

中文版 | English



VITLAB®

微量移液器

VITLAB®

micropipette

操作手册 (中文版)

Operating Manual (Simplified Chinese)



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目录

1. 安全说明	4
2. 用途	5
3. 使用限制	5
4. 操作限制	5
5. 操作例外情况	5
6. 操作和控制元件	6
7. 移液	7
8. 检查移液体积	9
9. 精度表	10
10. 调整	11
11. 高温灭菌	12
12. 紫外灭菌	12
13. 5 mL/10 mL 移液器滤芯	12
14. 保养和清洁	13
14.1 1000 µL 及以下的 VITLAB®微量移液器	13
14.2 VITLAB®5 mL 和 10 mL 微量移液器	14
15. 订购信息和附件	15
15.1 订购信息	15
15.2 附件	15
16. 备件	16
16.1 1000 µL 及以下的 VITLAB®微量移液器	16
16.2 VITLAB®5 mL 和 10 mL 微量移液器	17
17. 故障排除	18
18. 安全符号	18
19. 维修 - 校准服务	19
19.1 返厂维修	19
19.2 校准服务	19
20. 保修	20
21. 废弃物处置	20

1. 安全说明

请仔细阅读以下内容！

本仪器有时可能会与危险物质、操作和设备搭配使用。本手册并未提及与本仪器用于上述应用相关的所有潜在安全风险。本仪器的使用者有责任在使用前查阅并制定适当的安全和健康规范，并确定法规限制的适用性。

1. 每位使用者在使用本仪器之前，都必须阅读并理解本操作手册，并在使用过程中遵循这些说明。
2. 请遵守一般危害预防和安全规范，例如，应穿戴防护服、护目镜和手套。处理具有传染性或其他危险样品时，必须遵守所有适当的法规，并采用适当的预防措施。
3. 请遵循试剂制造商提供的所有规格说明。
4. 仅可将本仪器用于移取符合使用限制和操作限制中规定的液体。请注意操作例外情况（见第 5 页）。如有任何疑问，请联系制造商或供应商。
5. 使用本仪器时，请始终确保不会危及使用者或任何其他人的安全。请避免液体飞溅。仅可使用合适的容器。
6. 处理危险样品时，请避免接触吸头上的开口。
7. 切勿暴力使用本仪器。
8. 仅可使用原装附件。请勿尝试进行任何技术改动。请勿超出操作手册所述的范围进一步拆卸本仪器！
9. 使用前，请检查本仪器有无明显的损坏。如果存在潜在的故障迹象（如活塞难以移动或泄漏），应立即停止移液。请查阅本手册的“故障排除”部分（见第 18 页），必要时联系制造商。

2. 用途

空气活塞式移液器用于移取中等密度、中低粘度的水溶液。

3. 使用限制

本仪器用于在以下限制范围内移液：

- 仪器和溶液的温度应为 15°C 至 40°C。如要在此温度范围之外使用，请咨询制造商。
- 蒸气压力最高 500 mbar。
- 粘度：260 mPas (260 cps)

4. 操作限制

高粘度和高吸附性液体可能会影响移液精度。移取的液体温度与环境温度相差超过±1 °C时，也会影响移液精度。

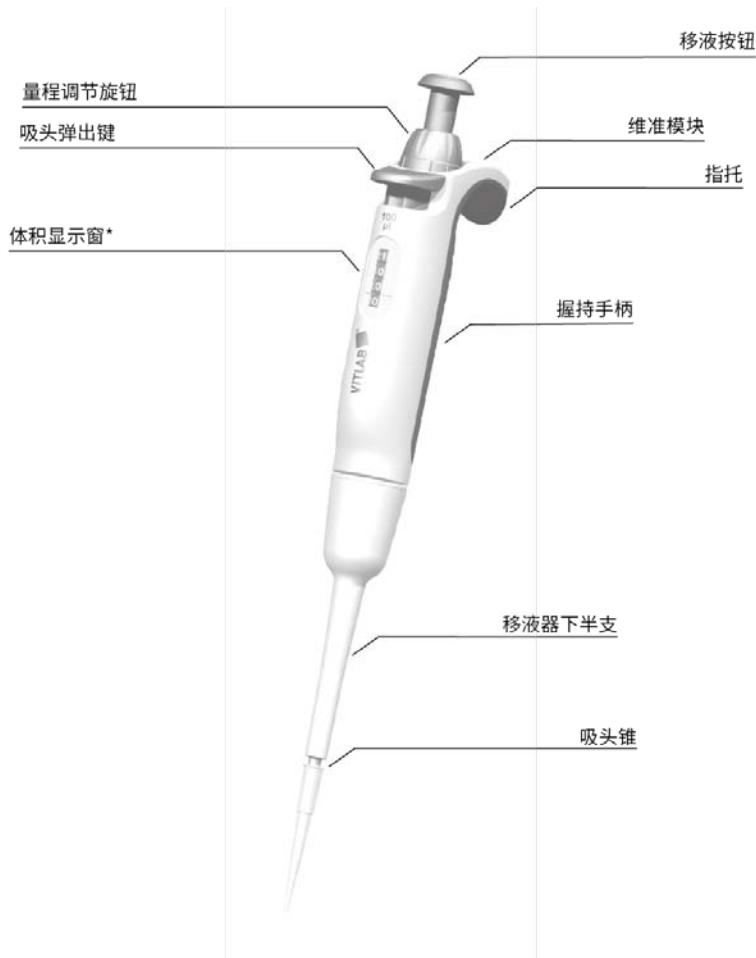
5. 操作例外情况

使用者必须确保本仪器符合预期用途。

本仪器不能用于：

- 与聚丙烯不兼容的液体
- 与聚碳酸酯（显示窗）不兼容的液体
- 蒸气压极高的液体
- 与 FKM 和聚醚醚酮（PEEK）不兼容的液体
- 与聚偏二氟乙烯不兼容的液体

