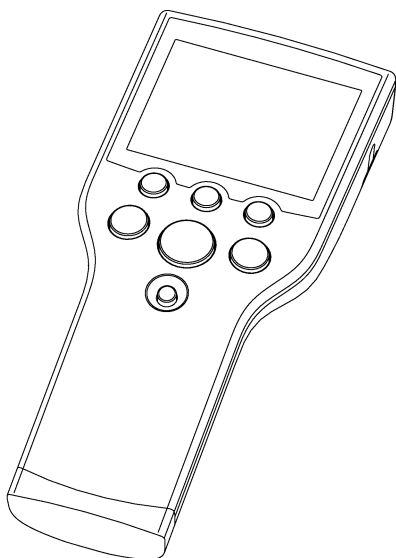




沪制 01040055 号

使用说明

Operating Instructions



SevenGo™

SG8 pH 计 /pH/ORP/Ion meter SG8

METTLER TOLEDO

A graphic element consisting of a series of parallel diagonal lines that converge towards the bottom right, creating a sense of motion or a stylized 'Z' shape.

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1. 简介

非常感谢您购买梅特勒-托利多公司的高品质便携式仪表，拥有SevenGo™系列便携式仪表，您就真正实现了移动的电化学实验室，而这正是我们一贯的追求。

SevenGo™系列便携式仪表远不仅仅是一系列高性价比的便携式仪表，同时它还具有以下诸多卓越新特点：

- 符合IP67等级，包括仪表、传感器和连接器
- 易于操作，操作手册会给您提供清楚易懂的操作指南
- 卓越的人体工效学设计，使仪器与人体仿佛浑然一体
- 符合标准设备认证，确保实验测量始终精确无误
- 诸如电极夹、防护罩、新型可洗手提箱以及附加野外助手等有用附件是工厂以及野外使用的所有便携式仪表的最佳辅助设备

2. 安全措施

操作人员防护措施



- 切勿在有爆炸危险的环境中工作！因为仪表壳体并非气密型（可能因火花形成或者侵入气体引起的腐蚀而产生爆炸危险）。

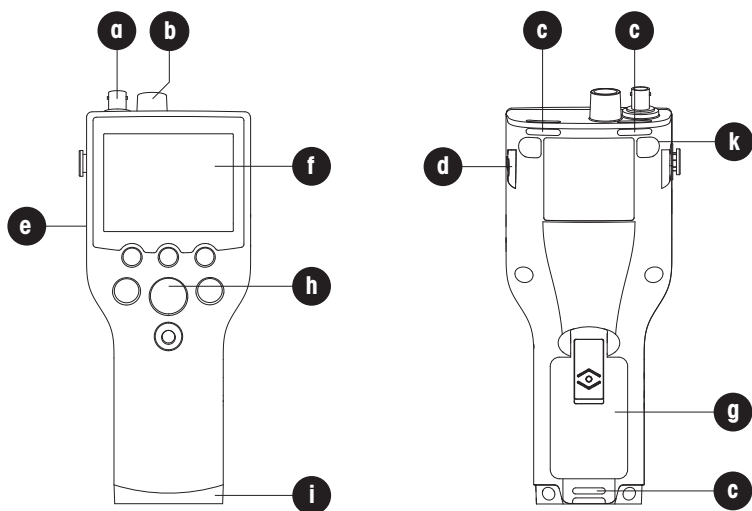


- 使用化学品和溶剂时，请遵照供应商提供的操作指南和实验室安全规程进行操作！

操作人员操作安全预防措施



- 禁止将仪器的壳体分离。
- 仅允许梅特勒-托利多服务人员维修仪表！
- 请避免下列环境因素的影响：
 - 剧烈的震动
 - 长期处于日照下
 - 大气湿度超过85%
 - 存在腐蚀性气体
 - 环境温度低于5 °C或者超过40 °C
 - 强电场或磁场下
 - 海拔高于4000m



a BNC信号输入插孔

b Cinch温度输入插孔

c 腕带安装槽

d SevenGo™电极夹安装位（仪表两侧）

e 红外传输窗口

f 显示屏

g 电池盖 (51302328)

h 橡胶按键

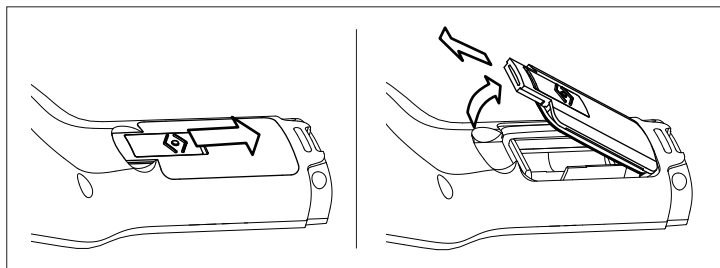
i 蓝色端盖(51302324)及野外助手安装位

k 橡皮垫安装位

3. 安装

小心开箱取出仪表。将校准证书存放在安全位置。

3.1 电池安装/拆卸

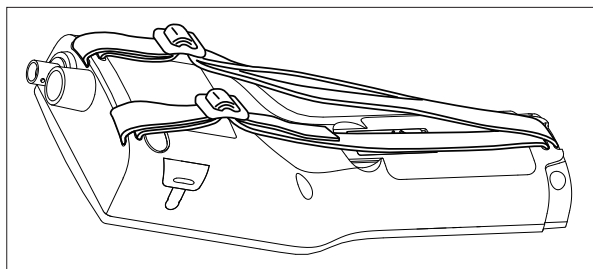


1. 向下推电池盖上的按钮, 用2个手指捏住电池盖并取下;
2. 按仪表电池盒中的标识将电池插入电池盒中; 或者用手指按住电池正极取出电池;
3. 合上电池盖, 并向上推按钮以固定电池盖。

注

IP67等级要求电池盒具有良好的密封性。当电池盖周边的O型圈破损时, 请及时更换。(SevenGo™密封套件, 订货号51302336)

3.2 腕带安装



根据图示安装妥当腕带

3.3 SevenGo™电极夹（选件）

SevenGo™电极夹（51302325）是一个电极的固定装置，可以安装在仪表外壳的任意一侧。首先将电极夹固定位上的盖子去掉，可以用拇指将盖子推开，之后将电极夹按进凹陷处。可以将电极从夹子的上方插进去，并根据工作和存储的需要使电极绕夹子旋转。

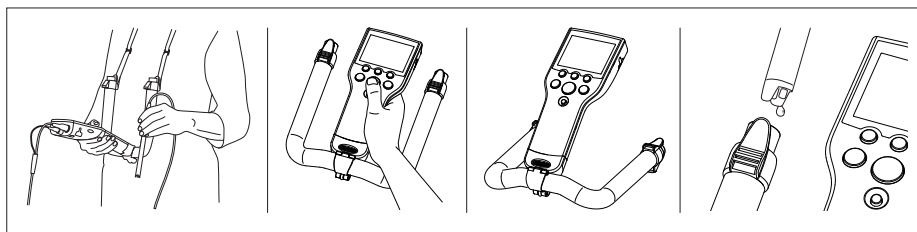
3.4 户外便携箱（选件）

户外便携箱（51302359）并不仅仅是一种携带测量设备的装置，它还可以用作一种理想的便携式工作站。在测量过程中可以将仪表放在便携箱中。

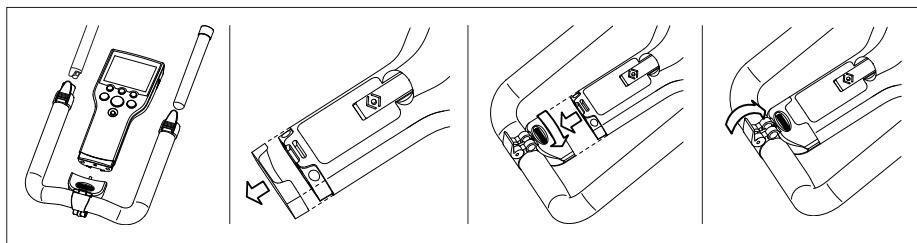
现场成套附件（51302360），电极夹，防护罩和腕带使操作变得十分简单。

3.5 ErGo™野外助手(选件)

ErGo™(51302320)能保护仪表免遭冲击并可安全地保护电极。对于在工厂或是野外测量，它都是一个完美的附件。若放在工作台或地上可以舒适地操作。

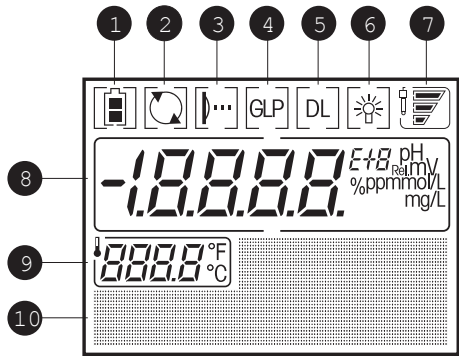


1. 卸下仪表端部上的底盖 (51302324)
2. 将ErGo™适配器拧到仪表上 (51302337)
3. 根据显示的图安装ErGo™
4. 将背带装到ErGo™的两端上。(51302321)



4. SG8专业型pH计操作

4.1 显示



- 1 电池状态, 指示电池电量是全满、半满还是空 (更换电池参阅 3.1)。
- 2 连续测量功能被激活 (禁止自动关机功能)。仪表的默认设置是十五分钟后自动关机。当再次开/关机后, 自动关机功能再次被激活。
- 3 IrDA 红外线接口,用于与打印机和PC的数据传输(见 4.7)。
- 4 GLP格式 (见 4.6)
- 5 数据记录, 定时数激活, 数据按照用户定义时间间隔传入内存。
- 6 背光功能开启指示灯。此时按任意键点亮背光灯。
- 7 电极状态 (电极维护见 5.2)



