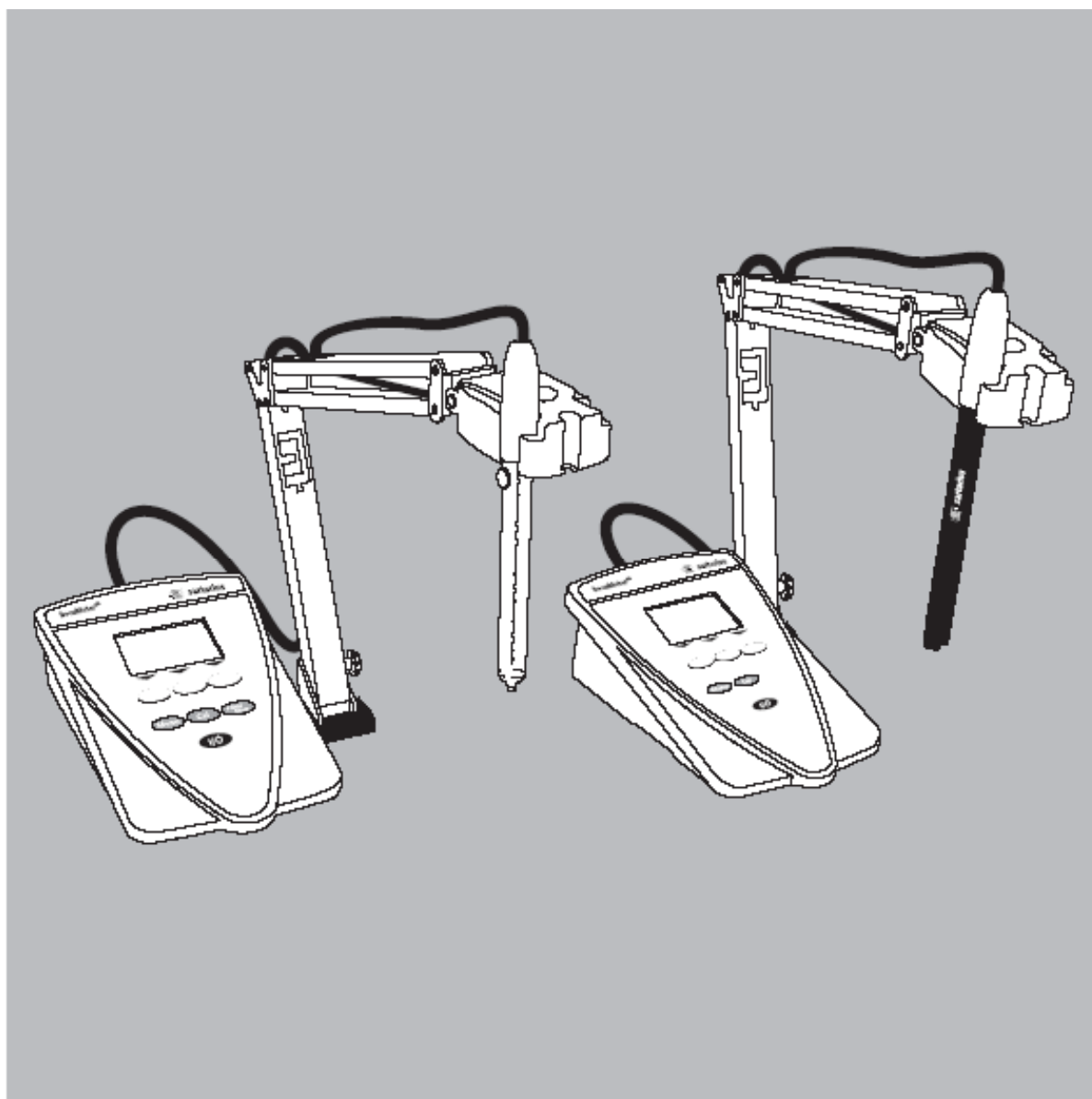


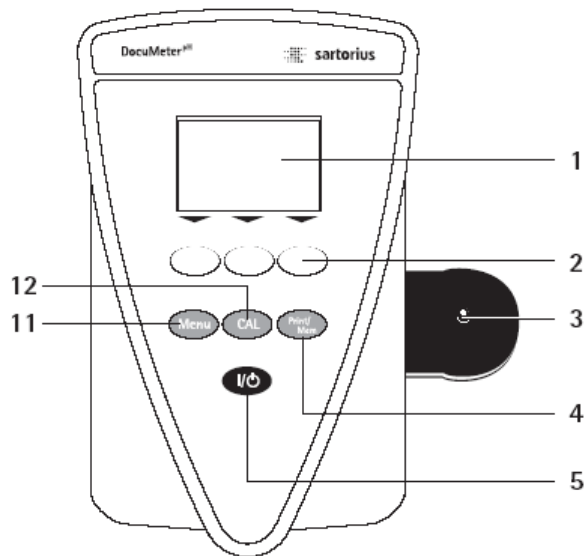
# Sartorius Docu-pH / Docu-pH+

## 설치 및 사용설명서



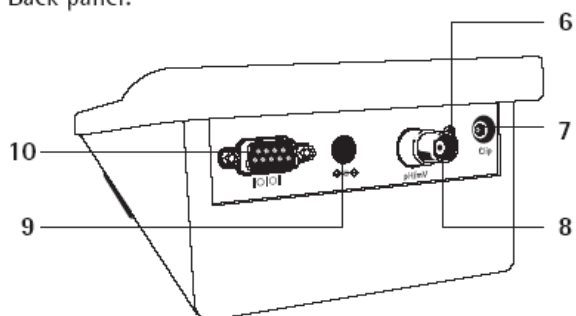
## 작동버튼의 설명

Front view:



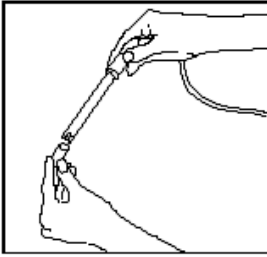
- 1 LCD
- 2 소프트 키
- 3 전극 지지대 꽃이
- 4 Docu-pH+ 만 :  
프린트 혹은 저장키
- 5 전원키
- 6 ATC 프로브 잭
- 7 Docuclip 연결단자
- 8 BNC 코넥터

Back panel:

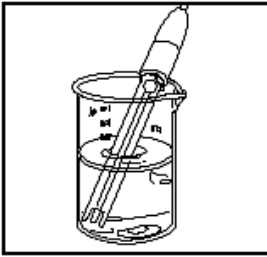


- 9 파워 잭
- 10 Docu-pH+만 : 인터페이스포트
- 11 셋업 키
- 12 교정 키

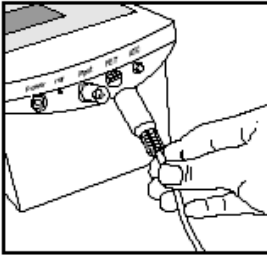
## 설치 및 전극유지법



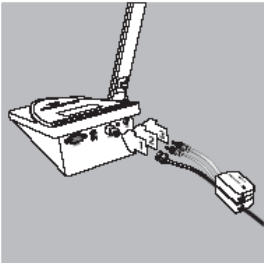
1. 전극으로부터 보호캡을 벗긴다.



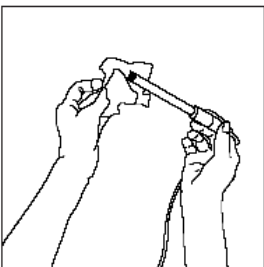
2. 전극을 처음 사용시나 건조된 전극을 사용할 때는 KCl용액이나 전극 저장용액에 하루정도 담가둔다.



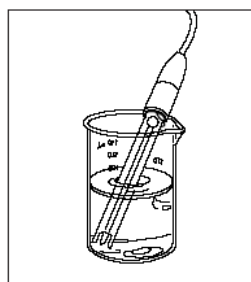
3. BNC 코넥터의 보호캡을 벗기고 pH/ATC전극을 후면의 input 코넥터에 ATC잭은 ATC 코넥터에 연결한다.