6. 操作和控制元件



(图中所示为 100 μL VITLAB® micropipette 微量移液器)

*体积显示窗

从上到下读取显示窗上的数字，破折号后代表小数点。

注：

只有使用优质的吸头，才能获得更好的移液结果。推荐使用 BRAND®移液器吸头。

7. 移液

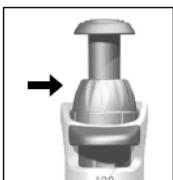
- 5 mL 和 10 mL 仪器仅可在安装 PE 滤芯后使用（见第 12 页）。
- 移液器吸头为一次性耗材！



1. 安装吸头

根据体积范围或颜色代码使用适当的吸头。

确保吸头固定到位。



2. 体积设置

旋转量程调节旋钮，选择所需的体积。在该调整过程中应避免扭转和突然旋转。



3. 吸取样品

- a) 将移液按钮按至第一档。
- b) 垂直握住移液器，将吸头浸入液体中。



体积范围	浸入深度 (mm)	等待时间 (s)
> 1 μL -100 μL	2 -3	1
> 100 μL -1000 μL	2 -4	1
> 1000 μL	3 -6	3

- c) 让吸头在液体中停留几秒钟，以便完全吸出设定体积的液体。这在移取粘性介质和使用大量程移液器时尤为重要。



4. 排出样品

- 将移液器吸头靠在容器壁上。握住移液器，使其与容器壁成 30-45° 角。
- 将移液按钮缓慢按至第一档，并按住不放。如果是血清和高粘度或低表面张力的液体，请注意等待时间要适当，以提高准确性。



- 通过吹出操作完全排空吸头内的液体：将吸头按钮向下按至第二挡。
- 同时在容器壁上擦拭移液器吸头。
- 从容器壁上移开移液器吸头，松开移液按钮使其归位。



5. 弹出吸头

将移液器置于合适的容器上方，将吸头弹出键按至低点。

注：

ISO 8655 规定，在实际移液之前，应首先用样品润洗移液器吸头一次。

重要提示！

吸头吸有液体时，请勿水平放置本仪器。否则液体可能会进入并污染本仪器。储存本仪器时，不宜带吸头，将本仪器垂直放在架子/挂架或旋转支架（可单独订购）上。

8. 检查移液体积

根据使用情况，建议每 3 至 12 个月测试一次仪器。可以根据实际需求调整该周期。

根据 DIN EN ISO 8655 标准第 6 部分的要求，按照以下步骤对移液器体积进行衡量法测试。

1. 设置标称体积

将体积设为仪器上显示的最大体积（见第 7 页“移液”）。

2. 测试移液器前的准备工作

测试前，用移液器吸头吸入然后再排出测试液体（蒸馏水），共计五次。

3. 进行测试

注：

根据 DIN EN ISO 8655-2 的规定，建议在每次测量后更换吸头。根据 DAkkS 指南 DKD-R8-1 的要求，对于以上规定可以有例外情况。

- a) 吸入液体并将其移入称量容器中。
- b) 在分析天平上称量移液质量。（请遵照天平制造商的操作手册说明）。
- c) 在考虑测试液体温度的情况下计算液体体积。
- d) 建议在三个体积点（标称体积的 100%、50%、10%）至少进行 10 次移液和称量，以便进行统计分析。

标称体积 V_0 的计算

x_i = 称量结果

Z = 校正因子（例如，在 20°C、1013 hPa

n = 称量次数

条件下为 1,0029 μL/mg）

平均值

$$\bar{x} = \frac{\sum x_i}{n}$$

准确度*

$$A\% = \frac{\bar{V} - V_0}{V_0} \cdot 100$$

平均体积

$$\bar{V} = \bar{x} \cdot Z$$

偏差系数*

$$CV\% = \frac{100 s}{\bar{V}}$$

标准差

$$s = Z \cdot \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

* 计算准确度 (A%) 和偏差系数 (CV%) :

根据统计控制公式计算 A% 和 CV%。

注：

可从 china.brand.com.cn

上下载测试说明 (SOP)。

9. 精度表

VITLAB® micropipette 微量移液器

量程范围 (μL)	体积点 (μL)	A* $\leq \pm \%$	CV* $\leq \%$	分量 μL	推荐的吸头规格 (μL)
0.1 - 2.5	2.5	1.4	0.7		
	1.25	2.5	1.5	0.002	0.5 - 20
	0.25	12	6		
0.5 - 10	10	1	0.5		
	5	1.6	1	0.01	0.5 - 20
	1	7	4		
2 - 20	20	0.8	0.4		
	10	1.2	0.7	0.02	2 - 200
	2	5	2		
10 - 100	100	0.6	0.2		
	50	0.8	0.4	0.1	2 - 200
	10	3	1		
20 - 200	200	0.6	0.2		
	100	0.8	0.3	0.2	2 - 200
	20	3	0.6		
100 - 1000	1000	0.6	0.2		
	500	0.8	0.3	1	50 - 1000
	100	3	0.6		
500 - 5000	5000	0.6	0.2		
	2500	0.8	0.3	5	500 - 5000
	500	3	0.6		
1000 - 10000	10000	0.6	0.2		
	5000	0.8	0.3	10	1000 - 10000
	1000	3	0.6		

本仪器上显示的标称体积 (=最大体积) 的最终测试值, 是根据 DIN EN ISO 8655 标准, 本仪器和蒸馏水在室温温度 (20 °C /68 °F) 下达到平衡且平顺操作时得出的。