斜率: 95-105%
零电位: $\pm(0-15)$ mV
电极状态良好



斜率: 90-94%
零电位: $\pm(15-35)$ mV
电极需要清洁



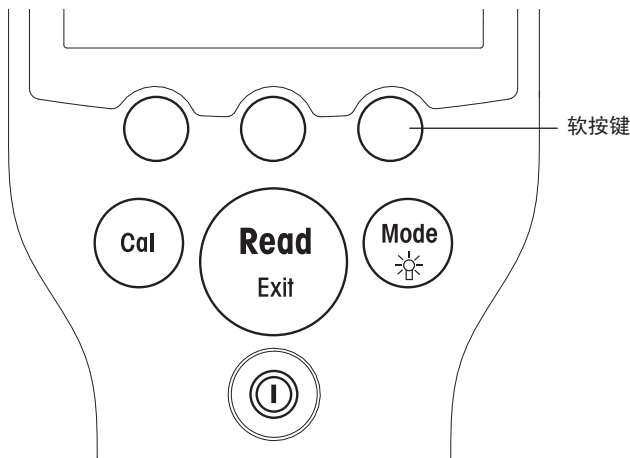
斜率: 80-89%
零电位: $\pm(>35)$ mV
电极故障或损坏



当校准提示处于开启状态,校准时间到时,此图标闪烁。

- 8 pH/mV/离子浓度读数
- 9 温度
- 10 点矩阵区

4.2 按键控制



	按下和释放 	按住持续2秒钟 
	- 仪表 开/关	- 接通/断开连续测量
	- 启动或结束测量 - 返回测量模式 (忽略输入)	
	- 开始校准	
	- 在pH, mV, rel. mV和离子浓度模式间切换	- 背光:激活/禁止背光功能(背光功能开启时,如果不操作仪表则背光会在用户设定的时间后自动熄灭。按任意键可重新开启背光。时间按照用户定义在10,15或30秒间任意转换。)

4.3 软按键操作

SG8专业型pH/离子计具有3个软按键,其功能分配视操作时的应用而不同。软按键功能显示在屏幕最底一行上。

举例: 在某个测量状态时的屏幕上, 3个软按键的分配如下:

Menu	Store	Data
进入菜单设置	存储终点数据	进入数据菜单

其他软键功能如下:

→	向右移动一个数字	+	增加一个数值
Enter	进入突出显示的菜单 接受输入值	Exit	返回上一层目录
Select	选择突出显示的功能	↓	滚动菜单
Edit	编辑设置	Back	程序返回一步
End	存储并退出菜单	Next	程序进入一步
Save	保存校准数据	Trans	传输数据到打印机
Delete	删除所选数据	Yes	确认

4.4 校准

SG8专业型pH/离子计最多可进行五点校准。

4.4.1 pH设置

如果选择仪表中预设六组校准缓冲液中的一组, 缓冲液可以被自动识别并显示。
六组预设缓冲液组是:

1	MT US	1.68	4.00	7.00	10.01		(25 °C)
2	MT Europe	2.00	4.01	7.00	9.21	11.00	(25 °C)
3	Merck	2.00	4.00	7.00	9.00	12.00	(20 °C)
4	JIS Z 8802	1.679	4.008	6.865	9.180		(25 °C)
5	DIN 19266	1.679	4.006	6.865	9.180	12.454	(25 °C)
6	DIN 19267	1.09	4.65	6.79	9.23	12.75	(25 °C)

对于每一组缓冲液(B1…B6), 自动温度补偿程序都固化在仪表中(见附录)。
您还可以按照下述缓冲液设置步骤来设定自己的缓冲液组, 但在这种情况下, 自动识别缓冲液功能在校准过程中不起作用。

4.4.2 设置一组用户自定义缓冲溶液组

- 在pH菜单下进入“4. Set Cal.”,进入项目“1. Buffer”并选择子项目“7. Customized”
- 编辑pH缓冲溶液的温度
- 输入第一个缓冲溶液的pH值。按 **Enter** 保存。
- 按 **Next** 输入下一个缓冲溶液,按 **Back** 返回当前值或是按 **End** 键结束设置。
- 校准缓冲溶液温度和值按照所示设置完后,退出菜单开始校准。

4.4.3 设置离子浓度标准溶液

SG8专业型pH/离子计可以设置以下离子浓度单位:

1. mmol/L
2. mol/L
3. ppm
4. mg/L
5. %

在离子菜单下,进入“4. Set Cal.”,进入项目“1. Standard”并按**Edit**键开始设置

- 选择标准溶液的离子浓度单位
- 输入标准溶液温度
- 按 **Enter** 保存设定值
- 输入标准溶液浓度值
- 按 **Enter** 保存设定值
- 按 **Next** 键进入下一个标准溶液设置,按 **Back** 键返回当前标准溶液设置或是按 **End** 键结束设置
- 校准缓冲溶液温度和数值按照所示设置完后,退出菜单开始校准。

4.4.4 执行校准

- 将电极放入一个校准缓冲液或标准液中,并按 **Cal**。
- 仪表根据预设终点设置来判断终点或是按 **Read** 达到终点
- 用去离子水冲洗电极。
- 将电极放入第2个校准液中,并按 **Cal**。
- 重复执行所有校准液步骤。
- 按 **End** 软键来结束校准。读数到达终点后,校准结果显现在显示屏上。
- 要将校准数据用于随后的测量,按 **Save** 即可。
- 要放弃校准数据,按 **Cancel** 即可。

注

- 为确保获得最精确的pH或离子浓度读数，您应当定期执行校准。
- 建议使用一个温度传感器或一个带内置温度探头的电极。
- 对于离子测量,或某些pH测量,可以使用MTC测量模式。然后应使所有缓冲液或标准溶液及样品溶液保持在相同的设定温度上。

4.5 样品测量

4.5.1 pH 测量

将电极放入样品中并按 **Read** 以开始测量，小数点闪动。
显示屏显示样品的pH值。自动测量终点A是仪表的默认设置。

在菜单设置中选择自动或手动或定时终点测量方法。要手动结束测量,按 **Read** 即可, 显示屏固定并显现 μM 。

如果选择定时终点测量方法, 并已超过读数时间, 显示屏将固定并显现 μr 。

自动终点判据见4.6.

4.5.2 mV/Rel. mV 测量

重复按 **Mode** 键直到出现mV或rel.mV单位。
要进行mV测量,请按与pH测量相同的步骤进行。

4.5.3 离子浓度测量

重复按 **Mode** 键直到出现离子浓度单位。
要执行离子测量,请按与pH测量相同的步骤执行。

4.6 pH/mV/Rel. mV/离子浓度测量菜单

SevenGo pro™ SG8专业pH/离子计可提供四类测量: pH, mV, Rel.mV和离子浓度测量。要切换为你所需要的测量模式, 请按 **Mode**。

菜单结构

pH菜单	mV菜单	Rel. mV菜单	离子浓度菜单
1. Set temp.	1. Set temp.	1. Set temp.	1. Set temp.
1. MTC temp.	1. MTC temp	1. MTC temp	1. MTC temp
2. Temp. unit	2. Temp. unit	2. Temp. unit	2. Temp. unit
1. °C	1. °C	1. °C	1. °C
2. °F	2. °F	2. °F	2. °F
2. Set. meas.	2. Set. meas.	2. Set. meas.	2. Set. meas.
1. EP format	1. EP format	1. EP format	1. EP format
1. Auto	1. Auto	1. Auto	1. Auto
2. Manual	2. Manual	2. Manual	2. Manual
3. Timed	3. Timed	3. Timed	3. Timed
2. Resolution	2. Resolution	2. Resolution	2. Ion type
1. X.X	1. X	1. X	1. Na ⁺
2. X.XX	2. X.X	2. X.X	2. K ⁺
3. X.XXX		3. R. mV offset	3. NO ₃ ⁻
			4. Cl ⁻
			5. F ⁻
			6. NH ₄ ⁺
			7. Ion ⁺
			8. Ion ⁻
			9. Ion ²⁺
			10. Ion ²⁻
3. Sensor ID	3. Sensor ID	3. Sensor ID	3. Sensor ID
4. Set cal.			4. Set cal.
1. Buffer			1. Standard
1. MT US			
2. MT Europe			
3. Merck			
4. JIS Z 8802			
5. DIN / NIST			
6. DIN 19267			
7. Customized			
2. Cal. Remind			2. Cal. Remind
1. Off			1. Off
2. On			2. On
3. Cal. Mode			3. Cal. Mode
1. Segment			1. Segment
2. Linear			2. Linear
5. Data log	4. Data log	4. Data log	5. Data log
1. Auto save	1. Auto save	1. Auto save	1. Auto save
1. Off	1. Off	1. Off	1. Off
2. On	2. On	2. On	2. On
2. T- int. read	2. T- int. read	2. T- int. read	2. T- int. read
1. Off	1. Off	1. Off	1. Off
2. On	2. On	2. On	2. On

6. Data output	5. Data output	5. Data output	6. Data output
1. To printer	1. To printer	1. To printer	1. To printer
2. To PC	2. To PC	2. To PC	2. To PC
7. GLP	6. GLP	6. GLP	7. GLP
1. On	1. On	1. On	1. On
2. Off	2. Off	2. Off	2. Off
8. System	7. System	7. System	8. System
1. Time	1. Time	1. Time	1. Time
2. Date	2. Date	2. Date	2. Date
3. Light off	3. Light off	3. Light off	3. Light off
4. Self test	4. Self test	4. Self test	4. Self test

Set temp.

温度设置

设定手动温度补偿

如果仪表没有连接温度探头,将自动转为手动温度补偿模式,并出现MTC。

不用温度传感器工作时,在该菜单中输入样品的温度(-30 °C至130 °C)。仪表根据此设置温度计算电极斜率并显示用该温度补偿后的测量数值。

注

为了精确测量,推荐使用独立或内置的温度探头。如果使用温度探头,ATC标记和样品温度将被显示出来。

Set meas.

