沪制 01040055 号

使 用 说 明

Operating Instructions
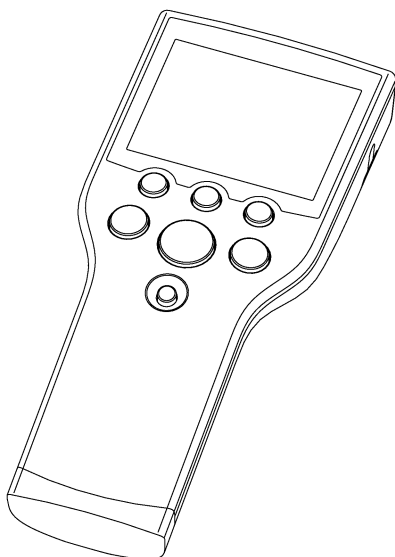
SevenGo™

SG3 电导率仪 /Conductivity meter SG3

METTLER TOLEDO

目录

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的新特点：

- 符合IP67等级，包括仪表、电极和连接器
- 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
- 可选的设备定期认证服务，确保实测测量始终精确无误
- 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 ℃或者超过40 ℃
  - 强电场或磁场下
  - 海拔高度大于4000m
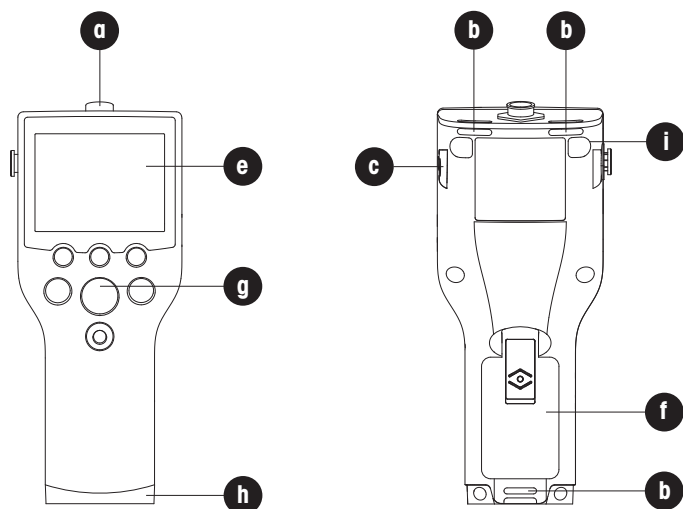
a　7针电导和温度信号输入插座

b　腕带安装槽

c　SevenGo™电极夹安装位（仪表两侧）

e　显示屏

f　电池盖 (51302328)

g　橡胶按键

h　蓝色底盖(51302324)及野外助手安装位

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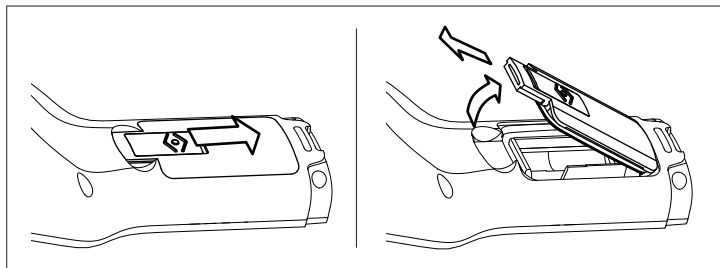
1. 向下推电池盖上的按钮，用2个手指捏住电池盖并取下;
2. 按仪表电池盒中的标识将电池插入电池盒中安装电池，或者用手指按住电池的正极取出电池;
3. 合上电池盖，并向上推按钮以固定电池盖。

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,订购号51302336)

3.2   腕带安装
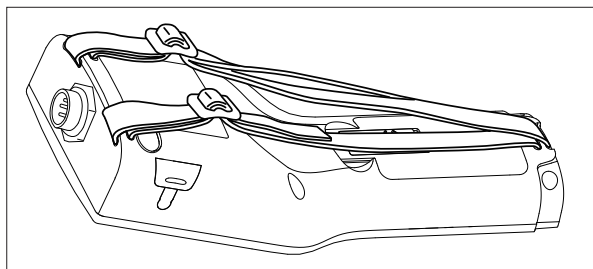
根据图示安装妥当腕带

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。
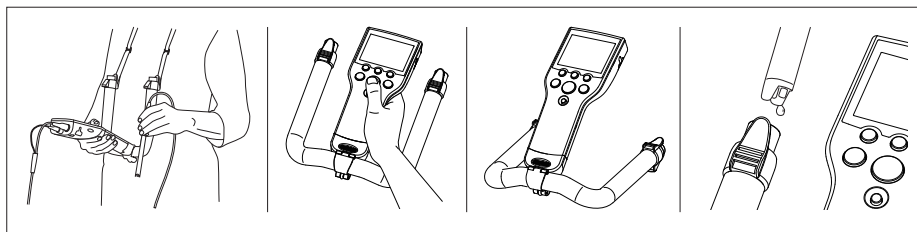
1. 卸下仪表端部上的底盖 (51302324)
2. 将ErGo™适配器拧到仪表上 (51302337)
3. 根据显示的图安装ErGo™
4. 将背带装到ErGo™的两端上。(51302321)
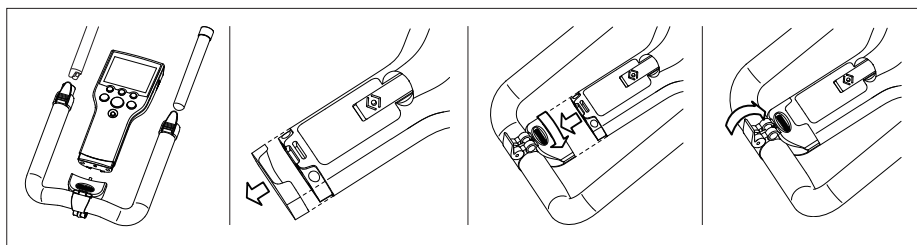
4. SG3标准电导率仪操作

