appearance of all display segments, symbols and StatFace indicators
- Display of Model number
- Display of software version
- Display of selected buffer set

Note



The meter can also be switched on with the **meas** key. However, only an abbreviated test is performed.

Configuration

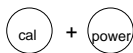
Note



If you calibrate using the Orion buffer set, you do not have to change the configuration.

The following basic settings can be changed in the configuration:

- Calibration timer
Interval
- Automatic calibration (AutoCal)
on or off (manual), buffer set for
automatic calibration
- Autoshtutoff after
1 hour or 12 hours
- Remote interface
Printer output on/off, baud rate
- Temperature display
°C or °F
- Date and time format
24 hours and day, month, year or
12 hours (am/pm) and month, day, year



To activate the configuration hold down the **cal** key with the meter switched off and then press the **power** key.

Conf

The menu items of the configuration menu are worked through in sequence.



To change the setting of the respective menu item, press the ▲ or ▼ key.



Pressing the **STO** key switches to the next menu item and stores the displayed settings.



Pressing the **meas** key exits the configuration menu at any time. The value last displayed will not be saved unless the **STO** key was pressed.

Calibration timer

0048
CAL h

With the calibration timer, the period of time can be specified within which calibration should occur. The interval range is 0 to 1,000 hours.

When approx. 80 % of the preset interval has passed, the calibration timer switches the StatFace display from ☺ to ☹. When the total interval has run out, the display is set to ☹.

The timer is reset with a calibration.

To switch off the calibration timer, enter 0 as the interval. (Default setting: calibration timer off).

Automatic or manual calibration

OFF
AutCAL

You can select whether you wish to calibrate with the Auto-Cal automatic buffer recognition system or with manual entry of the individual buffer values.

For manual calibration (AutCal off), the pH value of the buffer solution must be entered for the correct temperature. This allows calibration using any other buffer solutions.

On
AutCAL

When calibrating with AutoCal automatic buffer recognition (AutCal on), you only have to enter the buffer set used once in the configuration menu. The temperature-corrected buffer values are stored. During calibration the meter then automatically recognizes the buffer used (default setting: automatic calibration on, Orion buffers).

-05-
buffer

Select the buffer set with the buffers used in the buffer set selection. Various calibration buffer sets are stored in the Orion 265A and 266S.

The following buffer sets are permanently stored in the meter:

<i>BUFFER-00-</i>	Knick technical buffers pH 2.00 4.01 7.00 9.21
<i>BUFFER-01-</i>	Mettler Toledo technical buffers (former Ingold) pH 2.00 4.01 7.00 9.21
<i>BUFFER-02-</i>	Merck/Riedel pH 2.00 4.00 7.00 9.00 12.00

<i>BUFFER -03-</i>	DIN 19 267 pH 1.09 4.65 6.79 9.23 12.75
--------------------	--

<i>BUFFER -04</i>	Ciba (94) pH 2.06 4.00 7.00 10.00
-------------------	--------------------------------------

<i>BUFFER -05-</i>	THERMO ORION pH 1.68 4.01 7.00 10.01 12.46
--------------------	---

<i>BUFFER -06-</i>	DIN 19 266 and NIST (NBS) pH 1.679 4.006 6.865 9.180
--------------------	---

<i>BUFFER -07-</i>	HACH pH 4.00 7.00 10.18
--------------------	----------------------------

Note



The meter can only operate properly if the buffer solutions used correspond to the selected, activated buffer set. Other buffer solutions, even those with the same nominal values, demonstrate a different temperature behavior. This leads to measurement errors.

Autoshutoff

1 h
AutoOFF

To protect the batteries, the meter switches off automatically when not operated for a long time than specified. You can select whether shut-off is to take place after one hour or after twelve hours (default setting: 1 hour). If the data logger is active and during remote interface operation, the autoshutoff feature is disabled.

Interface

On
Print

If the meter is controlled by a PC, and interface conflicts occur when the print key is pressed, you should deactivate the print function (default setting: Print on, 4800 baud).

4800
baud

The transmission speed can be set to 600, 1200, 2400, 4800 or 9600 baud. The transmission speed must correspond to that set in the printer or PC. Data format and protocol are permanently set to 7 bits, one stop bit, even parity and XON/XOFF protocol (to NAMUR NE28).

Temperature display

The temperature can be displayed either in °C or °F (default setting: °C).



0C
TEMP

Time and date format

The time and date format can be set to either 24 hours and day.month.year or 12 hours am/pm and month.day.year (default setting: 24 hours and day.month.year).



24:00
DATE

Calibration

AutoCal automatic calibration

For calibration using AutoCal automatic buffer recognition, you only have to enter the buffer set used once in the configuration menu. With the AutoCal feature, the meter automatically recognizes the buffer solutions and calculates the slope and E_0 (based on 25 °C).

Note



The meter can only operate properly when the buffer solutions used correspond with the buffer set selected in the configuration menu.

Other buffer solutions, even with the same nominal values, may demonstrate different temperature behavior, which leads to measurement errors.



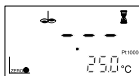
Pressing the **cal** key activates calibration.

Calibration can be exited by pressing the **meas** key. If exited prior to entry of the first calibration point, E_0 and slope of the last calibration are displayed for a moment.



Immerse the electrode and temperature probe in the first buffer solution. Begin with the more neutral buffer, i.e. pH 7.00.

Press the **cal** key again to calibrate to the first buffer solution.



During buffer recognition, the lower line indicates the temperature, while the hour glass indicator flashes.



The nominal value of the recognized buffer solution is displayed for approx. 5 s. Electrode and temperature probe must remain in the first buffer solution until the display prompts for the second buffer.

Note



Stirring the buffer solution shortens the response time of the electrode, providing stable values more quickly.