终点格式

用这个菜单可以在三类终点格式间进行选择:

Auto $\overline{A}$ (自动): 自动确定终点是一种根据所用传感器的特性来确定单个读数的结束的特别算法。

0.1 pH 单位分辨率的稳定性判据:

传感器输入的信号在4秒内变化不超过0.6mV;

0.01 pH 单位分辨率的稳定性判据:

传感器输入的信号在6秒内变化不超过0.1mV;

0.001 pH 单位和离子测量的分辨率的稳定性判据:

传感器输入的信号在6秒内变化不超过0.03mV;

1 mV和rel.mV单位分辨率的稳定性判据:

传感器输入的信号在4秒内变化不超过0.5mV;

0.1 mV和rel.mV单位分辨率的稳定性判据:

传感器输入的信号在4秒内变化不超过0.05mV;

"Manual" $\overline{M}$ (手动): 手动确定终点意味着如果用户不用手按 **Read** 键仪表不会结束读数。

"Timed" $\overline{T}$ (定时): 定时确定终点,即当超过设定时间周期时自动结束读数。

注

每一种测量都可以通过按 **Read** 键进行手动终点。仪表将显示 $\overline{M}$ 。

以下表格显示了在测量过程中，终点显示格式。

设定终点方式	开始测量后	信号稳定符号	终点后符号 ¹⁾
自动终点	A	$\overline{A}$	$\overline{A}$
	A	Read $\Rightarrow$	$\overline{M}$
手动终点	M	$\overline{M}$ Read $\Rightarrow$	$\overline{M}$
	M	Read $\Rightarrow$	$\overline{M}$
定时终点	T	$\overline{T}$ $\Rightarrow$	$\overline{T}$
	T	Read $\Rightarrow$	$\overline{M}$

¹⁾ 显示为实际终点的方式，而不是设定的终点方式。

Sensor ID
您可以设定一个8位数字传感器标识符。在GLP模式下，传感器标识符将与其校准和测量值相对应，这样可以用来查阅相应数据。

Set cal.
校准缓冲溶液和离子标准液。
在pH模式下，可以在六组预设校准缓冲溶液组中选择一组，也可以自定义一组校准缓冲溶液（最多可达5个值）。
在Ion模式下可以自定义温度、单位和浓度，最多可定义5个值。详见4.4

注

校准时，如果选择自定义缓冲溶液组，屏幕将显示所设置的缓冲溶液值。确保使用了正确的缓冲溶液，并使缓冲液温度和设定值保持一致。如使用温度探头，当测量温度值与设定值偏离超过0.5°C，将显示错误信息。

校准提示

如果将Calibration reminder选为“ON”，将在经过用户规定的一段时间后(最多9999小时)提示用户执行一次新校准。此时 $\uparrow$ 会闪烁。

校准模式

分段法是获得精确pH 读数的最新方法。校准曲线由连接各独立校准点的线性段组成。
采用线性方法时，校准曲线可通过线性回归进行确定。这种方法首选用于pH值变化比较大的样品

Data log

SG8可在存储器中存储多达200组测量数据。

自动保存

设置这个功能是为了自动将每一个终点读数记录到存储器中。

如果将 “Auto save” 设置为 **Off** ,那么在测量屏幕上出现 **Store** 键。然后通过按这个软键来手动存储测量数据。

定时-间隔读数

选择定时-间隔读数时，在每个设定的时间周期(3 - 9999 秒)将一个读数存储到存储器中。也可通过按 **Read** 键停止读数。当定时-间隔读数处于“开”，屏幕显示DL。

对于超过15分钟的读数,请按 **Ⓢ** 键两秒钟关闭自动关机功能。
在定时-间隔读数模式下工作时,可通过选择适当的终点模式来定义测量周期。

Data output

存储在存储器中的数据可以通过红外线接口传输到梅特勒-托利多打印机RS-P42上或PC软件上(如BalanceLink)。

GLP

当从存储器输出数据时有2种数据格式可供选择: GLP格式或非-GLP格式:

举例

GLP 格式

GLP	On
Date	01-JAN-05 / JAN-01-05
Time	09:31:03
Sample_ID	040914
Result	pH 6.986
mV	5.3 mV
Temperature	25.3 °C
ATC/MTC	ATC
Endpoint	Auto
Sensor_ID	04091401
Last_cal.	09-13-04
Signature	-----

非-GLP 格式

GLP	Off
Result	pH 6.986
Temperature	25.3 °C
ATC/MTC	ATC
Endpoint	Auto

System**关闭背光**

可以定义自动关闭背光的时间 (10s, 15s, 30s)

注

背光功能通过按和放  按钮操作。

自检

此项菜单条目可进行例行的仪器自检。仪表首先全屏显示，然后依次闪烁每一个图标。最后一步是检测每一个按键是否功能正常。检测按键时需要用户按相应的按键。

要求用户以任意次序一个接一个按键盘上的七个功能键：按一个键后，屏幕上的对应图标即消失；继续按其余按键直到所有图标均消失。

当仪表自检成功完成后，返回系统。如果有错误报告，请联系梅特勒-托利多公司技术服务人员。

注

必须在两分钟之内按完所有七个按键，否则将显示“自检失败”，并需要重新执行该过程。

4.7 存储数据处理

4.7.1 菜单结构

按软按键Data, 以调用数据菜单:

1. Meas. Data	(输入测量数据库)
1. Review	(浏览数据)
2. Transfer	(传输数据)
1. Partial	(设置参数以传输来自存储器的部分数据)
2. All	(传输来自存储器的所有数据)
3. Delete	(删除数据)
1. Partial	(设置参数以删除来自存储器的部分数据)
2. All	(删除来自存储器的所有数据)
2. Cal. Data	(输入校准数据库)
1. pH	
1. Current	(浏览/传输当前校准数据)
2. 5 latest	(浏览/传输5个最后校准数据)
2. Ion	
1. Current	(浏览/传输当前校准数据)
2. 5 latest	(浏览/传输5个最后校准数据)

4.7.2 红外接口

SevenGo pro™ 可以传输所有数据或是用户自定义的数据到电脑或是梅特勒-托利多RS-P42打印机。数据传输通过仪表左侧的红外接口进行。

以下说明描述了如何进行操作:

- 从SevenGo pro™ 向RS-P42打印机传输数据是通过IR-RS232适配器进行(订购号51302333)。将RS232一端接到打印机背面相应的接口上, 把仪表的红外窗口对准红外接收装置, 开始数据传输。
- 从SevenGo pro™ 向PC传输数据可通过以下三种不同方式进行:
 - 通过计算机的IrDA interface传输到PC
 - 通过IR-RS232 适配器 (订购号51302333) 传输到PC上
 - 通过IR-USB适配器(订购号51302332) 传输到PC上

安装驱动程序(配置PC的最新驱动程序可以到www.mt.com/pHlab下载)

打开Hyper Terminal 或是 BalanceLink,如下进行数据传输设置:

波特率: 9600 IR-USB / 1200 IR-RS232

数据位: 8

奇偶校验: 无

结束位: 1

信号握手: 无

将适配器连接到PC上并使仪表红外窗口对准接收装置。开始数据传输。

4.8 常规工作模式

SevenGo pro™ 仪表有两种工作模式:

专家模式	仪表的默认设置, 可以使用所有功能
常规模式	所有系统和校准设置都按照专家模式下的设置固化在仪表中。

常规模式下, 仅有以下功能可用:

- 校准和测量
- 编辑手动温度补偿
- 存储、查看和打印数据

激活常规模式

关闭机器。同时按 **Read, Mode** 和右边软按键,, 此时可以选择工作模式。

选择1.常规模式。仪表自动关机。按 **On/Off** 键后开机。此时就可以不用担心修改设置和数据了, 安全地工作了。

激活专家模式

关闭机器, 同时按 **Read, Mode** 和右边软按键。

选择2.专家模式。仪表自动关机。按 **On/Off** 键后开机, 就可以使用所有功能了。

注

两种工作模式的概念是GLP的特征之一, 它可以确保在常规模式下, 重要的设置和数据不会被无意删除。

4.9 出错信息

Self test failed! (自检失败)	重复自检步骤并确保你在两分钟内按完七个按键。如果 “Err 1” 仍然显现, 请给梅特勒-托利多公司技术服务人员打电话。
Meas. out of range! (测量值超出范围)	请检查电极润湿帽是否取下, 电极连接是否正确并放入待测溶液中, 如果仪表未连接电极, 请将短夹插入插座。
Full! (数据存储已满)	数据存储已满
Invalid value! (你输入的值无效)	重新输入一个值 当设置自定义的pH缓冲液组时, 未获得精确pH测量结果, 任何两个缓冲液pH值之间的差不应小于一个pH单位。
Offset out of range! (电极零电位超出范围)	请确认你使用的缓冲液正确并新鲜。 清洁或更换电极。
Slope out of range! (电极斜率超出范围!)	请确认你使用的缓冲液正确并新鲜。 清洁或更换电极。
Wrong buffer! (仪表不能识别缓冲液或标准溶液)	请确认你使用的缓冲液正确并新鲜。 检查在校准过程中是否重复使用同一种缓冲液。
T differs from setting!	(ATC测定温度比自定义的温度值高0.5 °C) 使缓冲液温度保持在设定温度上或更改温度设定值。
Temp. out of range!	(ATC 测定温度超出pH缓冲液范围: 5 °C~50 °C) 使缓冲液温度保持在规定范围内。