* A = 准确度

* CV = 偏差系数



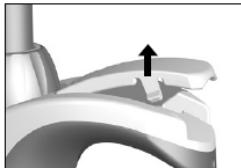
20 °C

量出式

10. 调整

该仪器已被校准适用于水溶液。如果移液器操作明显不准确，或者如果需要针对不同密度和粘度的溶液或特殊形状的移液器吸头进行调整，可以进行相应的调整操作。

1. 检查移液体积，确定实际值（见第 9 页）。



2. 取下保护盖：将挂钩向前推，稍稍抬起，然后向后拉。
3. 使用回形针或未使用过的移液器吸头，移除保护膜（该保护膜可以丢弃）。



4. 将红色调节滑块向外侧推（如图中右侧箭头），抬起量程调节旋钮（如图中左侧箭头），然后松开调节滑块。



5. 设置调整值：
将量程调节按钮调至之前测定的实际值。建议每次调节后进行移液体积检查。



6. 再次将红色调节滑块向外侧推，向下推动量程调节旋钮，再松开调节滑块。重新插入保护盖。

11. 高温灭菌

根据 DIN EN 285 标准，移液器可在 121 °C（250 °F）、2 bar（30 psi）的条件下进行高温灭菌，保持时间为至少 15 分钟。

1. 弹出移液器吸头。
2. 对整个移液器进行高温灭菌，无需再进行拆卸。高温灭菌前，拆除 5 mL 和 10 mL 移液器的滤芯。
3. 让移液器完全冷却和干燥。

注：

使用者必须自行验证高温灭菌的有效性。真空灭菌可获得更高的可靠性。推荐使用灭菌袋。

注意！

高温灭菌前，必须将量程调节旋钮设定在可用的有数字的体积上（如 11.25 或 11.26，但不能介于两者之间）。

如果经常对移液器进行高温灭菌，则应在活塞和密封圈上涂抹硅脂，以保证操作顺畅。请仅使用推荐的硅脂，参见第 15 页“附件”。灭菌后如有必要，请旋紧握持手柄与移液器下半支之间的连接处。

12. 紫外灭菌

本仪器可承受紫外灭菌灯的正常输出功率。紫外灭菌可能会导致移液器发生一些颜色变化。

13. 5 mL/10 mL 移液器滤芯

使用疏水性 PE 滤芯，以防液体进入移液器。

如果滤芯变湿或被污染，请进行更换。

- 使用螺丝刀等扁平物体
- 在不损坏吸头锥的情况下拆下滤芯。

在高温灭菌前拆下滤芯！

没有滤芯的情况下本仪器可操作。

14. 保养和清洁

14.1 1000 μL 及以下的 VITLAB®微量移液器

1. 保养

检查移液器吸头锥有无损坏。

检查活塞和密封圈是否受到污染。

测试仪器的活塞密封情况。为此，应安装吸头，然后吸取样品。

垂直握住仪器，让样品在吸头中停留约 10 s。如果在吸头开口处形成液滴，请参见第 18 页“故障排除指南”。

(A)



(B)



(C)



2. 拆卸和清洁

1. 从握持手柄上拧下移液器下半支 (S)。
2. 从移液器下半支上拧下弹出器上部 (A)。
3. 将组件 (B、C 和 D) 从弹出器下部 (E) 中取出。
4. 拧下活塞单元 (B)。

注：

请勿再拆卸活塞与活塞单元
(B)，保持连接状态！

(S)

(D)

5. 拆下带弹簧的密封圈 (C)（对于 10 μL 移液器型号，无法拆下此部件）。
6. 用温和的肥皂液或异丙醇清洗所示部件，然后用蒸馏水冲洗。
7. 干燥相应部件（最高 120 °C/248 °F），并让其冷却。
8. 给活塞和密封圈涂上一层很薄的硅脂。请仅使用推荐的硅脂，参见第 15 页“附件”。
9. 按与上述相反的顺序组装已降至常温的部件。活塞单元和弹出器上部 (A、B) 仅可手动拧紧。

(仅供参考)



(E)

14.2 VITLAB[®] 5 mL 和 10 mL 微量移液器

1. 保养

检查移液器吸头锥有无损坏。

检查活塞和 O 型密封圈是否受到污染。

测试仪器的活塞密封情况。为此，应安装吸头，然后吸取样品。垂直握住仪器，让样品在吸头中停留约 10 s。如果在吸头开口处形成液滴，请参见第 18 页“故障排除”。

2. 拆卸和清洁

1. 在弹出器上部 (F) 旋转，从握持手柄上拆下整个移液器下半支 (S)，然后从吸头锥套筒 (H) 拆下滤芯 (K)。
2. 旋开弹出器上部 (F) 和弹出器下部 (F')，将其分开。
3. 旋松并拆下活塞单元 (G)、弹出器弹簧 (I) 和吸头锥套筒 (H)。
4. 拆下活塞单元上的 O 型密封圈并对其进行清洁。

注：

请勿再拆卸活塞单元 (G)！

5. 用肥皂液或异丙醇清洗活塞单元 (G) 和吸头锥套筒 (H)，然后用蒸馏水冲洗。
6. 干燥相应部件（最高 120 °C/248 °F），并让其冷却。
7. 小心地润滑 O 型圈的内外部，然后将其安装到活塞上。
8. 按照与上述相反的顺序组装已降至常温的各个部件。



(仅供参考)

15. 订购信息和附件

15.1 订购信息

VITLAB®微量移液器

容量	货号
0.1 -2.5 μL	C0708869
0.5 -10 μL	C0708870
2 -20 μL	C0708872
10 -100 μL	C0708874
20 -200 μL	C0708878
100 -1000 μL	C0708880
0.5 -5 mL	C0708882
1.0 -10 mL	C0708884

