Ultimus V 高精密点胶机

操作手册

您也可以从www.nordsonefd.com/cn
获取PDF电子版诺信EFD手册

Nordson
EFD

您选择的是诺信EFD公司优质可靠的点胶系统。诺信EFD是世界领先的流体点胶专家。Ultimus™ V 高精密点胶机专为工业点胶而设计，并可为您提供多年可靠高效的服务。

本手册将向您介绍如何充分使用Ultimus V 高精密点胶机。

仅仅利用几分钟时间您就可以了解该系统的控制和特点。请按照我们推荐的测试步骤，认真阅读我们提供的有效信息，这是我们50多年在工业点胶方面经验的总结

本手册会回答您的大部分问题，不过如果您需要更多帮助，可及时与诺信EFD公司或经过授权的EFD经销商联系。本手册最后一页提供了具体联系信息。

诺信EFD的承诺

感谢！

您已选购了世界上最优秀的精密点胶设备。

EFD的团队都非常重视您的业务，并且会尽我们所能使您满意。

如您对我公司的设备或EFD产品专家所提供的支持有不尽满意之处，请直接与我们联系：800-556-3484（美国），401-431-7000（其他地区），或发送邮件至 Ferran.Ayala@nordsonefd.com

我们保证解决您的任何问题，使您满意。

再次感谢您购买诺信EFD的产品。

Ferran

Ferran Ayala，副总裁

目录

转下页

目录 (续)

转下页

目录 (续)

诺信EFD产品安全声明

⚠ 警告

下面的安全信息属于警告危害程度。
如未遵守可能导致死亡或严重受伤。

电击

触电危险：打开设备外壳前应先切断电源，并在对设备进行维修前切断电源，锁上开关，并在开关上悬挂标识。即使只受到轻微的电击，也应该立刻切断所有设备电源，直到查出问题并得到解决后再重新启动。

⚠注意

下面的安全信息属于注意危害程度。
如未遵守可能造成轻度或中度受伤。

阅读手册

阅读使用手册，正确使用本设备。遵守所有安全说明。将具体的工作和设备警告、警示及说明与随机文件一起放在合适的位置。确保设备操作与维修人员均能看到这类说明和所有其它设备相关文件。

最大气压

除非在产品手册里另作说明，胶阀的最大输入气压为7.0 bar(100 psi)。过大的进气压力可能会损坏设备。进气压力将通过外部调压表（气压0至7.0 bar（0至100 psi））来供应。

释放压力

打开、调节或维护增压系统或组件之前应先释放液压和气压。

灼伤

当心高温表面！避免接触胶阀组件的高温金属表面。如果难以避免接触，应在受热设备周围作业时佩戴隔热手套与服装。否则，与高温金属表面接触可能会造成人身伤害。

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卤化烃溶剂的危害

请勿在含有铝质元件的增压系统中使用卤化烃溶剂。在压力下，这些溶剂会与铝发生反应引起爆炸，造成伤害、死亡或财产损失。卤化烃溶剂含有以下一种或多种元素。

元素	符号	前缀
氟	F	“氟代 -”
氯气	Cl	“氯代 -”
溴	Br	“溴代 -”
碘	I	“碘代 -”

欲知详情，请核对您原料的物料安全数据表或与物料供应商联系。如必须使用卤化烃溶剂，请联系EFD，采用相兼容的EFD零部件。

高压流体

未完全密封的高压流体非常危险。调节或检修高压设备前，请务必释放流体压力。喷射出的高压液体可能像刀子一样造成严重的人身伤害、截肢或造成死亡。液体渗透皮肤也可能造成中毒。

⚠警告

高压液体会引起严重的伤害。如果受伤或怀疑受伤，应采取如下措施：

- 立刻进行紧急救治。
- 告诉医生您可能受到喷射伤害。
- 让医生阅读本提示。
- 告诉医生您当时正在使用的点胶材料种类。

医疗警报 — 喷雾区域通风不良造成的伤害：通知医生

皮肤内注射为严重外伤。应尽快对伤口进行手术治疗，请勿为研究毒性而耽误治疗时间。某些奇异涂层会直接注入血液中，因而毒素就成了一个危害。

合格人员

设备所有者负责保证EFD设备由合格人员进行安装、操作和维修。合格人员是指经培训后可以安全履行所分配任务的雇员或承办商。他们熟知所有相关的安全规程和规定，也有体力完成所安排的任务。

诺信EFD产品安全声明(续)

预期用途

如未按照设备随附文件的要求使用EFD设备，将会造成人员受伤或财产损失。设备的非预期用途包括：

- 使用不相容材料。
- 进行非授权篡改。
- 将安全护罩或联锁装置拆卸或设为旁路。
- 使用不兼容零件或受损零件。
- 使用未经批准的辅助设备。
- 设备在高于最大额定值条件下运行。
- 在易爆气体环境下运行设备。

规定与许可

请确保所有设备均经检定和许可，适合所用环境。如未遵从安装、操作和维护手册，诺信EFD设备获得的任何许可均为无效。如未按诺信EFD规定的方式来使用控制器，有可能影响设备提供的保护功能。

人身安全

应遵守以下说明以防人员受伤：

- 不得由不合格人员操作或维护设备。
- 确保安全防护装置、防护门或防护盖完整，且自动联锁装置运行正确，否则不得操作设备。不得将任何安全装置设为旁路或卸载。
- 远离运行设备。调整或检修运行设备前，切断电源，直到设备完全停止。锁定电源并固定设备，以防其意外移动。
- 请确保喷雾区域和其他工作区域通风良好。
- 当使用点胶针筒供料时，请将点胶针头始终保持朝向工件，远离身体或面部。在不使用点胶针筒时，请将点胶针头朝下存放。
- 获取并阅读所使用的所有材料的安全数据表(SDS)。遵循制造商的说明安全处理、使用物料，并使用推荐的个人防护设施。
- 请注意在工作场所，通常无法消除不是非常明显的危险情况，如发热表面、尖锐的边角、通电线路以及由于实际原因无法封闭或防护的移动部件。
- 要清楚紧急停止按钮、截流阀和灭火器的位置。
- 请佩戴听力保护装置，以防护由于长时间暴露在真空排气噪音下造成的听力损失。

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消防安全

为防止着火或爆炸,请遵循下列说明:

- 发现静电火花或放电,应立即关闭所有设备。在确认原因并排除故障后再重新启动设备。
- 禁止在使用或者存放易燃材料的区域吸烟、焊接、研磨或使用明火。
- 请勿将材料加热到超过制造商建议的温度。要保证热量监控和限制装置正常工作。
- 提供充分的通风,防止挥发性材料或蒸汽积聚到危险浓度。请遵守当地法规或物料安全数据表之指导。
- 使用易燃材料作业时不得直接断开电路。首先通过隔离开关切断电源,以防产生火花。
- 要清楚紧急停止按钮、截流阀和灭火器的位置。

预防性维护

为保证本产品能够连续无故障使用,诺信EFD提供了一些简单的预防性维修检查建议:

- 定期检查各气管接头连接是否牢固。必要时进行加固。
- 检查各气管是否有裂纹或受到污染。必要时进行更换。
- 检查所有电线接头是否松动。必要时进行紧固。
- 清洁:如果面板需要进行清理,应使用干净、柔软的抹布蘸适度清洁剂进行擦拭。请勿使用强溶剂(丁酮、丙酮或四氢呋喃等),可能会对面板材料造成损害。
- 保养:此设备只使用洁净干燥的空气。设备不需要任何其他的定期保养。
- 测试:按照本用户指南中有关章节对功能操作和设备的性能进行检验。有缺陷或受损的组件应退回给诺信EFD或其代理商进行更换。
- 仅使用设备的原装零部件。请与诺信EFD联系以索取相关信息和建议。

诺信EFD产品安全声明(续)

可抛弃型部件重要安全信息

所有诺信EFD可抛弃型部件,包括针筒、卡式胶筒、活塞、头塞、尾盖及点胶针头均为精密设计的一次性使用产品。若尝试清洁并重复使用,会影响点胶精度并增加人身伤害的风险。

应始终穿戴适于点胶应用的正确防护装置和服装,并遵守以下准则:

- 切勿将针筒或卡式胶筒加热至38°C(100°F)以上。
- 使用完一次后应依照当地管理法规来处置这些部件。
- 切勿使用强溶剂(丁酮、丙酮、四氢呋喃等)清洁部件。
- 仅可用温和清洁剂来清洁卡筒固定装置与针筒加载器。
- 为防止流体损耗,应使用诺信EFD的SmoothFlow™活塞。

故障对策

如果某个系统或设备出现故障,立即关闭系统并按以下流程进行操作:

1. 切断并锁定系统电源。如果有使用液压和气动截流阀,关闭并释放压力。
2. 若使用诺信EFD气动式点胶机,应将点胶针筒从套头组件上拆除。若使用诺信EFD机电式点胶机,应将针筒固定装置缓慢旋下并将针筒从驱动器中拆下。
3. 在确认原因并排除故障后,才可以重新启动设备。

废弃物处理

应按照地方法规,对操作和维护中使用过的设备和材料进行处理。

规格

注:规格和技术详情如有更改,恕不另行通知。

项目	规格
尺寸	22.5长 x 19.9宽 x 9.5高 厘米 (8.86长 x 7.85宽 x 3.74高 英寸)
重量	3.4 kg (7.7 lb)
电源适配器	AC输入: 100-240伏, 0.5安, 50至60赫兹 DC输出: 24伏, 最大电流1.7安
工作频率	每分钟超过600个点胶周期
时间范围	0.0000–9.9999 s
时间度数精度	±0.05%
脚踏板	电压: 24 VDC 电流: 20 mA
点胶周期结束反馈电路	5-24 VDC, 最高100 mA
触发方式	脚踏板、手触式开关或5-24VDC信号
输入气压	7.0 bar (100 psi) 最高
输出气压	0–7.0 bar (0–100 psi)
压力读数精度	±0.03 bar (±0.5 psi)
真空	0.0–18.0 inH_2O (0.00–1.32 inHg)
真空读数精度	±0.04 inHG (±0.5 inH_2O) **注:**真空读数精度校准范围为0–0.44 inHG (0–6 inH_2O)。
操作环境	温度: 5-50° C (41-122° F) 湿度:85% RH 在30°C 时无凝结 海拔高度: 2,000m 最高 (6,562 ft)
产品分类	安装类别II; 污染级别 2
认证	CE、UKCA 、TUV、RoHS、WEEE和中国RoHS认证

RoHS标准相关声明 (中国 RoHS有害物质声明)

产品名称 Part Name	有害物质及元素 Toxic or Hazardous Substances and Elements					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr6)	多溴联苯 Polybrominated Biphenyls (PBB)	多溴联苯醚 Polybrominated Diphenyl Ethers (PBDE)
外部接口 External Electrical Connectors	X	0	0	0	0	0

0: 表示该产品所含有的危险成分或有害物质含量依照EIP-A, EIP-B, EIP-C 的标准低于SJ/T11363-2006 限定要求。
Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C is below the limit requirement in SJ/T11363-2006.

X: 表示该产品所含有的危险成分或有害物质含量依照EIP-A, EIP-B, EIP-C 的标准高于SJ/T11363-2006 限定要求.
Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C is above the limit requirement in SJ/T11363-2006.

WEEE命令

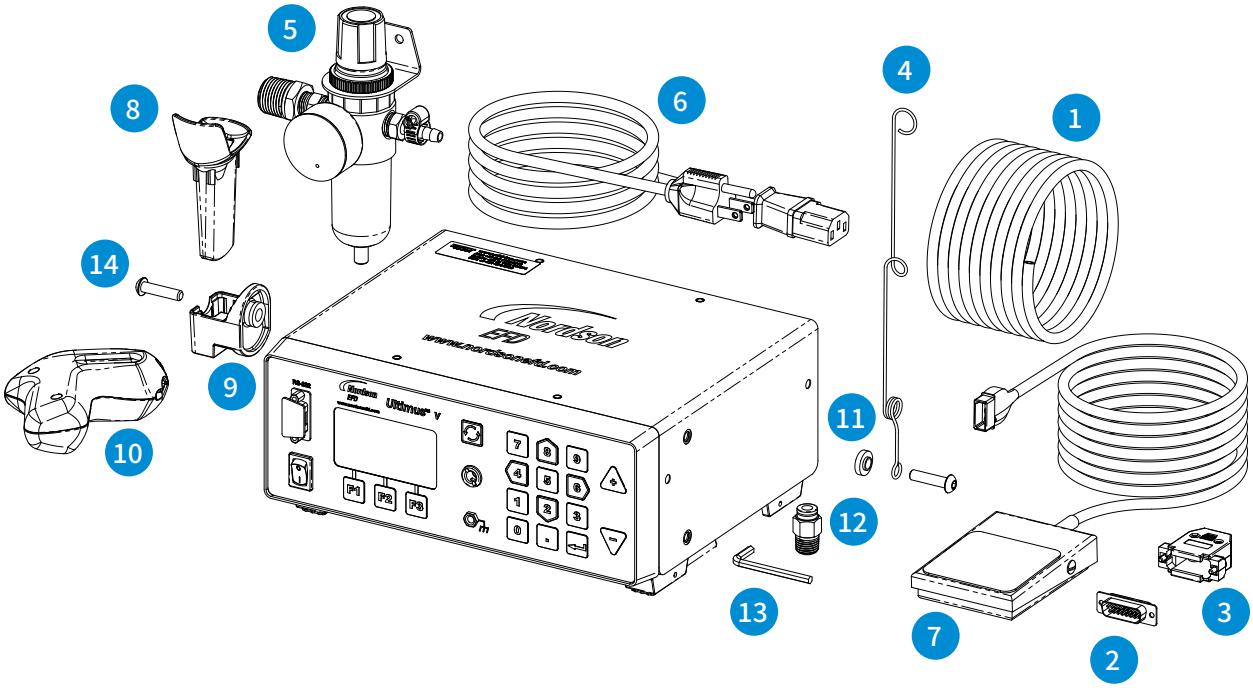
本设备符合欧盟WEEE命令(2012/19/EU)的要求。请访问 www.nordsonefd.com/WEEE 了解有关如何正确处置本设备的介绍。

Ultimus V特性

- 电子式控制调节点胶时间、点胶压力和真空回吸
- 数字化显示所有点胶时间、点胶压力和真空回吸
- 引入自动递增模式，可在一定点胶次数后或特定点胶时间后调节点胶参数。
- 提供自动排序模式，自动重复点胶图案
- 配有400个独立存储单元
- 可通过面板按键或外部PC/PLC来浏览或选择存储单元
- 在连续、计时和教导模式间切换
- 面板手动点胶按钮
- 教导功能
- 提供多级操作锁定
- 警报指示器
- 具有点胶周期结束反馈回路
- 0-9 数字键的软按钮式数据输入
- LCD界面亮度可调
- 便捷的上/下导航键
- 外部PC接口，方便数据输入
- 显示点胶周期次数
- RS 232接口，兼容标准RS-232协议
- 配备ESD接地端子，确保静电放电安全
- 气压调节范围：0-7.0 bar(0-100 psi)；真空调节范围：0-18 H_2O
- 通用内部电源
- D-sub I/O（15针）接口和通信接口（9针）连接
- 警报输入/输出 I/O 信号

点胶机拆箱

拆箱取出部件，放于干净的工作台上。

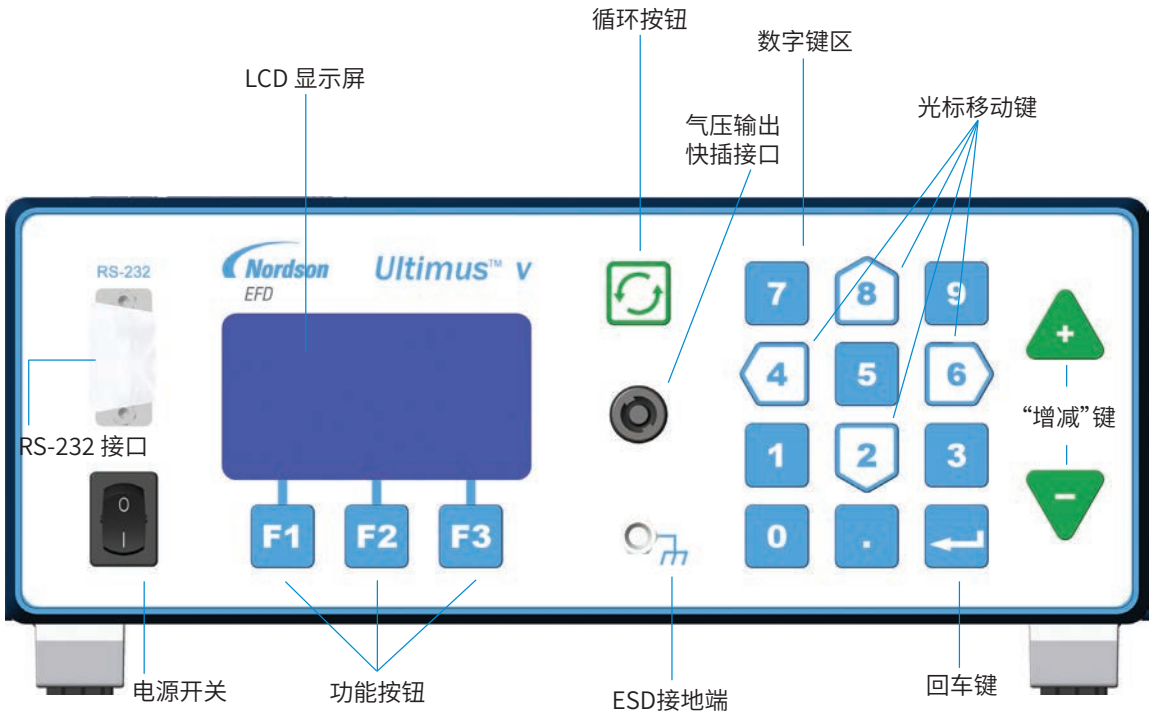


以下项目是包括您的 Ultimus V 点胶机的必备项目：

1 外径 6 mm 蓝色聚氨酯管
2 15 针 D-Sub 连接头
3 15 针 D-Sub 连接头后壳
4 软管支撑
5 过滤调压阀
6 电源线（需单独订购）
7 脚踏板组件
8 针筒套管
9 针筒套管支架
10 人机工程学针筒手持架
11 软管支撑定位垫圈
12 接头 - 1/4 NPT x 6mm 外径
13 内六角扳手，4mm
14 螺钉 - M6 X 25mm，布氏硬度，黑色

(未标注)
印刷资料 – Optimum点胶配件资料
胶点标准测试卡
头塞1盒（50个）

性能和控制



面板

电源开关：接通/切断Ultimus V点胶机。

RS-232端口：通过远程电脑或PLC控制器修改所有点胶参数。

LCD显示屏：显示数据、系统状态以及当前所选功能。

功能按钮：用于选择各个功能按钮上方LCD显示屏底部的显示项。每个键的功能取决于当前屏幕的显示内容和/或所处模式。

循环按钮：启动点胶周期。

气压输出快插接口：用于Optimeter™套头和普通针筒套头组件连接。

ESD接地端：标准 0.166” 接口，允许用户为静电敏感设备接地。

数字键：用于直接输入设置值。

光标移动键：数字键盘上箭形 2、4、6、8 数字键，用于移动光标，输入数据。

“增减”键：调节点胶时间或存储单元的地址。

回车键：  确认高亮选项或所输数据。

性能和控制（续）

背板

气源输入：已过滤的主气源输入。
6mm 口径的快插式接头用来连接主气源。最小输入压力为1.0 bar (15 psi)；最大输入压力为7.0 bar (100 psi)。

排气口：用于针筒压力释放和真空排出端口。
6 mm 快插式接头。每次点胶循环结束时，点胶针筒压力释放气体通过该接口排出。真空发生器耗用的空气也通过该接口排出。这种快插式接头允许连接管子实现远程排气。

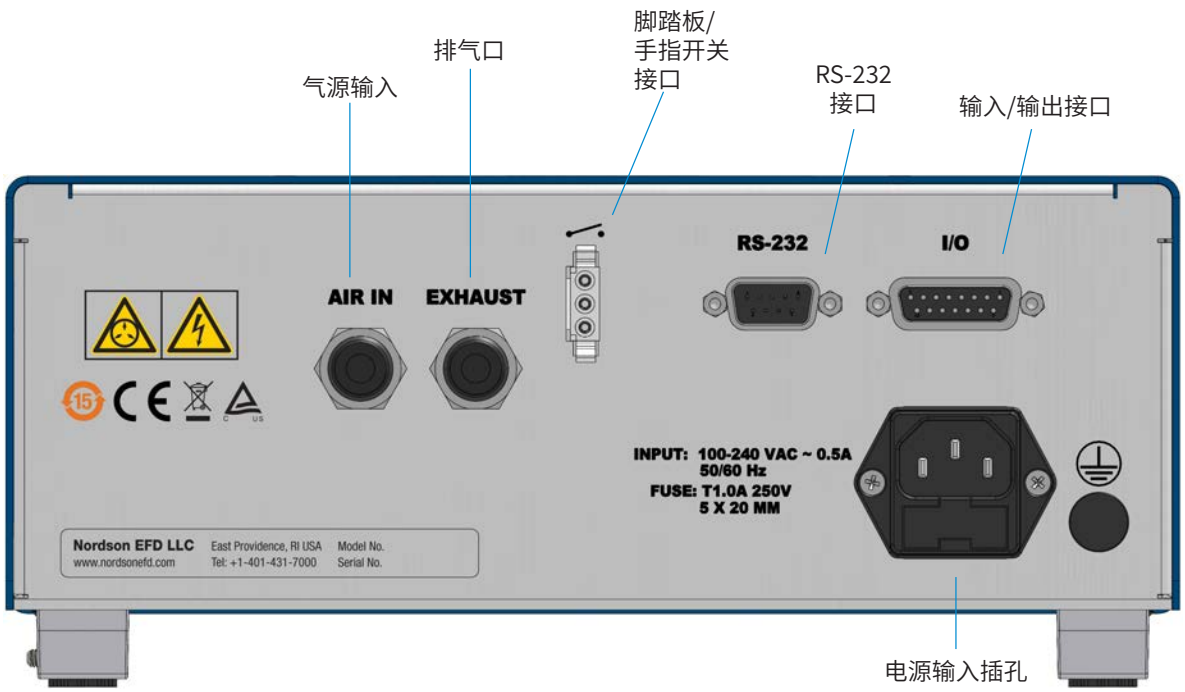
脚踏板/手指开关接口：通过该接口将点胶机连接到启动装置上。
该接口是一个瞬间触发的闭合开关装置。EFD强烈建议您使用EFD脚踏板和手指开关，它们都是为此应用而专门设计的。