5. 维护

5.1 仪表维护

禁止将仪器的壳体分离。

除了偶尔需要用一块湿布擦拭一下外，SevenGo™系列仪表不需要作其他维护保养。

外壳由 (ABS/PC) 塑料制成，会受一些有机溶剂如甲苯、二甲苯和丁酮(MEK)等的侵蚀。如出现上述情况，立即擦去溅到外壳上的此类溶剂。

5.2 电极维护

确保电极始终存放在适当的存储液中。

为了获得最大精度，任何附着或凝固在电极外部的填充液均应用蒸馏水及时除去。

请始终根据厂商规定存放电极，不要使之干涸。

如果电极斜率迅速下降，或者响应速度缓慢，则可用下列步骤解决。根据样品的不同，请尝试下列方法之一

1. 对于油脂类，请用蘸有丙酮或肥皂水的原棉除去电极膜表面的污垢。
2. 如果电极膜干涸，将电极头浸入0.1 M HCl溶液中，放置一夜。
3. 如果在隔膜中有蛋白质积聚，请将电极浸入HCl/胃蛋白酶溶液中除去沉积物(定货号 51340068)。
4. 如果电极发生硫化银污染，请将电极浸入硫脲溶液中除去沉积物(定货号51340070)。

电极处理后请重新校准。

注意

请按毒性或腐蚀性物质的处理条例来处理清洗液或填充液。

5.3 废弃物处理



根据欧洲报废电子电气设备(WEEE)指令(2002/96 EG)的要求,本设备不得与生活垃圾一同处理。依据各国现行法规,这也适用于非欧盟国家。

请根据当地规定将本产品送往专门适于电子电气设备的回收站处理。

如有疑问请咨询主管部门或您购买本设备的代理商。

转让本设备时(例如继续用于个人或工商业用途)请将本规定的内容一并转达。

非常感谢您对环境保护所做的贡献。

6. 选配件

	订货号
SevenGo™ pH计 SG2	
SevenGo™ 电导率仪 SG3	
SevenGo pro™ 电导率仪 SG7	
SevenGo pro™ 溶氧仪 SG6	
InLab® 413 SG (IP67) 3合1 pH 电极, PEEK电极杆	51340288
InLab® 413 SG/10m (IP67) 3合1 pH电极, PEEK电极杆	51340289
LE438 3合1 pH电极, 环氧树脂杆	51340242
ErGo™ (包括适配器和电极管)	51302320
ErGo™ 电极管	51302323
手提箱(空)	51302359
现场附件套件	51302360
防护罩(3个)	51302326
瓶子	51300240
IR-RS232 适配器	51302333
IR-USB 适配器	51302332
RS-P42 打印机	00229265
BalanceLink (数据传输软件)	00237010
腕带	51302331
电池盖	51302328
蓝色端盖	51302324
SevenGo™ 固定夹	51302325
固定夹盖	51302327
SevenGo™ 密封套件	51302336
橡胶支脚(2个)	51302335
野外工作电极支架	51302334
BNC短路插头	51302859
Guide to pH measurement (pH 测量指南)	51300047
Guide to ion selective measurement (离子浓度测量指南)	51300075
pH 4.01 缓冲液袋, 30 x 20 mL	51302069
pH 4.01 缓冲液, 6 x 250 mL	51340058
pH 7.00 缓冲液袋, 30 x 20 mL	51302047
pH 7.00 缓冲液, 6 x 250 mL	51340060
pH 9.21 缓冲液袋, 30 x 20 mL	51302070
pH 9.21 缓冲液, 6 x 250 mL	51300194
pH 10.01 缓冲液袋, 30 x 20 mL	51302079
pH 10.01 缓冲液, 6 x 250 mL	51340231
组合缓冲液(每箱, 10 x 20 mL, 4.01/7.00/9.21)	51302068
组合缓冲液(每箱, 10 x 20 mL, 4.01/7.00/10.01)	51302080
HCl/胃蛋白酶溶液(清除蛋白质污染)	51340068
硫脲溶液(清除硫化银污染)	51340070
pH 电极的活化液	51340073

7. 技术指标

	专业型
计量技术参数	(0.000~14.000) pH (-1999.9~1999.9) mV 0.001级
电子单元测量范围	pH: -2.000...19.999
	-1999.9...1999.9 mV
	ATC: -5...130 °C
	MTC: -30...130 °C
	离子浓度: 0.000...999.9%
	0.000...9999 ppm
	1.00E-9...9.99E+9 mg/L
	1.00E-9...9.99E+9 mmol/L
	1.00E-9...9.99E+9 mol/L
分辨率	0.1/0.01/0.001 pH
	0.1 mV
	0.1 °C
	离子 3 位数
误差极限	± 0.002 pH
	± 0.2 mV
	± 0.2 °C
误差极限离子计	± 0.5% (只是对于仪表)
pH校准	1,2,3,4 或 5点
等电位点	pH 7.00
标准缓冲液	6个固定组
	3~5个用户自定义缓冲液
输出	IrDA
电源要求	额定值 6 V DC, 70 mA 电池 4 x AA/LR6, 1.5 V 或 NiMH, 1.2 V 可充电的
尺寸/重量	220 x 90 x 45 mm / 0.33 kg
显示器	液晶显示器
pH输入	BNC (IP67), 阻抗 > 10 ¹² Ω
温度输入	Cinch (IP67), NTC 30 kΩ
IP等级	IP67
电池寿命	> 500 小时 (不开背光)
环境条件	环境温度: 5...40 °C
	相对湿度: 5%...80% (不冷凝)
	安装类别: II
	污染等级: 2
材料	外壳: ABS/PC 增强型
	窗口: 聚甲基丙烯酸甲酯 (PMMA)
	按键: 硅橡胶

8. 附录

8.1 缓冲液组

SevenGo™ pH 仪表用下表中所列出的值来自动校准设定温度

缓冲液组 1 (参比温度25 °C) MT US

5	7.09	4.00	10.25	1.67
10	7.06	4.00	10.18	1.67
15	7.04	4.00	10.12	1.67
20	7.02	4.00	10.06	1.68
25	7.00	4.00	10.01	1.68
30	6.99	4.01	9.97	1.68
35	6.98	4.02	9.93	1.69
40	6.97	4.03	9.89	1.69
45	6.97	4.04	9.86	1.70
50	6.97	4.06	9.83	1.71

缓冲液组 2 (参比温度25 °C) MT Europe

5	7.09	4.01	9.45	2.02	11.72
10	7.06	4.00	9.38	2.01	11.54
15	7.04	4.00	9.32	2.00	11.36
20	7.02	4.00	9.26	2.00	11.18
25	7.00	4.01	9.21	2.00	11.00
30	6.99	4.01	9.16	1.99	10.82
35	6.98	4.02	9.11	1.99	10.64
40	6.97	4.03	9.06	1.98	10.46
45	6.97	4.04	9.03	1.98	10.28
50	6.97	4.06	8.99	1.98	10.10

缓冲液组 3 (参比温度20 °C) Merck

5	7.07	4.04	9.16	2.01	12.41
10	7.05	4.02	9.11	2.01	12.26
15	7.02	4.01	9.05	2.00	12.10
20	7.00	4.00	9.00	2.00	12.00
25	6.98	4.01	8.95	2.00	11.88
30	6.98	4.01	8.91	2.00	11.72
35	6.96	4.01	8.88	2.00	11.67
40	6.95	4.01	8.85	2.00	11.54
45	6.95	4.01	8.82	2.00	11.44
50	6.95	4.00	8.79	2.00	11.33

缓冲液组 4 (参比温度 25 °C) JIS Z 8802

5	1.668	3.999	6.951	9.395
10	1.670	3.998	6.923	9.332
15	1.672	3.999	6.900	9.276
20	1.675	4.002	6.881	9.225
25	1.679	4.008	6.865	9.180
30	1.683	4.015	6.853	9.139
35	1.688	4.024	6.844	9.102
40	1.694	4.035	6.838	9.068
45	1.700	4.047	6.834	9.038
50	1.707	4.060	6.833	9.011

缓冲液组 5 (参比温度 25 °C) DIN 19266

5	1.668	4.004	6.950	9.392	13.207
10	1.670	4.001	6.922	9.331	13.003
15	1.672	4.001	6.900	9.277	12.810
20	1.676	4.003	6.880	9.228	12.627
25	1.680	4.008	6.865	9.184	12.454
30	1.685	4.015	6.853	9.144	12.289
35	1.691	4.026	6.845	9.110	12.133
40	1.697	4.036	6.837	9.076	11.984
45	1.704	4.049	6.834	9.046	11.841
50	1.712	4.064	6.833	9.018	11.705

缓冲液组 6 (参比温度 25 °C) DIN 19267

5	1.08	4.67	6.87	9.43	13.63
10	1.09	4.66	6.84	9.37	13.37
15	1.09	4.66	6.82	9.32	13.16
20	1.09	4.65	6.80	9.27	12.96
25	1.09	4.65	6.79	9.23	12.75
30	1.10	4.65	6.78	9.18	12.61
35	1.10	4.65	6.77	9.13	12.45
40	1.10	4.66	6.76	9.09	12.29
45	1.10	4.67	6.76	9.04	12.09
50	1.11	4.68	6.76	9.00	11.98

8.2 误差限

讯息描述	不可接受范围
测量值超出范围	pH: < -2.000 或 > 19.999 mV: < -1999 或 > 1999 Ion: < 1.00E-9 或 > 9.99E+9 [mmol/L], [mol/L], [mg/L] Ion: < 0.000 或 999.9 % Ion: < 0.000 或 999.9 ppm
测定温度超出pH缓冲液范围	T [°C]: < 5 或 > 50
电极零电位超出范围	Eref1-Eb > 60 mV
电极斜率超出范围	Eref1-Eb > 60 mV
电极零电位超出范围	ΔEref1 < 10 mV for pH ΔEref1 < 1 mV for Ion
ATC 测定温度比自定义温度值高	t _{ATC} -t _{buffer} > 0.5 °C

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1. Introduction

Thank you for purchasing this high quality METTLER TOLEDO portable meter. Electrochemistry in motion – that is our motto. And with the SevenGo™ portable line we really mean it.