15.2 附件

用于 6 支移液器的台式架

货号 VT003.1672002



用于 1 支移液器的架子/支架座

货号 VT003.1672000



VITLAB® 5 mL 移液器滤器

25 支装 货号 704652

VITLAB® 10 mL 移液器滤器

25 支装 货号 704653

用于 1000 μL 及以下的 VITLAB®微量移液器的硅脂

1 支装 货号 705502

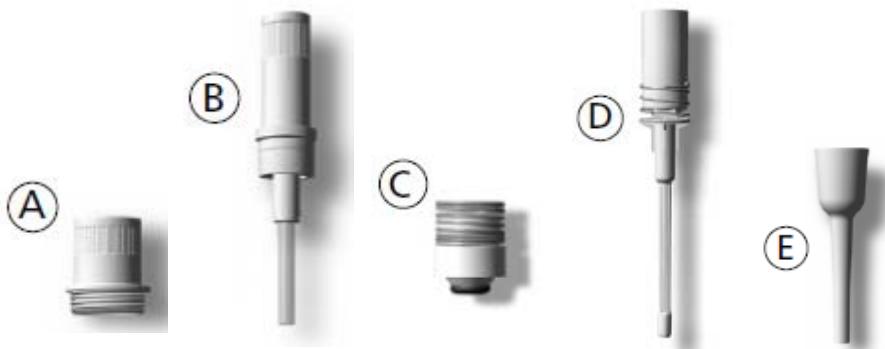
用于 VITLAB® 5 mL/10 mL 微量移液器的硅脂

1 支装 货号 703677

16. 备件

16.1 1000 μL 及以下的 VITLAB®微量移液器

根据仪器的标称量程，部件会略有不同。



弹出器上部

活塞单元

带弹簧的密封圈

吸头锥套筒
和弹出器弹簧

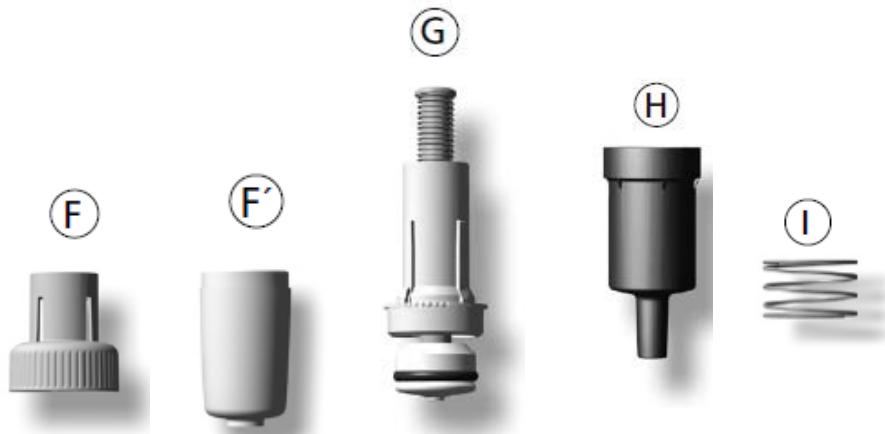
弹出器下部

量程	A	B	C	D	E
0.1 -2.5 μL	705508	704616	-	704719*	704731
0.5 -10 μL	705508	704601	-	704721*	704732
2 -20 μL	705509	704602	704610	704723	704733
10 -100 μL	705509	704654	704661	704724	704735
20 -200 μL	705509	704655	704662	704725	704736
100 -1000 μL	705511	704656	704663	704726	704737

* 密封圈永久安装在吸头锥套筒上 —— 不可拆卸!

16.2 VITLAB® 5 mL 和 10 mL 微量移液器

根据仪器的标称量程，部件会略有不同。



弹出器上部

弹出器下部

活塞单元

吸头锥套筒

弹出器弹簧

量程	F + F'	G	H	I
0.5 -5 mL	704766	704606	703247	704626
1 -10 mL	704767	704607	704628	704626

17. 故障排除

问题	可能的原因	解决方法
吸头滴液 (仪器泄漏)	- 吸头不匹配 - 吸头未安装到位	- 使用优质吸头 - 将吸头压紧
仪器无法吸液或吸液量太小； 排液量太小	- 密封圈被污染 - 密封圈或吸头锥损坏 - 活塞被污染或损坏	- 清洁密封圈 - 更换密封圈或吸头锥 - 清洁或更换活塞
吸液速度过慢	- 吸头锥套筒堵塞 - 5 mL 和 10 mL 型号的滤芯受到污染	- 清洁吸头锥套筒 - 更换滤芯
排液量过大	- 吸取样品前，将移液按钮按得过深，超出了第一档	- 适当操作 参见第 7 页“移液”
活塞难以移动	- 活塞受到污染或需要涂抹润滑脂	- 清洁并润滑活塞

18. 安全符号

符号或数字	含义
	请阅读操作手册。
XXZXXXXX	序列号
121 °C	可在所示温度下高温灭菌

19. 维修 - 校准服务

如果按照故障排除指南操作或更换备件均无法解决问题，则必须将仪器送修。

为安全起见，送回检查和维修的仪器必须经过清洁和消毒！

19.1 返厂维修

- a) 请仔细对本仪器进行清洁和消毒。
- b) 填写“无健康危害声明”（向供应商或制造商索要该表格）。
- c) 将填好的表格连同仪器一起寄给制造商或经销商，并准确描述故障类型和所用介质。

仪器寄回运输风险和费用均由寄件人承担。

19.2 校准服务

ISO 9001 和 GLP 指南要求，应定期检查容量仪器。建议每 3-12 个月检查一次体积。具体时间间隔视仪器的具体要求而定。对于频繁使用或与腐蚀性介质搭配使用的仪器，时间间隔应更短。

可从china.brand.com.cn上下载详细的测试说明。

我们也为您的设备提供收费校准服务，请咨询制造商或经销商获得 BRAND CNAS 实验室校准委托单。填写完校准委托单和“无健康危害声明”后，您只需要将待校准的设备和填好的校准委托单寄给我们，校准实验室将按照工作流程在十五个工作日内将校准报告和设备一起寄回给您。

20. 保修

对于因不当搬运、使用、保养、操作或擅自维修仪器而造成的后果，或因正常磨损（尤其是活塞、密封圈、阀门等易损件）和玻璃破损以及未遵守操作手册的说明而造成的后果，我方不承担任何责任。对于因执行操作手册未说明的任何操作或使用非原装部件造成的损坏，我方不承担任何责任。

