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中文版 | English



VITLAB®

# 多通道微量移液器

VITLAB®

## micropipette -8/-12

操作手册 (中文版)

Operating Manual (Simplified Chinese)



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## 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. 仅可使用原装备件。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 20 页），必要时联系制造商。

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## 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50 kPa。
- 粘度:260 mPa·s

## 4. 操作限制

高粘度和高蒸气压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。

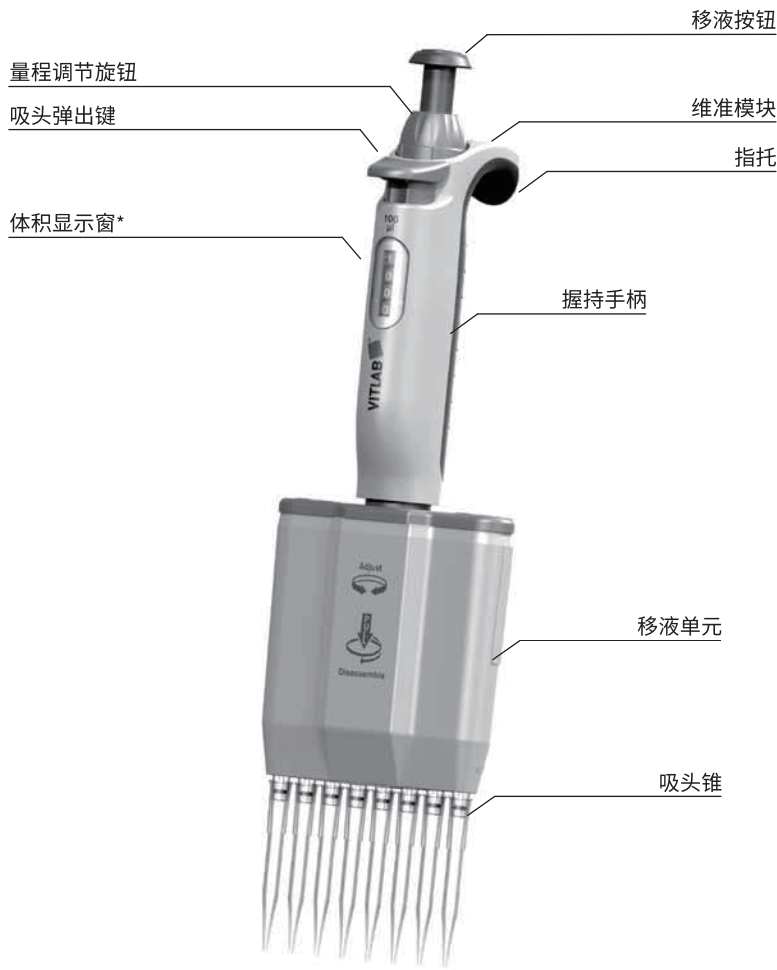
## 5. 操作例外情况

使用者必须确保本仪器符合预期用途。

本仪器不能用于：

- 1.与聚丙烯和FKM不兼容的液体
- 2.与聚碳酸酯不兼容的液体
- 3.与聚偏氟乙烯和硅脂不兼容的液体
- 4.与聚苯硫醚不兼容的液体 (对于50 µL、100 µL、200 µL和300 µL仪器)
- 5.蒸气压极高的液体

## 6. 操作和控制元件



(图中所示为100 µL VITLAB® micropipette 8通道微量移液器)

\*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



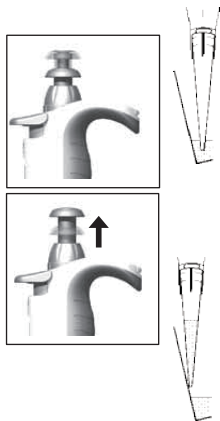
1. 安装吸头
- 根据体积范围或颜色代码使用适当的吸头。
- 确保吸头固定到位。
- 移液器吸头为一次性耗材！



2. 体积设置
- 旋转型程调节旋钮，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. 对齐移液单元
- 移液单元可以双向自由旋转。