4. 추가적으로 ATC 연결이 가능하며 (2), 자체 교정 Data를 가지고 있는 DocuClip 연결 가능 (3)



5. 측정 사이에 증류수나 초순수제 혹은 측정할 다음 용액으로 전극을 적시고 물기를 살짝 훔쳐준다.



6. 전극을 사용하지 않을 때에는 전극충전액인 KCl이나 전극저장용액에 저장한다. 혹은 전극 보호캡에 용액 충전 후 전극을 장착한다.

# Default Setting (Setup Menu)

사용자 필요에 의해 미리 세팅값을 구성하거나 설정변환

세팅메뉴

- Calibration functions (교정)
- Lock function (잠금설정)
- Fast mode (반응속도 설정)
- Settings (일반메뉴)
- Docu-pH+ only : data memory (메모리 저장기능)

Language Selection

- 5개의 언어 선택 가능
- English (factory setting)
  - German (Deutsch)
  - French (Francais)
  - Spanish (Espanol)
  - Italian (Italiano)

예) 프랑스 언어 설정

조작법

작동키

표시부

1. 필요하다면 전원을 켜다

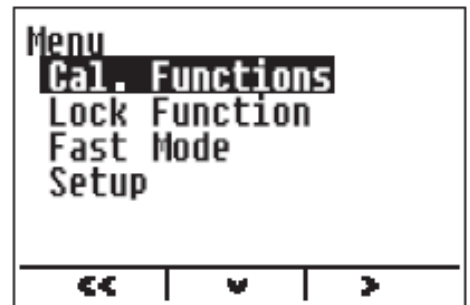


2. 메뉴버튼을 누른다



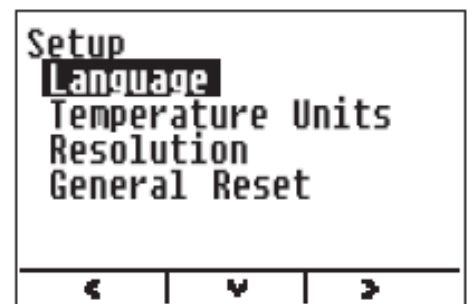
3. Setup 메뉴 선택

√ 버튼을 반복적으로 누른후  
Setup에서 > 버튼을 누른다.