The electrode stability is checked and the measured mV value is displayed. Stability check can be overridden with the **cal** key. However, this reduces calibration accuracy.



Calibration with the first buffer is complete. Remove electrode and temperature probe from the first buffer solution and rinse off both thoroughly.

- If you want to perform a one-point calibration, press the **meas** key to terminate the calibration now. The meter then shows the newly determined E_0 in the main display and the previous slope in the lower display and returns to pH measuring mode.
- If you want to perform a two-point calibration, immerse the electrode and temperature probe in the second buffer solution. Continue the calibration with the **cal** key. The calibration process runs again as for the first buffer.



Calibration with the second buffer is complete. Remove electrode and temperature probe from the second buffer solution and rinse off both thoroughly.

- For two-point calibration, press the **meas** key to terminate the calibration. The meter then shows the newly determined E_0 in the main display and the new slope in the lower display and returns to pH measuring mode.
- If you want to perform a three-point calibration, immerse the electrode and temperature probe in the third buffer solution. Continue the calibration with the **cal** key. The calibration process runs again as for the previous buffers and is automatically terminated. E_0 and slope are calculated for each line segment.



At the end of the calibration, the E_0 and slope (based on 25 °C) of the electrode are displayed. Then the meter switches back to measure mode.

Manual calibration

For calibration with manual buffers, you must first disable the AutoCal function (see Configuration Pg. 8). Then, you must enter the pH value of the buffer solution used for the correct temperature. The buffer temperature table is on the buffer package.

This allows calibration with any buffer solution.



Pressing the **cal** key activates calibration.

Calibration can be cancelled by pressing the **meas** key. In that case, E_0 and slope of the last calibration are displayed for a moment.



Enter the temperature-corrected pH of your buffer solution using the **▲** and **▼** keys. Press the **cal** key to start the calibration.

The buffer value set is stored so that you do not have to enter it for the next calibration (which must be performed at the same temperature).

If the temperature has changed, the pH value must be adjusted before proceeding.

Note



Stirring the buffer solution shortens the response time of the electrode, providing stable values more quickly.



The electrode stability is checked and the measured mV value displayed. Stability check can be overridden with the **cal** key. However, this reduces calibration accuracy.



Calibration with the first buffer is complete. Remove electrode and temperature probe from the first buffer solution and rinse off both thoroughly.

- If you want to perform a one-point calibration, press the **meas** key to terminate the calibration now. The meter then shows the newly determined E_0 in the main display and the previous slope in the lower display and returns to pH measuring mode.
- If you want to perform a two-point calibration, immerse the electrode and temperature probe in the second buffer solution. Enter the pH value of the second buffer solution. Then press the **cal** key to continue the calibration. The calibration process runs again as for the first buffer.



Calibration with the second buffer is complete. Remove electrode and temperature probe from the second buffer solution and rinse off both thoroughly.

- ❑ For two-point calibration, press the **meas** key to terminate the calibration. The meter then shows the newly determined E_0 in the main display and the new slope in the lower display and returns to pH measuring mode.
- ❑ If you want to perform a three-point calibration, immerse the electrode and temperature probe in the third buffer solution. Enter the pH value of the third buffer solution. Then press the **cal** key to continue the calibration. The calibration process runs again as for the previous buffers and is automatically terminated. E_0 and slope are calculated for each line segment.



At the end of the calibration, the E_0 and slope (based on 25 °C) of the electrode are displayed. Then the meter switches back to measure mode.

Converting slope % → mV/pH			
%	mV/pH	%	mV/pH
78	46.2	91	53.9
79	46.8	92	54.5
80	47.4	93	55.1
81	48.0	94	55.6
82	48.5	95	56.2
83	49.1	96	56.8
84	49.7	97	57.4
85	50.3	98	58.0
86	50.9	99	58.6
87	51.5	100	59.2
88	52.1	101	59.8
89	52.7	102	60.4
90	53.3	103	61.0

Measurement

Measure mode



Pressing the **meas** key accesses the measure mode from all functions. In measure mode, the main display indicates the measured value and the secondary display shows the temperature. The measure mode is selected with the **meas** key.

You can choose between the following modes:

- pH
- Electrode potential [mV]

Note



Stirring the buffer solution shortens the response time of the electrode, providing stable values more quickly.

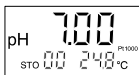
Manual temperature

The *man* indicator signals that no temperature probe is connected. The meter operates with the manual temperature. The manual temperature can be edited using the ▲ and ▼ keys.

Data Log Memory

Up to one hundred measured values can be stored in the data log memory together with temperature, date and time. Storage is performed either manually or automatically using the data log. The currently measured value (pH or mV) is stored.

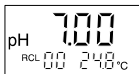
Write memory



Press the **STO** key. The currently measured value is shown on the display.

Select any memory location using the ▲ and ▼ keys. Press the **STO** key to store the measured value in the selected memory location. After storing, the memory location number is automatically incremented and the meter returns to measure mode.

Read memory



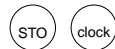
Pressing the **RCL** key displays the last measured values stored.

Select any memory location using the ▲ and ▼ keys.

Pressing the **RCL** key switches between the measured value and time/date of storage. In this way, for example, you can search for a value that was stored at a certain time.

Pressing the **meas** key returns to measure mode.

Clear memory



To clear the entire data log memory, press the **STO** key to access memory mode and then press the **clock** key to access data log mode. Select Clear (Clr) using the ▲ and ▼ keys.

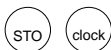
By confirming this with the **STO** key, the entire memory is cleared.

If you do not want to clear the data log, press the **meas** key to abort the procedure.

Data Log

Data log

The data log records up to 100 measured values together with temperature, time and date. Data storage is performed either manually (at the press of a key), interval or event-controlled. The data log always stores the currently measured parameter (pH or mV).