4. 吸取样品
- a) 将移液按钮按至第一档。
- b) 垂直握住移液器，将吸头浸入液体以下2-3mm处

体积范围	浸入深度 (mm)	等待时间 (s)
> 0.5µL -100 µL	2-3	1-2
> 100 µL -300 µL	2-4	1-2

- c) 然后缓慢松开移液按钮。让吸头在液体中停留1-2秒，以便完全吸出设定体积的液体。
- d) 将吸头抵在容器壁。



## 5. 排出样品

- a) 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。
- b) 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。



- c) 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，
- d) 同时在容器壁上擦拭移液器吸头。
- e) 从容器壁上移开移液器吸头，松开移液按钮使其归位



## 6. 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。

### 注意：

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。



## 8. 检查移液体积

根据使用情况, 建议每3至12个月检查一次仪器。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

将体积设定为仪器上显示的最大体积 (详见  
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

- a) 安装新的吸头, 并用测试液体润洗一次。
- b) 吸入液体并将其移入称量容器中。

### 注意:

每一通道必须分别测试。

- c) 用分析天平称重移液质量。(请遵照天平制造商的操作手册说明)
- d) 在考虑测试液体温度的情况下计算液体体积。
- e) 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

$n$  = 称量次数

平均值

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

平均体积

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

标准差

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

$Z$  = 校正因子 (例如, 在20°C、1013 hPa条件下为  
1,0029  $\mu\text{L}/\text{mg}$ )

准确度\*

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

偏差系数\*

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

\*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](http://china.brand.com.cn)上下载测试说明 (SOP)。

## 9. 精度表

VITLAB® micropipette -8/12多通道微量移液器

量程范围 ( $\mu\text{L}$ )	体积点 ( $\mu\text{L}$ )	A* $\leq \pm \%$	CV* $\leq \%$	分量 ( $\mu\text{L}$ )	推荐的吸头规格 ( $\mu\text{L}$ )
0.5- 10	10	1.6	1.0	0.01	0.5-20
	5	2	2		
	1	8	6		
5 - 50	50	0.8	0.4	0.05	2-200
	25	1.4	0.8		
	5	6	3		
10 - 100	100	0.8	0.3	0.1	2-200
	50	1.4	0.6		
	10	4	2		
20 - 200	200	0.8	0.3	0.2	2-200
	100	1.4	0.6		
	20	4	1.5		
30 - 300	300	0.6	0.3	0.5	5-300
	150	1.2	0.6		
	30	3	1.5		

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) 下达到平衡且平顺操作时得出的。

\* A = 准确度

\* CV = 偏差系数

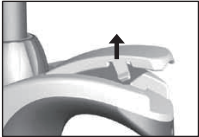


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# 10. 调整

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,可以通过维准模块进行相应的调整操作。

1.检查移液体积,确定实际值(详见第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

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## 11. 高温灭菌

根据DIN EN 285标准, 移液器可在121°C、200 kPa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。
- 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

### 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, 以保证操顺滑。请仅使用推荐的硅脂, 参见第19页“附件”。灭菌后如有必要, 请旋紧握持手柄与移液单元之间的连接处。

## 12. 紫外灭菌

该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. 保养和清洁

移液器的三个主要部件可以轻松分开和拆卸,以便维护、清洁或更换部件。以下几页说明了这些步骤。

注:

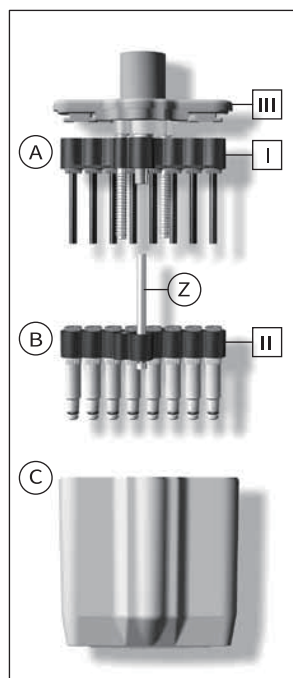
吸头锥上O形圈的更换,请详见配件随附的说明书。

### 13.1 移液单元的主要部件

A 活塞单元,带活塞支撑架[I]和插入此处的活塞,活塞可单独旋开进行清洁或更换。

B 吸头锥单元,吸头锥支撑架[II]和连接的中央导向轴(Z)、以及吸头锥和密封圈,吸头锥可单独拧下进行清洁和更换。

C 移液单元外壳,通过两个旋锁盖板将其与移液单元的移液器外壳盖[III]相连。



### 13.2 维护

为确保正常工作, VITLAB® micropipette -8/-12微量移液器应定期保养, 并要在必要时进行清洁。

必须检查哪些部件?