SevenGo™ is much more than just a series of portable meters with an excellent price/performance ratio. It is an ingenious concept that includes many exciting new features:

- IP67 rating: this applies to the instrument itself as well as to the sensors and the connections;
- optimum ease of use, making the operating instructions primarily a source of reference;
- excellent ergonomics, as if the instrument were part of you;
- option for regular equipment qualification, giving you full confidence that your measurement results are always accurate;
- useful accessories such as the electrode clip, the protecting cover, the new washable carry case, as well as the optional field assistant, ErGo – the ultimate aid for all measurements in the plant as well as in the field.

2. Safety measures

Measures for your protection



- Never work in an environment subject to explosion hazards! The housing of the instrument is not gas tight (explosion hazard due to spark formation, corrosion caused by the ingress of gases).

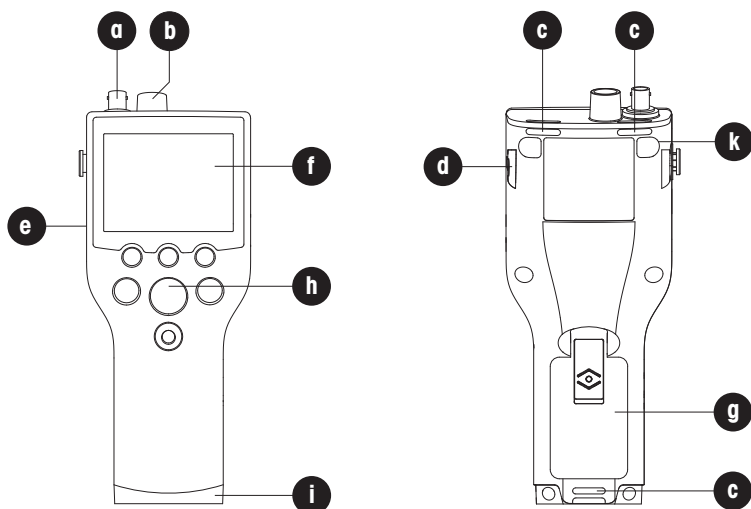


- When using chemicals and solvents, comply with the instructions of the producer and the general lab safety rules!

Measures for your operational safety



- Do not unscrew the two halves of the housing.
- Have the instrument serviced only by METTLER TOLEDO Service!
- Dry off any liquids sprayed immediately! The instrument is not watertight.
- Exclude the following environmental influences:
 - powerful vibrations,
 - direct sunlight,
 - atmospheric humidity greater than 80%,
 - corrosive gas atmosphere,
 - temperatures below 5 °C and above 40 °C,
 - powerful electric or magnetic fields,
 - altitude above than 4000m!



a BNC socket for mV/pH signal input

b Cinch socket for temperature signal input

c Slots for attaching the wrist strap

d Fixing points for SevenGo™ clip (on both sides of the meter)

e Infrared (IrDA) window

f Display

g Battery cover (51302328)

h Rubber key pad

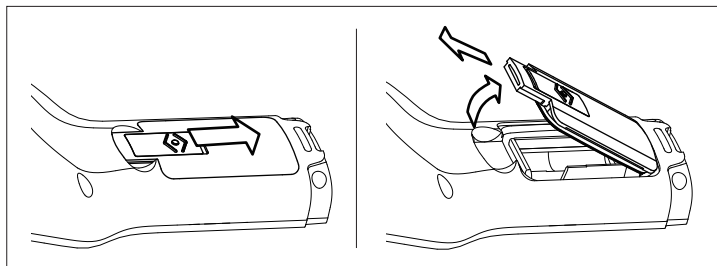
i Bottom cap (51302324) blue cover over the field assistant's fixing point

k Rubber feet fixing points

3. Installation

Carefully unpack the meter. Keep the calibration certificate in a safe place.

3.1 Installing / removing the batteries

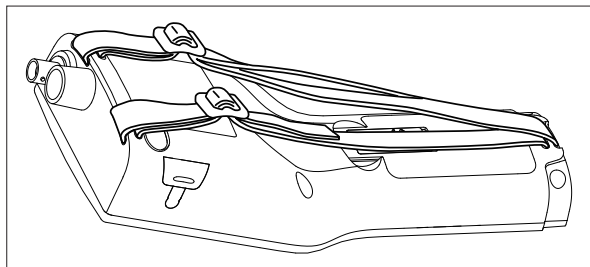


1. Push the button on the Battery cover in the direction of the arrow, hold the lid with two fingers and remove it;
2. Insert the batteries in the battery compartment, as shown; remove batteries from the battery compartment;
3. Replace the Battery cover, and push back the button to fix the lid in place.

Note

The IP67 rating requires the battery compartment to be perfectly sealed. The sealing ring around the Battery cover must be replaced if it is damaged in any way (SevenGo™ Sealing Kit, 51302336).

3.2 Fitting the wrist strap



Fit the wrist strap as shown in the diagram.

3.3 SevenGo™ clip (optional)

The SevenGo™ Clip (51302325) is an electrode holder that can be placed next to the display on either side of the housing. To mount the clip, remove the cover over the clip's fixing point using your thumbnail. Then attach the clip by pressing it into the recess. Slide the shaft of the sensor into the clip from top. You can switch between the storage and working positions by rotating the sensor around the clip's axis.

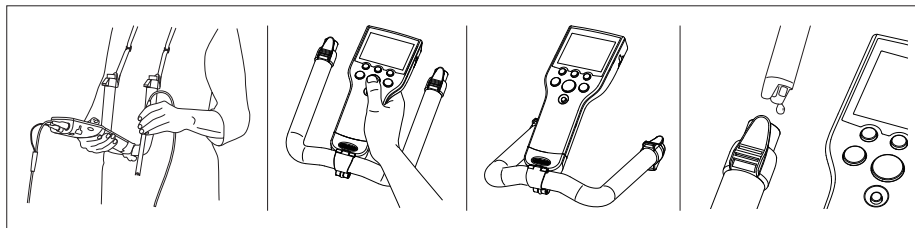
3.4 Field carry case (optional)

The portable carry case (51302359) is not just a device for transporting your measuring equipment, it is also ideal for use as a portable workbench. The meter can be placed in the carry case during the measurement.

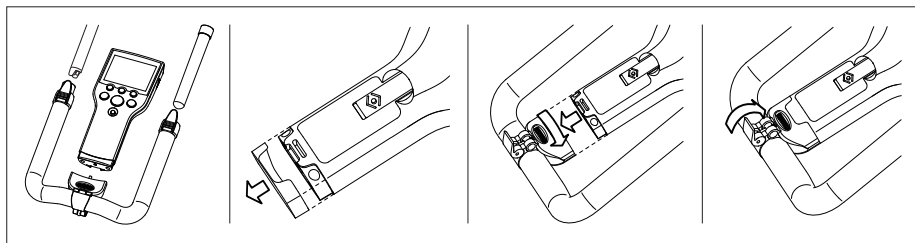
The field accessory kit (51302360) with electrode clip, protective cover and wrist strap completes your equipment. It allows you to make full use of the different possibilities offered by the system and facilitates operation.

3.5 ErGo™ field assistant (optional)

The ErGo™ (51302320) protects your instrument from shocks and allows you to safely store your electrode(s). It is the perfect accessory for carrying and measuring in the plant or field, and for working comfortably when the meter is placed on a table or on the ground.

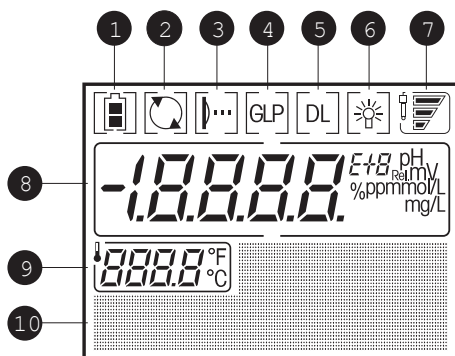


1. Remove the blue bottom cap (51302324) at the base of the meter;
2. Screw the ErGo™ adapter (51302337) onto the meter;
3. Mount the ErGo™ as shown;
4. Fit the neck strap (51302321) to both ends of the ErGo™.



4. Operating the SG8 pH meter

4.1 The display



- 1 Battery status shows the condition of the batteries – fully charged, half-charged or fully discharged. (To replace batteries see Section 3.1)
- 2 Auto-off override, in default operation, the meter switches itself off after 15 minutes to prolong battery life. After switching off/on the auto-off is active again
- 3 IrDA infrared interface for data transfer to printer or PC (See Section 4.7)
- 4 GLP print-out is activated (See end of Section 4.6)
- 5 Data Logging, timed interval reading is active, data is transferred to memory at a user-defined interval
- 6 Backlighting, meter switches on backlighting when any key is pressed
- 7 Electrode condition (for electrode maintenance, see Section 5.2)



Slope: 95-105%
Offset: $\pm(0-15)$ mV
Electrode is in
good condition



Slope: 90-94%
Offset: $\pm(15-35)$ mV
Electrode needs
cleaning



Slope: 85-89%
Offset: $\pm(>35)$ mV
Electrode is faulty



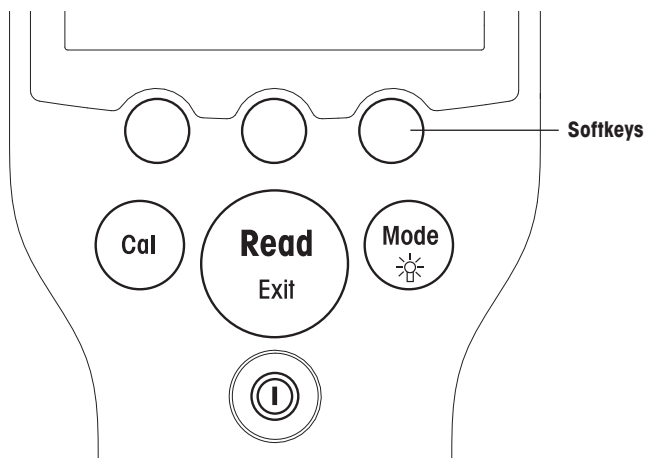
The frame blinks when the calibration reminder is on and a calibration is due.