4.1 显示与按键
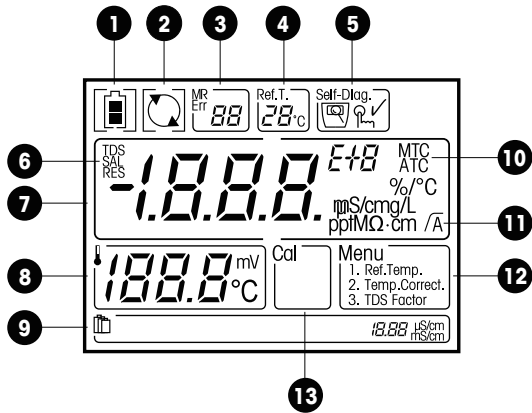
1	电池状态,指示电池电量是全满、半满还是空(更换电池参阅3.1)
2	连续测量功能被激活（禁止自动关机功能）。仪表的默认设置是十五分钟后自动关机。当再次开/关机后，自动关机功能再次被激活。
3	存储数据编号/错误索引(存储器使用参阅4.5/错误信息描述参阅4.7)

| 错误索引 | 已储存的测量记录总数 | 检索测量记录序号 |

4 参比温度

5 仪表自检(见4.6)

| 仪表 | 按键 | 自检 |
| 自检图标 | 提示 | 通过 |

6	测量模式
7	电导率/总固体溶解量／盐度/电阻率读数
8	温度
9	校正溶液（见4.2）
10	自动温度补偿
11	读数稳定提示符号/自动锁定终点 Γ 读数稳定提示符号　　A 自动终点锁定模式
12	菜单
13	校准提示
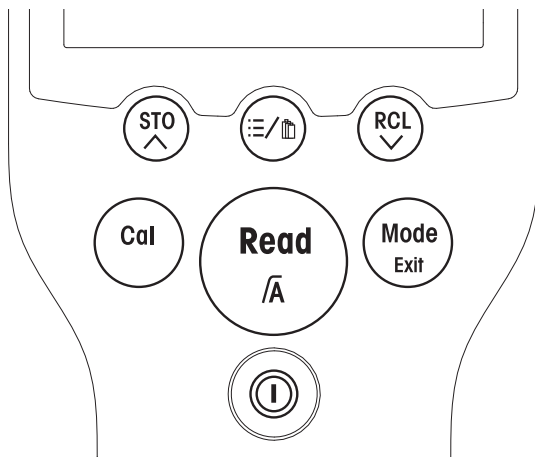
	按下并释放 🖐	按住持续2秒钟 ✊
⏻	- 仪表开/关	- 启用/关闭连续测量
Read /A̅	- 开始测量 - 返回测量模式 - 确认设置, 存储输入的值	- 开启/关闭自动终点测量 /A̅ / /¯
Cal	- 开始校准	
Mode Exit	- 在电导率, TDS, 盐度 和电阻率测量模式间切换	
☰/🗑	- 进入菜单	- 选择校准溶液
STO ∧	- 将当前结果存储到存储器中 - 在设置时增大值 - 向上滚动菜单	
RCL ∨	- 检索存储的数据 - 在设置时减小值 - 向下滚动菜单	- 浏览最近校准数据
Cal Read /A̅	- 启动仪表自检	Self-Diag. 📟 ✓

4.2 校准

4.2.1 选择校准液

使用SevenGo™ SG3标准电导率仪时，需要选择校准标准液。
按住 ☰/⬚ 键直到当前标准液开始闪烁。
使用 ∧ 或 ∨ 键，选择其他校准液组别，当需要的组别开始闪烁时，按 Read 键确认选择。
以下三种预设的标准是可供选择的：
- 84 μS/cm
- 1413 μS/cm
- 12.88 mS/cm

每一个标准的自动温度补偿程序是固化在仪表中的（可见附录）。

4.2.2 执行校准

将电导电极放入标准校准液中,按 Cal 键。
SevenGo™标准电导率仪将自动到达校准终点。如需手动终点判断,按 Read。 仪表显示屏锁定并显现标准值。按 Read 键接受校准值并返回样品测量。
放弃校准按 Exit 键。