- 检查移液器吸头锥、活塞和密封圈有无损坏和污染。
- 检查设备是否泄漏, 可以吸取样品, 然后垂直握住设备约10秒。如果移液器吸头开口处有液滴渗出, 请参考第20页“故障排除”。

### 13.3 清洁

- 使用肥皂液或异丙醇清洁各个吸头锥和活塞 (仅限这些部件)。然后用蒸馏水冲洗。
- 让部件完全干燥并冷却。吸头锥中的残留液体会导致准确度出现偏差。
- 在活塞上重新涂上一层很薄的硅脂。中央导向轴 (Z) 仅可使用规定的氟润滑脂。(请参考第19页“更多附件”中的货号)

### 13.4 将移液单元与握持手柄分开

- 弹出移液器吸头。
- 将移液单元向下拉到底然后顺时针旋转。旋转一圈后, 不需要再向下拉移液单元。

**注意:**

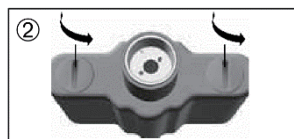
错误的操作可能损坏部件!



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## 14. 拆卸移液单元

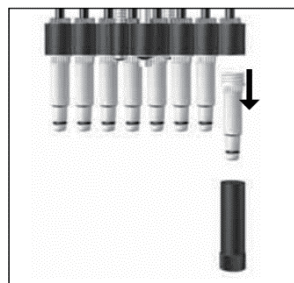
### 14.1 卸下吸头锥和密封圈

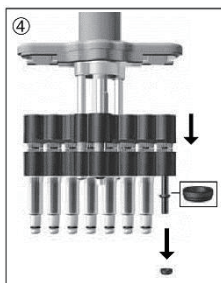


- 1) 将移液单元与握持手柄分开。
- 2) 将移液器外壳盖的两个旋锁盖板旋转90° (例如, 用硬币), 然后褪下移液器外壳。



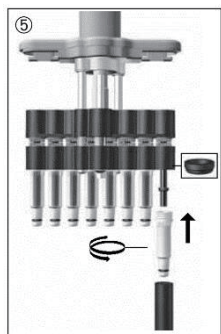
- 3) 将安装工具 (M) (移液器附件) 套在吸头锥上, 并旋松。





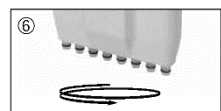
4) 将活塞部件推至底端。卸下吸头锥后，密封圈在吸头锥内或活塞上。拆下并检查密封圈，必要时进行清洁或更换。必要时可用硅脂轻轻润滑。

(如需清洁VITLAB®微量移液器-8/-12 30-300 $\mu$ L，还要将活塞上的附加耐压环卸下。)



5) 将密封圈平面向上，推入活塞 (在VITLAB®微量移液器-8/-12 30-300 $\mu$ L上，先重新安装附加耐压环！)

请用安装工具安装并拧紧清洁后的或新的吸头锥。



6) 重新组装移液单元，逆时针将主轴旋紧至握持手柄上，直到听到恰好咬合的咔哒声，检查本仪器有无泄漏。(详见14页“维护”)。

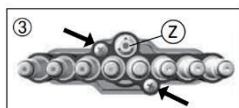


## 14.2 拆卸活塞进行清洁或更换

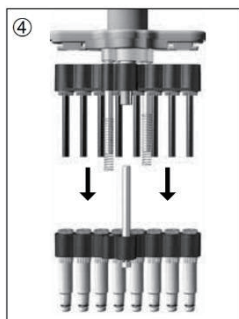


1) 将移液单元与握持手柄分开。

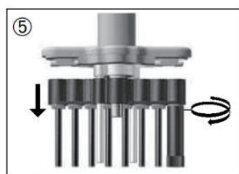
2) 将移液器外壳盖的两个旋锁盖板旋转90° (例如, 用硬币), 然后褪下移液器外壳。