RS-232 接口：(DB-9针脚型)
每次只能启用面板或背板 RS-232 端口中的一个。可以在LCD屏幕“通信”菜单中对 RS-232端口进行选择。

与被关闭 RS-232 端口之间的任何通信，对点胶机而言均属无效操作。请参阅附录 B，了解 RS-232 协议。

输入/输出接口：(DB-15针孔型) 用于连接所有的输入/输出信号。有关各针脚详细定义，请参阅附录 A。

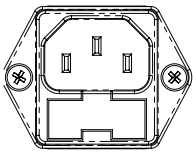
交流电源输入：将点胶机连接至本地电源。



测试的初始设置

连接电源

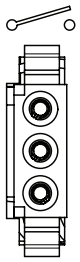
1. 把电源线插到点胶机背面的电源插孔。
2. 将电源线插入电源插座。
3. 开启面板上的电源开关。



连接脚踏板

Ultimus V 点胶机可通过脚踏板来操作，或通过外部装置（DB-15 接口）来操作。

1. 将脚踏板接到点胶机背面的接口。
2. 您也可以通过选配的手指开关或 5 至 24 VDC 脉冲信号来控制 Ultimus V 点胶机。

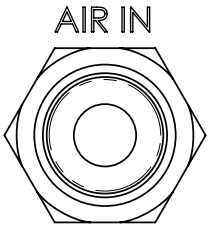


连接输入气源

注：质保的前提要求是工厂气源必须是洁净、干燥、过滤的。为确保气体质量，建议您安装随机附带的5微米过滤调压阀。

1. 将气管的一端插入到点胶机背面的AIR IN接头上。
2. 将气管的另外一端连接到Ultimus V点胶机的过滤调压阀上。

   注：输入气体压力应设为最小 1.0 bar (15 psi) 或高于点胶压力，最大为 7.0 bar (100 psi)。

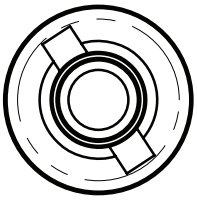


连接压力输出

将Optimeter 套头或普通针筒套头上的接头插入到 Ultimus V 点胶机面板相应接口上，同时将其顺时针旋转锁定。

连接针筒和点胶针头

1. 将装有胶水的EFD针筒安装到Optimeter 套头或普通针筒套头上。
2. 去掉针筒头塞并装上相应的EFD精密点胶针头。



点胶系统的设定

胶点尺寸是由时间、压力、针头尺寸共同决定的。

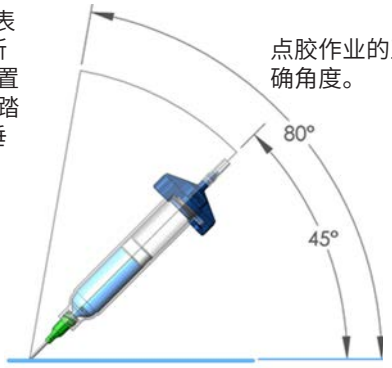
请按照以下方法来测试系统的每一项功能。当您在测试时，可以使用点胶工具包中的胶点标准测试卡。

使用连续模式来打点、划线或填充小孔

1. 将点胶压力设置为零。
2. 将针筒放在测试纸或者测试表面的上方。
3. 将机器设置在“连续”模式。
4. 打开安全夹。为了进行接下来的调试步骤，踩压脚踏板并保持这个状态。
5. 将针头放在纸上（测试表面），使用数字键盘每次增加 0.069-0.138 bar(1-2 psi)点胶压力直到达到您满意的流体流动速度。

   注：尽可能采用最小的气压和最大尺寸的针头的组合。最小可能的点胶压力+最大可能的针头尺寸 + 尽可能长的点胶时间 = 最可靠的一致性和精确度。
6. 松开脚踏板。
7. 重复测试点胶速度。根据要求，对点胶压力进行微调。

谨记 — 在针头和工作表面接触时应保持如图所示的角度。当针头被放置在正确位置时，踩压脚踏板。释放脚踏板时，应垂直向上的移开针头。



点胶作业的正确角度。

使用计时模式实现重复作业

1. 参照上节的步骤确保针头里的空气被排尽，且针头里充满了胶水。
2. 将机器设置在“计时”模式。
3. 调节点胶时间。可通过以下两种方式的一种，来调节点胶时间或点胶周期：
   - 使用 Up/Down 箭头设置时间。参阅《性能与控制》章节。
   - 使用 Program/Teach 按钮设置时间。参阅《性能与控制》章节。
4. 通过踩压脚踏板或触动手指开关来激活点胶周期。按照预先设定的点胶时间，点胶机将开始作业。一旦将要超过设定的时间，点胶机就会停止点胶并且等待脚踏板/手指式开关或者主控制器给他一个新的信号。

   注：脚踏板/手指开关仅需被瞬间按压。

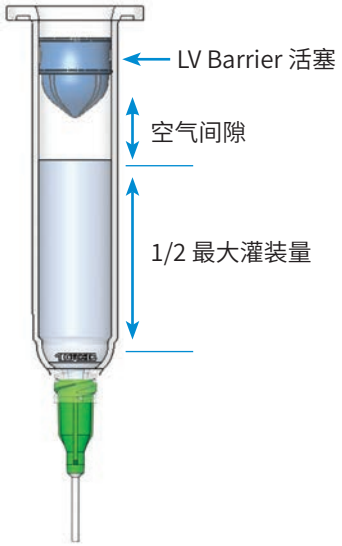
   如果脚踏板/手指开关或 触点开关I/O信号在点胶的过程中被按压，点胶机将会立刻中断并停止点胶工作。这一独特的安全功能，能使点胶机防止意外点胶作业的发生。

适用于低粘度流体的真空回吸控制功能

真空回吸功能使得您在使用低粘度的稀薄流体作业点胶时，依然保持很高的一致性，在两次点胶周期之间也不易发生滴漏现象。真空回吸功能有效的克服了针筒头部流体的压力问题，从而防止了胶水滴漏的发生。

1. 首先确认您已经将要作业的胶水灌装到 EFD 的针筒内，并将气压调节设置为零。EFD 建议您选用蓝色的 LV Barrier 活塞，这种活塞适用于水性、低粘度流体。
2. 确保夹紧套头组件上的安全夹。
3. 拧掉针筒头塞，同时装上选定的 EFD 点胶针头 。
4. 设置气压至0.1 bar(2 psi)。
5. 当针头被放置到指定容器或者测试表面时，此时方可松开Optimeter 针筒套头气管上的安全夹。
6. 将点胶机的状态设为“连续”模式。踩压脚踏板且不要松开开关，一直到胶水在针头上形成一个胶点。
7. 释放脚踏板，此时胶水仍会继续从针头滴出。
8. 使用键盘每次增加0.5至1.0 inH2O真空回吸压力，直到胶点的尺寸稳定下来且不再变大。

   注：千万不要使用过大的真空回吸压力，否则会使胶水倒吸进针头或者在针筒内产生气泡。过大的真空回吸压力，也会导致点胶作业的不一致性。



9. 抬升针头离开测试表面，擦拭针头，再次踩压脚踏板，并重新测试。胶点应该保持在设定的尺寸，不会增大也不会减小。如果不能达到理想的效果，可重复步骤 4–8 对真空回吸压力进行微调。
10. 一旦正确设置好真空回吸压力，在开始点胶前，可以按照生产需要设定点胶压力。

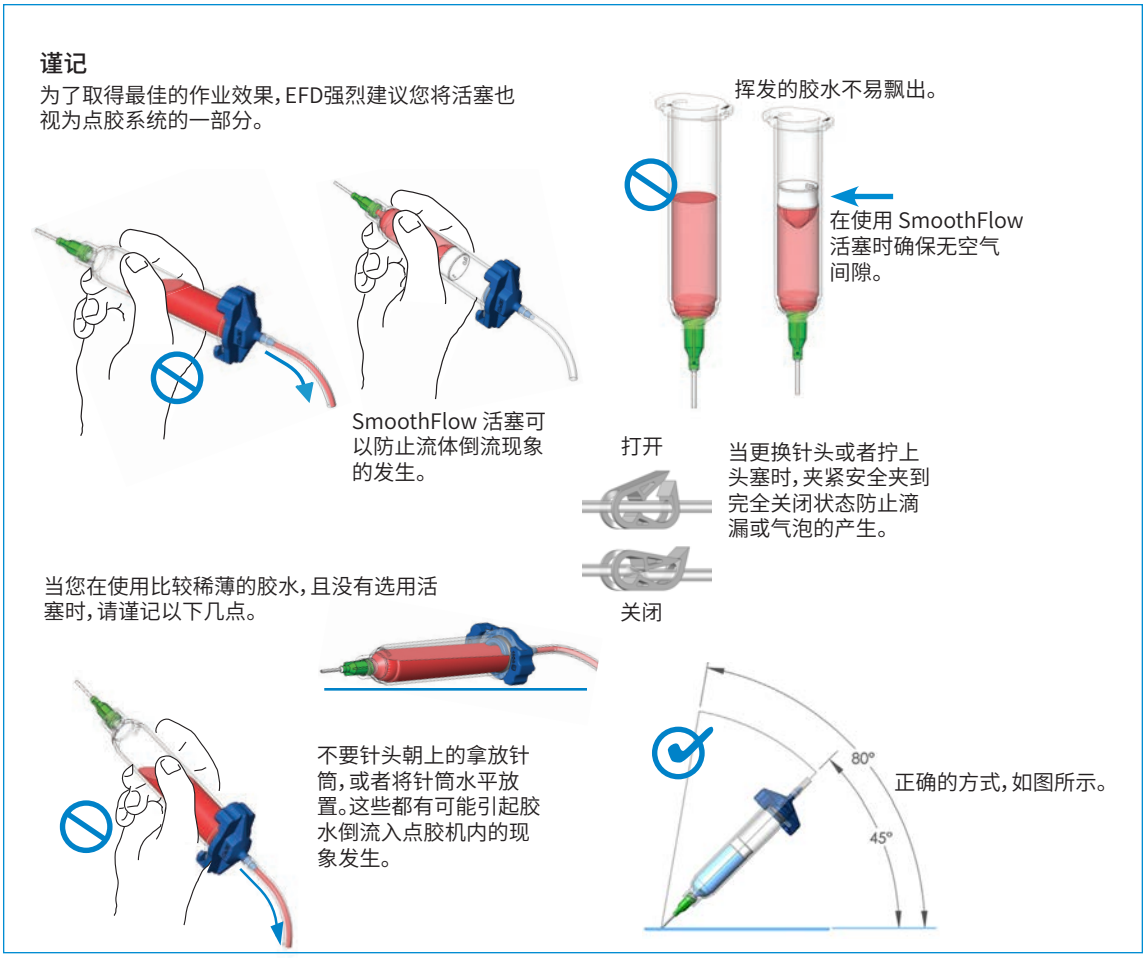
针筒灌装

警告：不要将针筒完全灌装满。如果是用 Optimum 针筒灌装，最好只灌装到针筒容积的2/3即可，如果配套使用EFD的蓝色 LV Barrier™ 活塞，则灌装到针筒容积的1/2即可。

为了达到最佳的作业效果，我们强烈建议您将活塞也作为点胶系统的一部分。EFD的 SmoothFlow 白色活塞广泛应用于大多数流体，该活塞具有多项优势：

- 第一：对真空回吸调节不会特别敏感。
- 第二：该活塞能阻止胶水挥发的气味被排入工作环境。
- 第三：如果针筒被随意的不正确地摆放，该活塞能防止胶水倒流入点胶机。
- 第四：使用这种活塞，让您在无滴漏的情况下方便安全的更换针头。

针对水性溶剂或者瞬干胶需要使用EFD的蓝色 LV Barrier 活塞，有3cc，10cc和30/55/70cc尺寸可供选择。如果您使用的是RTV的硅胶产品，发现有活塞弹跳或者胶水拉丝现象，请联络EFD获得相关帮助和指导。



初始设置

点胶机设置和点胶参数可以通过Ultimus V 点胶机正面的键盘和按钮手动输入，或者使用点胶机的 RS-232 远程通信功能。详见第39页的“附录B - RS-232协议”。

注：为了便于设置，请先设置显示语言。请参见第22页“语言设置”

下例所示为参数的手动输入方式。

- 按下电源开关，接通点胶机。随后出现主屏幕，显示所有点胶参数。点胶机首次通电时，所有设置参数均预设为零。

AI	自动递增功能
MEM	当前存储地址
TIME	点胶时间
PRES	点胶压力
VAC	真空回吸
SHOT	点胶计数
点胶状态（参见图符）	

基础菜单操作

- 在主屏内，按 F3 (菜单) 键，显示一级主菜单。
- 使用 Up/Down (8/2) 键浏览各个菜单项。
- 按回车键，进入高亮显示项所在的屏。
- 使用 Up/Down (8/2) 键滚动浏览菜单，选择单个菜单项。
- 按 F2 (保存) 键，确认选择项。
- 使用 F1 (上一级) 和 F2 (下一级) 键，显示上一级/下一级菜单屏。
- 按 F2 (主页) 功能键，返回主屏。
- 如果某个菜单项被“操作锁定”屏锁定，则该项将显示为空白项，无法选择。

设置实时时钟

在主菜单屏上高亮显示设置时钟（SET CLOCK），并按回车键。

- 按 F3 功能键，选择12小时制或24小时制，随后输入时间。

  注：必须使用前导零。例如：

时间	12小时制	24小时制
5:30 am 1:30 pm	05:30 am 01:30 pm	05:30 13:30

- 如果使用 12小时制，设置具体时间后，按 1 选择 am，按 2 选择 pm。
- 按 F2 (保存) 键，保存设置。

设置日期

- 在主菜单屏上高亮显示设置日期（SET DATE），并按回车键。
- 按 MM/DD/YY 格式输入日期。
- 按 F2 (保存) 键，保存设置。

设置压力单位

- 在主菜单屏上高亮显示 压力单位 (UNITS OF PRESSURE)，并按回车键。
- 使用 Up/Down (8/2) 键选择单位类型。
- 按 F2 (保存) 键，保存设置。

设置真空回吸单位

- 在主菜单屏上高亮显示 真空回吸单位 (UNITS OF VACUUM)，并按回车键。
- 使用 Up/Down (8/2) 键选择单位类型。
- 按 F2 (保存) 键，保存设置。

设置语言

- 在主屏上按 F3 (菜单) 键，显示主菜单。
- 按键盘上 Down (2) 按钮，直到高亮显示所需语言，随后按 F2 (保存) 键，确认所选项。
- 按 F2 键返回主屏，其中数据以所选语言进行显示。

操作参数锁定设置

- 在主屏上按 F3 (菜单) 键，显示主菜单屏。
- 使用 Up/Down (8/2) 键高亮显示操作锁定 (OPERATOR LOCKOUT)，并按回车键。
- 出现密码输入屏。

注：Ultimus V 点胶机出厂时，初始密码为 0000。

输入 4 位安全密码，并按回车键。不正确的密码将被清除，重新显示破折号。

一般操作锁定程序

下列各项可以被锁定，以防未经授权进行调整：

- 计时设置
- 压力设置
- 真空回吸设置
- 存储设置
- 点胶计数器
- 点胶模式
- 自动递增模式
- 自动递增重置
- 报警重置
- 主菜单
- 压力单位菜单
- 真空回吸单位菜单
- 语言菜单
- 设置通信菜单
- 报警菜单

注意:

- 如果菜单项的方框被打钩，表示该项已被锁定。用户无法更改或选择该项。
- 如需锁定某项功能，可按 Up/Down (8/2) 键高亮显示指定项。按回车键可以切换显示锁定设置的开和关。
- 按 F3 (下一个) 键，进入下一个“操作锁定”屏。按 F1 (上一个) 键，进入上一个“操作锁定”屏。结束锁定设置时，按 F2 (保存) 键，保存设置项，返回“主菜单”屏。
- 同样可锁定整个“主菜单”；当用户按主屏内“主菜单”键时，首先出现“密码输入”屏。密码正确输入后，进入“主菜单”屏。
- 锁定“计时设置”后，无法调节点胶时间，同时“教导”模式也将被锁定。
- 当F1 (点胶模式) 键被锁定后，Ultimus V仍将保持当前“点胶模式”(计时模式或连续模式)不变，并且无法更改。
- 锁定“设置时钟”项将同时锁定“设置日期”项。
- 可以通过锁定“自动递增重置”选项，在Ultimus V到达结束地址和最终触发值之前，防止点胶参数被重置为起始地址。
- 报警重置可被锁定。锁定的报警项需要重置时，要求用户输入密码。

设置新密码

- 高亮显示设置密码 (Set PASSWORD)，并按回车键。
- 出现“密码”屏时，输入新密码，并按回车键。
- 出现“请确认操作”(Please Confirm Operation) 屏时，按 F1 (Yes) 键，保存新密码，或按 F3 (No) 键，保存原密码。

清除密码

- 在 Ultimus V 加电期间，同时持续按回车键和数字键 1，将重置安全密码。
- 出现“请确认操作”屏。按 YES 功能键，将密码重置为‘0000’(全零)。按 NO 功能键将不会对 Ultimus V 重置密码。

报警选项屏

- “报警输入信号”(Alarm Input Signal) 为I/O 接口中报警输入针脚所检测的信号，该信号被检测到时，点胶机不会激活任何点胶周期。可在“启用输入报警信号”旁边方框显示复选标记时，启用“报警输入信号”。
- “报警输入信号”可以触发I/O 接口上报警输出信号。“启用输入报警输出信号”旁边的复选标记表示相应的报警输出信号已被启用。
- 报警输入信号可以被锁定。该选项被启用时，如果设备有检测到输入报警，用户必须先清除该报警，才能继续执行点胶周期。

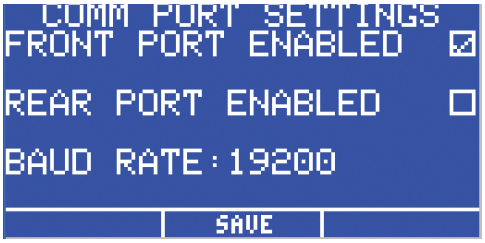
如需清除“输入报警”，可浏览主屏并使用 Up/Down (8/2) 键和 Left/Right (4/6) 键选择“输入报警”。按 F2 (重置) 键，清除输入报警。“启用输入报警锁定”旁边方框内的复选标记，表示“报警输入锁定”已被启用。

报警选项屏(续)

- “压力报警”“可以激活I/O 接口上“报警输出”信号。“启用压力报警输出信号”旁边方框内的复选标记,表示“压力报警”信号的“报警输出”信号已被启用。
- “压力报警信号”可以被锁定。该选项被启用时,如果设备有检测到压力报警,用户必须先清除该报警,才能继续执行点胶周期。如需清除“压力报警”,可浏览主屏并使用 Up/Down (8/2) 键和 Left/Right (4/6) 键选择“压力报警”。按 F2 (重置) 功能键,清除压力报警。“启用压力报警锁定”旁边方框内的复选标记,表示“压力报警锁定”已被启用。
- 启用自动递增报警。启用该功能时,当存储地址达到结束地址,并且点胶计数/计时器也达到触发值,“自动递增报警”将出现。可在“启用自动递增报警”旁边方框显示复选标记时,启用自动递增报警。
- “自动递增报警”可以触发I/O 接口上报警输出信号。“启用自动递增报警输出信号”旁边方框内的复选标记,表示自动递增报警的报警输出信号已被启用。
- 自动递增报警始终被锁定。如需重置“自动递增报警”,可浏览主屏,使用 Up/Down (8/2) 键和 Left/Right (4/6) 键选择“自动递增报警”。此时 F2 功能键标注为 RESET。按 F2 功能键,重置“自动递增报警”。

通信端口选项屏

- 在“通信端口”设置屏上选择启用 RS-232 端口。设备软件不允许同时启用两个端口。
- 选择波特率后按回车键，将显示波特率选择屏。
- 按 F2 (保存) 键，保存通信端口设置项。



对比度控制

- LCD 对比度调节范围为 0 至 63。当上下调节对比度时，LCD 将自动调整为新的对比度。
- LCD 对比度可用“增 (+)/减 (-)”按钮来增加或减少。按 F2 (保存) 键，保存 LCD 对比度设置。