注

为了确保最精确电导率读数,应定期用校准溶液测试电极常数,如需要请重新校准。请使用新鲜的校准溶液。

4.3 样品测量

4.3.1 电导率测量

将电极放在样品中并按 Read 以开始测量: 小数点闪动。
显示屏显示样品的电导率值。自动测量终点 A 是仪表的默认设置。
当电极输出稳定后，显示屏自动固定，并显现 ⌐A。
按住 Read 键,可以在自动和手动测量终点模式之间切换。要手动测量一个终点,可按 Read,显示屏锁定并显现 ⌐ 。

自动测量终点算法的原理是：
当所测样品的电导率值与6秒内仪表测得的电导率平均值之差不超过0.4%时确定为测量终点。

4.3.2 TDS/盐度/电阻率测量

要测量总固体溶量(TDS)/盐度/电阻率,请按与电导率测量相同的步骤执行。
只要按 Mode 即可在电导率、总固溶物、盐度、电阻率测量之间进行切换。

注

为确保SG3标准电导率仪的准确测量，请使用具有内置温度探头的电极。具有IP67等级的电导和温度电极InLab®738能确保仪器在潮湿环境中的优良表现。

4.4 菜单设置

按 ☰/🏛 键，菜单目录显示在屏幕上，第一项闪动：

```
Menu ─────────┐ ┌─── 设置参比温度
 1. Ref.Temp.──┤ │ 设置温度补偿系数
 2. Temp.Correct.┤─┘
 3. TDS Factor ──┘ ─── 设置TDS系数
```
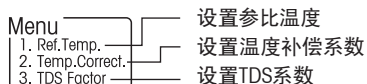
按 ⋀ 或 ⋁ 键选择其中一个项目，当所选项开始闪动，
按 Read 键开始设置，或按 Exit 键返回测量状态。

4.4.1 设置参比温度

当 "Ref.Temp. 25 °C" 标识出现并且边框开始闪动时，按 ⋀ 或 ⋁ 键在 25 °C 和 20 °C 中选定一个温度。按 Read 键确认选择设置 或按 Exit 键返回测量状态。

4.4.2 设置温度补偿系数

当温度补偿系数出现时，按 ⋀ 或 ⋁ 键增加或减小此系数。按 Read 键确认选择设置 或按 Exit 回测量状态。出厂设置为2.00% / °C

4.4.3 设置TDS因子

当TDS出现时，按 ⋀ 或 ⋁ 键增加或减小此系数。按 Read 键确认选择设置，或按 Exit 键返回测量状态。

4.5 使用存储器

4.5.1 存储读数

SevenGo™ SG3标准电导率仪可以存储多达 30个终点测量结果。当测量结束时按 STO。
M01 表示存储了一个测量结果， M30 表示存储了最多30个测量结果。
如果您在显示 M30 时按 STO, 会显示 FUL 表示存储器已存满。要存储数据就必须清除存储器。

4.5.2 调取存储读数

当测量结束时按 RCL 可从存储器中检索已存储的值。
按 ∧ 和 ∨ 以滚动显示存储的结果。
R01 至 R30 表示显示的是哪一个结果。
按 Read 可退出。

4.5.3 清除存储读数

当按 ∧ 或 ∨ 以滚动显示存储的结果时，将会看到 MRCL, 按 Read, 然后 CLr 闪烁,按 Read 以确认你想清除存储器或按 Exit 键返回测量。

4.6 仪表自检

同时按住 Read 和 Cal 直到仪表自检 图标 Self-Diag 显现。
仪表首先满屏显示所有图标,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。

当 🖑 图标闪烁时, 有七个图标显示在屏幕上, 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;继续按其余键直到所有图标均消失。

自检完成时，会显现一个 ✓ 图标。如果自检失败,将显现 "Err 1" 请参阅本操作说明书中的 "4.7 错误信息" 以采取适当措施。

注
必须在两分钟之内按完所有七个按键，否则将显示 'Err 1', 并需要重新执行该过程。

4.7   出错信息

Err 1	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。
Err 2	测量值超出范围	检查电极是否已被正确连接到仪表上及电极已置于样品中。
Err 3	测定缓冲液温度超出范围 (0…35 °C)	使缓冲液温度保持在规定范围内。
Err 4	测量温度超出范围 (0…105 °C)	检查电极是否已被正确连接,并保持测量时样品温度在限制范围内。
Err 5	当前数据已被存储过一次	一次测量只能被存储一次,请执行新的测量存储新的数据。

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。

注

为防止对仪器的静电干扰,在清洁探头时请将探头与仪表分开。

5.2   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 pro™ 电导率仪 SG7	
SevenGo™ pH计 SG2	
SevenGo pro™ pH/ORP /离子计 SG8	
SevenGo pro™ 溶氧仪 SG6	
InLab®738, (IP67) 电导电极	51344120
InLab®738 / 10m, (IP67) 电导电极	51344124
IlnLab®742, （IP67）低电导电极	51344126
LTW/Mini-DIN 适配器	51302329
ErGo™ (包括适配器和电极管)	51302320
ErGo™ 电极管	51302323
户外便携箱(空)	51302359
现场附件套件	51302360
橡胶保护套	51302322
瓶子	51300240
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
ErGo™ 适配器	51302337
84 µS/cm 标准溶液, 250 mL	51302153
1413 µS/cm 标准溶液（袋装）, 30 x 20 mL	51302049
1413 µS/cm 标准溶液, 250 mL	51300138
12.88 mS/cm 标准溶液（袋装）, 30 x 20 mL	51302050
12.88 mS/cm 标准溶液, 250 mL	51300139