Press the **STO** key to access memory mode and then the **clock** key to access data log mode. Now choose between three different logging modes and the parameter setting of the data logger using the ▲ or ▼ keys.



Pressing the **STO** key confirms the selected mode. In the Continue and Start mode this also activates the data log. The current data memory location is shown on the display. If "Clear" has been selected, all memory locations are cleared and the meter returns to measure mode.



Pressing the **meas** key ends the data log mode.

Data logging modes

Cont
LOGGER

After pressing the **STO** key, logging is continued after the memory location in which the last measured value was stored (continue). Press the **meas** key to end logging.

Clr
LOGGER

After pressing the **STO** key, the entire data log memory is cleared without starting the data log (clear).

Start
LOGGER

After pressing the **STO** key, the entire data log memory is cleared. Storage begins from memory location "00" (start). Press the **meas** key to end logging.

Setting parameters of the data log

PAR
LOGGER

In the parameter setting mode, you select whether data storage is to be interval, event-controlled or manual. Press the **STO** key to access the logging functions.

Int
LOGGER

To select interval-controlled storage of measured values, press the **STO** key and set the interval using the ▲ and ▼ keys. The interval range is between 5 seconds and 60 minutes. Default time (factory-set) is 2 minutes. After selecting your interval time, press the **STO** key to enter the value.

dIFF
LOGGER

With event-controlled data storage, a measured value is not stored until it deviates from the last logged value by the preset differential value. By using the storage time, you can determine when the value had changed. The differential value is entered in the subsequent parameter-setting step.

Note



The differential value is always based on the currently set measured parameter (pH or mV). This means that if differential pH values are to be logged, the meter must be set to pH measurement prior to parameter setting and data logging.

Shot
LOGGER

With manual data logging, the measured values are saved with the **STO** key.



After selecting the above parameters, select "Continue" or "Start" using the ▲ and ▼ keys and then press the **STO** key to commence logging.

Note



The data log does not stop after reaching the last memory location (99). Recording automatically continues with memory location number 00. To avoid losing data by overwriting, download stored data and clear the logger before beginning a new set of data. Be aware of this when using interval-controlled data collection.

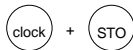
Clock Mode



Pressing the **clock** key activates the clock mode. The time and date are displayed. In this mode the battery consumption of the meter is reduced to a minimum.

Setting clock

To set the time or date, the clock mode must be activated. Press the **clock** and **STO** keys simultaneously to set the clock.



A digital display showing the time "10:48" in a seven-segment font.

The time display flashes. Now the time can be set using the ▲ and ▼ keys.

A digital display showing the word "DATE" in a large, spaced-out font, with "25.06" displayed below it.

Press the **STO** key again to store the displayed time. Now the date can be set.

A digital display showing the word "YEAR" in a large, spaced-out font, with "1996" displayed below it.

Press the **STO** key again to store the date. Now the year can be set. Press the **STO** key to confirm the year. The meter returns to clock mode.



Press the **meas** key to return to measure mode.

Serial Interface

Note



If the meter has been connected to a PC and measurement are taken in a grounded liquid, measurement errors may result.

With the remote interface, you can directly send data to a printer with serial port or set up a direct connection to a computer. Via the computer, the meter can be completely remote controlled and all data and parameters can be read. Using the printer (e.g. PRT 300 printer) you can directly print measured values, data points and GLPdoc™ report.

Interface parameters

The RS 232 interface can be defined for all common baud rates.

Setting is carried out in the configuration menu

- Baud rate:
 - 600 Bd
 - 1,200 Bd
 - 2,400 Bd
 - 4,800 Bd (default setting)
 - 9,600 Bd

Data format and protocol are permanently set to:

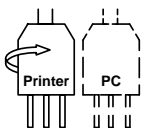
- 7 data bits
- even parity
- one stop bit
- XON/XOFF protocol

Note



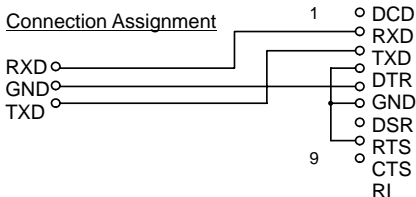
For the command set of the meter, refer to the online help of the PC software for data transfer.

Interface cable



Only one interface cable is required to operate with a printer or PC. By simply turning the plug around on the meter's interface port, the cable can be used to connect to either a printer or a PC.

The label facing the operator should match the output device being connected.



Standard Settings for PRT300 Printer

Meter configuration	Parameter	Setting
	baud rate	1200
	printer	ON

Configuring the Printer

In the meter, set the baud rate to 1200.

In the printer, set the dip switches, located in paper compartment, to the following settings:

- Switch 1: Down
- Switch 2: Up
- Switch 3: Up
- Switch 4: Down
- Switch 5: Up
- Switch 6: Down
- Switch 7: Down
- Switch 8: Down

Note



Be sure to plug the RS232 cable into the meter with the "PRINTER" label facing up.
(You will plug it with the "PC" label facing up if you hook into a computer.)

Printing Measured Values and GLPdoc™ Report

Note



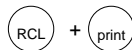
Make sure that the print function is activated in the configuration (*Print on*) and the baud rate corresponds to that of the printer.

Printing measured values



Press the **print** key while in measure mode to print out the currently measured value. The measured value is printed out together with temperature, date and time and a three-digit identification number. The identification number is reset when the meter is switched off.

Printing memory



Press the **RCL** and then **print** keys to print out the logged data. All stored data points are printed out with temperature, date and memory location number (Sxx).

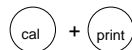
If you only want to print individual data points, press the **RCL** key first. Then select the desired data point using the **▲** or **▼** key and confirm with the **print** key.