信息屏

- 信息屏显示的是点胶机SAP物料编号和 Ultimus V 名称。同时显示技术支持电话和网站地址。
- VER:为主板软件版本号。

设置点胶时间、点胶压力和真空回吸

胶点尺寸是由点胶时间、点胶压力、真空回吸（点胶对象为稀流体时为防止出现滴漏）和针头尺寸等参数共同决定的。

选择存储单元

在主屏上按照下列方式选择存储单元：

- 使用 Up/Down (8/2) 或 Left/Right (4/6) 键高亮显示菜单（MEM）栏。
- 按回车键，输入存储单元的 3 位编号 (000-399)，重按回车键确认。

或

- 使用“增减”按钮增大或减小存储单元的编号。

注：切换到不同的存储单元时，会自动将调压阀的压力和真空回吸调为设定值，并显示其中的点胶时间、点胶压力、真空回吸和触发设置。对特定存储单元内点胶时间、点胶压力或真空回吸的任何更改，都将自动替换当前设置。

点胶模式

计时模式

该模式在已知点胶时间下使用。

- 使用 Up/Down (8/2) 或 Left/Right (4/6) 键高亮显示内存，时间，压力或真空回吸（MEM, TIME, PRES,VAC）栏。
- 按 F1 键循环浏览点胶模式 (TIMED -> STEADY -> TEACH -> TIMED)，直到显示 TIMED 为止，并高亮显示 TIME 栏。
- 按“回车”键显示时间输入屏。输入点胶时间，并按“回车”键保存

或

- 使用“增/减”按钮增加或减少点胶时间。

教导模式

教导模式允许根据个人观察设置理想的胶点尺寸。

- 按 F1 键直到显示 TEACH 为止，按 F2 (重置)键将点胶时间设为全零。
- 踩下脚踏板或按“手动点胶”按钮，直到获得理想的胶点尺寸为止，让后释放脚踏板或按钮。校准的点胶时间将在 TIME 栏上显示。
- 再次踩下脚踏板或按下按钮会增加的点胶时间。如需重新校准点胶时间，按 F2 (重置)按钮。
- 按 F3 键，保存时间设置。

点胶模式(续)

连续模式

在连续模式中,不再使用计时器。只要按下脚踏板或“手动点胶”按钮,点胶机将持续点胶。

设置压力

压力输入必须使用数字键区。

- 使用 Up/Down (8/2) 或 Left/Right (4/6) 键高亮显示压力(PRES)栏。
- 按“回车”键,输入理想的压力,并再次按“回车”保存设置。

设置真空回吸

真空回吸输入必须使用数字键区。

- 使用 Up/Down (8/2) 或 Left/Right (4/6) 键高亮显示真空回吸(VAC)栏。
- 按“回车”键,输入理想的真空回吸,并再次按“回车”保存设置。

使用自动递增模式

Ultimus V 点胶机具有自动递增模式，可以设置为自动调整点胶时间、点胶压力和真空回吸，以此解决点胶流体的粘度随时间发生变化的问题。一共有 400 种具有唯一地址的存储位置，其中保存有点胶时间、点胶压力和真空回吸的各种组合设置。

四种自动递增模式可供选择：

- **关闭。**自动递增关闭。
- **点胶计数模式。**根据点胶次数触发，进入下一个存储单元，来自动调节点胶设置，补偿流体粘度变化。
- **计时模式。**根据工作时间触发，通过进入下一个存储单元，来自动调节点胶设置，补偿流体粘度变化。
- **自动排序模式。**类似于点胶计数模式，只是存储单元的地址将自动重置，到达结束地址后继续重新开始。

选择自动递增模式：

- 使用 Up/Down (8/2) 或 Left/Right (4/6) 键高亮显示自动递增 (AI) 栏。
- 按 F1 键循环浏览 AI 模式。OFF -> COUNT -> TIMED ->SEQUENCE -> OFF。

在点胶计数模式、时间模式或自动排序模式下选择自动递增模式时，有三个变量可在 LCD 主屏幕内选择：起始地址、结束地址和触发值。其中每个变量都可直接通过键盘或增/减按钮进行选择和调节。关闭自动递增模式后，起始地址、结束地址和触发值不会显示在 LCD 屏幕。

- **起始地址。**开始执行自动递增模式的存储单元的地址。
- **结束地址。**自动递增模式结束前最后的存储单元地址。
- **触发值。**存储单元地址递增到下一地址前的点胶循环数或运行时间。每个存储单元都有自己的触发值。因此，随着存储单元地址的增加，会为其加载新的触发值。**特定存储单元内触发值的任何更改，都将自动保存在该单元内。**

使用自动递增模式(续)

点胶计数模式

启用自动递增模式下的“点胶计数模式”,可使Ultimus V根据点胶次数触发,从“起始地址”开始增加存储单元的地址,直到到达“结束地址”。

主屏上“点胶次数”记录当前存储地址的点胶周期数。在存储单元的地址递增为下一地址时被清“零”。

在“计数模式”下,“触发值”代表了当前存储单元递增到下一位置前需要激活的点胶周期数。触发值的有效范围是00001至99999,每个单元总的点胶次数会被记录下来并且会被累计。

计时模式

启用自动递增模式下的“计时模式”,可使 Ultimus V 根据点胶运行时间来触发,从“起始地址”开始增加存储单元的地址,直到到达“结束地址”。

选择“计时模式”时,实时时钟作为计数器在 00000 至 99999 秒内计数,并在存储单元的地址递增时重置为全零。

在“计时模式”下,“触发值”代表了当前存储单元递增到下一位置前需要运行的点胶时间。有效时间范围 00000 至 99999 秒。

自动排序模式

启用自动递增模式下的“自动排序模式”,可使 Ultimus V 根据点胶次数来触发,从“起始地址”开始增加存储单元的地址,直到到达“结束地址”。

主屏上“点胶次数”记录当前存储地址的点胶周期数。在存储单元的地址递增为下一地址时被清“零”。

在“计数模式”下,“触发值”代表了当前存储单元递增到下一位置前需要激活的点胶周期数。触发值的有效范围是00001至99999,每个单元总的点胶次数会被记录下来并且会被累计。

一旦到达结束地址所用的触发值,Ultimus V 将自动重置存储单元地址,返回开始地址,并继续按先前方式递增存储单元的地址。该模式将不设置自动递增报警。

使用自动递增模式(续)

存储单元设置范例

注意:

- 应用胶水为粘度变化流体时,“自动递增”设为计时模式通常比设为计数模式更好。
- 每个存储单元内的点胶时间最好保持相同,各存储单元之间只能改变压力,以便具有相同的点胶速率。
- 建议使用较小的压力变化调整,或保留一定的调压间隙,确保点胶量的均匀性。

Cell 0–设置初始参数,获得所需胶点尺寸。例如:点胶压力为 20 psi,点胶时间为 0.150秒,真空回吸为 0。触发值设为 900 (15 分钟)。

Cell 1–增加点胶压力至 23 psi,保持点胶时间为0.150秒,真空回吸为 0。触发值设为 900 (15 分钟)。

Cell 2–加点胶压力至 27 psi,保持点胶时间为0.150秒,真空回吸为 0。触发值设为 900 (15 分钟)。

Cell 3–增加点胶压力至 32 psi,保持点胶时间为0.150秒,真空回吸为 0。减少触发值至 540 (9 分钟)。

Cell 4–增加点胶压力至 37 psi,保持点胶时间为0.150秒,真空回吸为 0。触发值设为 540 (9 分钟)。

Cell 5–增加点胶压力至 45 psi,保持点胶时间为0.150秒,真空回吸为 0。触发值设为 540 (9 分钟)。

Cell 6–增加点胶压力至 55 psi,保持点胶时间为0.150秒,真空回吸为 0。减少触发值至 360 (6 分钟)。

Cell 7–增加点胶压力至65 psi,保持点胶时间为0.150秒,真空回吸为 0。减少触发值至 180 (3 分钟)。

Cell 8–(最后单元)增加点胶压力至80 psi,保持点胶时间为0.150秒,真空回吸为 0。减少触发值至 120 (2 分钟)。

如果在“报警选项”屏内,启用自动递增报警,则在结束Cell 8单元时该报警将被触发,无法继续点胶操作。若没有自动递增报警,计时器将继续递增,点胶操作仍可继续执行,但是存储单元的地址不再递增,仍保持在结束地址处。

注意:

- 存储单元内的参数只需设置一次便可。当胶水接近工作寿命时,只需更换一个装满胶水的针筒,使用相同的预设参数即可。
- 重新开始工作时,需要高亮显示 AI,随后按 F2 (重置) 键。如果使用 AI 报警,在清除该报警的同时也将重置 AI 模式。

物料编号

注: 电源线需单独订购。

物料编号	描述
7012590	Ultimus V 点胶机, 0-100 psi (0-7 bar)
7012589	Ultimus V 点胶机, 已校准*, 0-100 psi (0-7 bar) *使用美国国家标准技术研究所 (NIST) 的标准来校准此设备
7014871	套件, 电源线, 美式插头
7014872	套件, 电源线, 欧式插头

配件

请参见点胶机配件数据表, 获得完整可选配件清单, 将您的点胶机性能最优化。更多详情, 请访问 www.nordsonefd.com/CN_DispenserAccessories

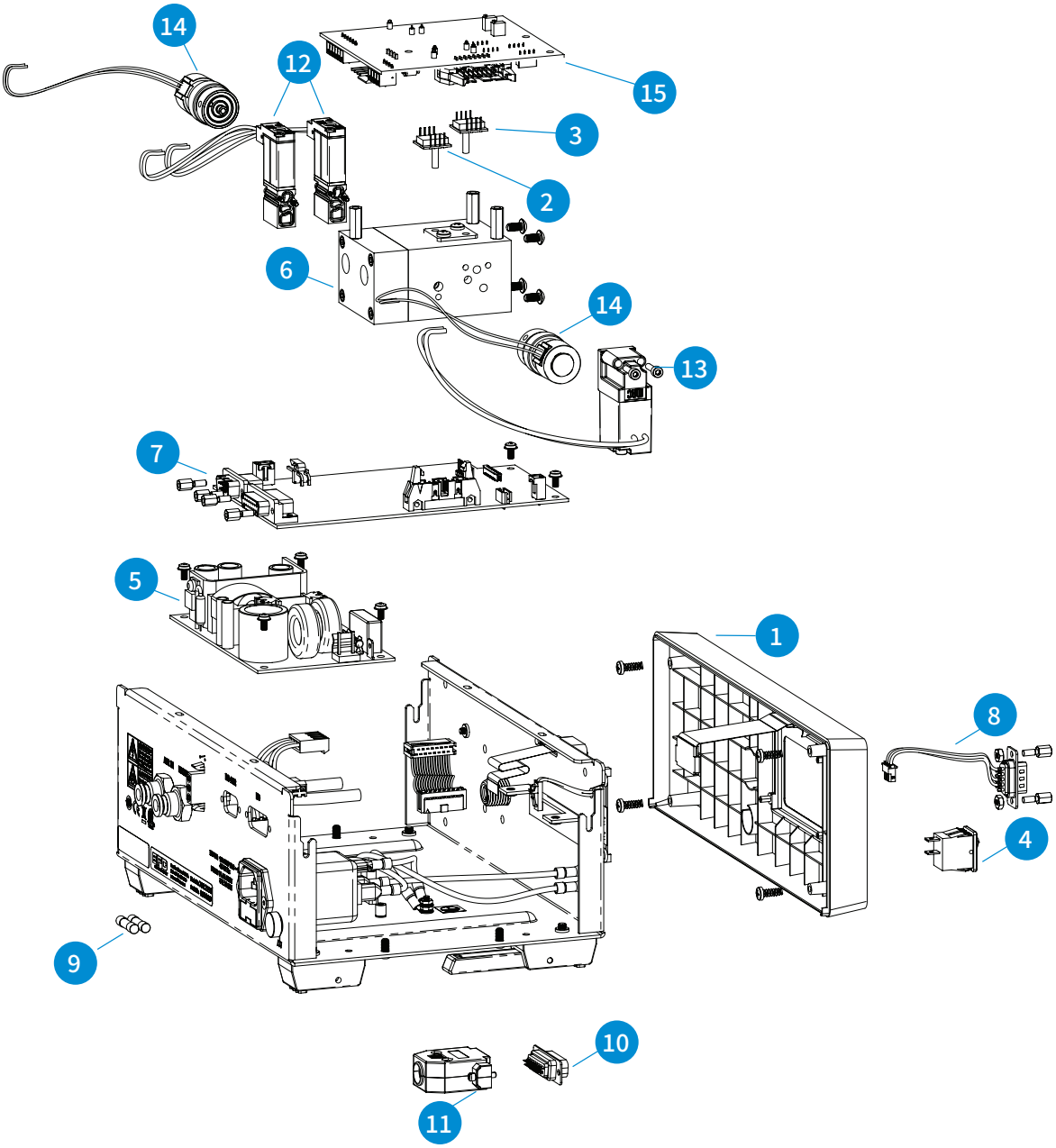
备件

Ultimus V

1	Ultimus V 前盖和外罩	—
2	Ultimus V 高气压传感器	7014545
3	Ultimus V 低气压传感器	7014546
4	Ultimus V 电源开关	7014547
5	Ultimus V 电源板	—
6	Ultimus V 气路歧管模块	—
7	Ultimus V 主板	—
8	Ultimus V RS-232前端口电缆	—
9	Ultimus V 保险丝 (与2800通用)	7017255
10	Ultimus V 15针D-Sub I/O接头	7014553
11	Ultimus V 15针D-Sub I/O接头外壳	—
12	Ultimus V 充气电磁阀	7014555
13	Ultimus V 点胶电磁阀	—
14	Ultimus V 电气比例阀	—
15	Ultimus V 控制板	—

备件 (续)

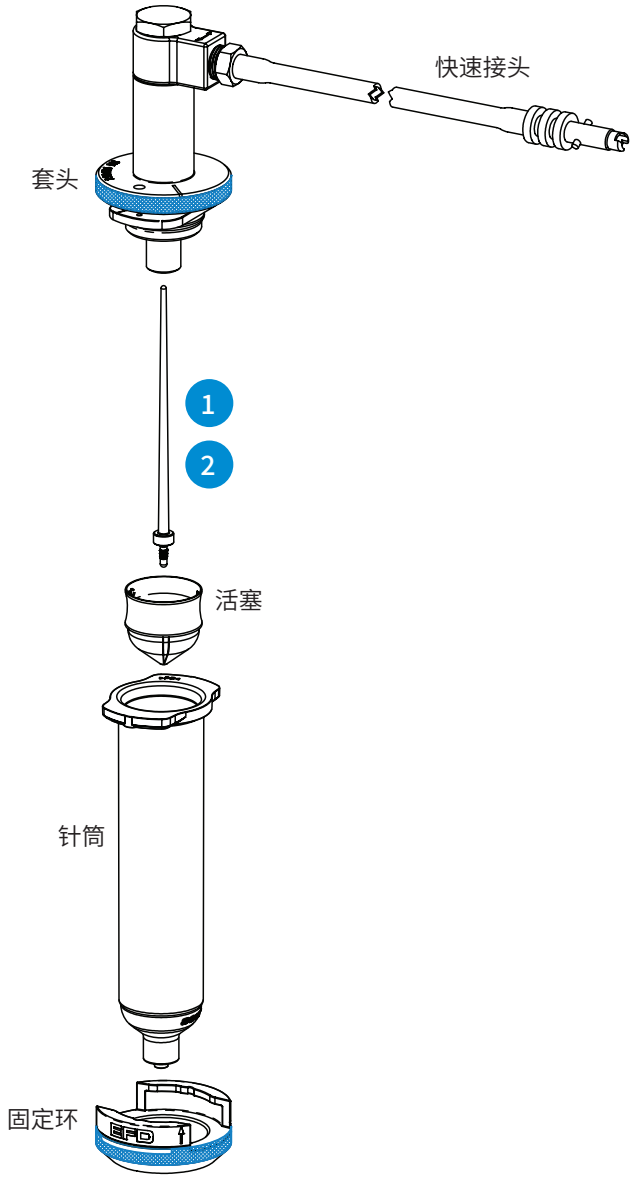
Ultimus V (续)



备件(续)

Optimeter

1	Optimeter活塞连杆，10cc，5件/包	7014561
2	Optimeter活塞连杆，30cc，5件/包	7014562



附录 A — I/O 接口针脚定义

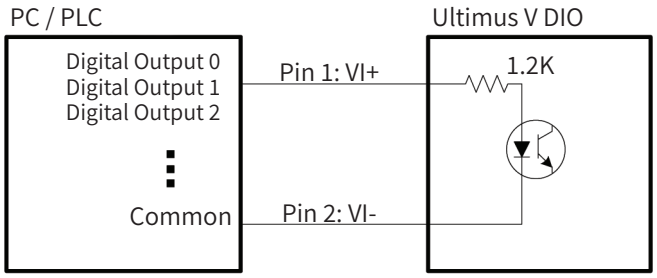
Pin 1: VI+

启动电压正端：该针脚为启动电压信号的正端。

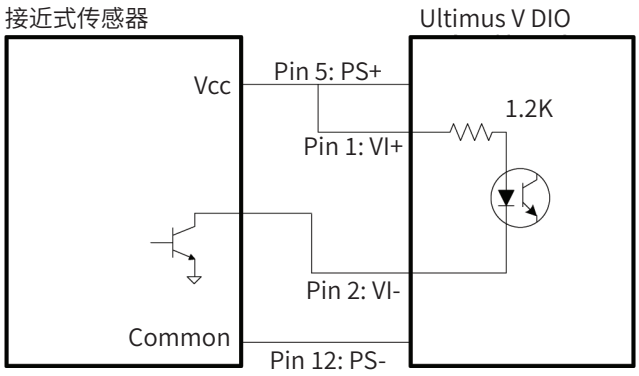
Pin 2: VI–

启动电压负端：该针脚为启动电压信号的负端。

向针脚施加 5 至 24 VDC 信号时，启动电压信号将触发一个点胶周期。并由内部 1.2K 电阻将启动电压信号电流限制在 20mA 以下（含 20mA）。该信号可为瞬时信号（少于 10ms）或持续信号。5 至 24 VDC 信号取消后一旦重新施加，将开始新的点胶周期。



外部启动电压接线回路



带NPN 接近式传感器外部启动电压接线回路

Pin 3: EOCF+

周期结束反馈正端+：该针脚是“循环反馈结束”固态开关的输入信号正端。

附录 A — I/O 接口针脚定义(续)

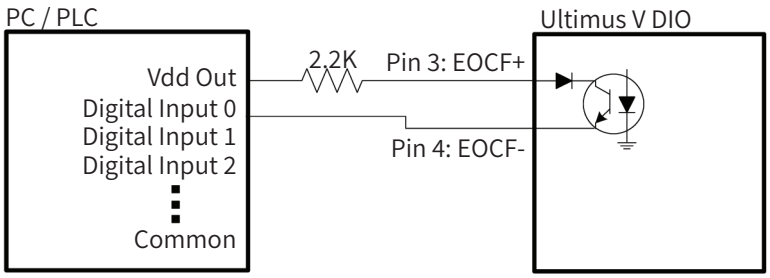
Pin 4: EOCF–

周期结束反馈负端–:该针脚是固态开关的输出信号端。

点胶周期一结束,固态开关便会闭和,直到下一个点胶周期开始执行为止。"周期结束反馈"回路可将信号传回主机,按序启动另一个装置,或启动点胶周期所需的其它操作。

该回路设计工作电压为 5至24 VDC,最大电流为 100mA。

注:外部电源与 EOCF+ 针脚之间应接入一个电阻器,限制 EOCF 回路内的电流不超过 100mA。



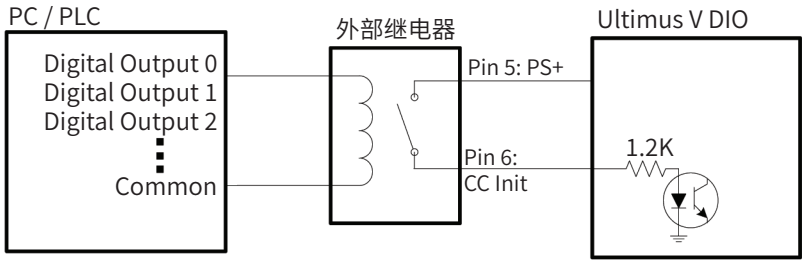
外部启动电压接线回路

Pin 5: PS+

24VDC电源正端:该针脚可为外部负载提供 24 V/100mA 直流电源。

Pin 6: CC Init

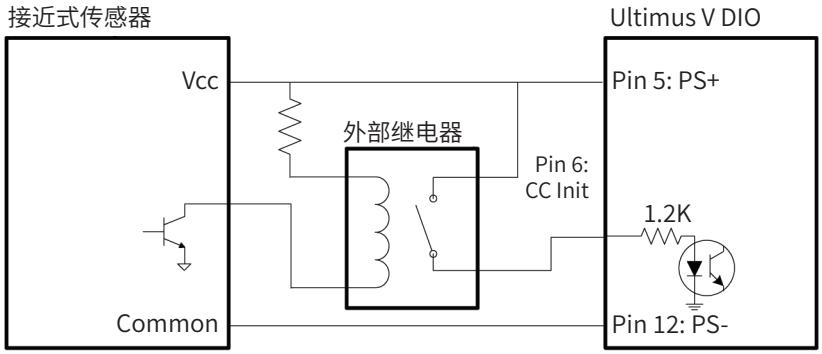
触点闭合启动:该针脚通过检测继电器或开关的闭合来启动点胶机。一旦检测到有触点闭合,点胶机将根据工作模式来启动,并由内部 1.2K 电阻将触点闭合初始化信号电流限制在 20mA 以下(含 20mA)。触点闭合可为瞬时闭合或持续闭合。随后断开触点并重新闭合,开始执行新的点胶周期。