7. 技术指标

	SG3 电导率仪
测量范围	
电导率	0.10 µS/cm...500 mS/cm
总固体溶解量	0.10 mg/L...300 g/L
盐度	0.00...80.0 ppt
电阻率	0.00...100.0 MΩ·cm
温度	-5...105 °C
分辨率	
电导率	(自动分档)
	0.10 µS/cm...19.99 µs/cm
	20.0 µS/cm...199.9 µS/cm
	200 µS/cm...1999 µS/cm
	2.00 mS/cm...19.99 mS/cm
	20.0 mS/cm...199.9 mS/cm
	200 mS/cm...500 mS/cm
总固体溶解量	(自动分档)
盐度	0.00 ppt...19.99 ppt
	20.0 ppt...80.0 ppt
电阻率	Ω·cm (科学计数法)
	0.00 Ω·cm...9.99 E +5 Ω·cm
	MΩ·cm
	1.000 MΩ·cm...19.99 MΩ·cm
	20.0 MΩ·cm...100.0 MΩ·cm
温度	0.1 °C
误差极限	
电导率	±0.5 % 读数± 1个字
总固体溶解量	±0.5 % 读数± 1个字
盐度	±0.5 % 读数± 1个字
电阻率	±0.5 % 读数± 1个字
温度	±0.2 °C
电源要求	额定值　6 V DC, 5 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
信号输入	7 芯圆形连接器
IP 等级	IP67
电池寿命	> 500 小时
环境条件	温度:　5...40 °C
	相对湿度:　5%...80% (不结露)
	安装类型:　II
	污染等级:　2
材料	壳体:　ABS/PC
	显示窗:　PMMA
	键盘:　硅橡胶

8. 附录

8.1 电导校准溶液

t(°C)	84 µS/cm	1413 µS/cm	12.88 mS/cm
0	46 µS/cm	776 µS/cm	7.15 mS/cm
10	60 µS/cm	1020 µS/cm	9.33 mS/cm
15	68 µS/cm	1147 µS/cm	10.48 mS/cm
20	76 µS/cm	1278 µS/cm	11.67 mS/cm
25	84 µS/cm	1413 µS/cm	12.88 mS/cm
30	93 µS/cm	1552 µS/cm	14.12 mS/cm
35	102 µS/cm	1696 µS/cm	15.39 mS/cm

8.2 温度补偿系数实例 (α-values)

化学物质 25°C	浓度 [%]	温度系数 α [%/°C]
HCl	10	1.56
KCl	10	1.88
CH_3COOH	10	1.69
NaCl	10	2.14
H_2SO_4	10	1.28
HF	1.5	7.20

8.3 实际盐度标准 (UNESCO 1978)

SG3 和 SG7 电导率仪测量的盐度是根据UNESCO 1978官方标准计算而得，
因此样品在压力为标准大气压得盐度Spsu是按照以下公式计算的：

$$S = \sum_{j=0}^{5} a_j R_T^{j/2} - \frac{(T-15)}{1+k(T-15)} \sum_{j=0}^{5} b_j R_T^{j/2}$$

$a_0 = 0.0080$	$b_0 = 0.0005$	$k = 0.00162$
$a_1 = -0.1692$	$b_1 = -0.0056$	
$a_2 = 25.3851$	$b_2 = -0.0066$	
$a_3 = 14.0941$	$b_3 = -0.0375$	
$a_4 = -7.0261$	$b_4 = 0.0636$	
$a_5 = 2.7081$	$b_5 = -0.0144$	

$$R_T = \frac{R_{Sample}(T)}{R_{KCl}(T)}$$

(每1000g溶液中含32.4356gKCl)

8.4   TDS系数

电导率	TDS KCl		TDS NaCl	
25 °C	ppm value	Factor	ppm value	Factor
84 µS/cm	40.38	0.5048	38.04	0.4755
447 µS/cm	225.6	0.5047	215.5	0.4822
1413 µS/cm	744.7	0.527	702.1	0.4969
1500 µS/cm	757.1	0.5047	737.1	0.4914
8974 µS/cm	5101	0.5685	4487	0.5000
12.880 mS/cm	7447	0.5782	7230	0.5613
15.000 mS/cm	8759	0.5839	8532	0.5688
80 mS/cm	52.168	0.6521	48.384	0.6048

8.5   误差限

讯息	描述	不可接受范围	
Err 2	测量值超出范围	电导率:	< 0.1 µS/cm 或 > 500 mS/cm
		TDS:	< 0.1 mg/L 或 > 300 g/L
		SAL:	< 0.01 ppt 或 > 80 ppt
		电阻率:	< 0.01 MΩ·cm 或 > 100 MΩ·cm
Err 3	校准液温度超出范围	T:	< 0 °C 或 > 35 °C
Err 4	测量温度超出范围	T:	< -5 °C 或 > 105 °C