3) 拆下吸头锥单元上的两颗外十字螺丝。



4) 拉开并分离活塞和吸头锥组件。拆下冲程弹簧。



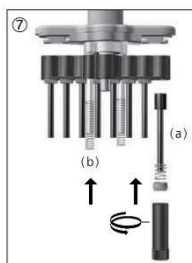
5) 将安装工具装在活塞螺帽上, 旋松活塞螺帽将其拧下。

注意:

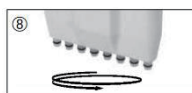
请勿旋松中央导向轴 (Z) !



6) 拆下带有活塞弹簧的活塞螺帽，并拔出活塞。



7) 插入活塞弹簧 (a) 和清洁后的活塞或新活塞。使用安装工具重新拧紧活塞螺帽。更换冲程弹簧 (b)。



8) 重新组装移液单元，逆时针将主轴旋紧至握持手柄上，直到听到恰好咬合的咔哒声，检查本仪器密封性、灵活性和准确度。(详见14页“维护”)。

# 15. 订购信息和附件

## 15.1 订购信息

VITLAB® 8 通道微量移液器

量程	货号
0.5 - 10 µL	C0708900
5 - 50 µL	C0708906
10 - 100 µL	C0708908
20 - 200 µL	C0708910
30 - 300 µL	C0708912

VITLAB® 12 通道微量移液器

量程	货号
0.5 - 10 µL	C0708920
5 - 50 µL	C0708926
10 - 100 µL	C0708928
20 - 200 µL	C0708930
30 - 300 µL	C0708932

## 15.2 更多附件

移液器旋转支架, 适用于6支

VITLAB®微量移液器或3支

VITLAB®多道微量移液器

货号 VT003.1672002



移液器挂架 适用于1支VITLAB

微量移液器

货号 VT003. 1672000



硅脂, 适用于VITLAB 微量移液枪 -8/-12

5 mL/10 mL 货号 703677

氟润滑脂 货号 703678

加样槽, 非灭菌型, 聚丙烯材质 60 mL,

包装规格=10个 货号 703459

# 16. 零配件

根据不同移液器的标称量程, 零配件货号会有所区别。(如图所示为VITLAB® 微量移液器 -8/-12,10-100µL的零配件。)



量程	A	B*	C	D
0.5 - 10 µL	705659	705677	703380	703340
5 - 50 µL	705666	705634	705618	703343
10 - 100 µL	705662	705635	705618	703344
20 - 200 µL	705663	705636	705618	703345
30 - 300 µL	705664	705638	705618	703346

\* 包括密封圈, O型圈和安装工具。

VITLAB® 30-300uL量程的多道微量移液器货号含附加耐压环。

# 17. 故障排除

问题	可能的原因	解决方法
吸头滴液 (仪器泄漏)	- 吸头不适配	- 使用优质吸头
	- 吸头未安装到位	- 将吸头压紧
仪器无法吸液或吸液量太小； 排放量太小	- 密封圈污染	- 清洁密封圈
	- 密封圈或吸头锥损坏	- 更换密封圈或吸头锥
	- 活塞污染或损坏	- 清洗或更换活塞
吸液速度过慢	- 吸头锥堵塞	- 清洗吸头锥
排放量过大	- 吸取样品前, 将移液按钮按 得过深, 超出了第一档	- 正确操作 请见7页“移液”
	- 活塞受到污染或需要涂抹硅脂	- 清洁并润滑活塞

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## 18. 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!

### 18.1 返厂维修

请仔细对本仪器进行清洁和消毒。

填写“无健康危害声明”(向供应商或制造商索要该表格。)

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。

### 18.2 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个月检查一次移液体积。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](http://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。

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## 19 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。

## 20 废弃物处置

在处置废弃仪器和吸头时，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。







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中文版 | English



VITLAB®

# 多通道微量移液器

VITLAB®

## micropipette -8/-12

操作手册 (英文版)

Operating Manual (English)



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# 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 20), and contact the manufacturer if needed.