带触点闭合和外部继电器点胶周期控制接线回路

附录 A — I/O 接口针脚定义（续）

Pin 6: CC Init（续）



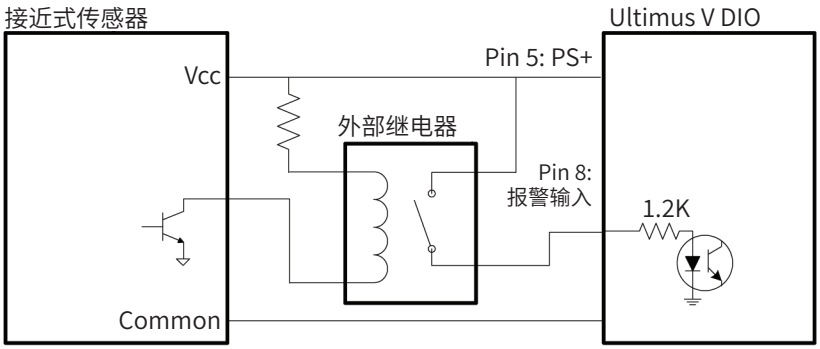
带触点闭合，
NPN 接近式传感器和外部继电器点胶周期控制接线回路

Pin 7: PS+

24 VDC 电源正端：该针脚可为外部负载提供 24 V/100mA 直流电源。

Pin 8:报警输入

报警输入：该针脚用于检测继电器或开关的闭合情况。一旦检测到有触点闭合，点胶机将显示“输入报警”指示符，防止初始化任何其它点胶周期。并由内部 1.2K 电阻将“报警输入”信号电流限制在 20mA 以下（含 20mA）。该信号可在“报警选项”菜单内被关闭。



带NPN 接近式传感器，
和外部继电器报警输入接线回路

Pin 9: 报警输出正端

报警输出正端：该针脚是“报警输出”固态开关的输入信号正端。

附录 A — I/O 接口针脚定义(续)

Pin 10: 报警输出负端

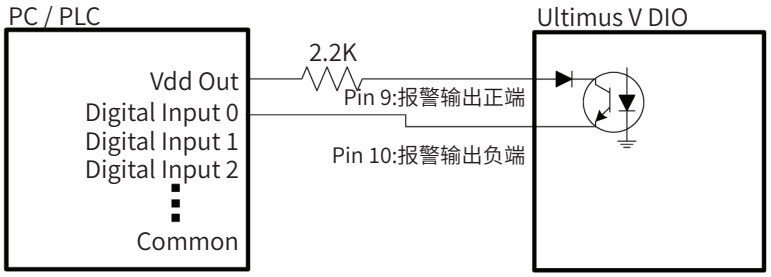
报警输出负端:该信号是固态开关的输出信号。

报警输出信号通过一个固态开关进行控制。出现报警状况时,点胶机将闭合固态开关,使报警输出针脚接通。

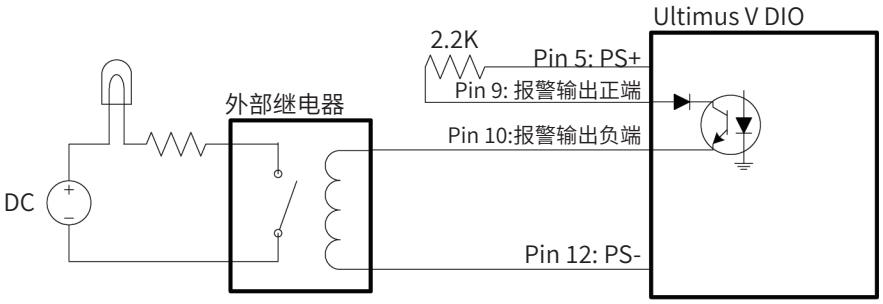
采用“输入报警”、“压力报警”或“自动递增报警”都可以来激活“报警输出”信号。激活“报警输出”信号后,可以在“报警选项”菜单内进行选择接受或拒绝该信号传送的任何报警的设置。

该回路设计工作电压 5 至 24 VDC,最大电流 100mA。

注: 外部电源与报警输出正端针脚之间应接入一个电阻器,限制报警输出回路内的电流不超过 100mA。



从“报警输出”至“PLC数字输入”接线回路



从“报警输出”至“外部指示器”接线回路

Pin 11: PS+

24VDC 电源正端:该针脚可为外部负载提供 24 V/100mA 直流电源。

Pin 12 至 Pin 15: PS–

24VDC 电源负端:这些针脚都为 24 VDC 电源的基准针脚和返回针脚。

附录B — RS-232 协议

注: 本附录仅提供英文版本。

You can control the dispenser remotely through a programmable logic controller (PLC) or personal computer (PC) by connecting to the RS-232 port located on the front or back of the dispenser.

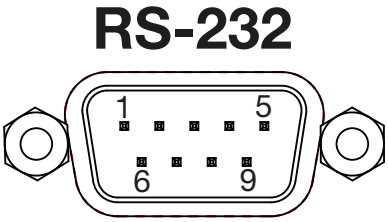
You can also use the Ultimus V Interactive software or the National Instruments LabVIEW™ software to view or change the Ultimus V dispenser settings. Information for using the Ultimus V Interactive software and a LabVIEW driver and sample program are included in this appendix.

1. Physical Connection

Use the RS-232 port located on the front or back of the dispenser to connect the dispenser to a PLC or PC. Ensure that the port you use is also enabled in the dispenser settings. Refer to “Communications Port Options Screen” on page 26 for details.

1.1 RS-232 Pin Assignments

Pin	Description
Pin 2: RS-232_TX	The RS-232 TX pin transmits data from the dispenser to an external communication device. The external communication device should connect this pin to its RS-232 RX pin.
Pin 3: RS-232_RX	The RS-232 RX pin receives data from the external communication device into the dispenser. The external communication device should connect this pin to its RS-232 TX pin.
Pin 5	Common Ground



附录B — RS-232 协议(续)

1.2 Connection Examples

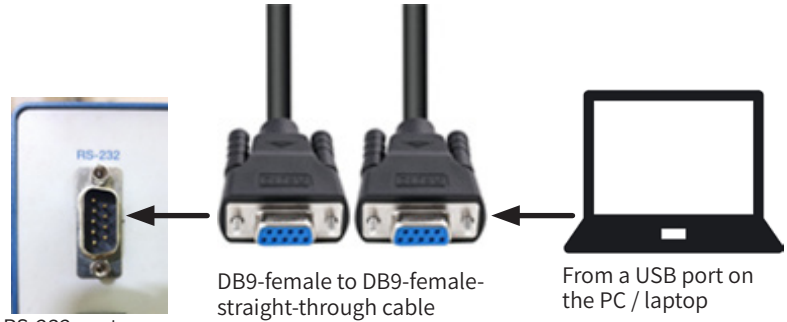
The following examples show how to connect using a PC / laptop without a built-in RS-232 COM port.

1.2.1 Using a USB-to-RS-232 Converter

Most standard USB-to-RS-232 converters come with a DB-9 male-type connector. Because the connector on the dispenser is also a DB-9 male-type connector, you can use a DB-9 female-to-female adapter (gender changer) to make the RS-232 connection.

1.2.2 Using a DB9-Female to DB9-Female-Straight-Through Cable

NOTE: A null modem cable (pin 2 and pin 3 connections swapped) will NOT work with the Ultimus V dispenser.



附录B — RS-232 协议(续)

2. RS-232 Protocol

The RS-232 protocol for the Ultimus V dispenser is RS-232C standard. The dispenser acts as a terminal to the remote PC / PLC, referred to as the Client.

2.1 Communication Specifications

The Ultimus V dispenser communicates using the following settings:

- Synchronous Mode: Half Duplex
- Baud Rates: 9600, 19200, 38400, 115200 (default)

  NOTE: Baud Rate is selectable through the Comm Port Settings menu. Refer to “Communications Port Options Screen” on page 26 for more information.
- Start Bit: 1
- Data Length: 8 bit (ASCII)
- Parity Bit: None
- Stop Bit: 1

附录B — RS-232 协议 (续)

2.2 Data Encoding

RS-232 communication is accomplished by using text packets that include one or more elements. All text packets passed between the Ultimus V dispenser and the client (PC / PLC) are encoded in ASCII.

The ASCII control characters shown below are used to synchronize communication between the dispenser and the client. These ASCII control characters must be sent as a single byte (their hexadecimal value) — not as the their text abbreviations.

CORRECT: ENQ is sent from the client as a control character using its hexadecimal (hex) value of `0x05` [Dec (Decimal) 5], **not** as the text characters "E," "N," and "Q."

INCORRECT: The client sends "E," "N," and "Q" as text characters, which means the dispenser will **not** respond.

The following ASCII control characters are used as part of the communication protocol:

Name	Abbreviation	Binary	Dec	Hex	Caret Notation (see NOTE)
Start of Text	STX	0000 0010	2	0x02	^B
End of Text	ETX	0000 0011	3	0x03	^C
End of Transmission	EOT	0000 0100	4	0x04	^D
Enquiry	ENQ	0000 0101	5	0x05	^E
Acknowledgment	ACK	0000 0110	6	0x06	^F
Negative Acknowledgment	NAK	0001 0101	21	0x15	^U
Space	-	0010 0000	32	0x20	[space bar]
Zero	0	0011 0000	48	0x30	0
…	…	…	…	…	…
Nine	9	0011 1001	57	0x39	9
A	A	0100 0001	65	0x41	A
…	…	…	…	…	…
Z	Z	0101 1010	90	0x5A	Z

NOTE: The caret notation is sometimes used to display the control characters, which are normally not visible. Additionally, many terminals allow typing of control characters by holding down the Ctrl key and pressing the corresponding caret notation key.

EXAMPLE: To send the ENQ control character, press Ctrl+E.

附录B — RS-232 协议 (续)

2.3 Text Packet Format

Each text packet contains the following information and is structured as shown below:

[STX] [No. Bytes] [Command] [Data] [Checksum] [ETX]

NOTE: EOT (0x04), ENQ (0x05), ACK (0x06), and NAK (0x15), and are single-byte control characters, with nothing else added to them.

2.3.1 STX

Every text packet begins with this Start of Text control character (hexadecimal 0x02 or CTRL+B), except as noted below.

NOTE: The Start of Text control character (STX / 0x02) is **not** added when sending ENQ (0x05), ACK (0x06), EOT (0x04), or NAK (0x15) because these are single-byte control characters, not text.

2.3.2 No. Bytes

The No. Bytes (Number of Bytes) part of the text packet is the number of characters in the Command and Data parts of the packet. This value is expressed as a 2-digit hexadecimal with its characters encoded as ASCII.

EXAMPLES:

- If Command is four characters and Data is six characters, the No. Bytes decimal value is 10. In the text packet, No. Bytes will be 0x0A in hexadecimal, so the ASCII character value for No. Bytes will be 0A. This is encoded in ASCII as 0x30, 0x41.
- If the number of Command plus Data characters is 16, No. Bytes will be 0x10 in hexadecimal, so the ASCII character value for No. Bytes will be 10, which is encoded as 0x31, 0x30.

2.3.3 Command

The Command part of the text packet is next. The list of available Commands is contained in “RS-232 Commands” on page 50. A Command is up to four characters long. If a Command does not contain four characters, the remaining characters must be the ASCII space character (0x20). The Command is transmitted as ASCII characters.

2.3.4 Data

The Data part of the text packet is after the Command. The Data part can be from 0 to 251 characters long, depending on the Command. The Data part is transmitted as ASCII characters, typically a decimal representation of a number.

附录B — RS-232 协议（续）

2.3.5 Checksum

The Checksum is the next part of the text packet. The Checksum is a form of error checking for the text packet. The Checksum is calculated by subtracting the actual value of each ASCII byte (e.g., “2” in ASCII is `0x32` in hex, 48 in decimal) from Zero (`0x00`). The resulting negative value’ s least significant byte is the Checksum value.

Each byte (ASCII character) starting with No. Bytes (2.3.2) through Data (2.3.4) is used to calculate the Checksum. Converting the least significant byte (2 digits in hex) to ASCII characters and appending them to the rest of the text packet provides the Checksum value. If the Checksum is incorrectly calculated / transmitted with the text packet, the dispenser responds with a Failure Command (A2) text packet.

The Checksum can also be understood as:

Checksum = 0 – (Byte 1 of No. Bytes + Byte 2 of No. Bytes + Command/Data byte[1] + Command/Data byte[2] + Command/Data byte[3] + … + Command/Data byte[n])

Where “n” = the number of bytes

An example of the Checksum calculation is shown in 2.3.7.

2.3.6 ETX

The final part of the text packet is the End of Text control character (hexadecimal `0x03` or CTRL+C), except as noted below.

NOTE: The End of Text control character (ETX / `0x03`) is **not** added when sending ENQ (`0x05`), ACK (`0x06`), NAK (`0x15`), or EOT (`0x04`), because these are single-byte control characters, not text.

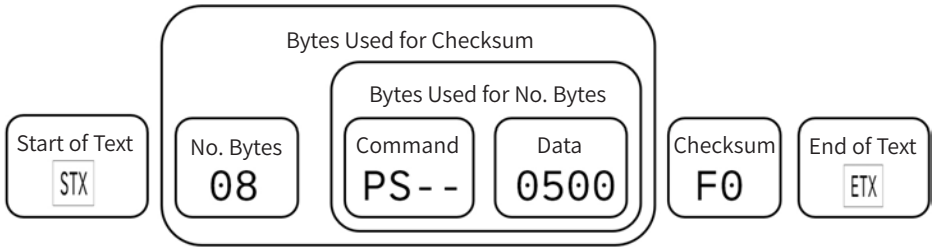
附录B — RS-232 协议(续)

2.3.7 Text Packet Example

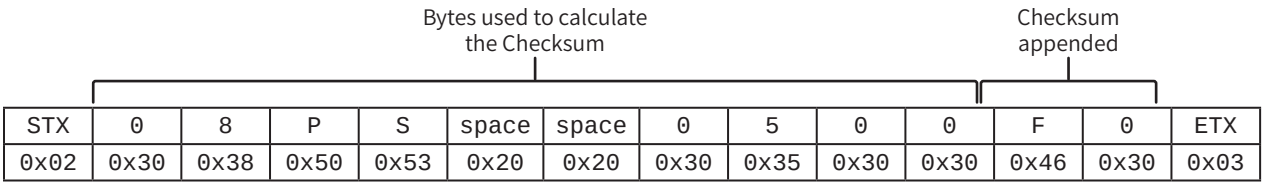
The following is a visual example of a text packet. This example uses the Pressure Set Command (`PS--0500`) to send a 50.0 psi value to the dispenser.

NOTE: The two hyphens (`--`) in the Pressure Set Command are used to denote two spaces (hex `0x20`).

The text packet:



The text packet in hexadecimal format:



STX	0	8	P	S	space	space	0	5	0	0	F	0	ETX
0x02	0x30	0x38	0x50	0x53	0x20	0x20	0x30	0x35	0x30	0x30	0x46	0x30	0x03

Checksum calculation example based on the above text packet:

```
0 - 0x30 - 0x38 - 0x50 - 0x53 - 0x20 - 0x20 - 0x30 - 0x35 - 0x30 - 0x30
        = 0xFDF0
```

The least significant byte of the above value is `F0`, so this value is appended to the text packet after the Data bytes. The End of Text control character (`ETX` / `0x03`) is appended.

附录B — RS-232 协议(续)

2.4 Communication Sequence

The dispenser uses two communication sequences: Write (2.4.1) and Read (2.4.2).

2.4.1 Write Text Packets

Write text packets are used when the client (PLC / PC) sets a parameter on the dispenser, but does not require feedback data.

NOTE: Refer to "Diagram of Write Text Packet Communication between the Client and Dispenser" on page 47 for a visual representation of the Write sequence.

The Write text packet sequence is as follows:

1. The client transmits an Enquiry (ENQ / 0x05) to the dispenser.
2. When the dispenser receives the Enquiry (ENQ / 0x05), the dispenser transmits an acknowledgment (ACK / 0x06) back to the client.
3. When the client receives the acknowledgment (ACK / 0x06), the client must send the Write text packet within 2 seconds to avoid a communication timeout.

   EXAMPLE: (STX) + 08 + PS-- + 0500 + F0 + (ETX)
   [In this example, the hyphens (--) represent ASCII space values (hexadecimal 0x20].

   In the above text packet, the Checksum is F0. The Checksum calculation method is explained in 2.3.5.

   NOTE: The plus signs (+) are present only to show how each character is appended to form the example text packet; they are not part of the transmitted data. The parentheses are present only to indicate a single-byte control character, and are also not part of the transmitted data.

   The above text packet in hexadecimal format is shown below:

STX	0	8	P	S	space	space	0	5	0	0	F	0	ETX
0x02	0x30	0x38	0x50	0x53	0x20	0x20	0x30	0x35	0x30	0x30	0x46	0x30	0x03

4. When the dispenser receives the text packet and successfully executes it, the dispenser transmits a Success Command (A0) text packet to the client.

   EXAMPLE: (STX) + 02 + A0 + 2D + (ETX)

   In the above text packet, the Checksum is 2D. The Checksum calculation method is explained in 2.3.5.

   NOTE: The plus signs (+) are present only to show how each character is appended to form the example text packet; they are not part of the transmitted data. The parentheses are present only to indicate a single-byte control character, and are also not part of the transmitted data.

   The above text packet in hexadecimal format is shown below:

STX	0	2	A	0	2	D	ETX
0x02	0x30	0x32	0x41	0x30	0x32	0x44	0x03

附录B — RS-232 协议 (续)

2.4.1 Write Text Packets (continued)

If there is an error in the text packet, if it cannot be executed, or if the transmission was interrupted and timed out (if the client takes more than 2 seconds to send a text packet), the dispenser transmits a Failure Command (A2) text packet. Refer to “2.5 Communication Timeout” on page 50 for details.

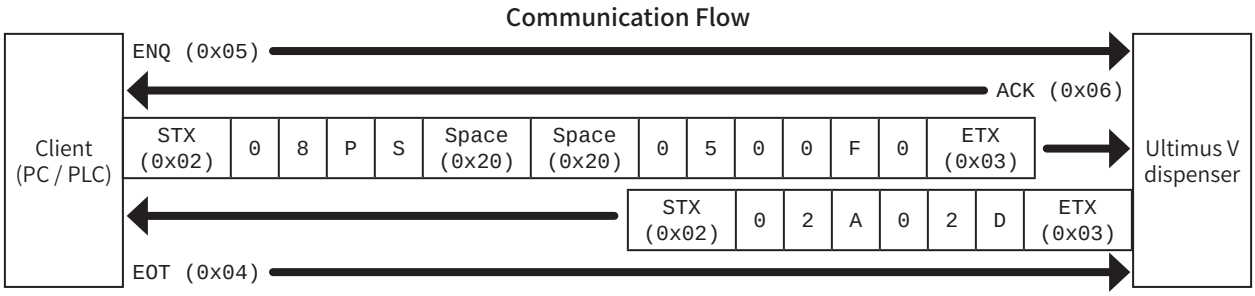
EXAMPLE: (STX) + 02 + A2 + 2B + (ETX)

The above text packet in hexadecimal format is shown below:

STX	0	2	A	2	2	B	ETX
0x02	0x30	0x32	0x41	0x32	0x32	0x42	0x03

If the client receives an Failure Command (A2) text packet, the client can either transmit another text packet or the client can transmit an End of Text (EOT / 0x04) command to end the sequence.

Diagram of Write Text Packet Communication between the Client and Dispenser



NOTES:

- The STX (0x02) and ETX (0x03) control characters are **not** added when sending ENQ (0x05), ACK (0x06), NAK (0x15), or EOT (0x04). These are stand-alone / single-byte control characters.
- **Communication Timeout:** The client sends an Enquiry (ENQ / 0x05) to the dispenser and receives an acknowledgment (ACK / 0x06) in response. The next text packet (such as the PS--0500 text packet shown previously) must be sent by the client within 2 seconds, otherwise the dispenser enters a Communication Timeout state and responds with an Failure Command (A2) text packet.

附录B — RS-232 协议(续)

2.4.2 Read Text Packets

When a Read text packet is sent, the dispenser sends the requested data back to the client.

NOTE: Refer to "Diagram of Read Text Packet Communication between the Client and Dispenser" on page 49 for a visual representation of the Write command sequence.

The Read text packet sequence is as follows:

5. The client transmits an Enquiry (ENQ / 0x05) to the dispenser.
6. When the dispenser receives the Enquiry (ENQ / 0x05), the dispenser transmits an acknowledgment (ACK / 0x06) back to the client.
7. When the client receives the acknowledgment (ACK / 0x06), the client must send the Read text packet within 2 seconds to avoid a communication timeout.

   EXAMPLE: (STX) + 04 + UA-- + C6 + (ETX)
   [In this example, the hyphen (-) represents an ASCII space value (Hex 0x20].

   NOTE: The plus signs (+) are present only to show how each character is appended to form the example text packet; they are not part of the transmitted data. The parentheses are present only to indicate a single-byte control character, and are also not part of the transmitted data.

   The above text packet in hexadecimal format is shown below:

STX	0	4	U	A	space	space	C	6	ETX
0x02	0x30	0x34	0x55	0x41	0x20	0x20	0x43	0x36	0x03

8. When the dispenser receives the text packet, the dispenser transmits a Success Command (A0) text packet to the client.

   EXAMPLE: (STX) + 02 + A0 + 2D + (ETX)

   In the above text packet, the Checksum is 2D. The Checksum calculation method is explained in 2.3.5.

   NOTE: The plus signs (+) are present only to show how each character is appended to form the example text packet; they are not part of the transmitted data. The parentheses are present only to indicate a single-byte control character, and are also not part of the transmitted data.