Contents

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
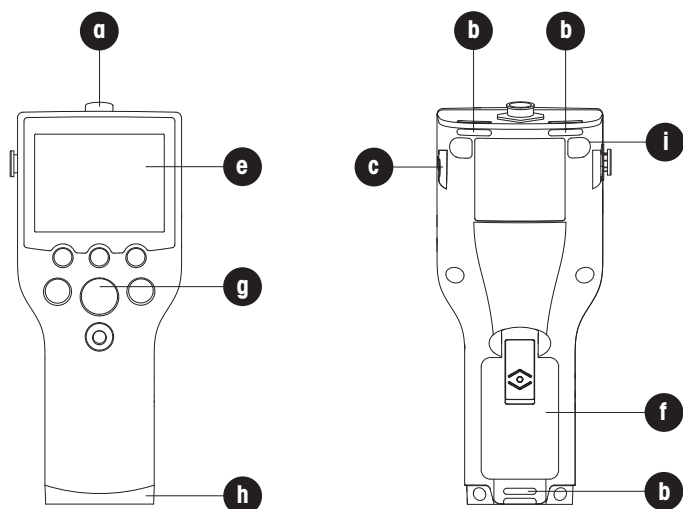
a **7-pin LTW socket** for conductivity and temperature signal input

b **Slots** for attaching the wrist strap

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

e **Display**

f **Battery cover** (51302328)

g **Rubber key pad**

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

i **Rubber feet** fixing points

3. Installation

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

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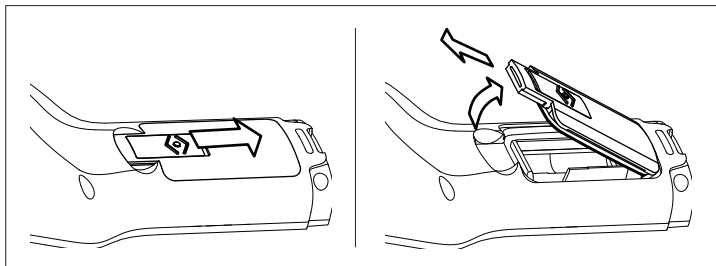
1. Push the button on the Battery cover in the direction of the arrow, hold the lid with two fingers and remove it, as shown;
2. Insert the batteries in the battery compartment, or remove battery from the battery compartment.
3. Replace the Battery cover, and push back the button to fix the lid in place.

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
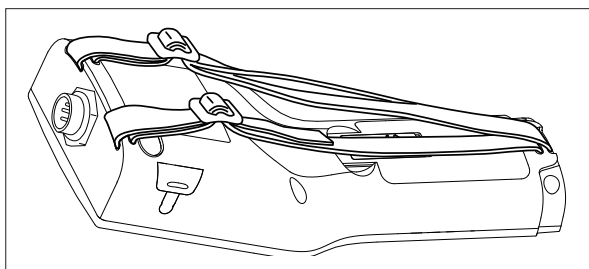
Fit the wrist strap as shown in the diagram.

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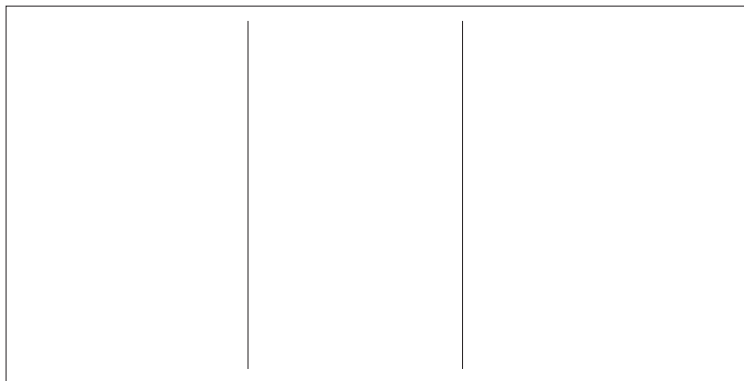
The field accessory kit (51302360) with electrode clip, protective cover and wrist strap completes your equipment. It allows you to make full use of the different possibilities offered by the system and facilitates operation.

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.
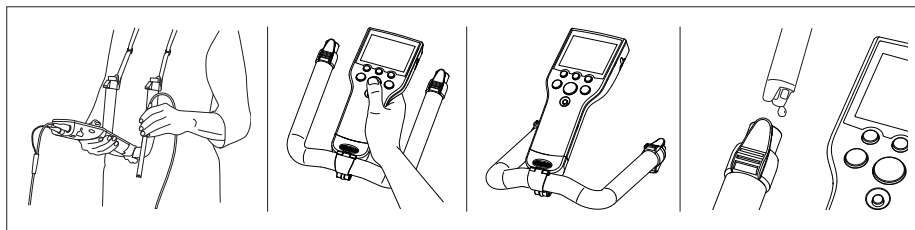
1. Remove the blue bottom cap (51302324) at the base of the meter;
2. Screw the ErGo™ adapter (51302337) onto the meter;
3. Mount the ErGo™ as shown;
4. Fit the neck strap (51302321) to both ends of the ErGo™.
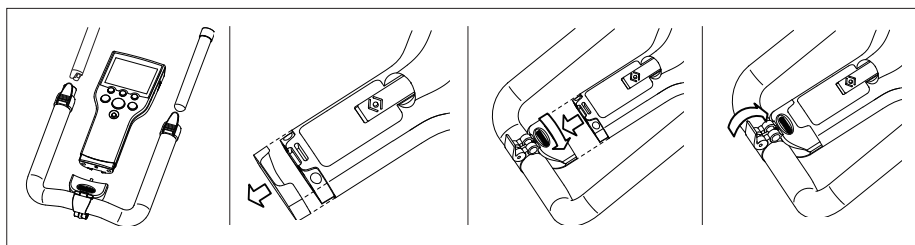
4. Operating the SG3 conductivity meter