Note



If StatFace was 😞 during data logging, the memory location will be marked with *, and if the measurement range (pH, mV, °C) was exceeded, with #.

Printing GLPdoc™ report



To print out the GLPdoc™ report, press the **cal** and then **print** keys. The report print-out contains:

- a calibration record with the data from the last calibration
- the settings of the configuration menu
- a record of the last self-test performed
- a list of the current StatFace criteria.

3 Troubleshooting and Maintenance

StatFace™ Electrode Monitoring



The automatic StatFace electrode monitoring system provides information on the electrode state. It evaluates E_0 , slope and response time of the electrode.

In addition, StatFace requests calibration at regular intervals.

Note



The deterioration of the electrode condition is signified by 😐 or 😞 of the StatFace indicator.

This evaluation is permanent. An improvement 😊 can only take place after a calibration.



This StatFace indicator provides information on the electrode response time. The value is determined during calibration.


Due to wear, aging and lack of maintenance, the electrode junction may become clogged. This leads to a longer response time and the electrode becomes sluggish.


😊 The electrode response is slow. You should consider maintaining or replacing the electrode. It may be possible to achieve an improvement by cleaning or, for an electrode returned to duty after dry storage, by rehydrating.

😞 The electrode response is very slow. Correct measurement is no longer ensured. The electrode should be maintained. If appropriate maintenance fails to remedy the situation, the electrode should be replaced.



This StatFace display provides information on the electrode E_0 and the slope.

 E_0 and slope of the electrode are still okay, however the electrode should be maintained or replaced soon.

 E_0 and/or slope of the electrode have reached values which no longer ensure proper calibration. See electrode instruction manual for cleaning and maintenance information.

Note



The E_0 and slope values are determined during calibration. Accurate information is required for proper calibration. For this reason, always use fresh buffer solutions.


cal



Using the calibration timer, you can set an interval within which calibration should take place.

The calibration timer continues to run with the meter switched off.

 Over 80 % of the calibration interval has passed.

 The calibration interval has been exceeded.

Error Messages

Measurement limits exceeded

If a measured value lies outside the measurement ranges, an error message appears and the measured-value display flashes.

ERROR 1

The measured pH is less than -2 or greater than $+16$.

Possible causes:

- Electrode defective or dirty
- Improper level of internal filling solution in the electrode
- Electrode not connected
- Break in electrode cable
- Wrong electrode connected

ERROR 2 The measured electrode potential is less than $-1,300$ mV or greater than $+1,300$ mV.

Possible causes:

- Electrode defective or dirty
- Electrode not connected
- Break in electrode cable

ERROR 3 The measured temperature is less than -20 °C or greater than $+120$ °C

Possible causes:

- Temperature probe defective
- Wrong temperature probe connected

Calibration error messages

If errors occur during calibration, or if the determined electrode data are outside the valid range, an error message appears (ERROR 4 ... ERROR 11).

ERROR 4 The electrode E_0 determined during calibration is outside the permissible range (pH 6 to pH 8). This message appears in measure mode following a calibration. It can only be remedied by recalibration with fresh buffer solutions.

Possible causes:

- Electrode "worn out"
- Need fresh buffers
- Buffer does not belong to configured buffer set
- Temperature probe not immersed in buffer solution
- Wrong buffer temperature set (for manual temperature specification)
- Electrode has different nominal E_0

ERROR 5

The electrode slope determined during calibration lies outside the permissible range (78 % to 103 %). This message appears in measure mode following a calibration. It can only be remedied by recalibration with fresh buffer solutions.

Possible causes:

- Electrode "worn out"
- Need fresh buffers
- Buffer does not belong to configured buffer set
- Temperature probe not immersed in buffer solution
- Wrong buffer temperature set (for manual temperature specification)
- Electrode used has different nominal slope

ERROR 8

The meter has recognized two identical buffer solutions. Calibration must be repeated with fresh buffer solutions.

Possible causes:

- Same or similar buffer solution was used for both calibration steps
- Need fresh buffers
- Electrode defective or dirty
- Electrode not connected
- Break or short circuit in electrode cable

ERROR 9

The meter cannot recognize the buffer solution used. Calibration must be repeated with fresh buffer solutions.

Possible causes:

- Buffer does not belong to configured buffer set
- Electrode defective or dirty

- Electrode not connected
- Break in electrode cable
- Wrong buffer temperature set (for manual temperature specification)

ERROR 10 During manual calibration, the buffer solutions were not used in the specified order. Calibration must be repeated.

ERROR 11 Calibration was cancelled after approx. 2 minutes because the electrode drift was too large. Calibration must be repeated with fresh buffer solutions.

Possible causes:

- Electrode defective or dirty
- Improper level of filling solution in the electrode
- Electrode cable insufficiently shielded or defective
- Strong electric fields influencing the measurement
- Major temperature fluctuation of the buffer solutions
- Electrode junction not sufficiently submerged
- Need fresh buffers

ERROR 14 If the clock has not been set, e.g. after battery replacement, this error message is displayed. To clear the message, set the clock (see Pg. 19).

ERROR 15

If errors occur during transmission via the RS 232 interface, this error message appears.

To eliminate the error message, switch the meter off and then on again. Should the error message occur again, check the settings in the Configuration menu.

Possible causes:

- No valid message terminator transmitted (receiver overflow)
- Wrong transmission rate (baud rate) set (see Pg. 9)
- Error during transmission
- Wrong data format (see Pg. 20) e.g. parity bit

ERROR 18

If the meter determines an error during the self-test, this error message appears: Configuration data defective

Possible causes:

- Configuration or calibration data are defective. Completely reconfigure and recalibrate the meter.

ERROR 19**FAIL**

Error in the factory settings or system memory.

“FAIL” appears in the display.