4. Language 언어 선택

Language에서 > 버튼을 누른다.



5. "French(Francais)" 선택

원하는 Francais로 가기 위해  
√ 버튼을 두 번 누른후 최종  
ok 버튼을 누른다.



6. 저장후 메뉴 빠져나오기

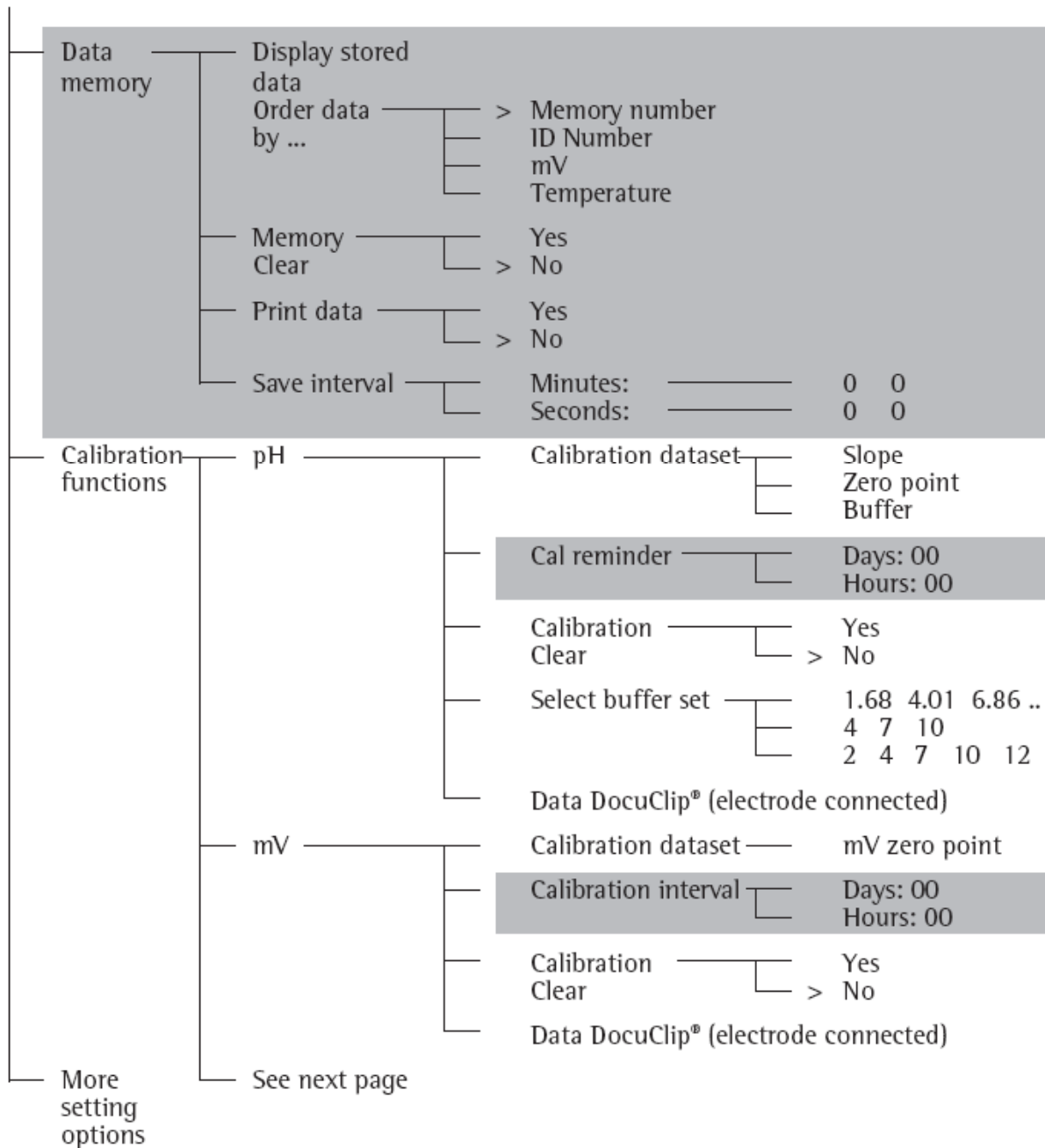
< 버튼을 누르고 <<버튼을  
누르면 저장과 동시에 빠져나  
온다.