21. 废弃物处置

在处置仪器和吸头时，请遵守相关国家的处置规定。

如有技术改动，恕不另行通知。

我方对印刷或排版错误不承担任何责任。

C1695043/0724-1

中文版 | English



VITLAB®

微量移液器

VITLAB®

micropipette

操作手册 (英文版)

Operating Manual (English)



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Contents

1.Safety Instructions	4
2.Purpose	5
3.Limitations of use	5
4.Operating Limitations	5
5.Eperating Exclusions	5
6.Operating and Control Elements	6
7.Pipetting	7
8.Checking the Volume	9
9.Accuracy Table	10
10.Adjustment	11
11.Autoclaving	12
12.UV sterilization	12
13.Filter pipette 5 mL / 10 mL	12
14.Servicing and Cleaning	13
14.1.VITLAB® micropipette up to 1000 µL	13
14.2.VITLAB® micropipette 5 mL / 10 mL	14
15.Ordering Information • Accessories	15
15.1.Ordering Information	15
15.2.Accessories	15
16.Spare Parts	16
16.1.VITLAB® micropipette up to 1000 µL	16
16.2.VITLAB® micropipette 5 mL / 10 mL	17
17.Troubleshooting	18
18.Safety Symbols	18
19.Repairs • Calibration Service	19
19.1.Return for repair	19
19.2.Calibration Service	19
20.Warranty Information	20
21.Disposal	20

1. Safety Instructions

Please read the following carefully!

This instrument may sometimes be used with hazardous materials, operations, and equipment. It is beyond the scope of this manual to address all of the potential safety risks associated with its use in such applications. It is the responsibility of the user of this pipette to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1. Every user must read and understand this operating manual prior to using the instrument and observe these instructions during use.
2. Follow general instructions for hazard prevention and safety instructions; e.g., wear protective clothing, eye protection and gloves. When working with infectious or other hazardous samples, all appropriate regulations and precautions must be followed.
3. Observe all specifications provided by reagent manufacturers.
4. Only use the instrument for pipetting liquids that conform to the specifications defined in the limitations of use and operating limitations. Observe operating exclusions (see page 5). If in doubt, contact the manufacturer or supplier.
5. Always use the instrument in such a way that neither the user nor any other person is endangered. Avoid splashes. Use only suitable vessels.
6. Avoid touching the tip orifices when working with hazardous samples.
7. Never use force on the instrument!
8. Use only original spare parts. Do not attempt to make any technical alterations. Do not dismantle the instrument any further than is described in the operating manual!
9. Before use check the instrument for visible damages. If there is a sign of a potential malfunction (e.g., piston difficult to move, leakage), immediately stop pipetting. Consult the 'Troubleshooting' section of this manual (see page 18), and contact the manufacturer if needed.

2. Purpose

Air-displacement pipette for pipetting aqueous solutions of medium density and low to medium viscosity.

3. Limitations of Use

The instrument is intended for the pipetting of liquids within the following limitations:

- Temperature of both the instrument and solution should be between 15 °C to 40 °C (59 °F to 104 °F). Consult the manufacturer for use in temperatures outside of this range.
- Vapor pressure up to 500 mbar
- Viscosity: 260 mPas (260 cps)

4. Operating Limitations

Viscous and highly adhesive liquids may impair volumetric accuracy. Volumetric accuracy may also be impaired when pipetting liquids that differ from ambient temperature by more than ± 1 °C.

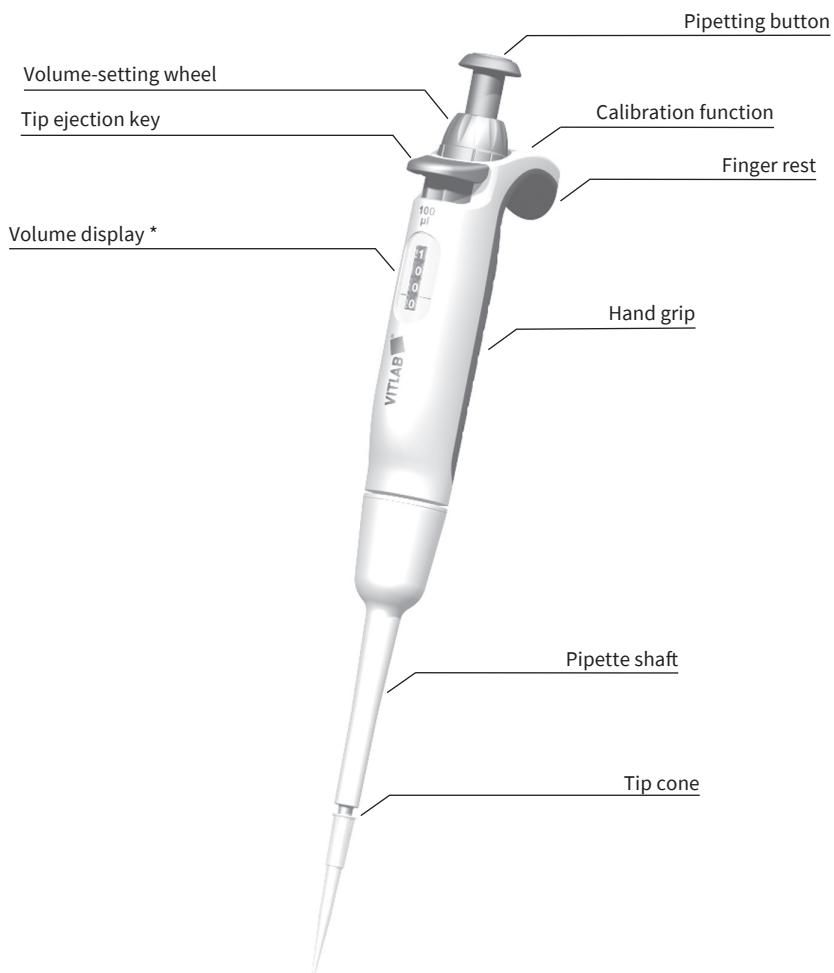
5. Operating Exclusions

The user has to ensure the compatibility of the instrument with the intended application.