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## 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. Consult the manufacturer for use in temperatures outside of this range.
- Vapor pressure up to 50 kPa
- Viscosity: 260 mPa · s

## 4. Operating Limitations

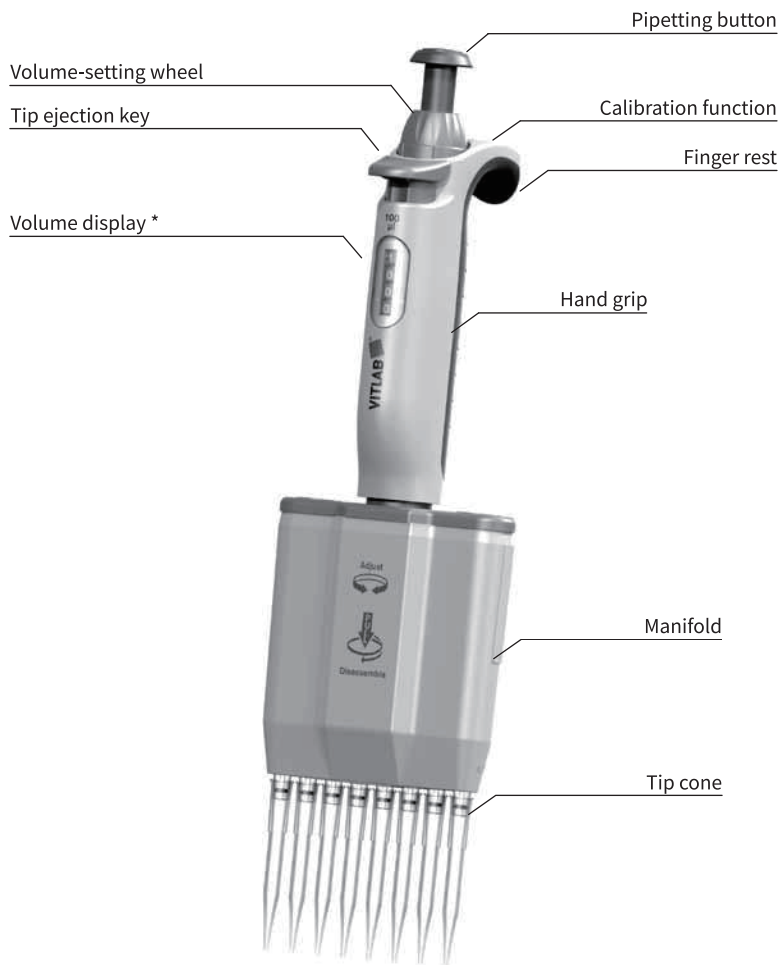
Viscous and highly adhesive liquids may impair volumetric accuracy. Volumetric accuracy may also be impaired when pipetting liquids that differ from ambient temperature by more than  $\pm 1$  °C

## 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 and FKM
- for liquids incompatible with polycarbonate (inspection window)
- for liquids that corrode polyvinylidene fluoride and silicone
- for liquids that corrode polyphenylene sulfide (on 50 µL, 100 µL, 200 µL and 300 µL instruments)
- for liquids of a very high vapor pressure

# 6. Operating and Control Elements



(Fig. shows VITLAB® micropipette 8 channels)

\* 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® pipette tips.

# 7. Pipetting



## 1.Fitting the tip

Use the correct tips according to the volume range or the color code.  
Ensure that the tips are securely seated.  
Pipette tips are disposable items!



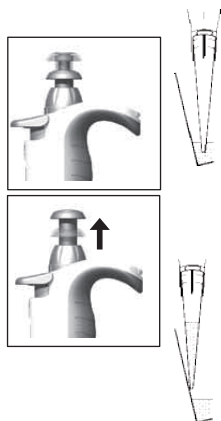
## 2.Volume setting

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



## 3.Align the manifold

The manifold can turn freely in both directions.



## 4.Aspirate sample

- a)Press pipetting button to the first stop.
- b)Hold the pipette vertically and immerse the tip 2 to 3 mm into the liquid.