## Parameter Settings (Overview)

> Factory setting; ✓ User setting

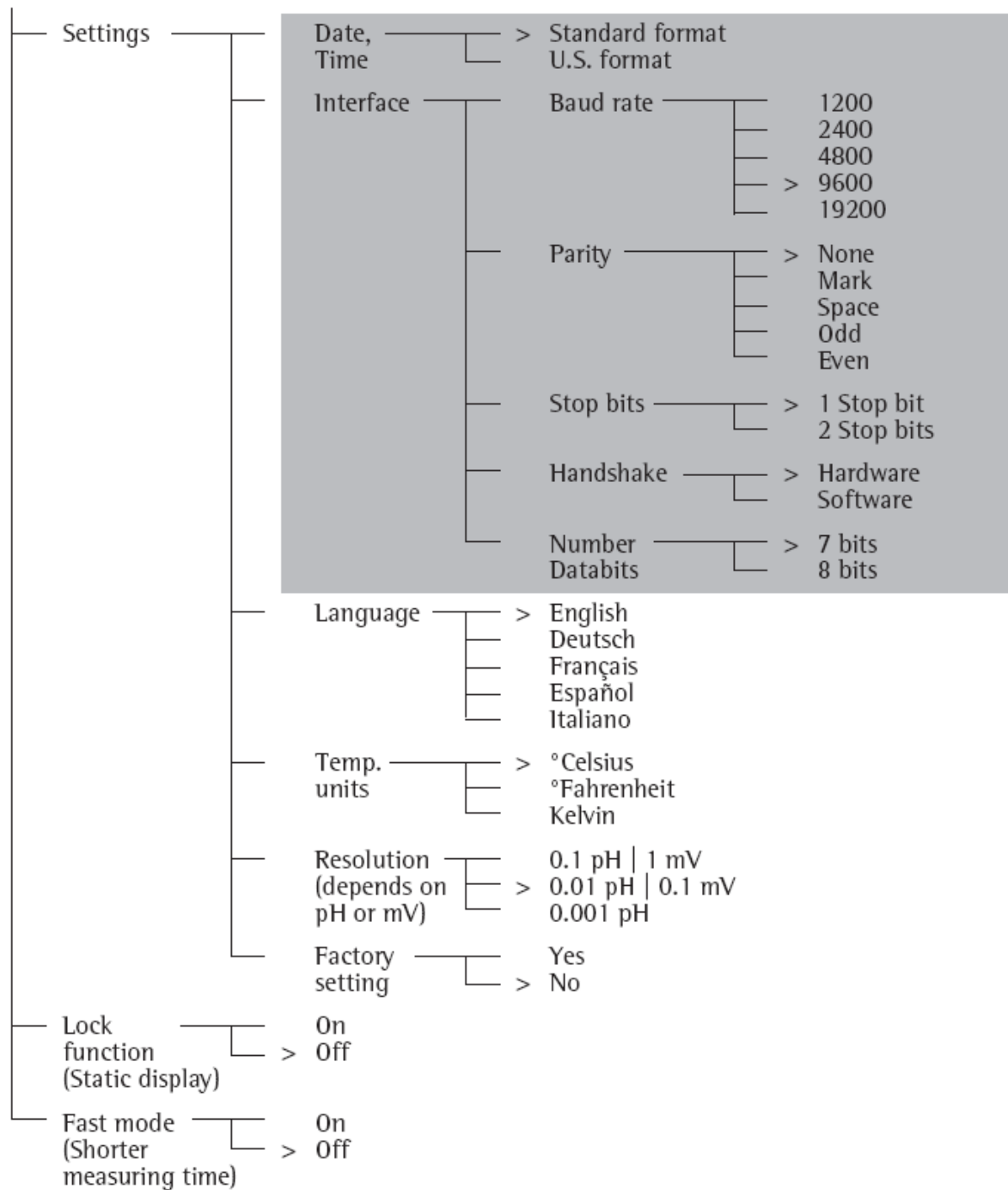
= Setting and function only apply to Docu-pH<sup>+</sup><sub>Meter</sub>

### Menu




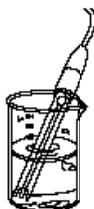

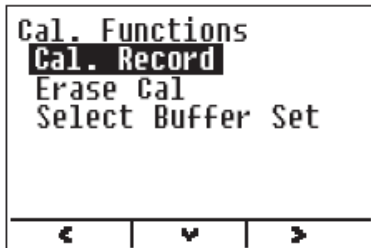
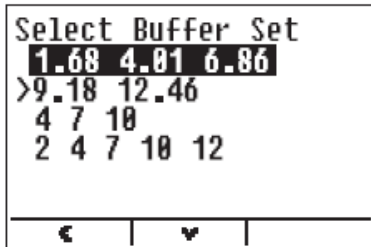