8 pH/mV/concentration reading

9 Temperature

10 Dot matrix area

4.2 Key controls



	Press and release 	Press and hold for 2 seconds 
	- Meter on/off	- Switch on/off auto-off override (switches off the meter after 15 minutes)
	- Start or endpoint measurement - Back to measurement mode (ignore the input)	
	- Start calibration	
	- Switch between pH, mV, rel. mV and ion concentration modes	- Backlighting: on/off (when backlighting is on, the meter switches on backlighting at the stroke of any key for a user defined period of 10, 15 or 30 seconds.)

4.3 Operation with softkeys

The SevenGo pro™ SG8 pH meter has three softkeys. The functions assigned to them change during operation depending on the application. The assignment is shown on the bottom line of the screen.

Example: In the a measurement screen, the three softkeys are assigned as follows:

Menu	Store	Data
Activate menu setting	Store an endpointed measurement	Activate "Data" menu

The other soft key functions are as follows:

	Move one digit to the right	+	Increase value by one
Enter	Enter the highlighted menu Accept the entered value	Exit	One level up in the menu tree
Select	Select the highlighted function		Scroll through the menu
Edit	Change the settings	Back	One step back in the procedure
End	Store and quit menu	Next	One step forward in the procedure
Save	Save the calibration data	Trans	Transfer data to printer or PC
Delete	Delete the selected data	Yes	Confirm deletion

4.4 Calibration

The SevenGo pro™ SG8 pH/ORP/ION Meter allows you to perform calibrations with up to five points.

4.4.1 pH settings

If you select your calibration buffer group from one of the six predefined buffer groups in the meter, the buffers are automatically recognized and displayed during calibration (auto buffer recognition).

The six predefined buffer groups are:

1	MT US	1.68	4.00	7.00	10.01		(at 25 °C)
2	MT Europe	2.00	4.01	7.00	9.21	11.00	(at 25 °C)
3	Merck	2.00	4.00	7.00	9.00	12.00	(at 20 °C)
4	JIS Z 8802	1.679	4.008	6.865	9.180		(at 25 °C)
5	DIN 19266	1.679	4.006	6.865	9.180	12.454	(at 25 °C)
6	DIN 19267	1.09	4.65	6.79	9.23	12.75	(at 25 °C)

Tables (B1...B6) for automatic temperature compensation are programmed in the meter for each buffer (see also Appendix).

You can also follow the buffer setting procedure described below to define your own buffer group, but in this case auto buffer recognition does not work during calibration.

4.4.2 Setting a customized buffer group

- In the pH menu enter "4. Set Cal", enter "1. Buffer" and select "7. Customized".
- Edit the temperature of the pH buffers.
- Press **Enter** to save the value.
- Enter the pH value of your first buffer. Press **Enter** to save the value.
- Press **Next** to enter the next buffer, press **Back** to re-enter the current buffer value or press **End** to finish setting.
- After you have made the settings, the temperature and buffers entered are shown on the display. Quit the menu and start the calibration.

4.4.3 Setting ion concentration standards

SevenGo pro™ SG8 pH/ORP/ION Meter allows you to calibrate using one of the following concentration units:

1. mmol/L
2. mol/L
3. ppm
4. mg/L
5. %

- In the ion menu enter "4. Set Cal", enter "1. Standard" and press **Edit** to start setting.
- Select the concentration unit in which you have prepared the standards.
- Enter the temperature of the standards.
- Press **Enter** to save the value.
- Enter the concentration of the standards.
- Press **Enter** to save the value
- Press **Next** to enter the next standard, press **Back** to re-enter the current standard or press **End** to finish setting.
- After you have made the settings, the temperature and buffers entered are shown on the display. Quit the menu and start the calibration.

4.4.4 Performing a calibration

- Place the electrode in a calibration buffer and press **Cal**.
- The meter endpoints according to the preselected endpoint format or after pressing **Read**.
- Rinse the electrode with deionized water.
- Place the electrode in the second calibration buffer and press **Cal**.
- Repeat the procedure for all of your calibration buffers.
- End the calibration by pressing the **End** softkey. The calibration data is shown on the display.
- To use the calibration data for later measurements, press **Save**. To discard the calibration data, press **Cancel**.

Note

- To ensure accurate pH or ion concentration readings, you should perform a calibration regularly.
- We recommend the use of a temperature sensor or an electrode with a built-in temperature probe.
- For ion measurements, or some cases in pH measurements, you can use the MTC mode. You should then keep all buffers or standard solutions and sample solutions at the same set temperature.

4.5 Sample measurement

4.5.1 Performing a pH measurement

Place the electrode in the sample and press **Read** to start the measurement: the decimal point blinks. The display shows the pH of the sample. The automatic endpoint **A** is the default setting of the meter.

Select the automatic, manual or timed endpointing method in the menu under "2. Set meas." in "1. EP Format".

To manually endpoint a measurement press **Read**, the display freezes and $\overline{M}$ appears.

If the timed endpointing method is selected, the display freezes automatically after the set time has elapsed and $\overline{T}$ appears.

Note

For stability criterion of automatic endpoint algorithm (**A**) see Section 4.6.

4.5.2 Performing a mV/rel. mV measurement

To change to mV mode press **Mode** repeatedly until the mV or rel. mV unit is shown.

To perform a mV measurement, follow the same procedure as for pH measurement.

4.5.3 Performing an ion measurement

To change to ion measurement mode press **Mode** repeatedly until the preset unit for ion measurement is shown.

To perform an ion measurement, follow the same procedure as for pH measurement.

4.6 Menus for pH/mV/Rel. mV/Ion measurement

The SevenGo pro™ SG8 pH meter allows you to perform four different types of measurement: pH, mV, Rel. mV and Ion. To switch to the measurement mode required, press **Mode**.

Menu structure

pH	mV	Rel. mV	Ion
1. Set temp.	1. Set temp.	1. Set temp.	1. Set temp.
1. MTC temp.	1. MTC temp	1. MTC temp	1. MTC temp
2. Temp. unit	2. Temp. unit	2. Temp. unit	2. Temp. unit
1. °C	1. °C	1. °C	1. °C
2. °F	1. °F	1. °F	1. °F
2. Set. meas.	2. Set. meas.	2. Set. meas.	2. Set. meas.
1. EP format	1. EP format	1. EP format	1. EP format
1. Auto	1. Auto	1. Auto	1. Auto
2. Manual	2. Manual	2. Manual	2. Manual
3. Timed	3. Timed	3. Timed	3. Timed
2. Resolution	2. Resolution	2. Resolution	2. Ion type
1. X.X	1. X	1. X	1. Na ⁺
2. X.XX	2. X.X	2. X.X	2. K ⁺
3. X.XXX		3. R. mV offset	3. NO ₃ ⁻
			4. Cl ⁻
			5. F ⁻
			6. NH ₄ ⁺
			7. Ion ⁺
			8. Ion ⁻
			9. Ion2 ⁺
			10. Ion2 ⁻
3. Sensor ID	3. Sensor ID	3. Sensor ID	3. Sensor ID
4. Set cal.			4. Set cal.
1. Buffer			1. Standard
1. MT US			
2. MT Europe			
3. Merck			
4. JIS Z 8802			
5. DIN / NIST			
6. DIN 19267			
7. Customized			
2. Cal. Remind			2. Cal. Remind
1. Off			1. Off
2. On			2. On
3. Cal. Mode			3. Cal. Mode
1. Segment			1. Segment
2. Linear			2. Linear
5. Data log	4. Data log	4. Data log	5. Data log
1. Auto save	1. Auto save	1. Auto save	1. Auto save
1. Off	1. Off	1. Off	1. Off
2. On	2. On	2. On	2. On
2. T- int. read	2. T- int. read	2. T- int. read	2. T- int. read
1. Off	1. Off	1. Off	1. Off
2. On	2. On	2. On	2. On

6. Data output	5. Data output	5. Data output	6. Data output
1. To printer	1. To printer	1. To printer	1. To printer
2. To PC	2. To PC	2. To PC	2. To PC
7. GLP	6. GLP	6. GLP	7. GLP
1. On	1. On	1. On	1. On
2. Off	2. Off	2. Off	2. Off
8. System	7. System	7. System	8. System
1. Time	1. Time	1. Time	1. Time
2. Date	2. Date	2. Date	2. Date
3. Light off	3. Light off	3. Light off	3. Light off
4. Self test	4. Self test	4. Self test	4. Self test

Set temp.

Set MTC temperature

If the meter does not detect a temperature probe, it automatically switches to the manual temperature compensation mode and MTC appears. In this case the temperature of the sample has to be entered in the Set MTC menu (-30 °C to 130 °C). The meter calculates the temperature-adjusted electrode slope using this temperature and shows the temperature-compensated value in the measurement display.

Note

For better accuracy, we recommend the use of either a built-in or a separate temperature probe. If a temperature probe is used, **ATC** and the sample temperature are displayed.

Set meas.

EP format

With this menu you can choose between one of three different types of endpoint formats:

"Auto"

Automatic endpoint $\overline{A}$ is a special algorithm that determines the end of an individual reading, depending on the behavior of the sensor used.