This instrument cannot be used:

- for liquids incompatible with polypropylene
- for liquids incompatible with polycarbonate (inspection window)
- for liquids of a very high vapor pressure
- for liquids incompatible with FKM and polyetheretherketone (PEEK)
- for liquids incompatible with polyvinylidene fluoride

6. Operating and Control Elements



(Fig. shows VITLAB® micropipette 100 µL)

* Volume display

The figures in the display are read from top to bottom, the dash represents the decimal point.

Note:

Optimum analysis results can only be obtained with quality tips. We recommend BRAND® pipettes.

7. Pipetting

- 5 mL and 10 mL instruments should only be used with the PE filter installed (see page 12).
- Pipette tips are disposable items!



1. Fitting the tip

Use the correct tips according to the volume range or the color code.

Ensure that the tips is securely seated.



2. Volume setting

Select the desired volume by rotating the volumes setting wheel. Avoid twisting and abrupt rotating motions during this adjustment.



3. Aspirate sample

- a) Press pipetting button to the first stop.
- b) Hold the pipette vertically and immerse the tip into the liquid.

Volume range	Immersion depth in mm	Waiting time in s
> 1 µL- 100 µL	2 - 3	1
> 100 µL - 1000 µL	2 - 4	1
> 1000 µL	3 - 6	3

- c) Leave the tip immersed in the liquid for a few seconds, so that the set volume is aspirated completely. This is especially important when pipetting viscous media and when using pipettes with large volumes.



4. Discharge sample

- Place the pipette tip against the wall of the vessel. Hold the pipette at an angle of 30-45° relative to the container wall.
- Press the pipetting button slowly to the first stop and hold it down. For serum and liquids of high viscosity or low surface tension, observe adequate waiting time to improve accuracy.
- The blow-out stroke empties the tip completely: Press the pipetting button down to the second stop.
- While doing this, wipe the pipette tip against the wall of the container.
- Remove the pipette tip from the container wall and let the pipetting button slide back.



5. Ejecting the tip

Hold the pipette shaft over a suitable disposal container and press the tip ejection key to the stop.



Note:

ISO 8655 prescribes rinsing the pipette tip once with the sample liquid prior to the actual pipetting process.

Important!

Don't lay the instrument horizontal when the tip is filled. Liquid may enter and contaminate the instrument. The instrument should be stored without tips, placed upright in the shelf/rack mount or bench top rack which can be ordered separately.

8. Checking the Volume

Depending on use, we recommend inspection of the instrument every 3 to 12 months. The cycle can, however, be adjusted to individual requirements.

The gravimetric testing of the pipette volume is performed according to the following steps and is in accordance with DIN EN ISO 8655, Part 6.

1. Set nominal volume

Set volume to the maximum volume indicated on the instrument (see page 7 for procedure).

2. Condition the pipette

Condition the pipette before testing by using a pipette tip to aspirate and discharge the test liquid (distilled H₂O) five times.

3. Carry out the test

Note:

In accordance with DIN EN ISO 8655-2, a tip change is recommended after each individual measurement. An exception to this rule can be made, according to DAkkS guideline DKD-R8-1.

- a) Aspirate liquid and pipette it into the weighing vessel.
- b) Weigh the pipetted quantity with an analytical balance. Please follow the operating manual instructions from the balance manufacturer.
- c) Calculate the volume, taking the temperature of test liquid into account.
- d) At least 10 pipettings and weighings in three volume ranges (100 %, 50 %, 10 % of nominal volume) are recommended for statistical analysis.

Calculation for nominal volume V₀

x_i = Weighing results

n = Number of weighings

Z = Correction factor (e.g. 1,0029 µL/mg at 20 °C, 1013 hPa)

Mean value

$$\bar{x} = \frac{\sum x_i}{n}$$

Accuracy*

$$A\% = \frac{\bar{V} - V_0}{V_0} \cdot 100$$

Mean volume

$$\bar{V} = \bar{x} \cdot Z$$

Coefficient of Variation*

$$CV\% = \frac{100 s}{\bar{V}}$$

Standard Deviation

$$s = Z \cdot \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

* Calculation of accuracy (A %) and variation coefficient (CV %): A% and CV % are calculated according to the formulas for statistical control.

Note:

Testing instructions (SOPs) are available for download at china.brand.com.cn

9. Accuracy Table

VITLAB® micropipette, Digital adjustable

Volume range µL	Volume step µL	A* ≤ ± %	CV* ≤ %	Increment µL	Recommended type of tip, µL
0.1 -2.5	2.5	1.4	0.7	0.002	0.5 -20
	1.25	2.5	1.5		
	0.25	12	6		
0.5 -10	10	1	0.5	0.01	0.5 -20
	5	1.6	1		
	1	7	4		
2 -20	20	0.8	0.4	0.02	2 -200
	10	1.2	0.7		
	2	5	2		
10 -100	100	0.6	0.2	0.1	2 -200
	50	0.8	0.4		
	10	3	1		
20 -200	200	0.6	0.2	0.2	2 -200
	100	0.8	0.3		
	20	3	0.6		
100 -1000	1000	0.6	0.2	1	50 -1000
	500	0.8	0.3		
	100	3	0.6		
500 -5000	5000	0.6	0.2	5	500 -5000
	2500	0.8	0.3		
	500	3	0.6		
1000 -10000	10000	0.6	0.2	10	1000 -10000
	5000	0.8	0.3		
	1000	3	0.6		

Final test values related to the nominal capacity (maximum volume) indicated on the instrument, obtained when instrument and distilled water are equilibrated at ambient temperature ((20 °C/68 °F)) and with smooth operation. According to DIN EN ISO 8655.