4.1 Display and key controls

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	Memory number / Error index (for use of memory see Section 4.5 / error messages are described in Section 4.7)

Error index   Number of data sets   Recall memory
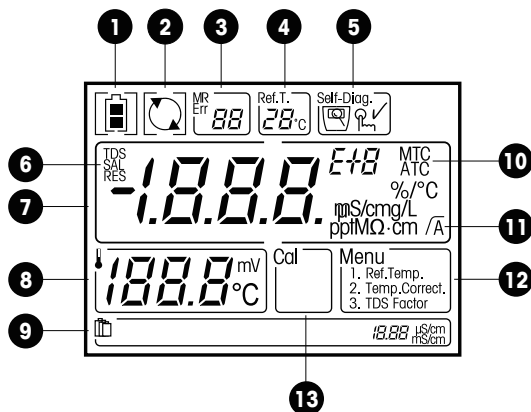stored in memory

4	Reference temperature

5	Meter self-diagnosis (see Section 4.6)

Self-diagnosis   Indication to   Self-diagnosis
indicator   press key   passed

6	Measurement mode
7	Conductivity/TDS/Salinity/Resistivity reading
8	Temperature
9	Standards (see Section 4.2)
10	Automatic temperature compensation
11	Endpoint stability/auto endpoint ⌐ Endpoint stability **A** Auto endpoint
12	Menu
13	Calibration indicator
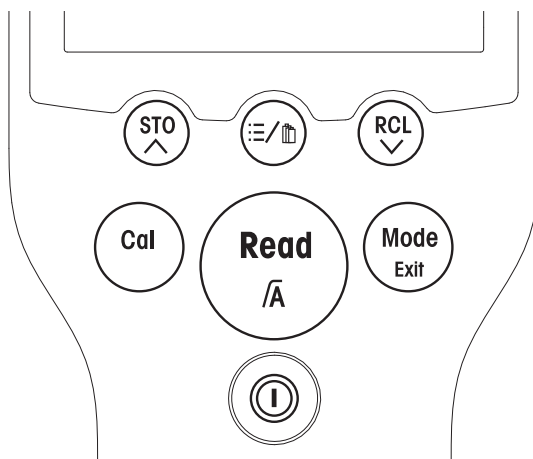
	Press and release 👆	Press and hold for 2 seconds ⏱
⏻	- Meter on/off	- Switch on/off auto-off override (switches off the meter after 15 minutes)
Read /Ā	- Start or endpoint measurement - Return to measurement mode - Confirm setting; store entered value	- Switch auto endpoint on/off ⌐ / /Ā
Cal	- Start calibration	
Mode Exit	- Switch between conductivity, TDS, salinity and resistivity measurement mode - Back to measurement (ignore the input)	
≣/📖	- Enter Menu	- Select calibration standard
STO ∧	- Store current reading to memory - Increase value during setting - Scroll up through the memory	
RCL ∨	- Recall stored data - Decrease value during setting - Scroll down through the memory	- Review the latest calibration data
Cal Read /Ā	- Start meter self-diagnosis Self-Diag.	

4.2   Calibration

4.2.1 Selecting a standard

When using the SevenGo™ SG3 conductivity meter, you have to select a standard for calibration.
Press and hold ☰/🖩 until the current standard blinks.
Use the ∧ or ∨ key to select another standard. When the desired standard blinks, press **Read** to confirm your selection.
The following three predefined standards are available:

- 84 μS/cm
- 1413 μS/cm
- 12.88 mS/cm

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

4.2.2 Performing a calibration

Place the conductivity sensor in the defined calibration standard and press **Cal**.
With the default setting, the SevenGo™ conductivity meter automatically endpoints when the signal is stable. To manually endpoint, press **Read**. The meter displays the value of the standard followed by the cell constant after a few seconds.
To accept the calibration and return to sample measurement, press **Read**. To reject the calibration, press **Exit**.

Note

To ensure the most accurate conductivity readings, you should verify your cell constant with a standard solution regularly and recalibrate if necessary. Use always fresh standards.

4.3   Sample measurement

4.3.1 Conductivity measurement

Place the conductivity sensor in the sample and press **Read** to start the measurement: the decimal point blinks.
The display shows the conductivity of the sample. The automatic endpoint **A** is the default setting of the meter. When the signal has stabilized, the display automatically freezes, and /A̅ appears.
By pressing and holding down **Read** key, you can switch between auto and manual endpoint mode. To manually endpoint a measurement, press **Read**, the display freezes and /‾ appears.