Possible causes:

- EPROM or RAM defective
- Error in meter factory settings

Note

This error message should normally not occur as the data is protected from loss by multiple safety functions. Should this error message appear, no remedy is available. The meter must be repaired and recalibrated at the factory. Contact The Technical Edge for Orion Products for a Return Authorization Number and instructions for returning the meter.

Maintenance

Changing batteries



When the battery symbol appears on the display, the batteries need replacement. However, you can still use the meter for a few days. When the battery voltage decreases further, the meter switches off. (Since battery consumption is higher when the remote interface is used, the battery symbol is displayed earlier.)



Never change the batteries within a hazardous area. Use only alkaline AA batteries. Be sure that the meter is carefully closed again and the protective cover is properly mounted on the meter after changing the batteries.

To replace the batteries, you need 3 alkaline AA cells and a screwdriver.

- Close the protective cover and remove the electrode holder.
- Unscrew the four screws on the back of the meter and remove the lid.
- Remove the old batteries from the battery holder.
- Insert the new batteries in the specified direction.
- Make sure the protective cover is in the notches provided and the rubber seal is correctly seated, especially near the pH socket.
- Replace the lid and secure it with the screws. Be sure to tighten the screws thoroughly.
- Replace the electrode holder.

Note



When changing the batteries, all calibration and configuration data are retained. The calibration timer runs out. Time and date must be reset. The meter switches to pH measurement (as does the event-controlled datalogger). The current memory location is set to 00.

Note



After battery replacement recording will also be continued with memory location 00 when the meter is in the datalogger mode "Continue". If you have stored measured values

before battery replacement and you do not want to overwrite them, set the first memory location to be written with the **RCL** key and the ▲ or ▼ key before restarting the data log.

Warning



If you want to store the meter for a longer time, the batteries must always be removed beforehand. Leaky batteries may damage the meter.

Cleaning the meter

To remove dust and dirt, the external surfaces of the meter may be cleaned with water, and also with a mild household cleaner if necessary.

Appendix

Declarations of Conformity

Thermo Electron Corporation Declaration of Conformity

Manufacturer:

Thermo Electron Corporation
166 Cummings Center
Beverly, MA 01915 U.S.A

hereby declares that the products

Waterproof, pH Meter Model 265A

conform with the following standards and documents

Safety	EC Directive 72/23/EEC Low Voltage Directive EN 61010-1: 1990 Laboratory Equipment
EMC	EC 89/336/EEC Electromagnetic Compatibility
Emissions:	EN 61326 / 01.1998 Emissions FCC Part 15 Class A
Immunity:	EN 61326/A1 / 05.1999 Generic Immunity IEC 801-2 ESD Susceptibility IEC 801-3 Radiated Susceptibility IEC 801-4 Conducted Susceptibility

These products have been manufactured in compliance with the provisions of the relevant Thermo Electron manufacturing and test documents and processes. Further, these documents and processes are recognized as complying with ISO 9001: 2000 by QMI, listed as File # 001911.

Place and date of issue:
Beverly, MA, USA
October 9, 2003


John Meserve
Quality Assurance Manager

Thermo Electron Corporation Declaration of Conformity

Manufacturer:

Thermo Electron Corporation
166 Cummings Center
Beverly, MA 01915 U.S.A

hereby declares that the products

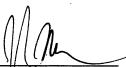
Waterproof pH Meter Model 266S

conform with the following standards and documents

Safety	EC Directive 72/23/EEC Low Voltage Directive EN 50014: 1977 Gen. Requirements EN 50020: 1977 Intrinsically Safe EN 61010-1: 1990 Laboratory Equipment
EMC	EC 89/336/EEC Electromagnetic Compatibility
Emissions:	EN 61326 / 01.1998 Emissions FCC Part 15 Class A
Immunity:	EN 61326/A1 / 05.1999 Generic Immunity IEC 801-2 ESD Susceptibility IEC 801-3 Radiated Susceptibility IEC 801-4 Conducted Susceptibility

These products have been manufactured in compliance with the provisions of the relevant Thermo Electron manufacturing and test documents and processes. Further, these documents and processes are recognized as complying with ISO 9001: 2000 by QMI, listed as File # 001911.

Place and date of issue:
Beverly, MA, USA
October 9, 2003



John Meserve
Quality Assurance Manager

Control Drawing

Hazardous (Classified) Locations

Portable pH Meter Model 26aS

Portable Conductivity Meter Model 13aS

Intrinsically Safe with output connections for Class I, Division 1, Groups A, B, C & D, T4 at +55°C

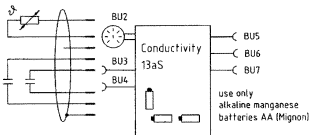
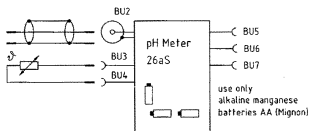
Class I, Zone 1 AEx ia IIC T4 at +55°C

Ex ia C_i = 90.6 μF

INTRINSICALLY SAFE

SÉCURITÉ INTRINSÈQUE

The probes must be FMRC approved or be simple apparatus.