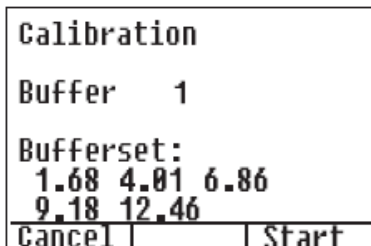
> Factory setting; ✓ User setting

Menu    = Setting and function only with Docu-pH<sup>+</sup><sub>Meter</sub>



# 버퍼를 이용한 pH 교정

## Calibration for pH Measurement

Step	Press key	Display
1. 필요하면 전원을 켜다		
2. 전극을 스탠다스 용액에 담그고 서서히 저어준후 디스플레이에 값이 안정화될때까지 기다린다.		
3. 필요하다면 버퍼세트를 변경한다.		
4. Calibration Functions을 선택한다.	2x > softkey	
5. 버퍼세트를 선택한다.	2x v softkey, > softkey	
6. 필요하다면 버퍼세트를 변경한다.	Press v softkey repeatedly; press OK softkey once	
7. 저장하고 빠져나온다.	press < softkey repeatedly, << softkey	
8. Calibration 선택		

Step	Press key	Display
------	-----------	---------

9. 첫번째 버퍼로 교정을  
시작한다.

Press  
Start softkey

Calibration running ...:  
미터기는 설정된 버퍼세트로부터  
자동으로 인식된다.  
일단 값이 안정되면 교정값은  
자동으로 저장되고  
기존 교정값은 덮어쓰여진다.

```

in progress ...
25.0°C
12.50 pH
Cancel | |

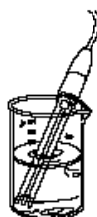
```

```

Calibration
Buffer 2
Bufferset:
1.68 4.01 6.86
9.18 12.46
Cancel | End | Start

```

10. 두번째 버퍼를 준비하고  
전극을 담근다.



11. 두번째 버퍼로 교정을  
시작한다.

Start softkey

```

Calibration
25.0°C
6.90 pH
Cancel | |

```

필요하다면 세번째 버퍼로도  
교정을 실행한다.

```

Calibration
Buffer 3
Bufferset:
1.68 4.01 6.86
9.18 12.46
Cancel | End | Start

```


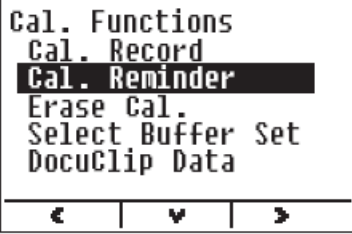

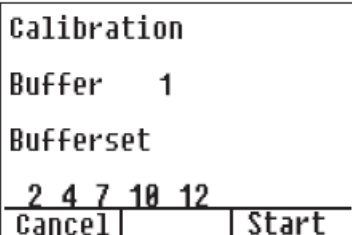
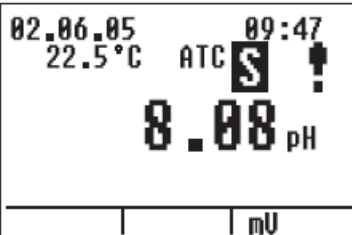


Step	Press key	Display
12. 두번째 교정 완료  교정 결과치는 디스플레이 된다. (교정 슬로프 등...)	End softkey	<div> <div>Cal. Results</div> <div>Slope1 98.7%</div> <div>Offset -8.4 mV</div> <div> <div>&lt;&lt;</div> <div>v</div> <div>&gt;</div> </div> </div>
13. 커서키를 이용해 결과 확인	v softkey ^ softkey	<div> <div>Cal. Results</div> <div>Buffer 2 6.86</div> <div>mV : -0.0</div> <div>°C : 25.0</div> <div> <div>&lt;</div> <div></div> <div>^</div> </div> </div>
14. 커서키를 이용해 빠져나온다.	< softkey	


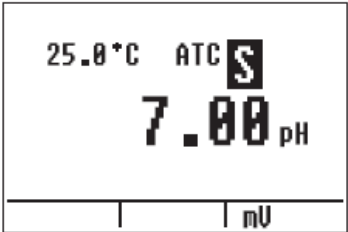

## Docu-pH<sup>+</sup><sub>Meter</sub> Model: Calibration with Cal Reminder

### Intended Use

In the Setup Menu, a calibration reminder can be programmed as a reminder of when electrode calibration should be repeated.