Stability criterion for resolution of 0.1 pH units

The signal of the sensor input must not change by more than 0.6 mV in 4 seconds.

Stability criterion for resolution of 0.01 pH units

The signal of the sensor input must not change by more than 0.1 mV in 6 seconds.

Stability criterion for resolution of 0.001 pH units and ion measurement

The signal of the sensor input must not change by more than 0.03 mV in 6 seconds.

Stability criterion for resolution of 1 mV, rel. mV units

The signal of the sensor input must not change by more than 0.5 mV in 4 seconds.

Stability criterion for resolution of 0.1 mV, rel. mV units

The signal of the sensor input must not change by more than 0.05 mV in 4 seconds.

"Manual"

Manual endpoint $\overline{M}$ means the meter never endpoints the reading unless the user manually presses **Read**.

"Timed"

With the timed endpoint $\overline{T}$, the reading is ended automatically when the set time period has elapsed.

Note

Every measurement can be endpointed manually by pressing **Read**. The meter then displays $\overline{M}$.

The table below shows how the endpoint format is displayed in the course of the measurement.

Preselected format	Start of measurement	Signal stability	Endpointed measurement ¹⁾
Auto endpoint	A	$\overline{A}$	$\overline{A}$
	A	Read $\Rightarrow$	$\overline{M}$
Manual endpoint	M	$\overline{M}$ Read $\Rightarrow$	$\overline{M}$
	M	Read $\Rightarrow$	$\overline{M}$
Timed endpoint	T	$\overline{T}$  $\Rightarrow$	$\overline{T}$
	T	Read $\Rightarrow$	$\overline{M}$

¹⁾ The endpoint format actually used (last column) and not that preselected is stored with the data.

Sensor ID

You can set an 8-digit, numerical sensor ID. In the GLP mode, the sensor ID will be assigned to each calibration and measurement value. This allows you to trace back data.

Set cal.**Buffer**

In pH mode you can choose one of 6 different predefined buffer groups. You can also define your own buffer group (up to 5 buffers).

In the ion mode, you can define temperature, units and concentrations for up to 5 ion standards. For more details, see Section 4.4.

Note

When using a user-defined buffer group in the calibration, the screen will display the buffer value you set. Make sure that you use the correct buffer. You should also keep the buffer temperature at the set value. When using a temperature probe, if the temperature measured differs by more than 0.5 °C from the set value, an error message is shown.

Calibration Reminder

If you choose calibration reminder "ON", you are reminded to perform a new calibration after a certain user defined interval (maximum 9999 h) has elapsed. In this case $\overline{t}$ blinks.

Calibration mode

If high pH accuracy is required, the segment method is recommended. The calibration curve is made up of linear segments joining the individual calibration points.

With the linear method, the calibration curve is determined using linear regression. This method is recommended for samples with widely varying pH values.

Data log

The SG8 is designed to store up to 200 sets of measurement data in the memory.

Auto Save

"Auto Save" logs automatically every endpointed reading ($\bar{A}$, $\bar{M}$ and $\bar{T}$) to the memory.

If "Auto Save" is set to **Off**, the **Store** softkey appears in the measuring screen. You can then manually store endpointed data by pressing this softkey.

T-int. read (Timed-interval reading)

With timed-interval reading, a reading is stored to memory every time after a certain interval (3 – 9999 s) defined in the menu has elapsed. You may stop the reading by pressing **Read**. When timed-interval reading is "on", DL is shown on the display.

For readings lasting longer than 15 minutes, switch off the auto-off function by pressing and holding down $\odot$ for two seconds.

When working in the timed-interval reading mode, you can define the length of the measurement period by selecting the appropriate endpoint mode ($\bar{A}$, $\bar{M}$ and $\bar{T}$) in the menu "2. Set. meas." under the item "1. EP format".

Data output

Data stored in the instrument's memory can be transferred to the METTLER TOLEDO RS-P42 printer or PC software (e.g. using BalanceLink) via the infrared interface.

GLP

You can choose between two different data formats when outputting the data from memory: GLP ON or GLP OFF:

Examples

GLP format

GLP	On
Date	01-JAN-05 / JAN-01-05
Time	09:31:03
Sample_ID	040914
Result	pH 6.986
mV	5.3 mV
Temperature	25.3 °C
ATC/MTC	ATC
Endpoint	Auto
Sensor_ID	04091401
Last_cal.	09-13-04
Signature	_____

Non-GLP format

GLP	Off
Result	pH 6.986
Temperature	25.3 °C
ATC/MTC	ATC
Endpoint	Auto

System**Light off**

You can define the time (10 s, 15 s, 30 s) after which backlighting automatically switches off.

Note

The light function can be turned on/off by pressing and holding down .

Self test

This menu item starts the self-diagnosis routine. The meter displays the full screen first, then each icon blinks one after the other. This allows you to check whether all the icons are correctly displayed. The final step is to check that the function keys are working properly. This requires user interaction.

You are now requested to press the seven function keys on the keypad one by one in any order. Each time you press a key, an icon disappears from the display. Continue to press the other keys until all the icons have disappeared.

When self-diagnosis has been successfully completed, the meter returns to the system menu. If error messages appear, contact METTLER TOLEDO Service.

Note

You have to finish pressing all the seven keys within two minutes, otherwise "Self test failed!" appears, and you will have to repeat the procedure.

4.7 Handling your stored data

4.7.1 Menu structure

To access the memory, press the **Data** softkey.

1. Meas. Data	(Enter measurement database)
1. Review	(Review data)
2. Transfer	(Transfer data)
1. Partial	(Set parameter to transfer part of data from memory)
2. All	(Transfer all data from memory)
3. Delete	(Delete data)
1. Partial	(Set parameter to delete part of data from memory)
2. All	(Delete all data from memory)
2. Cal. Data	(Enter calibration database)
1. pH	
1. Current	(Review/transfer current calibration data)
2. 5 latest	(Review/transfer 5 latest calibration data)
2. Ion	
1. Current	(Review/transfer current calibration data)
2. 5 latest	(Review/transfer 5 latest calibration data)

4.7.2 Infrared interface

With SevenGo pro™ it is possible to transfer either all data or a user defined set of data from the memory to a METTLER TOLEDO RS-P42 printer or to a PC. The data is transferred via the IR interface on the left side of the meter.

The following descriptions describes how to proceed with the different configurations:

- Data transfer from SevenGo pro™ to an RS-P42 printer is done using an IR-RS232 adapter (51302333). To prepare for data transfer connect the RS232 plug to the corresponding interface on the backside of the printer. Point the instrument's IR window toward the IR receiver on the other end of the adapter cable. Start data transfer in the data menu.
- For data transfer from SevenGo pro™ to a PC, there are three different possibilities:
 - direct transfer via an IrDA interface on your PC
 - transfer via IR-RS232 adapter (51302333)
 - via IR-USB adapter (51302332)

Install the driver software (the latest drivers required to configure your PC can be downloaded from www.mt.com/pHlab).

Open Hyperterminal or BalanceLink. Adjust the settings for data transfer as follows:

Baud rate: 9600 IR-USB / 1200 IR-RS232
 Data bits: 8
 Parity: none
 Stop bits: 1
 Handshake: none

Connect the adapter to the PC and/or point the IR window of the meter to the IR receiver. Start the data transfer by selecting the transfer item in the data menu.

4.8 Working in the routine mode

The SevenGo pro meter has two working modes:

Expert mode	The default setting enables all functions of the meter
Routine mode	All system and calibration settings are fixed according to what was defined in the expert mode.

In the routine mode the meter only allows the following functions:

- Calibrating and measuring
- Editing the MTC temperature
- Storing, viewing and printing data

Activation of the routine mode

To change to the routine mode, switch off the meter. Press **Read, Mode** and the **right** softkey simultaneously. The meter now allows you to select the working mode.

Select "1. Routine" and confirm by pressing **Select**. The meter switches itself off automatically. Switch on the meter by pressing **On/Off**. From now on you can work safely without the risk of unintentionally changing settings or deleting data.

Activation of expert mode

To enable all functions, switch off the meter and press **Read, Mode** and the **right** softkey simultaneously. Select "2. Expert" and confirm by pressing **Select**. The meter switches itself off automatically.

Switch on the meter by pressing **On/Off**. You now have access to all menu functions again.

Note

The concept of the two working modes is a GLP feature that ensures that important settings or stored data cannot be unintentionally changed under routine working conditions.

4.9 Error messages

Self test failed!		Repeat the self-diagnosis procedure and make sure that you finish pressing all seven keys within two minutes. If "Self test failed!" still appears, call METTLER TOLEDO Service.
Meas. out of range!	Measured value out of range	Make sure the electrode wetting cap has been removed and that the electrode is properly connected and placed in the sample solution. If no electrode is connected, put the shorting clip in the socket.
Full!	Data memory is full	Go to "Data" to delete data, otherwise you will not be able to store new measurement data.
Invalid value!	The value you entered is invalid	Reenter a value.
Offset out of range!		Make sure you have the correct buffer and that it is fresh. Clean or replace the electrode.

Slope out of range!		Make sure you have the correct buffer and that it is fresh. Clean or replace the electrode.
Wrong buffer!	Meter cannot recognize the buffer or standard	Make sure you have the correct buffer and that it is fresh. Make sure that the buffer has not been used more than once during the calibration.
T differs from setting!	ATC measured temperature differs by more than 0.5 °C from the user-defined value	Keep the buffer or sample at the set temperature or change the temperature setting.
Temp. out of range!	ATC measured temperature is out of pH calibration buffer range: 5 °C...50 °C	Keep the buffer temperature within the range.

5. Maintenance

5.1 Meter maintenance

Never unscrew the two halves of the housing.

The SevenGo™ series instruments do not require any maintenance other than an occasional wipe with a damp cloth and the replacement of dead batteries.