   The above text packet in hexadecimal format is shown below:

STX	0	2	A	0	2	D	ETX
0x02	0x30	0x32	0x41	0x30	0x32	0x44	0x03

   If there is an error in the text packet, if it cannot be executed, or if the transmission was interrupted and timed out (if the client takes more than 2 seconds to send a text packet), the dispenser transmits a Failure Command (A2) text packet. Refer to "2.5 Communication Timeout" on page 50 for details.

   EXAMPLE: (STX) + 02 + A2 + 2B + (ETX)

   The above text packet in hexadecimal format is shown below:

STX	0	2	A	2	2	B	ETX
0x02	0x30	0x32	0x41	0x32	0x32	0x42	0x03

附录B — RS-232 协议 (续)

2.4.2 Read Text Packets (continued)

9. If the client receives a Success Command (A0) text packet, the client returns an acknowledgment (ACK / 0x06) to indicate that it is ready to receive data. If the client receives a Failure Command (A2) text packet, the client must restart the communication process by sending an Enquiry (ENQ / 0x05) to the dispenser.

10. When the acknowledgment (ACK / 0x06) from the client is received, the dispenser sends a text packet that contains the data requested by the client.

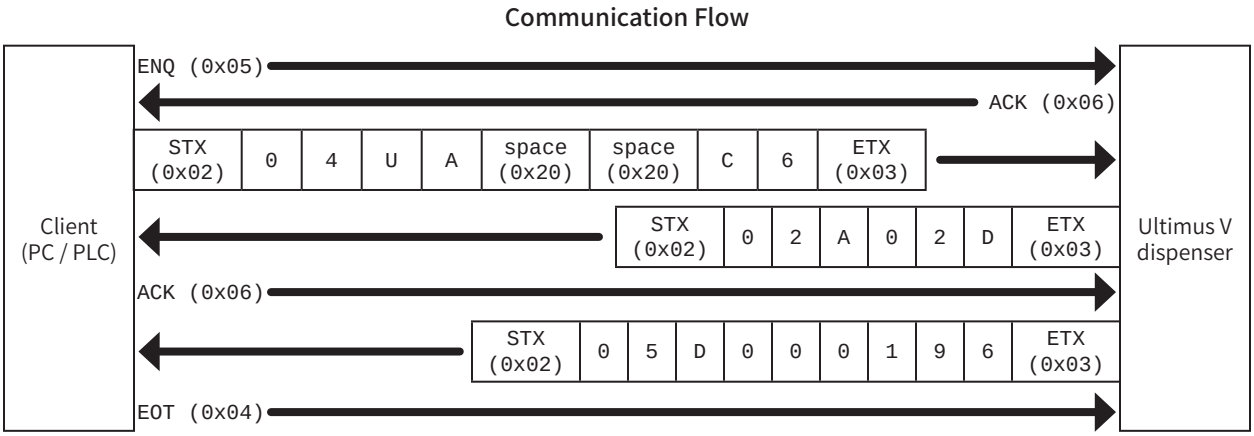
    EXAMPLE: (STX) + 05 + D0 + 001 + 96 + (ETX)

    The above text packet in hexadecimal format is shown below:

STX	0	5	D	0	0	0	1	9	6	ETX
0x02	0x30	0x35	0x44	0x30	0x30	0x30	0x31	0x39	0x36	0x03

11. When the client receives the text packet, the client can either transmit another text packet or the client can transmit End of Text (EOT / 0x04) to end the sequence.

Diagram of Read Text Packet Communication between the Client and Dispenser



NOTES:

- The STX (0x02) and ETX (0x03) control characters are **not** added when sending ENQ (0x05), ACK (0x06), NAK (0x15), or EOT (0x04). These are stand-alone / single-byte control characters.
- **Communication Timeout:** The client sends an Enquiry (ENQ / 0x05) to the dispenser and receives an acknowledgment (ACK / 0x06) in response. The next text packet (such as the UA- - text packet shown previously) must be sent by the client within 2 seconds, otherwise the dispenser enters a Communication Timeout state and responds with an Failure Command (A2) text packet.

附录B — RS-232 协议 (续)

2.5 Communication Timeout

To ensure that RS-232 packets do not compromise the operation of the LCD display, the Ultimus V dispenser has a Communication Timeout safeguard. As soon as the dispenser receives an Enquiry (ENQ / 0x05) from the client, it responds with an acknowledgment (ACK / 0x06). The dispenser enters a communication-hold state and awaits the next text packet(s). If no text packet is received within 2 seconds, the dispenser sends a Failure Command (A2) text packet to the client and removes the communication hold. Any characters received by the dispenser will reset the timeout. When a failure occurs, the client must restart the communication sequence by (1) sending an End of Text (EOT / 0x04) and then (2) starting a new Write or Read sequence by sending an Enquiry (ENQ / 0x05).

2.6 RS-232 Commands

This section contains the RS-232 commands for the Ultimus V dispenser. Each sub-section includes a brief description of the command, the command format with the text packet data attached to the command, and, if necessary, the format of the return command along with its attached data.

These commands are contained in the Command part of the text packet, shown below:

[STX] [No. Bytes] [Command] [Data] [Checksum] [ETX]

NOTE: A hyphen (-) represents an ASCII space value (hex 0x20).

2.6.1 Response Commands

These commands are used to communicate command success or failure between the client and the dispenser.

2.6.1.1 Success Command (A0)

This command is sent when a command is successfully executed.

Text packet structure: (STX) + 02 + A0 + 2D + (ETX)

The above text packet in hexadecimal format:

STX	0	2	A	0	2	D	ETX
0x02	0x30	0x32	0x41	0x30	0x32	0x44	0x03

2.6.1.2 Failure Command (A2)

This command is sent if a command fails to execute. This can be caused by an error in the text packet or if the transmission was interrupted and timed out (if the client takes more than 2 seconds to send a text packet).

Text packet structure: (STX) + 02 + A2 + 2B + (ETX)

The above text packet in hexadecimal format:

STX	0	2	A	2	2	B	ETX
0x02	0x30	0x32	0x41	0x32	0x32	0x42	0x03

附录B — RS-232 协议 (续)

2.6.2 Write Commands

These commands are sent by the client (PC / PLC) to the dispenser to change specific parameters or settings on the dispenser. Write commands are sent using the sequence explained in “2.4.1 Write Text Packets” on page 46.

NOTE: The two hyphens (- -) shown in the commands represent ASCII space values (hex `0x20`).

2.6.2.1 Memory Change Command

This command changes the selected memory location of the dispenser. The LCD screen will update to the new memory location, including updating the dispense time, pressure, and vacuum parameters.

Client command and data: CH--ccc

ccc: The 3-digit memory location from 0–399. The dispenser will automatically limit the value to prevent any errors.

EXAMPLE: To change the Memory Location to 001, the text packet is:
(STX) + 07 + CH-- + 001 + 3D + (ETX)

The above text packet in hexadecimal format:

STX	0	7	C	H	Space	Space	0	0	1	3	D	ETX
0x02	0x30	0x37	0x43	0x48	0x20	0x20	0x30	0x30	0x31	0x33	0x44	0x03

2.6.2.2 Timed Mode Command

This command switches the dispenser to the Timed mode.

Client command and data: (STX) + 04 + TT-- + B4 + (ETX)

The above text packet in hexadecimal format:

STX	0	4	T	T	Space	Space	B	4	ETX
0x02	0x30	0x34	0x54	0x54	0x20	0x20	0x42	0x34	0x03

2.6.2.3 Steady Mode Command

This command switches the dispenser to the Steady mode.

Client command and data: (STX) + 04 + MT-- + BB + (ETX)

The above text packet in hexadecimal format:

STX	0	4	M	T	Space	Space	B	B	ETX
0x02	0x30	0x34	0x4D	0x54	0x20	0x20	0x42	0x42	0x03

2.6.2.4 Time / Steady Toggle Command

This command toggles the dispenser between Timed mode and Steady mode.

Client command and data: (STX) + 04 + TM-- + BB + (ETX)

The above text packet in hexadecimal format:

STX	0	4	T	M	Space	Space	B	B	ETX
0x02	0x30	0x34	0x54	0x4D	0x20	0x20	0x42	0x42	0x03

附录B — RS-232 协议 (续)

2.6.2.5 Pressure Set Command

This command updates the pressure value in the current memory location

Client command and data: PS--pppp

pppp: The 4-digit pressure setting excluding the decimal point. This is a unitless value. The valid pressure ranges and decimal point are determined by the pressure units currently selected in the dispenser.

Values to use in the command:

Pressure Unit	Pressure Setting Required	Value to Send in the Command (pppp)
psi	0.0–100.0 psi	0000–1000
kPa	0.0–689.5 kPa	0000–6895
Bar	0.000–6.895 bar	0000–6895

EXAMPLE: If the units of pressure are set to psi and you want to change the pressure setpoint to 50.0 psi, the text packet is: (STX) + 08 + PS-- + 0500 + F0 + (ETX)

The above text packet in hexadecimal format:

STX	0	8	P	S	space	space	0	5	0	0	F	0	ETX
0x02	0x30	0x38	0x50	0x53	0x20	0x20	0x30	0x35	0x30	0x30	0x66	0x30	0x03

2.6.2.6 Memory-Pressure Set Command

This command updates the pressure value in the memory location specified in the command. This command also updates the LCD screen to the specified memory location.

Client command and data: PH--CHcccPpppp

ccc: The 3-digit memory location from 0–399. The dispenser will automatically limit the value to prevent any errors.

pppp: The 4-digit pressure setting, excluding the decimal point. This is a unitless value. The valid pressure ranges and decimal point are determined by the pressure units currently selected in the dispenser.

Values to use in the command:

Pressure Unit	Pressure Setting Required	Value to Send in the Command (pppp)
psi	0.0–100.0 psi	0000–1000
kPa	0.0–689.5 kPa	0000–6895
Bar	0.000–6.895 bar	0000–6895

EXAMPLE: If the units of pressure are set to psi, the required memory location is 2, and the required pressure setpoint is 30.0 psi, the text packet is: (STX) + 0E + PH-- + CH002P0300 + 83 + (ETX)

Length of this text packet: Decimal 14 or hexadecimal 0x0E

The above text packet in hexadecimal format:

STX	0	E	P	H	space	space	C	H	0	0	2
0x02	0x30	0x45	0x50	0x48	0x20	0x20	0x43	0x48	0x30	0x30	0x32

P	0	3	0	0	8	3	ETX
0x50	0x30	0x33	0x30	0x30	0x38	0x33	0x03

附录B — RS-232 协议 (续)

2.6.2.7 Vacuum Set Command

This command updates the vacuum value in the current memory location.

Client command and data: VS--vvvv

vvvv: The 4-digit vacuum, setting excluding the decimal point. This is a unitless value. The valid vacuum ranges and decimal point are determined by the vacuum units currently selected in the dispenser.

Values to use in the command:

Vacuum Unit	Vacuum Setting Required	Value to Send in the Command (vvvv)
H_2O	0.0–18.0 H_2O	0000–0180
kPa	0.00–4.48 kPa	0000–0448
Hg	0.00–1.32 Hg	0000–0132
mmHg or Torr	0.0–33.6 mmHg	0000–0336

EXAMPLE: If the units of vacuum are set to H_2O and if the required vacuum setpoint is 10.5 H_2O, the text packet is: (STX) + 08 + VS-- + 0105 + E9 + (ETX)

The above text packet in hexadecimal format:

STX	0	8	V	S	space	space	0	1	0	5	E	9	ETX
0x02	0x30	0x38	0x56	0x53	0x20	0x20	0x30	0x31	0x30	0x35	0x45	0x39	0x03

2.6.2.8 Memory-Vacuum Set Command

This command updates the vacuum value in the memory location specified in the command. This command also updates the LCD screen to the specified memory location.

Client command and data: VH--CHcccVvvvv

ccc: The 3-digit memory location from 0–399. The dispenser will automatically limit value to prevent any errors.

vvv: The 4-digit vacuum setting, excluding the decimal point. This is a unitless value. The valid vacuum ranges and decimal point are determined by the vacuum units currently selected in the dispenser.

Values to use in the command:

Vacuum Unit	Vacuum Setting Required	Value to Send in the Command (vvvv)
H_2O	0.0–18.0 H_2O	0000–0180
kPa	0.00–4.48 kPa	0000–0448
Hg	0.00–1.32 Hg	0000–0132
mmHg or Torr	0.0–33.6 mmHg	0000–0336

EXAMPLE: If the units of vacuum are set to H_2O, the required memory location is 2, and the required vacuum setpoint is 10.0 H_2O, the command is: (STX) + 0E + VH-- + CH002V0100 + 79 + (ETX)

Length of this text packet: Decimal 14 or hexadecimal 0x0E

The above text packet in hexadecimal format:

STX	0	E	V	H	space	space	C	H	0	0	2
0x02	0x30	0x45	0x56	0x48	0x20	0x20	0x43	0x48	0x30	0x30	0x32

V	0	1	0	0	7	9	ETX
0x56	0x30	0x31	0x30	0x30	0x37	0x39	0x03

附录B — RS-232 协议(续)

2.6.2.9 Time Set Command

This command updates the dispense time value in the current memory location.

Client command and data: DS--Ttttt

ttttt: The 4- or 5-digit dispense time value, excluding the decimal point. The valid range is 0.0000 to 9.9999. This command accepts either 3 or 4 decimal places.

- If a value between 0000 to 9999 is entered, the dispenser will set the dispense time as 0.000 s to 9.999 s.
- If a value between 10001 to 99999 is entered, the dispenser will set the dispense time as 1.0001 s to 9.9999 s.

EXAMPLE: (1) If the required dispense time is 0.125 s, the text packet is: (STX) + 09 + DS-- + T0125 + A4 + (ETX)

Length of this text packet: Decimal 9 or hexadecimal 0x09

The above text packet in hexadecimal format:

STX	0	9	D	S	space	space	T	0	1	2	5	A	4	ETX
0x02	0x30	0x39	0x44	0x53	0x20	0x20	0x54	0x30	0x31	0x32	0x35	0x41	0x34	0x03

EXAMPLE: (2) If the required dispense time is 1.0125 s, the command is: (STX) + 0A + DS-- + T10125 + 6B + (ETX)

Length of text packet: Decimal 10 or hexadecimal 0x0A

The above text packet in hexadecimal format:

STX	0	A	D	S	space	space	T	1	0	1	2	5	6
0x02	0x30	0x41	0x44	0x53	0x20	0x20	0x54	0x31	0x30	0x31	0x32	0x35	0x36

B	ETX
0x42	0x03

2.6.2.10 Memory-Time Set Command

This command updates the dispense time value in the memory location specified in the command. This command also updates the LCD screen to the specified memory location.

Client command and data: DH--CHcccTttttt

ccc: The 3-digit memory location from 0–399. The dispenser will automatically limit value to prevent any errors.

ttttt: The 4- or 5-digit dispense time value, excluding the decimal point. The valid range is 0.0000 to 9.9999. This command accepts either 3 or 4 decimal places.

- If a value between 0000 to 9999 is entered, the dispenser will set the dispense time as 0.000 s to 9.999 s.
- If a value between 10001 to 99999 is entered, the dispenser will set the dispense time as 1.0001 s to 9.9999 s.

EXAMPLE: (1) If the required memory location is 001 and the required dispense time 0.125 s, the text packet is: (STX) + 0E + DH-- + CH001T0125 + 87 + (ETX)

Length of this text packet: Decimal 14 or hexadecimal 0x0E

The above text packet in hexadecimal format:

STX	0	E	D	H	space	space	C	H	0	0	1	T	0
0x02	0x30	0x45	0x44	0x48	0x20	0x20	0x43	0x48	0x30	0x30	0x31	0x54	0x30

1	2	5	8	7	ETX
0x31	0x32	0x35	0x38	0x37	0x03

附录B — RS-232 协议 (续)

2.6.2.10 Memory-Time Set Command (continued)

EXAMPLE: (2) If the required memory location is 001 and the required dispense time 1.0125 s, the text packet is:
(STX) + 0F + DH-- + CH001T10125 + 55 + (ETX)

Length of this text packet: Decimal 15 or hexadecimal 0x0F

The above text packet in hexadecimal format:

STX	0	F	D	H	space	space	C	H	0	0	1	T	1
0x02	0x30	0x46	0x44	0x48	0x20	0x20	0x43	0x48	0x30	0x30	0x31	0x54	0x31

0	1	2	5	5	5	ETX
0x30	0x31	0x32	0x35	0x35	0x35	0x03

2.6.2.11 Memory-Time-Pressure-Vacuum Set Command

This command updates the dispense time, dispense pressure and vacuum values in the memory location specified in the command. This command also updates the LCD screen to the specified memory location.

Client command and data: EM--CHcccTttttPppppVvvvv

ccc: The 3-digit memory location from 0–399. The dispenser will automatically limit value to prevent any errors.

ttttt: The 5-digit dispense time value excluding the decimal point. The valid range is 0.0000 to 9.9999.

pppp: The 4-digit dispense pressure value excluding the decimal point. The valid pressure ranges and decimal point are determined by the pressure units currently selected in the dispenser.

vvvv: The 4-digit vacuum value excluding the decimal point. The valid vacuum ranges and decimal point are determined by the vacuum units currently selected in the dispenser.

Values to use in the command:

Pressure Unit	Pressure Setting Required	Value to Send in the Command (pppp)
psi	0.0–100.0 psi	0000–1000
kPa	0.0–689.5 kPa	0000–6895
Bar	0.000–6.895 bar	0000–6895

Vacuum Unit	Vacuum Setting Required	Value to Send in the Command (vvvv)
H_2O	0.0–18.0 H_2O	0000–0180
kPa	0.00–4.48 kPa	0000–0448
Hg	0.00–1.32 Hg	0000–0132
mmHg or Torr	0.0–33.6 mmHg	0000–0336

EXAMPLE: If the required memory location is 001, the required dispense time is 1.0125 s, the required pressure setting is 30.0 psi, and the required vacuum setting is 10.0 H_2O, the text packet is:
(STX) + 19 + EM-- + CH001T10125P0300V0100 + 31 + (ETX)

Length of this text packet: Decimal 25 or hexadecimal 0x19

附录B — RS-232 协议 (续)

2.6.2.11 Memory-Time-Pressure-Vacuum Set Command (continued)

The above text packet in hexadecimal format:

STX	1	9	E	M	space	space	C	H	0	0	1
0x02	0x31	0x39	0x45	0x4D	0x20	0x20	0x43	0x48	0x30	0x30	0x31

T	1	0	1	2	5	P	0	3	0	0	V
0x54	0x31	0x30	0x31	0x32	0x35	0x50	0x30	0x33	0x30	0x30	0x56

0	1	0	0	3	1	ETX
0x30	0x31	0x30	0x30	0x33	0x31	0x03

2.6.2.12 Pressure Units Set Command

This command sets the unit of measure for pressure display.

Client command and data: E6--uu

uu: The pressure units. 00 = PSI, 01 = BAR, 02 = KPA

EXAMPLE: To display pressure in kPA, the text packet is: (STX) + E6-- + 02 + 7D + (ETX)

The above text packet in hexadecimal format:

STX	0	6	E	6	space	space	0	2	7	D	ETX
0x02	0x30	0x36	0x45	0x36	0x20	0x20	0x30	0x32	0x37	0x44	0x03

2.6.2.13 Vacuum Units Set Command

This command sets the unit of measure for vacuum display.

Client command and data: E7--uu

uu: The vacuum units. 00 = KPA, 01 = Inches H_2O, 02 = Inches Hg, 03 = mmHg, 04 = TORR

EXAMPLE: To display vacuum in H_2O, the text packet is: (STX) + 06 + E7-- + 01 + 7D + (ETX)

The above text packet in hexadecimal format:

STX	0	6	E	7	space	space	0	1	7	D	ETX
0x02	0x30	0x36	0x45	0x37	0x20	0x20	0x30	0x31	0x37	0x44	0x03

2.6.2.14 Dispense Parameter Memory Clear

This command re-initializes the dispensing parameter memory locations by setting them all to 0.

Client command and data: (STX) + 04 + CL-- + CD + (ETX)

The above text packet in hexadecimal format:

STX	0	4	C	L	space	space	C	D	ETX
0x02	0x30	0x34	0x43	0x4C	0x20	0x20	0x43	0x44	0x03

附录B — RS-232 协议(续)

2.6.2.15 Deposit Count Clear Command

This command resets the deposit counter on the dispenser to all zeros.

Client command and data: (STX) + 04 + EA-- + D6 + (ETX)

The above text packet in hexadecimal format:

STX	0	4	E	A	space	space	D	6	ETX
0x02	0x30	0x34	0x45	0x41	0x20	0x20	0x44	0x36	0x03

2.6.2.16 Reset Auto Increment Command

This command resets the Auto Increment functions. The dispenser will set the Memory Address to the Start Address Value, reset the counters, and clear the auto increment alarm. If the dispenser is not in counter or timer mode, the dispenser returns a Failure Command (A2) text packet.

Client command and data: (STX) + 04 + SE-- + C4 + (ETX)

The above text packet in hexadecimal format:

STX	0	4	S	E	space	space	C	4	ETX
0x02	0x30	0x34	0x53	0x45	0x20	0x20	0x43	0x34	0x03

2.6.2.17 Auto Increment Mode On / Off Command

This command enables or disables the Auto Increment Mode. When enabling the Auto Increment Mode, the dispenser will enable to Count Mode.

NOTE: This command is not necessary to enable Auto Increment Mode. The Auto Increment Mode command (2.6.2.18) can be used instead.