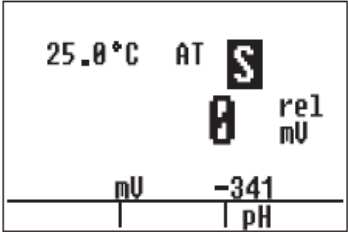

Step	Press key	Display
1. 메뉴버튼을 누른다.		
2. Calibration function 선택후 pH 선택	Press $\nabla$ softkey If necessary, press $\triangleright$ softkey repeatedly	
3. "Cal reminder" 선택	$\nabla$ softkey,	
	$\triangleright$ softkey	
4. 교정주기 설정	$\nabla$ , $\triangleright$ softkeys	
5. 교정주기 저장	OK softkey	
6. 메뉴빠져나오기	$\triangleleft$ , $\triangleleft\triangleleft$ softkeys	
> Docu-pH <sup>+</sup> 의 경우 교정주기 설정후 자동으로 Calibration창이 뜬다.		
> 설정된 교정주기가 되면 다음 표시되는 값 옆에 느낌표가 보여 진다. :		
- Current measurements		
- Measurements in data memory		
- Measurements on the printout		

## Measuring the pH(pH 측정)

Step	Press key	Display
1. 필요하다면 전원을 켜다. > Sartorius logo와 기기정보가 표시된다.		
2. 전극을 샘플에 넣고 서서히 저어주면 잠시 후 LCD창에 pH가 표시된다.		

## Measuring Redox Potential (ORP 측정)


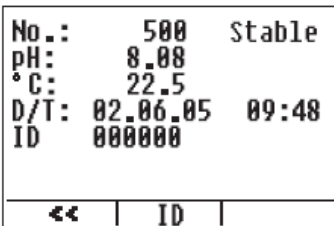




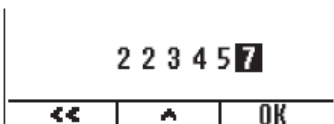
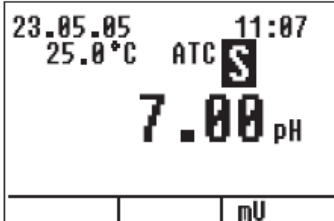
Millivolt measurement is used in electrode diagnostics, titration, and in measuring oxidation/reduction (redox) potential (ORP). ORP measurements indicate the oxidizing or reducing capacity of a solution. You can use ORP potential values to monitor and control solutions that require a defined level of oxidants or reductants.





Step	Press key	Display
1. 필요하다면 전원을 켜다. > Sartorius logo와 기기정보가 표시된다.		
2. millivolt 측정으로 변환한다.	mV or rel mV softkey	
3. 전극을 샘플에 넣고 서서히 저어주면 잠시 후 안정된 값을 표시한다.		

# Docu-pH<sup>+</sup><sub>Meter</sub> Model: 측정된 Data 저장

## 특징

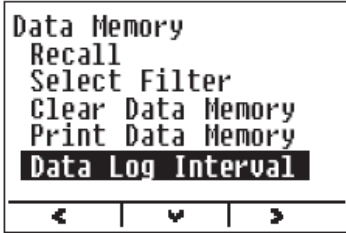
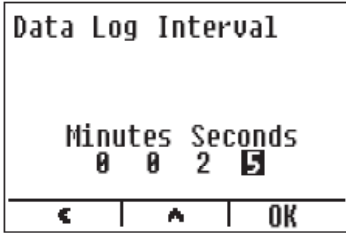
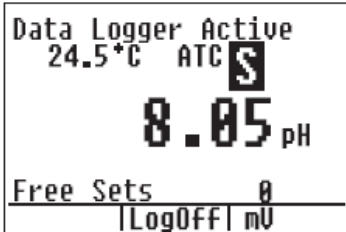
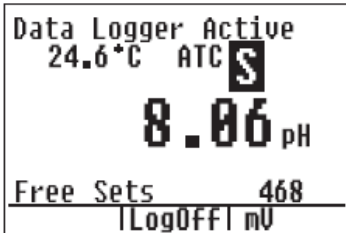
- 500 개의 데이터 저장이 가능
- 21 CFR Part 11: Docu-pH<sub>Meter</sub> and DocuClip® 는 품질관리 시스템의 적합한 사용을 위해 개발 (for example, GLP, ISO 17025, 21 CFR Part 11).
- Sample ID: 6 자리까지 각 데이터별 입력 가능
- 데이터 저장 주기 설정 : 1초에서 99분 사이 입력가능하며 설정된 주기로 데이터 저장 가능.
- 데이터 출력 가능

Step	Press key	Display
1. 필요하다면 전원을 켜다. > Sartorius logo와 기기정보가 표시된다.		
2. 필요하다면 기존 데이터는 지운다. Menu, > softkey, Menu: data memory: delete memory	 , > softkey, repeatedly press < softkey	
3. 데이터 저장 시작		
4. 필요하다면 샘플 ID변경	ID softkey	
5. 6 자리 ID입력	Repeatedly press < softkey, > softkey	
6. 샘플 ID 저장	OK softkey	