Portable pH Meter, Model 26aS

pH/Temperature Measuring Circuit
(BU 2, 3, 4)

V_T = 10 V I_T = 9.9 mA P_{max} = 13 mW

Class I, Division 1, Groups A & B C₂ = 3 μF I₂ = 300 mA

Class I & II, Division 1, Groups C & E C₂ = 9 μF I₂ = 1 H

Class I, II, III, Division 1, Groups D, F & G C₂ = 24 μF I₂ = 1 H

entity concept

$$V_{oc} \text{ or } V_T = V_{max} \quad I_{sc} \text{ or } I_T = I_{max}$$

$$C_2 = C_1 + C_{cable} \quad I_2 = I_1 + I_{cable}$$

Portable Conductivity Meter, Model 13aS

Cond/Temperature Measuring Circuit
(BU 2, 3, 4)

V_T = 10 V I_T = 62.5 mA P_{max} = 157 mW

Class I, Division 1, Groups A & B C₂ = 3 μF I₂ = 8.4 mA

Class I & II, Division 1, Groups C & E C₂ = 9 μF I₂ = 40 mA

Class I, II, III, Division 1, Groups D, F & G C₂ = 24 μF I₂ = 70 mA

WARNING: TO PREVENT IGNITION OF A HAZARDOUS ATMOSPHERE,
BATTERIES MUST ONLY BE CHANGED IN AN AREA KNOWN TO BE NONHAZARDOUS.
BATTERY REPLACEMENT: USE SIZE AA (LR6) ALKALINE-MANGANESE
BATTERIES NOT EXCEEDING 1.5 VOLTS. SEE MANUAL FOR DETAILS.
SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

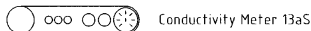
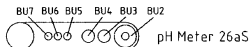
AVERTISSEMENT: AFIN DE PREVENIR L'INFLAMMATION D'ATMOSPHERES DANGEREUSES,
NE CHANGER LES BATTERIES QUE DANS DES EMPLACEMENTS DESIGNES NON DANGEREUX.
LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE.

Interface circuits RxD, TxDUm = 250 V
(BU 5, 6, 7)

WARNING: THE FOLLOWING CONNECTIONS TO TERMINALS BU5, BU6 AND BU7
MUST NOT BE USED WHEN THE AREA IS KNOWN TO BE HAZARDOUS.

Intrinsically safe equipment must be FMRC Approved or
be simple apparatus (a device which will neither generate nor store
more than 1.2 V, 0.1 A, 25 mW, or 20 μ J). For example, switches,
thermocouples, LED's and RTD's).

No revisions to drawing without prior FMRC Approval.



Version **ORION**

Verteiler: FUA (Zs)		Zul. Abweichungen für Maße ohne Toleranzangabe ISO 2768 - m		Oberfläche		Maßstab 1:1			
						Maßstab			
						Benennung		Control / Installation drawing	
						pH-Meter Model 26aS			
						Conductivity Meter Model 13aS			
				Schutzzeichen DIN 34-1-0		Zeichnungsnummer		193.060-027	
1 div. Ändg.		01.07.98							
Nr. AE		Datum		Bearbeiter		FUA KON		Ungültig ab:	
								Ersetzt durch:	

Specifications

Ranges	pH: -2.00 to +16.00 mV: -1,300 to +1,300 °C: -20.0 to +120.0
Display	LC display 35 x 67 mm, character height 15 mm
Measurement Cycle	approx. 1 s
Accuracy (+ 1 count)	pH: < 0.01 mV: < 0.1 % of meas. value + 0.3 mV °C: < 0.3 K
Input	WP DIN
Input Resistance	> 1 x 10 ¹² Ω
Input Current (20 °C)	< 1 x 10 ⁻¹² A
Electrode Standardization	AutoCal automatic calibration with automatic buffer recognition manual calibration
Instrument and Electrode Monitoring	StatFace: evaluates the calibration interval, E ₀ , electrode slope, response time and glass impedance of the electrode, resulting in indication of good/average/poor Calibration timer: monitors the calibration intervals, configurable from 1 to 1,000 hours, can be disabled Meter self test: during power-up
Temperature Compensation	NTC 30 kΩ (automatic recognition) or manual
Data Logger	manual, interval or event-controlled
Data Points	100 memory locations: pH/mV, temp, time, date
Remote Interface	serial RS 232 interface, bidirectional, asynchronous, variable baud rate, can be used as either printer or computer interface
Data Retention	configuration/calibration data and factory settings >10 years
Autoshutoff	after either 1 or 12 hours

EMC:	Emitted interference: EN 61 326 Class B Immunity to interference: EN 61 326, EN 61 326/A1 NAMUR NE 21
Explosion Protection (only Orion 266S)	FM: IS, Class I Div 1 Group A, B, C, D, T4
Environmental Temperature	Operation: -10 to +55 °C Transport and storage: -20 to +70 °C
Power Supply	3 alkaline AA cells
Operating Time	approx. 2,000 h, clock mode > 2 years
Enclosure	Material: PA, IP 66 protected, with integrated electrode holder
Dimensions	133 x 160 x 30 mm (w x h x d)
Weight	approx. 560 g including batteries

Specifications for PRT300 Printer

Printer Type	impact printer
Interface	serial RS 232 interface
Paper	normal paper, width 57.5 mm (2.25 inches)
Data Transfer	baud rate: 1,200 baud, data bits: 7, stop bits: 1, parity: even, protocol: no
Power Supply	110 V (PRT301 is 220 V)

4 General Information on Measurement

During pH measurement, simultaneous temperature detection is required. Combination electrodes with integrated temperature probe are particularly advantageous. For this reason, the Orion 3-in-1 Triode pH/ATC electrode is the ideal probe to use.

Calibration and measurement

The measuring characteristics of pH electrodes are different for each electrode. Therefore, the meter must be adjusted to the characteristics of the current electrode. This process is called calibration.

For calibration, you take measurements of buffer solutions. These are solutions with exactly defined pH values. With the Orion 265A and 266S meters, two calibration modes are available – automatic calibration using AutoCal and manual calibration.

AutoCal automatic calibration

In the Orion 265A and 266S pH Meters the corrected pH values of various buffer sets are stored for various temperatures. Simply select and enter the buffer set once upon initial start-up of the meter (see Pg. 8). Then the AutoCal will calibrate the meter at the press of a key.