Client command and data: AI--i

i: Enable Command. 0=OFF, 1 = ON

EXAMPLE: To enable the Auto Increment Mode, the text packet is: (STX) + 05 + AI-- + 1 + A0 + (ETX)

The above text packet in hexadecimal format:

STX	0	5	A	I	space	space	1	A	0	ETX
0x02	0x30	0x35	0x41	0x49	0x20	0x20	0x31	0x41	0x30	0x03

附录B — RS-232 协议 (续)

2.6.2.18 Auto Increment Mode Command

This command changes the Auto Increment Mode to either Timer, Counter, or Auto Sequence mode. This command also updates the lower four digits of the trigger value.

Client command and data: AC--SsDdddd

s: Mode Command. 1 = Timer Mode, 2 = Counter Mode, 4 = Auto Sequence Mode.

dddd: Trigger Value. 0001–9999

EXAMPLE: To set the mode to Timer Mode and the Trigger value to 100, the text packet is:
(STX) + 0B + AC-- + S1D0100 + 41 + (ETX)

Length of this text packet: Decimal 11 or hexadecimal 0B

The above text packet in hexadecimal format:

STX	0	B	A	C	space	space	S	1	D	0	1	0	0
0x02	0x30	0x42	0x41	0x43	0x20	0x20	0x53	0x31	0x44	0x30	0x31	0x30	0x30

4	1	ETX
0x34	0x31	0x03

2.6.2.19 Set Start & End Address Command

This command downloads the auto increment start and end addresses.

Client command and data: SS--SsssEeee

sss: Start Address 000–399

eee: End Address 000–399

EXAMPLE: To set the Auto Increment Start Address as 1 and the End Address as 50, the text packet is:
(STX) + 0C + SS-- + S001E050 + E9 + (ETX)

Length of this text packet: Decimal 12 or hexadecimal 0C

The above text packet in hexadecimal format:

STX	0	C	S	S	space	space	S	0	0	1	E	0	5
0x02	0x30	0x43	0x53	0x53	0x20	0x20	0x53	0x30	0x30	0x31	0x45	0x30	0x35

0	E	9	ETX
0x30	0x45	0x39	0x03

附录B — RS-232 协议 (续)

2.6.2.20 Set Trigger Value Command

This command downloads the 5-digit trigger value into the current memory location.

Client command and data: EQ--Ttttt

ttttt: Trigger Value. 00001–99999

EXAMPLE: If the trigger value is 1000, the text packet it: (STX) + 0A + EQ-- + T01000 + 74 + (ETX)

Length of this text packet: Decimal 10 or hexadecimal 0A

The above text packet in hexadecimal format:

STX	0	A	E	Q	space	space	T	0	1	0	0	0	7
0x02	0x30	0x41	0x45	0x51	0x20	0x20	0x54	0x30	0x31	0x30	0x30	0x30	0x37

4	ETX
0x34	0x03

2.6.2.21 Set the Real Time Clock Command

This command sets the time for the real time clock on the dispenser.

Client command and data: EB--HhhMmmAMa

hh: Hours. 0–23 for 24 hour format, 1–12 for 12 hour format

mm: Minutes. 0–59

a: Hour format. 0 = AM, 1 = PM, 2 = 24 hour format

EXAMPLE: To set the time as 14:05 and the hour format to 24-Hour, the text packet is:
(STX) + 0D + EB-- + H14M05AM2 + A6 + (ETX)

Length of this text packet: Decimal 13 or hexadecimal 0D

The above text packet in hexadecimal format:

STX	0	D	E	B	space	space	H	1	4	M	0	5	A
0x02	0x30	0x44	0x45	0x42	0x20	0x20	0x48	0x31	0x34	0x4D	0x30	0x35	0x41

M	2	A	6	ETX
0x4D	0x32	0x41	0x36	0x03

附录B — RS-232 协议 (续)

2.6.2.22 Set the Real Time Date Command

This command sets the date for the real time clock on the dispenser.

Client command and data: EC--MmmDddYyy

mm: Months. 1–12

dd: Days. 1–31

yy: Years. 00–99

EXAMPLE: To set the date as 1st January 2022, the text packet is: (STX) + 0D + EC-- + M01D01Y22 + B4 + (ETX)

Length of this text packet: Decimal 13 or hexadecimal 0D

The above text packet in hexadecimal format:

STX	0	D	E	C	space	space	M	0	1	D	0	1	Y
0x02	0x30	0x44	0x45	0x43	0x20	0x20	0x4D	0x30	0x31	0x44	0x30	0x31	0x59

2	2	B	4	ETX
0x32	0x32	0x42	0x34	0x03

2.6.2.23 Operator Lockout Set Command

This command updates the operator lockout settings. A “1” indicates that a feature is locked out. A “0” indicates that the feature is not locked out.

Client command and data: EG--PApppDTtDPpDVvMmDCcDMdAIaARuALbMMePUfVUgLAhCLjCOkAMn

pppp: 4-digit password. This needs to match the password set on the dispenser. The dispenser returns an error if incorrect.

t: Lockout dispense time: “1”=lockout, “0”=enabled (DT)

p: Lockout dispense pressure (DP)

v: Lockout dispense vacuum (DV)

m: Lockout memory cell selection (M)

c: Lockout deposit counter selection (DC)

d: Lockout dispense mode change (DM)

a: Lockout Auto Increment Mode selection (AI)

u: Lockout Auto Increment Reset (AR)

b: Lockout Alarms Reset (AL)

e: Lockout Main Menu selection (MM)

f: Lockout Pressure Unit Menu selection (PU)

g: Lockout Vacuum Unit Menu selection (VU)

h: Lockout Language Menu selection (LA)

j: Lockout Set Clock / Date Menu selection (CL)

k: Lockout Set Communications Menu selection (CO)

n: Lockout Alarm Options Menu selection (AM)

附录B — RS-232 协议 (续)

2.6.2.23 Operator Lockout Set Command (continued)

EXAMPLE: If the supervisor password is 0000 and if Dispense Time, Dispense Pressure, and Dispense Vacuum need to be locked out, the text packet is:
(STX) + 39 + EG-- + PA0000DT1DP1DV1M0DC0DM0AI0AR0AL0MM0PU0VU0LA0CL0CO0AM0 + 79 + (ETX)

Length of this text packet: Decimal 57 or hexadecimal 39

The above text packet in hexadecimal format:

STX	3	9	E	G	space	space	P	A	0	0	0	0
0x02	0x33	0x39	0x45	0x47	0x20	0x20	0x50	0x41	0x30	0x30	0x30	0x30

D	T	1	D	P	1	D	V	1	M	0	D	C
0x44	0x54	0x31	0x44	0x50	0x31	0x44	0x56	0x31	0x4D	0x30	0x44	0x43

0	D	M	0	A	I	0	A	R	0	A	L	0
0x30	0x44	0x4D	0x30	0x41	0x49	0x30	0x41	0x52	0x30	0x41	0x4C	0x30

M	M	0	P	U	0	V	U	0	L	A	0	C
0x4D	0x4D	0x30	0x50	0x55	0x30	0x56	0x55	0x30	0x4C	0x41	0x30	0x43

L	0	C	O	0	A	M	0	7	9	ETX
0x4C	0x30	0x43	0x4F	0x30	0x41	0x4D	0x30	0x37	0x39	0x03

2.6.2.24 Set Language Command

This command sets the language for the dispenser.

Client command and data: ED--LI: Language Index

0 = English

1 = French

2 = German

3 = Spanish

4 = Italian

5 = Chinese

6 = Japanese

7 = Korean

EXAMPLE: To set the language as Spanish, the text packet is: (STX) + 05 + ED-- + 3 + 9F + (ETX)

The above text packet in hexadecimal format:

STX	0	5	E	D	space	space	3	9	F	ETX
0x02	0x30	0x35	0x45	0x44	0x20	0x20	0x33	0x39	0x46	0x03

附录B — RS-232 协议(续)

2.6.2.25 Alarm Options Set Command

This command sets the options for all dispenser alarms. A “1” indicates the alarm feature is enabled. A “0” indicates the alarm feature is disabled.

Client command and data: EI--INiIOoILlPOpPLbAEeAOa

i: Enable Input Alarm (IN)

o: Enable Output of Input Alarm (IO)

l: Latch the Input Alarm (IL)

p: Enable Output of the Pressure Alarm (PO)

b: Latch the Pressure Alarm (PL)

e: Enable Auto Increment Alarm (AE)

a: Enable Output of the Auto Increment Alarm (AO)

EXAMPLE: To enable the alarms for “Enable Output of the Pressure Alarm (PO)” and “Latch the Pressure Alarm (PL)”, the text packet is: (STX) + 19 + EI-- + IN0IO0IL0PO1PL1AE0AO0 + 61 + (ETX)

Length of this text packet: Decimal 25 or hexadecimal 19

The above text packet in hexadecimal format:

STX	1	9	E	I	space	space	I	N	0	I	O	0
0x02	0x31	0x39	0x45	0x49	0x20	0x20	0x49	0x4E	0x30	0x49	0x4F	0x30

I	L	0	P	O	1	P	L	1	A	E	0	A
0x49	0x4C	0x30	0x50	0x4F	0x31	0x50	0x4C	0x31	0x41	0x45	0x30	0x41

O	0	6	1	ETX
0x4F	0x30	0x36	0x31	0x03

2.6.2.26 Reset Alarms Command

This command clears any latched alarms.

Client command and data: (STX) + 04 + EK-- + CC + (ETX)

The above text packet in hexadecimal format:

STX	0	4	E	K	space	space	C	C	ETX
0x02	0x30	0x34	0x45	0x4B	0x20	0x20	0x43	0x43	0x03

2.6.2.27 Dispense Command

This command initiates a dispense cycle. If the dispenser is in Timed Mode, it will dispense for the duration currently set for the Dispense Time parameter. If the dispenser is in Steady Mode, it will begin dispensing. Another dispense command is then needed to end the dispense cycle.

Client command and data: (STX) + 04 + DI-- + CF + (ETX)

The above text packet in hexadecimal format:

STX	0	4	D	I	space	space	C	F	ETX
0x02	0x30	0x34	0x44	0x49	0x20	0x20	0x43	0x46	0x03

附录B — RS-232 协议 (续)

2.6.3 Read Commands

For these commands, the client requests a set of data from the dispenser, which the dispenser will return before ending the transmission. Read commands are sent using the sequence explained in “2.4.2 Read Text Packets” on page 48.

NOTE: The two hyphens “--” shown in the commands represent ASCII space values (Hex 0x20).

2.6.3.1 Pressure Time Read Command

This command returns the Dispense Pressure and Dispense Time for the specified address. It also updates the LCD screen to the specified memory location.

Client command and data: UCccc

ccc: The 3-digit memory location from 0–399. The dispenser will automatically limit value to prevent any errors.

EXAMPLE: To read the Dispense Pressure and Dispense Time values in memory location #1, the text packet is: (STX) + 05 + UC001 + 72 + (ETX)

NOTE: This command changes the current memory location in the dispenser as set in the command (e.g., 001 in above example command), in addition to returning the values for Dispense Pressure and Dispense Time.

The above text packet in hexadecimal format:

STX	0	5	U	C	0	0	1	7	2	ETX
0x02	0x30	0x35	0x55	0x43	0x30	0x30	0x31	0x37	0x32	0x03

NOTE: “D0” is the letter “D” followed by the digit “0.”

Return Format: D0PDppppDTtttt

pppp: The 4-digit pressure setting excluding the decimal point. This is a unitless value. The valid pressure ranges and decimal point are determined by the pressure units currently selected in the dispenser.

ttttt: The 4-digit dispense time value excluding the decimal point. The valid range is 0.000 to 9.999. This command truncates the last decimal place of the dispense time. This was done to make this command compatible with the Musashi FX808 protocol.

Interpreting the pressure setting from the return feedback value:

Pressure Unit	Value Received from the Dispenser (pppp)	Pressure Setting
psi	0000–1000	0.0–100.0 psi
kPa	0000–6895	0.0–689.5 kPa
Bar	0000–6895	0.000–6.895 bar

EXAMPLE: If the pressure setting at the requested memory location is 50.0 psi and the time setting is 1.005 s, the text packet received from the dispenser is: (STX) + 0E + D0PD0500DT1005 + 60 + (ETX)

Length of the response text packet: Decimal 14 or hexadecimal 0x0E

The above text packet in hexadecimal format:

STX	0	E	D	0	P	D	0	5	0	0	D	T	1
0x02	0x30	0x45	0x44	0x30	0x50	0x44	0x30	0x35	0x30	0x30	0x44	0x54	0x31

0	0	5	6	0	ETX
0x30	0x30	0x35	0x36	0x30	0x03

附录B — RS-232 协议 (续)

2.6.3.2 Memory Channel, Dispense Pressure, and Dispense Time Read Command

This command returns the dispenser' s current memory channel, Dispense Pressure value, and Dispense Time value to the client.

Client command and data: (STX) + 04 + UD-- + C3 + (ETX)

The above text packet in hexadecimal format:

STX	0	4	U	D	space	space	C	3	ETX
0x02	0x30	0x34	0x55	0x44	0x20	0x20	0x43	0x33	0x03

NOTE: "D0" is the letter "D" followed by the digit "0."

Return Format: D0ChcccPDppppDTtttt

ccc: The 3-digit memory location from 0–399. The dispenser will automatically limit value to prevent any errors.

pppp: The 4-digit pressure setting excluding the decimal point. This is a unitless value. The valid pressure ranges and decimal point are determined by the pressure units currently selected in the dispenser.

ttttt: The 4-digit dispense time value excluding the decimal point. The valid range is 0.000 to 9.999. This command truncates the last decimal place of the dispense time. This was done to make this command compatible with the Musashi FX808 protocol.

Interpreting the pressure setting from the return feedback value:

Pressure Unit	Value Received from the Dispenser (pppp)	Pressure Setting
psi	0000–1000	0.0–100.0 psi
kPa	0000–6895	0.0–689.5 kPa
Bar	0000–6895	0.000–6.895 bar

EXAMPLE: If the current memory location is 1, the pressure setting at the memory location is 50.0 psi, and the time setting is 1.005 s, the text packet received from the dispenser is:
(STX) + 13 + D0CH001PD0500DT1005 + 55 + (ETX)

Length of the response text packet: Decimal 19 or hexadecimal 0x13

The above text packet in hexadecimal format:

STX	1	3	D	0	C	H	0	0	1	P	D	0	5
0x02	0x31	0x33	0x44	0x30	0x43	0x48	0x30	0x30	0x31	0x50	0x44	0x30	0x35

0	0	D	T	1	0	0	5	5	5	ETX
0x30	0x30	0x44	0x54	0x31	0x30	0x30	0x35	0x35	0x35	0x03

附录B — RS-232 协议 (续)

2.6.3.3 Pressure Time Vacuum Read Command

This command returns the Dispense Pressure, Dispense Time, and Vacuum values of the specified address. This command also update the LCD screen to the specified memory location.

Client command and data: E8ccc

ccc: The 3-digit memory location from 0–399. The dispenser will automatically limit value to prevent any errors.

EXAMPLE: To read the pressure, time, and vacuum values in memory location #1, the text packet is:
(STX) + 05 + E8001 + 8D + (ETX)

NOTE: This command changes the current memory location in the dispenser as set in the command (e.g., 001 in above example command), in addition to returning the values for pressure, time, and vacuum.

The above text packet in hexadecimal format:

STX	0	5	E	8	0	0	1	8	D	ETX
0x02	0x30	0x35	0x45	0x38	0x30	0x30	0x31	0x38	0x44	0x03

NOTE: "D0" is the letter "D" followed by the digit "0."

Return Format: D0PDppppDTttttVCvvvv

pppp: The 4-digit pressure setting excluding the decimal point. This is a unitless value. The valid pressure ranges and decimal point are determined by the pressure units currently selected in the dispens

ttttt: The 5-digit dispense time value excluding the decimal point. The valid range is 0.0000 to 9.9999 seconds.

vvvv: The 4-digit vacuum setting excluding the decimal point. This is a unitless value. The valid vacuum ranges and decimal point are determined by the vacuum units currently selected in the dispenser.

Interpreting the pressure setting from the return feedback value:

Pressure Unit	Value Received from the Dispenser (pppp)	Pressure Setting
psi	0000–1000	0.0–100.0 psi
kPa	0000–6895	0.0–689.5 kPa
Bar	0000–6895	0.000–6.895 bar

Interpreting the vacuum setting from the return feedback value:

Vacuum Unit	Value received from Ultimus V (vvvv)	Vacuum Setting
H_2O	0000–0180	0.0–18.0 H_2O
kPa	0000–0448	0.00–4.48 kPa
Hg	0000–0132	0.00–1.32 Hg
mmHg or Torr	0000–0336	0.0–33.6 mmHg

EXAMPLE: If the requested memory location is 1, the pressure setting at the memory location is 50.0 psi, the time setting is 1.0055 s, and the vacuum setting is 10.0 H_2O, the text packet received from the dispenser is:
(STX) + 15 + D0PD0500DT10055VC0100 + E0 + (ETX)

Length of the response text packet: Decimal 21 or hexadecimal 0x15

附录B — RS-232 协议 (续)

2.6.3.3 Pressure Time Vacuum Read Command (continued)

The above text packet in hexadecimal format:

STX	1	5	D	0	P	D	0	5	0	0	D	T	1
0x02	0x31	0x35	0x44	0x30	0x50	0x44	0x30	0x35	0x30	0x30	0x44	0x54	0x31

0	0	5	5	V	C	0	1	0	0	E	0	ETX
0x30	0x30	0x35	0x35	0x56	0x43	0x30	0x31	0x30	0x30	0x45	0x30	0x03

2.6.3.4 Memory Location Read Command

This command returns the current memory location at which the dispenser is set. “D0” is the letter “D” followed by the digit “0.”

Client command and data: (STX) + 04 + UA-- + C6 + (ETX)

The above text packet in hexadecimal format:

STX	0	4	U	A	space	space	C	6	ETX
0x02	0x30	0x34	0x55	0x41	0x20	0x20	0x43	0x36	0x03

Return Format: D0ccc

ccc: The 3-digit memory location from 0–399.

EXAMPLE: If the current memory location is 001, the text packet received from the dispenser is:
(STX) + 05 + D0001 + 96 + (ETX)

The above text packet in hexadecimal format:

STX	0	5	D	0	0	0	1	9	6	ETX
0x02	0x30	0x35	0x44	0x30	0x30	0x30	0x31	0x39	0x36	0x03

附录B — RS-232 协议(续)

2.6.3.5 Pressure Units Read Command

This command returns the units the dispenser is using to display pressure.

Client command and data: (STX) + 04 + E4-- + E3 + (ETX)

The above text packet in hexadecimal format:

STX	0	4	E	4	space	space	E	3	ETX
0x02	0x30	0x34	0x45	0x34	0x20	0x20	0x45	0x33	0x03

NOTE: "D0" is the letter "D" followed by the digit "0."
Return Format: D0PUuu
uu: The pressure units. 00 = PSI, 01 = BAR, 02 = KPA

EXAMPLE: If the dispenser is set to display units of pressure in KPA, the text packet received from the dispenser is: (STX) + 06 + D0PU02 + 1F + (ETX)

The above text packet in hexadecimal format:

STX	0	6	D	0	P	U	0	2	1	F	ETX
0x02	0x30	0x36	0x44	0x30	0x50	0x55	0x30	0x32	0x31	0x46	0x03

2.6.3.6 Vacuum Units Read Command

This command returns the units the dispenser is using to display vacuum.

Client command and data: (STX) + 04 + E5-- + E2 + (ETX)

The above text packet in hexadecimal format:

STX	0	4	E	5	space	space	E	2	ETX
0x02	0x30	0x34	0x45	0x35	0x20	0x20	0x45	0x32	0x03

NOTE: "D0" is the letter "D" followed by the digit "0."
Return Format: D0VUuu
uu: The vacuum units. 00 = KPA, 01 = Inches H_2O, 02 = Inches Hg, 03 = mmHg, 04 = TORR.

EXAMPLE: If the dispenser is set to display units of vacuum in H_2O, the text packet received from the dispenser is: (STX) + 06 + D0VU01 + 1A + (ETX)

The above text packet in hexadecimal format:

STX	0	6	D	0	V	U	0	1	1	A	ETX
0x02	0x30	0x36	0x44	0x30	0x56	0x55	0x30	0x31	0x31	0x41	0x03

附录B — RS-232 协议 (续)

2.6.3.7 Total Status Read Command

This command returns the status and values of the Auto Increment Mode and the dispense mode (Timed, Steady, or Teach).

NOTE: This is the same command as the Musashi 808FX Total Status command, so the Vacuum Interval Mode status is included in the text packet. However, the Ultimus V dispenser does not support this mode, so this data defaults to safe values.

Client command and data: (STX) + 04 + AU-- + C6 + (ETX)

The above text packet in hexadecimal format:

STX	0	4	A	U	space	space	C	6	ETX
0x02	0x30	0x34	0x41	0x55	0x20	0x20	0x43	0x36	0x03

NOTE: "D0" is the letter "D" followed by the digit "0."