Stability criterion for conductivity measurement
The sensor input signal of the must not deviate by more than 0.4% from the measured average conductivity of the probe in 6 seconds.

4.3.2 TDS/salinity/resistivity measurement

To perform a TDS/salinity/resistivity measurement, follow the same procedure as for a conductivity measurement. Press **Mode** to switch between conductivity, TDS, salinity and resistivity measurement modes.

Note

For accurate measurement with the SevenGo™ SG3 conductivity meter it is important to use an electrode with a built-in temperature sensor. The use of the special IP67 conductivity and temperature sensor InLab®738 guarantees optimum performance even in very humid environments.

4.4   Menu settings

Press ☰/🔖, the menu's content appears on the screen and first item blinks:

Menu ─────────── Set reference temperature
1. Ref.Temp. ──────── Set temperature correction coefficient
2. Temp.Correct. ──
3. TDS Factor ────── Set TDS factor
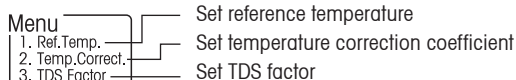
Use ∧ or ∨ to select a menu item. When the desired item blinks, press the **Read** key to start the setting or press the **Exit** key to return to measurement.

4.4.1 Set reference temperature

When "Ref.Temp. 25 °C" appears and the frame of current reference temperature blinks, use ∧ or ∨ to toggle between 25 °C and 20 °C. Press **Read** to confirm your selection or press **Exit** to return to the menu settings.

4.4.2 Set temperature correction coefficient

When the current temperature coefficient appears, use ∧ or ∨ to increase or decrease the value. Press **Read** to confirm your setting or press **Exit** to back to menu settings.

4.4.3 Set TDS factor

When the current TDS factor appears, use ∧ or ∨ to increase or decrease the value. Press **Read** to confirm your setting or press **Exit** to back to menu settings.

4.5   Using the memory

4.5.1 Storing a reading

The SevenGo™ SG3 can store up to 30 end-pointed results. Press **STO** when the measurement has end-pointed. **M01** indicates that one result has been stored, and **M30** that the maximum of 30 results have been stored.
If you press **STO** when **M30** is displayed, **FUL** indicates that the memory is full. To store further data you will have to clear the memory (see below).

4.5.2 Recalling from memory

Press **RCL** to recall the stored values from memory when the current measurement has end-pointed.

Press ∧ or ∨ to scroll through the stored results. **R01** to **R30** indicate which result is being displayed. Press **Read** to exit.

4.5.3 Clearing the memory

Continue pressing ∧ or ∨ to scroll through stored results until **MRCL** appears. Then press **Read**, **CLr** blinks; Press **Read** again to confirm the deletion or press **Exit** to return to measurement mode without deletion of the data.

4.6   Self-diagnosis

Press and hold **Read** and **Cal** simultaneously until the meter **Self-Diag.** icon appears.
The meter displays the full screen first, then each icon blinks one after the other. This way you may check whether all icons are correctly shown. The final step is to check that the keys are functioning correctly. This requires user interaction.

When ☞ blinks, seven icons are displayed. You are 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 completed, ✓ appears. If self-diagnosis fails, "Err 1" appears
(see Section 4.7).

Note
You have to finish pressing all the seven keys within two minutes, otherwise 'Err 1' appears, and you will have to repeat the procedure.

4.7   Error messages

Err 1	Self-diagnosis failed	Repeat the self-diagnosis procedure and make sure that you finish pressing all seven keys within two minutes. If "Err 1" still appears, call METTLER TOLEDO Service.
Err 2	Measured value out of range	Check if the electrode is properly connected and placed in a sample solution.
Err 3	The measured standard temperature is out of the range (0…35 °C)	Keep the standard temperature within the range for calibration.
Err 4	Measuring temperature out of range (0…105 °C)	Check if the electrode is properly connected and keep the sample temperature within the range.
Err 5	The current data set has already been stored once	A measurement can only be stored once. Perform a new measurement to store a new data set.

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.

Note

To prevent static damage to the instrument, always disconnect the conductivity sensor from the meter before cleaning the sensor.

5.2   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 pro™ conductivity meter SG7	
SevenGo™ pH meter SG2	
SevenGo pro™ pH meter SG8	
SevenGo™ dissolved oxygen meter SG6	
InLab®738, (IP67) conductivity sensor	51344120
InLab®738 / 10m, (IP67) conductivity sensor	51344124
InLab®731, conductivity sensor	51344020
InLab®741, conductivity sensor	51344024
LTW/Mini-DIN adapter	51302329
Electrode weight	51303019
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
Ruber holster	51302322
Plastic sample bottle	51300240
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
ErGo™-adapter	51302337
84 µS/cm standard solution, 250 mL	51302153
1413 µS/cm standard solution sachets, 30 x 20 mL	51302049
1413 µS/cm standard solution, 250 mL	51300138
12.88 mS/cm standard solution sachets, 30 x 20 mL	51302050
12.88 mS/cm standard solution, 250 mL	51300139