Calibration is conducted with two or three different buffer solutions from the selected buffer set. Use pH 7 or neutral buffer first. The pH meter measures the electrode voltages and temperatures and compares them with the programmed pH temperature tables for the buffer solutions. From the measured values, the meter calculates the slope and E_0 of the electrode.

For a one-point calibration, only the E_0 is adjusted. The previous slope value is retained. As two- or three-point calibrations are only slightly more complicated, they are always preferable.

Note



The buffer solutions used for calibration must always correspond to the buffer set selected in the meter.

Manual calibration

If you want to work with special buffer solutions not included in the stored buffer sets, select manual calibration (see Pg. 8). Here, you enter your individual buffer value at the correct temperature (pH at calibration temperature). Values entered once remain stored. During the next calibration, the meter will suggest these values. However, the sequence of the last calibration must be repeated .

Note



Make sure that the buffer values are entered for the proper calibration temperature.

Calibration intervals

A one or two point calibration should be performed using fresh buffers before pH is measured. It is recommended that a two buffer calibration, using buffers that bracket the expected sample range, be performed at the beginning of each day to determine the slope of the electrode. This serves the dual purpose of determining if the electrode is working properly, and storing the slope value in memory. For maximum accuracy, perform a one buffer calibration every two hours to compensate for electrode drift, using a fresh aliquot of pH 7 buffer.

However, the calibration can be performed at a frequency determined by the user. For measurements under constant conditions, a longer interval may be sufficient. On the other hand, calibration may be necessary prior to each measurement when measuring in media with large temperature or pH differences. To change the calibration interval, you should configure the calibration timer (see Pg. 8).

Observe the following:

- For refillable electrodes, open the filling hole for calibration, measurement and cleaning.
- Immerse the electrode in the buffer solution ensuring that the junction is completely immersed.
- Electrode response time is shortened when the buffer solution is stirred.
- Always rinse the electrode with deionized water before immersing it in buffer solution.
- Use two- or three-point calibration with fresh buffers whenever possible.

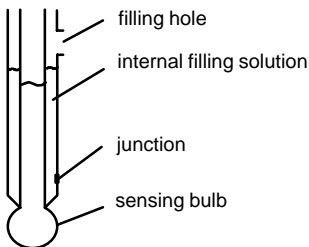
- If you calibrate without a temperature probe, make sure that the manually set temperature matches the actual temperature of the buffer solutions and samples.

Note



For additional information, refer to the electrode instruction manual.

Design of a refillable combination electrode



Buffer solutions

For a two-point calibration, the values of the buffer solutions should differ by at least two pH units and bracket the expected sample range.

Note



To ensure measurement accuracy, the buffer solutions should be fresh.

- Never pour used buffer solution back into the bottle. Never use used buffer solution.
- Never immerse the electrode directly into the bottle.
- Always keep the bottle closed. The carbon dioxide from the air can lead to incorrect buffer solution values.

Note



The problems described above can be avoided by using perpHect[®] buffer packs (Orion 910425, 910725, 911025, 910410, 910710 and 911010).

Electrodes Combination electrodes are commonly used due to ease of use.

The Orion 265A and 266S pH meters are compatible with the Orion 3-in-1 Triode™ Combination pH/ATC Electrodes, 9109WP and 9157WP. The nominal isopotential point of these electrodes is pH 7. For additional information, refer to the appropriate electrode instruction manual.

Electrode care Proper cleaning and care increases electrode service life and measurement accuracy. Therefore, you should observe the following points:

- ❑ When not in use, store electrodes in Storage Solution, Orion 910001.
- ❑ Soak dry electrodes in Thermo Orion Storage Solution for up to 2 hours prior to initial use.
- ❑ For refillable electrodes, open the filling hole for calibration, measurement and cleaning.
- ❑ Make sure the internal filling solution in the electrode is always at least 1 inch higher than the sample level. Fill electrode with solution if necessary. Use the Thermo Orion filling solution specified for the electrode being used.

Grease and oil deposits on the electrode can be removed with Detergent Cleaning Solution D, Orion 900024.

Protein contaminations can be removed by soaking the electrode in Thermo Cleaning Solution B, Orion 900022.

- ❑ Do not rub the electrode dry with a cloth or fleece, as this will cause electric charging which may later result in incorrect measurements or even make them impossible.

Temperature compensation

The temperature compensation takes the temperature dependency of the electrode slope into account. Reference temperature for E_0 and slope of the meter is 25°C. The pH of the sample is also temperature-dependent. This temperature dependence is unknown and depends on the composition of the sample. As a result, this temperature dependence cannot be compensated. Therefore, always indicate the measuring temperature together with the pH.

Note



In the case of a major temperature difference between the calibration and measuring temperature, an additional temperature effect on E_0 may affect the electrode performance. These effects are not subject to any general rules (in contrast to the temperature dependence of the slope). To achieve a particularly high degree of measurement accuracy, this error can be eliminated by calibrating at the measuring temperature. The temperature dependence of the calibration buffer pH values is automatically taken into consideration during an AutoCal calibration.

Technical Terms

AutoCal	Automatic buffer recognition. Before the first calibration, the buffer set used must be activated once. The AutoCal then automatically recognizes the buffer solution used during calibration.
Autoshutoff	To protect the batteries, the meter switches off automatically when not operated for a longer period. Autoshutoff can take place after either one hour or twelve hours. When data log or remote interface are active, the autoshutoff feature is disabled.
Buffer set	Contains selected buffer solutions which can be used for automatic calibration with the AutoCal feature. The buffer set must be selected prior to initial calibration.
Buffer solution	Solution with an exactly defined pH for calibrating a pH measuring instrument.
cal	Key for activating calibration.
Calibration	Adjustment of the pH meter to the current electrode characteristics. The E_0 and slope are adjusted. A one-, two-, or three-point calibration can be performed. With one-point calibration, only the E_0 is adjusted.
Calibration buffer set	See buffer set.
Combination electrode	Combination of sensing and reference electrode in one probe.
Data log	The data log records up to 100 measured values (pH or mV) together with the temperature, date and time. Logging takes place either interval or event-controlled (measured-value difference) or manually.
Data points	Up to 100 measured values (pH or mV) can be stored in the data log together with temperature, time and date.