Return Format: D0AIiMmSssssDddddddddVIqVvvvvItttttTMxSAaaaEAeee

i: Auto Increment mode status. 0 = Off, 1 = Enabled

m: Auto Increment mode function. 1 = Timer, 2 = Count, 4=Auto Sequence Mode

ssss: Trigger Value. The upper digit is truncated to make this function compatible with the Musashi command

ddddddd: Current Timer / Counter value

q: Defaulted to 0

vvvv: Defaulted to 0001

tttt: Defaulted to 0001

x: Dispense mode. 0 = Timed, 1 = Steady, 2 = Teach

aaa: Auto Increment Start Address. 000–399

eee: Auto Increment End Address. 000–399

EXAMPLE: If Auto Increment mode is On, the Auto Increment Mode function is Count, the Trigger value is 100, the current Timer / Counter value is 10500, the dispense mode is Timed, the Auto Increment Start Address is 001, and the Auto increment End Address is 050, the text packet received from the dispenser is:
(STX) + 2E + D0AI1M2S0100D0010500VI0V0001I0001TM0SA001EA050 + 2C + (ETX)

Length of the response text packet: Decimal 46 or hexadecimal 0x2E

The above text packet in hexadecimal format:

STX	2	E	D	0	A	I	1	M	2	S	0	1	0
0x02	0x32	0x45	0x44	0x30	0x41	0x49	0x31	0x4D	0x32	0x53	0x30	0x31	0x30
0	D	0	0	1	0	5	0	0	V	I	0	V	0
0x30	0x44	0x30	0x30	0x31	0x30	0x35	0x30	0x30	0x56	0x49	0x30	0x56	0x30
0	0	1	I	0	0	0	1	T	M	0	S	A	0
0x30	0x30	0x31	0x49	0x30	0x30	0x30	0x31	0x54	0x4D	0x30	0x53	0x41	0x30
0	1	E	A	0	5	0	2	C	ETX				
0x30	0x31	0x45	0x41	0x30	0x35	0x30	0x32	0x43	0x03				

附录B — RS-232 协议 (续)

2.6.3.8 Trigger Value Read Command

This command returns the 5-digit trigger value of the current memory location.

Client command and data: (STX) + 04 + ER-- + C5 + (ETX)

The above text packet in hexadecimal format:

STX	0	4	E	R	space	space	C	5	ETX
0x02	0x30	0x34	0x45	0x52	0x20	0x20	0x43	0x35	0x03

NOTE: "D0" is the letter "D" followed by the digit "0."
Return Format: D0TVttttt
ttttt: 5-digit trigger value. Range is 00000–99999.

EXAMPLE: If the trigger value is 100, the text packet received from the dispenser is:
(STX) + 09 + D0TV00100 + 88 + (ETX)

Length of the response text packet: Decimal 9 or hexadecimal 0x09

The above text packet in hexadecimal format:

STX	0	9	D	0	T	V	0	0	1	0	0	8
0x02	0x30	0x39	0x44	0x30	0x54	0x56	0x30	0x30	0x31	0x30	0x30	0x38

8	ETX
0x38	0x03

2.6.3.9 Deposit Count Read Command

This command returns the current 7-digit deposit count that is stored in the dispenser.

Client command and data: (STX) + 04 + E9-- + DE + (ETX)

The above text packet in hexadecimal format:

STX	0	4	E	9	space	space	D	E	ETX
0x02	0x30	0x34	0x45	0x39	0x20	0x20	0x44	0x45	0x03

NOTE: "D0" is the letter "D" followed by the digit "0."
Return Format: D0SCccccccc
ccccccc: 7-digit deposit counter. Range is 0000000 to 9999999.

EXAMPLE: If the deposit counter value is 1050250, the text packet received from the dispenser is:
(STX) + 0B + D0SC1050250 + 27 + (ETX)

The above text packet in hexadecimal format:

STX	0	B	D	0	S	C	1	0	5	0	2	5	0
0x02	0x30	0x42	0x44	0x30	0x53	0x43	0x31	0x30	0x35	0x30	0x32	0x35	0x30

2	7	ETX
0x32	0x37	0x03

附录B — RS-232 协议(续)

2.6.3.10 Real Time Clock Read Command

This command returns the current time of the real time clock on the dispenser.

Client command and data: (STX) + 04 + EE-- + D2 + (ETX)

The above text packet in hexadecimal format:

STX	0	4	E	E	space	space	D	2	ETX
0x02	0x30	0x34	0x45	0x45	0x20	0x20	0x44	0x32	0x03

NOTE: "D0" is the letter "D" followed by the digit "0."

Return Format: D0HhhMmmAMa

hh: Hours. 0–23 for 24 hour format, 1–12 for 12 hour format

mm: Minutes. 0–59

a: Hour format. 0 = AM, 1 = PM, 2 = 24 hour format

EXAMPLE: If the current time on the dispenser is 14:25, the text packet received from the dispenser is:
(STX) + 0B + D0H14M25AM2 + F9 + (ETX)

The above text packet in hexadecimal format:

STX	0	B	D	0	H	1	4	M	2	5	A	M	2
0x02	0x30	0x42	0x44	0x30	0x48	0x31	0x34	0x4D	0x32	0x35	0x41	0x4D	0x32

F	9	ETX
0x46	0x39	0x03

附录B — RS-232 协议(续)

2.6.3.11 Real Time Date Read Command

This command returns the current date of the real time clock on the dispenser.

Client command and data: (STX) + 04 + EF-- + D1 + (ETX)

The above text packet in hexadecimal format:

STX	0	4	E	F	space	space	D	1	ETX
0x02	0x30	0x34	0x45	0x46	0x20	0x20	0x44	0x31	0x03

NOTE: "D0" is the letter "D" followed by the digit "0."

Return Format: D0MmmDddYyy

mm: Months. 1–12

dd: Days. 1–31

yy: Years. 00–99

EXAMPLE: if the date is 25th December 21, the text packet received from the dispenser is:
(STX) + 0B + D0M12D25Y21 + 03 + (ETX)

The above text packet in hexadecimal format:

STX	0	B	D	0	M	1	2	D	2	5	Y	2	1
0x02	0x30	0x42	0x44	0x30	0x4D	0x31	0x32	0x44	0x32	0x35	0x59	0x32	0x31

0	3	ETX
0x30	0x33	0x03

2.6.3.12 Operator Lockout Read Command

This command returns the current operator lockout settings.

Client command and data: EH--PApppp

pppp: 4-digit password. This needs to match the password set on the dispenser. The dispenser returns an error if incorrect.

EXAMPLE: If the supervisor password is 0000, the text packet received from the dispenser is:
(STX) + 0A + EH--PA0000 + 71 + (ETX)

The above text packet in hexadecimal format:

STX	0	A	E	H	space	space	P	A	0	0	0	0
0x02	0x30	0x41	0x45	0x48	0x20	0x20	0x50	0x41	0x30	0x30	0x30	0x30

7	1	ETX
0x37	0x31	0x03

附录B — RS-232 协议 (续)

2.6.3.12 Operator Lockout Read Command (continued)

NOTE: “D0” is the letter “D” followed by the digit “0.”

Return Format: D0DTtDPpDVvMmDCcDMdAIaARuALbMMePUfVUgLAhCLjCOkAMn

t: Lockout dispense time: “1”=lockout, “0”=enabled (DT)

p: Lockout dispense pressure (DP)

v: Lockout dispense vacuum (DV)

m: Lockout memory cell selection (M)

c: Lockout deposit counter selection (DC)

d: Lockout dispense mode change (DM)

a: Lockout Auto Increment Mode selection (AI)

u: Lockout Auto Increment Reset (AR)

b: Lockout Alarms Reset (AL)

e: Lockout Main Menu selection (MM)

f: Lockout Pressure Unit Menu selection (PU)

g: Lockout Vacuum Unit Menu selection (VU)

h: Lockout Language Menu selection (LA)

j: Lockout Set Clock / Date Menu selection (CL)

k: Lockout Set Communications Menu selection (CO)

n: Lockout Alarm Options Menu selection (AM)

EXAMPLE: If the Dispense Time (DT), Dispense Pressure (DP), and Dispense Vacuum (DV) are locked out, the text packet received from the dispenser is:
(STX) + 31 + D0DT1DP1DV1M0DC0DM0AI0AR0AL0MM0PU0VU0LA0CL0CO0AM0 + 2A + (ETX)

Length of the response text packet: Decimal 49 or hexadecimal 31

The above text packet in hexadecimal format:

STX	3	1	D	0	D	T	1	D	P	1	D	V	1
0x02	0x33	0x31	0x44	0x30	0x44	0x54	0x31	0x44	0x50	0x31	0x44	0x56	0x31
M	0	D	C	0	D	M	0	A	I	0	A	R	0
0x4D	0x30	0x44	0x43	0x30	0x44	0x4D	0x30	0x41	0x49	0x30	0x41	0x52	0x30
A	L	0	M	M	0	P	U	0	V	U	0	L	A
0x41	0x4C	0x30	0x4D	0x4D	0x30	0x50	0x55	0x30	0x56	0x55	0x30	0x4C	0x41
0	C	L	0	C	O	0	A	M	0	2	A	ETX	
0x30	0x43	0x4C	0x30	0x43	0x4F	0x30	0x41	0x4D	0x30	0x32	0x41	0x03	

附录B — RS-232 协议 (续)

2.6.3.13 Alarm Options Read Command

This command returns the current settings of the dispenser alarm options.

Client command and data: (STX) + 04 + EJ-- + CD + (ETX)

The above text packet in hexadecimal format:

STX	0	4	E	J	space	space	C	D	ETX
0x02	0x30	0x34	0x45	0x4A	0x20	0x20	0x43	0x44	0x03

NOTE: "D0" is the letter "D" followed by the digit "0."

Return Format: D0INiIOoILlPOpPLbAEeAOa

A "1" indicates the alarm feature is enabled. A "0" indicates the alarm feature is disabled.

i: Enable Input Alarm (IN)

o: Enable Output Of Input Alarm (IO)

l: Latch the Input Alarm (IL)

p: Enable Output of the Pressure Alarm (PO)

b: Latch the Pressure Alarm (PL)

e: Enable Auto Increment Alarm (AE)

a: Enable Output of the Auto Increment Alarm (AO)

EXAMPLE: If Enable Output of the Pressure Alarm (PO) and Latch the Pressure Alarm (PL) are enabled, the text packet received from the dispenser is: (STX) + 17 + D0IN0IO0IL0PO1PL1AE0AO0 + BD + (ETX)

Length of the response text packet: Decimal 23 or hexadecimal 17

The above text packet in hexadecimal format:

STX	1	7	D	0	I	N	0	I	O	0	I	L
0x02	0x31	0x37	0x44	0x30	0x49	0x4E	0x30	0x49	0x4F	0x30	0x49	0x4C

0	P	O	1	P	L	1	A	E	0	A	O	0
0x30	0x50	0x4F	0x31	0x50	0x4C	0x31	0x41	0x45	0x30	0x41	0x4F	0x30

B	D	ETX
0x42	0x44	0x03

附录B — RS-232 协议(续)

2.6.3.14 Alarm Status Read Command

This command returns the status of each of the dispenser alarms.

Client command and data: (STX) + 04 + EL-- + CB + (ETX)

The above text packet in hexadecimal format:

STX	0	4	E	L	space	space	C	B	ETX
0x02	0x30	0x34	0x45	0x4C	0x20	0x20	0x43	0x42	0x03

NOTE: "D0" is the letter "D" followed by the digit "0."

Return Format: D0INiPApAIa

i: input Alarm Status: 1= Alarm is set, 2= No alarm

p: Pressure Alarm Status

a: Auto Increment Alarm Status

EXAMPLE: If the Pressure Alarm Status is "Alarm is set," the text packet received from the dispenser is: (STX) + 0B + D0IN2PA1AI2 + D3 + (ETX)

Length of the response text packet: Decimal 11 or hexadecimal 0B

The above text packet in hexadecimal format:

STX	0	B	D	0	I	N	2	P	A	1	A	I	2
0x02	0x30	0x42	0x44	0x30	0x49	0x4E	0x32	0x50	0x41	0x31	0x41	0x49	0x32

D	3	ETX
0x44	0x33	0x03

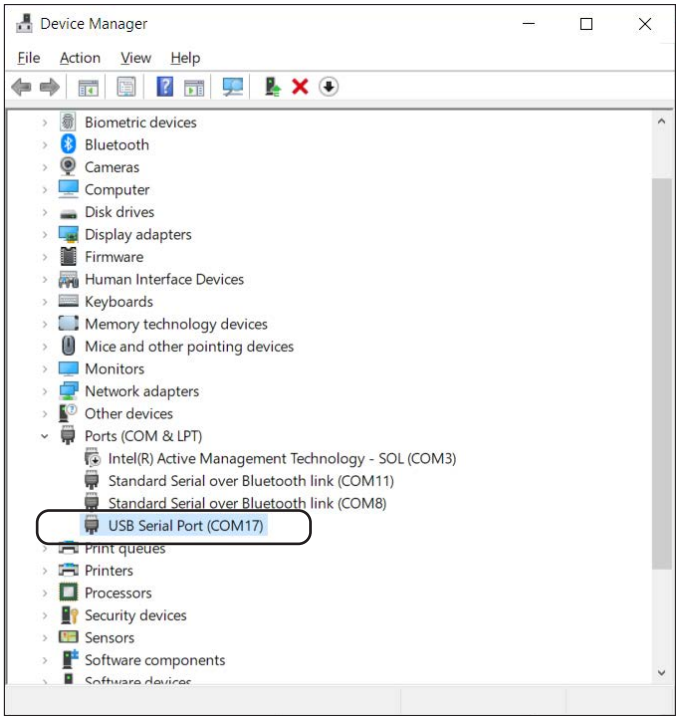
附录B — RS-232 协议 (续)

3. Troubleshooting Remote Communication

3.1 No Response from the Dispenser

1. Check that the dispenser is powered ON.

2. Check that the cable connections between the client and the dispenser are firmly and properly secured.
3. Check that the dispenser Comm Port Settings match the COM port you are trying to use: Front Port Enabled / Rear Port Enabled checkbox and Baud Rate. Refer to “Communications Port Options Screen” on page 26 for details.
4. Ensure that the cable used for communication is not a null-modem / cross cable. Use only a DB9-female-to-DB9-female straight-through cable.
5. Check that the COM port is present in the Device Manager and that you are using the correct COM port. In the example below, the correct port is COM17. If multiple COM ports appear, unplug and replug the adapter to see which COM ports disappear and reappear.



附录B — RS-232 协议 (续)

Troubleshooting Remote Communication (continued)

3.1 No Response from the Dispenser (continued)

6. Check that you are using the correct command format, as explained under “2.6.2 Write Commands” on page 51 and “2.6.3 Read Commands” on page 63.

7. Check that you are sending the Enquiry (ENQ / 0x05) control character from the client to the dispenser as a single-byte text packet (hexadecimal 0x05), not as separate “E,” “N,” and “Q” characters.

   NOTE: This also applies to the ACK (0x06), NAK (0x21), EOT (0x04) control characters. Control characters do not need STX (0x02) or ETX (0x03) added to them.

3.2 Dispenser Returns a Failure Command (A2)

1. Check that the length of the data and the checksum calculation is correct in the sent text packet. If the checksum is incorrectly calculated, the dispenser discards the text packet and returns a Failure Command (A2) response.

2. If the client sends an Enquiry (ENQ / 0x05) text packet, the dispenser responds with an Acknowledgment (ACK / 0x06) text packet. However, if the client does not transmit the next text packet within 2 seconds, the dispenser enters a Communication Timeout and responds with a Failure Command (A2).

   To recover the communication, ensure that the length of the data and checksum calculation are correct, then restart the communication by sending the Enquiry (ENQ /0x05) control character to the dispenser and following the correct write / read communication sequence as explained under “2.4.1 Write Text Packets” on page 46 and “2.4.2 Read Text Packets” on page 48.

附录B — RS-232 协议 (续)

4. Ultimus V Interactive Software

The Ultimus V Interactive Software facilitates RS-232 communication. It is especially useful for bulk editing of the Dispense Time, Dispense Pressure, Vacuum, and Trigger Value settings.

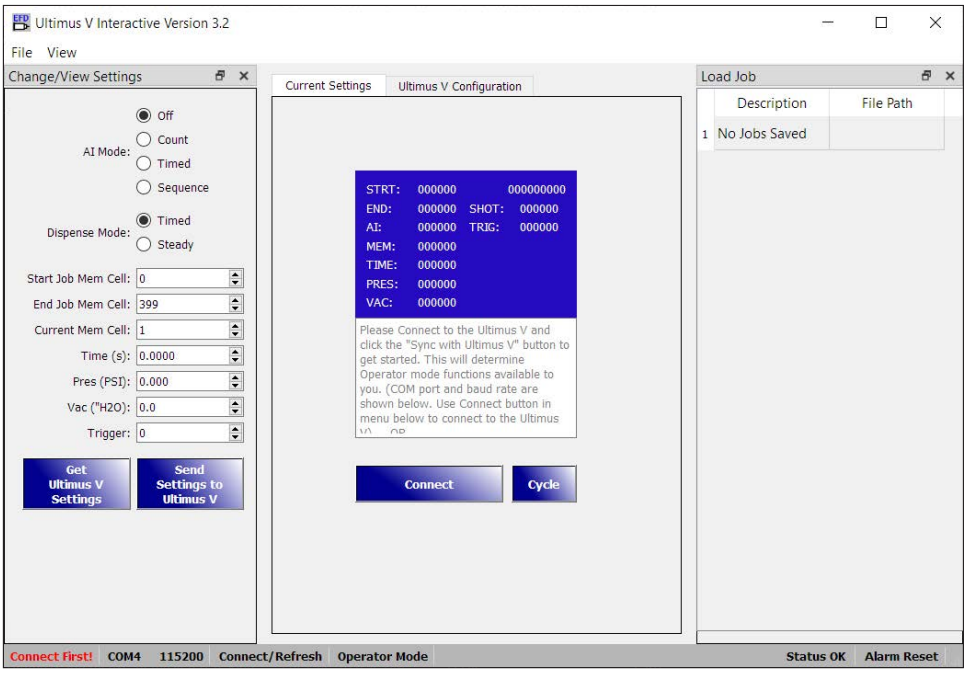
NOTE: For physical connection instructions, refer to “1. Physical Connection” on page 39.

4.1 Installation

1. Download the Ultimus V Interactive software from the following address:
   https://www.nordson.com/en/divisions/efd/contact-us/ultimus-interactive-software
   NOTE: The name of the file will be “UltimusVInteractive_3_0_Installer.zip,” or a higher version.
2. Unzip the file in the folder where you want to store the program.

4.2 Opening the Software

Open the “UltimusV_Interactive_Remastered.exe” file from inside the extracted folder.



You should see the following elements (as shown from the bottom left corner of the software screen):

- Connection status messages from the Ultimus V Interactive software to the Ultimus V dispenser:
  - Not Connected to Ultimus V
  - Connect First!
  - Connected to Ultimus V
- COM port number (COM1, COM2, COM3, etc.)
- Baud Rate selected: 115200, 38400, 19200, 9600
- Operator Mode / Supervisor Mode

附录B — RS-232 协议 (续)

Ultimus V Interactive Software (continued)

4.3 Connecting to the Dispenser

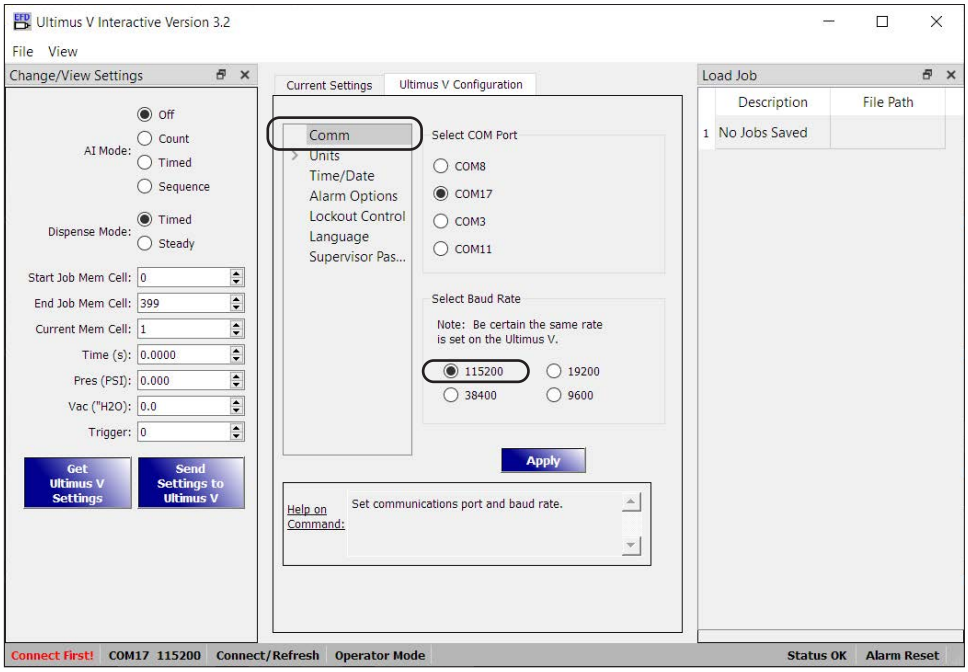
4.3.1 Check the Communication Settings

1. Click the Ultimus V Configuration tab and select COMM from the list on the left side.

   The installed COM port number (COM17 in this example) is shown on the right side. This list refreshes every time you navigate to this setting. If you do not see your COM port, ensure that the COM port cable is properly connected, change to the Current Settings tab, then return to the Comm tab, If the COM port still does not appear, check that the COM port appears in the device manager and that it is not in use by another program.

   Below the Select COM Port area is the Select Baud Rate (Data Rate) setting. Ensure that this settings matches the baud rate setting of the Ultimus V dispenser. When you check the baud rate setting for the dispenser, EFD recommends also ensuring that the expected front/rear connection is selected. Refer to “Communications Port Options Screen” on page 26for more details.