Step	Press key	Display /Printout
7. 측정된 데이터 저장 및 출력		. . . . . No: 4                      Stable pH: 6.65 °C: 21.5                      ATC D/T: 20.05.05 08:53 ID: 135933 CAL: 19.05.05 11:52
8. 필요하다면 추가적으로 저장		
9. 저장된 측정 데이터 보기	 , press ➤ softkey twice	Menu: data memory: Display stored data
10. 필요하다면 데이터군 분류 :	 , ➤ softkey, ↵, ➤ softkey	Menu: data memory: Order data by ...
11. 데이터가 가득 차있을경우 : Confirm "Overwrite data"	OK softkey	

Confirm Overwrite	
Cancel	OK

## Saving Measured Data with Calibration Reminder(저장주기에 의한 데이터 저장)

Step	Press key	Display
1. 필요하다면 기존 데이터 삭제 Menu: data memory: memory delete	<b>Menu</b> , ➤ softkey, ▼ softkey	
2. 자동 데이터저장 주기 설정 Menu: Data memory: Time interval for data logging	<b>Menu</b> , ➤ softkey , repeatedly press ▼, ➤ softkeys	
3. 원하는 저장 주기로 설정	▼, ➤ softkeys	
4. 데이터 저장 주기 저장	OK softkey	
5. 메뉴 빠져나오기	<, << softkeys	
6. 자동 데이터 저장 시작	LogOn softkey	
> 설정된 저장주기에 의해 데이터 자동 저장.		
7. 데이터 자동 저장 끝내기	LogOff softkey	
8. 저장된 데이터 값 보기	<b>Menu</b> , 2x softkey ➤	
9. 필요하다면 데이터군 분류: Menu: data memory: Order data by...	<b>Menu</b> , ➤ softkey, ▼, ➤ softkey	

# Docu-pH<sup>+</sup><sub>Meter</sub> Model: Data Output

## Print Data Log

### Intended use

For printing out measurements, calibration data and ID codes in accordance with the requirements of quality management systems.

### Preparation:

△ Switch off numerator on the optional Sartorius printer.

The data log in the pH mode can include the following lines:

. . . . .	Dotted line
	Blank line
No: 4                      S t a b l e	Consecutive number and measurement status
pH: 6.63	pH
mV:	If required, mV in the mV mode
°C: 25.0                      M T C	Temperature is set manually here
D/T: 20.05.05              11:53	Date and time
ID: 135933	Sample ID, entered by user
CAL: 19.05.05              08:52	Date and time of the calibration (forms the basis for calculating the pH)

The data log for calibration results:

. . . . .	Dotted line
	Blank line
Cal. Record	
Sartorius Docu-pH+Meter	Instrument number
S/N: 1234567800	Docu-pH <sub>Meter</sub> serial number
pH Electrode PY-P12D0C	Type of electrode
S/N: A044805002	Serial number of the electrode
20.05.05                      11:56	Date and time of calibration end
S1: 97.2 %	Slope 1 (between buffer 1 and buffer 2)
S2: 97.1 %	Slope 2 (between buffer 2 and buffer 3)
Offset :                      -9.1 mV	Zero point in mV (= deviation ... at pH = 7.00)
B1: 1.68	Nominal value of buffer 1 at 25°C
+310.8 mV                      +25.0 °C	Voltage and temperature of buffer 1
B2: 6.86	Nominal value of buffer 2 at 25°C
+0.1 mV                      +25.0 °C	Voltage and temperature of buffer 2
Calibration OK	Calibration status

Data log from memory identifiable in line:

ID: 135933              memory	Sample ID and memory printout
--------------------------------	-------------------------------

# Docu-pH<sup>+</sup><sub>Meter</sub> Model: Data Interface

## Intended Use

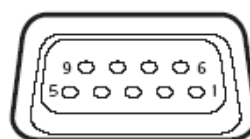
The Docu-pH<sup>+</sup><sub>Meter</sub> comes equipped with an interface port for connection to a computer or Sartorius printer.

## Available Features

- Interface type: serial interface
- Operating mode: unidirectional
- RS232
- Transmission rate:  
1200, 2400, 4800, 9600, 19200 baud
- Parity: odd, even, none, mark, space
- Character format: 7-/8-bit ASCII, parity,  
1 or 2 stopbits
- Handshake:  
2-wire interface: Software (XON/XOFF)  
4-wire interface: Hardware (CTS/DTR-  
none)
- Data output format: 24 characters

## Female Interface Connector:

- 9-pin D-subminiature DB9 connector with screw attachment for direct connection to a computer or an optional Sartorius data printer.



## Pin Assignment:

Pin 1: Not connected  
Pin 2: Serial data input (Rx/D)  
Pin 3: Serial data output (Tx/D)  
Pin 4: Data Terminal Ready (DTR)  
Pin 5: Signal GND  
Pin 6: Not connected  
Pin 7: Not connected  
Pin 8: CTS  
Pin 9: Not connected

⚠ No other pins may be assigned in the Docu-pH<sup>+</sup><sub>Meter</sub>!