* A = Accuracy

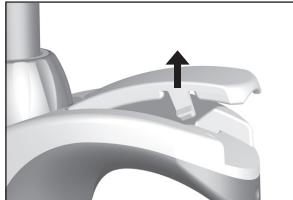
* CV = Coefficient of Variation



10. Adjustment

The instrument is permanently adjusted for aqueous solutions. If the pipette operation is clearly inaccurate, or if the instrument must be adjusted for solutions of different densities and viscosities or specially-shaped pipette tips, adjustments can be made.

1. Check the volume, determine actual value (see page 9).
2. Remove the cover: Push the hook forward, raise it slightly and then pull it back.
3. Using a paperclip or an unused pipette tip, remove the protective film (this protective film can be discarded).
4. Push the red adjustment slider completely back (right arrow), raise the volume-setting wheel (left arrow) and release the adjustment slider.
5. Set the adjustment value:
set the volume-setting wheel to the previously determined actual value. A volume check is recommended after every adjustment.
6. Push the adjustment slider completely back again, push the volume-setting wheel downwards and release the adjustment slider. Re-insert the cover.



11. Autoclaving

The pipette is completely autoclavable at (121 °C / 250 °F), 2 bar absolute (30 psi) with a holding time of at least 15 minutes, according to DIN EN 285.

1. Eject the pipette tip.
2. Autoclave the complete pipette without any further disassembling.
Remove the filter of pipette 5 mL and 10 mL before autoclaving.
3. Allow the pipette to completely cool and dry.

Note:

The effectiveness of the autoclaving must be verified by the user. Maximum reliability is obtained with vacuum sterilization. We recommend the use of sterilization bags.

Attention!

Prior to autoclaving, the volume adjustment must be set on an available numbered volume (e.g., 11.25 or 11.26 but not between).

If the pipette is autoclaved frequently, the piston and the seal should be greased with silicone grease in order to preserve smooth movement. Please use only the recommended silicone grease, see accessories page 15. If necessary after sterilization, tighten the connection between the hand grip and the pipette shaft.

12. UV sterilization

The unit can withstand the usual output of a UV sterilization lamp. The effects of the UV may cause some color change.

13. Filter pipette 5 mL / 10 mL

A hydrophobic PE filter is used as a safeguard against liquid entering the pipette.

Change the filter if it becomes wet or contaminated.

- Use a flat object such as a screwdriver
- Remove the filter without damaging the tip cone.

Remove the filter before autoclaving!

The instrument can be operated without a filter.

14. Servicing and Cleaning

14.1. VITLAB® micropipette up to 1000 µL

1. Servicing

Inspect the pipette tip cone for damage.

Inspect the piston and seal for contamination.

Test the instrument's piston seal. To do this affix a tip, and aspirate a sample. Hold the instrument vertically, with the sample in the tip for approximately 10 s. If a drop forms at the tip orifice, see the troubleshooting guide on page 18.

(A)



(B)



(C)



(D)



Note:

Piston remains connected with piston unit (B)!

1. Unscrew the pipette shaft (S) from the hand grip.
2. Unscrew the upper part of the ejector (A) from the pipette shaft.
3. Pull the shaft (B, C and D) out of the lower part (E) of the ejector.
4. Unscrew the piston unit (B).
5. Remove the seal with spring (C) (this is non-removable on 10 µL pipette models).
6. Clean the parts shown with a mild soap solution or isopropanol and then rinse with distilled water.
7. Allow the parts to dry (max.120 °C / 248 °F).
8. Grease piston and seal with a very thin layer of silicone grease.
Please use only the recommended silicone grease, see accessories page 15.
9. Assemble the ambient temperature parts in reverse order from above. Piston unit and upper part of the ejector (A, B) should only be hand-tight.

(E)



(For illustration purposes only)

14.2. VITLAB® micropipette 5 mL and 10 mL

1. Servicing

Inspect the pipette tip cone for damage.

Inspect the piston and O-Ring-seal for contamination.

Test the instrument's piston seal. To do this, affix a tip, and aspirate a sample. Hold the instrument vertically, with the sample in the tip for approximately 10 s. If a drop forms at the tip orifice, see the troubleshooting guide on page 18.

2. Disassembly and cleaning

1. Remove the entire shaft (S) from the handgrip by rotating at the upper end of the ejector (F) and remove the filter (K) from the bottom part of the shaft (H).
2. Separate the bottom part of the ejector (F') by unscrewing it from the upper part of the ejector (F).
3. Unscrew and dismantle the piston unit (G) with the ejector spring (I) and the bottom part of the shaft (H).
4. Remove the O-Ring-seal from the piston unit and clean it.

Note:

Do not disassemble piston unit (G) any further!

5. Clean piston unit (G) and lower part of pipette shaft (H) with a soap solution or isopropanol and then rinse with distilled water.
6. Allow the parts to dry (max. 120 °C / 248 °F) and to cool down.
7. Carefully lubricate the inside and outside of the O-ring and mount it on the piston.
8. Assemble the individual components in the reverse order from that described above.