The housing is made of acrylonitrile butadiene styrene/polycarbonate (ABS/PC). This material is attacked by some organic solvents, such as toluene, xylene and methyl ethyl ketone (MEK). Any spillage should be immediately wiped off.

5.2 Electrode maintenance

Make sure the electrode is always stored in an appropriate storage solution.

For maximum accuracy, any filling solution that may have "crept" and encrusted the outside of the electrode should be removed with deionized water.

Always store the electrode according to the manufacturer's instructions and do not allow it to dry out.

If the electrode slope falls rapidly, or if the response becomes sluggish, the following procedures may help.

Try one of the following, depending on your sample.

1. For fat or oil build-up, degrease the membrane with cotton wool soaked in either acetone or a soap solution.
2. If the sensor membrane has dried out, soak the tip of the electrode in 0.1 M HCl overnight.
3. If protein build-up has occurred in the diaphragm, remove deposits by soaking the electrode in an HCl /pepsin solution (51340068).
4. If silver sulfide contamination has occurred, remove the deposits by soaking the electrode in a solution of thiourea (51340070).

After treatment a new calibration should be performed.

Note

Cleaning and filling solutions should be handled with the same care as that given to toxic or corrosive substances.

5.3 Disposal



In conformance with the European Directive 2002/96/ EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.

If you have any questions, please contact the responsible authority or the distributor from which you purchased this device.

Should this device be passed on to other parties (for private or professional use), the content of this regulation must also be related.

Thank you for your contribution to environmental protection.

6. Accessories

	Order No.
SevenGo™ pH meter SG2	
SevenGo™ conductivity meter SG3	
SevenGo pro™ conductivity meter SG7	
SevenGo pro™ dissolved oxygen meter SG6	
InLab®413 SG (IP67) 3-in-1 pH electrode, PEEK shaft	51340288
InLab®413 SG/10m (IP67) 3-in-1 pH electrode, PEEK shaft	51340289
LE438 3-in-1 pH electrode, epoxy shaft	51340242/C
ErGo™ Field assistant (incl. adapter and ErGo™ electrode tube)	51302320
ErGo™ Electrode tube	51302323
Portable carry case (empty)	51302359
Field case accessory kit (Field electrode arm, protective cover, clip, 4 bottles)	51302360
Rubber holster	51302322
Plastic sample bottle	51300240
IR-RS232 adapter	51302333
IR-USB adapter	51302332
RS-P26 printer	11124313-CN
LabX direct pH	51302876
Wrist strap	51302331
Battery cover	51302328
Bottom cap blue	51302324
SevenGo™ clip	51302325
Clip cover	51302327
SevenGo™ sealing kit (sealing rings for battery case and electrode plugs)	51302336
Rubber feet (2 pcs.)	51302335
Field electrode arm	51302334
Shorting plug BNC	51302859
pH 4.01 buffer sachets, 30 x 20 mL	51302069
pH 4.01 buffer solution, colour red, 6 x 250 mL	51340058
pH 7.00 buffer sachets, 30 x 20 mL	51302047
pH 7.00 buffer solution, colour green, 6 x 250 mL	51340060
pH 9.21 buffer sachets, 30 x 20 mL	51302070
pH 9.21 buffer solution, colour blue, 6 x 250 mL	51300194
pH 10.01 buffer sachets, 30 x 20 mL	51302079
pH 10.01 buffer solution, colourless, 6 x 250 mL	51340231
Rainbow I (3 x 10 sachets 20 mL, 4.01/7.00/9.21)	51302068
Rainbow II (3 x 10 sachets 20 mL, 4.01/7.00/10.01)	51302080
HCl/pepsin solution (removes protein contamination)	51340068
Thiourea solution (removes silver sulfide contamination)	51340070
Reactivation solution for pH electrodes	51340073

7. Specifications

SevenGo pro™ pH/ORP/Ion meter SG8	
Measurement range	pH: -2.000...19.999
	-1999.9...1999.9 mV
	ATC: -5...130 °C
	MTC: -30...130 °C
	Ion: 0.000...999.9%
	0.000...9999 ppm
	1.00E-9...9.99E+9 mg/L
	1.00E-9...9.99E+9 mmol/L
	1.00E-9...9.99E+9 mol/L
Resolution	0.1/0.01/0.001 pH
	0.1 mV
	0.1 °C
	Ion 3 or 4 digits
Limits of error pH	± 0.002 pH
	± 0.2 mV
	± 0.2 °C
Limits of error Ion	± 0.5% (this limit only applies for meter)
pH calibration	up to 5 points
Isopotential point	pH 7.00
Calibration buffer	6 predefined groups
	1 user-defined group of 5 buffers
Output	IrDA
Power requirements	Ratings: 6 V DC, 70 mA
	Batteries: 4 x AA/LR6 1.5 V or NiMH 1.2 V rechargeable
Size/Weight	220 x 90 x 45 mm / 0.33 kg
Display	Liquid crystal
pH input	BNC (IP67), impedance $>10^{12} \Omega$
T input	Cinch (IP67), NTC 30K Ω
IP rating	IP67 with and without electrode
Battery life	> 500 working hours (with no backlighting)
Ambient conditions	Temperature: 5...40 °C
	Relative humidity: 5%...80% (non-condensing)
	Installation category: II
	Pollution degree: 2
Materials	Housing: ABS/PC reinforced
	Window: polymethylmethacrylate (PMMA)
	Keypad: silicone rubber

8. Appendix

8.1 Buffer tables

SevenGo™ pH Meters automatically correct for the temperature dependence of the buffer pH using the values given in the tables:

Buffer Set 1 (ref. 25 °C) MT US

5	7.09	4.00	10.25	1.67
10	7.06	4.00	10.18	1.67
15	7.04	4.00	10.12	1.67
20	7.02	4.00	10.06	1.68
25	7.00	4.00	10.01	1.68
30	6.99	4.01	9.97	1.68
35	6.98	4.02	9.93	1.69
40	6.97	4.03	9.89	1.69
45	6.97	4.04	9.86	1.70
50	6.97	4.06	9.83	1.71

Buffer Set 2 (ref. 25 °C) MT Europe

5	7.09	4.01	9.45	2.02	11.72
10	7.06	4.00	9.38	2.01	11.54
15	7.04	4.00	9.32	2.00	11.36
20	7.02	4.00	9.26	2.00	11.18
25	7.00	4.01	9.21	2.00	11.00
30	6.99	4.01	9.16	1.99	10.82
35	6.98	4.02	9.11	1.99	10.64
40	6.97	4.03	9.06	1.98	10.46
45	6.97	4.04	9.03	1.98	10.28
50	6.97	4.06	8.99	1.98	10.10

Buffer Set 3 (ref. 20 °C) Merck

5	7.07	4.04	9.16	2.01	12.41
10	7.05	4.02	9.11	2.01	12.26
15	7.02	4.01	9.05	2.00	12.10
20	7.00	4.00	9.00	2.00	12.00
25	6.98	4.01	8.95	2.00	11.88
30	6.98	4.01	8.91	2.00	11.72
35	6.96	4.01	8.88	2.00	11.67
40	6.95	4.01	8.85	2.00	11.54
45	6.95	4.01	8.82	2.00	11.44
50	6.95	4.00	8.79	2.00	11.33

Buffer Set 4 (ref. 25 °C) JIS Z 8802

5	1.668	3.999	6.951	9.395
10	1.670	3.998	6.923	9.332
15	1.672	3.999	6.900	9.276
20	1.675	4.002	6.881	9.225
25	1.679	4.008	6.865	9.180
30	1.683	4.015	6.853	9.139
35	1.688	4.024	6.844	9.102
40	1.694	4.035	6.838	9.068
45	1.700	4.047	6.834	9.038
50	1.707	4.060	6.833	9.011

Buffer Set 5 (ref. 25 °C) DIN 19266

5	1.668	4.004	6.950	9.392	13.207
10	1.670	4.001	6.922	9.331	13.003
15	1.672	4.001	6.900	9.277	12.810
20	1.676	4.003	6.880	9.228	12.627
25	1.680	4.008	6.865	9.184	12.454
30	1.685	4.015	6.853	9.144	12.289
35	1.691	4.026	6.845	9.110	12.133
40	1.697	4.036	6.837	9.076	11.984
45	1.704	4.049	6.834	9.046	11.841
50	1.712	4.064	6.833	9.018	11.705

Buffer Set 6 (ref. 25 °C) DIN 19267

5	1.08	4.67	6.87	9.43	13.63
10	1.09	4.66	6.84	9.37	13.37
15	1.09	4.66	6.82	9.32	13.16
20	1.09	4.65	6.80	9.27	12.96
25	1.09	4.65	6.79	9.23	12.75
30	1.10	4.65	6.78	9.18	12.61
35	1.10	4.65	6.77	9.13	12.45
40	1.10	4.66	6.76	9.09	12.29
45	1.10	4.67	6.76	9.04	12.09
50	1.11	4.68	6.76	9.00	11.98

8.2 Error Limits

Message / Description	Range not accepted	
Meas. out of range (Measuring value out of range)	pH:	< -2.000 or > 19.999
	mV:	< -1999 or > 1999
	Ion:	< 1.00E-9 or > 9.99E+9 [mmol/L], [mol/L], [mg/L]
	Ion:	< 0.000 or 999.9 %
	Ion:	< 0.000 or 999.9 ppm
Temperature out of range	T [°C]:	< 5 or > 50
Offset out of range (first cal. point)	Eref1-Eb	> 60 mV
Slope out of range (cal.points 2, 3...)	Eref1-Eb	> 60 mV
Wrong buffer	ΔEref1	< 10 mV for pH
	ΔEref1	< 1 mV for Ion
T differs from setting!	t _{ATC} -t _{buffer}	> 0.5 °C

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如有技术变更，恕不另行通知。
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