## Cabling Diagram

Diagram for interfacing a computer to the Docu-pH<sup>+</sup><sub>Meter</sub> using the RS232C/V24 standard and cables up to 15 m (~50 ft.) long

pH meter, 9-pin	Computer, 9-pin
TxD 3	2
RxD 2	3
CTS 8	4
DTR 4	8
GND 5	5

## Most Common Errors:

- The baud rates between the Docu-pH<sup>+</sup><sub>Meter</sub> and the computer/printer are different.
- The parity or stop bits are not set in the computer properly
- The pins in the cable are not properly configured.



# Overview

## Meter Specifications

	Docu-pH <sub>Meter</sub>	Docu-pH <sup>+</sup> <sub>Meter</sub>
pH measurement		
Measuring range	-2.000 ... 20.000	
Readability	0.001   0.01   0.1, adjustable	
Accuracy	± 0.005	
mV measurement		
Measuring range in mV	-2000.0 ... +2000.0	
Readability in mV	0.1   1 adjustable	
Accuracy in mV	± 0.2 <   1000	± 1 >   1000
Temperature measurement		
Measuring range in °C	-5 ... 105	
Readability in °C	0.1	
Accuracy in °C	± 0.2	
Temperature compensation	Automatic or manual from -5°C ... 105°C	
Buffer recognition	Automatic: technical buffers, DIN/NIST buffers	
Calibration points, max. number	3	
Date Time battery-supplied	-	×
Sample IDs	-	×
Calibration reminder	-	×
Complete GLP-compliant record	-	×
Memory for measurement data	-	×
Communication with DocuClip®	×	×
Input for pH combination electrodes	BNC	BNC
Input for temperature probes		
NTC 10 kΩ, NTC 30 kΩ, Pt1000	2.5 mm phone plug	2.5 mm phone plug
Interface RS232C	-	×
Dimensions in mm	89 × 229 × 145	
Weight in kg	1	

## Accessories

	Order No.
<b>pH/ATC combination electrodes</b> with DocuClip®; Clip ready installed and precalibrated:	
Gel electrolyte, fiber junction with integrated ATC probe	PY-P12doc
Gel electrolyte, fiber junction	PY-P20doc
KCl liquid-filled, fiber junction with integrated ATC probe	PY-P10doc
KCl liquid-filled, platinum junction with integrated ATC probe	PY-P11doc
KCl liquid-filled, platinum junction	PY-P21doc
KCl liquid-filled, platinum junction (microelectrode)	PY-P22doc
Gel electrolyte-filled, annular gap junction (surface electrode)	PY-P23doc
KCl liquid-filled, adjustable flow rate, sleeve junction	PY-P24doc
All Sartorius pH electrodes standard equipped without DocuClip®	PY-P...
<b>DocuClip®</b> for use with any electrode	DocuClip®
<b>Redox/ORP combination electrode with DocuClip®</b> , Clip ready installed:	
KCl liquid-filled, platinum disk	PY-R01doc
<b>ATC probe:</b>	
10 kΩ NTC	PY-T01
<b>pH buffer solutions:</b>	
Buffer pH = 4.00 (0.01 at 25°C), twin-neck bottle, 500 ml	PY-Y21
Buffer pH = 7.00 (0.01 at 25°C), twin-neck bottle, 500 ml	PY-Y22
Buffer pH = 10.00 (0.01 at 25°C), twin-neck bottle, 500 ml	PY-Y23
<b>Cleaning solution</b> , pepsin   hydrochloric acid, 500 ml	PY-Y06
<b>Electrolyte solution</b> , KCl (3 mol/L), silver ion-free, 500 ml	PY-Y07
<b>Sartorius lab printer</b>	YDP05-pH
<b>"IQ   OQ" Qualification</b> for pH meter	8407pH



**Declaration of Conformity  
to Council Directives 89/336/EEC and 73/23/EEC  
(amended by Directive 93/68/EEC)**

**The electronic pH meter of the series  
Docu-pH & Docu-pH+**

meets the applicable requirements of the test standards listed below, in conjunction with the associated power supplies, auxiliary peripheral devices and installation equipment listed in Annex A2 (see Annex A1 for a technical description and a list of the individual versions).

**1. Electromagnetic Compatibility**

1.1 Source for 89/336/EEC: Official Journal of the European Communities, No. 2003/C271/04

EN 61326 Electrical equipment for measurement, control and laboratory use  
EMC requirements

Limitation of emissions: Residential areas, Class B

Defined immunity to interference: Industrial areas, continuous unmonitored operation

**2. Safety of Electrical Equipment**

2.1 Source for 73/23/EEC: Official Journal of the European Communities, No. 2003/C60/01

EN 61010 Safety requirements for electrical equipment for  
measurement, control and laboratory use  
Part 1: General requirements

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