Volume range	Immersion depth in mm	Waiting time in s
> 0.5µl -100 µL	2 -3	1 -2
> 100 µl -300 µL	2 -4	1 -2

- c)Let the pipetting button slide back slowly. In order for the liquid to reach its end position, leave the tip immersed for another 1-2 s.
- d)Touch the tip against the container wall.



#### 5. Discharge sample

- a) Place the pipette tips against the wall of the vessel. Hold the pipette at an angle of 30-45° relative to the container wall.
- b) 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.



- c) The blow-out stroke empties the tips completely: Press the pipetting button down to the second stop.
- d) While doing this, wipe the pipette tips against the wall of the container.
- e) Remove the pipette tips from the container wall and let the pipetting button slide back.



#### 6. Ejecting the tips

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

#### **Note:**

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

#### **Important!**

Don't lay the instrument horizontal when the tips are filled. Liquid may enter and contaminate the instrument.



## 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 tips to aspirate and discharge the test liquid (distilled H<sub>2</sub>O) five times. After this, discard the pipette tips.

### 3. Carry out the test

a) Attach new pipette tips and prerinse one time with test liquid.

b) Aspirate liquid and pipette it into the weighing vessel.

#### Note:

Each individual channel must be tested separately.

c) Weigh the pipetted quantity with an analytical balance. (Please follow the operating manual instructions from the balance manufacturer.)

d) Calculate the volume, taking the temperature into account.

e) 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 $V_0$

$x_i$  = Weighing results

$n$  = Number of weighings

Mean value

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

Mean volume

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

Standard Deviation

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

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

Accuracy\*

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

Coefficient of Variation\*

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

\*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](http://china.brand.com.cn)

# 9. Accuracy Table

VITLAB® micropipette -8/12, Digital adjustable

Volume range μL	Volume step μL	A* ≤ ± %	CV* ≤ %	Increment μL	Type of tip μL
0.5- 10	10	1.6	1.0	0.01	0.5-20
	5	2	2		
	1	8	6		
5 - 50	50	0.8	0.4	0.05	2-200
	25	1.4	0.8		
	5	6	3		
10 - 100	100	0.8	0.3	0.1	2-200
	50	1.4	0.6		
	10	4	2		
20 - 200	200	0.8	0.3	0.2	2-200
	100	1.4	0.6		
	20	4	1.5		
30 - 300	300	0.6	0.3	0.5	5-300
	150	1.2	0.6		
	30	3	1.5		

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) and with smooth operation. According to DIN EN ISO 8655.

\* A = Accuracy

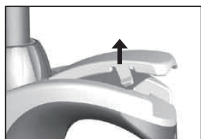
\* CV = Coefficient of Variation



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## 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. Reinsert the cover.

---

## 11. Autoclaving

The pipette is completely autoclavable at 121 °C, 200 kPa absolute with a holding time of at least 15 minutes, according to DIN EN 285.

1. Eject the pipette tips.
2. Autoclave the complete pipette without any further disassembling.
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 pistons should be oiled with silicone oil in order to preserve smooth movement. Please use only the recommended silicone oil, see accessories page 19. If necessary after sterilization, tighten the connection between the hand grip and the manifold.

## 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.



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## 13. Servicing and Cleaning

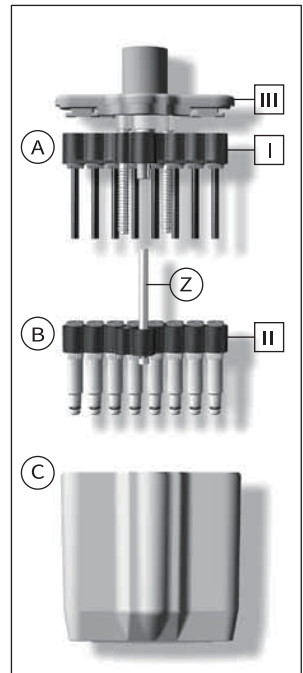
The three main components of the manifold can be easily separated and disassembled for servicing, cleaning or replacing parts. The procedures are illustrated on the following pages.

**Note:**

The changing of the O-rings on the individual nose cones is described in detail in the instructions enclosed with the spare part.