2. If you changed the baud rate to any setting other than the default setting (115200), click APPLY.



附录B — RS-232 协议(续)

Ultimus V Interactive Software (continued)

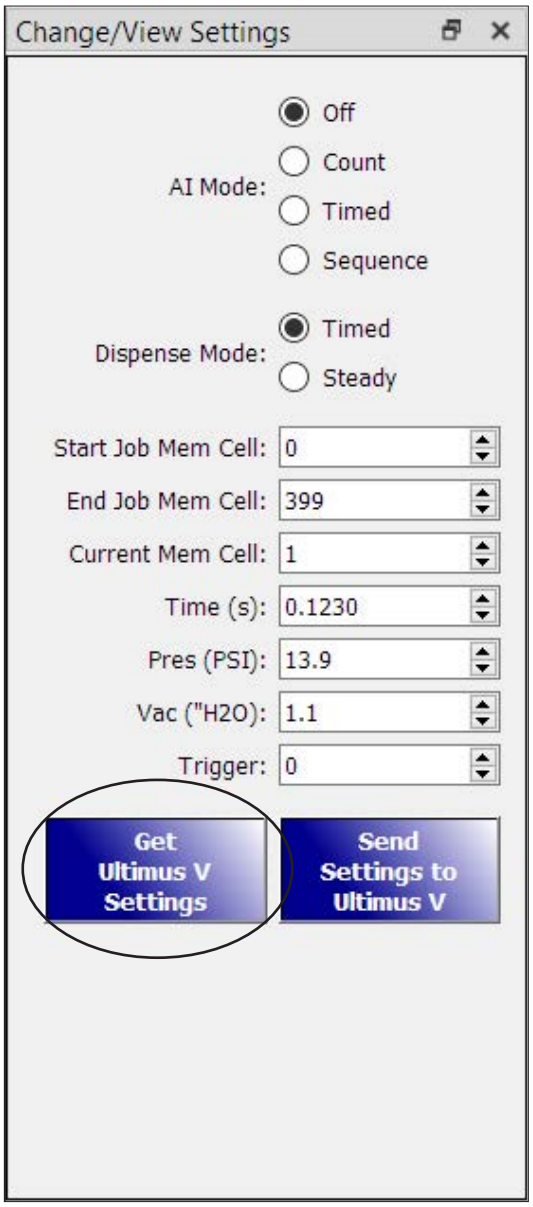
4.3.2 Connect

1. Return to the Current Settings tab and click CONNECT.

   At this point, the status shown on the bottom left of the screen should say “Connected.” Note however, that this status references only that the software is now connected to the COM port; it has not necessarily established communication with the dispenser.

2. To check the connection, click GET ULTIMUS V SETTINGS.

   If the values in the window update to the current dispenser settings, the connection is successful.



附录B — RS-232 协议(续)

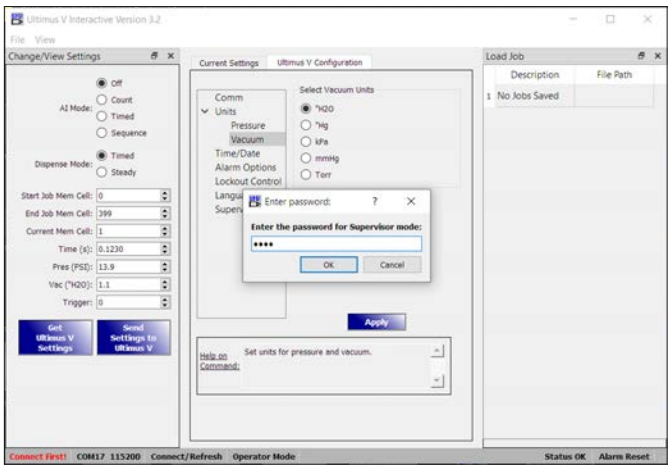
Ultimus V Interactive Software (continued)

4.4 Bulk Editing

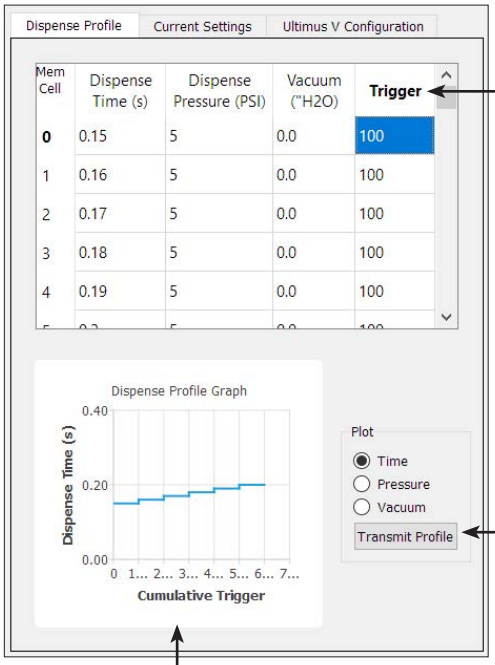
To send multiple values to the dispenser at once, you must use the Supervisor Mode.

1. Click FILE > SUPERVISOR MODE, or press CTRL + S at the main screen of the Ultimus V Interactive software.
2. Enter the password for Supervisor mode (Default: 0000).

   The Supervisor password can be changed at the Ultimus V dispenser front panel keypad. The Ultimus V dispenser and Ultimus V Interactive software must use the same password for correct operation.



3. After correct entry of the Supervisor password, a new tab called “Dispense Profile” appears. Use this tab to send multiple values to the dispenser at once.



Enter the settings you want to send to the dispenser, from Memory cell 0 up to 399. You can enter settings for the following parameters:

- Dispense Time
- Dispense Pressure
- Vacuum
- Trigger Value

Click TRANSMIT PROFILE to send all the settings to the dispenser.

See the Dispense Profile Graph for Dispense Time, Dispense Pressure, or Vacuum with respect to Cumulative Trigger.

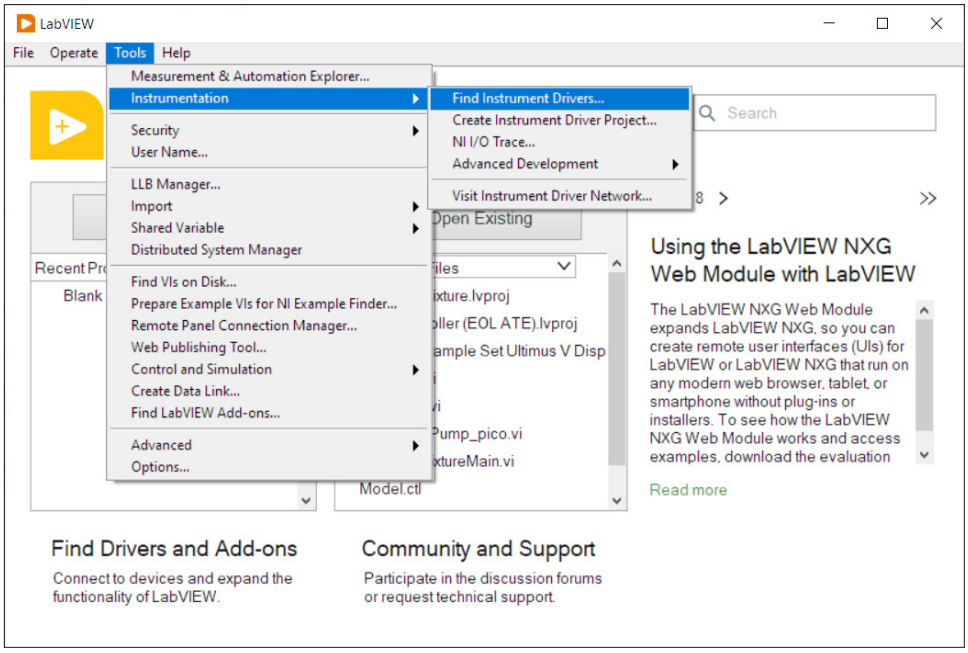
附录B — RS-232 协议 (续)

5. LabVIEW Driver and Example Program

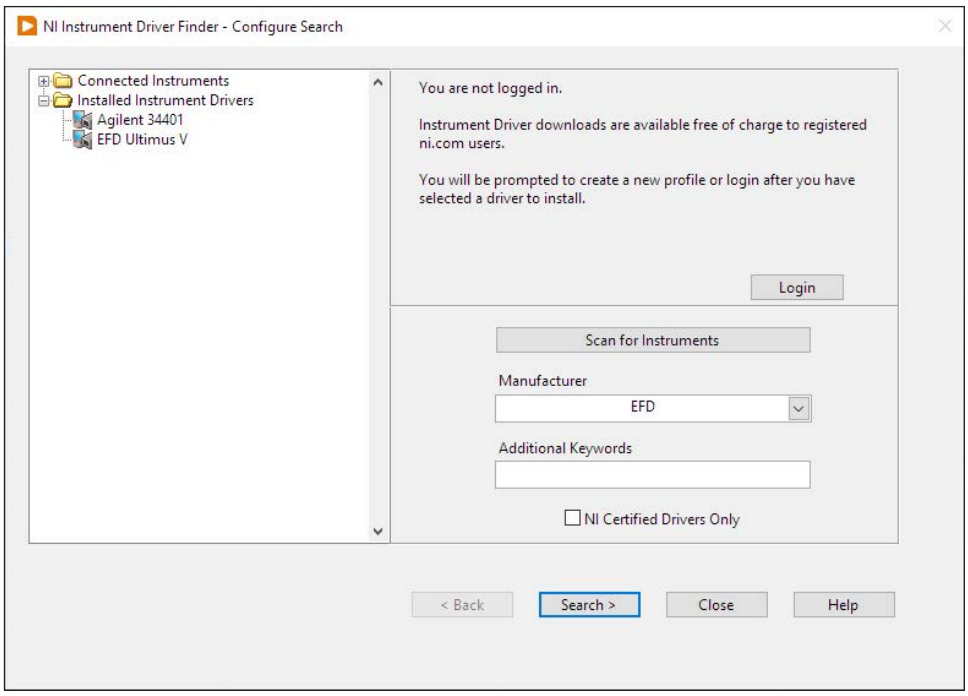
National Instruments LabVIEW software facilitates RS-232 communication with the dispenser. An EFD driver and sample program are available.

NOTE: For physical connection instructions, refer to “1. Physical Connection” on page 39.

1. Open the NI Instrument Driver Finder.



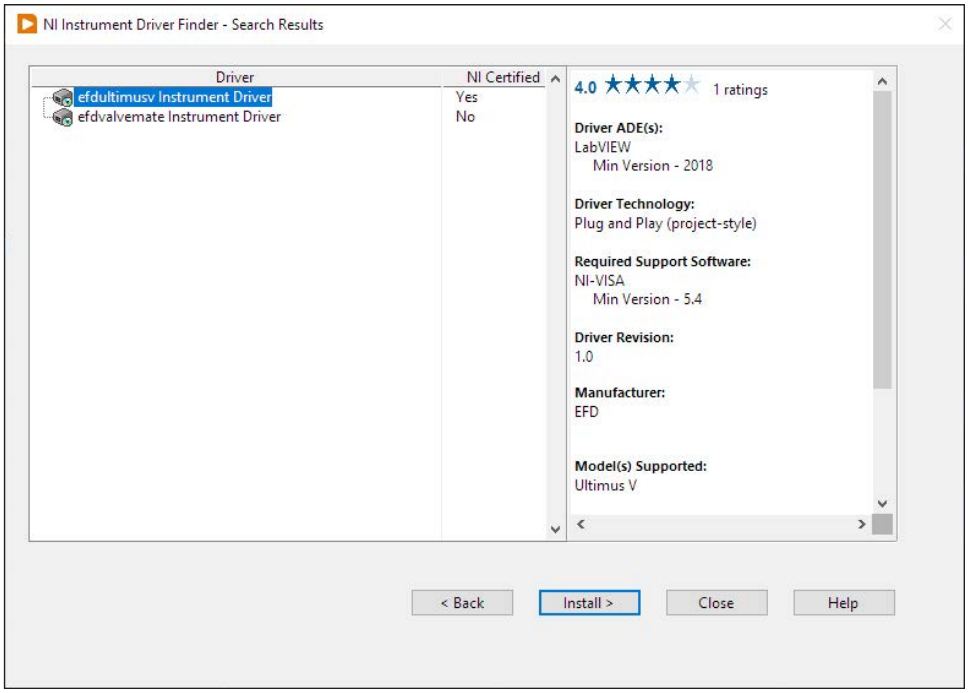
2. Search by manufacturer for “EFD.”



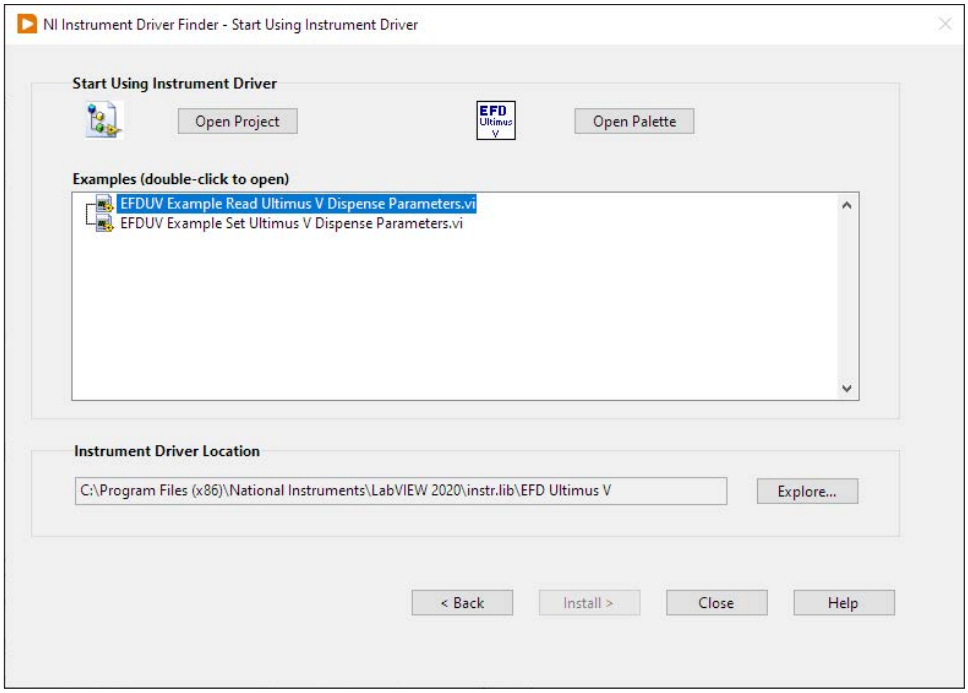
附录B — RS-232 协议 (续)

LabVIEW Driver and Example Program (continued)

3. Select and install the “efdultimusv Instrument Driver.”



4. Once installed, select the “EFDUV Example Read Ultimus V Dispense Parameters” file.

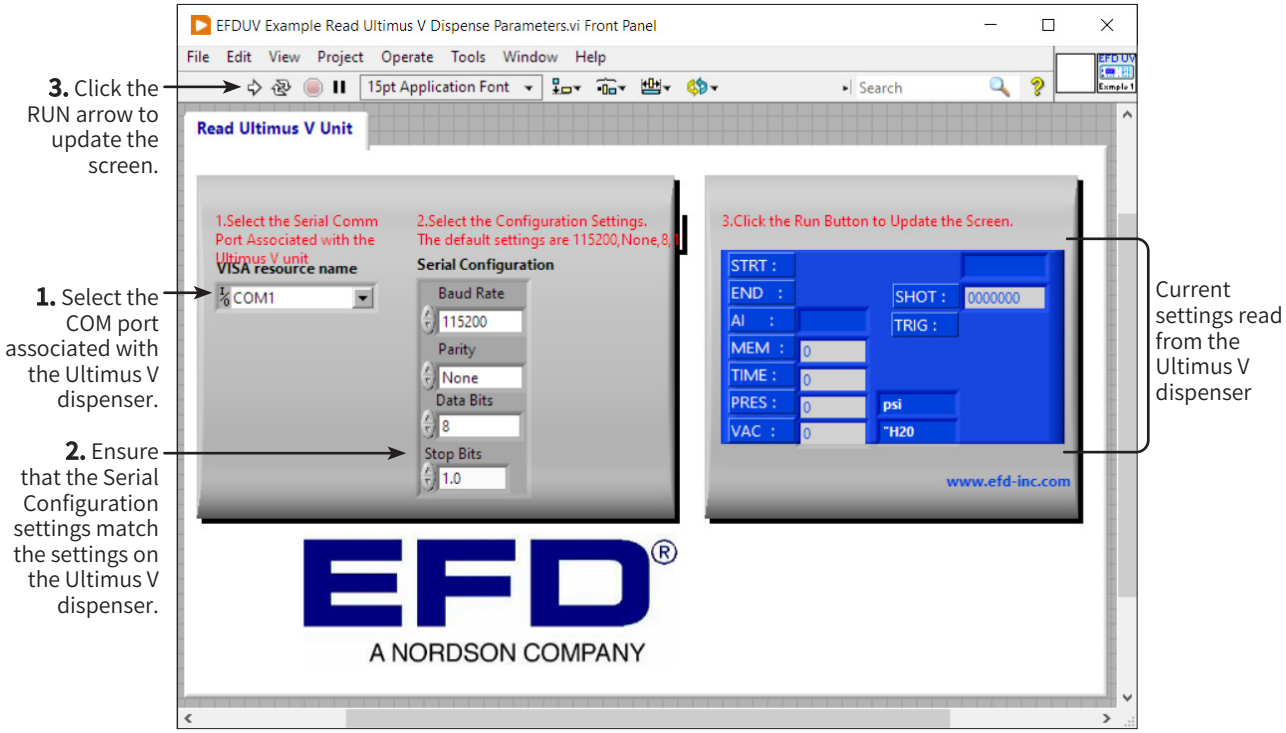


附录B — RS-232 协议 (续)

LabVIEW Driver and Example Program (continued)

The “EFDUV Example Read Ultimus V Dispense Parameters” GUI opens. Follow the steps shown below to read the current settings of the Ultimus V dispenser.

In this example, the software opens with the COM port configuration settings as shown. Clicking the RUN arrow runs a set of commands that will read the settings from the dispenser and display them in the box on the right side.



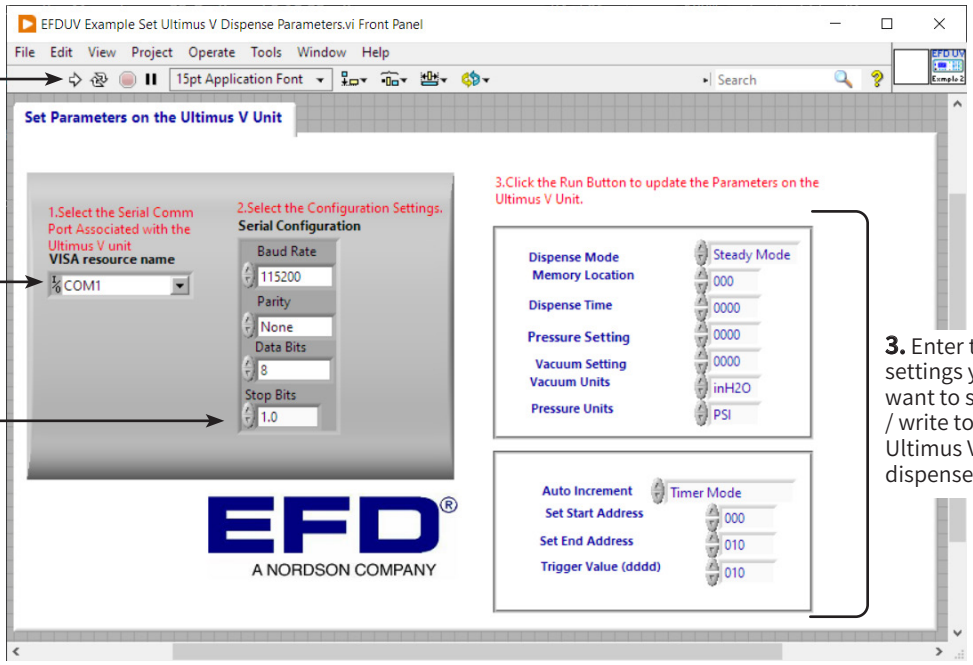
附录B — RS-232 协议 (续)

LabVIEW Driver and Example Program (continued)

5. Open the “EFDUV Example Set Ultimus V Dispense Parameters” file.

   The “EFDUV Example Set Ultimus V Dispense Parameters” GUI opens. Follow the steps shown below to write the settings to the Ultimus V dispenser.

   In this example, the software opens with the COM port configuration settings as shown. Clicking the RUN arrow runs a set of commands that will write (send) the settings entered in the box on the right side to the Ultimus V dispenser.



Dispense Time:

- The Dispense Time setting is either a 4-digit or 5-digit value.
- If a value between 0000 to 9999 is entered, the dispenser sets the Dispense Time as 0.000 s to 9.999 s.
- If a value between 10001 to 99999 is entered, the dispenser sets the Dispense Time as 1.0001 s to 9.9999 s.

Pressure Setting:

- For psi pressure units, if the required pressure is 100.0 psi, enter a value of 1000. For 99.8 psi, enter 998, and so on.
- For kPa pressure units, if the required pressure is 689.5 kPa, enter a value of 6895.
- For bar pressure units, if the required pressure is 6.895 bar, enter a value of 6895.

Vacuum Setting:

- For H_2O vacuum units, if the required vacuum is 18.0 H_2O, enter a value of 180.
- For kPa vacuum units, if the required vacuum is 4.48 kPa, enter a value of 448.
- For Hg vacuum units, if the required vacuum is 1.32 Hg, enter a value of 132.
- For mmHg or Torr vacuum units, if the required vacuum is 33.6 mmHg or Torr, enter a value of 336.

附注

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