Electrode E_0	The pH which is exhibited at 0 mV. This typically corresponds to the isopotential point of an electrode. The E_0 is different for every electrode and changes with age and wear.
Electrode slope	Is indicated in % of the theoretical slope (59.2 mV/pH at 25 °C). The electrode slope is different for every electrode and changes with age and wear.
GLP	Good Laboratory Practice: Rules for conducting and documenting measurements in the laboratory.
GLPdoc™ report	Printout of meter parameters, calibration and diagnostic information for GLP reporting.
meas	This key is used to return to measure mode from all other modes. In measure mode, it switches between mV and pH.
NAMUR	German committee for measurement and control standards in the chemical industry
One-point calibration	Calibration with which only the E_0 is taken into consideration. The previous slope value is retained. Only one buffer solution is required for a one-point calibration.
pH electrode system	A pH electrode system consists of sensing and reference electrodes. If they are combined in one body, they are referred to as a combination electrode.
Response time	Time from the start of a calibration step to the stabilization of the electrode potential. This time is one of the criteria for the StatFace indicator. It is printed with the calibration data on the GLPdoc™ report.
StatFace	Automatic electrode monitoring. The StatFace indicators provide information on the status of the electrode and the unit. Calibration interval, E_0 , slope and response time of the electrode are evaluated.

Slope	See electrode slope.
Three-point calibration	Calibration in which the E_0 and slope are taken into consideration. Three buffer solutions are required for three-point calibration. E_0 and slope are calculated for each line segment during calibration. The line segment which includes the mV measured in the sample is used to calculate the pH of the sample. An average of the two E_0 points is used for reporting purposes.
Two-point calibration	Calibration in which the E_0 and slope are taken into consideration. Two buffer solutions are required for two-point calibration.

Index

 , 23

A

AutoCal, 11, 47
 configuration, 8
 definition, 52

Autoshutoff, 9
 definition, 50

B

Battery replacement, 29

Baud rate, setting, 9

Buffer set
 definition, 50
 selection, 8

Buffer solution, 47
 definition, 50

C

Calibration, 11, 45
 automatic, 11, 45
 configuration, 8
 buffer solution, 47
 definition, 50
 manual, 12, 46
 configuration, 8

Calibration buffer set, definition,
50

Calibration intervals, 46

Calibration timer, configuration, 8

Certificate of Conformity, 33

Cleaning, 30

Clock mode, 19

Combination electrode, definition,
50

Configuration, 7
 PRT300 printer, 21

Configuration menu, 7

Control Drawing, 35

D

Data log, 17
 definition, 52
 setting, 17, 18

Data log memory, 16

Data points, definition, 50

Date format, configuration, 10

Declarations of Conformity, 31

Diagnostics, StatFace, 23

Display, 4

E

E0, definition, 51

Electrode monitoring, StatFace,
23

Electrode slope, definition, 51

Electrodes, 48
 care, 48
 monitoring, 5

Error messages, 24–26

G

GLP, definition, 51

GLPdoc report, definition, 51

I

Interface, 20

- commands, 20
- configuration, 9
- data format, 20
- parameters, 20
- protocol, 20

Interface cable, 21

Interface commands, 20

Interface parameters, 20

K

Keypad, 4

L

Laboratory printer PRT300

- configuration, 21
- standard settings, 21

M

Maintenance, 29

Manual calibration, 46

Manual temperature specification,
15

Measure mode, 15

Measured values

- reading out, 16
- storing, 16

Measurement, 15

Measurement, general, 45

Memory

- clearing, 16
- reading, 16
- writing, 16

Messages, StatFace, 23

Meter design, 3

mV measurement, 15

N

NAMUR, definition, 51

O

One–point calibration, 12, 13
definition, 51

Ordering information, 35

P

Package contents, 1

pH electrode system, definition,
51

pH measurement, 15

Printer PRT300

- configuration, 21
- standard settings, 21

Printing

- GLPdoc reports, 22
- measured values, 22

R

Response time, definition, 51

RS–232 interface, 20

S

Safety precautions, V

Setting clock, 19

Short description, 1

Slope, definition, 52

Smiley, 23

Specifications, 43
PRT300 printer, 44

StatFace, 5, 23
definition, 51
diagnostic, 23
messages, 23

Storing, 16
automatic, 17
measured values, 16

T

Technical terms, 50

Temperature compensation, 49

Temperature display, configuration, 10

Three-point calibration, 12, 14
definition, 52

Time format, configuration, 10

Two-point calibration, 12, 13
definition, 52

W

Warranty, 40

Water Analysis Instruments

North America

166 Cummings Center
Beverly, MA 01915 USA
Toll Free: 1-800-225-1480
Tel: 1-978-232-6000
Dom. Fax: 1-978-232-6015
Int'l Fax: 978-232-6031



Europe

P.O. Box 254, 3860 AG Nijkerk
Wallerstraat 125K, 3862 CN Nijkerk,
Netherlands
Tel: (31) 033-2463887
Fax: (31) 033-2460832

Asia Pacific

Blk 55, Ayer Rajah Crescent
#04-16/24, Singapore 139949
Tel: 65-6778-6876
Fax: 65-6773-0836

www.thermo.com/water

© 2009 Thermo Fisher Scientific Inc. All rights reserved.

233847-001 Rev. E 09-09