### 13.1 The main components of the manifold

- A Piston unit with piston support bar [ I ] and pistons inserted in this unit, which can be unscrewed individually for cleaning or replacement.
- B Nose cone assembly with nose cone support bar [ II ] and central guide rod (Z), which is attached to this, and the nose cones and seals, which can be unscrewed individually for cleaning or replacement.
- C Manifold housing, which is connected to the manifold housing cover [ III ] of the piston unit with two turnlock fasteners.



---

## 13.2 Servicing

In order to assure proper functioning, the VITLAB® micropipette -8/-12 should be serviced and cleaned at regular intervals.

What is to be inspected?

- a) Inspect nose cones, pistons and seals for damage and contamination.
- b) Test the sealing of the instrument. To do this aspirate a sample, and then hold the instrument in a vertical position for about 10 sec. If a drop forms at the tip orifices, see the troubleshooting guide, page 20.

## 13.3 Cleaning instructions

- a) Clean single nose cones, pistons and nose cone support bar/ piston support bar (these components only) with soap solution or isopropyl alcohol. Afterwards, rinse with distilled water.
- b) Let these parts dry and cool down completely. Residual moisture in the nose cones may result in a loss of accuracy.
- c) Lubricate the piston with a very thin coating of the silicone oil supplied. For the central guide rod (Z) only use the recommended fluorstatic grease! See accessories page 19.

## 13.4 Disconnecting handle from manifold

- a) Eject the pipette tips.
- b) To disconnect the manifold, pull it downward as far as possible, and only then turn it clockwise. After one rotation, it should no longer be pulled downward while it is being turned.

### Attention:

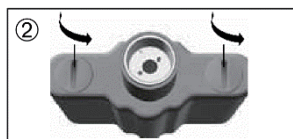
Improper handling can damage the unit!



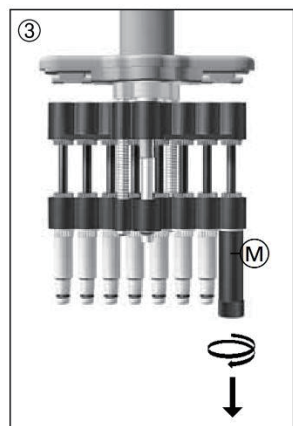
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## 14. Disassembling the Manifold

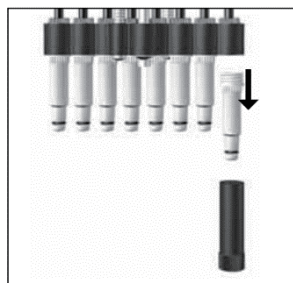
### 14.1 Removing of nose cones and seals

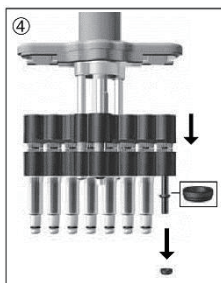


- 1) Disconnect the manifold from the handle.
- 2) Turn both closures of the manifold housing cover 90° (e.g., using a coin) and slide off the housing.



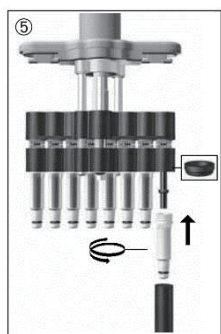
- 3) Push the mounting tool (M) (supplied with the pipette) on the nose cone and unscrew it.





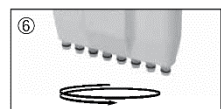
- 4) Push the piston unit down to the bottom. The seal will either remain inside the nose cone or will stay on the piston after the nose cone is removed. Remove the seal, inspect it and clean or replace if necessary. If required, lubricate the piston lightly with the supplied silicone oil.

(In the VITLAB® micropipette -8/-12 30-300  $\mu$ L unit, remove the additional pressure ring from the piston for cleaning.)



- 5) Push the seal on the piston with its flat side facing upward. (In the VITLAB® micropipette -8/-12 30-300  $\mu$ L unit, first replace the additional pressure ring!)

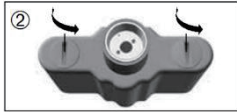
Use the mounting tool to mount and tighten the cleaned or new nose cone.