(For illustration purposes only)

15. Ordering Information and Accessories

15.1. Ordering Information

VITLAB® micropipette

Volume	Cat. No.
0.1 -2.5 µL	C0708869
0.5 -10 µL	C0708870
2 -20 µL	C0708872
10 -100 µL	C0708874
20 -200 µL	C0708878
100 -1000 µL	C0708880
0.5 -5 mL	C0708882
1.0 -10 mL	C0708884

15.2. Accessories

Bench-top rack for 6 pipettes

Cat. No. VT003.1672002



**Filter for VITLAB® micropipette 5 mL,
pack of 25** Cat. No. 704652

**Filter for VITLAB® micropipette 10 mL,
pack of 25** Cat. No. 704653

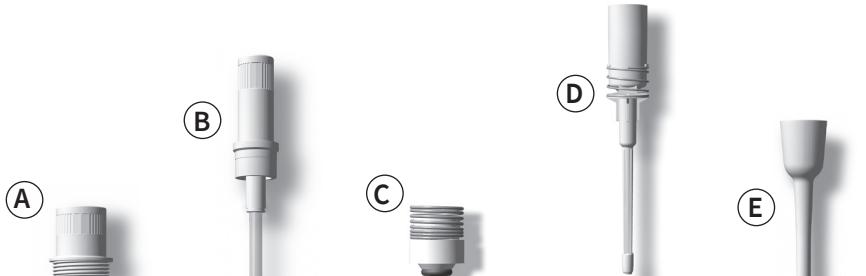
**Silicone grease for VITLAB® micropipette up to 1000 µL
pack of 1** Cat. No. 705502

**Silicone grease for VITLAB® micropipette 5 mL/10 mL
pack of 1** Cat. No. 703677

16. Spare parts

16.1. VITLAB® micropipette up to 1000 µL

For illustration purposes only, parts will differ slightly depending on nominal volume of instrument.



Upper part
of ejector

Piston
unit

Seal with
spring

Shaft with
ejector spring

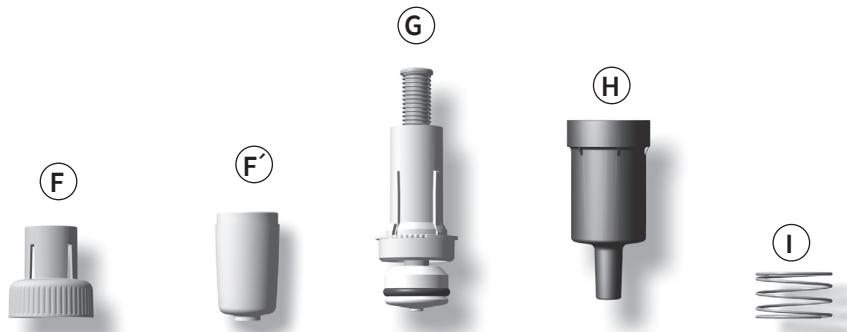
Lower Part
of ejector

Volume	A	B	C	D	E
0.1 - 2.5 µL	705508	704616	-	704719*	704731
0.5 - 10 µL	705508	704601	-	704721*	704732
2 - 20 µL	705509	704602	704610	704723	704733
10 - 100 µL	705509	704654	704661	704724	704735
20 - 200 µL	705509	704655	704662	704725	704736
100 - 1000 µL	705511	704656	704663	704726	704737

* Seal permanently installed in shaft – not removable!

16.2. VITLAB® micropipette 5 mL and 10 mL

For illustration purposes only, parts will differ slightly depending on nominal volume of instrument.



Upper part
of ejector

Lower part
of ejector

Piston
unit

Lower part
of pipette
shaft

Ejector
spring

Volume	F + F'	G	H	I
0.5 - 5 mL	704766	704606	703247	704626
1 - 10 mL	704767	704607	704628	704626

17. Troubleshooting

Problem	Possible cause	Corrective action
Tip dripping (instrument leaks)	- Unsuitable tip - Tip not seated tightly	- Only use high-quality tips - Press tip on firmly
The instrument does not aspirate or aspirates too little; the discharged volume is too low	- Seal contaminated - The seal or cone is damaged - The piston is contaminated or damaged	- Clean seal - Replace seal or shaft - Clean or replace piston
Aspiration is too slow	- Shaft clogged - The filter in the 5 mL and 10 mL models is contaminated	- Clean shaft - Change the filter
Discharged volume is too large	- Pipetting button pressed too far into the blow-out position before sample uptake	- Operate properly. See 'Pipetting', page 7.
Piston is difficult to move	- The piston is contaminated or needs grease	- Clean and grease piston

18. Safety Symbols

Symbol or number	Meaning
	Read the user manual.
XXZXXXXX	Serial number
	Autoclavable up to the temperature shown

19. Repairs - Calibration Service

If a problem cannot be fixed by following the troubleshooting guide, or by replacing spare parts, then the instrument must be sent in for repair.

For safety reasons, instruments returned for checks and repairs must be clean and decontaminated!

19.1. Return for repair

- a) Clean and decontaminate the instrument carefully.
- b) Complete the 'Declaration on Absence of Health Hazards' (ask your supplier or manufacturer for the form).
- c) Send the completed form along with the instrument to the manufacturer or to the dealer with an exact description of the type of malfunction and the media used.

The return transport of the instrument is at risk and cost of the sender.

19.2. Calibration Service

ISO 9001 and GLP-guidelines require regular examinations of your volumetric instruments. We recommend checking the volume every 3-12 months. The interval depends on the specific requirements on the instrument. For instruments frequently used or in use with aggressive media, the interval should be shorter.

The detailed testing instruction can be downloaded on china.brand.com.cn.

We also offer a paid calibration service for your equipment. Please contact the manufacturer or distributor to obtain a BRAND CNAS laboratory calibration request form. After completing the calibration request form and the 'Declaration on Absence of Health Hazards', simply send the equipment to be calibrated and the completed form to us. The calibration laboratory will return the calibration report along with the equipment within fifteen working days, following the standard procedures.

20. Warranty

We shall not be liable for the consequences of improper handling, use, servicing, operating or unauthorized repairs of the instrument or the consequences of normal wear and tear especially of wearing parts such as pistons, seals, valves and the breakage of glass as well as the failure to follow the instructions of the operating manual. We are not liable for damage resulting from any actions not described in the operating manual or if non-original parts have been used.

21. Disposal

For the disposal of instruments and tips, please observe the relevant national disposal regulations.

Subject to technical modification without notice.
We will not be held responsible for printing or typographical errors.

C1695043/0724-1