7. Specifications

	SevenGo™ conductivity meter SG3	
Measurement range		
Conductivity	0.10 µS/cm…500 mS/cm	
TDS	0.10 mg/L…300 g/L	
Salinity	0.00…80.0 ppt	
Resistivity	0.00…100.0 MΩ·cm	
Temperature	-5…105 °C	
Resolution		
Conductivity	Auto range	
	0.10 µS/cm…19.99 µs/cm	
	20.0 µS/cm…199.9 µS/cm	
	200 µS/cm…1999 µS/cm	
	2.00 mS/cm…19.99 mS/cm	
	20.0 mS/cm…199.9 mS/cm	
	200 mS/cm…500 mS/cm	
TDS	Auto range, same as conductivity	
Salinity	0.00 ppt…19.99 ppt	
	20.0 ppt…80.0 ppt	
Resistivity	Ω·cm (Scientific)	
	0.00 Ω·cm…9.99 E +5 Ω·cm	
	MΩ·cm	
	1.000 MΩ·cm…19.99 MΩ·cm	
	20.0 MΩ·cm…100.0 MΩ·cm	
Temperature	0.1 °C	
Limits of error		
Conductivity	±0.5 % of measured value	
TDS	±0.5 % of measured value	
Salinity	±0.5 % of measured value	
Resistivity	±0.5 % of measured value	
Temperature	±0.2 °C	
Power requirements	Ratings:	6 V DC, 5 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	
Signal input	7-Pin LTW plug	
IP rating	IP67 with and without electrode	
Battery life	> 500 working hours	
Ambient conditions	Temperature:	5…40 °C
	Relative humidity:	5%...80% (non-condensing)
	Installation category:	II
	Pollution degree:	2
Materials	Housing:	ABS/PC reenforced
	Window:	polymethylmethacrylate (PMMA)
	Keypad:	silicone rubber

8.   Appendix

8.1   Conductivity standards

t(°C)	84 µS/cm	1413 µS/cm	12.88 mS/cm
0	46 µS/cm	776 µS/cm	7.15 mS/cm
10	60 µS/cm	1020 µS/cm	9.33 mS/cm
15	68 µS/cm	1147 µS/cm	10.48 mS/cm
20	76 µS/cm	1278 µS/cm	11.67 mS/cm
25	84 µS/cm	1413 µS/cm	12.88 mS/cm
30	93 µS/cm	1552 µS/cm	14.12 mS/cm
35	102 µS/cm	1696 µS/cm	15.39 mS/cm

8.2   Examples of temperature coefficients (α-values)

Substance at 25°C	Concentration [%]	Temperature coefficient α [%/°C]
HCl	10	1.56
KCl	10	1.88
CH_3COOH	10	1.69
NaCl	10	2.14
H_2SO_4	10	1.28
HF	1.5	7.20

8.3   Practical salinity scale (UNESCO 1978)

In the SG3 and SG7 conductivity meter the salinity is calculated according to the official definition of UNESCO 1978, Therefore the salinity Spsu of a sample in psu (practical salinity unit) at standard atmospheric pressure is calculated as follows:

$$S = \sum_{j=0}^{5} a_j R_T^{j/2} - \frac{(T-15)}{1+k(T-15)} \sum_{j=0}^{5} b_j R_T^{j/2}$$

$a_0 = 0.0080 \qquad b_0 = 0.0005 \qquad k = 0.00162$
$a_1 = -0.1692 \qquad b_1 = -0.0056$
$a_2 = 25.3851 \qquad b_2 = -0.0066$
$a_3 = 14.0941 \qquad b_3 = -0.0375$
$a_4 = -7.0261 \qquad b_4 = 0.0636$
$a_5 = 2.7081 \qquad b_5 = -0.0144$

$$R_T = \frac{R_{Sample}(T)}{R_{KCl}(T)}$$

(32.4356 g KCl per 1000 g of solution)

8.4 Conductivity to TDS conversion factors

Conductivity at 25 °C	TDS KCl		TDS NaCl	
	ppm value	Factor	ppm value	Factor
84 µS	40.38	0.5048	38.04	0.4755
447 µS	225.6	0.5047	215.5	0.4822
1413 µS	744.7	0.527	702.1	0.4969
1500 µS	757.1	0.5047	737.1	0.4914
8974 µS	5101	0.5685	4487	0.5000
12.880 µS	7447	0.5782	7230	0.5613
15.000 µS	8759	0.5839	8532	0.5688
80 mS	52.168	0.6521	48.384	0.6048

8.5 Error Limits

Message	Description	Range not accepted	
Err 2	Measured value out of range	C:	< 0.1 µS/cm or > 500 mS/cm
		TDS:	< 0.1 mg/L or > 300 g/L
		SAL:	< 0.01 ppt or > 80 ppt
		Res:	< 0.01 MΩ·cm or > 100 MΩ·cm
Err 3	Calibration standard temperature out of range	T:	< 0 °C or > 35 °C
Err 4	Temp. out of range	T:	< -5 °C or > 105 °C

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如有技术变更，恕不另行通知。
Subject to technical changes and to the availability
of the accessories supplied with the instruments.

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