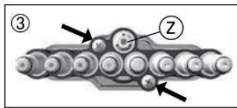
- 6) Reassemble the manifold. The manifold must be screwed into the handle counter-clockwise, until it audibly snaps into place. Check the instrument for tightness (see page 14, 'Servicing').



## 14.2 Removing of pistons for cleaning or replacing



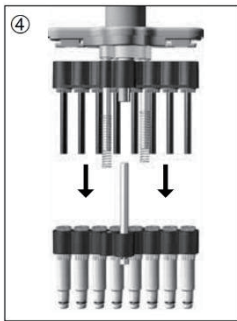
- 1) Disconnect the manifold from the handle.
- 2) Turn both closures of the manifold housing cover 90° (e.g., using a coin) and slide off the housing.



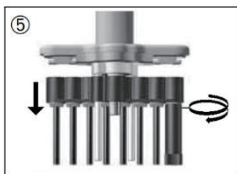
- 3) Remove both outer Phillips screws on the nose cone assembly.

**Attention:**

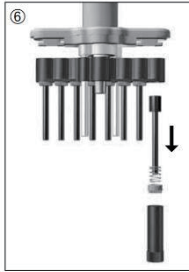
Do not loosen the central guide rod (Z)!



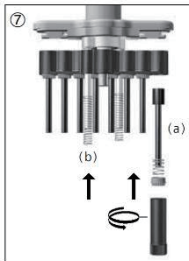
- 4) Pull the piston and nose cone assembly apart and separate.  
Remove stroke springs.



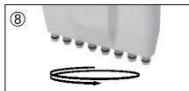
- 5) Place the mounting tool on the piston nut and unscrew the piston nut.



6) Remove the piston nut with piston spring and pull out the piston.



7) Insert the cleaned or new piston and piston spring ( a ). Screw on the piston nut and tighten with the mounting tool. Replace the stroke springs ( b ).



8) Reassemble the manifold. The manifold must be screwed counter-clockwise into the handle so that it audibly snaps into place.

Check the instrument for tightness, mobility and accuracy (see page 14, 'Servicing').

# 15. Ordering Information and Accessories

## 15.1 Ordering Information

VITLAB® micropipette -8

Volume	Cat. No.
0.5 - 10 µL	C0708900
5 - 50 µL	C0708906
10 - 100 µL	C0708908
20 - 200 µL	C0708910
30 - 300 µL	C0708912

VITLAB® 12 micropipette -12

Volume	Cat. No.
0.5 - 10 µL	C0708920
5 - 50 µL	C0708926
10 - 100 µL	C0708928
20 - 200 µL	C0708930
30 - 300 µL	C0708932

## 15.2 More Accessories

Bench-top rack for 6 VITLAB® micropipettes or 3 VITLAB® micropipettes -8/-12  
Cat. No. VT003.1672002



Silicone oil for VITLAB® micropipette  
5 mL/10 mL Cat. No. 703677

Fluorstatic grease Cat. No. 703678

Shelf/rack mount for 1 VITLAB® micropipette bzw. VITLAB® micropipettes -8/-12  
Cat. No. VT003.1672000



Reagent reservoir, non-sterile, PP,  
Volume 60 mL, VE 10 Cat. No. 703459

# 16. Spare Parts

Parts will differ slightly depending on nominal volume of instrument.  
(Fig. shows spare parts for VITLAB® micropipette -8/-12, 10-100 µL).



Capacity	A	B*	C	D
0.5 - 10 µL	705659	705677	703380	703340
5 - 50 µL	705666	705634	705618	703343
10 - 100 µL	705662	705635	705618	703344
20 - 200 µL	705663	705636	705618	703345
30 - 300 µL	705664	705638	705618	703346

\* incl. seal, O-ring and mounting tool.  
VITLAB® micropipette -8/-12 30-300 µL  
with additional pressurering.

## 17.Troubleshooting

Problem	Possible cause	Corrective actio
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	- Clean shaft
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 oil	- Clean and oil piston
Tip dripping (instrument leaks)		

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## 18. 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!

### 18.1 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

### 18.2 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](http://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.

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## 19. 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.

## 20. 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.



